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Metric Catalog

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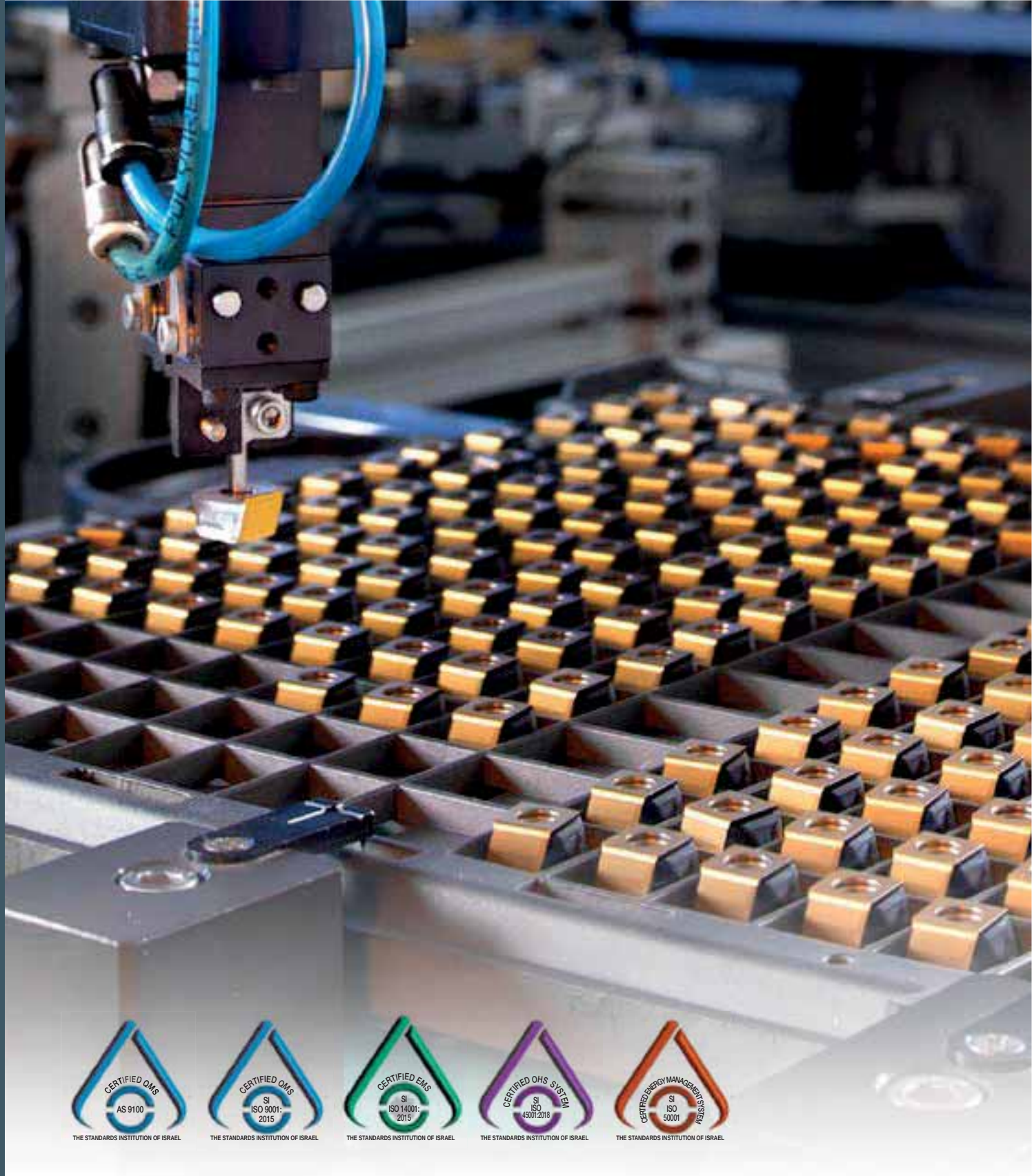

Quality Standard

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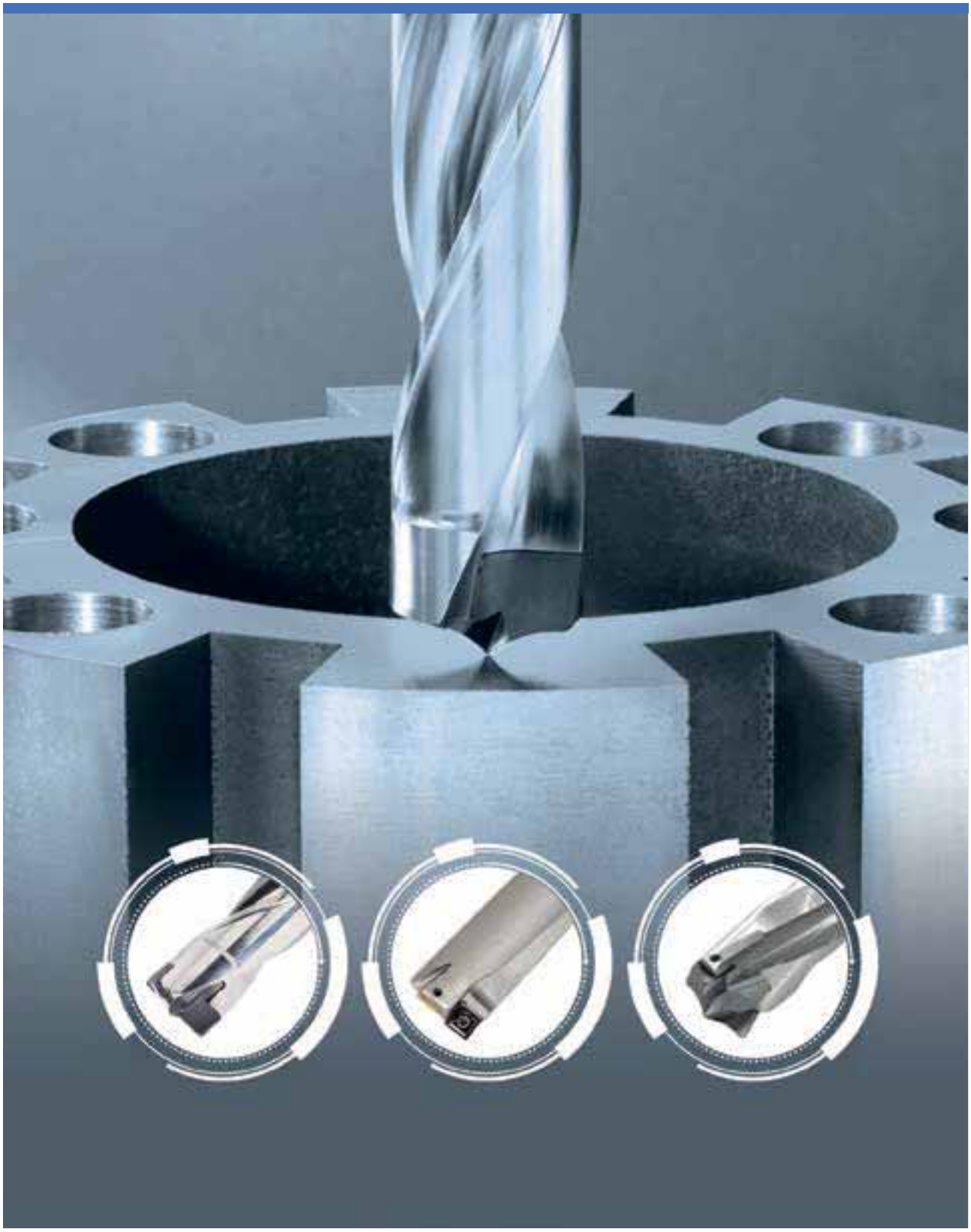
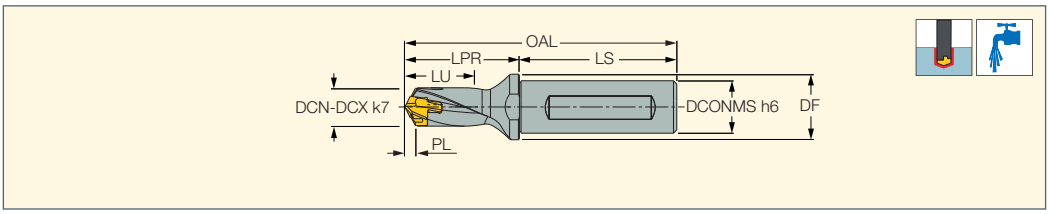
INDEXABLE DRILLS



SUMOCHAM CHAMDRILL LINE

DCN A-1.5D

Exchangeable Head Drills with Coolant Holes and One Flat Shank, Drilling Depth 1.5xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC[3]	MIID[4]	
DCN 060-009-12A-1.5D	6.00	6.40	12.00	16.00	9.96	23.0	0.960	45.0	68.00	6.0	ICP 060	K DCN 6-9.99-Y
DCN 065-010-12A-1.5D	6.50	6.90	12.00	16.00	10.93	24.1	1.180	45.0	69.10	6.5	ICP 065	K DCN 6-9.99-Y
DCN 070-011-12A-1.5D	7.00	7.40	12.00	16.00	11.51	25.1	1.010	45.0	70.10	7.0	ICP 070	K DCN 6-9.99
DCN 075-011-12A-1.5D	7.50	7.90	12.00	16.00	12.35	25.9	1.100	45.0	70.90	7.0	ICP 075	K DCN 6-9.99
DCN 080-012-12A-1.5D	8.00	8.40	12.00	16.00	13.20	27.9	1.200	45.0	72.90	8.0	ICP 080	K DCN 6-9.99
DCN 085-013-12A-1.5D	8.50	8.90	12.00	16.00	14.04	28.2	1.290	45.0	73.20	8.0	ICP 085	K DCN 6-9.99
DCN 090-014-12A-1.5D	9.00	9.40	12.00	16.00	14.85	29.3	1.350	45.0	74.30	9.0	ICP 090	K DCN 6-9.99
DCN 095-014-12A-1.5D	9.50	9.90	12.00	16.00	15.69	30.1	1.440	45.0	75.10	9.0	ICP 095	K DCN 6-9.99
DCN 100-015-16A-1.5D	10.00	10.40	16.00	20.00	16.50	31.2	1.500	48.0	79.20	10.0	ICP 100	K DCN 10-13.99
DCN 105-016-16A-1.5D	10.50	10.90	16.00	20.00	17.34	32.0	1.590	48.0	80.00	10.0	ICP 105	K DCN 10-13.99
DCN 110-017-16A-1.5D	11.00	11.40	16.00	20.00	18.17	33.1	1.670	48.0	81.10	11.0	ICP 110	K DCN 10-13.99
DCN 115-017-16A-1.5D	11.50	11.90	16.00	20.00	19.01	33.9	1.760	48.0	81.90	11.0	ICP 115	K DCN 10-13.99
DCN 120-018-16A-1.5D	12.00	12.40	16.00	20.00	19.82	35.0	1.820	48.0	83.00	12.0	ICP 120	K DCN 10-13.99
DCN 125-019-16A-1.5D	12.50	12.90	16.00	20.00	20.66	35.8	1.910	48.0	83.80	12.0	ICP 125	K DCN 10-13.99
DCN 130-020-16A-1.5D	13.00	13.40	16.00	20.00	21.46	37.1	1.960	48.0	85.10	13.0	ICP 130	K DCN 10-13.99
DCN 135-020-16A-1.5D	13.50	13.90	16.00	20.00	22.30	37.9	2.050	48.0	85.90	13.0	ICP 135	K DCN 10-13.99
DCN 140-021-16A-1.5D	14.00	14.40	16.00	20.00	23.12	41.1	2.120	48.0	89.10	14.0	ICP 140	K DCN 14-17.99
DCN 145-022-16A-1.5D	14.50	14.90	16.00	20.00	23.96	41.9	2.210	48.0	89.90	14.0	ICP 145	K DCN 14-17.99
DCN 150-023-20A-1.5D	15.00	15.90	20.00	25.00	24.77	46.2	2.270	50.0	96.20	15.0	ICP 150	K DCN 14-17.99
DCN 160-024-20A-1.5D	16.00	16.90	20.00	25.00	26.42	49.3	2.420	50.0	99.30	16.0	ICP 160	K DCN 14-17.99
DCN 170-026-20A-1.5D	17.00	17.90	20.00	25.00	28.09	52.4	2.590	50.0	102.40	17.0	ICP 170	K DCN 14-17.99
DCN 180-027-25A-1.5D	18.00	18.90	25.00	32.00	29.73	55.5	2.730	56.0	111.50	18.0	ICP 180	K DCN 18-21.99
DCN 190-029-25A-1.5D	19.00	19.90	25.00	32.00	31.38	58.5	2.880	56.0	114.50	19.0	ICP 190	K DCN 18-21.99
DCN 200-030-25A-1.5D	20.00	20.90	25.00	32.00	33.02	61.6	3.020	56.0	117.60	20.0	ICP 200	K DCN 18-21.99
DCN 210-032-25A-1.5D	21.00	21.90	25.00	32.00	34.68	64.7	3.180	56.0	120.70	21.0	ICP 210	K DCN 18-21.99
DCN 220-033-25A-1.5D	22.00	22.90	25.00	32.00	36.32	67.8	3.320	56.0	123.80	22.0	ICP 220	K DCN 22-26.99
DCN 230-035-32A-1.5D	23.00	23.90	32.00	42.00	37.96	70.9	3.460	60.0	130.90	23.0	ICP 230	K DCN 22-26.99
DCN 240-036-32A-1.5D	24.00	24.90	32.00	42.00	39.62	73.9	3.620	60.0	133.90	24.0	ICP 240	K DCN 22-26.99
DCN 250-038-32A-1.5D	25.00	25.90	32.00	42.00	41.30	77.0	3.800	60.0	137.00	25.0	ICP 250	K DCN 22-26.99
DCN 260-039-32A-1.5D	26.00	26.90	32.00	42.00	42.95	80.1	3.950	60.0	140.10	26.0	ICP 260	K DCN 22-26.99
DCN 270-041-32A-1.5D	27.00	27.90	32.00	42.00	44.60	83.1	4.100	60.0	151.10	27.0	ICP 270	K DCN 27-32.99
DCN 280-042-32A-1.5D	28.00	28.90	32.00	42.00	46.25	86.2	4.250	60.0	146.20	28.0	ICP 280	K DCN 27-32.99
DCN 290-044-32A-1.5D	29.00	29.90	32.00	42.00	47.93	89.3	4.430	60.0	149.30	29.0	ICP 290	K DCN 27-32.99
DCN 300-045-32A-1.5D	30.00	30.90	32.00	42.00	49.59	92.4	4.590	60.0	152.40	30.0	ICP 300	K DCN 27-32.99
DCN 310-047-32A-1.5D	31.00	31.90	32.00	42.00	51.26	95.5	4.760	60.0	155.50	31.0	ICP 310	K DCN 27-32.99
DCN 320-048-32A-1.5D	32.00	32.90	32.00	42.00	52.86	98.5	4.860	60.0	158.50	32.0	ICP 320	K DCN 27-32.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

[1] Cutting diameter minimum

[2] Cutting diameter maximum

[3] Seat size code

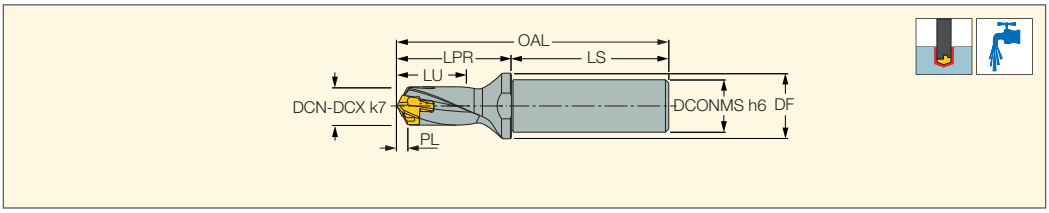
[4] Master insert identification

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57)

SUMOCHAM CHAMDRILL LINE

DCN R-1.5D

Exchangeable Head Drills with Coolant Holes and a Cylindrical Shank, Drilling Depth 1.5xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC[3]	MIID[4]	
DCN 060-009-12R-1.5D	6.00	6.40	12.00	16.00	9.96	23.0	0.960	45.0	68.00	6.0	ICP 060	K DCN 6-9.99-Y
DCN 065-010-12R-1.5D	6.50	6.90	12.00	16.00	10.78	24.1	1.030	45.0	69.10	6.5	ICP 065	K DCN 6-9.99-Y
DCN 070-011-12R-1.5D	7.00	7.40	12.00	16.00	11.51	25.1	1.010	45.0	70.10	7.0	ICP 070	K DCN 6-9.99
DCN 075-011-12R-1.5D	7.50	7.90	12.00	16.00	12.35	25.9	1.100	45.0	70.90	7.0	ICP 075	K DCN 6-9.99
DCN 080-012-12R-1.5D	8.00	8.40	12.00	16.00	13.20	27.9	1.200	45.0	72.90	8.0	ICP 080	K DCN 6-9.99
DCN 085-013-12R-1.5D	8.50	8.90	12.00	16.00	14.04	28.2	1.290	45.0	73.20	8.0	ICP 085	K DCN 6-9.99
DCN 090-014-12R-1.5D	9.00	9.40	12.00	16.00	14.85	29.3	1.350	45.0	74.30	9.0	ICP 090	K DCN 6-9.99
DCN 095-014-12R-1.5D	9.50	9.90	12.00	16.00	15.69	30.1	1.440	45.0	75.10	9.0	ICP 095	K DCN 6-9.99
DCN 100-015-16R-1.5D	10.00	10.40	16.00	20.00	16.50	31.2	1.500	48.0	79.20	10.0	ICP 100	K DCN 10-13.99
DCN 105-016-16R-1.5D	10.50	10.90	16.00	20.00	17.27	32.0	1.520	48.0	80.00	10.0	ICP 105	K DCN 10-13.99
DCN 110-017-16R-1.5D	11.00	11.40	16.00	20.00	18.17	33.1	1.670	48.0	81.10	11.0	ICP 110	K DCN 10-13.99
DCN 115-017-16R-1.5D	11.50	11.90	16.00	20.00	19.01	33.9	1.760	48.0	81.90	11.0	ICP 115	K DCN 10-13.99
DCN 120-018-16R-1.5D	12.00	12.40	16.00	20.00	19.82	35.0	1.820	48.0	83.00	12.0	ICP 120	K DCN 10-13.99
DCN 125-019-16R-1.5D	12.50	12.90	16.00	20.00	20.66	35.8	1.910	48.0	83.80	12.0	ICP 125	K DCN 10-13.99
DCN 130-020-16R-1.5D	13.00	13.40	16.00	20.00	21.46	37.1	1.960	48.0	85.10	13.0	ICP 130	K DCN 10-13.99
DCN 135-020-16R-1.5D	13.50	13.90	16.00	20.00	22.30	37.9	2.050	48.0	85.90	13.0	ICP 135	K DCN 10-13.99
DCN 140-021-16R-1.5D	14.00	14.40	16.00	20.00	23.12	41.1	2.120	48.0	89.10	14.0	ICP 140	K DCN 14-17.99
DCN 145-022-16R-1.5D	14.50	14.90	16.00	20.00	23.96	41.9	2.210	48.0	89.90	14.0	ICP 145	K DCN 14-17.99
DCN 150-023-20R-1.5D	15.00	15.90	20.00	25.00	24.77	46.2	2.270	50.0	96.20	15.0	ICP 150	K DCN 14-17.99
DCN 160-024-20R-1.5D	16.00	16.90	20.00	25.00	26.42	49.3	2.420	50.0	99.30	16.0	ICP 160	K DCN 14-17.99
DCN 170-026-20R-1.5D	17.00	17.90	20.00	25.00	28.09	52.4	2.590	50.0	102.40	17.0	ICP 170	K DCN 14-17.99
DCN 180-027-25R-1.5D	18.00	18.90	25.00	32.00	29.73	55.5	2.730	56.0	111.50	18.0	ICP 180	K DCN 18-21.99
DCN 190-029-25R-1.5D	19.00	19.90	25.00	32.00	31.38	58.5	2.880	56.0	114.50	19.0	ICP 190	K DCN 18-21.99
DCN 200-030-25R-1.5D	20.00	20.90	25.00	32.00	33.02	61.6	3.020	56.0	117.60	20.0	ICP 200	K DCN 18-21.99
DCN 210-032-25R-1.5D	21.00	21.90	25.00	32.00	34.68	64.7	3.180	56.0	120.70	21.0	ICP 210	K DCN 18-21.99
DCN 220-033-25R-1.5D	22.00	22.90	25.00	32.00	36.32	67.8	3.320	56.0	123.80	22.0	ICP 220	K DCN 22-26.99
DCN 230-035-32R-1.5D	23.00	23.90	32.00	42.00	37.96	70.9	3.460	60.0	130.90	23.0	ICP 230	K DCN 22-26.99
DCN 240-036-32R-1.5D	24.00	24.90	32.00	42.00	39.62	74.0	3.620	60.0	134.00	24.0	ICP 240	K DCN 22-26.99
DCN 250-038-32R-1.5D	25.00	25.90	32.00	42.00	41.30	77.0	3.800	60.0	137.00	25.0	ICP 250	K DCN 22-26.99
DCN 260-039-32R-1.5D	26.00	26.90	32.00	42.00	42.95	80.1	3.950	60.0	140.10	26.0	ICP 260	K DCN 22-26.99
DCN 270-041-32R-1.5D	27.00	27.90	32.00	42.00	44.60	83.1	4.100	60.0	143.10	27.0	ICP 270	K DCN 27-32.99
DCN 280-042-32R-1.5D	28.00	28.90	32.00	42.00	46.25	86.2	4.250	60.0	146.20	28.0	ICP 280	K DCN 27-32.99
DCN 290-044-32R-1.5D	29.00	29.90	32.00	42.00	47.93	89.3	4.430	60.0	149.30	29.0	ICP 290	K DCN 27-32.99
DCN 300-045-32R-1.5D	30.00	30.90	32.00	42.00	49.59	92.4	4.590	60.0	152.40	30.0	ICP 300	K DCN 27-32.99
DCN 310-047-32R-1.5D	31.00	31.90	32.00	42.00	51.26	95.5	4.760	60.0	155.50	31.0	ICP 310	K DCN 27-32.99
DCN 320-048-32R-1.5D	32.00	32.90	32.00	42.00	52.86	98.5	4.860	60.0	158.50	32.0	ICP 320	K DCN 27-32.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

[1] Cutting diameter minimum

[2] Cutting diameter maximum

[3] Seat size code

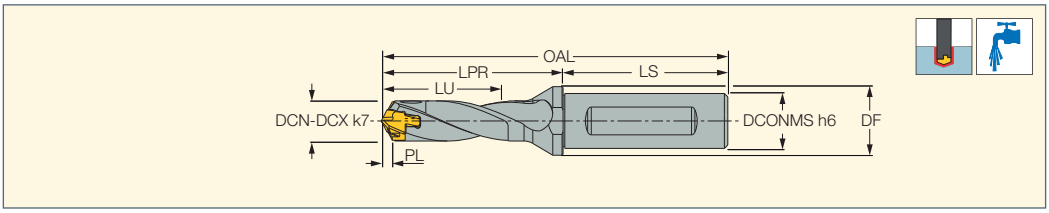
[4] Master insert identification

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57)

SUMOCHAM CHAMDRILL LINE

DCN A-3D

Exchangeable Head Drills with Coolant Holes and One Flat Shank, Drilling Depth 3xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC[3]	MIID[4]	
DCN 060-018-12A-3D	6.00	6.40	12.00	16.00	18.96	32.0	0.960	45.0	77.00	6.0	ICP 060	K DCN 6-9.99-Y
DCN 065-020-12A-3D	6.50	6.90	12.00	16.00	20.68	33.8	1.180	45.0	78.80	6.5	ICP 065	K DCN 6-9.99-Y
DCN 070-021-12A-3D	7.00	7.40	12.00	16.00	22.01	35.6	1.010	45.0	80.60	7.0	ICP 070	K DCN 6-9.99
DCN 075-023-12A-3D	7.50	7.90	12.00	16.00	23.60	37.1	1.100	45.0	82.10	7.0	ICP 075	K DCN 6-9.99
DCN 080-024-12A-3D	8.00	8.40	12.00	16.00	25.20	39.4	1.200	45.0	84.40	8.0	ICP 080	K DCN 6-9.99
DCN 085-025-12A-3D	8.50	8.90	12.00	16.00	26.79	40.9	1.290	45.0	85.90	8.0	ICP 085	K DCN 6-9.99
DCN 090-027-12A-3D	9.00	9.40	12.00	16.00	28.35	42.8	1.350	45.0	87.80	9.0	ICP 090	K DCN 6-9.99
DCN 095-029-12A-3D	9.50	9.90	12.00	16.00	29.94	44.3	1.440	45.0	89.30	9.0	ICP 095	K DCN 6-9.99
DCN 100-030-16A-3D	10.00	10.40	16.00	20.00	31.50	46.2	1.500	48.0	94.20	10.0	ICP 100	K DCN 10-13.99
DCN 105-032-16A-3D	10.50	10.90	16.00	20.00	33.09	47.7	1.590	48.0	95.70	10.0	ICP 105	K DCN 10-13.99
DCN 110-033-16A-3D	11.00	11.40	16.00	20.00	34.67	49.6	1.670	48.0	97.60	11.0	ICP 110	K DCN 10-13.99
DCN 115-035-16A-3D	11.50	11.90	16.00	20.00	36.26	51.1	1.760	48.0	99.10	11.0	ICP 115	K DCN 10-13.99
DCN 120-036-16A-3D	12.00	12.40	16.00	20.00	37.82	53.0	1.820	48.0	101.00	12.0	ICP 120	K DCN 10-13.99
DCN 125-037-16A-3D	12.50	12.90	16.00	20.00	39.41	54.5	1.910	48.0	102.50	12.0	ICP 125	K DCN 10-13.99
DCN 130-039-16A-3D	13.00	13.40	16.00	20.00	40.96	56.6	1.960	48.0	104.60	13.0	ICP 130	K DCN 10-13.99
DCN 135-041-16A-3D	13.50	13.90	16.00	20.00	42.55	58.1	2.050	48.0	106.10	13.0	ICP 135	K DCN 10-13.99
DCN 140-042-16A-3D	14.00	14.40	16.00	20.00	44.12	62.1	2.120	48.0	110.10	14.0	ICP 140	K DCN 14-17.99
DCN 145-044-16A-3D	14.50	14.90	16.00	20.00	45.71	63.6	2.210	48.0	111.60	14.0	ICP 145	K DCN 14-17.99
DCN 150-045-20A-3D	15.00	15.90	20.00	25.00	47.27	68.7	2.270	50.0	118.70	15.0	ICP 150	K DCN 14-17.99
DCN 160-048-20A-3D	16.00	16.90	20.00	25.00	5.42	73.3	2.420	50.0	123.30	16.0	ICP 160	K DCN 14-17.99
DCN 170-051-20A-3D	17.00	17.90	20.00	25.00	53.59	77.9	2.590	50.0	127.90	17.0	ICP 170	K DCN 14-17.99
DCN 180-054-25A-3D	18.00	18.90	25.00	32.00	56.73	82.5	2.730	56.0	138.50	18.0	ICP 180	K DCN 18-21.99
DCN 190-057-25A-3D	19.00	19.90	25.00	32.00	59.88	87.0	2.880	56.0	143.00	19.0	ICP 190	K DCN 18-21.99
DCN 200-060-25A-3D	20.00	20.90	25.00	32.00	63.02	91.6	3.020	56.0	147.60	20.0	ICP 200	K DCN 18-21.99
DCN 210-063-25A-3D	21.00	21.90	25.00	32.00	66.18	96.2	3.180	56.0	152.20	21.0	ICP 210	K DCN 18-21.99
DCN 220-066-25A-3D	22.00	22.90	25.00	32.00	69.32	100.8	3.320	56.0	156.80	22.0	ICP 220	K DCN 22-26.99
DCN 230-069-32A-3D	23.00	23.90	32.00	42.00	72.46	105.4	3.460	60.0	165.40	23.0	ICP 230	K DCN 22-26.99
DCN 240-072-32A-3D	24.00	24.90	32.00	42.00	75.62	110.0	3.620	60.0	170.00	24.0	ICP 240	K DCN 22-26.99
DCN 250-075-32A-3D	25.00	25.90	32.00	42.00	78.80	114.5	3.800	60.0	174.50	25.0	ICP 250	K DCN 22-26.99
DCN 260-078-32A-3D	26.00	26.90	32.00	42.00	81.95	119.0	3.950	60.0	179.00	26.0	ICP 260	K DCN 22-26.99
DCN 270-081-32A-3D	27.00	27.90	32.00	42.00	85.10	123.7	4.100	60.0	191.70	27.0	ICP 270	K DCN 27-32.99
DCN 270-081-40A-3D	27.00	27.90	40.00	50.00	85.10	123.7	4.100	68.0	183.70	27.0	ICP 270	K DCN 27-32.99
DCN 280-084-32A-3D	28.00	28.90	32.00	42.00	88.25	128.2	4.250	60.0	196.20	28.0	ICP 280	K DCN 27-32.99
DCN 280-084-40A-3D	28.00	28.90	40.00	50.00	88.25	128.2	4.250	68.0	188.20	28.0	ICP 280	K DCN 27-32.99
DCN 290-087-32A-3D	29.00	29.90	32.00	42.00	91.43	132.8	4.430	60.0	200.80	29.0	ICP 290	K DCN 27-32.99
DCN 290-087-40A-3D	29.00	29.90	40.00	50.00	91.43	132.8	4.430	68.0	192.80	29.0	ICP 290	K DCN 27-32.99
DCN 300-090-32A-3D	30.00	30.90	32.00	42.00	94.59	137.4	4.590	60.0	205.40	30.0	ICP 300	K DCN 27-32.99
DCN 300-090-40A-3D	30.00	30.90	40.00	50.00	94.59	137.4	4.590	68.0	197.40	30.0	ICP 300	K DCN 27-32.99
DCN 310-093-32A-3D	31.00	31.90	32.00	42.00	97.76	142.0	4.760	60.0	210.00	31.0	ICP 310	K DCN 27-32.99
DCN 320-096-32A-3D	32.00	32.90	32.00	42.00	100.86	146.5	4.860	60.0	214.50	32.0	ICP 320	K DCN 27-32.99
DCN 320-096-40A-3D	32.00	32.90	40.00	50.00	100.86	146.5	4.860	68.0	206.50	32.0	ICP 320	K DCN 27-32.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Seat size code

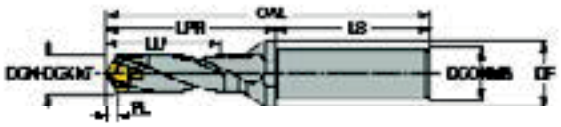
(4) Master insert identification

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57)

SUMOCHAM
CHAMDRILL LINE

DCN R-3D

Exchangeable Head Drills with Coolant Holes and a Cylindrical Shank, Drilling Depth 3xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC[3]	MIID[4]	
DCN 060-018-12R-3D	6.00	6.40	12.00	16.00	18.96	32.0	0.960	45.0	77.00	6.0	ICP 060	K DCN 6-9.99-Y
DCN 065-020-12R-3D	6.50	6.90	12.00	16.00	20.68	33.8	1.180	45.0	78.80	6.5	ICP 065	K DCN 6-9.99-Y
DCN 070-021-12R-3D	7.00	7.40	12.00	16.00	22.01	35.6	1.010	45.0	80.60	7.0	ICP 070	K DCN 6-9.99
DCN 075-023-12R-3D	7.50	7.90	12.00	16.00	23.60	37.1	1.100	45.0	82.10	7.0	ICP 075	K DCN 6-9.99
DCN 080-024-12R-3D	8.00	8.40	12.00	16.00	25.20	39.4	1.200	45.0	84.40	8.0	ICP 080	K DCN 6-9.99
DCN 085-025-12R-3D	8.50	8.90	12.00	16.00	26.79	40.9	1.290	45.0	85.90	8.0	ICP 085	K DCN 6-9.99
DCN 090-027-12R-3D	9.00	9.40	12.00	16.00	28.35	42.8	1.350	45.0	87.80	9.0	ICP 090	K DCN 6-9.99
DCN 095-029-12R-3D	9.50	9.90	12.00	16.00	29.94	44.3	1.440	45.0	89.30	9.0	ICP 095	K DCN 6-9.99
DCN 100-030-16R-3D	10.00	10.40	16.00	20.00	31.50	46.2	1.500	48.0	94.20	10.0	ICP 100	K DCN 10-13.99
DCN 105-032-16R-3D	10.50	10.90	16.00	20.00	33.09	47.7	1.590	48.0	95.70	10.0	ICP 105	K DCN 10-13.99
DCN 110-033-16R-3D	11.00	11.40	16.00	20.00	34.67	49.6	1.670	48.0	97.60	11.0	ICP 110	K DCN 10-13.99
DCN 115-035-16R-3D	11.50	11.90	16.00	20.00	36.26	51.1	1.760	48.0	99.10	11.0	ICP 115	K DCN 10-13.99
DCN 120-036-16R-3D	12.00	12.40	16.00	20.00	37.82	53.0	1.820	48.0	101.00	12.0	ICP 120	K DCN 10-13.99
DCN 125-037-16R-3D	12.50	12.90	16.00	20.00	39.41	54.5	1.910	48.0	102.50	12.0	ICP 125	K DCN 10-13.99
DCN 130-039-16R-3D	13.00	13.40	16.00	20.00	40.96	56.6	1.960	48.0	104.60	13.0	ICP 130	K DCN 10-13.99
DCN 135-041-16R-3D	13.50	13.90	16.00	20.00	42.55	58.1	2.050	48.0	106.10	13.0	ICP 135	K DCN 10-13.99
DCN 140-042-16R-3D	14.00	14.40	16.00	20.00	44.12	62.1	2.120	48.0	110.10	14.0	ICP 140	K DCN 14-17.99
DCN 145-044-16R-3D	14.50	14.90	16.00	20.00	45.71	63.6	2.210	48.0	111.60	14.0	ICP 145	K DCN 14-17.99
DCN 150-045-20R-3D	15.00	15.90	20.00	25.00	47.27	68.7	2.270	50.0	118.70	15.0	ICP 150	K DCN 14-17.99
DCN 160-048-20R-3D	16.00	16.90	20.00	25.00	50.42	73.3	2.420	50.0	123.30	16.0	ICP 160	K DCN 14-17.99
DCN 170-051-20R-3D	17.00	17.90	20.00	25.00	53.59	77.9	2.590	50.0	127.90	17.0	ICP 170	K DCN 14-17.99
DCN 180-054-25R-3D	18.00	18.90	25.00	32.00	56.73	82.5	2.730	56.0	138.50	18.0	ICP 180	K DCN 18-21.99
DCN 190-057-25R-3D	19.00	19.90	25.00	32.00	59.88	87.0	2.880	56.0	143.00	19.0	ICP 190	K DCN 18-21.99
DCN 200-060-25R-3D	20.00	20.90	25.00	32.00	63.02	91.6	3.020	56.0	147.60	20.0	ICP 200	K DCN 18-21.99
DCN 210-063-25R-3D	21.00	21.90	25.00	32.00	66.18	96.2	3.180	56.0	152.20	21.0	ICP 210	K DCN 18-21.99
DCN 220-066-25R-3D	22.00	22.90	25.00	32.00	69.32	100.8	3.320	56.0	156.80	22.0	ICP 220	K DCN 22-26.99
DCN 230-069-32R-3D	23.00	23.90	32.00	42.00	72.46	105.4	3.460	60.0	165.40	23.0	ICP 230	K DCN 22-26.99
DCN 240-072-32R-3D	24.00	24.90	32.00	42.00	75.62	110.0	3.620	60.0	170.00	24.0	ICP 240	K DCN 22-26.99
DCN 250-075-32R-3D	25.00	25.90	32.00	42.00	78.80	114.5	3.800	60.0	174.50	25.0	ICP 250	K DCN 22-26.99
DCN 260-078-32R-3D	26.00	26.90	32.00	42.00	81.95	119.0	3.950	60.0	179.00	26.0	ICP 260	K DCN 22-26.99
DCN 270-081-32R-3D	27.00	27.90	32.00	42.00	85.10	123.7	4.100	60.0	183.70	27.0	ICP 270	K DCN 27-32.99
DCN 280-084-32R-3D	28.00	28.90	32.00	42.00	88.25	128.2	4.250	60.0	188.20	28.0	ICP 280	K DCN 27-32.99
DCN 290-087-32R-3D	29.00	29.90	32.00	42.00	91.43	132.8	4.430	60.0	192.80	29.0	ICP 290	K DCN 27-32.99
DCN 300-090-32R-3D	30.00	30.90	32.00	42.00	94.59	137.4	4.590	60.0	197.40	30.0	ICP 300	K DCN 27-32.99
DCN 310-093-32R-3D	31.00	31.90	32.00	42.00	97.76	142.0	4.760	60.0	202.00	31.0	ICP 310	K DCN 27-32.99
DCN 320-096-32R-3D	32.00	32.90	32.00	42.00	100.86	146.5	4.860	60.0	206.50	32.0	ICP 320	K DCN 27-32.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

[1] Cutting diameter minimum

[2] Cutting diameter maximum

[3] Seat size code

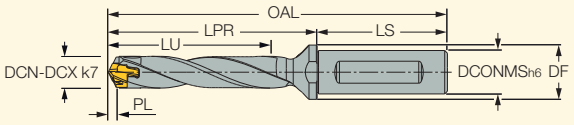
[4] Master insert identification

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57)

SUMOCHAM CHAMDRILL LINE

DCN A-5D

Exchangeable Head Drills with Coolant Holes and One Flat Shank, Drilling Depth 5xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC[3]	MIID[4]	
DCN 060-030-12A-5D	6.00	6.40	12.00	16.00	30.96	44.0	0.960	45.0	89.00	6.0	ICP 060	K DCN 6-9.99-Y
DCN 065-033-12A-5D	6.50	6.90	12.00	16.00	33.68	46.8	1.180	45.0	91.80	6.5	ICP 065	K DCN 6-9.99-Y
DCN 070-035-12A-5D	7.00	7.40	12.00	16.00	36.01	49.6	1.010	45.0	94.60	7.0	ICP 070	K DCN 6-9.99
DCN 075-038-12A-5D	7.50	7.90	12.00	16.00	38.60	52.1	1.100	45.0	97.10	7.0	ICP 075	K DCN 6-9.99
DCN 080-040-12A-5D	8.00	8.40	12.00	16.00	41.20	55.4	1.200	45.0	100.40	8.0	ICP 080	K DCN 6-9.99
DCN 085-042-12A-5D	8.50	8.90	12.00	16.00	43.79	57.9	1.290	45.0	102.90	8.0	ICP 085	K DCN 6-9.99
DCN 090-045-12A-5D	9.00	9.40	12.00	16.00	46.35	60.8	1.350	45.0	105.80	9.0	ICP 090	K DCN 6-9.99
DCN 095-048-12A-5D	9.50	9.90	12.00	16.00	48.94	63.3	1.440	45.0	108.30	9.0	ICP 095	K DCN 6-9.99
DCN 100-050-16A-5D	10.00	10.40	16.00	20.00	51.50	66.2	1.500	48.0	114.20	10.0	ICP 100	K DCN 10-13.99
DCN 105-053-16A-5D	10.50	10.90	16.00	20.00	54.09	68.7	1.590	48.0	116.70	10.0	ICP 105	K DCN 10-13.99
DCN 110-055-16A-5D	11.00	11.40	16.00	20.00	56.67	71.6	1.670	48.0	119.60	11.0	ICP 110	K DCN 10-13.99
DCN 115-058-16A-5D	11.50	11.90	16.00	20.00	59.26	74.1	1.760	48.0	122.10	11.0	ICP 115	K DCN 10-13.99
DCN 120-060-16A-5D	12.00	12.40	16.00	20.00	61.82	77.0	1.820	48.0	125.00	12.0	ICP 120	K DCN 10-13.99
DCN 125-062-16A-5D	12.50	12.90	16.00	20.00	64.41	79.5	1.910	48.0	127.50	12.0	ICP 125	K DCN 10-13.99
DCN 130-065-16A-5D	13.00	13.40	16.00	20.00	66.96	82.6	1.960	48.0	130.60	13.0	ICP 130	K DCN 10-13.99
DCN 135-068-16A-5D	13.50	13.90	16.00	20.00	69.55	85.1	2.050	48.0	133.10	13.0	ICP 135	K DCN 10-13.99
DCN 140-070-16A-5D	14.00	14.40	16.00	20.00	72.12	90.2	2.120	48.0	138.20	14.0	ICP 140	K DCN 14-17.99
DCN 145-073-16A-5D	14.50	14.90	16.00	20.00	74.71	92.7	2.210	48.0	140.70	14.0	ICP 145	K DCN 14-17.99
DCN 150-075-20A-5D	15.00	15.90	20.00	25.00	77.27	98.7	2.270	50.0	148.70	15.0	ICP 150	K DCN 14-17.99
DCN 160-080-20A-5D	16.00	16.90	20.00	25.00	82.42	105.3	2.420	50.0	155.30	16.0	ICP 160	K DCN 14-17.99
DCN 170-085-20A-5D	17.00	17.90	20.00	25.00	87.59	111.9	2.590	50.0	161.90	17.0	ICP 170	K DCN 14-17.99
DCN 180-090-25A-5D	18.00	18.90	25.00	32.00	92.73	118.5	2.730	56.0	174.50	18.0	ICP 180	K DCN 18-21.99
DCN 190-095-25A-5D	19.00	19.90	25.00	32.00	97.88	125.0	2.880	56.0	181.00	19.0	ICP 190	K DCN 18-21.99
DCN 200-100-25A-5D	20.00	20.90	25.00	32.00	103.02	131.6	3.020	56.0	187.60	20.0	ICP 200	K DCN 18-21.99
DCN 210-105-25A-5D	21.00	21.90	25.00	32.00	108.18	138.2	3.180	56.0	194.20	21.0	ICP 210	K DCN 18-21.99
DCN 220-110-25A-5D	22.00	22.90	25.00	32.00	113.32	144.8	3.320	56.0	200.80	22.0	ICP 220	K DCN 22-26.99
DCN 230-115-32A-5D	23.00	23.90	32.00	42.00	118.46	151.4	3.460	60.0	211.40	23.0	ICP 230	K DCN 22-26.99
DCN 240-120-32A-5D	24.00	24.90	32.00	42.00	123.62	158.0	3.620	60.0	218.00	24.0	ICP 240	K DCN 22-26.99
DCN 250-125-32A-5D	25.00	25.90	32.00	42.00	128.80	164.5	3.800	60.0	224.50	25.0	ICP 250	K DCN 22-26.99
DCN 260-130-32A-5D	26.00	26.90	32.00	42.00	133.95	171.0	3.950	60.0	231.00	26.0	ICP 260	K DCN 22-26.99
DCN 270-135-32A-5D	27.00	27.90	32.00	42.00	139.10	177.7	4.100	60.0	237.65	27.0	ICP 270	K DCN 27-32.99
DCN 270-135-40A-5D	27.00	27.90	40.00	50.00	139.10	177.7	4.100	68.0	245.65	27.0	ICP 270	K DCN 27-32.99
DCN 280-140-32A-5D	28.00	28.90	32.00	42.00	144.25	184.2	4.250	60.0	252.20	28.0	ICP 280	K DCN 27-32.99
DCN 280-140-40A-5D	28.00	28.90	40.00	50.00	144.25	184.2	4.250	68.0	244.20	28.0	ICP 280	K DCN 27-32.99
DCN 290-145-32A-5D	29.00	29.90	32.00	42.00	149.43	190.8	4.430	60.0	258.80	29.0	ICP 290	K DCN 27-32.99
DCN 290-145-40A-5D	29.00	29.90	40.00	50.00	149.43	190.8	4.430	68.0	250.80	29.0	ICP 290	K DCN 27-32.99
DCN 300-150-32A-5D	30.00	30.90	32.00	42.00	154.59	197.4	4.590	60.0	265.40	30.0	ICP 300	K DCN 27-32.99
DCN 300-150-40A-5D	30.00	30.90	40.00	50.00	154.59	197.4	4.590	68.0	257.40	30.0	ICP 300	K DCN 27-32.99
DCN 310-155-32A-5D	31.00	31.90	32.00	42.00	159.76	204.0	4.760	60.0	272.00	31.0	ICP 310	K DCN 27-32.99
DCN 310-155-40A-5D	31.00	31.90	40.00	50.00	159.76	204.0	4.760	68.0	264.00	31.0	ICP 310	K DCN 27-32.99
DCN 320-160-32A-5D	32.00	32.90	32.00	42.00	164.86	210.5	4.860	60.0	278.50	32.0	ICP 320	K DCN 27-32.99
DCN 320-160-40A-5D	32.00	32.90	40.00	50.00	164.86	210.5	4.860	68.0	270.50	32.0	ICP 320	K DCN 27-32.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Seat size code

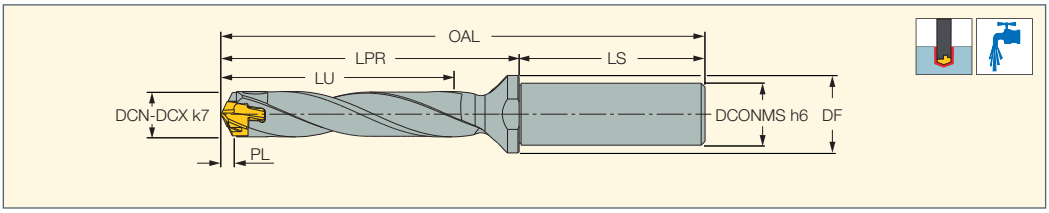
(4) Master insert identification

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57)

SUMOCHAM CHAMDRILL LINE

DCN R-5D

Exchangeable Head Drills with Coolant Holes and a Cylindrical Shank, Drilling Depth 5xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC[3]	MIID[4]	
DCN 060-030-12R-5D	6.00	6.40	12.00	16.00	30.96	44.0	0.960	45.0	89.00	6.0	ICP 060	K DCN 6-9.99-Y
DCN 065-033-12R-5D	6.50	6.90	12.00	16.00	33.68	46.8	1.180	45.0	91.80	6.5	ICP 065	K DCN 6-9.99-Y
DCN 070-035-12R-5D	7.00	7.40	12.00	16.00	36.01	49.6	1.010	45.0	94.60	7.0	ICP 070	K DCN 6-9.99
DCN 075-038-12R-5D	7.50	7.90	12.00	16.00	38.60	52.1	1.100	45.0	97.10	7.0	ICP 075	K DCN 6-9.99
DCN 080-040-12R-5D	8.00	8.40	12.00	16.00	41.20	55.4	1.200	45.0	100.40	8.0	ICP 080	K DCN 6-9.99
DCN 085-042-12R-5D	8.50	8.90	12.00	16.00	43.79	57.9	1.290	45.0	102.90	8.0	ICP 085	K DCN 6-9.99
DCN 090-045-12R-5D	9.00	9.40	12.00	16.00	46.35	60.8	1.350	45.0	105.80	9.0	ICP 090	K DCN 6-9.99
DCN 095-048-12R-5D	9.50	9.90	12.00	16.00	48.94	63.3	1.440	45.0	108.30	9.0	ICP 095	K DCN 6-9.99
DCN 100-050-16R-5D	10.00	10.40	16.00	20.00	51.50	66.2	1.500	48.0	114.20	10.0	ICP 100	K DCN 10-13.99
DCN 105-053-16R-5D	10.50	10.90	16.00	20.00	54.09	68.7	1.590	48.0	116.70	10.0	ICP 105	K DCN 10-13.99
DCN 110-055-16R-5D	11.00	11.40	16.00	20.00	56.67	71.6	1.670	48.0	119.60	11.0	ICP 110	K DCN 10-13.99
DCN 115-058-16R-5D	11.50	11.90	16.00	20.00	59.26	74.1	1.760	48.0	122.10	11.0	ICP 115	K DCN 10-13.99
DCN 120-060-16R-5D	12.00	12.40	16.00	20.00	61.82	77.0	1.820	48.0	125.00	12.0	ICP 120	K DCN 10-13.99
DCN 125-062-16R-5D	12.50	12.90	16.00	20.00	64.41	79.5	1.910	48.0	127.50	12.0	ICP 125	K DCN 10-13.99
DCN 130-065-16R-5D	13.00	13.40	16.00	20.00	66.96	82.6	1.960	48.0	130.60	13.0	ICP 130	K DCN 10-13.99
DCN 135-068-16R-5D	13.50	13.90	16.00	20.00	69.55	85.1	2.050	48.0	133.10	13.0	ICP 135	K DCN 10-13.99
DCN 140-070-16R-5D	14.00	14.40	16.00	20.00	72.12	90.2	2.120	48.0	138.20	14.0	ICP 140	K DCN 14-17.99
DCN 145-073-16R-5D	14.50	14.90	16.00	20.00	74.62	92.7	2.210	48.0	140.70	14.0	ICP 145	K DCN 14-17.99
DCN 150-075-20R-5D	15.00	15.90	20.00	25.00	77.27	98.7	2.270	50.0	148.70	15.0	ICP 150	K DCN 14-17.99
DCN 160-080-20R-5D	16.00	16.90	20.00	25.00	82.42	105.3	2.420	50.0	155.30	16.0	ICP 160	K DCN 14-17.99
DCN 170-085-20R-5D	17.00	17.90	20.00	25.00	87.59	111.9	2.590	50.0	161.90	17.0	ICP 170	K DCN 14-17.99
DCN 180-090-25R-5D	18.00	18.90	25.00	32.00	92.73	118.5	2.730	56.0	174.50	18.0	ICP 180	K DCN 18-21.99
DCN 190-095-25R-5D	19.00	19.90	25.00	32.00	97.88	125.0	2.880	56.0	181.00	19.0	ICP 190	K DCN 18-21.99
DCN 200-100-25R-5D	20.00	20.90	25.00	32.00	103.02	131.6	3.020	56.0	187.60	20.0	ICP 200	K DCN 18-21.99
DCN 210-105-25R-5D	21.00	21.90	25.00	32.00	108.18	138.2	3.180	56.0	194.20	21.0	ICP 210	K DCN 18-21.99
DCN 220-110-25R-5D	22.00	22.90	25.00	32.00	113.32	144.8	3.320	56.0	200.80	22.0	ICP 220	K DCN 22-26.99
DCN 230-115-32R-5D	23.00	23.90	32.00	42.00	118.46	151.4	3.460	60.0	211.40	23.0	ICP 230	K DCN 22-26.99
DCN 240-120-32R-5D	24.00	24.90	32.00	42.00	123.62	158.0	3.620	60.0	218.00	24.0	ICP 240	K DCN 22-26.99
DCN 250-125-32R-5D	25.00	25.90	32.00	42.00	128.80	164.5	3.800	60.0	224.50	25.0	ICP 250	K DCN 22-26.99
DCN 260-130-32R-5D	26.00	26.90	32.00	42.00	133.95	171.0	3.950	60.0	231.00	26.0	ICP 260	K DCN 22-26.99
DCN 270-135-32R-5D	27.00	27.90	32.00	42.00	139.10	177.7	4.100	60.0	237.70	27.0	ICP 270	K DCN 27-32.99
DCN 280-140-32R-5D	28.00	28.90	32.00	42.00	144.25	184.2	4.250	60.0	244.20	28.0	ICP 280	K DCN 27-32.99
DCN 290-145-32R-5D	29.00	29.90	32.00	42.00	149.43	190.8	4.430	60.0	250.80	29.0	ICP 290	K DCN 27-32.99
DCN 300-150-32R-5D	30.00	30.90	32.00	42.00	154.59	197.4	4.590	60.0	257.40	30.0	ICP 300	K DCN 27-32.99
DCN 310-155-32R-5D	31.00	31.90	32.00	42.00	159.76	204.0	4.760	60.0	264.00	31.0	ICP 310	K DCN 27-32.99
DCN 320-160-32R-5D	32.00	32.90	32.00	42.00	164.86	210.5	4.860	60.0	270.50	32.0	ICP 320	K DCN 27-32.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

[1] Cutting diameter minimum

[2] Cutting diameter maximum

[3] Seat size code

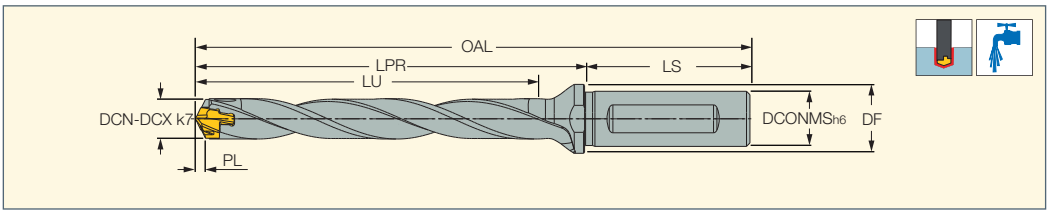
[4] Master insert identification

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57)

SUMOCHAM CHAMDRILL LINE

DCN A-8D

Exchangeable Head Drills with Coolant Holes and One Flat Shank, Drilling Depth 8xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC[3]	MIID[4]	
DCN 060-048-12A-8D	6.00	6.40	12.00	16.00	48.96	62.0	0.960	45.0	107.00	6.0	ICP 060	K DCN 6-9.99-Y
DCN 065-052-12A-8D	6.50	6.90	12.00	16.00	53.18	66.3	1.180	45.0	111.30	6.5	ICP 065	K DCN 6-9.99-Y
DCN 070-056-12A-8D	7.00	7.40	12.00	16.00	57.01	70.6	1.010	45.0	115.60	7.0	ICP 070	K DCN 6-9.99
DCN 075-060-12A-8D	7.50	7.90	12.00	16.00	61.10	74.6	1.100	45.0	120.00	7.0	ICP 075	K DCN 6-9.99
DCN 080-064-12A-8D	8.00	8.40	12.00	16.00	65.20	79.4	1.200	45.0	124.40	8.0	ICP 080	K DCN 6-9.99
DCN 085-068-12A-8D	8.50	8.90	12.00	16.00	69.29	83.4	1.290	45.0	128.40	8.0	ICP 085	K DCN 6-9.99
DCN 090-072-12A-8D	9.00	9.40	12.00	16.00	73.36	87.8	1.360	45.0	132.80	9.0	ICP 090	K DCN 6-9.99
DCN 095-076-12A-8D	9.50	9.90	12.00	16.00	77.44	91.8	1.440	45.0	136.80	9.0	ICP 095	K DCN 6-9.99
DCN 100-080-16A-8D	10.00	10.40	16.00	20.00	81.50	96.2	1.500	48.0	144.20	10.0	ICP 100	K DCN 10-13.99
DCN 105-084-16A-8D	10.50	10.90	16.00	20.00	85.59	100.2	1.590	48.0	148.20	10.0	ICP 105	K DCN 10-13.99
DCN 110-088-16A-8D	11.00	11.40	16.00	20.00	89.67	104.6	1.670	48.0	152.60	11.0	ICP 110	K DCN 10-13.99
DCN 115-092-16A-8D	11.50	11.90	16.00	20.00	93.76	108.6	1.760	48.0	156.60	11.0	ICP 115	K DCN 10-13.99
DCN 120-096-16A-8D	12.00	12.40	16.00	20.00	97.82	113.0	1.820	48.0	161.00	12.0	ICP 120	K DCN 10-13.99
DCN 125-100-16A-8D	12.50	12.90	16.00	20.00	101.91	117.0	1.910	48.0	165.00	12.0	ICP 125	K DCN 10-13.99
DCN 130-104-16A-8D	13.00	13.40	16.00	20.00	105.96	121.6	1.960	48.0	169.60	13.0	ICP 130	K DCN 10-13.99
DCN 135-108-16A-8D	13.50	13.90	16.00	20.00	110.05	125.6	2.050	48.0	173.60	13.0	ICP 135	K DCN 10-13.99
DCN 140-112-16A-8D	14.00	14.40	16.00	20.00	114.12	132.1	2.120	48.0	180.10	14.0	ICP 140	K DCN 14-17.99
DCN 145-116-16A-8D	14.50	14.90	16.00	20.00	118.21	136.2	2.210	48.0	184.20	14.0	ICP 145	K DCN 14-17.99
DCN 150-120-20A-8D	15.00	15.90	20.00	25.00	122.27	143.7	2.270	50.0	193.70	15.0	ICP 150	K DCN 14-17.99
DCN 160-128-20A-8D	16.00	16.90	20.00	25.00	130.42	153.3	2.420	50.0	203.30	16.0	ICP 160	K DCN 14-17.99
DCN 170-136-20A-8D	17.00	17.90	20.00	25.00	138.59	162.9	2.590	50.0	212.90	17.0	ICP 170	K DCN 14-17.99
DCN 180-144-25A-8D	18.00	18.90	25.00	32.00	146.73	172.5	2.730	56.0	228.50	18.0	ICP 180	K DCN 18-21.99
DCN 190-152-25A-8D	19.00	19.90	25.00	32.00	154.88	182.0	2.880	56.0	238.00	19.0	ICP 190	K DCN 18-21.99
DCN 200-160-25A-8D	20.00	20.90	25.00	32.00	163.02	191.6	3.020	56.0	247.60	20.0	ICP 200	K DCN 18-21.99
DCN 210-168-25A-8D	21.00	21.90	25.00	32.00	171.18	201.2	3.180	56.0	257.20	21.0	ICP 210	K DCN 18-21.99
DCN 220-176-25A-8D	22.00	22.90	25.00	32.00	179.32	210.8	3.320	56.0	266.80	22.0	ICP 220	K DCN 22-26.99
DCN 230-184-32A-8D	23.00	23.90	32.00	42.00	187.46	220.4	3.460	60.0	280.40	23.0	ICP 230	K DCN 22-26.99
DCN 240-192-32A-8D	24.00	24.90	32.00	42.00	195.62	230.0	3.620	60.0	290.00	24.0	ICP 240	K DCN 22-26.99
DCN 250-200-32A-8D	25.00	25.90	32.00	42.00	203.80	239.5	3.800	60.0	299.50	25.0	ICP 250	K DCN 22-26.99
DCN 260-208-32A-8D	26.00	26.90	32.00	42.00	211.95	249.3	3.950	60.0	309.30	26.0	ICP 260	K DCN 22-26.99
DCN 270-216-32A-8D	27.00	27.90	32.00	42.00	220.10	258.6	4.100	60.0	318.60	27.0	ICP 270	K DCN 27-32.99
DCN 280-224-32A-8D	28.00	28.90	32.00	42.00	228.25	268.2	4.250	60.0	328.20	28.0	ICP 280	K DCN 27-32.99
DCN 290-232-32A-8D	29.00	29.90	32.00	42.00	236.43	277.8	4.430	60.0	337.80	29.0	ICP 290	K DCN 27-32.99
DCN 300-240-32A-8D	30.00	30.90	32.00	42.00	244.59	287.4	4.590	60.0	347.40	30.0	ICP 300	K DCN 27-32.99
DCN 310-248-32A-8D	31.00	31.90	32.00	42.00	252.76	297.0	4.760	60.0	357.00	31.0	ICP 310	K DCN 27-32.99
DCN 320-256-32A-8D	32.00	32.90	32.00	42.00	260.86	306.5	4.860	60.0	366.50	32.0	ICP 320	K DCN 27-32.99

- Prior to using the 8xD drill, it is recommended to drill a pre-hole by using a DCN 1.5xD drill or a centering drill. It is not required if HCP or QCP drilling head is used
- Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

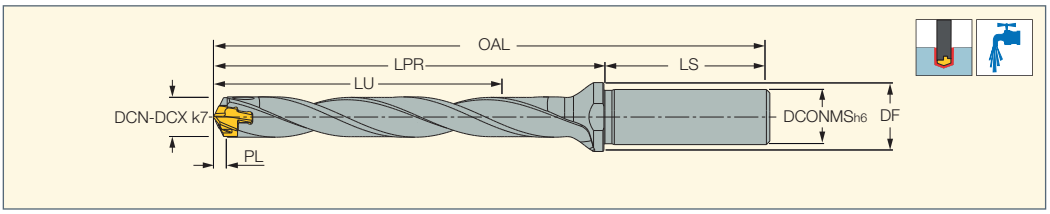
[1] Cutting diameter minimum
[2] Cutting diameter maximum
[3] Seat size code
[4] Master insert identification

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57)

SUMOCHAM CHAMDRILL LINE

DCN R-8D

Exchangeable Head Drills with Coolant Holes and a Cylindrical Shank, Drilling Depth 8xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC[3]	MIID[4]	
DCN 060-048-12R-8D	6.00	6.40	12.00	16.00	48.96	62.0	0.960	45.0	107.00	6.0	ICP 060	K DCN 6-9.99-Y
DCN 065-052-12R-8D	6.50	6.90	12.00	16.00	53.18	66.3	1.180	45.0	111.30	6.5	ICP 065	K DCN 6-9.99-Y
DCN 070-056-12R-8D	7.00	7.40	12.00	16.00	57.01	70.6	1.010	45.0	115.60	7.0	ICP 070	K DCN 6-9.99
DCN 075-060-12R-8D	7.50	7.90	12.00	16.00	61.10	74.6	1.100	45.0	120.00	7.0	ICP 075	K DCN 6-9.99
DCN 080-064-12R-8D	8.00	8.40	12.00	16.00	65.20	79.4	1.200	45.0	124.40	8.0	ICP 080	K DCN 6-9.99
DCN 085-068-12R-8D	8.50	8.90	12.00	16.00	69.29	83.4	1.290	45.0	128.40	8.0	ICP 085	K DCN 6-9.99
DCN 090-072-12R-8D	9.00	9.40	12.00	16.00	73.35	87.8	1.350	45.0	132.80	9.0	ICP 090	K DCN 6-9.99
DCN 095-076-12R-8D	9.50	9.90	12.00	16.00	77.44	91.8	1.440	45.0	136.80	9.0	ICP 095	K DCN 6-9.99
DCN 100-080-16R-8D	10.00	10.40	16.00	20.00	81.50	96.2	1.500	48.0	144.20	10.0	ICP 100	K DCN 10-13.99
DCN 105-084-16R-8D	10.50	10.90	16.00	20.00	85.59	100.2	1.590	48.0	148.20	10.0	ICP 105	K DCN 10-13.99
DCN 110-088-16R-8D	11.00	11.40	16.00	20.00	89.67	104.6	1.670	48.0	152.60	11.0	ICP 110	K DCN 10-13.99
DCN 115-092-16R-8D	11.50	11.90	16.00	20.00	93.76	108.6	1.760	48.0	156.60	11.0	ICP 115	K DCN 10-13.99
DCN 120-096-16R-8D	12.00	12.40	16.00	20.00	97.82	113.0	1.820	48.0	161.00	12.0	ICP 120	K DCN 10-13.99
DCN 125-100-16R-8D	12.50	12.90	16.00	20.00	101.91	117.0	1.910	48.0	165.00	12.0	ICP 125	K DCN 10-13.99
DCN 130-104-16R-8D	13.00	13.40	16.00	20.00	105.96	121.6	1.960	48.0	169.60	13.0	ICP 130	K DCN 10-13.99
DCN 135-108-16R-8D	13.50	13.90	16.00	20.00	110.05	125.6	2.050	48.0	173.60	13.0	ICP 135	K DCN 10-13.99
DCN 140-112-16R-8D	14.00	14.40	16.00	20.00	114.12	132.1	2.120	48.0	180.10	14.0	ICP 140	K DCN 14-17.99
DCN 145-116-16R-8D	14.50	14.90	16.00	20.00	118.21	136.2	2.210	48.0	184.20	14.0	ICP 145	K DCN 14-17.99
DCN 150-120-20R-8D	15.00	15.90	20.00	25.00	122.27	143.7	2.270	50.0	193.70	15.0	ICP 150	K DCN 14-17.99
DCN 160-128-20R-8D	16.00	16.90	20.00	25.00	130.42	153.3	2.420	50.0	203.30	16.0	ICP 160	K DCN 14-17.99
DCN 170-136-20R-8D	17.00	17.90	20.00	25.00	138.59	162.9	2.590	50.0	212.90	17.0	ICP 170	K DCN 14-17.99
DCN 180-144-25R-8D	18.00	18.90	25.00	32.00	146.73	172.5	2.730	56.0	228.50	18.0	ICP 180	K DCN 18-21.99
DCN 190-152-25R-8D	19.00	19.90	25.00	32.00	154.88	182.0	2.880	56.0	238.00	19.0	ICP 190	K DCN 18-21.99
DCN 200-160-25R-8D	20.00	20.90	25.00	32.00	163.02	191.6	3.020	56.0	247.60	20.0	ICP 200	K DCN 18-21.99
DCN 210-168-25R-8D	21.00	21.90	25.00	32.00	171.18	201.2	3.180	56.0	257.20	21.0	ICP 210	K DCN 18-21.99
DCN 220-176-25R-8D	22.00	22.90	25.00	32.00	179.32	210.8	3.320	56.0	266.80	22.0	ICP 220	K DCN 22-26.99
DCN 230-184-32R-8D	23.00	23.90	32.00	42.00	187.46	220.4	3.460	60.0	280.40	23.0	ICP 230	K DCN 22-26.99
DCN 240-192-32R-8D	24.00	24.90	32.00	42.00	195.62	230.0	3.620	60.0	290.00	24.0	ICP 240	K DCN 22-26.99
DCN 250-200-32R-8D	25.00	25.90	32.00	42.00	203.80	239.5	3.800	60.0	299.50	25.0	ICP 250	K DCN 22-26.99
DCN 260-208-32R-8D	26.00	26.90	32.00	42.00	211.95	249.3	3.950	60.0	309.30	26.0	ICP 260	K DCN 22-26.99
DCN 270-216-32R-8D	27.00	27.90	32.00	42.00	220.10	258.6	4.100	60.0	318.60	27.0	ICP 270	K DCN 27-32.99
DCN 280-224-32R-8D	28.00	28.90	32.00	42.00	228.25	268.2	4.250	60.0	328.20	28.0	ICP 280	K DCN 27-32.99
DCN 290-232-32R-8D	29.00	29.90	32.00	42.00	236.43	277.8	4.430	60.0	337.80	29.0	ICP 290	K DCN 27-32.99
DCN 300-240-32R-8D	30.00	30.90	32.00	42.00	244.59	287.4	4.590	60.0	347.40	30.0	ICP 300	K DCN 27-32.99
DCN 310-248-32R-8D	31.00	31.90	32.00	42.00	252.76	297.0	4.760	60.0	357.00	31.0	ICP 310	K DCN 27-32.99
DCN 320-256-32R-8D	32.00	32.90	32.00	42.00	260.86	306.5	4.860	60.0	366.50	32.0	ICP 320	K DCN 27-32.99

- Prior to using the 8xD drill, it is recommended to drill a pre-hole by using a DCN 1.5xD drill or a centering drill. It is not required if HCP or QCP drilling head is used
- Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

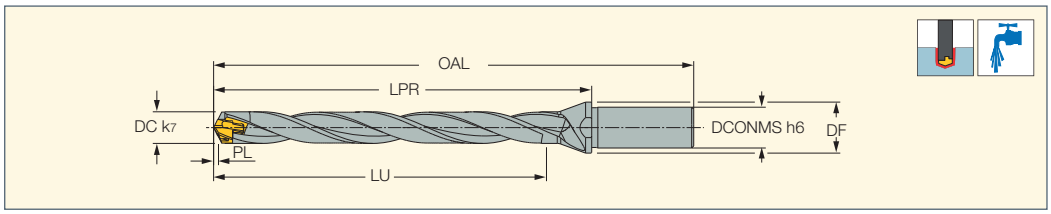
[1] Cutting diameter minimum
[2] Cutting diameter maximum
[3] Seat size code
[4] Master insert identification

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57)

SUMOCHAM CHAMDRILL LINE

DCN R-10D

Exchangeable Head Drills with Coolant Holes and a Cylindrical Shank, Drilling Depth 10xD



Designation	DC	DCONMS	DF	LU	LPR	PL	OAL	SSC[1]	
DCN 160-160-20R-10D	16.00	20.00	25.00	162.40	185.30	2.420	235.30	16.0	K DCN 14-17.99
DCN 190-190-25R-10D	19.00	25.00	32.00	192.90	220.00	2.880	276.00	19.0	K DCN 18-21.99
DCN 250-250-32R-10D	25.00	32.00	42.00	253.80	289.50	3.800	349.50	25.0	K DCN 22-26.99

- Prior to using the 10xD drill, it is recommended to drill a pre-hole by using a DCN 1.5xD drill or a centering drill. It is not required if HCP or QCP drilling head is used • Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

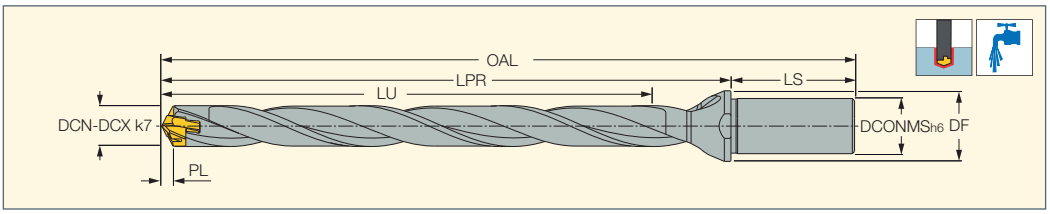
[1] Seat size code

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57)

SUMOCHAM CHAMDRILL LINE

DCN R-12D

Exchangeable Head Drills with Coolant Holes and a Cylindrical Shank, Drilling Depth 12xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC[3]	MIID[4]	
DCN 080-096-12R-12D	8.00	8.40	12.00	16.00	97.50	111.4	1.200	45.0	156.40	8.0	ICP 080	K DCN 6-9.99
DCN 085-102-12R-12D	8.50	8.90	12.00	16.00	103.60	117.4	1.290	45.0	162.40	8.0	ICP 085	K DCN 6-9.99
DCN 090-108-12R-12D	9.00	9.40	12.00	16.00	109.60	123.8	1.350	45.0	168.80	9.0	ICP 090	K DCN 6-9.99
DCN 095-114-12R-12D	9.50	9.90	12.00	16.00	115.70	129.8	1.440	45.0	174.80	9.0	ICP 095	K DCN 6-9.99
DCN 100-120-16R-12D	10.00	10.40	16.00	20.00	121.80	136.2	1.500	48.0	184.20	10.0	ICP 100	K DCN 10-13.99
DCN 105-126-16R-12D	10.50	10.90	16.00	20.00	127.90	142.2	1.590	48.0	190.20	10.0	ICP 105	K DCN 10-13.99
DCN 110-132-16R-12D	11.00	11.40	16.00	20.00	134.00	148.6	1.670	48.0	196.60	11.0	ICP 110	K DCN 10-13.99
DCN 115-138-16R-12D	11.50	11.90	16.00	20.00	140.10	154.6	1.760	48.0	202.60	11.0	ICP 115	K DCN 10-13.99
DCN 120-144-16R-12D	12.00	12.40	16.00	20.00	146.20	161.0	1.820	48.0	209.00	12.0	ICP 120	K DCN 10-13.99
DCN 125-150-16R-12D	12.50	12.90	16.00	20.00	152.30	167.0	1.910	48.0	215.00	12.0	ICP 125	K DCN 10-13.99
DCN 130-156-16R-12D	13.00	13.40	16.00	20.00	158.40	173.6	1.960	48.0	221.60	13.0	ICP 130	K DCN 10-13.99
DCN 135-162-16R-12D	13.50	13.90	16.00	20.00	164.50	179.6	2.050	48.0	227.00	13.0	ICP 135	K DCN 10-13.99
DCN 140-168-16R-12D	14.00	14.40	16.00	20.00	170.60	188.2	2.120	48.0	236.00	14.0	ICP 140	K DCN 14-17.99
DCN 145-174-16R-12D	14.50	14.90	16.00	20.00	176.60	194.2	2.210	48.0	242.00	14.0	ICP 145	K DCN 14-17.99
DCN 150-180-20R-12D	15.00	15.90	20.00	25.00	182.70	203.7	2.270	50.0	253.73	15.0	ICP 150	K DCN 14-17.99
DCN 160-192-20R-12D	16.00	16.90	20.00	25.00	194.90	217.3	2.420	50.0	267.30	16.0	ICP 160	K DCN 14-17.99
DCN 170-204-20R-12D	17.00	17.90	20.00	25.00	207.10	230.9	2.590	50.0	280.90	17.0	ICP 170	K DCN 14-17.99
DCN 180-216-25R-12D	18.00	18.90	25.00	32.00	219.30	244.5	2.730	56.0	300.50	18.0	ICP 180	K DCN 18-21.99
DCN 190-228-25R-12D	19.00	19.90	25.00	32.00	231.50	258.0	2.880	56.0	314.00	19.0	ICP 190	K DCN 18-21.99
DCN 200-240-25R-12D	20.00	20.90	25.00	32.00	243.60	271.6	3.020	56.0	327.60	20.0	ICP 200	K DCN 18-21.99
DCN 210-252-25R-12D	21.00	21.90	25.00	32.00	255.80	285.2	3.180	56.0	341.20	21.0	ICP 210	K DCN 18-21.99
DCN 220-264-25R-12D	22.00	22.90	25.00	32.00	268.00	298.8	3.320	56.0	354.80	22.0	ICP 220	K DCN 22-26.99
DCN 230-276-32R-12D	23.00	23.90	32.00	42.00	280.20	312.3	3.460	60.0	362.40	23.0	ICP 230	K DCN 22-26.99
DCN 240-288-32R-12D	24.00	24.90	32.00	42.00	292.40	325.9	3.620	60.0	386.00	24.0	ICP 240	K DCN 22-26.99
DCN 250-300-32R-12D	25.00	25.90	32.00	42.00	304.60	339.5	3.800	60.0	399.50	25.0	ICP 250	K DCN 22-26.99
DCN 260-312-32R-12D	26.00	26.90	32.00	42.00	316.70	381.1	3.950	60.0	441.10	26.0	ICP 260	K DCN 22-26.99
DCN 270-324-32R-12D	27.00	27.90	32.00	42.00	328.90	393.7	4.100	60.0	453.60	27.0	ICP 270	K DCN 27-32.99
DCN 280-336-32R-12D	28.00	28.90	32.00	42.00	341.10	406.2	4.250	60.0	466.20	28.0	ICP 280	K DCN 27-32.99
DCN 290-348-32R-12D	29.00	29.90	32.00	42.00	353.30	418.8	4.430	60.0	478.80	29.0	ICP 290	K DCN 27-32.99
DCN 300-360-32R-12D	30.00	30.90	32.00	42.00	365.50	431.4	4.590	60.0	491.40	30.0	ICP 300	K DCN 27-32.99
DCN 310-372-32R-12D	31.00	31.90	32.00	42.00	377.60	444.0	4.760	60.0	504.00	31.0	ICP 310	K DCN 27-32.99
DCN 320-384-32R-12D	32.00	32.90	32.00	42.00	389.80	457.5	4.860	60.0	516.50	32.0	ICP 320	K DCN 27-32.99

• Prior to using the 12xD drill, it is recommended to drill a pre-hole by using a DCN 1.5xD drill or a centering drill • The HCP or QCP drilling head may eliminate the need for a pre-hole • Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

[1] Cutting diameter minimum

[2] Cutting diameter maximum

[3] Seat size code

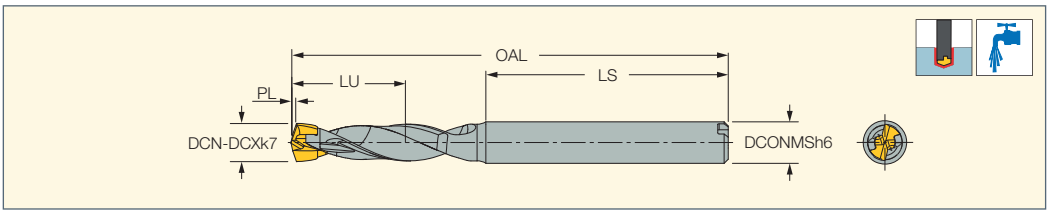
[4] Master insert identification

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57)

SUMOCHAM CHAMDRILL LINE

DCN C-3D

Exchangeable Head Drills with Coolant Holes and a Cylindrical Shank, Drilling Depth 3xD



Designation	DCN[2]	DCX[3]	DCONMS	LU	PL	LS	OAL	SSC[4]	MIID[5]	
DCN 040-012-06C-3D [1]	4.00	4.40	6.00	12.62	0.620	35.0	57.70	4.0	ICP 040	
DCN 045-014-06C-3D [1]	4.50	4.90	6.00	14.16	0.660	35.0	59.65	4.5	ICP 045	
DCN 050-015-06C-3D [1]	5.00	5.40	6.00	15.73	0.730	35.0	61.30	5.0	ICP 050	
DCN 055-017-06C-3D [1]	5.50	5.90	6.00	17.31	0.810	35.0	63.15	5.5	ICP 055	
DCN 060-018-08C-3D	6.00	6.40	8.00	18.96	0.960	36.0	64.00	6.0	ICP 060	K DCN 6-9.99-Y
DCN 065-020-08C-3D	6.50	6.90	8.00	20.68	1.180	36.0	65.80	6.5	ICP 065	K DCN 6-9.99-Y
DCN 070-021-08C-3D	7.00	7.40	8.00	22.01	1.010	36.0	67.60	7.0	ICP 070	K DCN 6-9.99
DCN 075-023-08C-3D	7.50	7.90	8.00	23.60	1.100	36.0	69.10	7.0	ICP 075	K DCN 6-9.99
DCN 080-024-10C-3D	8.00	8.40	10.00	25.20	1.200	40.0	75.40	8.0	ICP 080	K DCN 6-9.99
DCN 085-026-10C-3D	8.50	8.90	10.00	27.69	1.290	40.0	76.90	8.0	ICP 085	K DCN 6-9.99
DCN 090-027-10C-3D	9.00	9.40	10.00	28.38	1.350	40.0	78.80	9.0	ICP 090	K DCN 6-9.99
DCN 095-029-10C-3D	9.50	9.90	10.00	29.94	1.440	40.0	80.30	9.0	ICP 095	K DCN 6-9.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

[1] The SK DCN key is supplied with the insert

[2] Cutting diameter minimum

[3] Cutting diameter maximum

[4] Seat size code

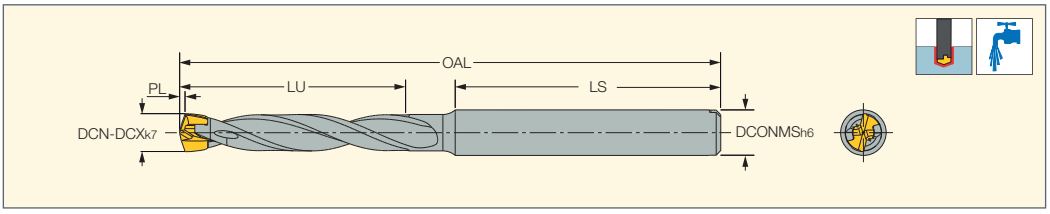
[5] Master insert identification

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52)

SUMOCHAM CHAMDRILL LINE

DCN C-5D

Exchangeable Head Drills with Coolant Holes and a Cylindrical Shank, Drilling Depth 5xD



Designation	DCN[2]	DCX[3]	DCONMS	LU	PL	LS	OAL	SSC[4]	MIID[5]	
DCN 040-020-06C-5D [1]	4.00	4.40	6.00	20.62	0.620	35.0	65.70	4.0	ICP 040	
DCN 045-023-06C-5D [1]	4.50	4.90	6.00	23.16	0.660	35.0	68.65	4.5	ICP 045	
DCN 050-025-06C-5D [1]	5.00	5.40	6.00	25.73	0.730	35.0	71.30	5.0	ICP 050	
DCN 055-028-06C-5D [1]	5.50	5.90	6.00	28.31	0.810	35.0	74.15	5.5	ICP 055	
DCN 060-030-08C-5D	6.00	6.40	8.00	30.96	0.960	36.0	76.00	6.0	ICP 060	K DCN 6-9.99-Y
DCN 065-033-08C-5D	6.50	6.90	8.00	33.68	1.180	36.0	78.80	6.5	ICP 065	K DCN 6-9.99-Y
DCN 070-035-08C-5D	7.00	7.40	8.00	36.01	1.010	36.0	81.60	7.0	ICP 070	K DCN 6-9.99
DCN 075-038-08C-5D	7.50	7.90	8.00	38.60	1.100	36.0	84.10	7.0	ICP 075	K DCN 6-9.99
DCN 080-040-10C-5D	8.00	8.40	10.00	41.20	1.200	40.0	91.40	8.0	ICP 080	K DCN 6-9.99
DCN 085-043-10C-5D	8.50	8.90	10.00	43.79	1.290	40.0	93.90	8.0	ICP 085	K DCN 6-9.99
DCN 090-045-10C-5D	9.00	9.40	10.00	46.35	1.350	40.0	96.80	9.0	ICP 090	K DCN 6-9.99
DCN 095-048-10C-5D	9.50	9.90	10.00	48.94	1.440	40.0	99.30	9.0	ICP 095	K DCN 6-9.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

[1] The SK DCN key is supplied with the insert

[2] Cutting diameter minimum

[3] Cutting diameter maximum

[4] Seat size code

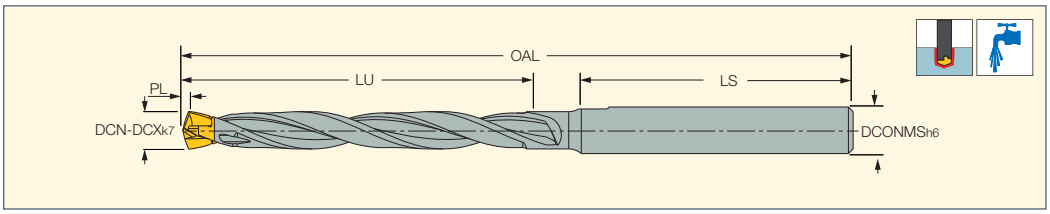
[5] Master insert identification

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52)

SUMOCHAM CHAMDRILL LINE

DCN C-8D

Exchangeable Head Drills with Coolant Holes and a Cylindrical Shank, Drilling Depth 8xD



Designation	DCN(1)	DCX(2)	DCONMS	LU	PL	LS	OAL	SSC(3)	MIID(4)
DCN 040-032-06C-8D	4.00	4.40	6.00	32.62	0.620	35.0	77.70	4.0	ICP 040
DCN 045-036-06C-8D	4.50	4.90	6.00	36.66	0.660	35.0	82.20	4.5	ICP 045
DCN 050-040-06C-8D	5.00	5.40	6.00	40.73	0.730	35.0	86.30	5.0	ICP 050
DCN 055-044-06C-8D	5.50	5.90	6.00	44.81	0.810	35.0	90.70	5.5	ICP 055

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Seat size code

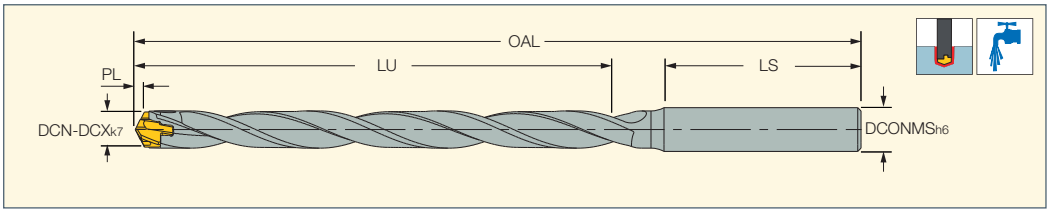
(4) Master insert identification

For inserts, see pages: ICP (18) • ICK (28) • ICM (36) • HCP-IQ (47) • FCP (52)

SUMOCHAM CHAMDRILL LINE

DCN C-12D

Exchangeable Head Drills with Coolant Holes and a Cylindrical Shank, Drilling Depth 12xD



Designation	DCN(1)	DCX(2)	DCONMS	LU	PL	LS	OAL	SSC(3)	MIID(4)	
DCN 060-072-08C-12D	6.00	6.40	8.00	72.96	0.960	36.0	120.00	6.0	ICP 060	K DCN 6-9.99-Y
DCN 065-078-08C-12D	6.50	6.90	8.00	79.18	1.180	36.0	126.30	6.5	ICP 065	K DCN 6-9.99-Y
DCN 070-084-08C-12D	7.00	7.40	8.00	85.01	1.010	36.0	132.60	7.0	ICP 070	K DCN 6-9.99
DCN 075-090-08C-12D	7.50	7.90	8.00	91.10	1.100	36.0	136.60	7.0	ICP 075	K DCN 6-9.99

• Prior to using the 12xD drill, it is recommended to drill a pre-hole by using a DCN 1.5xD drill or a centering drill • The HCP or QCP drilling head may eliminate the need for a pre-hole • Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Seat size code

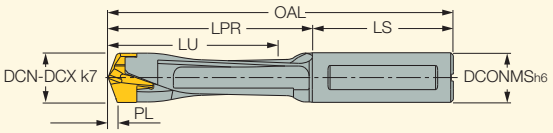
(4) Master insert identification

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52)

SUMO UNICHAM

DCNS-3D

Exchangeable Head Drills without a Flange and One Flat Shank, Drilling Depth 3xD, Suitable for Chamfering Holders



Designation	DCN[1]	DCX[2]	DCONMS	LU	LPR	PL	LS	OAL	SSC[3]	
DCNS 075-022-080B-3D	7.50	7.90	8.00	23.60	34.2	1.100	36.0	70.20	7.0	K DCN 6-9.99
DCNS 080-024-080B-3D	8.00	8.40	8.00	25.20	34.7	1.200	36.0	70.70	8.0	K DCN 6-9.99
DCNS 085-025-090B-3D	8.50	8.90	9.00	26.79	36.8	1.290	36.0	72.90	8.0	K DCN 6-9.99
DCNS 090-027-090B-3D	9.00	9.40	9.00	28.35	38.8	1.350	36.0	74.80	9.0	K DCN 6-9.99
DCNS 095-029-100B-3D	9.50	9.90	10.00	29.94	40.3	1.440	36.0	76.30	9.0	K DCN 6-9.99
DCNS 100-030-100B-3D	10.00	10.40	10.00	31.50	45.2	1.500	41.0	86.20	10.0	K DCN 10-13.99
DCNS 105-032-110B-3D	10.50	10.90	11.00	33.09	46.7	1.590	41.0	87.70	10.0	K DCN 10-13.99
DCNS 110-033-110B-3D	11.00	11.40	11.00	34.67	48.6	1.670	41.0	89.60	11.0	K DCN 10-13.99
DCNS 115-035-120B-3D	11.50	11.90	12.00	36.26	50.1	1.760	41.0	91.10	11.0	K DCN 10-13.99
DCNS 120-036-120B-3D	12.00	12.40	12.00	37.82	52.0	1.820	41.0	93.00	12.0	K DCN 10-13.99
DCNS 125-037-130B-3D	12.50	12.90	13.00	34.41	53.5	1.910	46.0	99.50	12.0	K DCN 10-13.99
DCNS 130-039-130B-3D	13.00	13.40	13.00	40.96	55.6	1.960	47.0	102.60	13.0	K DCN 10-13.99
DCNS 135-041-140B-3D	13.50	13.90	14.00	42.55	57.1	2.050	43.0	100.10	13.0	K DCN 10-13.99
DCNS 140-042-140B-3D	14.00	14.40	14.00	44.12	59.2	2.120	44.0	103.20	14.0	K DCN 14-17.99
DCNS 145-044-150B-3D	14.50	14.90	15.00	45.71	60.7	2.210	45.0	105.70	14.0	K DCN 14-17.99
DCNS 150-045-150B-3D	15.00	15.90	15.00	47.27	62.7	2.270	45.0	107.70	15.0	K DCN 14-17.99
DCNS 160-048-160B-3D	16.00	16.90	16.00	50.42	69.6	2.420	48.0	117.70	16.0	K DCN 14-17.99
DCNS 170-051-170B-3D	17.00	17.90	17.00	53.59	71.9	2.590	48.0	119.90	17.0	K DCN 14-17.99
DCNS 180-054-180B-3D	18.00	18.90	18.00	56.73	75.5	2.730	48.0	123.50	18.0	K DCN 18-21.99
DCNS 190-057-190B-3D	19.00	19.90	19.00	59.88	78.6	2.880	54.0	132.60	19.0	K DCN 18-21.99
DCNS 200-060-200B-3D	20.00	20.90	20.00	63.02	88.1	3.020	54.0	142.10	20.0	K DCN 18-21.99
DCNS 210-063-210B-3D	21.00	21.90	21.00	66.18	90.7	3.180	60.0	150.70	21.0	K DCN 18-21.99
DCNS 220-066-220B-3D	22.00	22.90	22.00	69.32	94.3	3.320	60.0	154.30	22.0	K DCN 22-26.99
DCNS 230-069-230B-3D	23.00	23.90	23.00	72.46	97.8	3.460	60.0	157.80	23.0	K DCN 22-26.99
DCNS 240-072-240B-3D	24.00	24.90	24.00	75.62	101.3	3.620	60.0	161.40	24.0	K DCN 22-26.99
DCNS 250-075-250B-3D	25.00	25.90	25.00	78.80	105.0	3.800	60.0	165.00	25.0	K DCN 22-26.99

- Do not mount smaller drilling heads other than the specified range of the drill body
- For user guide and cutting conditions, see pages 86-81
- For CHAMRING, see page 139

(1) Cutting diameter minimum

(2) Cutting diameter maximum

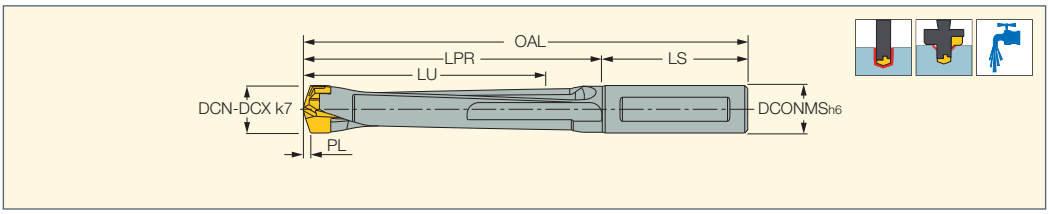
(3) Seat size code

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57)

SUMO UNICHAM

DCNS-5D

Exchangeable Head Drills without a Flange and One Flat Shank, Drilling Depth 5xD, Suitable for Chamfering Holders



Designation	DCN[1]	DCX[2]	DCONMS	LU	LPR	PL	LS	OAL	SSC[3]	
DCNS 075-037-080B-5D	7.50	7.90	8.00	38.60	49.2	1.100	36.0	85.20	7.0	K DCN 6-9.99
DCNS 080-040-080B-5D	8.00	8.40	8.00	41.20	56.4	1.200	36.0	92.40	8.0	K DCN 6-9.99
DCNS 085-042-090B-5D	8.50	8.90	9.00	43.79	53.9	1.290	36.0	89.90	8.0	K DCN 6-9.99
DCNS 090-045-090B-5D	9.00	9.40	9.00	46.35	56.8	1.350	36.0	92.80	9.0	K DCN 6-9.99
DCNS 095-048-100B-5D	9.50	9.90	10.00	48.94	59.2	1.440	36.0	95.30	9.0	K DCN 6-9.99
DCNS 100-050-100B-5D	10.00	10.40	10.00	51.50	65.2	1.500	41.0	106.20	10.0	K DCN 10-13.99
DCNS 105-053-110B-5D	10.50	10.90	11.00	54.09	67.7	1.590	41.0	108.70	10.0	K DCN 10-13.99
DCNS 110-055-110B-5D	11.00	11.40	11.00	56.67	70.6	1.670	41.0	111.60	11.0	K DCN 10-13.99
DCNS 115-058-120B-5D	11.50	11.90	12.00	59.26	73.1	1.760	41.0	114.10	11.0	K DCN 10-13.99
DCNS 120-060-120B-5D	12.00	12.40	12.00	61.82	75.9	1.820	41.0	117.00	12.0	K DCN 10-13.99
DCNS 125-062-130B-5D	12.50	12.90	13.00	64.41	78.5	1.910	46.0	124.50	12.0	K DCN 10-13.99
DCNS 130-065-130B-5D	13.00	13.40	13.00	66.96	81.5	1.960	47.0	128.60	13.0	K DCN 10-13.99
DCNS 135-068-140B-5D	13.50	13.90	14.00	69.55	84.1	2.050	43.0	127.10	13.0	K DCN 10-13.99
DCNS 140-070-140B-5D	14.00	14.40	14.00	72.12	87.1	2.120	44.0	131.20	14.0	K DCN 14-17.99
DCNS 145-073-150B-5D	14.50	14.90	15.00	74.71	89.7	2.210	45.0	134.70	14.0	K DCN 14-17.99
DCNS 150-075-150B-5D	15.00	15.90	15.00	77.27	92.7	2.270	45.0	137.70	15.0	K DCN 14-17.99
DCNS 160-080-160B-5D	16.00	16.90	16.00	82.42	101.7	2.420	48.0	149.70	16.0	K DCN 14-17.99
DCNS 170-085-170B-5D	17.00	17.90	17.00	87.59	105.9	2.590	48.0	153.90	17.0	K DCN 14-17.99
DCNS 180-090-180B-5D	18.00	18.90	18.00	92.73	111.5	2.730	48.0	159.50	18.0	K DCN 18-21.99
DCNS 190-095-190B-5D	19.00	19.90	19.00	97.88	116.6	2.880	54.0	170.60	19.0	K DCN 18-21.99
DCNS 200-100-200B-5D	20.00	20.90	20.00	103.02	128.1	3.020	54.0	182.10	20.0	K DCN 18-21.99
DCNS 210-105-210B-5D	21.00	21.90	21.00	108.18	132.6	3.180	60.0	192.70	21.0	K DCN 18-21.99
DCNS 220-110-220B-5D	22.00	22.90	22.00	113.32	138.3	3.320	60.0	198.30	22.0	K DCN 22-26.99
DCNS 230-115-230B-5D	23.00	23.90	23.00	118.46	143.8	3.460	60.0	203.80	23.0	K DCN 22-26.99
DCNS 240-120-240B-5D	24.00	24.90	24.00	123.62	149.4	3.620	60.0	209.40	24.0	K DCN 22-26.99
DCNS 250-125-250B-5D	25.00	25.90	25.00	128.80	155.0	3.800	60.0	215.00	25.0	K DCN 22-26.99

- Do not mount smaller drilling heads other than the specified range of the drill body
- For user guide and cutting conditions, see pages 68-81
- For CHAMRING, see page 139

[1] Cutting diameter minimum

[2] Cutting diameter maximum

[3] Seat size code

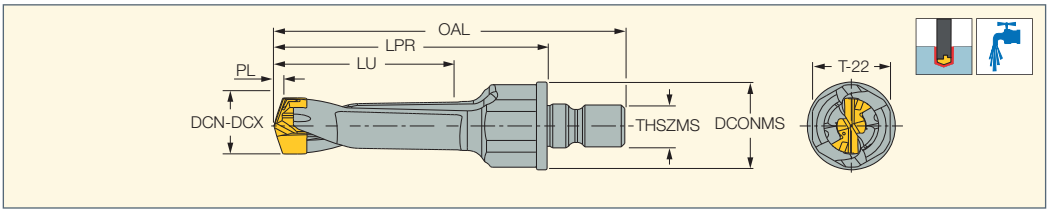
For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57)

SUMOCHAM CHAMDRILL LINE

FLEXFIT

DCNM

Modular SUMOCHAM Drill with FLEXFIT Connection for Multi-Spindle and Swiss-Type Machines



Designation	DCN[1]	DCX[2]	DCONMS	LU	LPR	PL	OAL	THSZMS	SSC[3]	TQ_3[4]	
DCNM 060-018-M12-3D	6.00	6.40	25.00	22.00	42.0	0.960	64.00	M12	6.0	33	K DCN 6-9.99-Y
DCNM 065-020-M12-3D	6.50	6.90	25.00	24.30	44.3	1.180	66.30	M12	6.5	33	K DCN 6-9.99-Y
DCNM 070-021-M12-3D	7.00	7.40	25.00	25.60	45.6	1.010	67.60	M12	7.0	33	K DCN 6-9.99
DCNM 075-023-M12-3D	7.50	7.90	25.00	27.60	47.6	1.100	69.60	M12	7.0	33	K DCN 6-9.99
DCNM 080-024-M12-3D	8.00	8.40	25.00	29.40	49.4	1.200	71.40	M12	8.0	33	K DCN 6-9.99
DCNM 085-025-M12-3D	8.50	8.90	25.00	30.40	50.4	1.290	72.40	M12	8.0	33	K DCN 6-9.99
DCNM 090-027-M12-3D	9.00	9.40	25.00	32.80	52.8	1.350	74.80	M12	9.0	33	K DCN 6-9.99
DCNM 095-029-M12-3D	9.50	9.90	25.00	34.80	54.8	1.440	76.80	M12	9.0	33	K DCN 6-9.99
DCNM 100-030-M12-3D	10.00	10.40	25.00	36.20	56.2	1.500	78.20	M12	10.0	33	K DCN 10-13.99
DCNM 105-032-M12-3D	10.50	10.90	25.00	38.20	58.2	1.590	80.20	M12	10.0	33	K DCN 10-13.99
DCNM 110-033-M12-3D	11.00	11.40	25.00	39.60	59.6	1.670	81.60	M12	11.0	33	K DCN 10-13.99
DCNM 115-035-M12-3D	11.50	11.90	25.00	41.60	61.6	1.760	83.60	M12	11.0	33	K DCN 10-13.99
DCNM 120-036-M12-3D	12.00	12.40	25.00	43.00	63.0	1.820	85.00	M12	12.0	33	K DCN 10-13.99
DCNM 125-037-M12-3D	12.50	12.90	25.00	44.00	64.0	1.910	86.00	M12	12.0	33	K DCN 10-13.99
DCNM 130-039-M12-3D	13.00	13.40	25.00	46.60	66.6	1.960	88.60	M12	13.0	33	K DCN 10-13.99
DCNM 135-041-M12-3D	13.50	13.90	25.00	48.60	68.6	2.050	90.60	M12	13.0	33	K DCN 10-13.99
DCNM 140-042-M12-3D	14.00	14.40	25.00	50.20	70.2	2.120	92.15	M12	14.0	33	K DCN 14-17.99
DCNM 145-044-M12-3D	14.50	14.90	25.00	52.20	72.2	2.210	94.15	M12	14.0	33	K DCN 14-17.99
DCNM 150-045-M12-3D	15.00	15.90	25.00	53.70	73.7	2.270	95.73	M12	15.0	33	K DCN 14-17.99
DCNM 160-048-M12-3D	16.00	16.90	25.00	57.30	77.3	2.420	99.30	M12	16.0	33	K DCN 14-17.99
DCNM 170-051-M12-3D	17.00	17.90	25.00	60.90	80.9	2.590	102.90	M12	17.0	33	K DCN 14-17.99
DCNM 180-054-M12-3D	18.00	18.90	25.00	64.50	84.5	2.730	106.50	M12	18.0	33	K DCN 18-21.99
DCNM 190-057-M12-3D	19.00	19.90	25.00	68.00	88.0	2.880	110.00	M12	19.0	33	K DCN 18-21.99
DCNM 200-060-M12-3D	20.00	20.90	25.00	71.60	91.6	3.020	113.60	M12	20.0	33	K DCN 18-21.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

[1] Cutting diameter minimum

[2] Cutting diameter maximum

[3] Seat size code

[4] Tool tightening torque Nxm (lbfxin)

For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57)

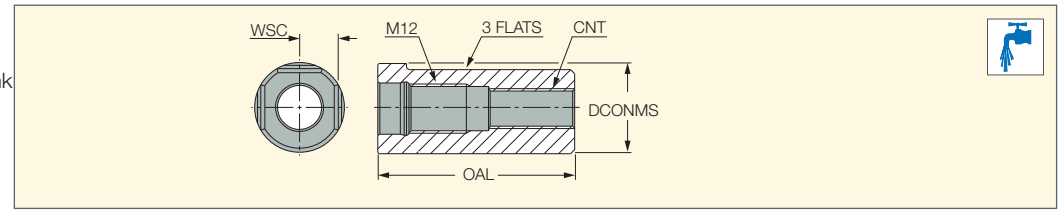
For holders, see pages: FLEXFIT HOLDER (17)

For more holders see ISCAR MILLING LINES catalog

FLEXFIT

FLEXFIT HOLDER

FLEXFIT Threaded Modular Shank with 3 Flats for Side Clamping



Designation	DCONMS	OAL	WSC[1]	CNT
FLEXFIT 160-HOLDER-DCN-MS	16.00	36.00	7.5	5/16"-24
FLEXFIT 1905-HOLDER-DCNMS	19.05	36.00	8.5	5/16"-24
FLEXFIT 200-HOLDER-DCN-MS	20.00	36.00	8.5	G1/8" BSP
FLEXFIT 220-HOLDER-DCN-MS	22.00	48.00	9.5	G1/8" BSP
FLEXFIT 250-HOLDER-DCN-MS	25.00	54.00	11.0	G1/8" BSP
FLEXFIT 254-HOLDER-DCN-MS	25.40	54.00	11.0	G1/8" BSP

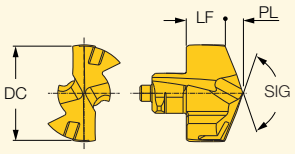
[1] For all 3 flats

For tools, see pages: DCNM (17)

SUMOCHAM CHAMDRILL LINE

ICP

Exchangeable Drilling Heads for DCN Drills, for Machining ISO P Materials



Designation	Dimensions DC	PL	LF	SIG	SSC(1)		IC908
ICP 040	4.00	0.620	2.48	140	4.0	SK DCN 4-4.99	•
ICP 041	4.10	0.620	2.48	140	4.0	SK DCN 4-4.99	•
ICP 042	4.20	0.620	2.48	140	4.0	SK DCN 4-4.99	•
ICP 043	4.30	0.620	2.48	140	4.0	SK DCN 4-4.99	•
ICP 044	4.40	0.620	2.48	140	4.0	SK DCN 4-4.99	•
ICP 045	4.50	0.660	2.89	140	4.5	SK DCN 4-4.99	•
ICP 046	4.60	0.680	2.87	140	4.5	SK DCN 4-4.99	•
ICP 047	4.70	0.700	2.85	140	4.5	SK DCN 4-4.99	•
ICP 048	4.80	0.710	2.84	140	4.5	SK DCN 4-4.99	•
ICP 049	4.90	0.730	2.82	140	4.5	SK DCN 4-4.99	•
ICP 050	5.00	0.730	2.97	140	5.0	SK DCN 5-5.99	•
ICP 051	5.10	0.750	3.02	140	5.0	SK DCN 5-5.99	•
ICP 052	5.20	0.770	3.00	140	5.0	SK DCN 5-5.99	•
ICP 053	5.30	0.780	2.99	140	5.0	SK DCN 5-5.99	•
ICP 054	5.40	0.800	2.97	140	5.0	SK DCN 5-5.99	•
ICP 055	5.50	0.810	3.04	140	5.5	SK DCN 5-5.99	•
ICP 056	5.60	0.830	3.02	140	5.5	SK DCN 5-5.99	•
ICP 057	5.70	0.850	3.00	140	5.5	SK DCN 5-5.99	•
ICP 058	5.80	0.860	2.99	140	5.5	SK DCN 5-5.99	•
ICP 059	5.90	0.880	2.97	140	5.5	SK DCN 5-5.99	•
ICP 060	6.00	0.960	3.04	140	6.0		•
ICP 061	6.10	0.980	3.02	140	6.0		•
ICP 062	6.20	1.000	3.00	140	6.0		•
ICP 063	6.30	1.010	2.99	140	6.0		•
ICP 0635	6.35	1.020	2.98	140	6.0		•
ICP 064	6.40	1.030	2.97	140	6.0		•
ICP 065	6.50	1.180	3.12	140	6.5		•
ICP 066	6.60	1.200	3.10	140	6.5		•
ICP 067	6.70	1.220	3.08	140	6.5		•
ICP 068	6.80	1.230	3.07	140	6.5		•
ICP 069	6.90	1.250	3.05	140	6.5		•
ICP 070	7.00	1.010	3.59	140	7.0		•
ICP 071	7.10	1.030	3.57	140	7.0		•
ICP 072	7.20	1.050	3.55	140	7.0		•
ICP 073	7.30	1.060	3.54	140	7.0		•
ICP 074	7.40	1.080	3.52	140	7.0		•
ICP 075	7.50	1.100	3.50	140	7.0		•
ICP 076	7.60	1.120	3.48	140	7.0		•
ICP 077	7.70	1.140	3.46	140	7.0		•
ICP 078	7.80	1.160	3.44	140	7.0		•
ICP 079	7.90	1.170	3.43	140	7.0		•
ICP 080	8.00	1.200	4.20	140	8.0		•
ICP 081	8.10	1.220	4.18	140	8.0		•
ICP 082	8.20	1.240	4.16	140	8.0		•
ICP 083	8.30	1.250	4.15	140	8.0		•
ICP 084	8.40	1.270	4.13	140	8.0		•
ICP 085	8.50	1.290	4.11	140	8.0		•
ICP 086	8.60	1.310	4.09	140	8.0		•
ICP 087	8.70	1.330	4.07	140	8.0		•
ICP 088	8.80	1.350	4.05	140	8.0		•
ICP 089	8.90	1.360	4.04	140	8.0		•
ICP 090	9.00	1.350	4.45	140	9.0		•
ICP 091	9.10	1.370	4.43	140	9.0		•
ICP 092	9.20	1.390	4.41	140	9.0		•
ICP 093	9.30	1.400	4.40	140	9.0		•

• The drill head has a honed cutting edge • For cutting conditions see page 68-81

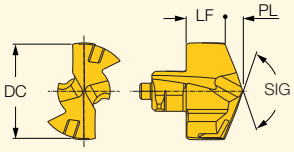
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • MNC-5D (66) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICP (continued)

Exchangeable Drilling Heads for DCN Drills, for Machining ISO P Materials



Designation	Dimensions					IC908
	DC	PL	LF	SIG	SSC(1)	
ICP 094	9.40	1.420	4.38	140	9.0	•
ICP 095	9.50	1.440	4.36	140	9.0	•
ICP 096	9.60	1.460	4.34	140	9.0	•
ICP 097	9.70	1.480	4.32	140	9.0	•
ICP 098	9.80	1.500	4.30	140	9.0	•
ICP 099	9.90	1.510	4.29	140	9.0	•
ICP 100	10.00	1.500	4.70	140	10.0	•
ICP 101	10.10	1.520	4.68	140	10.0	•
ICP 102	10.20	1.540	4.66	140	10.0	•
ICP 103	10.30	1.550	4.65	140	10.0	•
ICP 104	10.40	1.570	4.63	140	10.0	•
ICP 105	10.50	1.590	4.61	140	10.0	•
ICP 106	10.60	1.610	4.59	140	10.0	•
ICP 107	10.70	1.630	4.57	140	10.0	•
ICP 108	10.80	1.650	4.55	140	10.0	•
ICP 109	10.90	1.660	4.54	140	10.0	•
ICP 110	11.00	1.670	4.93	140	11.0	•
ICP 111	11.10	1.690	4.91	140	11.0	•
ICP 112	11.20	1.710	4.89	140	11.0	•
ICP 113	11.30	1.720	4.88	140	11.0	•
ICP 114	11.40	1.740	4.86	140	11.0	•
ICP 115	11.50	1.760	4.84	140	11.0	•
ICP 116	11.60	1.780	4.82	140	11.0	•
ICP 117	11.70	1.800	4.80	140	11.0	•
ICP 118	11.80	1.820	4.78	140	11.0	•
ICP 119	11.90	1.830	4.77	140	11.0	•
ICP 120	12.00	1.820	5.18	140	12.0	•
ICP 121	12.10	1.320	5.16	140	12.0	•
ICP 122	12.20	1.340	5.14	140	12.0	•
ICP 123	12.30	1.350	5.13	140	12.0	•
ICP 124	12.40	1.370	5.11	140	12.0	•
ICP 125	12.50	1.390	5.09	140	12.0	•
ICP 126	12.60	1.410	5.07	140	12.0	•
ICP 127	12.70	1.430	5.05	140	12.0	•
ICP 128	12.80	1.450	5.03	140	12.0	•
ICP 129	12.90	1.460	5.02	140	12.0	•
ICP 130	13.00	1.960	5.64	140	13.0	•
ICP 131	13.10	1.980	5.62	140	13.0	•
ICP 132	13.20	2.000	5.60	140	13.0	•
ICP 133	13.30	2.010	5.59	140	13.0	•
ICP 134	13.40	2.030	5.57	140	13.0	•
ICP 135	13.50	2.050	5.55	140	13.0	•
ICP 136	13.60	2.070	5.53	140	13.0	•
ICP 137	13.70	2.090	5.51	140	13.0	•
ICP 138	13.80	2.110	5.49	140	13.0	•
ICP 139	13.90	2.120	5.48	140	13.0	•
ICP 140	14.00	2.120	6.03	140	14.0	•
ICP 141	14.10	2.140	6.01	140	14.0	•
ICP 142	14.20	2.160	5.99	140	14.0	•
ICP 143	14.30	2.170	5.98	140	14.0	•
ICP 144	14.40	2.190	5.96	140	14.0	•
ICP 145	14.50	2.210	5.94	140	14.0	•
ICP 146	14.60	2.230	5.92	140	14.0	•
ICP 147	14.70	2.250	5.90	140	14.0	•

• The drill head has a honed cutting edge • For cutting conditions see page 68-81

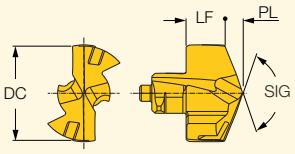
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • MNC-5D (66) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICP (continued)

Exchangeable Drilling Heads for DCN Drills, for Machining ISO P Materials



Designation	Dimensions					IC908
	DC	PL	LF	SIG	SSC(1)	
ICP 148	14.80	2.270	5.88	140	14.0	•
ICP 149	14.90	2.280	5.87	140	14.0	•
ICP 150	15.00	2.270	6.46	140	15.0	•
ICP 151	15.10	2.290	6.44	140	15.0	•
ICP 152	15.20	2.310	6.42	140	15.0	•
ICP 153	15.30	2.320	6.41	140	15.0	•
ICP 154	15.40	2.340	6.39	140	15.0	•
ICP 155	15.50	2.360	6.37	140	15.0	•
ICP 156	15.60	2.380	6.35	140	15.0	•
ICP 157	15.70	2.400	6.33	140	15.0	•
ICP 158	15.80	2.420	6.31	140	15.0	•
ICP 159	15.90	2.430	6.30	140	15.0	•
ICP 160	16.00	2.420	6.88	140	16.0	•
ICP 161	16.10	2.440	6.86	140	16.0	•
ICP 162	16.20	2.460	6.84	140	16.0	•
ICP 163	16.30	2.470	6.83	140	16.0	•
ICP 164	16.40	2.490	6.81	140	16.0	•
ICP 165	16.50	2.510	6.79	140	16.0	•
ICP 166	16.60	2.530	6.77	140	16.0	•
ICP 167	16.70	2.550	6.75	140	16.0	•
ICP 168	16.80	2.570	6.73	140	16.0	•
ICP 169	16.90	2.580	6.72	140	16.0	•
ICP 170	17.00	2.590	7.31	140	17.0	•
ICP 171	17.10	2.610	7.29	140	17.0	•
ICP 172	17.20	2.630	7.27	140	17.0	•
ICP 173	17.30	2.640	7.26	140	17.0	•
ICP 174	17.40	2.660	7.24	140	17.0	•
ICP 175	17.50	2.680	7.22	140	17.0	•
ICP 176	17.60	2.700	7.20	140	17.0	•
ICP 177	17.70	2.720	7.18	140	17.0	•
ICP 178	17.80	2.740	7.16	140	17.0	•
ICP 179	17.90	2.750	7.15	140	17.0	•
ICP 180	18.00	2.730	7.77	140	18.0	•
ICP 181	18.10	2.750	7.75	140	18.0	•
ICP 182	18.20	2.770	7.73	140	18.0	•
ICP 183	18.30	2.780	7.72	140	18.0	•
ICP 184	18.40	2.800	7.70	140	18.0	•
ICP 185	18.50	2.820	7.68	140	18.0	•
ICP 186	18.60	2.840	7.66	140	18.0	•
ICP 187	18.70	2.860	7.64	140	18.0	•
ICP 188	18.80	2.880	7.62	140	18.0	•
ICP 189	18.90	2.890	7.61	140	18.0	•
ICP 190	19.00	2.880	8.12	140	19.0	•
ICP 1905	19.05	2.890	8.11	140	19.0	•
ICP 191	19.10	2.900	8.10	140	19.0	•
ICP 192	19.20	2.920	8.08	140	19.0	•
ICP 1927	19.27	2.930	8.07	140	19.0	•
ICP 193	19.30	2.930	8.07	140	19.0	•
ICP 194	19.40	2.950	8.05	140	19.0	•
ICP 195	19.50	2.970	8.03	140	19.0	•
ICP 196	19.60	2.990	8.01	140	19.0	•
ICP 197	19.70	3.010	7.99	140	19.0	•
ICP 198	19.80	3.030	7.97	140	19.0	•
ICP 199	19.90	3.040	7.96	140	19.0	•
ICP 200	20.00	3.020	8.58	140	20.0	•

• The drill head has a honed cutting edge • For cutting conditions see page 68-81

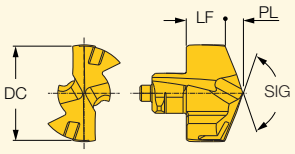
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • MNC-5D (66) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICP (continued)

Exchangeable Drilling Heads for DCN Drills, for Machining ISO P Materials



Designation	Dimensions					IC908
	DC	PL	LF	SIG	SSC(1)	
ICP 201	20.10	3.040	8.56	140	20.0	•
ICP 202	20.20	3.060	8.54	140	20.0	•
ICP 203	20.30	3.070	8.53	140	20.0	•
ICP 204	20.40	3.090	8.51	140	20.0	•
ICP 205	20.50	3.110	8.49	140	20.0	•
ICP 206	20.60	3.130	8.47	140	20.0	•
ICP 207	20.70	3.150	8.45	140	20.0	•
ICP 208	20.80	3.170	8.43	140	20.0	•
ICP 209	20.90	3.180	8.42	140	20.0	•
ICP 210	21.00	3.180	9.00	140	21.0	•
ICP 211	21.10	3.200	8.98	140	21.0	•
ICP 212	21.20	3.220	8.96	140	21.0	•
ICP 213	21.30	3.230	8.95	140	21.0	•
ICP 214	21.40	3.250	8.93	140	21.0	•
ICP 215	21.50	3.270	8.91	140	21.0	•
ICP 216	21.60	3.290	8.89	140	21.0	•
ICP 217	21.70	3.310	8.87	140	21.0	•
ICP 218	21.80	3.330	8.85	140	21.0	•
ICP 219	21.90	3.340	8.84	140	21.0	•
ICP 220	22.00	3.320	9.44	140	22.0	•
ICP 221	22.10	3.340	9.42	140	22.0	•
ICP 222	22.20	3.360	9.40	140	22.0	•
ICP 223	22.30	3.370	9.39	140	22.0	•
ICP 224	22.40	3.390	9.37	140	22.0	•
ICP 225	22.50	3.410	9.35	140	22.0	•
ICP 226	22.60	3.430	9.33	140	22.0	•
ICP 227	22.70	3.450	9.31	140	22.0	•
ICP 228	22.80	3.470	9.29	140	22.0	•
ICP 229	22.90	3.480	9.28	140	22.0	•
ICP 230	23.00	3.460	9.87	140	23.0	•
ICP 231	23.10	3.480	9.85	140	23.0	•
ICP 232	23.20	3.500	9.83	140	23.0	•
ICP 233	23.30	3.510	9.82	140	23.0	•
ICP 234	23.40	3.530	9.80	140	23.0	•
ICP 235	23.50	3.550	9.78	140	23.0	•
ICP 236	23.60	3.570	9.76	140	23.0	•
ICP 237	23.70	3.590	9.74	140	23.0	•
ICP 238	23.80	3.610	9.72	140	23.0	•
ICP 239	23.90	3.620	9.71	140	23.0	•
ICP 240	24.00	3.620	10.28	140	24.0	•
ICP 241	24.10	3.640	10.26	140	24.0	•
ICP 242	24.20	3.660	10.24	140	24.0	•
ICP 243	24.30	3.670	10.23	140	24.0	•
ICP 244	24.40	3.690	10.21	140	24.0	•
ICP 245	24.50	3.710	10.19	140	24.0	•
ICP 246	24.60	3.730	10.17	140	24.0	•
ICP 247	24.70	3.750	10.15	140	24.0	•
ICP 248	24.80	3.770	10.13	140	24.0	•
ICP 249	24.90	3.780	10.12	140	24.0	•
ICP 250	25.00	3.800	10.70	140	25.0	•
ICP 251	25.10	3.820	10.68	140	25.0	•
ICP 252	25.20	3.840	10.66	140	25.0	•
ICP 253	25.30	3.850	10.65	140	25.0	•
ICP 254	25.40	3.870	10.63	140	25.0	•
ICP 255	25.50	3.890	10.61	140	25.0	•

• The drill head has a honed cutting edge • For cutting conditions see page 68-81

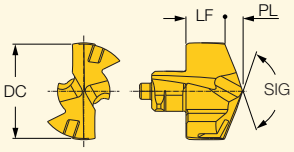
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • MNC-5D (66) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICP (continued)

Exchangeable Drilling Heads for DCN Drills, for Machining ISO P Materials



Designation	Dimensions					IC908
	DC	PL	LF	SIG	SSC(1)	
ICP 256	25.60	3.910	10.59	140	25.0	•
ICP 257	25.70	3.930	10.57	140	25.0	•
ICP 258	25.80	3.950	10.55	140	25.0	•
ICP 259	25.90	3.960	10.54	140	25.0	•
ICP 260	26.00	3.950	11.12	140	26.0	•
ICP 261	26.10	3.970	11.10	140	26.0	•
ICP 262	26.20	3.990	11.08	140	26.0	•
ICP 263	26.30	4.000	11.07	140	26.0	•
ICP 264	26.40	4.020	11.05	140	26.0	•
ICP 265	26.50	4.040	11.03	140	26.0	•
ICP 266	26.60	4.060	11.01	140	26.0	•
ICP 267	26.70	4.080	10.99	140	26.0	•
ICP 268	26.80	4.100	10.97	140	26.0	•
ICP 269	26.90	4.110	10.96	140	26.0	•
ICP 270	27.00	4.100	11.55	140	27.0	•
ICP 271	27.10	4.120	11.53	140	27.0	•
ICP 272	27.20	4.140	11.51	140	27.0	•
ICP 273	27.30	4.150	11.50	140	27.0	•
ICP 274	27.40	4.170	11.48	140	27.0	•
ICP 275	27.50	4.190	11.46	140	27.0	•
ICP 276	27.60	4.210	11.44	140	27.0	•
ICP 277	27.70	4.230	11.42	140	27.0	•
ICP 278	27.80	4.250	11.40	140	27.0	•
ICP 279	27.90	4.260	11.39	140	27.0	•
ICP 280	28.00	4.250	11.97	140	28.0	•
ICP 281	28.10	4.270	11.95	140	28.0	•
ICP 282	28.20	4.290	11.93	140	28.0	•
ICP 283	28.30	4.300	11.92	140	28.0	•
ICP 284	28.40	4.320	11.90	140	28.0	•
ICP 285	28.50	4.340	11.88	140	28.0	•
ICP 2858	28.58	4.360	11.86	140	28.0	•
ICP 286	28.60	4.360	11.86	140	28.0	•
ICP 287	28.70	4.380	11.84	140	28.0	•
ICP 288	28.80	4.400	11.82	140	28.0	•
ICP 289	28.90	4.410	11.81	140	28.0	•
ICP 290	29.00	4.430	12.37	140	29.0	•
ICP 291	29.10	4.450	12.35	140	29.0	•
ICP 292	29.20	4.470	12.33	140	29.0	•
ICP 293	29.30	4.480	12.32	140	29.0	•
ICP 294	29.40	4.500	12.30	140	29.0	•
ICP 295	29.50	4.520	12.28	140	29.0	•
ICP 296	29.60	4.540	12.26	140	29.0	•
ICP 297	29.70	4.560	12.24	140	29.0	•
ICP 298	29.80	4.580	12.22	140	29.0	•
ICP 299	29.90	4.590	12.21	140	29.0	•
ICP 300	30.00	4.590	12.79	140	30.0	•
ICP 301	30.10	4.610	12.77	140	30.0	•
ICP 302	30.20	4.630	12.75	140	30.0	•
ICP 303	30.30	4.640	12.74	140	30.0	•
ICP 304	30.40	4.660	12.72	140	30.0	•
ICP 305	30.50	4.680	12.70	140	30.0	•
ICP 306	30.60	4.700	12.68	140	30.0	•
ICP 307	30.70	4.720	12.66	140	30.0	•
ICP 308	30.80	4.740	12.64	140	30.0	•

• The drill head has a honed cutting edge • For cutting conditions see page 68-81

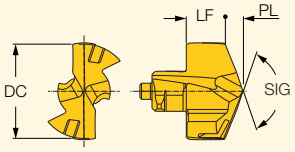
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • MNC-5D (66) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICP (continued)

Exchangeable Drilling Heads for DCN Drills, for Machining ISO P Materials



Designation	Dimensions					IC908
	DC	PL	LF	SIG	SSC(1)	
ICP 309	30.90	4.750	12.63	140	30.0	●
ICP 310	31.00	4.760	13.20	140	31.0	●
ICP 311	31.10	4.780	13.18	140	31.0	●
ICP 312	31.20	4.800	13.16	140	31.0	●
ICP 313	31.30	4.810	13.15	140	31.0	●
ICP 314	31.40	4.830	13.13	140	31.0	●
ICP 315	31.50	4.850	13.11	140	31.0	●
ICP 316	31.60	4.870	13.09	140	31.0	●
ICP 317	31.70	4.890	13.07	140	31.0	●
ICP 3175	31.75	4.900	13.06	140	31.0	●
ICP 318	31.80	4.910	13.05	140	31.0	●
ICP 319	31.90	4.920	13.04	140	31.0	●
ICP 320	32.00	4.860	13.68	140	32.0	●
ICP 321	32.10	4.880	13.66	140	32.0	●
ICP 322	32.20	4.900	13.64	140	32.0	●
ICP 323	32.30	4.910	13.63	140	32.0	●
ICP 324	32.40	4.930	13.61	140	32.0	●
ICP 325	32.50	4.950	13.59	140	32.0	●
ICP 326	32.60	4.970	13.57	140	32.0	●
ICP 327	32.70	4.990	13.55	140	32.0	●
ICP 328	32.80	5.010	13.53	140	32.0	●
ICP 329	32.90	5.020	13.52	140	32.0	●

• The drill head has a honed cutting edge • For cutting conditions see page 68-81

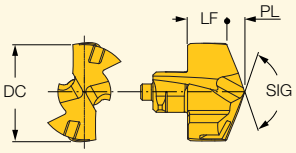
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • MNC-5D (66) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICP-2M

Exchangeable Double Margin Drilling Heads for DCN Drills, for Machining ISO P Materials with High Surface Finish Results



Designation	Dimensions					IC908
	DC	LF	PL	SIG	SSC(1)	
ICP 060-2M	6.00	2.91	1.090	140	6.0	•
ICP 061-2M	6.10	2.89	1.110	140	6.0	•
ICP 062-2M	6.20	2.87	1.130	140	6.0	•
ICP 064-2M	6.40	2.84	1.160	140	6.0	•
ICP 065-2M	6.50	3.12	1.180	140	6.5	•
ICP 066-2M	6.60	3.10	1.200	140	6.5	•
ICP 067-2M	6.70	3.08	1.220	140	6.5	•
ICP 068-2M	6.80	3.06	1.240	140	6.5	•
ICP 069-2M	6.90	3.04	1.260	140	6.5	•
ICP 070-2M	7.00	3.33	1.270	140	7.0	•
ICP 071-2M	7.10	3.31	1.290	140	7.0	•
ICP 073-2M	7.30	3.27	1.330	140	7.0	•
ICP 074-2M	7.40	3.25	1.350	140	7.0	•
ICP 075-2M	7.50	3.24	1.360	140	7.0	•
ICP 077-2M	7.70	3.20	1.400	140	7.0	•
ICP 078-2M	7.80	3.18	1.420	140	7.0	•
ICP 079-2M	7.90	3.16	1.440	140	7.0	•
ICP 080-2M	8.00	3.94	1.460	140	8.0	•
ICP 081-2M	8.10	3.93	1.470	140	8.0	•
ICP 082-2M	8.20	3.91	1.490	140	8.0	•
ICP 083-2M	8.30	3.89	1.510	140	8.0	•
ICP 084-2M	8.40	3.87	1.530	140	8.0	•
ICP 085-2M	8.50	3.85	1.550	140	8.0	•
ICP 086-2M	8.60	3.83	1.570	140	8.0	•
ICP 087-2M	8.70	3.82	1.580	140	8.0	•
ICP 088-2M	8.80	3.80	1.600	140	8.0	•
ICP 089-2M	8.90	3.78	1.620	140	8.0	•
ICP 090-2M	9.00	4.16	1.640	140	9.0	•
ICP 091-2M	9.10	4.14	1.660	140	9.0	•
ICP 092-2M	9.20	4.13	1.670	140	9.0	•
ICP 093-2M	9.30	4.11	1.690	140	9.0	•
ICP 094-2M	9.40	4.09	1.710	140	9.0	•
ICP 095-2M	9.50	4.07	1.730	140	9.0	•
ICP 096-2M	9.60	4.05	1.750	140	9.0	•
ICP 097-2M	9.70	4.03	1.770	140	9.0	•
ICP 098-2M	9.80	4.02	1.780	140	9.0	•
ICP 099-2M	9.90	4.00	1.800	140	9.0	•
ICP 100-2M	10.00	4.38	1.820	140	10.0	•
ICP 101-2M	10.10	4.36	1.840	140	10.0	•
ICP 102-2M	10.20	4.34	1.860	140	10.0	•
ICP 103-2M	10.30	4.33	1.870	140	10.0	•
ICP 104-2M	10.40	4.31	1.890	140	10.0	•
ICP 105-2M	10.50	4.29	1.910	140	10.0	•
ICP 106-2M	10.60	4.27	1.930	140	10.0	•
ICP 107-2M	10.70	4.25	1.950	140	10.0	•
ICP 108-2M	10.80	4.23	1.970	140	10.0	•
ICP 109-2M	10.90	4.22	1.980	140	10.0	•
ICP 110-2M	11.00	4.60	2.000	140	11.0	•
ICP 111-2M	11.10	4.58	2.020	140	11.0	•
ICP 112-2M	11.20	4.56	2.040	140	11.0	•
ICP 113-2M	11.30	4.54	2.060	140	11.0	•
ICP 114-2M	11.40	4.53	2.070	140	11.0	•
ICP 115-2M	11.50	4.51	2.090	140	11.0	•
ICP 116-2M	11.60	4.49	2.110	140	11.0	•

• Can provide high surface finish of up to 1.6 Ra hole cylindricity and straightness of up to 0.05 mm • For cutting conditions see page 68-81

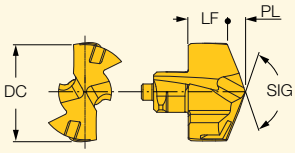
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICP-2M (continued)

Exchangeable Double Margin Drilling Heads for DCN Drills, for Machining ISO P Materials with High Surface Finish Results



Designation	Dimensions					IC908
	DC	LF	PL	SIG	SSC(1)	
ICP 117-2M	11.70	4.47	2.130	140	11.0	•
ICP 118-2M	11.80	4.45	2.150	140	11.0	•
ICP 119-2M	11.90	4.43	2.170	140	11.0	•
ICP 120-2M	12.00	4.82	2.180	140	12.0	•
ICP 121-2M	12.10	4.80	2.200	140	12.0	•
ICP 122-2M	12.20	4.78	2.220	140	12.0	•
ICP 123-2M	12.30	4.76	2.240	140	12.0	•
ICP 124-2M	12.40	4.74	2.260	140	12.0	•
ICP 125-2M	12.50	4.73	2.270	140	12.0	•
ICP 126-2M	12.60	4.71	2.290	140	12.0	•
ICP 127-2M	12.70	4.69	2.310	140	12.0	•
ICP 128-2M	12.80	4.67	2.330	140	12.0	•
ICP 129-2M	12.90	4.65	2.350	140	12.0	•
ICP 130-2M	13.00	5.23	2.370	140	13.0	•
ICP 131-2M	13.10	5.22	2.380	140	13.0	•
ICP 132-2M	13.20	5.20	2.400	140	13.0	•
ICP 133-2M	13.30	5.18	2.420	140	13.0	•
ICP 134-2M	13.40	5.16	2.440	140	13.0	•
ICP 135-2M	13.50	5.14	2.460	140	13.0	•
ICP 136-2M	13.60	5.13	2.470	140	13.0	•
ICP 137-2M	13.70	5.11	2.490	140	13.0	•
ICP 138-2M	13.80	5.09	2.510	140	13.0	•
ICP 139-2M	13.90	5.07	2.530	140	13.0	•
ICP 140-2M	14.00	5.60	2.550	140	14.0	•
ICP 141-2M	14.10	5.58	2.570	140	14.0	•
ICP 142-2M	14.20	5.57	2.580	140	14.0	•
ICP 143-2M	14.30	5.55	2.600	140	14.0	•
ICP 144-2M	14.40	5.53	2.620	140	14.0	•
ICP 145-2M	14.50	5.51	2.640	140	14.0	•
ICP 146-2M	14.60	5.49	2.660	140	14.0	•
ICP 147-2M	14.70	5.47	2.680	140	14.0	•
ICP 148-2M	14.80	5.46	2.690	140	14.0	•
ICP 149-2M	14.90	5.44	2.710	140	14.0	•
ICP 150-2M	15.00	6.00	2.730	140	15.0	•
ICP 151-2M	15.10	5.98	2.750	140	15.0	•
ICP 152-2M	15.20	5.96	2.770	140	15.0	•
ICP 153-2M	15.30	5.95	2.780	140	15.0	•
ICP 154-2M	15.40	5.93	2.800	140	15.0	•
ICP 155-2M	15.50	5.91	2.820	140	15.0	•
ICP 156-2M	15.60	5.89	2.840	140	15.0	•
ICP 157-2M	15.70	5.87	2.860	140	15.0	•
ICP 158-2M	15.80	5.85	2.880	140	15.0	•
ICP 159-2M	15.90	5.84	2.890	140	15.0	•
ICP 160-2M	16.00	6.39	2.910	140	16.0	•
ICP 161-2M	16.10	6.37	2.930	140	16.0	•
ICP 162-2M	16.20	6.35	2.950	140	16.0	•
ICP 163-2M	16.30	6.33	2.970	140	16.0	•
ICP 165-2M	16.50	6.30	3.000	140	16.0	•
ICP 166-2M	16.60	6.28	3.020	140	16.0	•
ICP 167-2M	16.70	6.26	3.040	140	16.0	•
ICP 170-2M	17.00	6.81	3.090	140	17.0	•
ICP 171-2M	17.10	6.79	3.110	140	17.0	•
ICP 172-2M	17.20	6.77	3.130	140	17.0	•
ICP 174-2M	17.40	6.73	3.170	140	17.0	•

• Can provide high surface finish of up to 1.6 Ra hole cylindricity and straightness of up to 0.05 mm • For cutting conditions see page 68-81

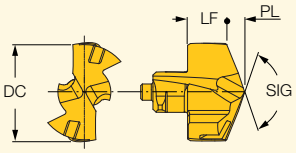
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICP-2M (continued)

Exchangeable Double Margin Drilling Heads for DCN Drills, for Machining ISO P Materials with High Surface Finish Results



Designation	Dimensions					IC908
	DC	LF	PL	SIG	SSC(1)	
ICP 175-2M	17.50	6.72	3.180	140	17.0	•
ICP 177-2M	17.70	6.68	3.220	140	17.0	•
ICP 178-2M	17.80	6.66	3.240	140	17.0	•
ICP 179-2M	17.90	6.64	3.260	140	17.0	•
ICP 180-2M	18.00	7.22	3.280	140	18.0	•
ICP 181-2M	18.10	7.21	3.290	140	18.0	•
ICP 182-2M	18.20	7.19	3.310	140	18.0	•
ICP 183-2M	18.30	7.17	3.330	140	18.0	•
ICP 184-2M	18.40	7.15	3.350	140	18.0	•
ICP 185-2M	18.50	7.13	3.370	140	18.0	•
ICP 186-2M	18.60	7.12	3.380	140	18.0	•
ICP 187-2M	18.70	7.10	3.400	140	18.0	•
ICP 188-2M	18.80	7.08	3.420	140	18.0	•
ICP 189-2M	18.90	7.06	3.440	140	18.0	•
ICP 190-2M	19.00	7.54	3.460	140	19.0	•
ICP 191-2M	19.10	7.52	3.480	140	19.0	•
ICP 192-2M	19.20	7.51	3.490	140	19.0	•
ICP 1925-2M	19.25	7.50	3.500	140	19.0	•
ICP 1927-2M	19.27	7.49	3.510	140	19.0	•
ICP 193-2M	19.30	7.49	3.510	140	19.0	•
ICP 194-2M	19.40	7.47	3.530	140	19.0	•
ICP 195-2M	19.50	7.45	3.550	140	19.0	•
ICP 196-2M	19.60	7.43	3.570	140	19.0	•
ICP 197-2M	19.70	7.41	3.590	140	19.0	•
ICP 198-2M	19.80	7.40	3.600	140	19.0	•
ICP 199-2M	19.90	7.38	3.620	140	19.0	•
ICP 200-2M	20.00	7.96	3.640	140	20.0	•
ICP 201-2M	20.10	7.94	3.660	140	20.0	•
ICP 202-2M	20.20	7.92	3.680	140	20.0	•
ICP 203-2M	20.30	7.91	3.690	140	20.0	•
ICP 204-2M	20.40	7.89	3.710	140	20.0	•
ICP 206-2M	20.60	7.85	3.750	140	20.0	•
ICP 207-2M	20.70	7.83	3.770	140	20.0	•
ICP 208-2M	20.80	7.81	3.790	140	20.0	•
ICP 209-2M	20.90	7.80	3.800	140	20.0	•
ICP 210-2M	21.00	8.38	3.820	140	21.0	•
ICP 211-2M	21.10	8.36	3.840	140	21.0	•
ICP 212-2M	21.20	8.34	3.860	140	21.0	•
ICP 213-2M	21.30	8.32	3.880	140	21.0	•
ICP 214-2M	21.40	8.31	3.890	140	21.0	•
ICP 215-2M	21.50	8.29	3.910	140	21.0	•
ICP 216-2M	21.60	8.27	3.930	140	21.0	•
ICP 217-2M	21.70	8.25	3.950	140	21.0	•
ICP 218-2M	21.80	8.23	3.970	140	21.0	•
ICP 219-2M	21.90	8.21	3.990	140	21.0	•
ICP 220-2M	22.00	8.80	4.000	140	22.0	•
ICP 221-2M	22.10	8.78	4.020	140	22.0	•
ICP 222-2M	22.20	8.76	4.040	140	22.0	•
ICP 223-2M	22.30	8.74	4.060	140	22.0	•
ICP 224-2M	22.40	8.72	4.080	140	22.0	•
ICP 225-2M	22.50	8.71	4.090	140	22.0	•
ICP 226-2M	22.60	8.69	4.110	140	22.0	•
ICP 227-2M	22.70	8.67	4.130	140	22.0	•
ICP 228-2M	22.80	8.65	4.150	140	22.0	•

• Can provide high surface finish of up to 1.6 Ra hole cylindricity and straightness of up to 0.05 mm • For cutting conditions see page 68-81

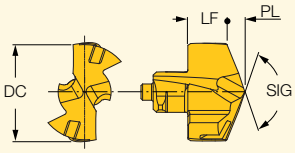
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICP-2M (continued)

Exchangeable Double Margin Drilling Heads for DCN Drills, for Machining ISO P Materials with High Surface Finish Results



Designation	Dimensions					IC908
	DC	LF	PL	SIG	SSC(1)	
ICP 229-2M	22.90	8.63	4.170	140	22.0	•
ICP 230-2M	23.00	9.11	4.190	140	23.0	•
ICP 231-2M	23.10	9.10	4.200	140	23.0	•
ICP 232-2M	23.20	9.08	4.220	140	23.0	•
ICP 233-2M	23.30	9.06	4.240	140	23.0	•
ICP 234-2M	23.40	9.04	4.260	140	23.0	•
ICP 235-2M	23.50	9.02	4.280	140	23.0	•
ICP 236-2M	23.60	9.01	4.290	140	23.0	•
ICP 237-2M	23.70	8.99	4.310	140	23.0	•
ICP 238-2M	23.80	8.97	4.330	140	23.0	•
ICP 239-2M	23.90	8.95	4.350	140	23.0	•
ICP 240-2M	24.00	9.53	4.370	140	24.0	•
ICP 241-2M	24.10	9.51	4.390	140	24.0	•
ICP 242-2M	24.20	9.50	4.400	140	24.0	•
ICP 243-2M	24.30	9.48	4.420	140	24.0	•
ICP 245-2M	24.50	9.44	4.460	140	24.0	•
ICP 246-2M	24.60	9.42	4.480	140	24.0	•
ICP 247-2M	24.70	9.40	4.500	140	24.0	•
ICP 248-2M	24.80	9.39	4.510	140	24.0	•
ICP 249-2M	24.90	9.37	4.530	140	24.0	•
ICP 250-2M	25.00	9.95	4.550	140	25.0	•
ICP 251-2M	25.10	9.93	4.570	140	25.0	•
ICP 252-2M	25.20	9.91	4.590	140	25.0	•
ICP 253-2M	25.30	9.90	4.600	140	25.0	•
ICP 254-2M	25.40	9.88	4.620	140	25.0	•
ICP 255-2M	25.50	9.86	4.640	140	25.0	•
ICP 256-2M	25.60	9.84	4.660	140	25.0	•
ICP 2567-2M	25.67	10.58	3.920	140	25.0	•
ICP 257-2M	25.70	9.82	4.680	140	25.0	•
ICP 258-2M	25.80	9.80	4.700	140	25.0	•
ICP 259-2M	25.90	9.79	4.710	140	25.0	•

• Can provide high surface finish of up to 1.6 Ra hole cylindricity and straightness of up to 0.05 mm • For cutting conditions see page 68-81

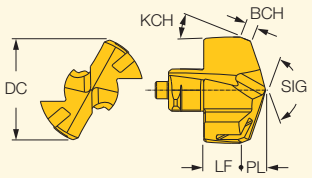
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICK

Exchangeable Drilling Heads for DCN Drills, for Machining ISO K Materials



Designation	Dimensions								Tough ↔ Hard	
	DC	LF	PL	BCH	KCH	SIG	SSC(1)		IC908	IC907
ICK 050	5.00	2.45	1.250	0.60	30.0	140	5.0	SK DCN 5-5.99	•	
ICK 055	5.50	2.47	1.380	0.60	30.0	140	5.5	SK DCN 5-5.99	•	
ICK 059	5.90	2.47	1.380	0.60	30.0	140	5.5	SK DCN 5-5.99	•	
ICK 061	6.10	2.48	1.520	0.72	30.0	140	6.0		•	
ICK 062	6.20	2.48	1.520	0.72	30.0	140	6.0		•	
ICK 063	6.30	2.48	1.520	0.72	30.0	140	6.0		•	
ICK 0635	6.35	2.48	1.520	0.72	30.0	140	6.0		•	
ICK 064	6.40	2.48	1.520	0.72	30.0	140	6.0		•	
ICK 065	6.50	2.64	1.660	0.72	30.0	140	6.5		•	
ICK 066	6.60	2.64	1.660	0.72	30.0	140	6.5		•	
ICK 067	6.70	2.64	1.660	0.72	30.0	140	6.5		•	
ICK 068	6.80	2.64	1.660	0.72	30.0	140	6.5		•	
ICK 069	6.90	2.64	1.660	0.72	30.0	140	6.5		•	
ICK 070	7.00	3.02	1.580	0.84	30.0	140	7.0		•	
ICK 071	7.10	3.02	1.580	0.84	30.0	140	7.0		•	
ICK 072	7.20	3.02	1.580	0.84	30.0	140	7.0		•	
ICK 073	7.30	3.02	1.580	0.84	30.0	140	7.0		•	
ICK 074	7.40	3.02	1.580	0.84	30.0	140	7.0		•	
ICK 075	7.50	3.02	1.580	0.84	30.0	140	7.0		•	
ICK 076	7.60	3.02	1.580	0.84	30.0	140	7.0		•	
ICK 078	7.80	3.02	1.580	0.84	30.0	140	7.0		•	
ICK 079	7.90	3.02	1.580	0.84	30.0	140	7.0		•	
ICK 080	8.00	3.43	1.970	0.96	30.0	140	8.0		•	•
ICK 082	8.20	3.43	1.970	0.96	30.0	140	8.0		•	
ICK 083	8.30	3.43	1.970	0.96	30.0	140	8.0		•	
ICK 084	8.40	3.43	1.970	0.96	30.0	140	8.0		•	
ICK 085	8.50	3.43	1.970	0.96	30.0	140	8.0		•	•
ICK 086	8.60	3.43	1.970	0.96	30.0	140	8.0		•	
ICK 087	8.70	3.43	1.970	0.96	30.0	140	8.0		•	
ICK 088	8.80	3.43	1.970	0.96	30.0	140	8.0		•	
ICK 089	8.90	3.43	1.970	0.96	30.0	140	8.0		•	
ICK 090	9.00	3.60	2.200	1.08	30.0	140	9.0		•	•
ICK 091	9.10	3.60	2.200	1.08	30.0	140	9.0		•	•
ICK 092	9.20	3.60	2.200	1.08	30.0	140	9.0		•	
ICK 094	9.40	3.60	2.200	1.08	30.0	140	9.0		•	
ICK 095	9.50	3.60	2.200	1.08	30.0	140	9.0		•	•
ICK 098	9.80	3.60	2.200	1.08	30.0	140	9.0		•	
ICK 099	9.90	3.60	2.200	1.08	30.0	140	9.0		•	
ICK 100	10.00	3.77	2.430	1.20	30.0	140	10.0		•	•
ICK 101	10.10	3.77	2.430	1.20	30.0	140	10.0		•	
ICK 102	10.20	3.77	2.430	1.20	30.0	140	10.0		•	•
ICK 103	10.30	3.77	2.430	1.20	30.0	140	10.0		•	•
ICK 104	10.40	3.77	2.430	1.20	30.0	140	10.0		•	
ICK 105	10.50	3.77	2.430	1.20	30.0	140	10.0		•	•
ICK 106	10.60	3.77	2.430	1.20	30.0	140	10.0		•	•
ICK 107	10.70	3.77	2.430	1.20	30.0	140	10.0		•	•
ICK 108	10.80	3.77	2.430	1.20	30.0	140	10.0		•	•
ICK 109	10.90	3.77	2.430	1.20	30.0	140	10.0		•	
ICK 110	11.00	3.94	2.660	1.32	30.0	140	11.0		•	
ICK 111	11.10	3.94	2.660	1.32	30.0	140	11.0		•	•
ICK 112	11.20	3.94	2.660	1.32	30.0	140	11.0		•	
ICK 113	11.30	3.94	2.660	1.32	30.0	140	11.0		•	•
ICK 114	11.40	3.94	2.660	1.32	30.0	140	11.0		•	
ICK 115	11.50	3.94	2.660	1.32	30.0	140	11.0		•	•
ICK 116	11.60	3.94	2.660	1.32	30.0	140	11.0		•	

• The drill head is produced with a ground chamfer and a honed cutting edge • For cutting conditions see page 68-81

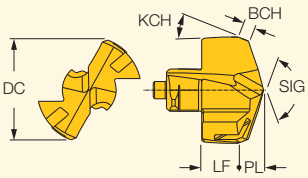
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICK (continued)

Exchangeable Drilling Heads for DCN Drills, for Machining ISO K Materials



Designation	Dimensions							Tough ↔ Hard	
	DC	LF	PL	BCH	KCH	SIG	SSC(1)	IC908	IC907
ICK 117	11.70	3.94	2.660	1.32	30.0	140	11.0	•	•
ICK 118	11.80	3.94	2.660	1.32	30.0	140	11.0	•	
ICK 119	11.90	3.94	2.660	1.32	30.0	140	11.0	•	
ICK 120	12.00	4.10	2.180	1.44	30.0	140	12.0	•	•
ICK 121	12.10	4.10	2.200	1.44	30.0	140	12.0	•	
ICK 122	12.20	4.10	2.220	1.44	30.0	140	12.0	•	
ICK 123	12.30	4.10	2.240	1.44	30.0	140	12.0	•	
ICK 124	12.40	4.10	2.260	1.44	30.0	140	12.0	•	
ICK 125	12.50	4.10	2.270	1.44	30.0	140	12.0	•	•
ICK 126	12.60	4.10	2.290	1.44	30.0	140	12.0	•	
ICK 127	12.70	4.10	2.310	1.44	30.0	140	12.0	•	
ICK 128	12.80	4.10	2.330	1.44	30.0	140	12.0	•	•
ICK 129	12.90	4.10	2.350	1.44	30.0	140	12.0	•	
ICK 130	13.00	4.48	3.120	1.56	30.0	140	13.0	•	•
ICK 131	13.10	4.48	3.120	1.56	30.0	140	13.0	•	
ICK 132	13.20	4.48	3.120	1.56	30.0	140	13.0	•	•
ICK 133	13.30	4.48	3.120	1.56	30.0	140	13.0	•	
ICK 134	13.40	4.48	3.120	1.56	30.0	140	13.0	•	
ICK 135	13.50	4.48	3.120	1.56	30.0	140	13.0	•	•
ICK 136	13.60	4.48	3.120	1.56	30.0	140	13.0	•	•
ICK 137	13.70	4.48	3.120	1.56	30.0	140	13.0	•	•
ICK 138	13.80	4.48	3.120	1.56	30.0	140	13.0	•	•
ICK 139	13.90	4.48	3.120	1.56	30.0	140	13.0	•	
ICK 140	14.00	4.79	3.360	1.68	30.0	140	14.0	•	•
ICK 141	14.10	4.79	3.360	1.68	30.0	140	14.0	•	•
ICK 142	14.20	4.79	3.360	1.68	30.0	140	14.0	•	•
ICK 143	14.30	4.79	3.360	1.68	30.0	140	14.0	•	•
ICK 144	14.40	4.79	3.360	1.68	30.0	140	14.0	•	
ICK 145	14.50	4.79	3.360	1.68	30.0	140	14.0	•	•
ICK 146	14.60	4.79	3.360	1.68	30.0	140	14.0	•	
ICK 147	14.70	4.79	3.360	1.68	30.0	140	14.0	•	•
ICK 148	14.80	4.79	3.360	1.68	30.0	140	14.0	•	
ICK 149	14.90	4.79	3.360	1.68	30.0	140	14.0	•	
ICK 150	15.00	5.14	3.590	1.80	30.0	140	15.0	•	•
ICK 151	15.10	5.14	3.590	1.80	30.0	140	15.0	•	
ICK 152	15.20	5.14	3.590	1.80	30.0	140	15.0	•	
ICK 153	15.30	5.14	3.590	1.80	30.0	140	15.0	•	•
ICK 154	15.40	5.14	3.590	1.80	30.0	140	15.0	•	•
ICK 155	15.50	5.14	3.590	1.80	30.0	140	15.0	•	•
ICK 156	15.60	5.14	3.590	1.80	30.0	140	15.0	•	•
ICK 157	15.70	5.14	3.590	1.80	30.0	140	15.0	•	•
ICK 158	15.80	5.14	3.590	1.80	30.0	140	15.0	•	•
ICK 159	15.90	5.14	3.590	1.80	30.0	140	15.0	•	
ICK 160	16.00	5.55	3.750	1.92	30.0	140	16.0	•	
ICK 161	16.10	5.55	3.750	1.92	30.0	140	16.0	•	
ICK 162	16.20	5.55	3.750	1.92	30.0	140	16.0	•	
ICK 163	16.30	5.55	3.750	1.92	30.0	140	16.0	•	
ICK 164	16.40	5.55	3.750	1.92	30.0	140	16.0	•	•
ICK 165	16.50	5.55	3.750	1.92	30.0	140	16.0	•	•
ICK 166	16.60	5.55	3.750	1.92	30.0	140	16.0	•	
ICK 167	16.70	5.55	3.750	1.92	30.0	140	16.0	•	
ICK 168	16.80	5.55	3.750	1.92	30.0	140	16.0	•	•
ICK 170	17.00	5.84	4.060	2.04	30.0	140	17.0	•	•
ICK 171	17.10	5.84	4.060	2.04	30.0	140	17.0	•	•

• The drill head is produced with a ground chamfer and a honed cutting edge • For cutting conditions see page 68-81

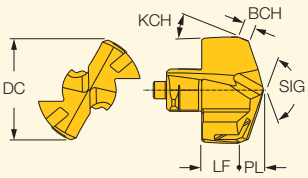
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICK (continued)

Exchangeable Drilling Heads for DCN Drills, for Machining ISO K Materials



Designation	Dimensions							Tough ↔ Hard	
	DC	LF	PL	BCH	KCH	SIG	SSC(1)	IC908	IC907
ICK 172	17.20	5.84	4.060	2.04	30.0	140	17.0	•	•
ICK 173	17.30	5.84	4.060	2.04	30.0	140	17.0	•	
ICK 174	17.40	5.84	4.060	2.04	30.0	140	17.0	•	
ICK 175	17.50	5.84	4.060	2.04	30.0	140	17.0	•	•
ICK 176	17.60	5.84	4.060	2.04	30.0	140	17.0	•	
ICK 177	17.70	5.84	4.060	2.04	30.0	140	17.0	•	
ICK 178	17.80	5.84	4.060	2.04	30.0	140	17.0	•	•
ICK 179	17.90	5.84	4.060	2.04	30.0	140	17.0	•	•
ICK 180	18.00	6.21	4.290	2.16	30.0	140	18.0	•	•
ICK 181	18.10	6.21	4.290	2.16	30.0	140	18.0	•	•
ICK 182	18.20	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 183	18.30	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 184	18.40	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 185	18.50	6.21	4.290	2.16	30.0	140	18.0	•	•
ICK 186	18.60	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 187	18.70	6.21	4.290	2.16	30.0	140	18.0	•	•
ICK 189	18.90	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 190	19.00	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 1905	19.05	6.47	4.530	2.28	30.0	140	19.0	•	•
ICK 191	19.10	6.47	4.530	2.28	30.0	140	19.0	•	•
ICK 192	19.20	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 193	19.30	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 194	19.40	6.47	4.530	2.28	30.0	140	19.0	•	•
ICK 195	19.50	6.47	4.530	2.28	30.0	140	19.0	•	•
ICK 196	19.60	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 197	19.70	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 198	19.80	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 199	19.90	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 200	20.00	6.81	4.790	2.40	30.0	140	20.0	•	•
ICK 201	20.10	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 204	20.40	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 205	20.50	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 206	20.60	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 207	20.70	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 208	20.80	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 209	20.90	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 210	21.00	7.20	4.980	2.52	30.0	140	21.0	•	•
ICK 211	21.10	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 212	21.20	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 213	21.30	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 215	21.50	7.20	4.980	2.52	30.0	140	21.0	•	•
ICK 216	21.60	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 217	21.70	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 218	21.80	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 219	21.90	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 220	22.00	7.54	5.220	2.64	30.0	140	22.0	•	•
ICK 221	22.10	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 222	22.20	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 223	22.30	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 225	22.50	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 226	22.60	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 227	22.70	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 230	23.00	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 231	23.10	7.88	5.450	2.76	30.0	140	23.0	•	•
ICK 233	23.30	7.88	5.450	2.76	30.0	140	23.0	•	

• The drill head is produced with a ground chamfer and a honed cutting edge • For cutting conditions see page 68-81

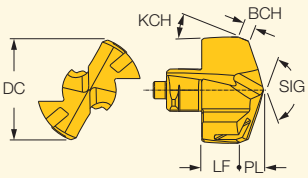
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICK (continued)

Exchangeable Drilling Heads for DCN Drills, for Machining ISO K Materials



Designation	Dimensions							Tough ↔ Hard	
	DC	LF	PL	BCH	KCH	SIG	SSC(1)	IC908	IC907
ICK 234	23.40	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 235	23.50	7.88	5.450	2.76	30.0	140	23.0	•	•
ICK 236	23.60	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 238	23.80	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 239	23.90	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 240	24.00	8.21	5.690	2.88	30.0	140	24.0	•	•
ICK 243	24.30	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 245	24.50	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 247	24.70	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 248	24.80	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 249	24.90	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 250	25.00	8.56	5.940	3.00	30.0	140	25.0	•	•
ICK 251	25.10	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 252	25.20	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 253	25.30	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 254	25.40	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 255	25.50	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 256	25.60	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 258	25.80	8.56	5.940	3.00	30.0	140	25.0	•	•
ICK 259	25.90	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 260	26.00	9.05	6.020	3.12	30.0	140	26.0	•	
ICK 264	26.40	9.05	6.020	3.12	30.0	140	26.0	•	
ICK 265	26.50	9.05	6.020	3.12	30.0	140	26.0	•	
ICK 269	26.90	9.05	6.020	3.12	30.0	140	26.0	•	
ICK 270	27.00	9.44	6.210	3.24	30.0	140	27.0	•	
ICK 275	27.50	9.44	6.210	3.24	30.0	140	27.0	•	
ICK 279	27.90	9.44	6.210	3.24	30.0	140	27.0	•	
ICK 280	28.00	9.78	6.440	3.36	30.0	140	28.0	•	
ICK 285	28.50	9.78	6.440	3.36	30.0	140	28.0	•	
ICK 289	28.90	9.78	6.440	3.36	30.0	140	28.0	•	
ICK 290	29.00	10.10	6.700	3.48	30.0	140	29.0	•	
ICK 295	29.50	10.10	6.700	3.48	30.0	140	29.0	•	
ICK 299	29.90	10.10	6.700	3.48	30.0	140	29.0	•	
ICK 300	30.00	10.45	6.930	3.60	30.0	140	30.0	•	
ICK 305	30.50	10.45	6.930	3.60	30.0	140	30.0	•	
ICK 309	30.90	10.45	6.930	3.60	30.0	140	30.0	•	
ICK 310	31.00	10.78	7.180	3.72	30.0	140	31.0	•	
ICK 315	31.50	10.78	7.180	3.72	30.0	140	31.0	•	
ICK 3175	31.75	10.78	7.180	3.72	30.0	140	31.0	•	
ICK 319	31.90	10.78	7.180	3.72	30.0	140	31.0	•	
ICK 320	32.00	11.18	7.360	3.84	30.0	140	32.0	•	
ICK 325	32.50	11.18	7.360	3.84	30.0	140	32.0	•	
ICK 329	32.90	11.18	7.360	3.84	30.0	140	32.0	•	

• The drill head is produced with a ground chamfer and a honed cutting edge • For cutting conditions see page 68-81

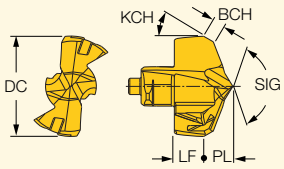
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICK-2M

Exchangeable Double Margin Drilling Heads for DCN Drills, for Machining ISO K Materials with High Surface Finish Results



Designation	Dimensions							Tough ↔ Hard	
	DC	LF	PL	BCH	KCH	SIG	SSC(1)	IC908	IC907
ICK 060-2M	6.00	2.48	1.520	0.72	30.0	140	6.0	•	
ICK 061-2M	6.10	2.48	1.520	0.72	30.0	140	6.0	•	
ICK 062-2M	6.20	2.48	1.520	0.72	30.0	140	6.0	•	
ICK 063-2M	6.30	2.48	1.520	0.72	30.0	140	6.0	•	
ICK 0635-2M	6.35	2.48	1.520	0.72	30.0	140	6.0	•	
ICK 064-2M	6.40	2.48	1.520	0.72	30.0	140	6.0	•	
ICK 065-2M	6.50	2.64	1.660	0.72	30.0	140	6.5	•	
ICK 066-2M	6.60	2.64	1.660	0.72	30.0	140	6.5	•	
ICK 067-2M	6.70	2.64	1.660	0.72	30.0	140	6.5	•	
ICK 068-2M	6.80	2.64	1.660	0.72	30.0	140	6.5	•	
ICK 069-2M	6.90	2.64	1.660	0.72	30.0	140	6.5	•	
ICK 070-2M	7.00	3.02	1.580	0.84	30.0	140	7.0	•	
ICK 071-2M	7.10	3.02	1.580	0.84	30.0	140	7.0	•	
ICK 072-2M	7.20	3.02	1.580	0.84	30.0	140	7.0	•	
ICK 073-2M	7.30	3.02	1.580	0.84	30.0	140	7.0	•	
ICK 074-2M	7.40	3.02	1.580	0.84	30.0	140	7.0	•	
ICK 075-2M	7.50	3.02	1.580	0.84	30.0	140	7.0	•	
ICK 076-2M	7.60	3.02	1.580	0.84	30.0	140	7.0	•	
ICK 077-2M	7.70	3.02	1.580	0.84	30.0	140	7.0	•	
ICK 078-2M	7.80	3.02	1.580	0.84	30.0	140	7.0	•	
ICK 079-2M	7.90	3.02	1.580	0.84	30.0	140	7.0	•	
ICK 080-2M	8.00	3.43	1.970	0.96	30.0	140	8.0	•	
ICK 081-2M	8.10	3.43	1.970	0.96	30.0	140	8.0	•	
ICK 083-2M	8.30	3.43	1.970	0.96	30.0	140	8.0	•	
ICK 084-2M	8.40	3.43	1.970	0.96	30.0	140	8.0	•	
ICK 085-2M	8.50	3.43	1.970	0.96	30.0	140	8.0	•	
ICK 086-2M	8.60	3.43	1.970	0.96	30.0	140	8.0	•	
ICK 087-2M	8.70	3.43	1.970	0.96	30.0	140	8.0	•	
ICK 088-2M	8.80	3.43	1.970	0.96	30.0	140	8.0	•	
ICK 089-2M	8.90	3.43	1.970	0.96	30.0	140	8.0	•	
ICK 090-2M	9.00	3.60	2.200	1.08	30.0	140	9.0	•	
ICK 091-2M	9.10	3.60	2.200	1.08	30.0	140	9.0	•	
ICK 093-2M	9.30	3.60	2.200	1.08	30.0	140	9.0	•	
ICK 094-2M	9.40	3.60	2.200	1.08	30.0	140	9.0	•	
ICK 095-2M	9.50	3.60	2.200	1.08	30.0	140	9.0	•	
ICK 096-2M	9.60	3.60	2.200	1.08	30.0	140	9.0	•	
ICK 097-2M	9.70	3.60	2.200	1.08	30.0	140	9.0	•	
ICK 098-2M	9.80	3.60	2.200	1.08	30.0	140	9.0	•	
ICK 099-2M	9.90	3.60	2.200	1.08	30.0	140	9.0	•	
ICK 100-2M	10.00	3.77	2.430	1.20	30.0	140	10.0	•	
ICK 101-2M	10.10	3.77	2.430	1.20	30.0	140	10.0	•	•
ICK 102-2M	10.20	3.77	2.430	1.20	30.0	140	10.0	•	
ICK 103-2M	10.30	3.77	2.430	1.20	30.0	140	10.0	•	
ICK 104-2M	10.40	3.77	2.430	1.20	30.0	140	10.0	•	
ICK 105-2M	10.50	3.77	2.430	1.20	30.0	140	10.0	•	
ICK 106-2M	10.60	3.77	2.430	1.20	30.0	140	10.0	•	•
ICK 107-2M	10.70	3.77	2.430	1.20	30.0	140	10.0	•	
ICK 108-2M	10.80	3.77	2.430	1.20	30.0	140	10.0	•	
ICK 109-2M	10.90	3.77	2.430	1.20	30.0	140	10.0	•	
ICK 110-2M	11.00	3.94	2.660	1.32	30.0	140	11.0	•	
ICK 111-2M	11.10	3.94	2.660	1.32	30.0	140	11.0	•	
ICK 112-2M	11.20	3.94	2.660	1.32	30.0	140	11.0	•	
ICK 113-2M	11.30	3.94	2.660	1.32	30.0	140	11.0	•	
ICK 114-2M	11.40	3.94	2.660	1.32	30.0	140	11.0	•	

• Can provide high surface finish of up to 1.6 Ra hole cylindricity and straightness of up to 0.05 mm • For cutting conditions see page 68-81

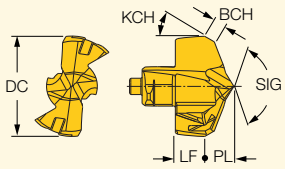
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICK-2M (continued)

Exchangeable Double Margin Drilling Heads for DCN Drills, for Machining ISO K Materials with High Surface Finish Results



Designation	Dimensions							Tough ↔ Hard	
	DC	LF	PL	BCH	KCH	SIG	SSC(1)	IC908	IC907
ICK 116-2M	11.60	3.94	2.660	1.32	30.0	140	11.0	•	
ICK 117-2M	11.70	3.94	2.660	1.32	30.0	140	11.0	•	
ICK 118-2M	11.80	3.94	2.660	1.32	30.0	140	11.0	•	
ICK 119-2M	11.90	3.94	2.660	1.32	30.0	140	11.0	•	
ICK 120-2M	12.00	4.10	2.180	1.44	30.0	140	12.0	•	
ICK 121-2M	12.10	4.10	2.200	1.44	30.0	140	12.0	•	
ICK 122-2M	12.20	4.10	2.220	1.44	30.0	140	12.0	•	
ICK 123-2M	12.30	4.10	2.240	1.44	30.0	140	12.0	•	
ICK 124-2M	12.40	4.10	2.260	1.44	30.0	140	12.0	•	
ICK 125-2M	12.50	4.10	2.270	1.44	30.0	140	12.0	•	
ICK 126-2M	12.60	4.10	2.290	1.44	30.0	140	12.0	•	
ICK 127-2M	12.70	4.10	2.310	1.44	30.0	140	12.0	•	
ICK 128-2M	12.80	4.10	2.330	1.44	30.0	140	12.0	•	
ICK 131-2M	13.10	4.48	3.120	1.56	30.0	140	13.0	•	
ICK 132-2M	13.20	4.48	3.120	1.56	30.0	140	13.0	•	
ICK 133-2M	13.30	4.48	3.120	1.56	30.0	140	13.0	•	
ICK 134-2M	13.40	4.48	3.120	1.56	30.0	140	13.0	•	
ICK 135-2M	13.50	4.48	3.120	1.56	30.0	140	13.0	•	•
ICK 136-2M	13.60	4.48	3.120	1.56	30.0	140	13.0	•	
ICK 137-2M	13.70	4.48	3.120	1.56	30.0	140	13.0	•	
ICK 138-2M	13.80	4.48	3.120	1.56	30.0	140	13.0	•	
ICK 139-2M	13.90	4.48	3.120	1.56	30.0	140	13.0	•	
ICK 140-2M	14.00	4.79	3.360	1.68	30.0	140	14.0	•	
ICK 141-2M	14.10	4.79	3.360	1.68	30.0	140	14.0	•	•
ICK 142-2M	14.20	4.79	3.360	1.68	30.0	140	14.0	•	
ICK 144-2M	14.40	4.79	3.360	1.68	30.0	140	14.0	•	
ICK 145-2M	14.50	4.79	3.360	1.68	30.0	140	14.0	•	
ICK 146-2M	14.60	4.79	3.360	1.68	30.0	140	14.0	•	
ICK 147-2M	14.70	4.79	3.360	1.68	30.0	140	14.0	•	
ICK 148-2M	14.80	4.79	3.360	1.68	30.0	140	14.0	•	
ICK 149-2M	14.90	4.79	3.360	1.68	30.0	140	14.0	•	
ICK 150-2M	15.00	5.14	3.590	1.80	30.0	140	15.0	•	
ICK 151-2M	15.10	5.14	3.590	1.80	30.0	140	15.0	•	
ICK 152-2M	15.20	5.14	3.590	1.80	30.0	140	15.0	•	•
ICK 153-2M	15.30	5.14	3.590	1.80	30.0	140	15.0	•	
ICK 154-2M	15.40	5.14	3.590	1.80	30.0	140	15.0	•	
ICK 155-2M	15.50	5.14	3.590	1.80	30.0	140	15.0	•	
ICK 156-2M	15.60	5.14	3.590	1.80	30.0	140	15.0	•	
ICK 159-2M	15.90	5.14	3.590	1.80	30.0	140	15.0	•	
ICK 160-2M	16.00	5.55	3.750	1.92	30.0	140	16.0	•	•
ICK 161-2M	16.10	5.55	3.750	1.92	30.0	140	16.0	•	•
ICK 162-2M	16.20	5.55	3.750	1.92	30.0	140	16.0	•	
ICK 163-2M	16.30	5.55	3.750	1.92	30.0	140	16.0	•	
ICK 164-2M	16.40	5.55	3.750	1.92	30.0	140	16.0	•	
ICK 165-2M	16.50	5.55	3.750	1.92	30.0	140	16.0	•	
ICK 166-2M	16.60	5.55	3.750	1.92	30.0	140	16.0	•	
ICK 167-2M	16.70	5.55	3.750	1.92	30.0	140	16.0	•	•
ICK 168-2M	16.80	5.55	3.750	1.92	30.0	140	16.0	•	
ICK 169-2M	16.90	5.55	3.750	1.92	30.0	140	16.0	•	
ICK 170-2M	17.00	5.84	4.060	2.04	30.0	140	17.0	•	•
ICK 171-2M	17.10	5.84	4.060	2.04	30.0	140	17.0	•	
ICK 172-2M	17.20	5.84	4.060	2.04	30.0	140	17.0	•	
ICK 173-2M	17.30	5.84	4.060	2.04	30.0	140	17.0	•	
ICK 174-2M	17.40	5.84	4.060	2.04	30.0	140	17.0	•	

• Can provide high surface finish of up to 1.6 Ra hole cylindricity and straightness of up to 0.05 mm • For cutting conditions see page 68-81

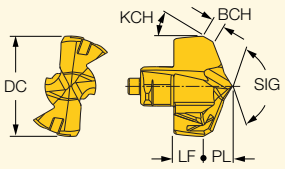
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICK-2M (continued)

Exchangeable Double Margin Drilling Heads for DCN Drills, for Machining ISO K Materials with High Surface Finish Results



Designation	Dimensions							Tough ↔ Hard	
	DC	LF	PL	BCH	KCH	SIG	SSC(1)	IC908	IC907
ICK 175-2M	17.50	5.84	4.060	2.04	30.0	140	17.0	•	•
ICK 176-2M	17.60	5.84	4.060	2.04	30.0	140	17.0	•	
ICK 178-2M	17.80	5.84	4.060	2.04	30.0	140	17.0	•	
ICK 179-2M	17.90	5.84	4.060	2.04	30.0	140	17.0	•	
ICK 180-2M	18.00	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 181-2M	18.10	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 183-2M	18.30	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 184-2M	18.40	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 185-2M	18.50	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 186-2M	18.60	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 187-2M	18.70	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 188-2M	18.80	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 189-2M	18.90	6.21	4.290	2.16	30.0	140	18.0	•	
ICK 190-2M	19.00	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 191-2M	19.10	6.47	4.530	2.28	30.0	140	19.0	•	•
ICK 192-2M	19.20	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 193-2M	19.30	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 195-2M	19.50	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 196-2M	19.60	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 197-2M	19.70	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 198-2M	19.80	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 199-2M	19.90	6.47	4.530	2.28	30.0	140	19.0	•	
ICK 200-2M	20.00	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 201-2M	20.10	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 202-2M	20.20	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 203-2M	20.30	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 204-2M	20.40	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 205-2M	20.50	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 206-2M	20.60	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 207-2M	20.70	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 208-2M	20.80	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 209-2M	20.90	6.81	4.790	2.40	30.0	140	20.0	•	
ICK 210-2M	21.00	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 211-2M	21.10	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 212-2M	21.20	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 213-2M	21.30	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 214-2M	21.40	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 215-2M	21.50	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 216-2M	21.60	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 217-2M	21.70	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 218-2M	21.80	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 219-2M	21.90	7.20	4.980	2.52	30.0	140	21.0	•	
ICK 220-2M	22.00	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 221-2M	22.10	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 222-2M	22.20	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 223-2M	22.30	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 224-2M	22.40	7.54	5.220	2.64	30.0	140	22.0	•	•
ICK 225-2M	22.50	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 226-2M	22.60	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 227-2M	22.70	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 228-2M	22.80	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 229-2M	22.90	7.54	5.220	2.64	30.0	140	22.0	•	
ICK 230-2M	23.00	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 231-2M	23.10	7.88	5.450	2.76	30.0	140	23.0	•	

• Can provide high surface finish of up to 1.6 Ra hole cylindricity and straightness of up to 0.05 mm • For cutting conditions see page 68-81

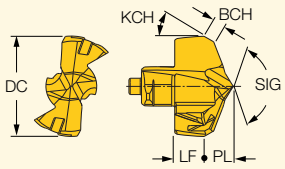
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICK-2M (continued)

Exchangeable Double Margin Drilling Heads for DCN Drills, for Machining ISO K Materials with High Surface Finish Results



Designation	Dimensions							Tough ↔ Hard	
	DC	LF	PL	BCH	KCH	SIG	SSC(1)	IC908	IC907
ICK 232-2M	23.20	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 233-2M	23.30	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 234-2M	23.40	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 235-2M	23.50	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 236-2M	23.60	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 237-2M	23.70	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 238-2M	23.80	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 239-2M	23.90	7.88	5.450	2.76	30.0	140	23.0	•	
ICK 240-2M	24.00	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 241-2M	24.10	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 242-2M	24.20	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 243-2M	24.30	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 244-2M	24.40	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 245-2M	24.50	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 246-2M	24.60	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 247-2M	24.70	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 249-2M	24.90	8.21	5.690	2.88	30.0	140	24.0	•	
ICK 250-2M	25.00	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 251-2M	25.10	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 252-2M	25.20	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 253-2M	25.30	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 254-2M	25.40	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 255-2M	25.50	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 256-2M	25.60	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 257-2M	25.70	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 258-2M	25.80	8.56	5.940	3.00	30.0	140	25.0	•	
ICK 259-2M	25.90	8.56	5.940	3.00	30.0	140	25.0	•	

• Can provide high surface finish of up to 1.6 Ra hole cylindricity and straightness of up to 0.05 mm • For cutting conditions see page 68-81

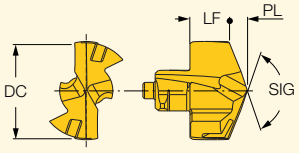
(1) Seat size code

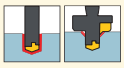
For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

ICM

Exchangeable Drilling Heads for DCN Drills, for Machining ISO M and ISO S Materials





Designation	Dimensions DC	PL	LF	SIG	SSC(1)		Tough ↔ Hard IC908	IC907
ICM 050	5.00	0.700	3.00	140	5.0	SK DCN 5-5.99	•	
ICM 051	5.10	0.720	2.98	140	5.0	SK DCN 5-5.99	•	
ICM 052	5.20	0.740	2.96	140	5.0	SK DCN 5-5.99	•	
ICM 053	5.30	0.750	2.95	140	5.0	SK DCN 5-5.99	•	
ICM 054	5.40	0.770	2.93	140	5.0	SK DCN 5-5.99	•	
ICM 055	5.50	0.900	2.95	140	5.5	SK DCN 5-5.99	•	
ICM 056	5.60	0.920	2.93	140	5.5	SK DCN 5-5.99	•	
ICM 057	5.70	0.940	2.91	140	5.5	SK DCN 5-5.99	•	
ICM 058	5.80	0.960	2.89	140	5.5	SK DCN 5-5.99	•	
ICM 059	5.90	0.970	2.88	140	5.5	SK DCN 5-5.99	•	
ICM 060	6.00	0.960	3.04	140	6.0		•	
ICM 061	6.10	0.980	3.02	140	6.0		•	
ICM 062	6.20	1.000	3.00	140	6.0		•	
ICM 063	6.30	1.010	2.99	140	6.0		•	
ICM 0635	6.35	1.020	2.98	140	6.0		•	
ICM 064	6.40	1.030	2.97	140	6.0		•	
ICM 065	6.50	1.270	3.03	140	6.5		•	
ICM 066	6.60	1.290	3.01	140	6.5		•	
ICM 067	6.70	1.310	2.99	140	6.5		•	
ICM 068	6.80	1.330	2.97	140	6.5		•	
ICM 069	6.90	1.340	2.96	140	6.5		•	
ICM 070	7.00	1.010	3.59	140	7.0		•	
ICM 071	7.10	1.030	3.57	140	7.0		•	
ICM 072	7.20	1.050	3.55	140	7.0		•	
ICM 073	7.30	1.060	3.54	140	7.0		•	
ICM 074	7.40	1.080	3.52	140	7.0		•	
ICM 075	7.50	1.100	3.24	140	7.0		•	•
ICM 076	7.60	1.120	3.48	140	7.0		•	
ICM 077	7.70	1.140	3.46	140	7.0		•	
ICM 078	7.80	1.160	3.44	140	7.0		•	
ICM 079	7.90	1.170	3.43	140	7.0		•	
ICM 080	8.00	1.200	3.94	140	8.0		•	•
ICM 081	8.10	1.220	4.18	140	8.0		•	
ICM 082	8.20	1.240	4.16	140	8.0		•	
ICM 083	8.30	1.250	4.15	140	8.0		•	
ICM 084	8.40	1.270	4.13	140	8.0		•	
ICM 085	8.50	1.290	3.85	140	8.0		•	•
ICM 086	8.60	1.310	4.09	140	8.0		•	
ICM 087	8.70	1.330	3.82	140	8.0		•	•
ICM 088	8.80	1.350	4.05	140	8.0		•	
ICM 089	8.90	1.360	4.04	140	8.0		•	
ICM 090	9.00	1.360	4.16	140	9.0		•	•
ICM 091	9.10	1.380	4.14	140	9.0		•	•
ICM 092	9.20	1.400	4.40	140	9.0		•	
ICM 093	9.30	1.410	4.39	140	9.0		•	
ICM 094	9.40	1.430	4.37	140	9.0		•	•
ICM 095	9.50	1.450	4.07	140	9.0		•	•
ICM 096	9.60	1.470	4.33	140	9.0		•	
ICM 097	9.70	1.490	4.03	140	9.0		•	•
ICM 098	9.80	1.510	4.29	140	9.0		•	
ICM 099	9.90	1.520	4.00	140	9.0		•	•
ICM 100	10.00	1.500	4.38	140	10.0		•	•
ICM 101	10.10	1.520	4.68	140	10.0		•	

• The drill head features a T-land on the cutting edge • For cutting conditions see page 68-81

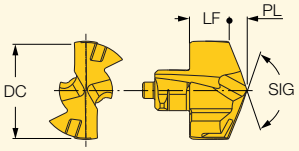
(1) Seat size code

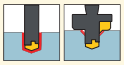
For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136)

SUMOCHAM CHAMDRILL LINE

ICM (continued)

Exchangeable Drilling Heads for DCN Drills, for Machining ISO M and ISO S Materials





Designation	Dimensions					Tough ↔ Hard	
	DC	PL	LF	SIG	SSC(1)	IC908	IC907
ICM 102	10.20	1.540	4.66	140	10.0	•	•
ICM 103	10.30	1.550	4.65	140	10.0	•	•
ICM 104	10.40	1.570	4.31	140	10.0	•	•
ICM 105	10.50	1.590	4.29	140	10.0	•	•
ICM 106	10.60	1.610	4.27	140	10.0	•	•
ICM 107	10.70	1.630	4.25	140	10.0	•	•
ICM 108	10.80	1.650	4.55	140	10.0	•	
ICM 109	10.90	1.660	4.54	140	10.0	•	
ICM 110	11.00	1.660	4.94	140	11.0	•	•
ICM 111	11.10	1.680	4.58	140	11.0	•	•
ICM 112	11.20	1.700	4.56	140	11.0	•	•
ICM 113	11.30	1.710	4.89	140	11.0	•	
ICM 114	11.40	1.730	4.87	140	11.0	•	
ICM 115	11.50	1.750	4.51	140	11.0	•	•
ICM 116	11.60	1.770	4.83	140	11.0	•	
ICM 117	11.70	1.790	4.81	140	11.0	•	
ICM 118	11.80	1.810	4.45	140	11.0	•	•
ICM 119	11.90	1.820	4.43	140	11.0	•	•
ICM 120	12.00	1.810	4.82	140	12.0	•	•
ICM 121	12.10	1.830	5.17	140	12.0	•	
ICM 122	12.20	1.850	5.15	140	12.0	•	
ICM 123	12.30	1.860	4.76	140	12.0	•	•
ICM 124	12.40	1.880	4.74	140	12.0	•	•
ICM 125	12.50	1.900	4.73	140	12.0	•	•
ICM 126	12.60	1.920	5.08	140	12.0	•	
ICM 127	12.70	1.940	4.69	140	12.0	•	•
ICM 128	12.80	1.960	5.04	140	12.0	•	
ICM 129	12.90	1.970	4.65	140	12.0	•	•
ICM 130	13.00	1.950	5.23	140	13.0	•	•
ICM 131	13.10	1.970	5.22	140	13.0	•	•
ICM 132	13.20	1.990	5.61	140	13.0	•	
ICM 133	13.30	2.000	5.60	140	13.0	•	
ICM 134	13.40	2.020	5.58	140	13.0	•	
ICM 135	13.50	2.040	5.14	140	13.0	•	•
ICM 136	13.60	2.060	5.13	140	13.0	•	•
ICM 137	13.70	2.080	5.52	140	13.0	•	
ICM 138	13.80	2.100	5.50	140	13.0	•	
ICM 139	13.90	2.110	5.49	140	13.0	•	
ICM 140	14.00	2.110	5.60	140	14.0	•	•
ICM 141	14.10	2.130	6.02	140	14.0	•	
ICM 142	14.20	2.150	5.57	140	14.0	•	•
ICM 143	14.30	2.160	5.55	140	14.0	•	•
ICM 144	14.40	2.180	5.97	140	14.0	•	
ICM 145	14.50	2.200	5.51	140	14.0	•	•
ICM 146	14.60	2.220	5.93	140	14.0	•	
ICM 147	14.70	2.240	5.91	140	14.0	•	•
ICM 148	14.80	2.260	5.89	140	14.0	•	
ICM 149	14.90	2.270	5.88	140	14.0	•	
ICM 150	15.00	2.260	6.00	140	15.0	•	•
ICM 151	15.10	2.280	6.45	140	15.0	•	
ICM 152	15.20	2.300	6.43	140	15.0	•	
ICM 153	15.30	2.310	6.42	140	15.0	•	
ICM 154	15.40	2.330	6.40	140	15.0	•	
ICM 155	15.50	2.350	5.91	140	15.0	•	•

• The drill head features a T-land on the cutting edge • For cutting conditions see page 68-81

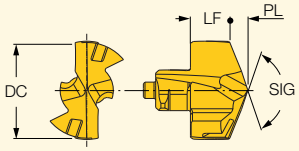
(1) Seat size code

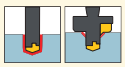
For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136)

SUMOCHAM CHAMDRILL LINE

ICM (continued)

Exchangeable Drilling Heads for DCN Drills, for Machining ISO M and ISO S Materials





Designation	Dimensions					Tough ↔ Hard	
	DC	PL	LF	SIG	SSC(1)	IC908	IC907
ICM 156	15.60	2.370	6.36	140	15.0	•	
ICM 157	15.70	2.390	5.87	140	15.0	•	•
ICM 158	15.80	2.410	6.32	140	15.0	•	
ICM 159	15.90	2.420	5.84	140	15.0	•	•
ICM 160	16.00	2.420	6.39	140	16.0	•	•
ICM 1605	16.05	2.430	6.87	140	16.0	•	
ICM 161	16.10	2.440	6.86	140	16.0	•	
ICM 162	16.20	2.460	6.84	140	16.0	•	
ICM 163	16.30	2.470	6.83	140	16.0	•	
ICM 164	16.40	2.490	6.32	140	16.0	•	•
ICM 165	16.50	2.510	6.30	140	16.0	•	•
ICM 166	16.60	2.530	6.77	140	16.0	•	
ICM 167	16.70	2.550	6.26	140	16.0	•	•
ICM 168	16.80	2.570	6.73	140	16.0	•	
ICM 169	16.90	2.580	6.72	140	16.0	•	
ICM 170	17.00	2.570	6.81	140	17.0	•	•
ICM 171	17.10	2.590	6.79	140	17.0	•	•
ICM 172	17.20	2.610	7.29	140	17.0	•	
ICM 173	17.30	2.620	7.28	140	17.0	•	
ICM 174	17.40	2.640	7.26	140	17.0	•	
ICM 175	17.50	2.660	6.72	140	17.0	•	•
ICM 176	17.60	2.680	7.22	140	17.0	•	
ICM 177	17.70	2.700	7.20	140	17.0	•	
ICM 178	17.80	2.720	7.18	140	17.0	•	
ICM 179	17.90	2.730	6.64	140	17.0	•	•
ICM 180	18.00	2.720	7.22	140	18.0	•	•
ICM 182	18.20	2.760	7.74	140	18.0	•	
ICM 183	18.30	2.770	7.73	140	18.0	•	
ICM 184	18.40	2.790	7.71	140	18.0	•	
ICM 185	18.50	2.810	7.69	140	18.0	•	•
ICM 186	18.60	2.830	7.67	140	18.0	•	
ICM 187	18.70	2.850	7.65	140	18.0	•	
ICM 188	18.80	2.870	7.63	140	18.0	•	
ICM 189	18.90	2.880	7.62	140	18.0	•	
ICM 190	19.00	2.870	7.54	140	19.0	•	•
ICM 1905	19.05	2.880	8.12	140	19.0	•	•
ICM 191	19.10	2.890	8.11	140	19.0	•	
ICM 192	19.20	2.910	8.09	140	19.0	•	
ICM 1925	19.25	2.920	8.08	140	19.0	•	
ICM 1927	19.27	2.920	8.08	140	19.0	•	
ICM 193	19.30	2.920	8.08	140	19.0	•	
ICM 194	19.40	2.940	8.06	140	19.0	•	
ICM 195	19.50	2.960	8.04	140	19.0	•	
ICM 196	19.60	2.980	8.02	140	19.0	•	
ICM 197	19.70	3.000	7.41	140	19.0	•	•
ICM 198	19.80	3.020	7.98	140	19.0	•	
ICM 199	19.90	3.030	7.97	140	19.0	•	
ICM 200	20.00	3.020	7.96	140	20.0	•	•
ICM 201	20.10	3.040	8.56	140	20.0	•	
ICM 202	20.20	3.060	8.54	140	20.0	•	
ICM 203	20.30	3.070	8.53	140	20.0	•	
ICM 204	20.40	3.090	8.51	140	20.0	•	
ICM 205	20.50	3.110	7.87	140	20.0	•	•

• The drill head features a T-land on the cutting edge • For cutting conditions see page 68-81

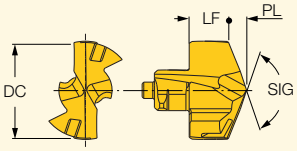
(1) Seat size code

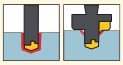
For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136)

SUMOCHAM CHAMDRILL LINE

ICM (continued)

Exchangeable Drilling Heads for DCN Drills, for Machining ISO M and ISO S Materials





Designation	Dimensions					Tough ↔ Hard	
	DC	PL	LF	SIG	SSC(1)	IC908	IC907
ICM 206	20.60	3.130	8.47	140	20.0	•	
ICM 207	20.70	3.150	8.45	140	20.0	•	
ICM 208	20.80	3.170	8.43	140	20.0	•	
ICM 209	20.90	3.180	8.42	140	20.0	•	
ICM 210	21.00	3.200	8.38	140	21.0	•	•
ICM 211	21.10	3.220	8.96	140	21.0	•	
ICM 212	21.20	3.240	8.94	140	21.0	•	
ICM 213	21.30	3.250	8.93	140	21.0	•	
ICM 214	21.40	3.270	9.91	140	21.0	•	
ICM 215	21.50	3.290	9.89	140	21.0	•	
ICM 216	21.60	3.310	8.87	140	21.0	•	
ICM 217	21.70	3.330	8.85	140	21.0	•	
ICM 218	21.80	3.350	8.83	140	21.0	•	
ICM 219	21.90	3.360	8.82	140	21.0	•	
ICM 220	22.00	3.350	8.80	140	22.0	•	•
ICM 221	22.10	3.370	9.39	140	22.0	•	
ICM 222	22.20	3.390	9.37	140	22.0	•	
ICM 223	22.30	3.400	9.36	140	22.0	•	
ICM 224	22.40	3.420	9.34	140	22.0	•	
ICM 225	22.50	3.440	9.32	140	22.0	•	
ICM 226	22.60	3.460	9.30	140	22.0	•	
ICM 227	22.70	3.480	9.28	140	22.0	•	
ICM 228	22.80	3.500	9.26	140	22.0	•	
ICM 229	22.90	3.510	9.25	140	22.0	•	
ICM 230	23.00	3.510	9.82	140	23.0	•	
ICM 232	23.20	3.550	9.78	140	23.0	•	
ICM 233	23.30	3.560	9.77	140	23.0	•	
ICM 234	23.40	3.580	9.75	140	23.0	•	
ICM 235	23.50	3.600	9.73	140	23.0	•	
ICM 237	23.70	3.640	9.69	140	23.0	•	
ICM 238	23.80	3.660	9.67	140	23.0	•	
ICM 239	23.90	3.670	9.66	140	23.0	•	
ICM 240	24.00	3.640	10.26	140	24.0	•	
ICM 241	24.10	3.660	10.24	140	24.0	•	
ICM 242	24.20	3.680	10.22	140	24.0	•	
ICM 243	24.30	3.690	10.21	140	24.0	•	
ICM 244	24.40	3.710	10.19	140	24.0	•	
ICM 245	24.50	3.730	10.17	140	24.0	•	
ICM 246	24.60	3.750	10.15	140	24.0	•	
ICM 247	24.70	3.770	10.13	140	24.0	•	
ICM 248	24.80	3.790	10.11	140	24.0	•	
ICM 249	24.90	3.800	10.10	140	24.0	•	
ICM 250	25.00	3.840	10.66	140	25.0	•	
ICM 251	25.10	3.860	10.64	140	25.0	•	
ICM 252	25.20	3.880	10.62	140	25.0	•	
ICM 253	25.30	3.890	10.61	140	25.0	•	
ICM 254	25.40	3.910	10.59	140	25.0	•	
ICM 255	25.50	3.930	10.57	140	25.0	•	
ICM 256	25.60	3.950	10.55	140	25.0	•	
ICM 2565	25.65	3.960	10.54	140	25.0	•	
ICM 2567	25.67	3.960	10.54	140	25.0	•	
ICM 257	25.70	3.970	10.53	140	25.0	•	
ICM 258	25.80	3.990	10.51	140	25.0	•	
ICM 259	25.90	4.000	10.50	140	25.0	•	

• The drill head features a T-land on the cutting edge • For cutting conditions see page 68-81

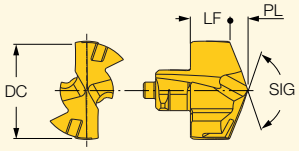
(1) Seat size code

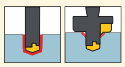
For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136)

SUMOCHAM CHAMDRILL LINE

ICM (continued)

Exchangeable Drilling Heads for DCN Drills, for Machining ISO M and ISO S Materials





Designation	Dimensions					Tough ↔ Hard	
	DC	PL	LF	SIG	SSC(1)	IC908	IC907
ICM 260	26.00	3.970	11.10	140	26.0	•	
ICM 261	26.10	3.990	11.08	140	26.0	•	
ICM 262	26.20	4.010	11.06	140	26.0	•	
ICM 263	26.30	4.020	11.05	140	26.0	•	
ICM 264	26.40	4.040	11.03	140	26.0	•	
ICM 265	26.50	4.060	11.01	140	26.0	•	
ICM 266	26.60	4.080	10.99	140	26.0	•	
ICM 267	26.70	4.100	10.97	140	26.0	•	
ICM 268	26.80	4.120	10.95	140	26.0	•	
ICM 269	26.90	4.130	10.94	140	26.0	•	
ICM 270	27.00	4.130	11.52	140	27.0	•	
ICM 271	27.10	4.150	11.50	140	27.0	•	
ICM 272	27.20	4.170	11.48	140	27.0	•	
ICM 273	27.30	4.180	11.47	140	27.0	•	
ICM 274	27.40	4.200	11.45	140	27.0	•	
ICM 275	27.50	4.220	11.43	140	27.0	•	
ICM 276	27.60	4.240	11.41	140	27.0	•	
ICM 277	27.70	4.260	11.39	140	27.0	•	
ICM 278	27.80	4.280	11.37	140	27.0	•	
ICM 279	27.90	4.290	11.36	140	27.0	•	
ICM 280	28.00	4.280	11.94	140	28.0	•	
ICM 281	28.10	4.300	11.92	140	28.0	•	
ICM 282	28.20	4.320	11.90	140	28.0	•	
ICM 283	28.30	4.330	11.89	140	28.0	•	
ICM 284	28.40	4.350	11.87	140	28.0	•	
ICM 285	28.50	4.370	11.85	140	28.0	•	
ICM 286	28.60	4.390	11.83	140	28.0	•	
ICM 287	28.70	4.410	11.81	140	28.0	•	
ICM 288	28.80	4.430	11.79	140	28.0	•	
ICM 289	28.90	4.440	11.78	140	28.0	•	
ICM 290	29.00	4.460	12.34	140	29.0	•	
ICM 291	29.10	4.480	12.32	140	29.0	•	
ICM 292	29.20	4.500	12.30	140	29.0	•	
ICM 293	29.30	4.510	12.29	140	29.0	•	
ICM 294	29.40	4.530	12.27	140	29.0	•	
ICM 295	29.50	4.550	12.25	140	29.0	•	
ICM 296	29.60	4.570	12.23	140	29.0	•	
ICM 297	29.70	4.590	12.21	140	29.0	•	
ICM 298	29.80	4.610	12.19	140	29.0	•	
ICM 300	30.00	4.610	12.77	140	30.0	•	
ICM 301	30.10	4.630	12.75	140	30.0	•	
ICM 302	30.20	4.650	12.73	140	30.0	•	
ICM 303	30.30	4.660	12.72	140	30.0	•	
ICM 304	30.40	4.680	12.70	140	30.0	•	
ICM 305	30.50	4.700	12.68	140	30.0	•	
ICM 306	30.60	4.720	12.66	140	30.0	•	
ICM 307	30.70	4.740	12.64	140	30.0	•	
ICM 308	30.80	4.760	12.62	140	30.0	•	
ICM 309	30.90	4.770	12.61	140	30.0	•	
ICM 310	31.00	4.790	13.17	140	31.0	•	
ICM 311	31.10	4.810	13.15	140	31.0	•	
ICM 312	31.20	4.830	13.13	140	31.0	•	
ICM 315	31.50	4.880	13.08	140	31.0	•	
ICM 317	31.70	4.920	13.04	140	31.0	•	

• The drill head features a T-land on the cutting edge • For cutting conditions see page 68-81

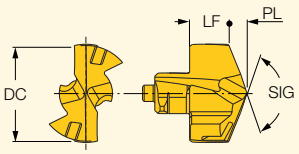
(1) Seat size code

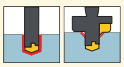
For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136)

SUMOCHAM CHAMDRILL LINE

ICM (continued)

Exchangeable Drilling Heads for DCN Drills, for Machining ISO M and ISO S Materials





Designation	Dimensions					Tough ↔ Hard	
	DC	PL	LF	SIG	SSC(1)	IC908	IC907
ICM 3175	31.75	4.930	13.03	140	31.0	●	
ICM 318	31.80	4.940	13.02	140	31.0	●	
ICM 319	31.90	4.950	13.01	140	31.0	●	
ICM 320	32.00	4.890	13.65	140	32.0	●	
ICM 321	32.10	4.910	13.63	140	32.0	●	
ICM 322	32.20	4.930	13.61	140	32.0	●	
ICM 323	32.30	4.940	13.60	140	32.0	●	
ICM 324	32.40	4.960	13.58	140	32.0	●	
ICM 325	32.50	4.980	13.56	140	32.0	●	
ICM 326	32.60	5.000	13.54	140	32.0	●	
ICM 327	32.70	5.020	13.52	140	32.0	●	
ICM 328	32.80	5.040	13.50	140	32.0	●	
ICM 329	32.90	5.050	13.49	140	32.0	●	

• The drill head features a T-land on the cutting edge • For cutting conditions see page 68-81

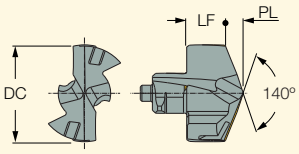
(1) Seat size code

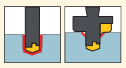
For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136)

SUMOCHAM CHAMDRILL LINE

ICN

Exchangeable Drilling Heads for DCN Drills, for Machining ISO N Materials





Designation	Dimensions					IC08
	DC	PL	LF	SIG	SSC(1)	
ICN 0635	6.35	1.020	2.98	140	6.0	●
ICN 0952	9.52	1.440	4.36	140	9.0	●
ICN 100	10.00	1.500	4.70	140	10.0	●
ICN 102	10.20	1.540	4.66	140	10.0	●
ICN 103	10.30	1.550	4.65	140	10.0	●
ICN 105	10.50	1.590	4.61	140	10.0	●
ICN 108	10.80	1.650	4.55	140	10.0	●
ICN 110	11.00	1.670	4.93	140	11.0	●
ICN 111	11.10	1.690	4.91	140	11.0	●
ICN 115	11.50	1.760	4.84	140	11.0	●
ICN 119	11.90	1.830	4.77	140	11.0	●
ICN 120	12.00	1.820	5.18	140	12.0	●
ICN 123	12.30	1.350	5.65	140	12.0	●
ICN 125	12.50	1.390	5.61	140	12.0	●
ICN 127	12.70	1.430	5.57	140	12.0	●
ICN 130	13.00	1.960	5.64	140	13.0	●
ICN 135	13.50	2.050	5.55	140	13.0	●
ICN 137	13.70	2.090	5.51	140	13.0	●
ICN 140	14.00	2.120	6.03	140	14.0	●
ICN 141	14.10	2.140	6.01	140	14.0	●
ICN 142	14.20	2.160	5.99	140	14.0	●
ICN 1427	14.27	2.170	5.98	140	14.0	●
ICN 145	14.50	2.210	5.94	140	14.0	●
ICN 150	15.00	2.270	6.46	140	15.0	●
ICN 157	15.70	2.400	6.33	140	15.0	●
ICN 158	15.80	2.420	6.31	140	15.0	●
ICN 1587	15.87	2.430	6.30	140	15.0	●
ICN 160	16.00	2.420	6.88	140	16.0	●
ICN 165	16.50	2.510	6.79	140	16.0	●
ICN 167	16.70	2.550	6.75	140	16.0	●
ICN 170	17.00	2.590	7.31	140	17.0	●
ICN 175	17.50	2.680	7.22	140	17.0	●
ICN 180	18.00	2.730	7.77	140	18.0	●
ICN 185	18.50	2.820	7.68	140	18.0	●
ICN 190	19.00	2.880	8.12	140	19.0	●
ICN 1905	19.05	2.890	8.11	140	19.0	●
ICN 195	19.50	2.970	8.03	140	19.0	●
ICN 2062	20.62	3.130	8.47	140	20.0	●
ICN 2222	22.22	3.360	9.40	140	22.0	●
ICN 254	25.40	3.870	10.63	140	25.0	●

• The drill is manufactured with a sharp cutting edge and polished flutes • For cutting conditions see page 68-81

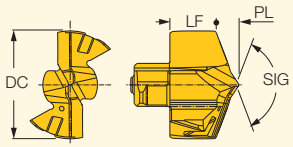
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136)

SUMOCHAM CHAMDRILL LINE

QCP-2M

Exchangeable Double Margin & Self-Centering Drilling Heads for DCN Drills, for Machining ISO P Materials with High Surface Finish Results



Designation	Dimensions					IC908
	DC	LF	PL	SIG	SSC(1)	
QCP 060-2M	6.00	2.79	1.210	136	6.0	•
QCP 061-2M	6.10	2.77	1.230	136	6.0	•
QCP 062-2M	6.20	2.75	1.250	136	6.0	•
QCP 0635-2M	6.35	2.72	1.280	136	6.0	•
QCP 064-2M	6.40	2.71	1.290	136	6.0	•
QCP 065-2M	6.50	2.89	1.410	136	6.5	•
QCP 066-2M	6.60	2.87	1.430	136	6.5	•
QCP 067-2M	6.70	2.85	1.450	136	6.5	•
QCP 068-2M	6.80	2.83	1.470	136	6.5	•
QCP 069-2M	6.90	2.81	1.490	136	6.5	•
QCP 070-2M	7.00	3.25	1.350	136	7.0	•
QCP 071-2M	7.10	3.23	1.370	136	7.0	•
QCP 072-2M	7.20	3.21	1.390	136	7.0	•
QCP 073-2M	7.30	3.19	1.410	136	7.0	•
QCP 074-2M	7.40	3.17	1.430	136	7.0	•
QCP 075-2M	7.50	3.15	1.450	136	7.0	•
QCP 076-2M	7.60	3.13	1.470	136	7.0	•
QCP 077-2M	7.70	3.11	1.490	136	7.0	•
QCP 078-2M	7.80	3.09	1.510	136	7.0	•
QCP 079-2M	7.90	3.07	1.530	136	7.0	•
QCP 080-2M	8.00	3.78	1.620	136	8.0	•
QCP 081-2M	8.10	3.76	1.640	136	8.0	•
QCP 082-2M	8.20	3.74	1.660	136	8.0	•
QCP 083-2M	8.30	3.72	1.680	136	8.0	•
QCP 084-2M	8.40	3.70	1.700	136	8.0	•
QCP 085-2M	8.50	3.68	1.720	136	8.0	•
QCP 086-2M	8.60	3.66	1.740	136	8.0	•
QCP 087-2M	8.70	3.64	1.760	136	8.0	•
QCP 088-2M	8.80	3.62	1.780	136	8.0	•
QCP 090-2M	9.00	3.89	1.910	136	9.0	•
QCP 091-2M	9.10	3.87	1.930	136	9.0	•
QCP 092-2M	9.20	3.85	1.950	136	9.0	•
QCP 093-2M	9.30	3.83	1.970	136	9.0	•
QCP 094-2M	9.40	3.81	1.990	136	9.0	•
QCP 095-2M	9.50	3.79	2.010	136	9.0	•
QCP 096-2M	9.60	3.77	2.030	136	9.0	•
QCP 097-2M	9.70	3.75	2.050	136	9.0	•
QCP 098-2M	9.80	3.73	2.070	136	9.0	•
QCP 099-2M	9.90	3.71	2.090	136	9.0	•
QCP 100-2M	10.00	4.70	2.090	136	10.0	•
QCP 101-2M	10.10	4.68	2.110	136	10.0	•
QCP 102-2M	10.20	4.66	2.130	136	10.0	•
QCP 103-2M	10.30	4.64	2.150	136	10.0	•
QCP 104-2M	10.40	4.62	2.170	136	10.0	•
QCP 105-2M	10.50	4.60	2.190	136	10.0	•
QCP 106-2M	10.60	4.58	2.210	136	10.0	•
QCP 107-2M	10.70	4.56	2.230	136	10.0	•
QCP 108-2M	10.80	4.54	2.250	136	10.0	•
QCP 109-2M	10.90	4.52	2.270	136	10.0	•
QCP 110-2M	11.00	4.93	2.320	136	11.0	•
QCP 111-2M	11.10	4.91	2.340	136	11.0	•
QCP 112-2M	11.20	4.89	2.360	136	11.0	•
QCP 113-2M	11.30	4.87	2.380	136	11.0	•
QCP 114-2M	11.40	4.85	2.400	136	11.0	•

• Can provide high surface finish of up to 1.6 Ra hole cylindricity and straightness of up to 0.05 mm • For cutting conditions see page 68-81

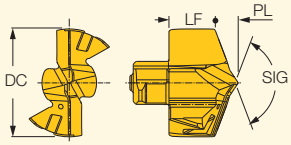
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

QCP-2M (continued)

Exchangeable Double Margin & Self-Centering Drilling Heads for DCN Drills, for Machining ISO P Materials with High Surface Finish Results



Designation	Dimensions DC	LF	PL	SIG	SSC(1)	IC908
QCP 115-2M	11.50	4.83	2.420	136	11.0	•
QCP 116-2M	11.60	4.81	2.440	136	11.0	•
QCP 117-2M	11.70	4.79	2.460	136	11.0	•
QCP 118-2M	11.80	4.77	2.480	136	11.0	•
QCP 119-2M	11.90	4.75	2.500	136	11.0	•
QCP 120-2M	12.00	5.18	2.450	136	12.0	•
QCP 121-2M	12.10	5.16	2.470	136	12.0	•
QCP 122-2M	12.20	5.14	2.490	136	12.0	•
QCP 123-2M	12.30	5.12	2.510	136	12.0	•
QCP 124-2M	12.40	5.10	2.530	136	12.0	•
QCP 125-2M	12.50	5.08	2.550	136	12.0	•
QCP 126-2M	12.60	5.06	2.570	136	12.0	•
QCP 127-2M	12.70	5.04	2.590	136	12.0	•
QCP 128-2M	12.80	5.02	2.610	136	12.0	•
QCP 129-2M	12.90	5.00	2.630	136	12.0	•
QCP 130-2M	13.00	5.64	2.710	136	13.0	•
QCP 131-2M	13.10	5.62	2.730	136	13.0	•
QCP 132-2M	13.20	5.60	2.750	136	13.0	•
QCP 133-2M	13.30	5.58	2.770	136	13.0	•
QCP 134-2M	13.40	5.56	2.790	136	13.0	•
QCP 135-2M	13.50	5.54	2.810	136	13.0	•
QCP 136-2M	13.60	5.52	2.830	136	13.0	•
QCP 137-2M	13.70	5.50	2.850	136	13.0	•
QCP 138-2M	13.80	5.48	2.870	136	13.0	•
QCP 139-2M	13.90	5.46	2.890	136	13.0	•
QCP 140-2M	14.00	6.03	2.930	136	14.0	•
QCP 141-2M	14.10	6.01	2.950	136	14.0	•
QCP 142-2M	14.20	5.99	2.970	136	14.0	•
QCP 143-2M	14.30	5.97	2.990	136	14.0	•
QCP 144-2M	14.40	5.95	3.010	136	14.0	•
QCP 145-2M	14.50	5.93	3.030	136	14.0	•
QCP 146-2M	14.60	5.91	3.050	136	14.0	•
QCP 147-2M	14.70	5.89	3.070	136	14.0	•
QCP 148-2M	14.80	5.87	3.090	136	14.0	•
QCP 149-2M	14.90	5.85	3.110	136	14.0	•
QCP 150-2M	15.00	6.46	3.180	136	15.0	•
QCP 151-2M	15.10	6.44	3.200	136	15.0	•
QCP 152-2M	15.20	6.42	3.220	136	15.0	•
QCP 153-2M	15.30	6.40	3.240	136	15.0	•
QCP 155-2M	15.50	6.36	3.280	136	15.0	•
QCP 156-2M	15.60	6.34	3.300	136	15.0	•
QCP 157-2M	15.70	6.32	3.320	136	15.0	•
QCP 158-2M	15.80	6.30	3.340	136	15.0	•
QCP 159-2M	15.90	6.28	3.360	136	15.0	•
QCP 160-2M	16.00	6.88	3.390	136	16.0	•
QCP 161-2M	16.10	6.86	3.410	136	16.0	•
QCP 162-2M	16.20	6.84	3.430	136	16.0	•
QCP 163-2M	16.30	6.82	3.450	136	16.0	•
QCP 165-2M	16.50	6.78	3.490	136	16.0	•
QCP 166-2M	16.60	6.76	3.510	136	16.0	•
QCP 167-2M	16.70	6.74	3.530	136	16.0	•
QCP 170-2M	17.00	7.31	3.570	136	17.0	•
QCP 171-2M	17.10	7.29	3.590	136	17.0	•
QCP 172-2M	17.20	7.27	3.610	136	17.0	•
QCP 174-2M	17.40	7.23	3.650	136	17.0	•

• Can provide high surface finish of up to 1.6 Ra hole cylindricity and straightness of up to 0.05 mm • For cutting conditions see page 68-81

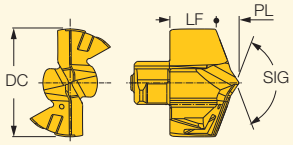
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

QCP-2M (continued)

Exchangeable Double Margin & Self-Centering Drilling Heads for DCN Drills, for Machining ISO P Materials with High Surface Finish Results



Designation	Dimensions					IC908
	DC	LF	PL	SIG	SSC(1)	
QCP 175-2M	17.50	7.21	3.670	136	17.0	•
QCP 177-2M	17.70	7.17	3.710	136	17.0	•
QCP 178-2M	17.80	7.15	3.730	136	17.0	•
QCP 179-2M	17.90	7.13	3.750	136	17.0	•
QCP 180-2M	18.00	7.77	3.780	136	18.0	•
QCP 181-2M	18.10	7.75	3.800	136	18.0	•
QCP 183-2M	18.30	7.71	3.840	136	18.0	•
QCP 185-2M	18.50	7.67	3.880	136	18.0	•
QCP 186-2M	18.60	7.65	3.900	136	18.0	•
QCP 187-2M	18.70	7.63	3.920	136	18.0	•
QCP 188-2M	18.80	7.61	3.940	136	18.0	•
QCP 189-2M	18.90	7.59	3.960	136	18.0	•
QCP 190-2M	19.00	8.12	3.990	136	19.0	•
QCP 1905-2M	19.05	8.11	4.000	136	19.0	•
QCP 191-2M	19.10	8.10	4.010	136	19.0	•
QCP 192-2M	19.20	8.08	4.030	136	19.0	•
QCP 1927-2M	19.27	8.07	4.040	136	19.0	•
QCP 193-2M	19.30	8.06	4.050	136	19.0	•
QCP 194-2M	19.40	8.04	4.070	136	19.0	•
QCP 195-2M	19.50	8.02	4.090	136	19.0	•
QCP 197-2M	19.70	7.98	4.130	136	19.0	•
QCP 198-2M	19.80	7.96	4.150	136	19.0	•
QCP 199-2M	19.90	7.94	4.170	136	19.0	•
QCP 200-2M	20.00	8.58	4.240	136	20.0	•
QCP 201-2M	20.10	8.56	4.260	136	20.0	•
QCP 202-2M	20.20	8.54	4.280	136	20.0	•
QCP 203-2M	20.30	8.52	4.300	136	20.0	•
QCP 204-2M	20.40	8.50	4.320	136	20.0	•
QCP 205-2M	20.50	8.48	4.340	136	20.0	•
QCP 206-2M	20.60	8.46	4.360	136	20.0	•
QCP 207-2M	20.70	8.44	4.380	136	20.0	•
QCP 209-2M	20.90	8.40	4.420	136	20.0	•
QCP 210-2M	21.00	9.00	4.400	136	21.0	•
QCP 213-2M	21.30	8.94	4.460	136	21.0	•
QCP 215-2M	21.50	8.90	4.500	136	21.0	•
QCP 217-2M	21.70	8.86	4.540	136	21.0	•
QCP 218-2M	21.80	8.84	4.560	136	21.0	•
QCP 220-2M	22.00	9.44	4.600	136	22.0	•
QCP 221-2M	22.10	9.42	4.620	136	22.0	•
QCP 222-2M	22.20	9.40	4.640	136	22.0	•
QCP 223-2M	22.30	9.38	4.660	136	22.0	•
QCP 225-2M	22.50	9.34	4.700	136	22.0	•
QCP 226-2M	22.60	9.32	4.720	136	22.0	•
QCP 227-2M	22.70	9.30	4.740	136	22.0	•
QCP 230-2M	23.00	9.87	4.840	136	23.0	•
QCP 233-2M	23.30	9.81	4.900	136	23.0	•
QCP 234-2M	23.40	9.79	4.920	136	23.0	•
QCP 235-2M	23.50	9.77	4.940	136	23.0	•
QCP 237-2M	23.70	9.73	4.980	136	23.0	•
QCP 238-2M	23.80	9.71	5.000	136	23.0	•
QCP 240-2M	24.00	10.28	5.030	136	24.0	•
QCP 242-2M	24.20	10.24	5.070	136	24.0	•
QCP 243-2M	24.30	10.22	5.090	136	24.0	•
QCP 245-2M	24.50	10.18	5.130	136	24.0	•
QCP 246-2M	24.60	10.16	5.150	136	24.0	•

• Can provide high surface finish of up to 1.6 Ra hole cylindricity and straightness of up to 0.05 mm • For cutting conditions see page 68-81

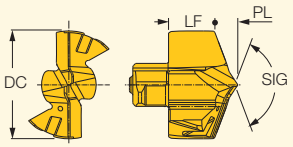
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM CHAMDRILL LINE

QCP-2M (continued)

Exchangeable Double Margin & Self-Centering Drilling Heads for DCN Drills, for Machining ISO P Materials with High Surface Finish Results



Designation	Dimensions DC	LF	PL	SIG	SSC(1)	IC908
QCP 247-2M	24.70	10.14	5.170	136	24.0	●
QCP 249-2M	24.90	10.10	5.210	136	24.0	●
QCP 250-2M	25.00	10.70	5.280	136	25.0	●
QCP 251-2M	25.10	10.68	5.300	136	25.0	●
QCP 252-2M	25.20	10.66	5.320	136	25.0	●
QCP 253-2M	25.30	10.64	5.340	136	25.0	●
QCP 254-2M	25.40	10.62	5.360	136	25.0	●
QCP 255-2M	25.50	10.60	5.380	136	25.0	●
QCP 256-2M	25.60	10.58	5.400	136	25.0	●
QCP 2567-2M	25.67	10.56	5.420	136	25.0	●
QCP 257-2M	25.70	10.56	5.420	136	25.0	●
QCP 258-2M	25.80	10.54	5.440	136	25.0	●
QCP 259-2M	25.90	10.52	5.460	136	25.0	●

• Can provide high surface finish of up to 1.6 Ra hole cylindricity and straightness of up to 0.05 mm • For cutting conditions see page 68-81

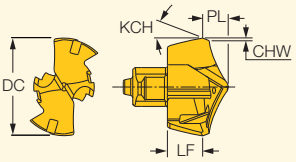
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAMIQ
CHAMDRILL LINE

HCP-IQ

Exchangeable Self-Centering Drilling Heads for DCN Drills, for Machining ISO P and ISO K Materials



Designation	Dimensions DC	LF	PL	CHW	KCH	SSC(1)		IC908
HCP 040-IQ	4.00	2.40	1.160	0.20	30.0	4	SK DCN 4-4.99	•
HCP 041-IQ	4.10	2.40	1.160	0.20	30.0	4	SK DCN 4-4.99	•
HCP 042-IQ	4.20	2.40	1.160	0.20	30.0	4	SK DCN 4-4.99	•
HCP 043-IQ	4.30	2.40	1.160	0.20	30.0	4	SK DCN 4-4.99	•
HCP 044-IQ	4.40	2.40	1.160	0.20	30.0	4	SK DCN 4-4.99	•
HCP 045-IQ	4.50	2.64	1.190	0.20	30.0	4.5	SK DCN 4-4.99	•
HCP 046-IQ	4.60	2.64	1.190	0.20	30.0	4.5	SK DCN 4-4.99	•
HCP 047-IQ	4.70	2.64	1.190	0.20	30.0	4.5	SK DCN 4-4.99	•
HCP 048-IQ	4.80	2.64	1.190	0.20	30.0	4.5	SK DCN 4-4.99	•
HCP 049-IQ	4.90	2.64	1.190	0.20	30.0	4.5	SK DCN 4-4.99	•
HCP 050-IQ	5.00	2.79	1.440	0.25	30.0	5.0	SK DCN 5-5.99	•
HCP 051-IQ	5.10	2.79	1.440	0.25	30.0	5.0	SK DCN 5-5.99	•
HCP 052-IQ	5.20	2.79	1.440	0.25	30.0	5.0	SK DCN 5-5.99	•
HCP 053-IQ	5.30	2.79	1.440	0.25	30.0	5.0	SK DCN 5-5.99	•
HCP 054-IQ	5.40	2.79	1.440	0.25	30.0	5.0	SK DCN 5-5.99	•
HCP 055-IQ	5.50	2.75	1.630	0.25	30.0	5.5	SK DCN 5-5.99	•
HCP 056-IQ	5.60	2.75	1.630	0.25	30.0	5.5	SK DCN 5-5.99	•
HCP 057-IQ	5.70	2.75	1.630	0.25	30.0	5.5	SK DCN 5-5.99	•
HCP 058-IQ	5.80	2.75	1.630	0.25	30.0	5.5	SK DCN 5-5.99	•
HCP 059-IQ	5.90	2.75	1.630	0.25	30.0	5.5	SK DCN 5-5.99	•
HCP 060-IQ	6.00	2.35	1.650	0.29	30.0	6.0		•
HCP 061-IQ	6.10	2.35	1.650	0.29	30.0	6.0		•
HCP 062-IQ	6.20	2.35	1.650	0.29	30.0	6.0		•
HCP 063-IQ	6.30	2.35	1.650	0.29	30.0	6.0		•
HCP 064-IQ	6.40	2.35	1.650	0.29	30.0	6.0		•
HCP 065-IQ	6.50	2.63	1.670	0.29	30.0	6.5		•
HCP 066-IQ	6.60	2.63	1.670	0.29	30.0	6.5		•
HCP 067-IQ	6.70	2.63	1.670	0.29	30.0	6.5		•
HCP 068-IQ	6.80	2.63	1.670	0.29	30.0	6.5		•
HCP 069-IQ	6.90	2.63	1.670	0.29	30.0	6.5		•
HCP 070-IQ	7.00	2.83	1.770	0.35	30.0	7.0		•
HCP 071-IQ	7.10	2.83	1.770	0.35	30.0	7.0		•
HCP 072-IQ	7.20	2.83	1.770	0.35	30.0	7.0		•
HCP 073-IQ	7.30	2.83	1.770	0.35	30.0	7.0		•
HCP 074-IQ	7.40	2.83	1.770	0.35	30.0	7.0		•
HCP 075-IQ	7.50	2.83	1.770	0.35	30.0	7.0		•
HCP 076-IQ	7.60	2.83	1.770	0.35	30.0	7.0		•
HCP 077-IQ	7.70	2.83	1.770	0.35	30.0	7.0		•
HCP 078-IQ	7.80	2.83	1.770	0.35	30.0	7.0		•
HCP 079-IQ	7.90	2.83	1.770	0.35	30.0	7.0		•
HCP 080-IQ	8.00	3.24	2.160	0.40	30.0	8.0		•
HCP 081-IQ	8.10	3.24	2.160	0.40	30.0	8.0		•
HCP 082-IQ	8.20	3.24	2.160	0.40	30.0	8.0		•
HCP 083-IQ	8.30	3.24	2.160	0.40	30.0	8.0		•
HCP 084-IQ	8.40	3.24	2.160	0.40	30.0	8.0		•
HCP 085-IQ	8.50	3.24	2.160	0.40	30.0	8.0		•
HCP 086-IQ	8.60	3.24	2.160	0.40	30.0	8.0		•
HCP 087-IQ	8.70	3.24	2.160	0.40	30.0	8.0		•
HCP 088-IQ	8.80	3.24	2.160	0.40	30.0	8.0		•
HCP 089-IQ	8.90	3.20	2.160	0.40	30.0	8.0		•
HCP 090-IQ	9.00	3.55	2.250	0.46	30.0	9.0		•
HCP 091-IQ	9.10	3.55	2.250	0.46	30.0	9.0		•
HCP 092-IQ	9.20	3.55	2.250	0.46	30.0	9.0		•
HCP 093-IQ	9.30	3.55	2.250	0.46	30.0	9.0		•

• Advance Self-Centering and high surface finish • For cutting conditions see page 68-81

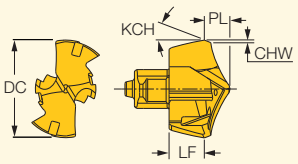
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • MNC-5D (66) • MNC-7/8D (67) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAMIQ CHAMDRILL LINE

HCP-IQ (continued)

Exchangeable Self-Centering Drilling Heads for DCN Drills, for Machining ISO P and ISO K Materials



Designation	Dimensions						IC908
	DC	LF	PL	CHW	KCH	SSC(1)	
HCP 094-IQ	9.40	3.55	2.250	0.46	30.0	9.0	•
HCP 095-IQ	9.50	3.55	2.250	0.46	30.0	9.0	•
HCP 096-IQ	9.60	3.55	2.250	0.46	30.0	9.0	•
HCP 097-IQ	9.70	3.55	2.250	0.46	30.0	9.0	•
HCP 098-IQ	9.80	3.55	2.250	0.46	30.0	9.0	•
HCP 099-IQ	9.90	3.55	2.250	0.46	30.0	9.0	•
HCP 100-IQ	10.00	3.48	2.720	0.46	30.0	10.0	•
HCP 101-IQ	10.10	3.48	2.720	0.46	30.0	10.0	•
HCP 102-IQ	10.20	3.48	2.720	0.46	30.0	10.0	•
HCP 103-IQ	10.30	3.48	2.720	0.46	30.0	10.0	•
HCP 104-IQ	10.40	3.48	2.720	0.46	30.0	10.0	•
HCP 105-IQ	10.50	3.48	2.720	0.46	30.0	10.0	•
HCP 106-IQ	10.60	3.48	2.720	0.46	30.0	10.0	•
HCP 107-IQ	10.70	3.48	2.720	0.46	30.0	10.0	•
HCP 108-IQ	10.80	3.48	2.720	0.46	30.0	10.0	•
HCP 109-IQ	10.90	3.48	2.720	0.46	30.0	10.0	•
HCP 110-IQ	11.00	3.85	2.750	0.52	30.0	11.0	•
HCP 111-IQ	11.10	3.85	2.750	0.52	30.0	11.0	•
HCP 112-IQ	11.20	3.85	2.750	0.52	30.0	11.0	•
HCP 113-IQ	11.30	3.85	2.750	0.52	30.0	11.0	•
HCP 114-IQ	11.40	3.85	2.750	0.52	30.0	11.0	•
HCP 115-IQ	11.50	3.85	2.750	0.52	30.0	11.0	•
HCP 116-IQ	11.60	3.85	2.750	0.52	30.0	11.0	•
HCP 117-IQ	11.70	3.85	2.750	0.52	30.0	11.0	•
HCP 118-IQ	11.80	3.85	2.750	0.52	30.0	11.0	•
HCP 119-IQ	11.90	3.85	2.750	0.52	30.0	11.0	•
HCP 120-IQ	12.00	3.84	3.160	0.52	30.0	12.0	•
HCP 121-IQ	12.10	3.84	3.160	0.52	30.0	12.0	•
HCP 122-IQ	12.20	3.84	3.160	0.52	30.0	12.0	•
HCP 123-IQ	12.30	3.84	3.160	0.52	30.0	12.0	•
HCP 124-IQ	12.40	3.84	3.160	0.52	30.0	12.0	•
HCP 125-IQ	12.50	3.84	3.160	0.52	30.0	12.0	•
HCP 126-IQ	12.60	3.84	3.160	0.52	30.0	12.0	•
HCP 127-IQ	12.70	3.84	3.160	0.52	30.0	12.0	•
HCP 128-IQ	12.80	3.84	3.160	0.52	30.0	12.0	•
HCP 129-IQ	12.90	3.84	3.160	0.52	30.0	12.0	•
HCP 130-IQ	13.00	4.09	3.510	0.58	30.0	13.0	•
HCP 131-IQ	13.10	4.09	3.510	0.58	30.0	13.0	•
HCP 132-IQ	13.20	4.09	3.510	0.58	30.0	13.0	•
HCP 133-IQ	13.30	4.09	3.510	0.58	30.0	13.0	•
HCP 134-IQ	13.40	4.09	3.510	0.58	30.0	13.0	•
HCP 135-IQ	13.50	4.09	3.510	0.58	30.0	13.0	•
HCP 136-IQ	13.60	4.09	3.510	0.58	30.0	13.0	•
HCP 137-IQ	13.70	4.09	3.510	0.58	30.0	13.0	•
HCP 138-IQ	13.80	4.09	3.510	0.58	30.0	13.0	•
HCP 139-IQ	13.90	4.09	3.510	0.58	30.0	13.0	•
HCP 140-IQ	14.00	4.52	3.630	0.64	30.0	14.0	•
HCP 141-IQ	14.10	4.52	3.630	0.64	30.0	14.0	•
HCP 142-IQ	14.20	4.52	3.630	0.64	30.0	14.0	•
HCP 143-IQ	14.30	4.52	3.630	0.64	30.0	14.0	•
HCP 144-IQ	14.40	4.52	3.630	0.64	30.0	14.0	•
HCP 145-IQ	14.50	4.52	3.630	0.64	30.0	14.0	•
HCP 146-IQ	14.60	4.52	3.630	0.64	30.0	14.0	•
HCP 147-IQ	14.70	4.52	3.630	0.64	30.0	14.0	•
HCP 148-IQ	14.80	4.52	3.630	0.64	30.0	14.0	•

• Advance Self-Centering and high surface finish • For cutting conditions see page 68-81

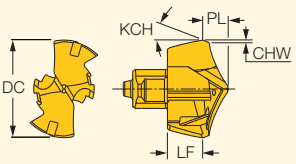
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • MNC-5D (66) • MNC-7/8D (67) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAMIQ
CHAMDRILL LINE

HCP-IQ (continued)

Exchangeable Self-Centering Drilling Heads for DCN Drills, for Machining ISO P and ISO K Materials



Designation	Dimensions						IC908
	DC	LF	PL	CHW	KCH	SSC(1)	
HCP 149-IQ	14.90	4.52	3.630	0.64	30.0	14.0	•
HCP 150-IQ	15.00	4.85	3.880	0.69	30.0	15.0	•
HCP 151-IQ	15.10	4.85	3.880	0.69	30.0	15.0	•
HCP 152-IQ	15.20	4.85	3.880	0.69	30.0	15.0	•
HCP 153-IQ	15.30	4.85	3.880	0.69	30.0	15.0	•
HCP 154-IQ	15.40	4.85	3.880	0.69	30.0	15.0	•
HCP 155-IQ	15.50	4.85	3.880	0.69	30.0	15.0	•
HCP 156-IQ	15.60	4.85	3.880	0.69	30.0	15.0	•
HCP 157-IQ	15.70	4.85	3.880	0.69	30.0	15.0	•
HCP 158-IQ	15.80	4.85	3.880	0.69	30.0	15.0	•
HCP 159-IQ	15.90	4.85	3.880	0.69	30.0	15.0	•
HCP 160-IQ	16.00	5.39	3.910	0.64	30.0	16.0	•
HCP 1605-IQ	16.05	5.39	3.910	0.62	30.0	16.0	•
HCP 161-IQ	16.10	5.39	3.910	0.64	30.0	16.0	•
HCP 162-IQ	16.20	5.39	3.910	0.64	30.0	16.0	•
HCP 163-IQ	16.30	5.39	3.910	0.64	30.0	16.0	•
HCP 164-IQ	16.40	5.39	3.910	0.64	30.0	16.0	•
HCP 165-IQ	16.50	5.39	3.910	0.64	30.0	16.0	•
HCP 166-IQ	16.60	5.39	3.910	0.64	30.0	16.0	•
HCP 167-IQ	16.70	5.39	3.910	0.64	30.0	16.0	•
HCP 168-IQ	16.80	5.39	3.910	0.64	30.0	16.0	•
HCP 169-IQ	16.90	5.39	3.910	0.64	30.0	16.0	•
HCP 170-IQ	17.00	5.33	4.570	0.87	30.0	17.0	•
HCP 171-IQ	17.10	5.33	4.570	0.87	30.0	17.0	•
HCP 172-IQ	17.20	5.33	4.570	0.87	30.0	17.0	•
HCP 173-IQ	17.30	5.33	4.570	0.87	30.0	17.0	•
HCP 174-IQ	17.40	5.33	4.570	0.87	30.0	17.0	•
HCP 175-IQ	17.50	5.33	4.570	0.87	30.0	17.0	•
HCP 176-IQ	17.60	5.33	4.570	0.87	30.0	17.0	•
HCP 177-IQ	17.70	5.33	4.570	0.87	30.0	17.0	•
HCP 178-IQ	17.80	5.33	4.570	0.87	30.0	17.0	•
HCP 179-IQ	17.90	5.33	4.570	0.87	30.0	17.0	•
HCP 180-IQ	18.00	5.84	4.660	0.81	30.0	18.0	•
HCP 181-IQ	18.10	5.84	4.660	0.81	30.0	18.0	•
HCP 182-IQ	18.20	5.84	4.660	0.81	30.0	18.0	•
HCP 183-IQ	18.30	5.84	4.660	0.81	30.0	18.0	•
HCP 184-IQ	18.40	5.84	4.660	0.81	30.0	18.0	•
HCP 185-IQ	18.50	5.84	4.660	0.81	30.0	18.0	•
HCP 186-IQ	18.60	5.84	4.660	0.81	30.0	18.0	•
HCP 187-IQ	18.70	5.84	4.660	0.81	30.0	18.0	•
HCP 188-IQ	18.80	5.84	4.660	0.81	30.0	18.0	•
HCP 189-IQ	18.90	5.84	4.660	0.81	30.0	18.0	•
HCP 190-IQ	19.00	6.34	4.660	0.75	30.0	19.0	•
HCP 191-IQ	19.10	6.34	4.660	0.75	30.0	19.0	•
HCP 192-IQ	19.20	6.34	4.660	0.75	30.0	19.0	•
HCP 1927-IQ	19.27	6.34	4.660	0.75	30.0	19.0	•
HCP 193-IQ	19.30	6.34	4.660	0.75	30.0	19.0	•
HCP 194-IQ	19.40	6.34	4.660	0.75	30.0	19.0	•
HCP 195-IQ	19.50	6.34	4.660	0.75	30.0	19.0	•
HCP 196-IQ	19.60	6.34	4.660	0.75	30.0	19.0	•
HCP 197-IQ	19.70	6.34	4.660	0.75	30.0	19.0	•
HCP 198-IQ	19.80	6.34	4.660	0.75	30.0	19.0	•
HCP 199-IQ	19.90	6.34	4.660	0.75	30.0	19.0	•
HCP 200-IQ	20.00	6.79	4.810	0.58	30.0	20.0	•
HCP 201-IQ	20.10	6.79	4.810	0.58	30.0	20.0	•

• Advance Self-Centering and high surface finish • For cutting conditions see page 68-81

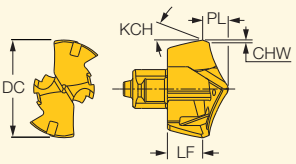
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • MNC-5D (66) • MNC-7/8D (67) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAMIQ CHAMDRILL LINE

HCP-IQ (continued)

Exchangeable Self-Centering Drilling Heads for DCN Drills, for Machining ISO P and ISO K Materials



Designation	Dimensions						IC608
	DC	LF	PL	CHW	KCH	SSC(1)	
HCP 202-IQ	20.20	6.79	4.810	0.58	30.0	20.0	•
HCP 203-IQ	20.30	6.79	4.810	0.58	30.0	20.0	•
HCP 204-IQ	20.40	6.79	4.810	0.58	30.0	20.0	•
HCP 205-IQ	20.50	6.79	4.810	0.58	30.0	20.0	•
HCP 206-IQ	20.60	6.79	4.810	0.58	30.0	20.0	•
HCP 207-IQ	20.70	6.79	4.810	0.58	30.0	20.0	•
HCP 208-IQ	20.80	6.79	4.810	0.58	30.0	20.0	•
HCP 209-IQ	20.90	6.79	4.810	0.58	30.0	20.0	•
HCP 210-IQ	21.00	7.24	4.940	0.69	30.0	21.0	•
HCP 211-IQ	21.10	7.24	4.940	0.69	30.0	21.0	•
HCP 212-IQ	21.20	7.24	4.940	0.69	30.0	21.0	•
HCP 213-IQ	21.30	7.24	4.940	0.69	30.0	21.0	•
HCP 214-IQ	21.40	7.24	4.940	0.69	30.0	21.0	•
HCP 215-IQ	21.50	7.24	4.940	0.69	30.0	21.0	•
HCP 216-IQ	21.60	7.24	4.940	0.69	30.0	21.0	•
HCP 217-IQ	21.70	7.24	4.940	0.69	30.0	21.0	•
HCP 218-IQ	21.80	7.24	4.940	0.69	30.0	21.0	•
HCP 219-IQ	21.90	7.20	4.940	0.69	30.0	21.0	•
HCP 220-IQ	22.00	7.56	5.200	0.69	30.0	22.0	•
HCP 221-IQ	22.10	7.56	5.200	0.69	30.0	22.0	•
HCP 222-IQ	22.20	7.56	5.200	0.69	30.0	22.0	•
HCP 223-IQ	22.30	7.56	5.200	0.69	30.0	22.0	•
HCP 224-IQ	22.40	7.56	5.200	0.69	30.0	22.0	•
HCP 225-IQ	22.50	7.56	5.200	0.69	30.0	22.0	•
HCP 226-IQ	22.60	7.56	5.200	0.69	30.0	22.0	•
HCP 227-IQ	22.70	7.56	5.200	0.69	30.0	22.0	•
HCP 228-IQ	22.80	7.56	5.200	0.69	30.0	22.0	•
HCP 229-IQ	22.90	7.56	5.200	0.69	30.0	22.0	•
HCP 230-IQ	23.00	8.05	5.280	0.75	30.0	23.0	•
HCP 231-IQ	23.10	8.05	5.280	0.75	30.0	23.0	•
HCP 232-IQ	23.20	8.05	5.280	0.75	30.0	23.0	•
HCP 233-IQ	23.30	8.05	5.280	0.75	30.0	23.0	•
HCP 234-IQ	23.40	8.05	5.280	0.75	30.0	23.0	•
HCP 235-IQ	23.50	8.05	5.280	0.75	30.0	23.0	•
HCP 236-IQ	23.60	8.05	5.280	0.75	30.0	23.0	•
HCP 237-IQ	23.70	8.05	5.280	0.75	30.0	23.0	•
HCP 238-IQ	23.80	8.05	5.280	0.75	30.0	23.0	•
HCP 239-IQ	23.90	8.05	5.280	0.75	30.0	23.0	•
HCP 240-IQ	24.00	8.27	5.630	0.81	30.0	24.0	•
HCP 241-IQ	24.10	8.27	5.630	0.81	30.0	24.0	•
HCP 242-IQ	24.20	8.27	5.630	0.81	30.0	24.0	•
HCP 243-IQ	24.30	8.27	5.630	0.81	30.0	24.0	•
HCP 244-IQ	24.40	8.27	5.630	0.81	30.0	24.0	•
HCP 245-IQ	24.50	8.27	5.630	0.81	30.0	24.0	•
HCP 246-IQ	24.60	8.27	5.630	0.81	30.0	24.0	•
HCP 247-IQ	24.70	8.27	5.630	0.81	30.0	24.0	•
HCP 248-IQ	24.80	8.27	5.630	0.81	30.0	24.0	•
HCP 249-IQ	24.90	8.27	5.630	0.81	30.0	24.0	•
HCP 250-IQ	25.00	8.80	5.700	0.64	30.0	25.0	•
HCP 251-IQ	25.10	8.80	5.700	0.64	30.0	25.0	•
HCP 252-IQ	25.20	8.80	5.700	0.64	30.0	25.0	•
HCP 253-IQ	25.30	8.80	5.700	0.64	30.0	25.0	•
HCP 254-IQ	25.40	8.80	5.700	0.64	30.0	25.0	•
HCP 255-IQ	25.50	8.80	5.700	0.64	30.0	25.0	•
HCP 256-IQ	25.60	8.80	5.700	0.64	30.0	25.0	•

• Advance Self-Centering and high surface finish • For cutting conditions see page 68-81

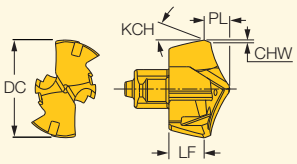
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • MNC-5D (66) • MNC-7/8D (67) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAMIQ CHAMDRILL LINE

HCP-IQ (continued)

Exchangeable Self-Centering Drilling Heads for DCN Drills, for Machining ISO P and ISO K Materials



Designation	Dimensions DC	LF	PL	CHW	KCH	SSC(1)	IC908
HCP 2565-IQ	25.65	8.80	5.700	0.67	30.0	25.0	•
HCP 257-IQ	25.70	8.80	5.700	0.64	30.0	25.0	•
HCP 258-IQ	25.80	8.80	5.700	0.64	30.0	25.0	•
HCP 259-IQ	25.90	8.80	5.700	0.64	30.0	25.0	•
HCP 260-IQ	26.00	9.12	5.950	0.58	30.0	26.0	•
HCP 262-IQ	26.20	9.12	5.950	0.58	30.0	26.0	•
HCP 265-IQ	26.50	9.12	5.950	0.58	30.0	26.0	•
HCP 266-IQ	26.60	9.12	5.950	0.58	30.0	26.0	•
HCP 269-IQ	26.90	9.12	5.950	0.58	30.0	26.0	•
HCP 270-IQ	27.00	9.45	6.200	0.64	30.0	27.0	•
HCP 275-IQ	27.50	9.45	6.200	0.64	30.0	27.0	•
HCP 277-IQ	27.70	9.45	6.200	0.64	30.0	27.0	•
HCP 280-IQ	28.00	9.80	6.420	0.64	30.0	28.0	•
HCP 285-IQ	28.50	9.80	6.420	0.64	30.0	28.0	•
HCP 290-IQ	29.00	10.16	6.640	0.64	30.0	29.0	•
HCP 295-IQ	29.50	10.16	6.640	0.64	30.0	29.0	•
HCP 300-IQ	30.00	10.50	6.880	0.69	30.0	30.0	•
HCP 305-IQ	30.50	10.50	6.880	0.69	30.0	30.0	•
HCP 310-IQ	31.00	11.00	6.960	0.69	30.0	31.0	•
HCP 315-IQ	31.50	11.00	6.960	0.69	30.0	31.0	•
HCP 3175-IQ	31.75	11.00	6.960	0.69	30.0	31.0	•
HCP 320-IQ	32.00	11.20	7.340	0.75	30.0	32.0	•
HCP 325-IQ	32.50	11.20	7.340	0.75	30.0	32.0	•
HCP 329-IQ	32.90	11.20	7.340	0.75	30.0	32.0	•

• Advance Self-Centering and high surface finish • For cutting conditions see page 68-81

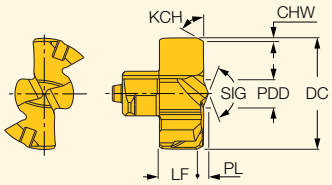
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • MNC-5D (66) • MNC-7/8D (67) • DCNT (M8-M24) (136) • MNSNT (293)

SUMOCHAM FLAT HEAD

FCP

Exchangeable Flat Bottom Drilling Heads for DCN Drills, for Machining ISO P and ISO K Materials



Designation	Dimensions									IC608
	DC	PDD	LF	PL	CHW	KCH	SIG	SSC(1)		
FCP 040-IQ	4.00	1.44	2.50	0.440	0.17	60.0	140	4	SK DCN 4-4.99	•
FCP 041-IQ	4.10	1.44	2.50	0.440	0.17	60.0	140	4	SK DCN 4-4.99	•
FCP 042-IQ	4.20	1.44	2.50	0.440	0.17	60.0	140	4	SK DCN 4-4.99	•
FCP 043-IQ	4.30	1.44	2.50	0.440	0.17	60.0	140	4	SK DCN 4-4.99	•
FCP 044-IQ	4.40	1.44	2.50	0.440	0.17	60.0	140	4	SK DCN 4-4.99	•
FCP 045-IQ	4.50	1.56	2.80	0.480	0.17	60.0	140	4.5	SK DCN 4-4.99	•
FCP 046-IQ	4.60	1.56	2.80	0.480	0.17	60.0	140	4.5	SK DCN 4-4.99	•
FCP 047-IQ	4.70	1.56	2.80	0.480	0.17	60.0	140	4.5	SK DCN 4-4.99	•
FCP 048-IQ	4.80	1.56	2.80	0.480	0.17	60.0	140	4.5	SK DCN 4-4.99	•
FCP 049-IQ	4.90	1.56	2.80	0.480	0.17	60.0	140	4.5	SK DCN 4-4.99	•
FCP 050-IQ	5.00	1.98	2.90	0.610	0.23	60.0	140	5.0	SK DCN 5-5.99	•
FCP 051-IQ	5.10	1.98	2.90	0.610	0.23	60.0	140	5.0	SK DCN 5-5.99	•
FCP 052-IQ	5.20	1.98	2.90	0.610	0.23	60.0	140	5.0	SK DCN 5-5.99	•
FCP 053-IQ	5.30	1.98	2.90	0.610	0.23	60.0	140	5.0	SK DCN 5-5.99	•
FCP 054-IQ	5.40	1.98	2.90	0.610	0.23	60.0	140	5.0	SK DCN 5-5.99	•
FCP 055-IQ	5.50	2.02	2.90	0.610	0.23	60.0	140	5.5	SK DCN 5-5.99	•
FCP 056-IQ	5.60	2.02	2.90	0.610	0.23	60.0	140	5.5	SK DCN 5-5.99	•
FCP 057-IQ	5.70	2.02	2.90	0.610	0.23	60.0	140	5.5	SK DCN 5-5.99	•
FCP 058-IQ	5.80	2.02	2.90	0.610	0.23	60.0	140	5.5	SK DCN 5-5.99	•
FCP 059-IQ	5.90	2.02	2.90	0.610	0.23	60.0	140	5.5	SK DCN 5-5.99	•
FCP 060	6.00	1.15	2.40	0.610	0.23	60.0	140	6.0		•
FCP 061	6.10	1.15	2.40	0.610	0.23	60.0	140	6.0		•
FCP 062	6.20	1.15	2.40	0.610	0.23	60.0	140	6.0		•
FCP 063	6.30	1.15	2.40	0.610	0.23	60.0	140	6.0		•
FCP 064	6.40	1.15	2.40	0.610	0.23	60.0	140	6.0		•
FCP 065	6.50	1.54	2.60	0.680	0.23	60.0	140	6.5		•
FCP 066	6.60	1.54	2.60	0.680	0.23	60.0	140	6.5		•
FCP 067	6.70	1.54	2.60	0.680	0.23	60.0	140	6.5		•
FCP 068	6.80	1.54	2.60	0.680	0.23	60.0	140	6.5		•
FCP 069	6.90	1.54	2.60	0.680	0.23	60.0	140	6.5		•
FCP 070	7.00	1.54	2.90	0.680	0.23	60.0	140	7.0		•
FCP 071	7.10	1.54	2.90	0.680	0.23	60.0	140	7.0		•
FCP 072	7.20	1.54	2.90	0.680	0.23	60.0	140	7.0		•
FCP 073	7.30	1.54	2.90	0.680	0.23	60.0	140	7.0		•
FCP 074	7.40	1.54	2.90	0.680	0.23	60.0	140	7.0		•
FCP 075	7.50	1.54	2.90	0.680	0.23	60.0	140	7.0		•
FCP 076	7.60	1.54	2.90	0.680	0.23	60.0	140	7.0		•
FCP 077	7.70	1.54	2.90	0.680	0.23	60.0	140	7.0		•
FCP 078	7.80	1.54	2.90	0.680	0.23	60.0	140	7.0		•
FCP 079	7.90	1.54	2.90	0.680	0.23	60.0	140	7.0		•
FCP 080	8.00	2.44	3.30	1.090	0.40	60.0	140	8.0		•
FCP 081	8.10	2.44	3.30	1.090	0.40	60.0	140	8.0		•
FCP 082	8.20	2.44	3.30	1.090	0.40	60.0	140	8.0		•
FCP 083	8.30	2.44	3.30	1.090	0.40	60.0	140	8.0		•
FCP 084	8.40	2.44	3.30	1.090	0.40	60.0	140	8.0		•
FCP 085	8.50	2.44	3.30	1.090	0.40	60.0	140	8.0		•
FCP 086	8.60	2.44	3.30	1.090	0.40	60.0	140	8.0		•
FCP 087	8.70	2.44	3.30	1.090	0.40	60.0	140	8.0		•
FCP 088	8.80	2.44	3.30	1.090	0.40	60.0	140	8.0		•
FCP 089	8.90	2.44	3.30	1.090	0.40	60.0	140	8.0		•
FCP 090	9.00	2.55	3.50	1.110	0.40	60.0	140	9.0		•
FCP 091	9.10	2.55	3.50	1.110	0.40	60.0	140	9.0		•
FCP 092	9.20	2.55	3.50	1.110	0.40	60.0	140	9.0		•
FCP 093	9.30	2.55	3.50	1.110	0.40	60.0	140	9.0		•
FCP 094	9.40	2.55	3.50	1.110	0.40	60.0	140	9.0		•

• For nearly flat bottom hole applications • For cutting conditions see page 68-81

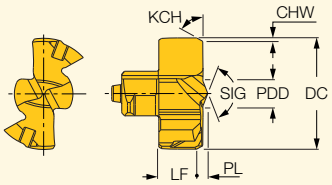
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136)

SUMOCHAM FLAT HEAD

FCP (continued)

Exchangeable Flat Bottom Drilling Heads for DCN Drills, for Machining ISO P and ISO K Materials



Designation	Dimensions								IC908
	DC	PDD	LF	PL	CHW	KCH	SIG	SSC(1)	
FCP 095	9.50	2.55	3.50	1.110	0.40	60.0	140	9.0	•
FCP 096	9.60	2.55	3.50	1.110	0.40	60.0	140	9.0	•
FCP 097	9.70	2.55	3.50	1.110	0.40	60.0	140	9.0	•
FCP 098	9.80	2.55	3.50	1.110	0.40	60.0	140	9.0	•
FCP 099	9.90	2.55	3.50	1.110	0.40	60.0	140	9.0	•
FCP 100	10.00	2.89	3.70	1.170	0.40	60.0	140	10.0	•
FCP 101	10.10	2.89	3.70	1.170	0.40	60.0	140	10.0	•
FCP 102	10.20	2.89	3.70	1.170	0.40	60.0	140	10.0	•
FCP 103	10.30	2.89	3.70	1.170	0.40	60.0	140	10.0	•
FCP 104	10.40	2.89	3.70	1.170	0.40	60.0	140	10.0	•
FCP 105	10.50	2.89	3.70	1.170	0.40	60.0	140	10.0	•
FCP 106	10.60	2.89	3.70	1.170	0.40	60.0	140	10.0	•
FCP 107	10.70	2.89	3.70	1.170	0.40	60.0	140	10.0	•
FCP 108	10.80	2.89	3.70	1.170	0.40	60.0	140	10.0	•
FCP 109	10.90	2.89	3.70	1.170	0.40	60.0	140	10.0	•
FCP 110	11.00	2.98	3.80	1.250	0.40	60.0	140	11.0	•
FCP 111	11.10	2.98	3.80	1.250	0.40	60.0	140	11.0	•
FCP 112	11.20	2.98	3.80	1.250	0.40	60.0	140	11.0	•
FCP 113	11.30	2.98	3.80	1.250	0.40	60.0	140	11.0	•
FCP 114	11.40	2.98	3.80	1.250	0.40	60.0	140	11.0	•
FCP 115	11.50	2.98	3.80	1.250	0.40	60.0	140	11.0	•
FCP 116	11.60	2.98	3.80	1.250	0.40	60.0	140	11.0	•
FCP 117	11.70	2.98	3.80	1.250	0.40	60.0	140	11.0	•
FCP 118	11.80	2.98	3.80	1.250	0.40	60.0	140	11.0	•
FCP 119	11.90	2.98	3.80	1.250	0.40	60.0	140	11.0	•
FCP 120	12.00	3.13	4.10	1.260	0.40	60.0	140	12.0	•
FCP 121	12.10	3.13	4.10	1.260	0.40	60.0	140	12.0	•
FCP 122	12.20	3.13	4.10	1.260	0.40	60.0	140	12.0	•
FCP 123	12.30	3.13	4.10	1.260	0.40	60.0	140	12.0	•
FCP 124	12.40	3.13	4.10	1.260	0.40	60.0	140	12.0	•
FCP 125	12.50	3.13	4.10	1.260	0.40	60.0	140	12.0	•
FCP 126	12.60	3.13	4.10	1.260	0.40	60.0	140	12.0	•
FCP 127	12.70	3.13	4.10	1.260	0.40	60.0	140	12.0	•
FCP 128	12.80	3.13	4.10	1.260	0.40	60.0	140	12.0	•
FCP 129	12.90	3.13	4.10	1.260	0.40	60.0	140	12.0	•
FCP 130	13.00	3.52	4.40	1.280	0.40	60.0	140	13.0	•
FCP 131	13.10	3.52	4.40	1.280	0.40	60.0	140	13.0	•
FCP 132	13.20	3.52	4.40	1.280	0.40	60.0	140	13.0	•
FCP 133	13.30	3.52	4.40	1.280	0.40	60.0	140	13.0	•
FCP 134	13.40	3.52	4.40	1.280	0.40	60.0	140	13.0	•
FCP 135	13.50	3.52	4.40	1.280	0.40	60.0	140	13.0	•
FCP 136	13.60	3.52	4.40	1.280	0.40	60.0	140	13.0	•
FCP 137	13.70	3.52	4.40	1.280	0.40	60.0	140	13.0	•
FCP 138	13.80	3.52	4.40	1.280	0.40	60.0	140	13.0	•
FCP 139	13.90	3.52	4.40	1.280	0.40	60.0	140	13.0	•
FCP 140	14.00	3.81	4.80	1.310	0.40	60.0	140	14.0	•
FCP 141	14.10	3.81	4.80	1.310	0.40	60.0	140	14.0	•
FCP 142	14.20	3.81	4.80	1.310	0.40	60.0	140	14.0	•
FCP 143	14.30	3.81	4.80	1.310	0.40	60.0	140	14.0	•
FCP 144	14.40	3.81	4.80	1.310	0.40	60.0	140	14.0	•
FCP 145	14.50	3.81	4.80	1.310	0.40	60.0	140	14.0	•
FCP 146	14.60	3.81	4.80	1.310	0.40	60.0	140	14.0	•
FCP 147	14.70	3.81	4.80	1.310	0.40	60.0	140	14.0	•
FCP 148	14.80	3.81	4.80	1.310	0.40	60.0	140	14.0	•
FCP 149	14.90	3.81	4.80	1.310	0.40	60.0	140	14.0	•

• For nearly flat bottom hole applications • For cutting conditions see page 68-81

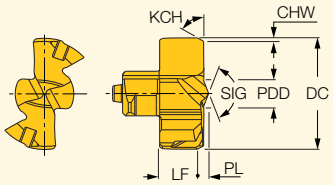
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136)

SUMOCHAM FLAT HEAD

FCP (continued)

Exchangeable Flat Bottom Drilling Heads for DCN Drills, for Machining ISO P and ISO K Materials



Designation	Dimensions								IC908
	DC	PDD	LF	PL	CHW	KCH	SIG	SSC(1)	
FCP 150	15.00	4.24	5.23	1.350	0.40	60.0	140	15.0	•
FCP 151	15.10	4.24	5.23	1.350	0.40	60.0	140	15.0	•
FCP 152	15.20	4.24	5.23	1.350	0.40	60.0	140	15.0	•
FCP 153	15.30	4.24	5.23	1.350	0.40	60.0	140	15.0	•
FCP 154	15.40	4.24	5.23	1.350	0.40	60.0	140	15.0	•
FCP 155	15.50	4.24	5.23	1.350	0.40	60.0	140	15.0	•
FCP 156	15.60	4.24	5.23	1.350	0.40	60.0	140	15.0	•
FCP 157	15.70	4.24	5.23	1.350	0.40	60.0	140	15.0	•
FCP 158	15.80	4.24	5.23	1.350	0.40	60.0	140	15.0	•
FCP 159	15.90	4.24	5.23	1.350	0.40	60.0	140	15.0	•
FCP 160	16.00	4.06	5.60	1.390	0.40	60.0	140	16.0	•
FCP 161	16.10	4.06	5.60	1.390	0.40	60.0	140	16.0	•
FCP 162	16.20	4.06	5.60	1.390	0.40	60.0	140	16.0	•
FCP 163	16.30	4.06	5.60	1.390	0.40	60.0	140	16.0	•
FCP 164	16.40	4.06	5.60	1.390	0.40	60.0	140	16.0	•
FCP 165	16.50	4.06	5.60	1.390	0.40	60.0	140	16.0	•
FCP 166	16.60	4.06	5.60	1.390	0.40	60.0	140	16.0	•
FCP 167	16.70	4.06	5.60	1.390	0.40	60.0	140	16.0	•
FCP 168	16.80	4.06	5.60	1.390	0.40	60.0	140	16.0	•
FCP 169	16.90	4.06	5.60	1.390	0.40	60.0	140	16.0	•
FCP 170	17.00	4.14	5.90	1.400	0.40	60.0	140	17.0	•
FCP 171	17.10	4.14	5.90	1.400	0.40	60.0	140	17.0	•
FCP 172	17.20	4.14	5.90	1.400	0.40	60.0	140	17.0	•
FCP 173	17.30	4.14	5.90	1.400	0.40	60.0	140	17.0	•
FCP 174	17.40	4.14	5.90	1.400	0.40	60.0	140	17.0	•
FCP 175	17.50	4.14	5.90	1.400	0.40	60.0	140	17.0	•
FCP 176	17.60	4.14	5.90	1.400	0.40	60.0	140	17.0	•
FCP 177	17.70	4.14	5.90	1.400	0.40	60.0	140	17.0	•
FCP 178	17.80	4.14	5.90	1.400	0.40	60.0	140	17.0	•
FCP 179	17.90	4.14	5.90	1.400	0.40	60.0	140	17.0	•
FCP 180	18.00	4.16	6.18	1.420	0.40	60.0	140	18.0	•
FCP 181	18.10	4.16	6.18	1.420	0.40	60.0	140	18.0	•
FCP 182	18.20	4.16	6.18	1.420	0.40	60.0	140	18.0	•
FCP 183	18.30	4.16	6.18	1.420	0.40	60.0	140	18.0	•
FCP 184	18.40	4.16	6.18	1.420	0.40	60.0	140	18.0	•
FCP 185	18.50	4.16	6.18	1.420	0.40	60.0	140	18.0	•
FCP 186	18.60	4.16	6.18	1.420	0.40	60.0	140	18.0	•
FCP 187	18.70	4.16	6.18	1.420	0.40	60.0	140	18.0	•
FCP 188	18.80	4.16	6.18	1.420	0.40	60.0	140	18.0	•
FCP 189	18.90	4.16	6.18	1.420	0.40	60.0	140	18.0	•
FCP 190	19.00	4.25	6.50	1.440	0.40	60.0	140	19.0	•
FCP 191	19.10	4.25	6.50	1.440	0.40	60.0	140	19.0	•
FCP 192	19.20	4.25	6.50	1.440	0.40	60.0	140	19.0	•
FCP 193	19.30	4.25	6.50	1.440	0.40	60.0	140	19.0	•
FCP 194	19.40	4.25	6.50	1.440	0.40	60.0	140	19.0	•
FCP 195	19.50	4.25	6.50	1.440	0.40	60.0	140	19.0	•
FCP 196	19.60	4.25	6.50	1.440	0.40	60.0	140	19.0	•
FCP 197	19.70	4.25	6.50	1.440	0.40	60.0	140	19.0	•
FCP 198	19.80	4.25	6.50	1.440	0.40	60.0	140	19.0	•
FCP 199	19.90	4.25	6.50	1.440	0.40	60.0	140	19.0	•
FCP 200	20.00	6.56	7.50	1.770	0.40	60.0	140	20.0	•
FCP 201	20.10	6.56	7.50	1.770	0.40	60.0	140	20.0	•
FCP 202	20.20	6.56	7.50	1.770	0.40	60.0	140	20.0	•
FCP 203	20.30	6.56	7.50	1.770	0.40	60.0	140	20.0	•
FCP 204	20.40	6.56	7.50	1.770	0.40	60.0	140	20.0	•

• For nearly flat bottom hole applications • For cutting conditions see page 68-81

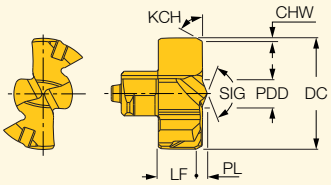
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136)

SUMOCHAM FLAT HEAD

FCP (continued)

Exchangeable Flat Bottom Drilling Heads for DCN Drills, for Machining ISO P and ISO K Materials



Designation	Dimensions								IC908
	DC	PDD	LF	PL	CHW	KCH	SIG	SSC(1)	
FCP 205	20.50	6.56	7.50	1.770	0.40	60.0	140	20.0	•
FCP 206	20.60	6.56	7.50	1.770	0.40	60.0	140	20.0	•
FCP 207	20.70	6.56	7.50	1.770	0.40	60.0	140	20.0	•
FCP 208	20.80	6.56	7.50	1.770	0.40	60.0	140	20.0	•
FCP 209	20.90	6.56	7.50	1.770	0.40	60.0	140	20.0	•
FCP 210	21.00	6.92	7.90	1.790	0.40	60.0	140	21.0	•
FCP 211	21.10	6.92	7.90	1.790	0.40	60.0	140	21.0	•
FCP 212	21.20	6.92	7.90	1.790	0.40	60.0	140	21.0	•
FCP 213	21.30	6.92	7.90	1.790	0.40	60.0	140	21.0	•
FCP 214	21.40	6.92	7.90	1.790	0.40	60.0	140	21.0	•
FCP 215	21.50	6.92	7.90	1.790	0.40	60.0	140	21.0	•
FCP 216	21.60	6.92	7.90	1.790	0.40	60.0	140	21.0	•
FCP 217	21.70	6.92	7.90	1.790	0.40	60.0	140	21.0	•
FCP 218	21.80	6.92	7.90	1.790	0.40	60.0	140	21.0	•
FCP 219	21.90	6.92	7.90	1.790	0.40	60.0	140	21.0	•
FCP 220	22.00	7.13	8.20	1.810	0.40	60.0	140	22.0	•
FCP 221	22.10	7.13	8.20	1.810	0.40	60.0	140	22.0	•
FCP 222	22.20	7.13	8.20	1.810	0.40	60.0	140	22.0	•
FCP 223	22.30	7.13	8.20	1.810	0.40	60.0	140	22.0	•
FCP 224	22.40	7.13	8.20	1.810	0.40	60.0	140	22.0	•
FCP 225	22.50	7.13	8.20	1.810	0.40	60.0	140	22.0	•
FCP 226	22.60	7.13	8.20	1.810	0.40	60.0	140	22.0	•
FCP 227	22.70	7.13	8.20	1.810	0.40	60.0	140	22.0	•
FCP 228	22.80	7.13	8.20	1.810	0.40	60.0	140	22.0	•
FCP 229	22.90	7.13	8.20	1.810	0.40	60.0	140	22.0	•
FCP 230	23.00	7.42	8.60	1.830	0.40	60.0	140	23.0	•
FCP 231	23.10	7.42	8.60	1.830	0.40	60.0	140	23.0	•
FCP 232	23.20	7.42	8.60	1.830	0.40	60.0	140	23.0	•
FCP 233	23.30	7.42	8.60	1.830	0.40	60.0	140	23.0	•
FCP 234	23.40	7.42	8.60	1.830	0.40	60.0	140	23.0	•
FCP 235	23.50	7.42	8.60	1.830	0.40	60.0	140	23.0	•
FCP 236	23.60	7.42	8.60	1.830	0.40	60.0	140	23.0	•
FCP 237	23.70	7.42	8.60	1.830	0.40	60.0	140	23.0	•
FCP 238	23.80	7.42	8.60	1.830	0.40	60.0	140	23.0	•
FCP 239	23.90	7.42	8.60	1.830	0.40	60.0	140	23.0	•
FCP 240	24.00	7.45	9.00	1.860	0.40	60.0	140	24.0	•
FCP 241	24.10	7.45	9.00	1.860	0.40	60.0	140	24.0	•
FCP 242	24.20	7.45	9.00	1.860	0.40	60.0	140	24.0	•
FCP 243	24.30	7.45	9.00	1.860	0.40	60.0	140	24.0	•
FCP 244	24.40	7.45	9.00	1.860	0.40	60.0	140	24.0	•
FCP 245	24.50	7.45	9.00	1.860	0.40	60.0	140	24.0	•
FCP 246	24.60	7.45	9.00	1.860	0.40	60.0	140	24.0	•
FCP 247	24.70	7.45	9.00	1.860	0.40	60.0	140	24.0	•
FCP 248	24.80	7.45	9.00	1.860	0.40	60.0	140	24.0	•
FCP 249	24.90	7.45	9.00	1.860	0.40	60.0	140	24.0	•
FCP 250	25.00	7.54	9.40	1.900	0.40	60.0	140	25.0	•
FCP 251	25.10	7.54	9.40	1.900	0.40	60.0	140	25.0	•
FCP 252	25.20	7.54	9.40	1.900	0.40	60.0	140	25.0	•
FCP 253	25.30	7.54	9.40	1.900	0.40	60.0	140	25.0	•
FCP 254	25.40	7.54	9.40	1.900	0.40	60.0	140	25.0	•
FCP 255	25.50	7.54	9.40	1.900	0.40	60.0	140	25.0	•
FCP 256	25.60	7.54	9.40	1.900	0.40	60.0	140	25.0	•
FCP 257	25.70	7.54	9.40	1.900	0.40	60.0	140	25.0	•
FCP 258	25.80	7.54	9.40	1.900	0.40	60.0	140	25.0	•
FCP 259	25.90	7.54	9.40	1.900	0.40	60.0	140	25.0	•

• For nearly flat bottom hole applications • For cutting conditions see page 68-81

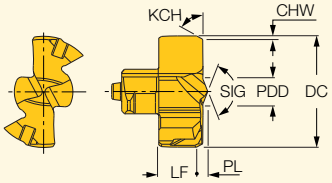
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136)

SUMOCHAM FLAT HEAD

FCP (continued)

Exchangeable Flat Bottom Drilling Heads for DCN Drills, for Machining ISO P and ISO K Materials



Designation	Dimensions								IC908
	DC	PDD	LF	PL	CHW	KCH	SIG	SSC(1)	
FCP 260	26.00	8.00	9.70	1.990	0.40	60.0	140	26.0	●
FCP 265	26.50	8.00	9.70	1.990	0.40	60.0	140	26.0	●
FCP 270	27.00	8.10	10.40	2.050	0.40	60.0	140	27.0	●
FCP 275	27.50	8.10	10.40	2.050	0.40	60.0	140	27.0	●
FCP 280	28.00	8.80	10.50	2.150	0.40	60.0	140	28.0	●
FCP 285	28.50	8.80	10.50	2.150	0.40	60.0	140	28.0	●
FCP 290	29.00	9.00	10.80	2.200	0.40	60.0	140	29.0	●
FCP 295	29.50	9.00	10.80	2.200	0.40	60.0	140	29.0	●
FCP 300	30.00	9.10	11.40	2.150	0.40	60.0	140	30.0	●
FCP 305	30.50	9.10	11.40	2.150	0.40	60.0	140	30.0	●
FCP 310	31.00	9.10	11.70	2.180	0.40	60.0	140	31.0	●
FCP 315	31.50	9.10	11.70	2.180	0.40	60.0	140	31.0	●
FCP 320	32.00	9.80	12.30	2.210	0.40	60.0	140	32.0	●
FCP 325	32.50	9.80	12.30	2.210	0.40	60.0	140	32.0	●

• For nearly flat bottom hole applications • For cutting conditions see page 68-81

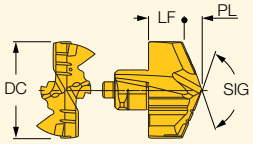
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCN C-3D (13) • DCN C-5D (13) • DCN C-8D (14) • DCN C-12D (14) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • DCNT (M8-M24) (136)

SUMOCHAM CHAMDRILL LINE

ICG

Exchangeable Chip Splitting Drilling Heads for DCN Drills, for Machining ISO M and ISO P Materials



Designation	Dimensions					IC908
	DC	LF	PL	SIG	SSC(1)	
ICG 140	14.00	5.08	2.770	130	14.0	●
ICG 142	14.20	5.08	2.770	130	14.0	●
ICG 145	14.50	5.08	2.770	130	14.0	●
ICG 150	15.00	5.45	2.980	130	15.0	●
ICG 155	15.50	5.33	3.100	130	15.0	●
ICG 160	16.00	5.81	3.190	130	16.0	●
ICG 163	16.30	5.81	3.190	130	16.0	●
ICG 165	16.50	5.81	3.190	130	16.0	●
ICG 170	17.00	6.20	3.400	130	17.0	●
ICG 175	17.50	6.20	3.400	130	17.0	●
ICG 177	17.70	6.20	3.400	130	17.0	●
ICG 180	18.00	6.60	3.600	130	18.0	●
ICG 185	18.50	6.60	3.600	130	18.0	●
ICG 190	19.00	6.89	3.810	130	19.0	●
ICG 193	19.30	6.89	3.810	130	19.0	●
ICG 195	19.50	6.89	3.810	130	19.0	●
ICG 200	20.00	7.22	3.980	130	20.0	●
ICG 203	20.30	7.22	3.980	130	20.0	●
ICG 205	20.50	7.22	3.980	130	20.0	●
ICG 210	21.00	7.65	4.130	130	21.0	●
ICG 215	21.50	7.65	4.130	130	21.0	●
ICG 220	22.00	8.05	4.310	130	22.0	●
ICG 225	22.50	8.05	4.310	130	22.0	●
ICG 230	23.00	8.44	4.490	130	23.0	●
ICG 235	23.50	8.44	4.490	130	23.0	●
ICG 240	24.00	8.81	4.690	130	24.0	●
ICG 245	24.50	8.81	4.690	130	24.0	●
ICG 250	25.00	9.18	4.920	130	25.0	●
ICG 253	25.30	9.18	4.920	130	25.0	●
ICG 257	25.70	9.18	4.920	130	25.0	●
ICG 259	25.90	9.18	4.920	130	25.0	●

• Drilling head equipped with chip breaker and chip splitter • For cutting conditions see page 68-81

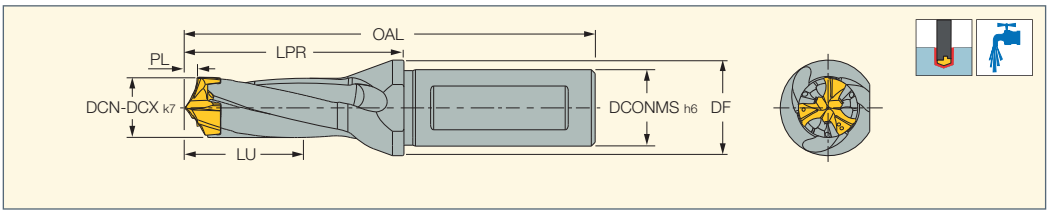
(1) Seat size code

For tools, see pages: DCN A-1.5D (4) • DCN R-1.5D (5) • DCN A-3D (6) • DCN R-3D (7) • DCN A-5D (8) • DCN R-5D (9) • DCN A-8D (10) • DCN R-8D (11) • DCN R-10D (11) • DCN R-12D (12) • DCNS-3D (15) • DCNS-5D (16) • DCNM (17) • MNC-5D (66) • DCNT (M8-M24) (136) • MNSNT (293)

LOGIQ 3CHAM THREE FLUTE CHAMDRILL

D3N A-1.5D

Exchangeable Head 3 Flute Drills with Coolant Holes and One Flat Shank, Drilling Depth 1.5xD



Designation	DCN(1)	DCX(2)	DCONMS	DF	LU	LPR	PL	OAL	SSC(3)	
D3N 120-018-16A-1.5D	12.00	12.40	16.00	20.00	20.71	42.92	2.710	90.92	12	K D3N 12-13.99
D3N 125-019-16A-1.5D	12.50	12.90	16.00	20.00	21.46	44.42	2.710	92.42	12	K D3N 12-13.99
D3N 130-020-16A-1.5D	13.00	13.40	16.00	20.00	22.41	46.58	2.910	94.58	13	K D3N 12-13.99
D3N 135-020-16A-1.5D	13.50	13.90	16.00	20.00	23.16	48.08	2.910	96.08	13	K D3N 12-13.99
D3N 140-021-16A-1.5D	14.00	14.40	16.00	20.00	24.10	50.08	3.100	98.08	14	K D3N 14-15.99
D3N 145-022-16A-1.5D	14.50	14.90	16.00	20.00	24.85	51.58	3.100	99.58	14	K D3N 14-15.99
D3N 150-023-20A-1.5D	15.00	15.90	20.00	25.00	25.97	53.66	3.470	103.66	15	K D3N 14-15.99
D3N 160-024-20A-1.5D	16.00	16.90	20.00	25.00	27.44	57.25	3.440	107.25	16	K D3N 16-17.99
D3N 170-026-20A-1.5D	17.00	17.90	20.00	25.00	29.02	60.72	3.520	110.72	17	K D3N 16-17.99
D3N 180-027-25A-1.5D	18.00	18.90	25.00	32.00	30.90	64.36	3.900	120.36	18	K D3N 18-19.99
D3N 190-029-25A-1.5D	19.00	19.90	25.00	32.00	32.60	67.92	4.100	123.92	19	K D3N 18-19.99
D3N 200-030-25A-1.5D	20.00	20.90	25.00	32.00	34.32	71.24	4.320	127.24	20	K D3N 20-21.99
D3N 210-032-25A-1.5D	21.00	21.90	25.00	32.00	36.05	74.80	4.550	130.80	21	K D3N 20-21.99
D3N 220-033-25A-1.5D	22.00	22.90	25.00	32.00	37.69	78.62	4.690	134.62	22	K D3N 22-23.99
D3N 230-035-32A-1.5D	23.00	23.90	32.00	40.00	39.41	82.00	4.910	142.00	23	K D3N 22-23.99
D3N 240-036-32A-1.5D	24.00	24.90	32.00	40.00	41.21	85.54	5.210	145.54	24	K D3N 24-25.99
D3N 250-038-32A-1.5D	25.00	25.90	32.00	40.00	42.81	89.22	5.310	149.11	25	K D3N 24-25.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

(1) Cutting diameter minimum

(2) Cutting diameter maximum

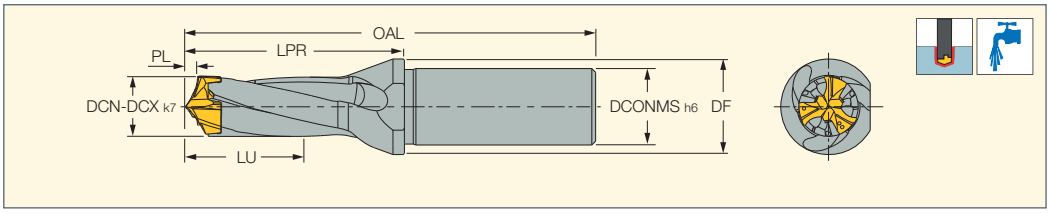
(3) Seat size code

For inserts, see pages: H3P (62) • F3P (65)

LOGIQ 3CHAM THREE FLUTE CHAMDRILL

D3N R-1.5D

Exchangeable Head 3 Flute Drills with Coolant Holes and A Round Shank, Drilling Depth 1.5xD



Designation	DCN(1)	DCX(2)	DCONMS	DF	LU	LPR	PL	OAL	SSC(3)	
D3N 120-018-16R-1.5D	12.00	12.40	16.00	20.00	20.71	42.92	2.710	90.92	12	K D3N 12-13.99
D3N 125-019-16R-1.5D	12.50	12.90	16.00	20.00	21.46	44.42	2.710	92.42	12	K D3N 12-13.99
D3N 130-020-16R-1.5D	13.00	13.40	16.00	20.00	22.41	46.58	2.910	94.58	13	K D3N 12-13.99
D3N 135-020-16R-1.5D	13.50	13.90	16.00	20.00	23.16	48.08	2.910	96.08	13	K D3N 12-13.99
D3N 140-021-16R-1.5D	14.00	14.40	16.00	20.00	24.10	50.08	3.100	98.08	14	K D3N 14-15.99
D3N 145-022-16R-1.5D	14.50	14.90	16.00	20.00	24.85	51.58	3.100	99.58	14	K D3N 14-15.99
D3N 150-023-20R-1.5D	15.00	15.90	20.00	25.00	25.97	53.66	3.470	103.66	15	K D3N 14-15.99
D3N 160-024-20R-1.5D	16.00	16.90	20.00	25.00	27.44	57.25	3.440	107.25	16	K D3N 16-17.99
D3N 170-026-20R-1.5D	17.00	17.90	20.00	25.00	29.02	60.72	3.520	110.72	17	K D3N 16-17.99
D3N 180-027-25R-1.5D	18.00	18.90	25.00	32.00	30.90	64.36	3.900	120.36	18	K D3N 18-19.99
D3N 190-029-25R-1.5D	19.00	19.90	25.00	32.00	32.60	67.92	4.100	123.92	19	K D3N 18-19.99
D3N 200-030-25R-1.5D	20.00	20.90	25.00	32.00	34.32	71.24	4.320	127.24	20	K D3N 20-21.99
D3N 210-032-25R-1.5D	21.00	21.90	25.00	32.00	36.05	74.80	4.550	130.80	21	K D3N 20-21.99
D3N 220-033-25R-1.5D	22.00	22.90	25.00	32.00	37.69	78.62	4.690	134.62	22	K D3N 22-23.99
D3N 230-035-32R-1.5D	23.00	23.90	32.00	40.00	39.41	82.00	4.910	142.00	23	K D3N 22-23.99
D3N 240-036-32R-1.5D	24.00	24.90	32.00	40.00	41.21	85.54	5.210	145.54	24	K D3N 24-25.99
D3N 250-038-32R-1.5D	25.00	25.90	32.00	40.00	42.81	89.22	5.310	149.11	25	K D3N 24-25.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

(1) Cutting diameter minimum

(2) Cutting diameter maximum

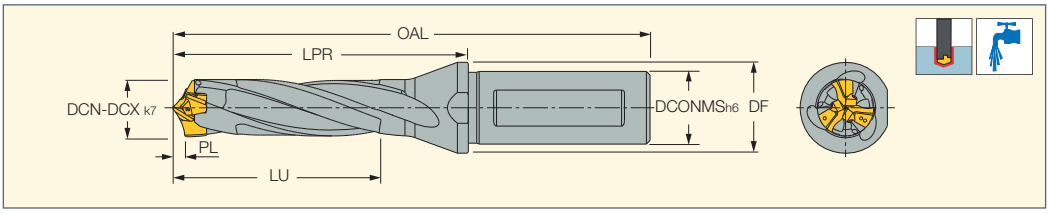
(3) Seat size code

For inserts, see pages: H3P (62) • F3P (65)

LOGIQ 3 CHAM THREE FLUTE CHAMDRILL

D3N A-3D

Exchangeable Head 3 Flute Drills with Coolant Holes and One Flat Shank, Drilling Depth 3xD



Designation	DCN(1)	DCX(2)	DCONMS	DF	LU	LPR	PL	OAL	SSC(3)	
D3N 120-036-16A-3D	12.00	12.40	16.00	20.00	38.71	60.92	2.710	108.92	12	K D3N 12-13.99
D3N 125-037-16A-3D	12.50	12.90	16.00	20.00	40.21	63.17	2.710	111.17	12	K D3N 12-13.99
D3N 130-039-16A-3D	13.00	13.40	16.00	20.00	41.91	66.08	2.910	114.08	13	K D3N 12-13.99
D3N 135-041-16A-3D	13.50	13.90	16.00	20.00	43.41	68.33	2.910	116.33	13	K D3N 12-13.99
D3N 140-042-16A-3D	14.00	14.40	16.00	20.00	45.10	71.08	3.100	119.08	14	K D3N 14-15.99
D3N 145-044-16A-3D	14.50	14.90	16.00	20.00	46.60	73.33	3.100	121.33	14	K D3N 14-15.99
D3N 150-045-20A-3D	15.00	15.90	20.00	25.00	48.47	76.16	3.470	126.16	15	K D3N 14-15.99
D3N 160-048-20A-3D	16.00	16.90	20.00	25.00	51.44	81.25	3.440	131.25	16	K D3N 16-17.99
D3N 170-051-20A-3D	17.00	17.90	20.00	25.00	54.52	86.22	3.520	136.22	17	K D3N 16-17.99
D3N 180-054-25A-3D	18.00	18.90	25.00	32.00	57.90	91.36	3.900	147.36	18	K D3N 18-19.99
D3N 190-057-25A-3D	19.00	19.90	25.00	32.00	61.10	96.42	4.100	152.42	19	K D3N 18-19.99
D3N 200-060-25A-3D	20.00	20.90	25.00	32.00	64.32	101.24	4.320	157.24	20	K D3N 20-21.99
D3N 210-063-25A-3D	21.00	21.90	25.00	32.00	67.55	106.30	4.550	162.30	21	K D3N 20-21.99
D3N 220-066-25A-3D	22.00	22.90	25.00	32.00	70.69	111.62	4.690	167.62	22	K D3N 22-23.99
D3N 230-069-32A-3D	23.00	23.90	32.00	42.00	73.91	116.50	4.910	176.50	23	K D3N 22-23.99
D3N 240-072-32A-3D	24.00	24.90	32.00	42.00	77.21	121.54	5.210	181.54	24	K D3N 24-25.99
D3N 250-075-32A-3D	25.00	25.90	32.00	42.00	80.31	126.72	5.310	186.61	25	K D3N 24-25.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

(1) Cutting diameter minimum

(2) Cutting diameter maximum

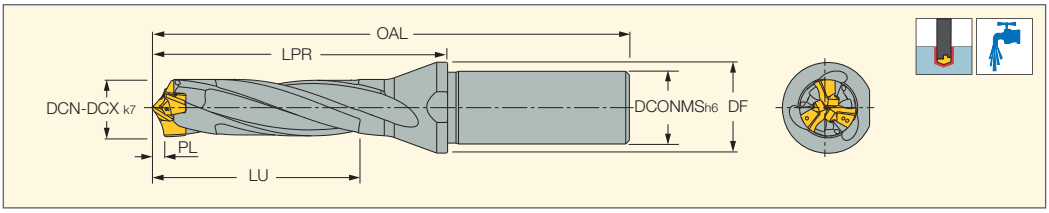
(3) Seat size code

For inserts, see pages: H3P (62) • F3P (65)

LOGIQ 3 CHAM THREE FLUTE CHAMDRILL

D3N R-3D

Exchangeable Head 3 Flute Drills with Coolant Holes and A Round Shank, Drilling Depth 3xD



Designation	DCN(1)	DCX(2)	DCONMS	DF	LU	LPR	PL	OAL	SSC(3)	
D3N 120-036-16R-3D	12.00	12.40	16.00	20.00	38.71	60.92	2.710	108.92	12	K D3N 12-13.99
D3N 125-037-16R-3D	12.50	12.90	16.00	20.00	40.21	63.17	2.710	111.17	12	K D3N 12-13.99
D3N 130-039-16R-3D	13.00	13.40	16.00	20.00	41.91	66.08	2.910	114.08	13	K D3N 12-13.99
D3N 135-041-16R-3D	13.50	13.90	16.00	20.00	43.41	68.33	2.910	116.33	13	K D3N 12-13.99
D3N 140-042-16R-3D	14.00	14.40	16.00	20.00	45.10	71.08	3.100	119.08	14	K D3N 14-15.99
D3N 145-044-16R-3D	14.50	14.90	16.00	20.00	46.60	73.33	3.100	121.33	14	K D3N 14-15.99
D3N 150-045-20R-3D	15.00	15.90	20.00	25.00	48.47	76.16	3.470	126.16	15	K D3N 14-15.99
D3N 160-048-20R-3D	16.00	16.90	20.00	25.00	51.44	81.25	3.440	131.25	16	K D3N 16-17.99
D3N 170-051-20R-3D	17.00	17.90	20.00	25.00	54.52	86.22	3.520	136.22	17	K D3N 16-17.99
D3N 180-054-25R-3D	18.00	18.90	25.00	32.00	57.90	91.36	3.900	147.36	18	K D3N 18-19.99
D3N 190-057-25R-3D	19.00	19.90	25.00	32.00	61.10	96.42	4.100	152.42	19	K D3N 18-19.99
D3N 200-060-25R-3D	20.00	20.90	25.00	32.00	64.32	101.24	4.320	157.24	20	K D3N 20-21.99
D3N 210-063-25R-3D	21.00	21.90	25.00	32.00	67.55	106.30	4.550	162.30	21	K D3N 20-21.99
D3N 220-066-25R-3D	22.00	22.90	25.00	32.00	70.69	111.62	4.690	167.82	22	K D3N 22-23.99
D3N 230-069-32R-3D	23.00	23.90	32.00	42.00	73.91	116.50	4.910	176.50	23	K D3N 22-23.99
D3N 240-072-32R-3D	24.00	24.90	32.00	42.00	77.21	121.54	5.210	181.54	24	K D3N 24-25.99
D3N 250-075-32R-3D	25.00	25.90	32.00	42.00	80.31	126.72	5.310	186.61	25	K D3N 24-25.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

(1) Cutting diameter minimum

(2) Cutting diameter maximum

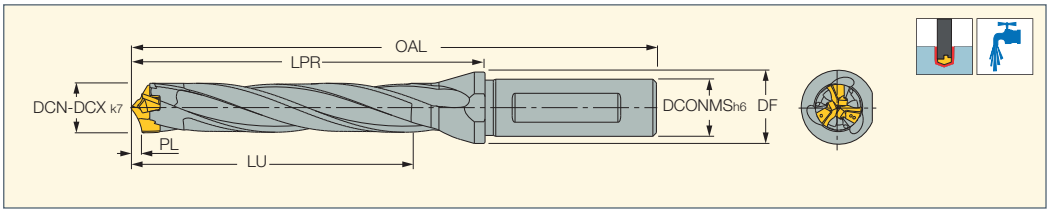
(3) Seat size code

For inserts, see pages: H3P (62) • F3P (65)

LOGIQ 3 CHAM THREE FLUTE CHAMDRILL

D3N A-5D

Exchangeable Head 3 Flute Drills with Coolant Holes and One Flat Shank, Drilling Depth 5xD



Designation	DCN(1)	DCX(2)	DCONMS	DF	LU	LPR	PL	OAL	SSC(3)	
D3N 120-060-16A-5D	12.00	12.40	16.00	20.00	62.71	84.92	2.710	132.92	12	K D3N 12-13.99
D3N 125-062-16A-5D	12.50	12.90	16.00	20.00	65.21	88.17	2.710	136.17	12	K D3N 12-13.99
D3N 130-065-16A-5D	13.00	13.40	16.00	20.00	67.91	92.08	2.910	140.08	13	K D3N 12-13.99
D3N 135-068-16A-5D	13.50	13.90	16.00	20.00	70.41	95.33	2.910	143.33	13	K D3N 12-13.99
D3N 140-070-16A-5D	14.00	14.40	16.00	20.00	73.10	99.08	3.100	147.08	14	K D3N 14-15.99
D3N 145-073-16A-5D	14.50	14.90	16.00	20.00	75.60	102.33	3.100	150.33	14	K D3N 14-15.99
D3N 150-075-20A-5D	15.00	15.90	20.00	25.00	78.47	106.16	3.470	156.16	15	K D3N 14-15.99
D3N 160-080-20A-5D	16.00	16.90	20.00	25.00	83.44	113.25	3.440	163.25	16	K D3N 16-17.99
D3N 170-085-20A-5D	17.00	17.90	20.00	25.00	88.52	120.22	3.520	170.22	17	K D3N 16-17.99
D3N 180-090-25A-5D	18.00	18.90	25.00	32.00	93.90	127.36	3.900	183.36	18	K D3N 18-19.99
D3N 190-095-25A-5D	19.00	19.90	25.00	32.00	99.10	134.42	4.100	190.42	19	K D3N 18-19.99
D3N 200-100-25A-5D	20.00	20.90	25.00	32.00	104.32	141.24	4.320	197.24	20	K D3N 20-21.99
D3N 210-105-25A-5D	21.00	21.90	25.00	32.00	109.55	148.30	4.550	204.30	21	K D3N 20-21.99
D3N 220-110-25A-5D	22.00	22.90	25.00	32.00	114.69	155.62	4.690	211.62	22	K D3N 22-23.99
D3N 230-115-32A-5D	23.00	23.90	32.00	42.00	119.91	162.50	4.910	222.50	23	K D3N 22-23.99
D3N 240-120-32A-5D	24.00	24.90	32.00	42.00	125.21	169.54	5.210	229.54	24	K D3N 24-25.99
D3N 250-125-32A-5D	25.00	25.90	32.00	42.00	130.31	176.72	5.310	236.61	25	K D3N 24-25.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

(1) Cutting diameter minimum

(2) Cutting diameter maximum

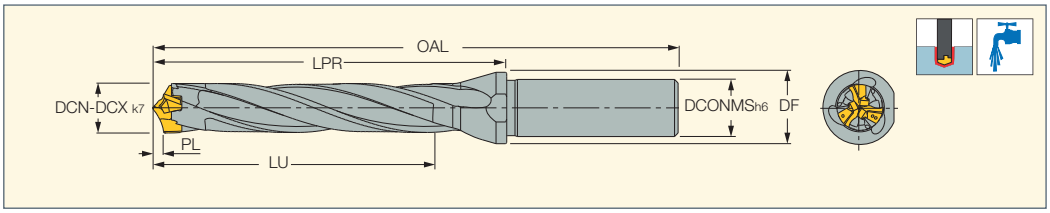
(3) Seat size code

For inserts, see pages: H3P (62) • F3P (65)

LOGIQ 3 CHAM THREE FLUTE CHAMDRILL

D3N R-5D

Exchangeable Head 3 Flute Drills with Coolant Holes and A Round Shank, Drilling Depth 5xD



Designation	DCN(1)	DCX(2)	DCONMS	DF	LU	LPR	PL	OAL	SSC(3)	
D3N 120-060-16R-5D	12.00	12.40	16.00	20.00	62.71	84.92	2.710	132.92	12	K D3N 12-13.99
D3N 125-062-16R-5D	12.50	12.90	16.00	20.00	65.21	88.17	2.710	136.17	12	K D3N 12-13.99
D3N 130-065-16R-5D	13.00	13.40	16.00	20.00	67.91	92.08	2.910	140.08	13	K D3N 12-13.99
D3N 135-068-16R-5D	13.50	13.90	16.00	20.00	70.41	95.33	2.910	143.33	13	K D3N 12-13.99
D3N 140-070-16R-5D	14.00	14.40	16.00	20.00	73.10	99.08	3.100	147.08	14	K D3N 14-15.99
D3N 145-073-16R-5D	14.50	14.90	16.00	20.00	75.60	102.33	3.100	150.33	14	K D3N 14-15.99
D3N 150-075-20R-5D	15.00	15.90	20.00	25.00	78.47	106.16	3.470	156.16	15	K D3N 14-15.99
D3N 160-080-20R-5D	16.00	16.90	20.00	25.00	83.44	113.25	3.440	163.25	16	K D3N 16-17.99
D3N 170-085-20R-5D	17.00	17.90	20.00	25.00	88.52	120.22	3.520	170.22	17	K D3N 16-17.99
D3N 180-090-25R-5D	18.00	18.90	25.00	32.00	93.90	127.36	3.900	183.36	18	K D3N 18-19.99
D3N 190-095-25R-5D	19.00	19.90	25.00	32.00	99.10	134.42	4.100	190.42	19	K D3N 18-19.99
D3N 200-100-25R-5D	20.00	20.90	25.00	32.00	104.32	141.24	4.320	197.24	20	K D3N 20-21.99
D3N 210-105-25R-5D	21.00	21.90	25.00	32.00	109.55	148.30	4.550	204.30	21	K D3N 20-21.99
D3N 220-110-25R-5D	22.00	22.90	25.00	32.00	114.69	155.62	4.690	211.62	22	K D3N 22-23.99
D3N 230-115-32R-5D	23.00	23.90	32.00	42.00	119.91	162.50	4.910	222.50	23	K D3N 22-23.99
D3N 240-120-32R-5D	24.00	24.90	32.00	42.00	125.21	169.54	5.210	229.54	24	K D3N 24-25.99
D3N 250-125-32R-5D	25.00	25.90	32.00	42.00	130.31	176.72	5.310	236.61	25	K D3N 24-25.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

(1) Cutting diameter minimum

(2) Cutting diameter maximum

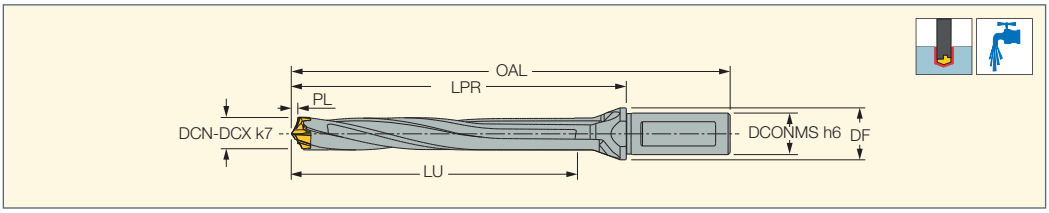
(3) Seat size code

For inserts, see pages: H3P (62) • F3P (65)

LOGIQ 3 CHAM THREE FLUTE CHAMDRILL

D3N A-8D

Exchangeable Head 3 Flute Drills with Coolant Holes and One Flat Shank, Drilling Depth 8xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	OAL	SSC[3]	
D3N 120-096-16A-8D	12.00	12.40	16.00	20.00	98.71	120.92	2.710	168.90	12	K D3N 12-13.99
D3N 125-100-16A-8D	12.50	12.90	16.00	20.00	102.71	125.67	2.710	173.70	12	K D3N 12-13.99
D3N 130-104-16A-8D	13.00	13.40	16.00	20.00	106.91	131.08	2.910	179.10	13	K D3N 12-13.99
D3N 135-108-16A-8D	13.50	13.90	16.00	20.00	110.91	135.83	2.910	183.80	13	K D3N 12-13.99
D3N 140-112-16A-8D	14.00	14.40	16.00	20.00	115.10	141.08	3.100	189.10	14	K D3N 14-15.99
D3N 145-116-16A-8D	14.50	14.90	16.00	20.00	119.10	145.83	3.100	193.80	14	K D3N 14-15.99
D3N 150-120-20A-8D	15.00	15.90	20.00	25.00	123.47	151.16	3.470	201.20	15	K D3N 14-15.99
D3N 160-128-20A-8D	16.00	16.90	20.00	25.00	131.44	161.25	3.440	211.30	16	K D3N 16-17.99
D3N 170-136-20A-8D	17.00	17.90	20.00	25.00	139.52	171.22	3.520	221.30	17	K D3N 16-17.99
D3N 180-144-25A-8D	18.00	18.90	25.00	32.00	147.90	181.36	3.900	237.40	18	K D3N 18-19.99
D3N 190-152-25A-8D	19.00	19.90	25.00	32.00	156.10	191.42	4.100	247.40	19	K D3N 18-19.99
D3N 200-160-25A-8D	20.00	20.90	25.00	32.00	164.32	201.24	4.320	257.20	20	K D3N 20-21.99
D3N 210-168-25A-8D	21.00	21.90	25.00	32.00	172.55	211.30	4.550	267.30	21	K D3N 20-21.99
D3N 220-176-25A-8D	22.00	22.90	25.00	32.00	180.69	221.62	4.690	277.60	22	K D3N 22-23.99
D3N 230-184-32A-8D	23.00	23.90	32.00	42.00	188.91	231.50	4.910	291.50	23	K D3N 22-23.99
D3N 240-192-32A-8D	24.00	24.90	32.00	42.00	197.21	241.54	5.210	301.50	24	K D3N 24-25.99
D3N 250-200-32A-8D	25.00	25.90	32.00	42.00	205.31	251.72	5.120	311.70	25	K D3N 24-25.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

[1] Cutting diameter minimum

[2] Cutting diameter maximum

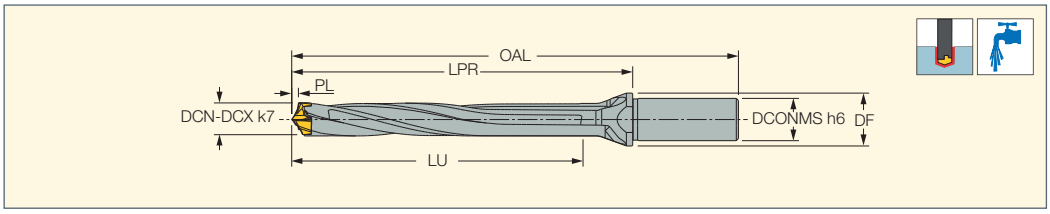
[3] Seat size code

For inserts, see pages: H3P (62) • F3P (65)

LOGIQ 3 CHAM THREE FLUTE CHAMDRILL

D3N R-8D

Exchangeable Head 3 Flute Drills with Coolant Holes and A Round Shank, Drilling Depth 8xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	OAL	SSC[3]	
D3N 120-096-16R-8D	12.00	12.40	16.00	20.00	98.71	120.92	2.710	168.90	12	K D3N 12-13.99
D3N 125-100-16R-8D	12.50	12.90	16.00	20.00	102.71	125.67	2.710	173.70	12	K D3N 12-13.99
D3N 130-104-16R-8D	13.00	13.40	16.00	20.00	106.91	131.08	2.910	179.10	13	K D3N 12-13.99
D3N 135-108-16R-8D	13.50	13.90	16.00	20.00	110.91	135.83	2.910	183.80	13	K D3N 12-13.99
D3N 140-112-16R-8D	14.00	14.40	16.00	20.00	115.10	141.08	3.100	189.10	14	K D3N 14-15.99
D3N 145-116-16R-8D	14.50	14.90	16.00	20.00	119.10	145.83	3.100	193.80	14	K D3N 14-15.99
D3N 150-120-20R-8D	15.00	15.90	20.00	25.00	123.47	151.16	3.470	201.20	15	K D3N 14-15.99
D3N 160-128-20R-8D	16.00	16.90	20.00	25.00	131.44	161.25	3.440	211.30	16	K D3N 16-17.99
D3N 170-136-20R-8D	17.00	17.90	20.00	25.00	139.52	171.22	3.520	221.20	17	K D3N 16-17.99
D3N 180-144-25R-8D	18.00	18.90	25.00	32.00	147.90	181.36	3.900	237.40	18	K D3N 18-19.99
D3N 190-152-25R-8D	19.00	19.90	25.00	32.00	156.10	191.42	4.100	247.40	19	K D3N 18-19.99
D3N 200-160-25R-8D	20.00	20.90	25.00	32.00	164.32	201.24	4.320	257.20	20	K D3N 20-21.99
D3N 210-168-25R-8D	21.00	21.90	25.00	32.00	172.55	211.30	4.550	267.30	21	K D3N 20-21.99
D3N 220-176-25R-8D	22.00	22.90	25.00	32.00	180.69	221.62	4.690	277.60	22	K D3N 22-23.99
D3N 230-184-32R-8D	23.00	23.90	32.00	42.00	188.91	231.50	4.910	291.50	23	K D3N 22-23.99
D3N 240-192-32R-8D	24.00	24.90	32.00	42.00	197.21	241.54	5.210	301.50	24	K D3N 24-25.99
D3N 250-200-32R-8D	25.00	25.90	32.00	42.00	205.31	251.72	5.120	311.70	25	K D3N 24-25.99

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 68-81

[1] Cutting diameter minimum

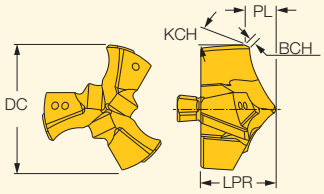
[2] Cutting diameter maximum

[3] Seat size code

For inserts, see pages: H3P (62) • F3P (65)

LOGIQ 3 CHAM
THREE FLUTE CHAMDRILL

H3P
Exchangeable 3 Flute Drilling Heads for Machining Carbon and Alloy Steel (ISO P) and Cast Iron (ISO K)



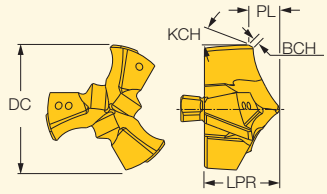
Designation	Dimensions					IC908
	DC	LPR[1]	PL[2]	KCH	BCH	
H3P 120-IQ	12.00	6.92	2.710	15.0	0.40	•
H3P 121-IQ	12.10	6.92	2.710	15.0	0.40	•
H3P 122-IQ	12.20	6.92	2.710	15.0	0.40	•
H3P 123-IQ	12.30	6.92	2.710	15.0	0.40	•
H3P 124-IQ	12.40	6.92	2.710	15.0	0.40	•
H3P 125-IQ	12.50	6.92	2.710	15.0	0.40	•
H3P 126-IQ	12.60	6.92	2.710	15.0	0.40	•
H3P 127-IQ	12.70	6.92	2.710	15.0	0.40	•
H3P 128-IQ	12.80	6.92	2.710	15.0	0.40	•
H3P 129-IQ	12.90	6.92	2.710	15.0	0.40	•
H3P 130-IQ	13.00	7.58	2.910	15.0	0.40	•
H3P 131-IQ	13.10	7.58	2.910	15.0	0.40	•
H3P 132-IQ	13.20	7.58	2.910	15.0	0.40	•
H3P 133-IQ	13.30	7.58	2.910	15.0	0.40	•
H3P 134-IQ	13.40	7.58	2.910	15.0	0.40	•
H3P 135-IQ	13.50	7.58	2.910	15.0	0.40	•
H3P 136-IQ	13.60	7.58	2.910	15.0	0.40	•
H3P 137-IQ	13.70	7.58	2.910	15.0	0.40	•
H3P 138-IQ	13.80	7.58	2.910	15.0	0.40	•
H3P 139-IQ	13.90	7.58	2.910	15.0	0.40	•
H3P 140-IQ	14.00	8.10	3.100	15.0	0.40	•
H3P 141-IQ	14.10	8.10	3.100	15.0	0.40	•
H3P 142-IQ	14.20	8.10	3.100	15.0	0.40	•
H3P 143-IQ	14.30	8.10	3.100	15.0	0.40	•
H3P 144-IQ	14.40	8.10	3.100	15.0	0.40	•
H3P 145-IQ	14.50	8.10	3.100	15.0	0.40	•
H3P 146-IQ	14.60	8.10	3.100	15.0	0.40	•
H3P 147-IQ	14.70	8.10	3.100	15.0	0.40	•
H3P 148-IQ	14.80	8.10	3.100	15.0	0.40	•
H3P 149-IQ	14.90	8.10	3.100	15.0	0.40	•
H3P 150-IQ	15.00	8.66	3.470	15.0	0.40	•
H3P 151-IQ	15.10	8.66	3.470	15.0	0.40	•
H3P 152-IQ	15.20	8.66	3.470	15.0	0.40	•
H3P 153-IQ	15.30	8.66	3.470	15.0	0.40	•
H3P 154-IQ	15.40	8.66	3.470	15.0	0.40	•
H3P 155-IQ	15.50	8.66	3.470	15.0	0.40	•
H3P 156-IQ	15.60	8.66	3.470	15.0	0.40	•
H3P 157-IQ	15.70	8.66	3.470	15.0	0.40	•
H3P 158-IQ	15.80	8.66	3.470	15.0	0.40	•
H3P 159-IQ	15.90	8.66	3.470	15.0	0.40	•
H3P 160-IQ	16.00	9.26	3.440	15.0	0.40	•
H3P 161-IQ	16.10	9.26	3.440	15.0	0.40	•
H3P 162-IQ	16.20	9.26	3.440	15.0	0.40	•
H3P 163-IQ	16.30	9.26	3.440	15.0	0.40	•
H3P 164-IQ	16.40	9.26	3.440	15.0	0.40	•
H3P 165-IQ	16.50	9.26	3.440	15.0	0.40	•
H3P 166-IQ	16.60	9.26	3.440	15.0	0.40	•
H3P 167-IQ	16.70	9.26	3.440	15.0	0.40	•
H3P 168-IQ	16.80	9.25	3.440	15.0	0.40	•
H3P 169-IQ	16.90	9.26	3.440	15.0	0.40	•
H3P 170-IQ	17.00	9.72	3.520	15.0	0.40	•
H3P 171-IQ	17.10	9.72	3.520	15.0	0.40	•
H3P 172-IQ	17.20	9.72	3.520	15.0	0.40	•
H3P 173-IQ	17.30	9.72	3.520	15.0	0.40	•
H3P 174-IQ	17.40	9.72	3.520	15.0	0.40	•
H3P 175-IQ	17.50	9.72	3.520	15.0	0.40	•

• For user guide and cutting conditions, see pages 68-81
[1] LPR tolerance ±0.05 mm
[2] PL tolerance ±0.1 mm
For tools, see pages: D3N A-1.5D (58) • D3N R-1.5D (58) • D3N A-3D (59) • D3N R-3D (59) • D3N A-5D (60) • D3N R-5D (60) • D3N A-8D (61) • D3N R-8D (61)

LOGIQ 3 CHAM THREE FLUTE CHAMDRILL

H3P (continued)

Exchangeable 3 Flute Drilling Heads for Machining Carbon and Alloy Steel (ISO P) and Cast Iron (ISO K)



Designation	Dimensions					IC908
	DC	LPR(1)	PL(2)	KCH	BCH	
H3P 176-IQ	17.60	9.72	3.520	15.0	0.40	•
H3P 177-IQ	17.70	9.72	3.520	15.0	0.40	•
H3P 178-IQ	17.80	9.72	3.520	15.0	0.40	•
H3P 179-IQ	17.90	9.72	3.520	15.0	0.40	•
H3P 180-IQ	18.00	10.36	3.900	15.0	0.40	•
H3P 181-IQ	18.10	10.36	3.900	15.0	0.40	•
H3P 182-IQ	18.20	10.36	3.900	15.0	0.40	•
H3P 183-IQ	18.30	10.36	3.900	15.0	0.40	•
H3P 184-IQ	18.40	10.36	3.900	15.0	0.40	•
H3P 185-IQ	18.50	10.36	3.900	15.0	0.40	•
H3P 186-IQ	18.60	10.36	3.900	15.0	0.40	•
H3P 187-IQ	18.70	10.36	3.900	15.0	0.40	•
H3P 188-IQ	18.80	10.36	3.900	15.0	0.40	•
H3P 189-IQ	18.90	10.36	3.900	15.0	0.40	•
H3P 190-IQ	19.00	10.92	4.100	15.0	0.40	•
H3P 1905-IQ	19.05	10.92	4.100	15.0	0.40	•
H3P 191-IQ	19.10	10.92	4.100	15.0	0.40	•
H3P 192-IQ	19.20	10.92	4.100	15.0	0.40	•
H3P 1927-IQ	19.27	10.92	4.100	15.0	0.40	•
H3P 193-IQ	19.30	10.92	4.100	15.0	0.40	•
H3P 194-IQ	19.40	10.92	4.100	15.0	0.40	•
H3P 195-IQ	19.50	10.92	4.100	15.0	0.40	•
H3P 196-IQ	19.60	10.92	4.100	15.0	0.40	•
H3P 197-IQ	19.70	10.92	4.100	15.0	0.40	•
H3P 198-IQ	19.80	10.92	4.100	15.0	0.40	•
H3P 199-IQ	19.90	10.92	4.100	15.0	0.40	•
H3P 200-IQ	20.00	11.24	4.320	15.0	0.40	•
H3P 201-IQ	20.10	11.24	4.320	15.0	0.40	•
H3P 202-IQ	20.20	11.24	4.320	15.0	0.40	•
H3P 203-IQ	20.30	11.24	4.320	15.0	0.40	•
H3P 204-IQ	20.40	11.24	4.320	15.0	0.40	•
H3P 205-IQ	20.50	11.24	4.320	15.0	0.40	•
H3P 206-IQ	20.60	11.24	4.320	15.0	0.40	•
H3P 207-IQ	20.70	11.24	4.320	15.0	0.40	•
H3P 208-IQ	20.80	11.24	4.320	15.0	0.40	•
H3P 209-IQ	20.90	11.24	4.320	15.0	0.40	•
H3P 210-IQ	21.00	11.80	4.550	15.0	0.40	•
H3P 211-IQ	21.10	11.80	4.550	15.0	0.40	•
H3P 212-IQ	21.20	11.80	4.550	15.0	0.40	•
H3P 213-IQ	21.30	11.80	4.550	15.0	0.40	•
H3P 214-IQ	21.40	11.80	4.550	15.0	0.40	•
H3P 215-IQ	21.50	11.80	4.550	15.0	0.40	•
H3P 216-IQ	21.60	11.80	4.550	15.0	0.40	•
H3P 217-IQ	21.70	11.80	4.550	15.0	0.40	•
H3P 218-IQ	21.80	11.80	4.550	15.0	0.40	•
H3P 219-IQ	21.90	11.80	4.550	15.0	0.40	•
H3P 220-IQ	22.00	12.63	4.690	15.0	0.40	•
H3P 221-IQ	22.10	12.63	4.690	15.0	0.40	•
H3P 222-IQ	22.20	12.63	4.690	15.0	0.40	•
H3P 223-IQ	22.30	12.63	4.690	15.0	0.40	•
H3P 224-IQ	22.40	12.63	4.690	15.0	0.40	•
H3P 225-IQ	22.50	12.63	4.690	15.0	0.40	•
H3P 226-IQ	22.60	12.63	4.690	15.0	0.40	•
H3P 227-IQ	22.70	12.63	4.690	15.0	0.40	•
H3P 228-IQ	22.80	12.63	4.690	15.0	0.40	•
H3P 229-IQ	22.90	12.63	4.690	15.0	0.40	•

• For user guide and cutting conditions, see pages 68-81

(1) LPR tolerance ±0.05 mm

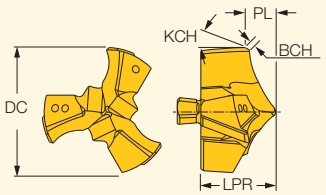
(2) PL tolerance ±0.1 mm

For tools, see pages: D3N A-1.5D (58) • D3N R-1.5D (58) • D3N A-3D (59) • D3N R-3D (59) • D3N A-5D (60) • D3N R-5D (60) • D3N A-8D (61) • D3N R-8D (61)

LOGIQ 3 CHAM THREE FLUTE CHAMDRILL

H3P (continued)

Exchangeable 3 Flute Drilling Heads for Machining Carbon and Alloy Steel (ISO P) and Cast Iron (ISO K)



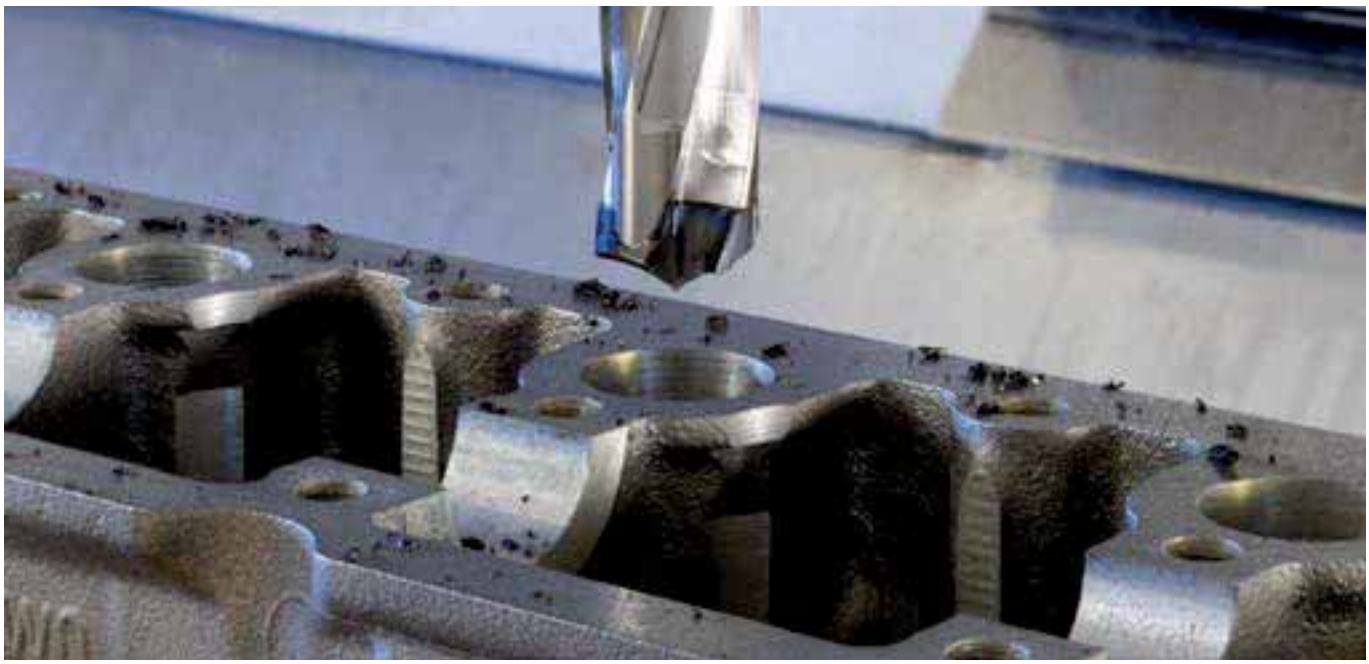
Designation	Dimensions					IC908
	DC	LPR(1)	PL(2)	KCH	BCH	
H3P 230-IQ	23.00	13.00	4.910	15.0	0.40	•
H3P 231-IQ	23.10	13.00	4.910	15.0	0.40	•
H3P 232-IQ	23.20	13.00	4.910	15.0	0.40	•
H3P 233-IQ	23.30	13.00	4.910	15.0	0.40	•
H3P 234-IQ	23.40	13.00	4.910	15.0	0.40	•
H3P 235-IQ	23.50	13.00	4.910	15.0	0.40	•
H3P 236-IQ	23.60	13.00	4.910	15.0	0.40	•
H3P 237-IQ	23.70	13.00	4.910	15.0	0.40	•
H3P 238-IQ	23.80	13.00	4.910	15.0	0.40	•
H3P 239-IQ	23.90	13.00	4.910	15.0	0.40	•
H3P 240-IQ	24.00	13.54	5.210	15.0	0.40	•
H3P 241-IQ	24.10	13.54	5.210	15.0	0.40	•
H3P 242-IQ	24.20	13.54	5.210	15.0	0.40	•
H3P 243-IQ	24.30	13.54	5.210	15.0	0.40	•
H3P 244-IQ	24.40	13.54	5.210	15.0	0.40	•
H3P 245-IQ	24.50	13.54	5.210	15.0	0.40	•
H3P 246-IQ	24.60	13.54	5.210	15.0	0.40	•
H3P 247-IQ	24.70	13.54	5.210	15.0	0.40	•
H3P 248-IQ	24.80	13.54	5.210	15.0	0.40	•
H3P 249-IQ	24.90	13.54	5.210	15.0	0.40	•
H3P 250-IQ	25.00	14.11	5.310	15.0	0.40	•
H3P 251-IQ	25.10	14.11	5.310	15.0	0.40	•
H3P 252-IQ	25.20	14.11	5.310	15.0	0.40	•
H3P 253-IQ	25.30	14.11	5.310	15.0	0.40	•
H3P 254-IQ	25.40	14.11	5.310	15.0	0.40	•
H3P 255-IQ	25.50	14.11	5.310	15.0	0.40	•
H3P 256-IQ	25.60	14.11	5.310	15.0	0.40	•
H3P 2565-IQ	25.65	14.11	5.310	15.0	0.40	•
H3P 257-IQ	25.70	14.11	5.310	15.0	0.40	•
H3P 258-IQ	25.80	14.11	5.310	15.0	0.40	•
H3P 259-IQ	25.90	14.11	5.310	15.0	0.40	•

• For user guide and cutting conditions, see pages 68-81

(1) LPR tolerance ±0.05 mm

(2) PL tolerance ±0.1 mm

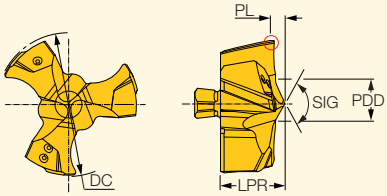
For tools, see pages: D3N A-1.5D (58) • D3N R-1.5D (58) • D3N A-3D (59) • D3N R-3D (59) • D3N A-5D (60) • D3N R-5D (60) • D3N A-8D (61) • D3N R-8D (61)



LOGIQ 3 CHAM THREE FLUTE CHAMDRILL

F3P

Exchangeable 3 Flute Flat Drilling Heads for Machining Carbon and Alloy Steel (ISO P) and Cast Iron (ISO K)



Designation	Dimensions								IC908
	DC	LPR(1)	PL	PDD	SIG	BCH	KCH	SSC(2)	
F3P 120-IQ	12.00	4.90	0.790	2.96	133	0.40	15.0	12	●
F3P 125-IQ	12.50	4.90	0.790	2.96	133	0.40	15.0	12	●
F3P 130-IQ	13.00	5.39	0.990	3.52	130	0.40	15.0	13	●
F3P 135-IQ	13.50	5.39	0.990	3.52	130	0.40	15.0	13	●
F3P 140-IQ	14.00	6.42	1.110	4.16	124	0.40	15.0	14	●
F3P 145-IQ	14.50	6.42	1.110	4.16	124	0.40	15.0	14	●
F3P 150-IQ	15.00	6.72	1.190	3.81	121	0.40	15.0	15	●
F3P 155-IQ	15.50	6.72	1.190	3.81	121	0.40	15.0	15	●
F3P 160-IQ	16.00	7.03	1.090	3.95	121	0.40	15.0	16	●
F3P 165-IQ	16.50	7.03	1.090	3.95	121	0.40	15.0	16	●
F3P 170-IQ	17.00	7.70	1.160	4.09	121	0.40	15.0	17	●
F3P 175-IQ	17.50	7.70	1.160	4.09	121	0.40	15.0	17	●
F3P 180-IQ	18.00	8.02	1.230	5.86	131	0.40	15.0	18	●
F3P 185-IQ	18.50	8.02	1.230	5.86	131	0.40	15.0	18	●
F3P 190-IQ	19.00	8.09	1.270	6.19	131	0.40	15.0	19	●
F3P 195-IQ	19.50	8.09	1.270	6.19	131	0.40	15.0	19	●
F3P 200-IQ	20.00	8.59	1.340	6.54	132	0.40	15.0	20	●
F3P 205-IQ	20.50	8.59	1.340	6.54	132	0.40	15.0	20	●
F3P 210-IQ	21.00	9.02	1.410	6.92	132	0.40	15.0	21	●
F3P 215-IQ	21.50	9.02	1.410	6.92	132	0.40	15.0	21	●
F3P 220-IQ	22.00	9.97	1.680	7.19	132	0.40	15.0	22	●
F3P 225-IQ	22.50	9.97	1.680	7.19	132	0.40	15.0	22	●
F3P 230-IQ	23.00	10.17	1.750	7.66	132	0.40	15.0	23	●
F3P 235-IQ	23.50	10.17	1.750	7.66	132	0.40	15.0	23	●
F3P 240-IQ	24.00	10.59	1.820	7.79	132	0.40	15.0	24	●
F3P 245-IQ	24.50	10.59	1.820	7.79	132	0.40	15.0	24	●
F3P 250-IQ	25.00	10.81	1.660	8.09	131	0.40	15.0	25	●
F3P 255-IQ	25.50	10.81	1.660	8.09	131	0.40	15.0	25	●

• For nearly flat bottom hole applications • For user guide and cutting conditions, see pages 68-81

(1) LPR tolerance ±0.05 mm

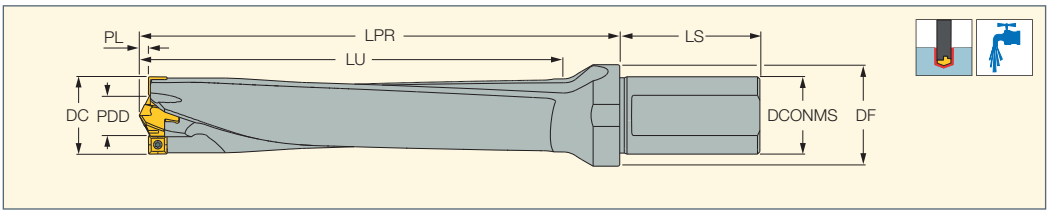
(2) Seat size code

For tools, see pages: D3N A-1.5D (58) • D3N R-1.5D (58) • D3N A-3D (59) • D3N R-3D (59) • D3N A-5D (60) • D3N R-5D (60) • D3N A-8D (61) • D3N R-8D (61)

COMBICHAM

MNC-5D

Large Diameter Indexable Drills with a Pilot Drilling Head and One Flat Shank, Drilling Depth 5xD



Designation	DC	LU	PL	DCONMS	PDD	DF	LS	LPR	Insert[1]	Insert 1[2]
MNC 260-130 A32-150-06-5D	26.00	132.93	2.93	32.00	15.00	42.00	60.0	166.92	SOGX 060304-W	ICP 150
MNC 265-132 A32-155-06-5D	26.50	135.53	3.03	32.00	15.50	42.00	60.0	167.03	SOGX 060304-W	ICP 155
MNC 270-135 A32-160-06-5D	27.00	138.10	3.10	32.00	16.00	42.00	60.0	170.10	SOGX 060304-W	ICP 160
MNC 280-140 A32-170-06-5D	28.00	143.25	3.25	32.00	17.00	42.00	60.0	174.30	SOGX 060304-W	ICP 170
MNC 290-145 A32-160-07-5D	29.00	148.10	3.10	32.00	16.00	42.00	60.0	180.11	SOGX 070305-W	ICP 160
MNC 295-148 A32-165-07-5D	29.50	150.69	3.19	32.00	16.50	42.00	60.0	183.21	SOGX 070305-W	ICP 165
MNC 300-150 A32-165-07-5D	30.00	153.19	3.19	32.00	16.50	42.00	60.0	186.21	SOGX 070305-W	ICP 165
MNC 310-155 A32-175-07-5D	31.00	158.34	3.34	32.00	17.50	42.00	60.0	193.30	SOGX 070305-W	ICP 175
MNC 320-160 A32-185-07-5D	32.00	163.49	3.49	32.00	18.50	42.00	60.0	198.50	SOGX 070305-W	ICP 185
MNC 330-165 A32-175-09-5D	33.00	168.64	3.64	32.00	17.50	42.00	60.0	203.60	SOGT 09T306-W	ICP 175
MNC 340-170 A32-180-09-5D	34.00	173.70	3.70	32.00	18.00	42.00	60.0	208.70	SOGT 09T306-W	ICP 180
MNC 350-175 A32-189-09-5D	35.00	178.86	3.86	32.00	18.90	42.00	60.0	213.90	SOGT 09T306-W	ICP 189
MNC 360-180 A32-190-10-5D	36.00	183.85	3.85	32.00	19.00	42.00	60.0	218.80	SOGT 100408-W	ICP 190
MNC 370-185 A32-200-10-5D	37.00	189.01	4.01	32.00	20.00	42.00	60.0	224.00	SOGT 100408-W	ICP 200
MNC 375-188 A32-205-10-5D	37.50	191.60	4.10	32.00	20.50	42.00	60.0	227.11	SOGT 100408-W	ICP 205
MNC 380-190 A40-209-10-5D	38.00	194.17	4.17	40.00	20.90	50.00	68.0	231.21	SOGT 100408-W	ICP 209
MNC 390-195 A40-215-10-5D	39.00	199.26	4.26	40.00	21.50	50.00	68.0	237.28	SOGT 100408-W	ICP 215
MNC 400-200 A40-225-10-5D	40.00	204.41	4.41	40.00	22.50	50.00	68.0	244.36	SOGT 100408-W	ICP 225
MNC 405-203 A40-235-10-5D	40.50	207.07	4.57	40.00	23.50	50.00	68.0	247.53	SOGT 100408-W	ICP 235
MNC 410-205 A40-239-10-5D	41.00	209.64	4.64	40.00	23.90	50.00	68.0	249.64	SOGT 100408-W	ICP 239
MNC 420-210 A40-249-10-5D	42.00	214.77	4.77	40.00	24.90	50.00	68.0	254.80	SOGT 100408-W	ICP 249
MNC 430-215 A40-259-10-5D	43.00	219.99	4.99	40.00	25.90	50.00	68.0	263.00	SOGT 100408-W	ICP 259
MNC 440-220 A40-210-12-5D	44.00	225.18	5.18	40.00	21.00	50.00	68.0	264.18	SOGT 120408-W	ICP 210
MNC 450-225 A40-219-12-5D	45.00	230.33	5.33	40.00	21.90	50.00	68.0	269.38	SOGT 120408-W	ICP 219
MNC 460-230 A40-229-12-5D	46.00	235.48	5.48	40.00	22.90	50.00	68.0	274.46	SOGT 120408-W	ICP 229
MNC 470-235 A40-239-12-5D	47.00	240.64	5.64	40.00	23.90	50.00	68.0	280.63	SOGT 120408-W	ICP 239
MNC 480-240 A40-249-12-5D	48.00	245.77	5.77	40.00	24.90	50.00	68.0	284.80	SOGT 120408-W	ICP 249
MNC 490-245 A40-259-12-5D	49.00	250.99	5.99	40.00	25.90	50.00	68.0	292.00	SOGT 120408-W	ICP 259
MNC 500-250 A40-269-12-5D	50.00	256.11	6.11	40.00	26.90	50.00	68.0	297.07	SOGT 120408-W	ICP 269

• Hole tolerance: D+0.10/-0.05 in average conditions. However, it can be higher or lower according to machine and tooling conditions • Intermediate sizes are available on request • For user guide and cutting conditions, see pages 68-81

[1] Outer insert

[2] Central insert

For inserts, see pages: HCP-IQ (47) • ICG (57) • ICP (18) • SOGT-W (67) • SOGX-W (67)

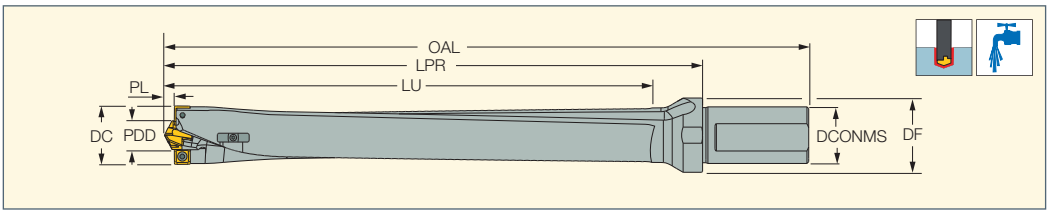
Spare Parts

Designation					
MNC 260-130 A32-150-06-5D	SR 34-508/L	T-7/51			K MNC MULTI
MNC 265-132 A32-155-06-5D	SR 34-508/L	T-7/51			K MNC MULTI
MNC 270-135 A32-160-06-5D	SR 34-508/L	T-7/51			K MNC MULTI
MNC 280-140 A32-170-06-5D	SR 34-508/L	T-7/51			K MNC MULTI
MNC 290-145 A32-160-07-5D	SR 14-560	T-8/53			K MNC MULTI
MNC 295-148 A32-165-07-5D	SR 14-560	T-8/53			K MNC MULTI
MNC 300-150 A32-165-07-5D	SR 14-560	T-8/53			K MNC MULTI
MNC 310-155 A32-175-07-5D	SR 14-560	T-8/53			K MNC MULTI
MNC 320-160 A32-185-07-5D	SR 14-560	T-8/53			K MNC MULTI
MNC 330-165 A32-175-09-5D	SR 34-506		BLD T09/M7-SW4	SW4-SD	K MNC MULTI
MNC 340-170 A32-180-09-5D	SR 34-506		BLD T09/M7-SW4	SW4-SD	K MNC MULTI
MNC 350-175 A32-189-09-5D	SR 34-506		BLD T09/M7-SW4	SW4-SD	K MNC MULTI
MNC 360-180 A32-190-10-5D	SR 14-571		BLD T10/S7	SW6-SD	K MNC MULTI
MNC 370-185 A32-200-10-5D	SR 14-571		BLD T10/S7	SW6-SD	K MNC MULTI
MNC 375-188 A32-205-10-5D	SR 14-571		BLD T10/S7	SW6-SD	K MNC MULTI
MNC 380-190 A40-209-10-5D	SR 14-571		BLD T10/S7	SW6-SD	K MNC MULTI
MNC 390-195 A40-215-10-5D	SR 14-571		BLD T10/S7	SW6-SD	K MNC MULTI
MNC 400-200 A40-225-10-5D	SR 14-571		BLD T10/S7	SW6-SD	K MNC 22-33
MNC 405-203 A40-235-10-5D	SR 14-571		BLD T10/S7	SW6-SD	K MNC 22-33
MNC 410-205 A40-239-10-5D	SR 14-571		BLD T10/S7	SW6-SD	K MNC 22-33
MNC 420-210 A40-249-10-5D	SR 14-571		BLD T10/S7	SW6-SD	K MNC 22-33
MNC 430-215 A40-259-10-5D	SR 14-571		BLD T10/S7	SW6-SD	K MNC 22-33
MNC 440-220 A40-210-12-5D	SR 14-544/S		BLD T15/S7	SW6-SD	K MNC MULTI
MNC 450-225 A40-219-12-5D	SR 14-544/S		BLD T15/S7	SW6-SD	K MNC MULTI
MNC 460-230 A40-229-12-5D	SR 14-544/S		BLD T15/S7	SW6-SD	K MNC 22-33
MNC 470-235 A40-239-12-5D	SR 14-544/S		BLD T15/S7	SW6-SD	K MNC 22-33
MNC 480-240 A40-249-12-5D	SR 14-544/S		BLD T15/S7	SW6-SD	K MNC 22-33
MNC 490-245 A40-259-12-5D	SR 14-544/S		BLD T15/S7	SW6-SD	K MNC 22-33
MNC 500-250 A40-269-12-5D	SR 14-544/S		BLD T15/S7	SW6-SD	K MNC 22-33

COMBICHAM

MNC-7/8D

Large Diameter Indexable Drills
for the Wind Turbine Industry



Designation	DC	PDD	LU	PL	LPR	OAL	DCONMS	DF	Insert(1)	Insert 1(2)
MNC 332-265 A32-175-09-8D	33.20	17.50	270.60	5.570	304.40	358.80	32.00	42.00	SOGT 09T306-W	HCP 175-IQ
MNC 362-289 A32-190-10-8D	36.20	19.00	294.60	5.570	326.90	381.30	32.00	42.00	SOGT 100408-W	HCP 190-IQ
MNC 392-289 A40-219-10-7D	39.20	21.90	294.90	5.940	352.20	414.30	40.00	50.00	SOGT 100408-W	HCP 219-IQ

• Hole tolerance: D+0.10/-0.05 in average conditions. However, it can be higher or lower according to machine and tooling conditions • Intermediate sizes are available on request • For user guide and cutting conditions, see pages 68-81

(1) Outer insert

(2) Central insert

For inserts, see pages: HCP-IQ (47) • SOGT-W (67)

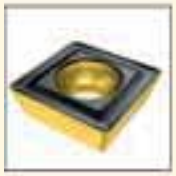
Spare Parts

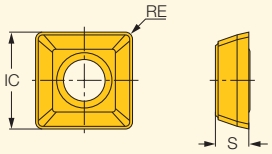
Designation							
MNC 332-265 A32-175-09-8D	SR 34-506	BLD T09/M7-SW4	SW4-SD	K MNC MULTI	SR 34-508	SR 34-508/S-HG	T-7/51
MNC 362-289 A32-190-10-8D	SR 14-571	BLD T10/S7	SW6-SD	K MNC MULTI	SR 34-508		T-7/51
MNC 392-289 A40-219-10-7D	SR 14-571	BLD T10/S7	SW6-SD	K MNC MULTI	SR 34-508		T-7/51

COMBICHAM

SOGX-W

Precision Ground Inserts with
DT General Use Chipformer
and a Wiper for MNC
Large Diameter Drills





Designation	Dimensions IC	S	RE	Tough ↔ Hard IC808	IC8080
SOGX 050204-W	5.40	2.40	0.40	•	
SOGX 060304-W	6.20	3.20	0.40	•	
SOGX 070305-W	7.70	3.60	0.50	•	•

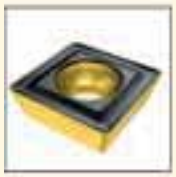
• For user guide and cutting conditions, see pages 68-81

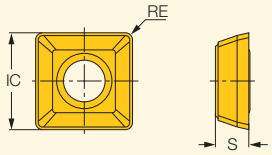
For tools, see pages: MNC-5D (66)

COMBICHAM

SOGT-W

Precision Ground Inserts with
DT General Use Chipformer
and a Wiper for MNC Drills





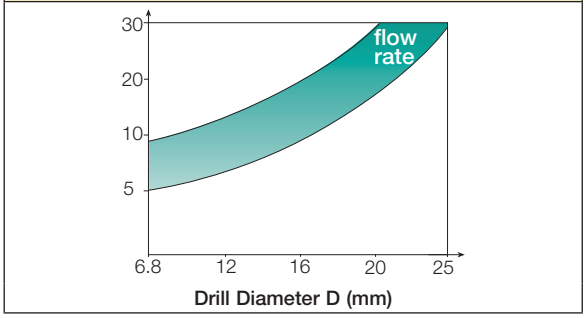
Designation	Dimensions IC	S	RE	Tough ↔ Hard IC808	IC8080
SOGT 09T306-W	9.00	3.81	0.60	•	•
SOGT 100408-W	9.80	4.30	0.80	•	•
SOGT 120408-W	12.70	4.76	0.80	•	

• For user guide and cutting conditions, see pages 68-81

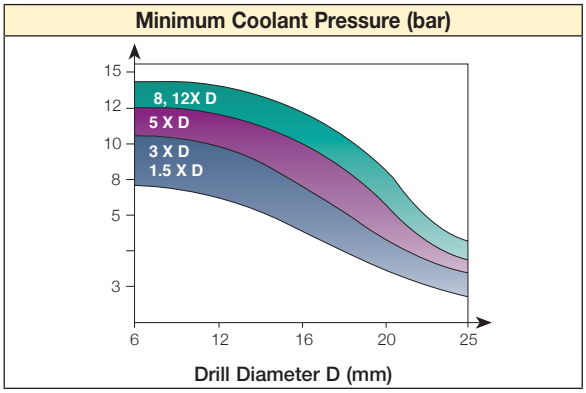
For tools, see pages: MNC-5D (66) • MNC-7/8D (67)

- When drilling stainless steel or high temperature alloys using the **ICM** drilling head, it is highly recommended to apply high-pressure oil or 7-10% mineral or vegetable based oil emulsion.
- Following is the recommended coolant flow rate and pressure.

Coolant Flow Rate (liter/min)



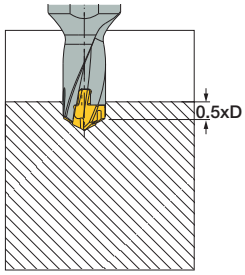
Minimum Coolant Pressure (bar)



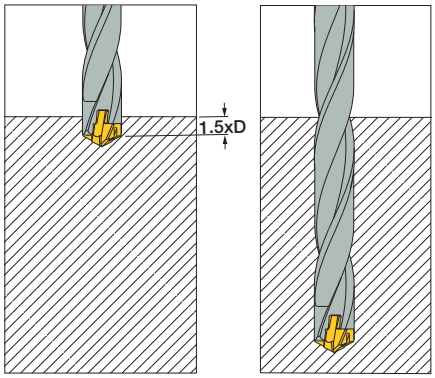
- For optimal performance, it is recommended to adjust runout of outer points or chisel with a maximum of 0.02 mm. Large runout will influence drill performance tool life and hole quality.
- No setup time is needed after indexing the **SUMOCHAM** drill head.
- **SUMOCHAM** drills can be used either on milling centers or lathe machines.
- When using **SUMOCHAM** drill in stationary (lathe) applications, we recommend using the **ISCAR GYRO** device or eccenter sleeve to reduce misalignment. Misalignment will cause poor performance of the **SUMOCHAM** drill or even tool breakage.

- Prior to using 8D or 12D drills, it is recommended to drill a 0.5xD pre-hole using a short or centering drill. Enter the pre-hole at slow speed and feed until 2-5 mm from its bottom. Start the cooling system and increase rotation to the recommended drilling speed. Hold for 2-3 seconds, then continue at the recommended drilling feed.

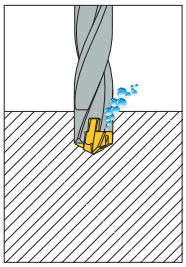
1 Pre-hole 0.5xD deep for centering



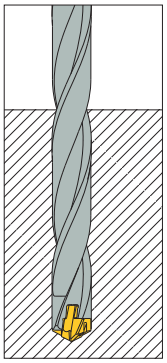
2 Slow rotation and feed while entering the pre-hole



3 Maintain for 2-3 seconds and activate the cooling system



4 Continue drilling at recommended cutting conditions

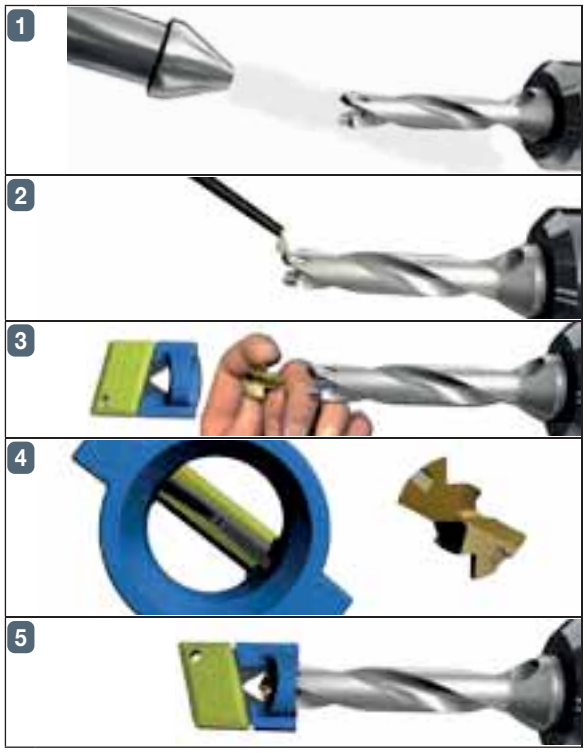


PreHole Adjustment

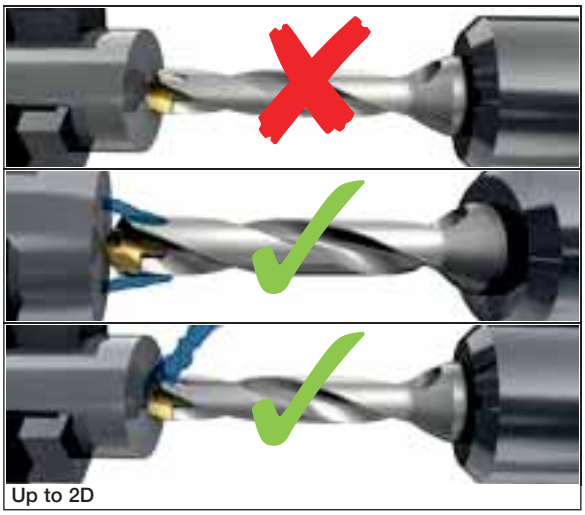
Hole \ PreHole	ICP/ ICM/ ICN	ICK	HCP/H3P	FCP/F3P	QCP	ICG
ICP ICM ICN	ICP/M/N PreHole ✓	ICK PreHole ✗	H#P PreHole ✗	FCP PreHole ✗	QCP PreHole ✗	ICG PreHole ✗
ICK	ICP/M/N PreHole ✓	ICK PreHole ✓	H#P PreHole ✗	FCP PreHole ✗	QCP PreHole ✗	ICG PreHole ✗
HCP H3P	ICP/M/N PreHole ✓	ICK PreHole ✗	H#P PreHole ✓	FCP PreHole ✓	QCP PreHole ✗	ICG PreHole ✗
FCP F3P	ICP/M/N PreHole ✗	ICK PreHole ✗	H#P PreHole ✗	FCP PreHole ✓	QCP PreHole ✗	ICG PreHole ✗
QCP	ICP/M/N PreHole ✓	ICK PreHole ✗	H#P PreHole ✗	FCP PreHole ✓	QCP PreHole ✓	ICG PreHole ✗
ICG	ICP/M/N PreHole ✓	ICK PreHole ✓	H#P PreHole ✗	FCP PreHole ✗	QCP PreHole ✗	ICG PreHole ✓

*For proper insert performance and centering, a bigger insert within a 1.0 mm range of the same diameter may be used

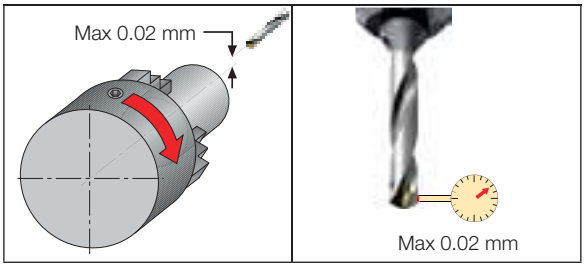
Drilling Head Mounting Procedure



Coolant Recommendations



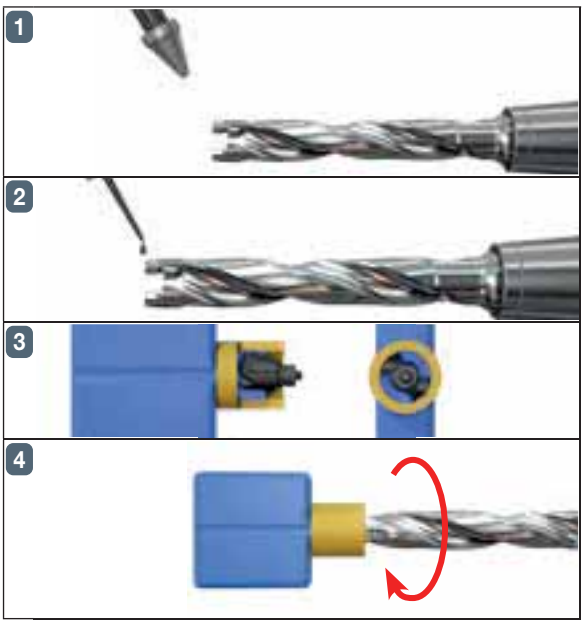
Maximum Runout, Misalignment



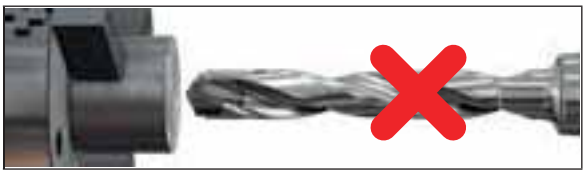
K DCN MULTI

The optional K DCN MULTI key enables clamping all currently available **SUMOCHAM** drilling heads in a 6-26.9 mm diameter range.

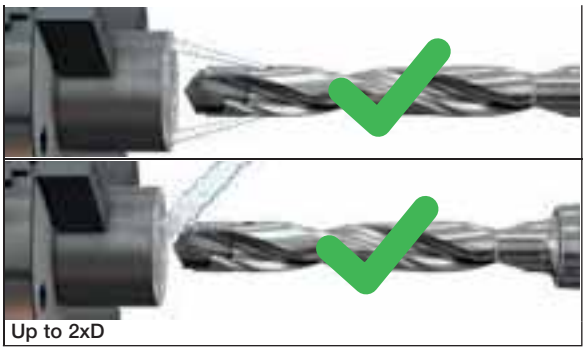
Drilling Head Dia. 4.0-5.99mm Mounting Procedure



Coolant Recommendations

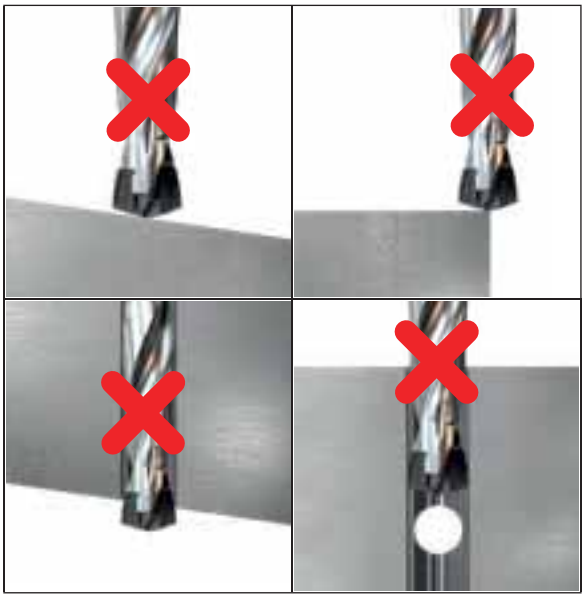


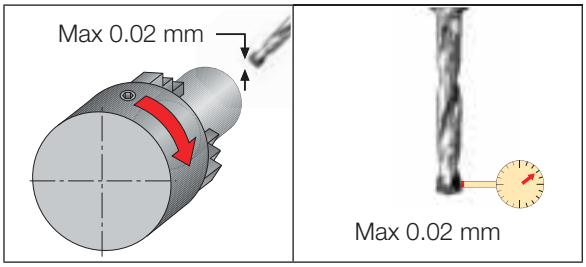
Dry machining



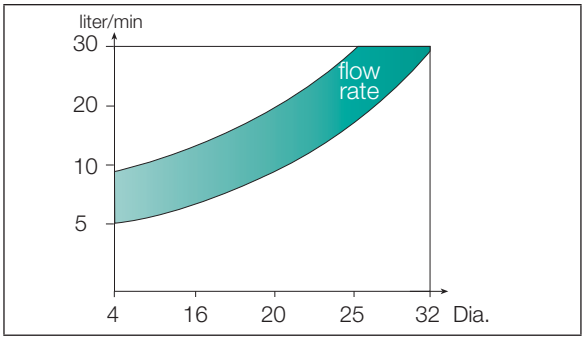
Up to 2xD

Drilling Limitations



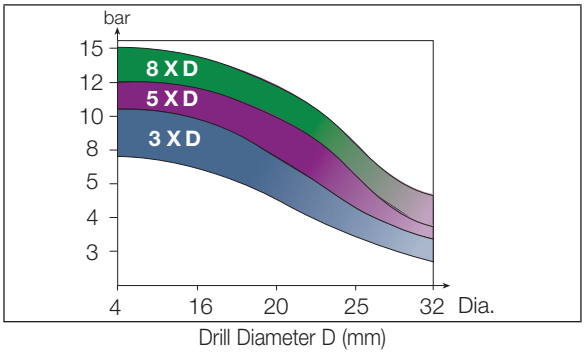


Coolant Flow Rate



Drill Diameter D (mm)

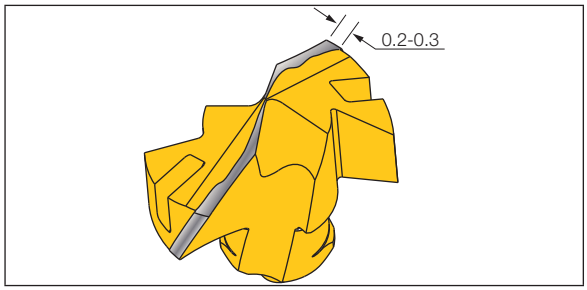
Minimum Coolant Pressure



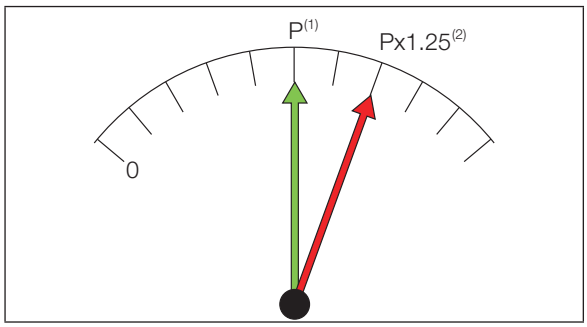
Drill Diameter D (mm)

Indication of Drill Head Wear

Wear Limit

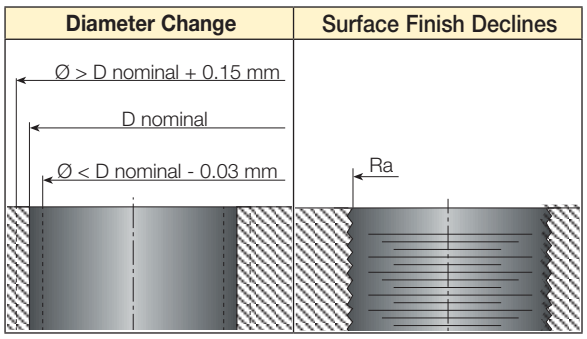


Power Restriction



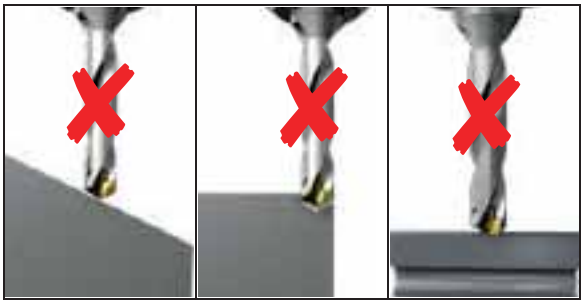
(1) New drilling head
(2) Worn-out drilling head

Diameter Change	Surface Finish Declines



Vibration Noise Drastically Increases

Drilling Limitations



Material Groups

Recommended Machining Conditions

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material No.(1)	V m/min	SUMOCHAM Feed vs. Drill Diameter									
								D=4-4.9	D=5-5.9	D=6-7.9	D=8-9.9	D=10-11.9	D=12-13.9	D=14-15.9	D=16-19.9	D=20-25.9	D=26-32.9
										mm/rev							
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	80-**110**-140	0.04	0.07	0.09	0.12	0.15	0.18	0.20	0.25	0.25	0.30
		≥ 0.25 %C	Annealed	650	190	2	80-**105**-130	**0.06**	**0.09**	**0.11**	**0.17**	**0.21**	**0.24**	**0.27**	**0.35**	**0.35**	**0.40**
		< 0.55 %C	Quenched and tempered	850	250	3	80-**100**-120	0.08	0.11	0.13	0.22	0.28	0.30	0.35	0.45	0.45	0.50
		≥ 0.55 %C	Annealed	750	220	4	70-**90**-110										
			Quenched and tempered	1000	300	5	50-**70**-90										
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	80-**100**-120	0.04	0.07	0.09	0.12	0.14	0.16	0.18	0.23	0.25	0.30
			Quenched and tempered	930	275	7	70-**90**-110	**0.06**	**0.10**	**0.12**	**0.18**	**0.21**	**0.24**	**0.26**	**0.31**	**0.35**	**0.40**
				1000	300	8	50-**70**-90	0.08	0.13	0.15	0.25	0.28	0.32	0.35	0.40	0.45	0.50
				1200	350	9	40-**55**-70										
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10	50-**70**-90	0.06	0.07	0.09	0.12	0.12	0.15	0.18	0.20	0.22	0.25
			Quenched and tempered	1100	325	11	40-**60**-80	**0.07**	**0.09**	**0.11**	**0.16**	**0.17**	**0.20**	**0.23**	**0.25**	**0.27**	**0.30**
								0.08	0.10	0.12	0.20	0.22	0.25	0.28	0.30	0.33	0.35
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12	40-**55**-70	0.05	0.06	0.08	0.10	0.12	0.14	0.16	0.16	0.18	0.20
			Martensitic	820	240	13	40-**55**-70	**0.06**	**0.07**	**0.09**	**0.12**	**0.15**	**0.17**	**0.20**	**0.21**	**0.24**	**0.27**
								0.07	0.08	0.10	0.15	0.18	0.20	0.24	0.26	0.30	0.35
M	Stainless steel and cast steel		Austenitic, duplex	600	180	14	30-**50**-70	0.05	0.06	0.08	0.10	0.12	0.14	0.16	0.16	0.18	0.20
								0.06	**0.07**	**0.09**	**0.12**	**0.15**	**0.17**	**0.20**	**0.21**	**0.24**	**0.27**
								0.07	0.08	0.10	0.15	0.18	0.20	0.24	0.26	0.30	0.35
K	Gray cast iron (GG)		Ferritic / pearlitic		180	15	90-**125**-160										
			Pearlitic / martensitic		260	16	80-**110**-140										
	Nodular cast iron (GGG)		Ferritic		160	17	90-**135**-180	0.04	0.10	0.12	0.15	0.20	0.25	0.30	0.35	0.35	0.40
			Pearlitic		250	18	80-**110**-140	**0.06**	**0.13**	**0.15**	**0.22**	**0.27**	**0.32**	**0.37**	**0.45**	**0.47**	**0.50**
	Malleable cast iron		Ferritic		130	19	90-**125**-160	0.08	0.15	0.18	0.30	0.35	0.40	0.45	0.55	0.60	0.60
			Pearlitic		230	20	80-**110**-140										
N	Aluminum-wrought alloys		Not hardenable		60	21	90-**155**-220										
			Hardenable		100	22											
	Aluminum-cast alloys	≤12% Si	Not hardenable		75	23											
			Hardenable		90	24					0.20	0.25	0.30	0.35	0.40	0.45	0.50
		>12% Si	High temperature		130	25	80-**120**-160				**0.27**	**0.32**	**0.37**	**0.42**	**0.50**	**0.57**	**0.67**
	Copper alloys	>1% Pb	Free cutting		110	26					0.35	0.40	0.45	0.50	0.60	0.70	0.75
			Brass		90	27	90-**155**-220										
			Electrolytic copper		100	28											
	Non metallic		Duroplastics, fiber plastics			29											
			Hard rubber			30											
S	High temperature alloys	Fe based	Annealed		200	31	30-**45**-60										
			Hardened		280	32	20-**35**-50			0.05	0.06	0.08	0.10	0.12	0.12	0.14	0.16
		Ni or Co based	Annealed		250	33				**0.06**	**0.08**	**0.10**	**0.12**	**0.15**	**0.16**	**0.18**	**0.20**
			Hardened		350	34				0.07	0.11	0.13	0.15	0.18	0.20	0.22	0.25
			Cast		320	35											
	Titanium alloys		Pure	400		36	20-**35**-50			0.05	0.06	0.08	0.10	0.12	0.14	0.16	0.18
			Alpha+beta alloys, hardened	1050		37				**0.06**	**0.09**	**0.11**	**0.14**	**0.16**	**0.18**	**0.20**	**0.22**
										0.07	0.12	0.15	0.18	0.20	0.22	0.25	0.27
H	Hardened steel		Hardened		55 HRC	38	20-**35**-50			0.05	0.06	0.08	0.10	0.12	0.14	0.16	0.18
			Hardened		60 HRC	39				**0.06**	**0.09**	**0.11**	**0.14**	**0.16**	**0.18**	**0.20**	**0.22**
										0.07	0.12	0.15	0.18	0.20	0.22	0.25	0.27

Recommended cutting data

(1) For workpiece materials list, see pages 495-524 . As a starting value, the middle of the recommended machining range should be used.

Then, according to the wear results, conditions can be changed to optimize performance.

The data refers to IC908

- When using external coolant supply only, reduce cutting speed by 10%
- Use internal coolant supply when machining austenitic stainless steel
- When using more than 5XD drill ratio, reduce cutting parameters by 10%

Material Groups

Recommended Machining Conditions

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material No.(1)	V m/min	SUMOCHAM Feed vs. Drill Diameter D=4-4.9	D=5-5.9	D=6-7.9	D=8-9.9	D=10-11.9	D=12-13.9	D=14-15.9	D=16-19.9	D=20-25.9	D=26-32.9
								mm/rev									
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	80-**110**-140	0.04	0.07	0.09	0.12	0.15	0.18	0.20	0.25	0.25	0.30
		≥ 0.25 %C	Annealed	650	190	2	80-**105**-130	**0.06**	**0.09**	**0.11**	**0.17**	**0.21**	**0.24**	**0.27**	**0.35**	**0.35**	**0.40**
		< 0.55 %C	Quenched and tempered	850	250	3	80-**100**-120	0.08	0.11	0.13	0.22	0.28	0.30	0.35	0.45	0.45	0.50
		≥ 0.55 %C	Annealed	750	220	4	70-**90**-110										
			Quenched and tempered	1000	300	5	50-**70**-90										
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	80-**100**-120	0.04	0.07	0.09	0.12	0.14	0.16	0.18	0.23	0.25	0.30
			Quenched and tempered	930	275	7	70-**90**-110	**0.06**	**0.09**	**0.12**	**0.18**	**0.21**	**0.24**	**0.26**	**0.31**	**0.35**	**0.40**
				1000	300	8	50-**70**-90	0.08	0.11	0.15	0.25	0.28	0.32	0.35	0.40	0.45	0.50
				1200	350	9	40-**55**-70										
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10	50-**70**-90	0.06	0.07	0.09	0.12	0.12	0.15	0.18	0.20	0.22	0.25
			Quenched and tempered	1100	325	11	40-**60**-80	**0.07**	**0.09**	**0.11**	**0.16**	**0.17**	**0.20**	**0.23**	**0.25**	**0.27**	**0.30**
								0.08	0.10	0.12	0.20	0.22	0.25	0.28	0.30	0.33	0.35
	Stainless steel and cast steel		Ferritic/ martensitic	680	200	12	40-**55**-70	0.05	0.06	0.08	0.11	0.11	0.14	0.17	0.22	0.21	0.24
								0.06	**0.07**	**0.10**	**0.15**	**0.16**	**0.19**	**0.22**	**0.24**	**0.26**	**0.29**
			Martensitic	820	240	13		0.07	0.08	0.11	0.19	0.21	0.24	0.27	0.29	0.32	0.34
K	Gray cast iron (GG)		Ferritic / pearlitic		180	15	90-**125**-160	0.04	0.10	0.12	0.15	0.20	0.25	0.30	0.35	0.35	0.40
			Pearlitic / martensitic		260	16	80-**110**-140	**0.06**	**0.13**	**0.15**	**0.22**	**0.27**	**0.32**	**0.37**	**0.45**	**0.47**	**0.50**
	Nodular cast iron (GGG)		Ferritic		160	17	90-**135**-180	0.08	0.15	0.18	0.30	0.35	0.40	0.45	0.55	0.60	0.60
			Pearlitic		250	18	80-**110**-140										
	Malleable cast iron		Ferritic		130	19	90-**125**-160										
			Pearlitic		230	20	80-**110**-140										

Recommended cutting data

(1) For workpiece materials list, see pages 495-524 . As a starting value, the middle of the recommended machining range should be used.

Then, according to the wear results, conditions can be changed to optimize performance.

The data refers to IC908

- When using external coolant supply only, reduce cutting speed by 10%
- When using more than 5XD drill ratio, reduce cutting parameters by 10%

No need to reduce the cutting parameters while using 8XD and up holders

Recommended Machining Conditions for ICG Inserts

Material group	Material number	Cutting Speed V_c m/min	Feed mm/rev		
			D=14-15.99	D=16-19.9	D=20-25.9
P	3	80-100-120	0.15 0.22 0.27	0.18 0.24 0.3	0.2 0.27 0.35
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12	60-80-100	0.12 0.2	0.16 0.23	0.18 0.26
	13				
M	14	60-80-100	0.12 0.2 0.27	0.16 0.23 0.3	0.18 0.26 0.35
N	21	80-200-300	0.35 0.45 0.5	0.4 0.5 0.6	0.45 0.57 0.65
	22				
	23				
	24				
	25				
	26				
	27				
	28				
S	31	25-30-35	0.10 0.14 0.22	0.12 0.18 0.25	0.12 0.18 0.25
	32				
	33				
	34				
	35				
	36				
	37				
H	38	20-35-50	0.12 0.15 0.2	0.14 0.18 0.22	0.16 0.2 0.25
	39				

Recommended cutting data

Recommended Machining Conditions for ICN Inserts

		SUMOCHAM			
		Feed vs. Drill Diameter			
		D=10-11.9	D=12-13.9	D=14-15.9	D=16-19.9
Mtl. No.	V m/min	mm/rev			
21	90-155-220	0.25 0.32 0.40	0.30 0.37 0.45	0.35 0.42 0.50	0.40 0.50 0.60
22					
23					
24					
25	80-120-160				
26	90-155-220				
27					
28					

Recommended cutting data

According to the wear results, conditions can be changed to optimize performance.

Material Groups

Recommended Machining Conditions

ISO	Material		Condition	Tensile Strength Rm [N/mm²]	Hardness HB	Mtl. No.	VC m/min	Feed vs. Drill Diameter D=12-13.9 mm/rev	D=14-15.9 mm/rev	D=16-17.9 mm/rev	D=18-19.9 mm/rev	D=20-21.9 mm/rev	D=22-23.9 mm/rev	D=24-25.9 mm/rev
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	80-100-120	0.30 **0.39** 0.45	0.36 **0.45** 0.51	0.45 **0.51** 0.57	0.48 **0.57** 0.63	0.51 **0.60** 0.66	0.54 **0.63** 0.69	0.57 **0.66** 0.72
		≥ 0.25 %C	Annealed	650	190	2								
		< 0.55 %C	Quenched and tempered	850	250	3								
		≥ 0.55 %C	Annealed	750	220	4	70-85-100							
			Quenched and tempered	1000	300	5	50-65-80							
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	70-90-110	0.33 **0.39** 0.42	0.36 **0.42** 0.48	0.39 **0.48** 0.54	0.42 **0.51** 0.60	0.45 **0.54** 0.63	0.48 **0.57** 0.66	0.51 **0.60** 0.69
			Quenched and tempered	930	275	7	70-85-100							
				1000	300	8	50-65-80							
				1200	350	9	40-50-60							
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10	50-70-90	0.27 **0.33** 0.36	0.30 **0.36** 0.39	0.33 **0.39** 0.42	0.36 **0.42** 0.45	0.39 **0.45** 0.48	0.42 **0.48** 0.51	0.45 **0.51** 0.54
			Quenched and tempered	1100	325	11	40-60-80							
K	Gray cast iron (GG)		Ferritic / pearlitic		180	15	90-125-140	0.40 **0.60** 0.78	0.45 **0.66** 0.84	0.54 **0.72** 0.90	0.60 **0.78** 0.96	0.66 **0.84** 1.02	0.72 **0.90** 1.08	0.78 **0.96** 1.14
			Pearlitic / martensitic		260	16	80-110-120							
	Nodular cast iron (GGG)		Ferritic		160	17	90-135-160							
			Pearlitic		250	18	80-110-120							
	Malleable cast iron		Ferritic		130	19	90-125-140							
			Pearlitic		230	20	80-110-120							

Recommended cutting data

Recommended Machining Conditions for MNC drills

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material No.(1)	Cutting Speed V_c [m/min]		Feed vs. Drill Diameter F [mm/rev]									
									26< ØD <28		29< ØD <32		33< ØD <35		36< ØD <43		44< ØD <50	
							Vc min	Vc max	f min	f max	f min	f max	f min	f max	f min	f max	f min	f max
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	120	200	0.25	0.35	0.25	0.35	0.25	0.40	0.25	0.40	0.28	0.45
		≥ 0.25 %C	Annealed	650	190	2												
		< 0.55 %C	Quenched and tempered	850	250	3	130	190										
		≥ 0.55 %C	Annealed	750	220	4												
			Quenched and tempered	1000	300	5												
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	120	180	0.25	0.33	0.25	0.33	0.25	0.38	0.25	0.38	0.26	0.43
			Quenched and tempered	930	275	7												
				1000	300	8												
				1200	350	9												
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10	100	160	0.25	0.33	0.25	0.33	0.25	0.36	0.25	0.36	0.26	0.41
			Quenched and tempered	1100	325	11												
	Stainless steel and cast steel		Ferritic/ martensitic	680	200	12	90	140	0.12	0.24	0.12	0.24	0.16	0.25	0.18	0.25	0.18	0.30
			Martensitic	820	240	13												
M	Stainless steel and cast steel		Austenitic, duplex	600	180	14	90	140	0.12	0.24	0.12	0.24	0.16	0.25	0.18	0.25	0.18	0.30
K	Gray cast iron (GG)		Ferritic / pearlitic		180	15												
			Pearlitic / martensitic		260	16												
	Nodular cast iron (GGG)		Ferritic		160	17	150	250	0.25	0.40	0.25	0.45	0.3	0.50	0.3	0.50	0.35	0.55
			Pearlitic		250	18												
	Malleable cast iron		Ferritic		130	19												
			Pearlitic		230	20												
N	Aluminum-wrought alloys		Not hardenable		60	21												
			Hardenable		100	22	160	260	0.3	0.50	0.3	0.50	0.35	0.55	0.35	0.55	0.4	0.60
	Aluminum-cast alloys	≤12% Si	Not hardenable		75	23												
			Hardenable		90	24												
		>12% Si	High temperature		130	25												
	Copper alloys	>1% Pb	Free cutting		110	26												
			Brass		90	27												
			Electrolytic copper		100	28												
	Non metallic		Duroplastics, fiber plastics			29												
			Hard rubber			30												
S	High temperature alloys	Fe based	Annealed		200	31												
			Hardened		280	32												
		Ni or Co based	Annealed		250	33												
			Hardened		350	34												
			Cast		320	35												
	Titanium alloys		Pure	400		36												
			Alpha+beta alloys, hardened	1050		37												
H	Hardened steel		Hardened		55 HRC	38	20	50	0.1	0.16	0.12	0.18	0.14	0.2	0.14	0.2	0.16	0.22
			Hardened		60 HRC	39												
	Chilled cast iron		Cast		400	40												
	Cast iron		Hardened		55 HRC	41												

(1) For workpiece materials list, see pages 495-524 . As a starting value, the middle of the recommended machining range should be used. Then, according to the wear results, conditions can be changed to optimize performance.

Troubleshooting

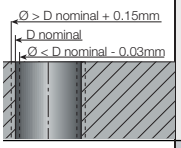
Cutting Edge Chipping
1 Check the stability of the machine spindle, tool and workpiece clamping rigidity.
2 Reduce feed rate, increase speed.
3 If the drill vibrates, reduce cutting speed and increase feed rate.
4 When drilling rough, hard or sloped surfaces (up to 7°), reduce the feed rate by 30-50% when entering and exiting.
5 Check cooling lubricant and increase coolant pressure. In case of external coolant supply, improve jet direction and add cooling jets.

Chisel Area Chipping
1 Reduce feed rate.
2 Increase coolant pressure.
3 Check the adaptation. Use hydraulic clamping chuck, MAXIN power chuck or side lock systems.
4 Increase workpiece chucking force.

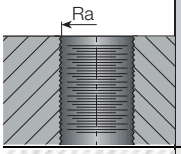
Excessive Flank Wear
1 Check that the correct geometry is used.
2 Reduce cutting speed.
3 Increase internal coolant pressure.

Excessive Flute Land Wear
1 Check that the correct geometry is used.
2 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial).
3 Reduce cutting speed.
4 When drilling rough, hard or sloped surfaces (up to 7°), reduce the feed rate by 30-50% when entering and exiting.
5 Increase coolant pressure.
6 Check the chisel point runout and make sure it is within 0.02 mm T.I.R.
7 Increase workpiece chucking force stability and rigidity.
8 If there is low pocket gripping force - replace drill body.

Built-Up Edge
1 Increase cutting speed/feed.
2 Increase coolant pressure.



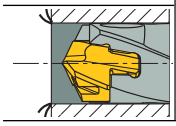
Deviation of Hole Tolerance
1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial cutting points).
2 Reduce feed rate.
3 Check the chisel point runout and make sure that it is within 0.02 mm T.I.R.
4 Wrong cutting edge. Replace head.
5 Increase workpiece chucking force.
6 Check the adaptation. Use hydraulic clamping chuck, **MAXIN** power chuck or side clamping systems.
7 Increase internal coolant pressure.



Surface Finish Too Rough
1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial).
2 Adjust the feed for improved chip formation.
3 In case of chip jamming - increase the coolant flow and/or reduce the cutting speed.
4 Increase the coolant pressure.
5 Check the chisel point runout and make sure it is within 0.02 mm T.I.R.
6 Use pecking cycle.
7 Use double margin geometry.

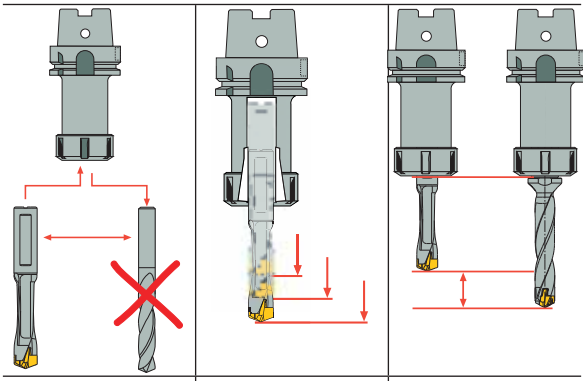
Hole Not Straight:
1 Use 2M geometry.
2 Drill a pre-hole for centering (check recommendations for pre-hole operation).
3 Increase coolant pressure, improve jet direction in case of external coolant supply.
4 Increase the feed.

Inaccurate Hole Position
1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial).
2 Check the stability of the machine spindle, tool and workpiece clamping rigidity.
3 When drilling rough, hard or sloped surfaces (up to 7°), reduce the feed rate by 30%-50% when entering.
4 Drill a pre-hole with a 140° point angle for centering.
5 Check the chisel point runout and make sure it is within 0.02 mm T.I.R.



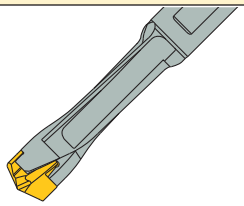
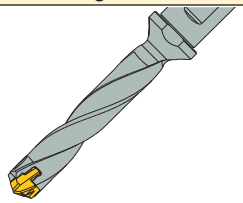
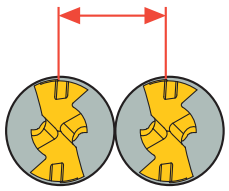
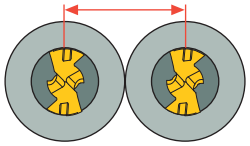
Burrs on Exit
1 Reduce the feed rate by 30%-50% when exiting.
2 Replace the worn head.
3 Check the adaptation. Use hydraulic clamping chuck, **MAXIN** power chuck or side clamping systems.

Applications for DCNS Drills



Replaces solid carbide drills without changing any holding components	When using SUMOUNICHAM, the drill's projection can be adjusted	Shorter projection compared to SUMOCHAM, when required

For better stability in rough applications and interrupted cuts

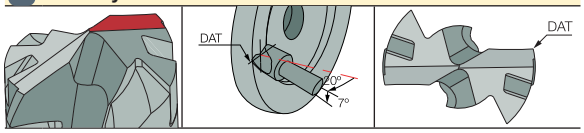
SUMOUNICHAM Moderate Helix	SUMOCHAM High Helix
	
SUMOUNICHAM	**SUMOCHAM**
	
Can be used on multi-spindle applications for close spacing between adjacent drills	

Regrinding Instructions

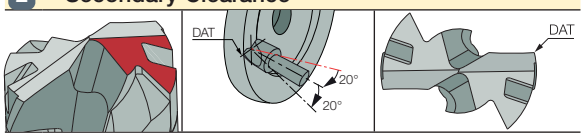
Regrinding Instructions for ICM Geometry

After each grinding operation, rotate the drill 180° and repeat the grinding procedure.

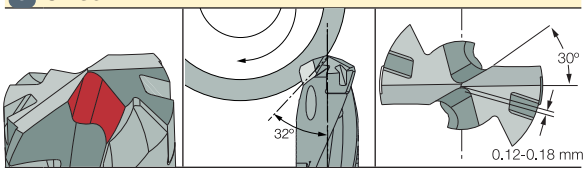
1 Primary Clearance



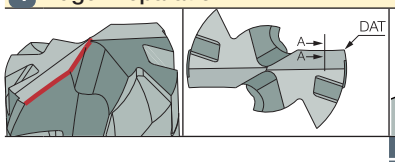
2 Secondary Clearance



3 Chisel



4 Edge Preparation

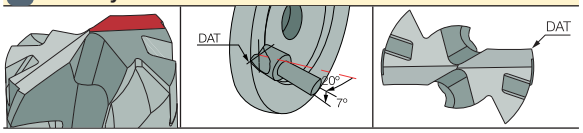


T	D Range
0.05	8-11.99
0.07	12-15.99
0.08	16-19.99
0.1	20-25.99
0.12	26-32.99

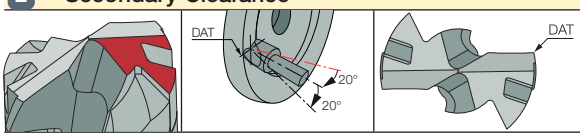
Regrinding Instructions for ICK Geometry

After each grinding operation, rotate the drill 180° and repeat the grinding procedure.

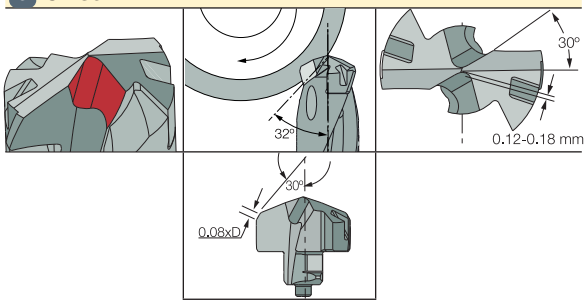
1 Primary Clearance



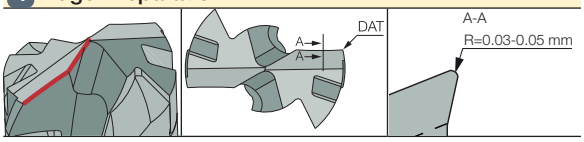
2 Secondary Clearance



3 Chisel



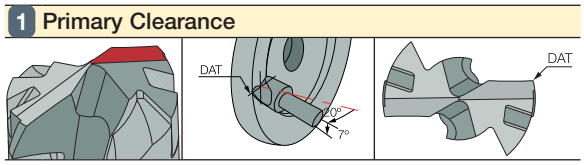
4 Edge Preparation



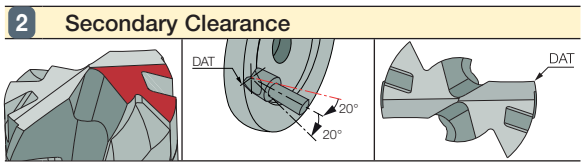
Regrinding Instructions for ICP Geometry

After each grinding operation, rotate the drill 180° and repeat the grinding procedure.

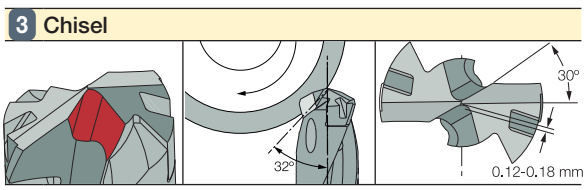
1 Primary Clearance



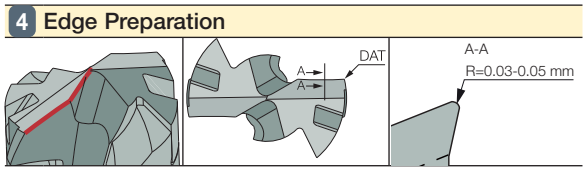
2 Secondary Clearance



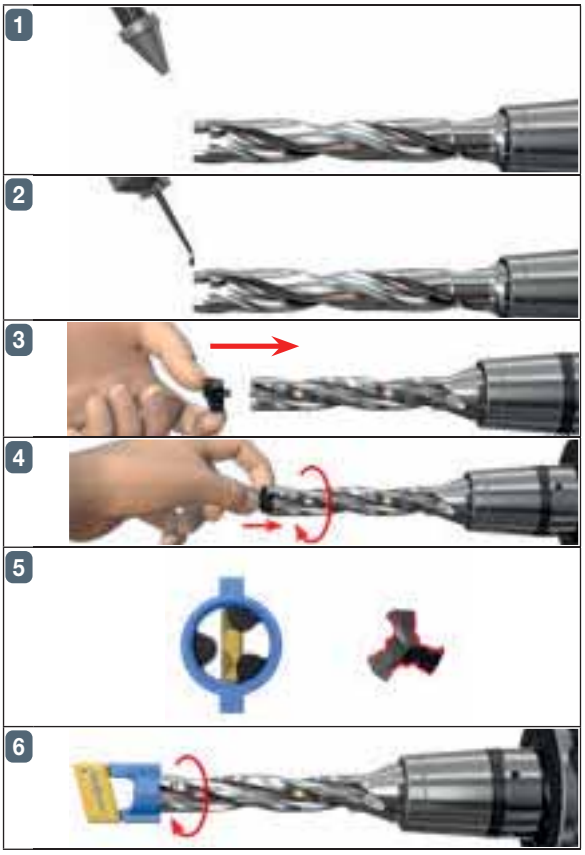
3 Chisel



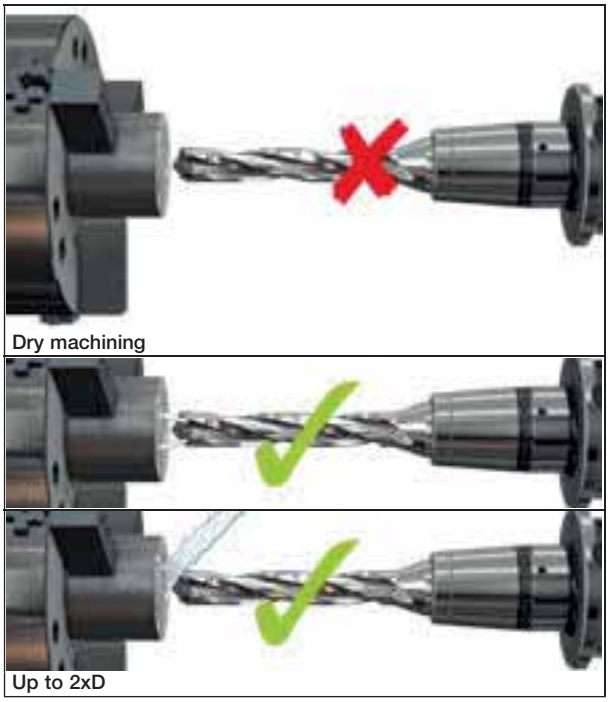
4 Edge Preparation



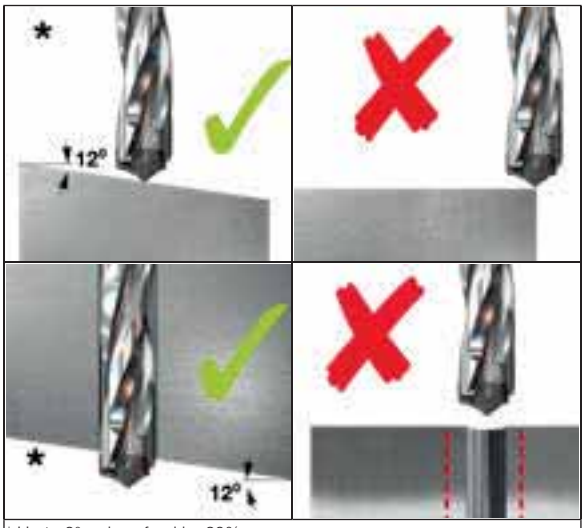
Drilling Head Mounting Procedure



Coolant Recommendations

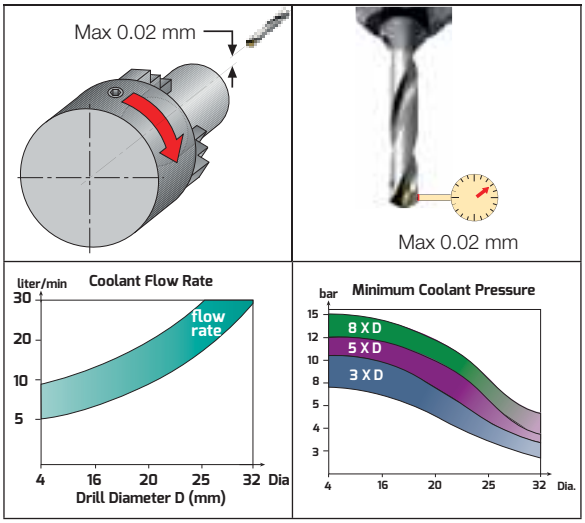


Drilling Limitations

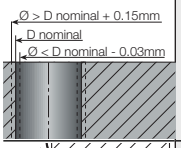
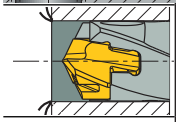
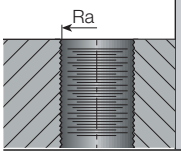


* Up to 6° reduce feed by 20%
* 6°-12° reduce feed by 50%

Maximum Runout, Misalignment



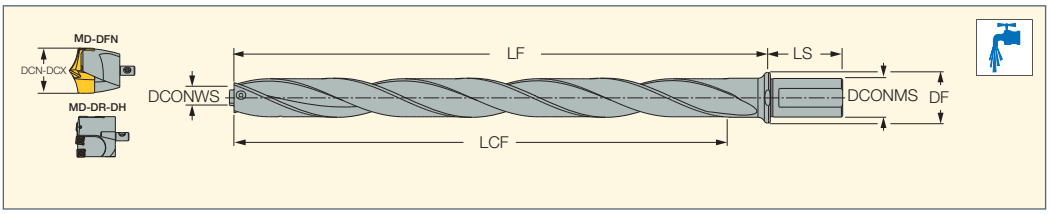
Troubleshooting

	**Cutting Edge Chipping** 1 Check the stability of the machine spindle, tool and workpiece clamping rigidity. 2 Reduce feed rate, increase speed. 3 If the drill vibrates, reduce cutting speed and increase feed rate. 4 When drilling rough, hard or angled (up to 12° angular surface), reduce the feed rate by 30-50%. 5 Check cooling lubricant. Increase coolant pressure. In case of external coolant supply, improve jet direction and add cooling jets.
	**Chisel Area Chipping** 1 Reduce feed rate. 2 Increase coolant pressure. 3 Increase workpiece chucking force.
	**Excessive Flank Wear** 4 Reduce cutting speed. 5 Increase internal coolant pressure.
	**Excessive Land Wear** 1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial). 2 Reduce cutting speed. 3 When drilling rough, hard or angled (up to 12° angular surface), reduce the feed rate by 30-50%. 4 Increase coolant pressure. 5 Check the chisel point runout and make sure it is within 0.02 mm T.I.R. 6 Increase workpiece chucking force stability and rigidity.
	**Built-Up Edge** 1 Increase cutting speed/feed. 2 Increase
	Inaccurate Hole Position 1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial). 2 Check the stability of the machine spindle, tool and workpiece clamping rigidity. 3 When drilling rough, hard or sloped surfaces (up to 7°), reduce the feed rate by 30%-50% when entering. 4 Drill a pre-hole with a 140° point angle for centering. 5 Check the chisel point runout and make sure it is within 0.02 mm T.I.R.
	**Deviation of Hole Tolerance** 1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial cutting points). 2 Reduce feed rate. 3 Check the chisel point runout and make sure that it is within 0.02 mm T.I.R. 4 Wrong cutting edge. Replace head. 5 Increase workpiece chucking force. 6 Increase internal coolant pressure.
	**Burrs on Exit** 1 Reduce the feed rate by 50%-70% during exit. 2 Replace the worn head.
	**Surface Finish Too Rough** 1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial). 2 Adjust the feed for improved chip formation. 3 In case of chip jamming - increase the coolant flow and/or reduce the cutting speed. 4 Increase the coolant pressure. 5 Check the chisel point runout and make sure it is within 0.02 mm T.I.R. 6 Use pecking cycle. 7 Replace the drilling head.

MODUDRILL
MODULAR HEADS

MD-BODY

Modular Drill Bodies, Each Can Carry a Variety of Exchangeable Drilling Heads with Different Diameters



Designation	DCONMS	DF	LS	LF	LCF	DCN(1)	DCX(2)	DCONWS(3)			
MD-BODY-33-36-400-32A	32.00	42.00	60.0	445.00	393.3	33.00	36.90	6.70	SET SCREW M6-MODUDRILL	BLD T15/S7	SW6-T-SH
MD-BODY-37-40-400-32A	32.00	42.00	60.0	445.00	393.3	37.00	40.00	6.90	SET SCREW M6-MODUDRILL	BLD T15/S7	SW6-T-SH

(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) HEAD connection size

For tools, see pages: MD-DFN-HEAD (82) • MD-DR-DH-HEAD (83)

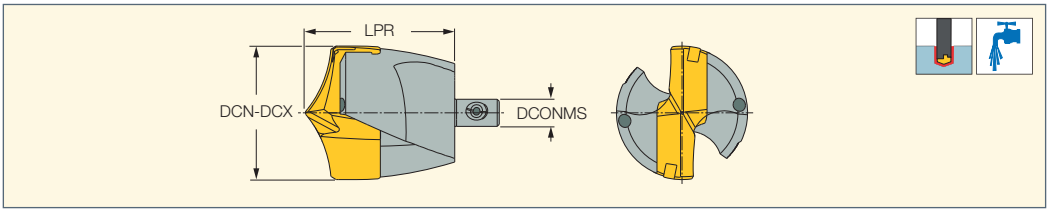
MODULAR DFN Assembly Options

Holder	Head	Pocket Range	CSI
DFN 33-36-A32-8.5-HOLDER	DFN 330 HEAD-09-33	33.00-33.50	8.5
	DFN 340 HEAD-09-33	34.00-34.50	8.5
	DFN 350 HEAD-09-33	35.00-35.50	8.5
	DFN 360 HEAD-09-33	36.00-36.50	8.5
DFN 37-40-A32-9.5-HOLDER	DFN 370 HEAD-10-33	37.00-37.50	9
	DFN 380 HEAD-10-33	38.00-38.50	9
	DFN 390 HEAD-10-33	39.00-40.00	9

MODUDRILL
MODULAR HEADS

MD-DFN-HEAD

Exchangeable Drilling Heads Carrying CHAMIQDRILL Solid Carbide Inserts



Designation	DCN(1)	DCX(2)	LPR	DCONMS	PL	SSC(3)	MIID(4)	
MD-DFN 330 HEAD	33.00	33.90	36.90	6.70	7.330	33.0	HFP 330-IQ	K DFN 30-40
MD-DFN 340 HEAD	34.00	34.90	37.20	6.70	7.620	34.0	HFP 340-IQ	K DFN 30-40
MD-DFN 350 HEAD	35.00	35.90	37.20	6.70	7.650	35.0	HFP 350-IQ	K DFN 30-40
MD-DFN 360 HEAD	36.00	36.90	37.60	6.70	8.150	36.0	HFP 360-IQ	K DFN 30-40
MD-DFN 370 HEAD	37.00	37.90	37.60	6.90	8.040	37.0	HFP 370-IQ	K DFN 30-40
MD-DFN 380 HEAD	38.00	38.90	38.00	6.90	8.200	38.0	HFP 380-IQ	K DFN 30-40
MD-DFN 390 HEAD	39.00	40.00	38.00	6.90	8.430	39.0	HFP 390-IQ	K DFN 30-40

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 84-85

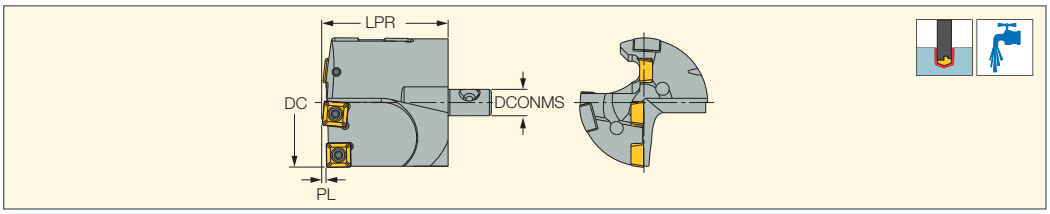
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Seat size code
(4) Master insert identification

For inserts, see pages: HFP-IQ (87)
For holders, see pages: MD-BODY (82) • MD-EXTENSION (83)

MODUDRILL
MODULAR HEADS

MD-DR-DH-HEAD

Exchangeable Drilling Heads with Guide Pads Carrying Square Inserts



Designation	DC	LPR	DCONMS	MIID[1]	MIID_2[2]	PL
MD-DR-DH 330 070606-06	33.00	33.00	6.70	SOMX 06	SOMX 07 [3]	1.000
MD-DR-DH 333 070606-06	33.30	33.00	6.70	SOMX 06	SOMX 07 [3]	1.000
MD-DR-DH 340 070606-06	34.00	33.00	6.70	SOMX 06	SOMX 07 [3]	1.000
MD-DR-DH 349 070606-06	34.90	33.00	6.70	SOMX 06	SOMX 07 [3]	1.000
MD-DR-DH 350 070606-06	35.00	33.00	6.70	SOMX 06	SOMX 07 [3]	1.000
MD-DR-DH 360 070707-06	36.00	33.00	6.70	SOMX 07	SOMX 07 [3]	1.000
MD-DR-DH 365 070707-06	36.50	33.00	6.70	SOMX 07	SOMX 07 [3]	1.000
MD-DR-DH 370 070707-06	37.00	39.00	6.90	SOMX 07	SOMX 07 [3]	1.000
MD-DR-DH 380 070707-06	38.00	39.00	6.90	SOMX 07	SOMX 07 [3]	1.000
MD-DR-DH 381 070707-06	38.10	39.00	6.90	SOMX 07	SOMX 07 [3]	1.000
MD-DR-DH 390 070707-06	39.00	39.00	6.90	SOMX 07	SOMX 07 [3]	1.000
MD-DR-DH 397 070707-06	39.70	39.00	6.90	SOMX 07	SOMX 07 [3]	1.000
MD-DR-DH 400 070707-06	40.00	40.00	6.90	SOMX 07	SOMX 07 [3]	1.000

- For user guide and cutting conditions, see pages 84-85

[1] Master insert identification

[2] Master insert identification 2

[3] Central insert

For inserts, see pages: SOMX-DT (114) • SOMX-GF (114) • SOMX-HD (115)

For holders, see pages: MD-BODY (82) • MD-EXTENSION (83)

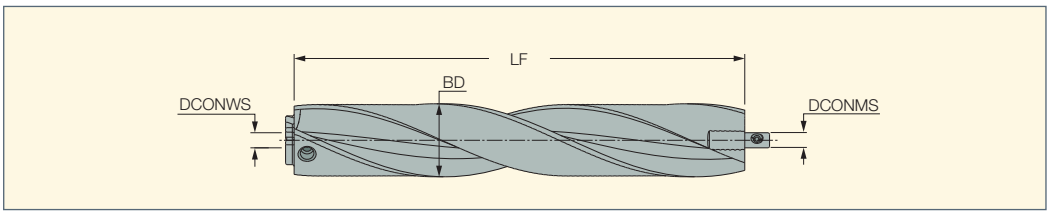
Spare Parts

Designation					
MD-DR-DH-HEAD	SR 14-560-HG	T-8/53	SR 22052/HG-P	IP-7/51	GPS-06-20-120

MODUDRILL
MODULAR HEADS

MD-EXTENSION

Modular Extension Holder to Prolong The Overall Length by 200 mm



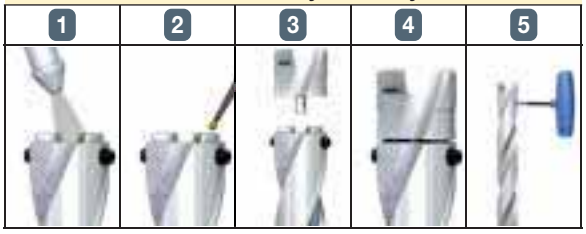
Designation	BDRED	LF	DCONWS	DCONMS
MD-EXTENSION-33-36-200	32.40	200.00	6.70	6.70
MD-EXTENSION-37-40-200	36.40	200.00	6.90	6.90

For tools, see pages: MD-DFN-HEAD (82) • MD-DR-DH-HEAD (83)

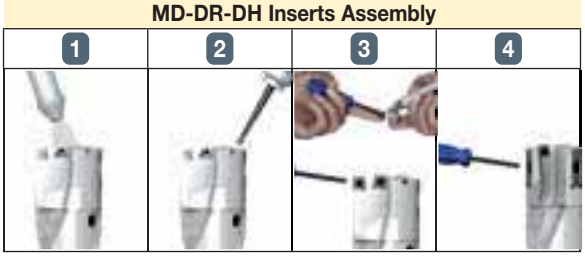
Spare Parts

Designation				
MD-EXTENSION	SET SCREW M6-MODUDRILL	SR M5X4 DIN913	BLD T15/S7	SW6-T-SH

Head and Body Assembly



MD-DR-DH Inserts Assembly

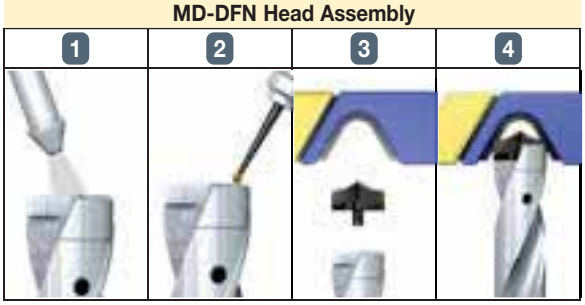


Important:

For MD-DR-DH Head

- A short pre-hole 1XD deep (minimum) with H8 hole tolerance should be prepared to guide the long drill (an endmill can be used)
- Use HD chip breaker for internal insert

MD-DFN Head Assembly

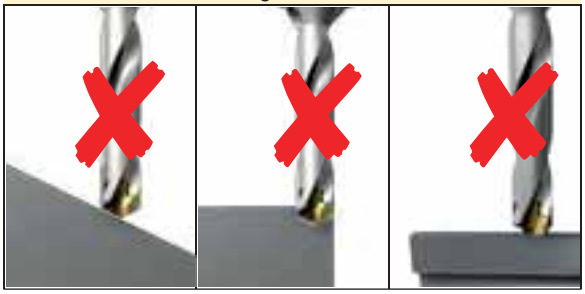


For MD-DFN Head

Max allowed Δ = 0.04 mm

Axial runout & Radial runout

Drilling Limitations



Flow Rate vs. Pressure & Drill Diameter

Drill Diameter (mm)	Pressure (bar)	Flow Rate (liter/min)
33	20	60
34	20	60
35	20	60
36	20	60
37	20	60
38	20	70
39	20	70
40	20	70

- Internal coolant supply only

MD-DR-DH Cutting Parameters

ISO	Material		Condition	Tensile Strength Rm [N/mm²]	Hardness HB	Material No.	V_c [m/min]	Feed Vs. Drill Diameter 33<ØD<40 (mm) f [mm/rev]
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	100-150	0.10-0.25
		≥ 0.25 %C	Annealed	650	190	2		
		< 0.55 %C	Quenched and tempered	850	250	3	80-150	0.15-0.30
		≥ 0.55 %C	Annealed	750	220	4		
			Quenched and tempered	1000	300	5		
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6		
			Quenched and tempered	930	275	7	70-120	0.15-0.30
				1000	300	8		
				1200	350	9		
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10	80-150	0.10-0.25
			Quenched and tempered	1100	325	11	70-120	0.10-0.25
K	Grey cast iron (GG)		Ferritic / pearlitic		180	15	180-300	0.18-0.35
			Pearlitic / martensitic		260	16		
	Nodular cast iron (GGG)		Ferritic		160	17	150-250	0.15-0.30
			Pearlitic		250	18		
	Malleable cast iron		Ferritic		130	19		0.15-0.35
			Pearlitic		230	20		

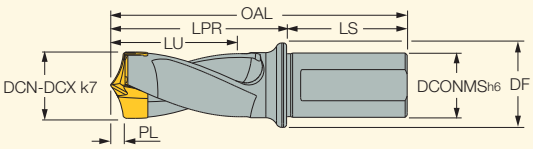
MD-DFN Cutting Parameters

ISO	Material		Condition	Tensile Strength Rm [N/mm²]	Hardness HB	Material No.	V_c [m/min]	Feed Vs. Drill Diameter 33<ØD<40 (mm) f [mm/rev]
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	80-110-140	0.30 0.40 0.50
		≥ 0.25 %C	Annealed	650	190	2	90-105-130	
		< 0.55 %C	Quenched and tempered	850	250	3	80-100-120	
		≥ 0.55 %C	Annealed	750	220	4	70-90-110	
			Quenched and tempered	1000	300	5	50-70-90	
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	80-100-120	0.30 0.40 0.50
			Quenched and tempered	930	275	7	70-90-110	
				1000	300	8	50-70-90	
				1200	350	9	40-55-70	
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10	50-70-90	0.25 0.30 0.35
			Quenched and tempered	1100	325	11	40-60-80	
K	Grey cast iron (GG)		Ferritic / pearlitic		180	15	90-125-160	0.40 0.50 0.60
			Pearlitic / martensitic		260	16	80-110-140	
	Nodular cast iron (GGG)		Ferritic		160	17	90-135-180	
			Pearlitic		250	18	80-110-140	
	Malleable cast iron		Ferritic		130	19	90-125-160	
			Pearlitic		230	20	80-110-140	

CHAMIQDRILL 700 LINE

DFN A-1.5D-IQ

Exchangeable Head Drills with Flat Shank and Internal Coolant Holes. Drilling Depth: 1.5xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC[3]	
DFN 330-050-32A-1.5D-IQ	33.00	33.90	32.00	42.00	50.0	87.5	7.330	60.0	147.50	33.0	K DFN 30-40
DFN 340-051-32A-1.5D-IQ	34.00	34.90	32.00	42.00	51.0	90.2	7.620	60.0	150.20	34.0	K DFN 30-40
DFN 350-053-32A-1.5D-IQ	35.00	35.90	32.00	42.00	53.0	92.8	7.650	60.0	152.80	35.0	K DFN 30-40
DFN 360-054-32A-1.5D-IQ	36.00	36.90	32.00	42.00	54.0	95.5	8.150	60.0	155.50	36.0	K DFN 30-40
DFN 370-056-32A-1.5D-IQ	37.00	37.90	32.00	42.00	56.0	98.1	8.040	60.0	158.10	37.0	K DFN 30-40
DFN 380-057-32A-1.5D-IQ	38.00	38.90	32.00	42.00	57.0	100.8	8.200	60.0	160.80	38.0	K DFN 30-40
DFN 390-059-32A-1.5D-IQ	39.00	40.00	32.00	42.00	59.0	103.4	8.430	60.0	163.40	39.0	K DFN 30-40

- Do not mount smaller drilling heads other than the specified range of the drill body
- For user guide and cutting conditions, see pages 89-91

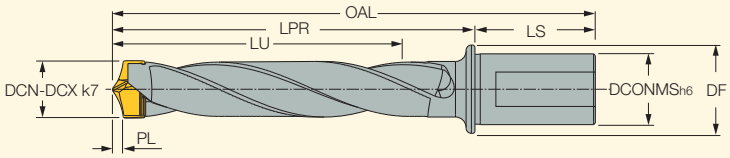
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Seat size code

For inserts, see pages: HFP-IQ (87)

CHAMIQDRILL 700 LINE

DFN A-3D-IQ

Exchangeable Head Drills with Flat Shank and Internal Coolant Holes. Drilling Depth: 3xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC[3]	
DFN 330-099-32A-3D-IQ	33.00	33.90	32.00	42.00	99.0	137.0	7.330	60.0	197.00	33.0	K DFN 30-40
DFN 340-102-32A-3D-IQ	34.00	34.90	32.00	42.00	102.0	141.2	7.620	60.0	201.20	34.0	K DFN 30-40
DFN 350-105-32A-3D-IQ	35.00	35.90	32.00	42.00	105.0	145.3	7.650	60.0	205.30	35.0	K DFN 30-40
DFN 360-108-32A-3D-IQ	36.00	36.90	32.00	42.00	108.0	149.5	8.150	60.0	209.50	36.0	K DFN 30-40
DFN 370-111-32A-3D-IQ	37.00	37.90	32.00	42.00	111.0	153.6	8.040	60.0	213.60	37.0	K DFN 30-40
DFN 380-114-32A-3D-IQ	38.00	38.90	32.00	42.00	114.0	157.8	8.200	60.0	217.80	38.0	K DFN 30-40
DFN 390-117-32A-3D-IQ	39.00	40.00	32.00	42.00	117.0	161.9	8.430	60.0	221.90	39.0	K DFN 30-40

- Do not mount smaller drilling heads other than the specified range of the drill body
- For user guide and cutting conditions, see pages 89-91

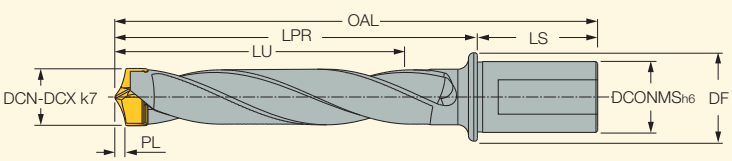
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Seat size code

For inserts, see pages: HFP-IQ (87)

CHAMIQDRILL 700 LINE

DFN A-5D-IQ

Exchangeable Head Drills with Flat Shank and Internal Coolant Holes. Drilling Depth: 5xD



Designation	DCN[1]	DCX[2]	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC[3]	
DFN 330-165-32A-5D-IQ	33.00	33.90	32.00	42.00	165.0	203.0	7.330	60.0	263.00	33.0	K DFN 30-40
DFN 340-170-32A-5D-IQ	34.00	34.90	32.00	42.00	170.0	209.2	7.620	60.0	269.20	34.0	K DFN 30-40
DFN 350-175-32A-5D-IQ	35.00	35.90	32.00	42.00	175.0	215.3	7.650	60.0	275.30	35.0	K DFN 30-40
DFN 360-180-32A-5D-IQ	36.00	36.90	32.00	42.00	180.0	221.5	8.150	60.0	281.50	36.0	K DFN 30-40
DFN 370-185-32A-5D-IQ	37.00	37.90	32.00	42.00	185.0	227.6	8.040	60.0	287.60	37.0	K DFN 30-40
DFN 380-190-32A-5D-IQ	38.00	38.90	32.00	42.00	190.0	233.8	8.200	60.0	293.80	38.0	K DFN 30-40
DFN 390-195-32A-5D-IQ	39.00	40.00	32.00	42.00	195.0	239.9	8.430	60.0	299.90	39.0	K DFN 30-40

- Do not mount smaller drilling heads other than the specified range of the drill body
- For user guide and cutting conditions, see pages 89-91

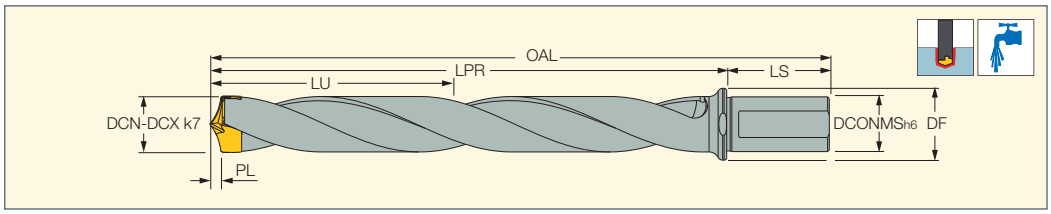
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Seat size code

For inserts, see pages: HFP-IQ (87)

CHAMIQDRILL 700 LINE

DFN A-8D-IQ

Exchangeable Head Drills with Flat Shank and Internal Coolant Holes. Drilling Depth: 8xD



Designation	DCN(1)	DCX(2)	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC(3)	
DFN 330-264-32A-8D-IQ	33.00	33.90	32.00	42.00	264.0	302.0	7.330	60.0	362.00	33.0	K DFN 30-40
DFN 340-272-32A-8D-IQ	34.00	34.90	32.00	42.00	272.0	311.2	7.620	60.0	371.20	34.0	K DFN 30-40
DFN 350-280-32A-8D-IQ	35.00	35.90	32.00	42.00	280.0	320.3	7.650	60.0	380.30	35.0	K DFN 30-40
DFN 360-288-32A-8D-IQ	36.00	36.90	32.00	42.00	288.0	329.5	8.150	60.0	389.50	36.0	K DFN 30-40
DFN 370-296-32A-8D-IQ	37.00	37.90	32.00	42.00	296.0	338.6	8.040	60.0	398.60	37.0	K DFN 30-40
DFN 380-304-32A-8D-IQ	38.00	38.90	32.00	42.00	304.0	347.8	8.200	60.0	407.80	38.0	K DFN 30-40
DFN 390-312-32A-8D-IQ	39.00	40.00	32.00	42.00	312.0	356.9	8.430	60.0	416.90	39.0	K DFN 30-40

• Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see pages 89-91

(1) Cutting diameter minimum

(2) Cutting diameter maximum

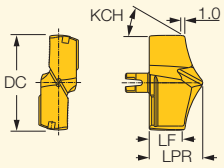
(3) Seat size code

For inserts, see pages: HFP-IQ (87)

CHAMIQDRILL 700 LINE

HFP-IQ

Exchangeable DFN Drill Heads for Carbon and Alloy Steel (ISO P) and Cast Iron (ISO K)



Designation	Dimensions					IC908
	DC	LPR	LF	SSC(1)	KCH	
HFP 330-IQ	33.00	18.50	11.2	33.0	30.0	•
HFP 331-IQ	33.10	18.50	11.2	33.0	30.0	•
HFP 332-IQ	33.20	18.50	11.2	33.0	30.0	•
HFP 333-IQ	33.30	18.50	11.2	33.0	30.0	•
HFP 334-IQ	33.40	18.50	11.2	33.0	30.0	•
HFP 335-IQ	33.50	18.50	11.2	33.0	30.0	•
HFP 339-IQ	33.90	18.50	11.2	33.0	30.0	•
HFP 340-IQ	34.00	19.70	12.1	34.0	30.0	•
HFP 343-IQ	34.30	19.70	12.1	34.0	30.0	•
HFP 345-IQ	34.50	19.70	12.1	34.0	30.0	•
HFP 349-IQ	34.90	19.70	12.1	34.0	30.0	•
HFP 350-IQ	35.00	19.70	12.1	35.0	30.0	•
HFP 355-IQ	35.50	19.70	12.1	35.0	30.0	•
HFP 360-IQ	36.00	20.80	12.7	36.0	30.0	•
HFP 362-IQ	36.20	20.80	12.7	36.0	30.0	•
HFP 364-IQ	36.40	20.80	12.7	36.0	30.0	•
HFP 365-IQ	36.50	20.80	12.7	36.0	30.0	•
HFP 370-IQ	37.00	20.80	12.8	37.0	30.0	•
HFP 375-IQ	37.50	20.80	12.8	37.0	30.0	•
HFP 380-IQ	38.00	22.00	13.8	38.0	30.0	•
HFP 381-IQ	38.10	22.00	13.8	38.0	30.0	•
HFP 385-IQ	38.50	22.00	13.8	38.0	30.0	•
HFP 390-IQ	39.00	22.00	13.6	39.0	30.0	•
HFP 392-IQ	39.20	22.00	13.6	39.0	30.0	•
HFP 395-IQ	39.50	22.00	13.6	39.0	30.0	•
HFP 397-IQ	39.70	22.00	13.6	39.0	30.0	•
HFP 400-IQ	40.00	23.00	14.4	39.0	30.0	•

• Advance self centering, and high surface finish • Intermediate sizes can be supplied on request • For user guide and cutting conditions, see pages 89-91

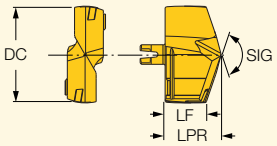
(1) Seat size code

For tools, see pages: DFN A-1.5D-IQ (86) • DFN A-3D-IQ (86) • DFN A-5D-IQ (86) • DFN A-8D-IQ (87) • MD-DFN-HEAD (82)

CHAMIQDRILL 700 LINE

IFP-IQ

Exchangeable DFN Drill Heads for Machining ISO P, ISO M and High Temp. Alloys (ISO S) Materials



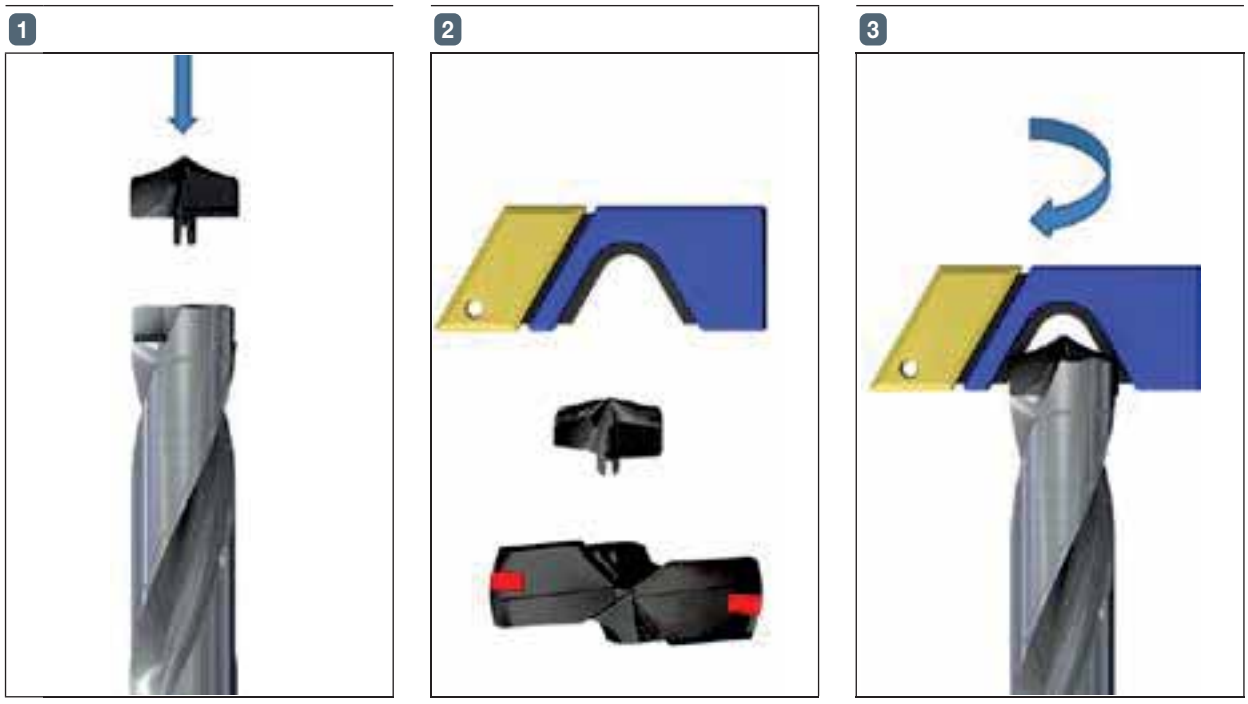
Designation	Dimensions					IC908
	DC	LPR	LF	SSC(1)	SIG	
IFP 330-IQ	33.00	18.50	13.48	33	140	●
IFP 332-IQ	33.20	18.50	13.45	33	140	●
IFP 335-IQ	33.50	18.50	13.41	33	140	●
IFP 340-IQ	34.00	19.70	14.53	34	140	●
IFP 345-IQ	34.50	19.70	14.46	34	140	●
IFP 350-IQ	35.00	19.70	14.38	35	140	●
IFP 355-IQ	35.50	19.70	14.30	35	140	●
IFP 360-IQ	36.00	20.80	15.33	36	140	●
IFP 362-IQ	36.20	20.80	15.30	36	140	●
IFP 370-IQ	37.00	20.80	15.18	37	140	●
IFP 375-IQ	37.50	20.80	15.10	37	140	●
IFP 380-IQ	38.00	22.00	16.22	38	140	●
IFP 385-IQ	38.50	22.00	16.15	38	140	●
IFP 390-IQ	39.00	22.00	16.07	39	140	●
IFP 392-IQ	39.20	22.00	16.04	39	140	●
IFP 395-IQ	39.50	22.00	16.00	39	140	●
IFP 400-IQ	40.00	22.00	15.92	40	140	●

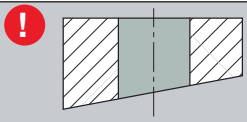
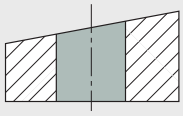
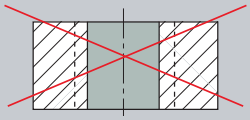
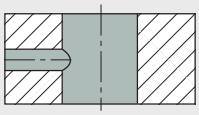
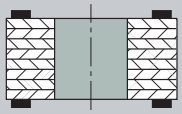
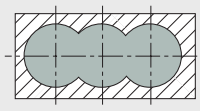
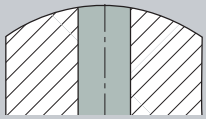
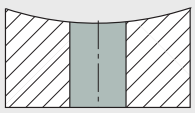
• Intermediate sizes can be supplied on request • For user guide and cutting conditions, see pages 89-91

(1) Seat size code

For tools, see pages: DFN A-1.5D-IQ (86) • DFN A-3D-IQ (86) • DFN A-5D-IQ (86) • DFN A-8D-IQ (87) • MD-DFN-HEAD (82)

Insert Clamping Instructions



1		**Exiting inclined surface** Up to 7°, reduce feed by 50-70% during exiting
2		**Entering inclined surface** Up to 7°
3		**Boring** Not possible
4		**Cross hole** Maximum cross hole diameter must be ¼ of drill diameter
5		**Stacked plates** Requires a rigid clamping
6		**Chamber** Reduce feed by 50-70%, maximum depth 3XD
7		**Convex** The radius of the penetration surface must be 4X the CHAMIQDRILL head ØD. Short pre-hole is needed
8		**Concave** Spot facing operation is needed before drilling

Cutting Condition Recommendations

Mtl. No.	V m/min	CHAMIQDRILL Feed vs. Drill Diameter D=33.0-40.0 mm/rev
1	80-**110**-140	0.30 **0.40** 0.50
2	80-**105**-130	
3	80-**100**-120	
4	70-**90**-110	
5	50-**70**-90	
6	80-**100**-120	0.30 **0.40** 0.50
7	70-**90**-110	
8	50-**70**-90	
9	40-**55**-70	
10	50-**70**-90	0.25 **0.30** 0.35
11	40-**60**-80	
15	90-**125**-160	0.40 **0.50** 0.60
16	80-**110**-140	
17	90-**135**-180	
18	80-**110**-140	
19	90-**125**-160	
20	80-**110**-140	

Recommended cutiing data

Flow Rate vs. Pressure and Drill Diameter

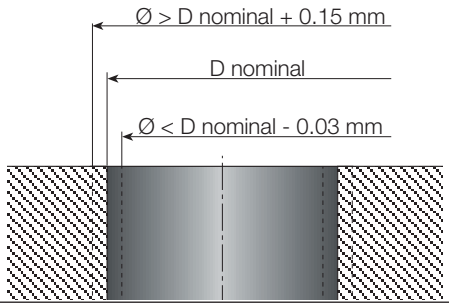
Drill Diameter (mm)	Pressure (bar)	Flow Rate (liter/min)
33	20	60
34	20	60
35	20	60
36	20	60
37	20	60
38	20	70
39	20	70
40	20	70

Indication of Drill Head Wear

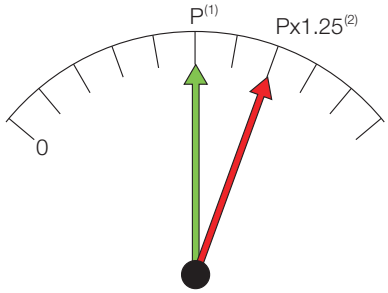
Wear Limit

0.2-0.3

Diameter Change

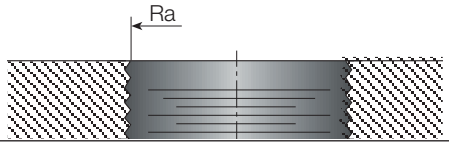


Power Restriction



(1) New drilling head
(2) Worn-out drilling head

Surface Finish Declines



Achievable Hole Tolerances

5xD Drills
Alloy and Carbon Steel and Cast Iron

Hole Geometrical Feature	What Should You Expect
Ø Diameter tolerance	+0.06 mm
Circularity ◯	0.035
Hole axis straightness (/100mm)	0.03-0.10
Surface finish ✓	0.6-3.2Ra

400 mm Modular Drills Alloy and Carbon Steel and Cast Iron

Hole Geometrical Feature	What Should You Expect
Ø Diameter tolerance	+0.06 mm
Circularity ◯	0.035
Hole axis straightness (/100mm)	0.03-0.15
Surface finish ✓	0.6-3.2Ra

Troubleshooting

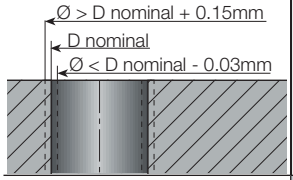
Cutting Edge Chipping
1 Check the stability of the machine spindle, tool and workpiece clamping rigidity.
2 Reduce feed rate, increase speed.
3 If the drill vibrates, reduce cutting speed and increase feed rate.
4 When drilling rough, hard or sloped surfaces (up to 7°), reduce the feed rate by 50-70% when entering and exiting.
5 Check cooling lubricant and increase coolant pressure. In case of external coolant supply, improve jet direction and add cooling jets.

Chisel Area Chipping
1 Reduce feed rate.
2 Increase coolant pressure.
3 Increase workpiece chucking force.

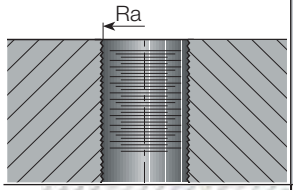
Excessive Flank Wear
1 Reduce cutting speed.
2 Increase internal coolant pressure.

Excessive Land Wear
1 Check the runout and make sure it is within 0.03 mm T.I.R. (radial and axial).
2 Reduce cutting speed.
3 When drilling rough, hard or sloped surfaces (up to 7°), reduce the feed rate by 50%-70% when entering and exiting.
4 Increase coolant pressure.
5 Check the chisel point runout and make sure it is within 0.03 mm T.I.R.
6 Increase workpiece chucking force stability and rigidity.

Built-Up Edge
1 Increase cutting speed/feed.
2 Increase coolant pressure.



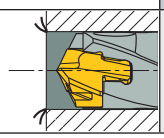
Deviation of Hole Tolerance
1 Check the runout and make sure it is within 0.03 mm T.I.R. (radial and axial cutting points).
2 Reduce feed rate.
3 Check the chisel point runout and make sure it is within 0.03 mm T.I.R.
4 Worn cutting edge. Replace head.
5 Increase workpiece chucking force.
6 Increase internal coolant pressure.



Surface Finish Too Rough
1 Check the runout and make sure it is within 0.03 mm T.I.R. (radial and axial).
2 Adjust the feed for improved chip formation.
3 In case of chip jamming - increase the coolant flow and/or reduce the cutting speed.
4 Increase the coolant pressure.
5 Check the chisel point runout and make sure it is within 0.03 mm T.I.R.
6 Use pecking cycle.
7 Replace the drilling head

Hole Not Straight
1 Drill a pre-hole for centering (check recommendations for pre-hole operation).
2 Increase coolant pressure, improve jet direction in case of external coolant supply.
3 Increase the feed.

Inaccurate Hole Position
1 Check the runout and make sure it is within 0.03 mm T.I.R. (radial and axial).
2 Check the stability of the machine spindle, tool and workpiece clamping rigidity.
3 When drilling rough, hard or sloped surfaces (up to 7°), reduce the feed rate by 50%-70% when entering.
4 Drill a pre-hole with a 140° point angle for centering.
5 Check the chisel point runout and make sure it is within 0.03 mm T.I.R.

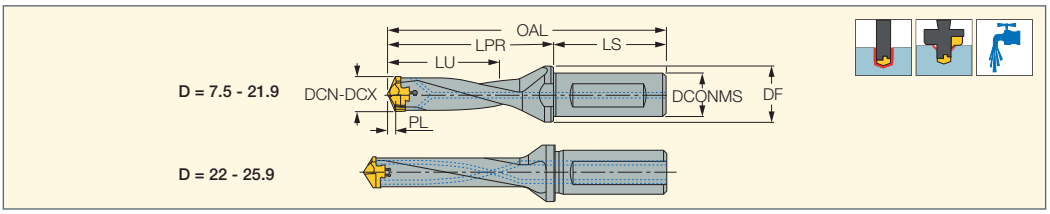


Burrs on Exit
1 Reduce the feed rate by 50%-70% when exiting.
2 Replace the worn head.

CHAMDRILL

DCM-3D (7.5-25.9 mm)

Exchangeable Head Drills with One Flat Shank, Drilling Depth 3xD



Designation	DCN(1)	DCX(2)	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC(3)	
DCM 075-022-12A-3D	7.50	7.90	12.00	16.00	22.0	33.1	1.360	45.0	78.10	8.0	K DCM- 8
DCM 080-024-12A-3D	8.00	8.40	12.00	16.00	24.0	35.0	1.460	45.0	80.00	8.0	K DCM- 8
DCM 085-025-12A-3D	8.50	8.90	12.00	16.00	25.0	37.0	1.550	45.0	82.00	8.0	K DCM- 8
DCM 090-027-12A-3D	9.00	9.40	12.00	16.00	27.0	39.1	1.640	45.0	84.10	9.0	K DCM- 9
DCM 095-028-12A-3D	9.50	9.90	12.00	16.00	28.0	41.1	1.730	45.0	86.10	9.0	K DCM- 9
DCM 100-030-16A-3D	10.00	10.40	16.00	20.00	30.0	44.0	1.820	48.0	92.00	10.0	K DCM-10
DCM 105-031-16A-3D	10.50	10.90	16.00	20.00	31.0	46.0	1.910	48.0	94.00	10.0	K DCM-10
DCM 110-033-16A-3D	11.00	11.40	16.00	20.00	33.0	48.1	2.000	48.0	96.10	11.0	K DCM-11
DCM 115-034-16A-3D	11.50	11.90	16.00	20.00	34.0	50.0	2.090	48.0	98.00	11.0	K DCM-11
DCM 120-036-16A-3D	12.00	12.40	16.00	20.00	36.0	52.2	2.180	48.0	100.20	12.0	K DCM-12
DCM 125-037-16A-3D	12.50	12.90	16.00	20.00	37.0	53.8	2.270	48.0	101.80	12.0	K DCM-12
DCM 130-039-16A-3D	13.00	13.40	16.00	20.00	39.0	56.5	2.370	48.0	104.50	13.0	K DCM-13
DCM 135-040-16A-3D	13.50	13.90	16.00	20.00	40.0	58.5	2.460	48.0	106.50	13.0	K DCM-13
DCM 140-042-16A-3D	14.00	14.40	16.00	20.00	42.0	61.2	2.550	48.0	109.20	14.0	K DCM-14
DCM 145-043-16A-3D	14.50	14.90	16.00	20.00	43.0	64.8	2.640	48.0	112.80	14.0	K DCM-14
DCM 150-045-20A-3D	15.00	15.90	20.00	25.00	45.0	65.7	2.730	50.0	115.70	15.0	K DCM-15
DCM 160-048-20A-3D	16.00	16.90	20.00	25.00	48.0	70.0	2.910	50.0	120.00	16.0	K DCM-16
DCM 170-051-20A-3D	17.00	17.90	20.00	25.00	51.0	73.5	3.090	50.0	123.50	17.0	K DCM-17
DCM 180-054-25A-3D	18.00	18.90	25.00	32.00	54.0	78.3	3.280	56.0	134.30	18.0	K DCM-18
DCM 190-057-25A-3D	19.00	19.90	25.00	32.00	57.0	82.3	3.460	56.0	138.30	19.0	K DCM-19
DCM 200-060-25A-3D	20.00	20.90	25.00	32.00	60.0	87.0	3.640	56.0	143.00	20.0	K DCM-20
DCM 210-063-25A-3D	21.00	21.90	25.00	32.00	63.0	90.8	3.820	56.0	146.80	21.0	K DCM-21
DCM 220-066-25A-3D	22.00	22.90	25.00	32.00	66.0	95.1	4.000	56.0	151.10	22.0	K DCM-22
DCM 230-069-25A-3D	23.00	23.90	25.00	32.00	69.0	99.5	4.190	56.0	155.50	23.0	K DCM-23
DCM 240-072-25A-3D	24.00	24.90	25.00	32.00	72.0	103.6	4.370	56.0	159.60	24.0	K DCM-24
DCM 250-075-25A-3D	25.00	25.90	25.00	32.00	75.0	109.0	4.550	56.0	165.00	25.0	K DCM-25

• Do not mount smaller drilling heads other than the specified range of the drill body • Drill tolerance: k7 • For user guide and cutting conditions, see pages 101-105

(1) Cutting diameter minimum

(2) Cutting diameter maximum

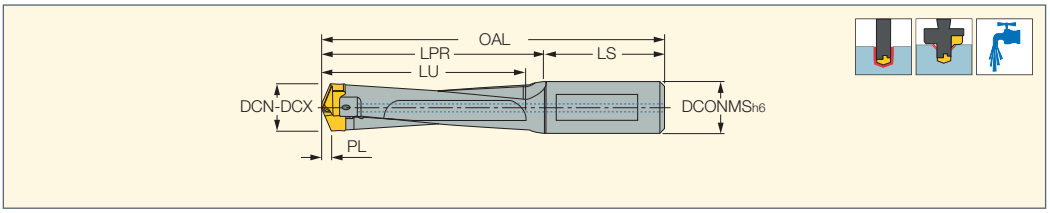
(3) Seat size code

For inserts, see pages: IDI-SG (94) • IDI-SK (98)

UNICHAMDRILL

DCM-3.5D (7.5-20.9 mm)

UNICHAMDRILL Exchangeable Head Drills without Flange and with Flat Shank, Drilling Depth 3.5xD, for Chamfering Holders



Designation	DCN(1)	DCX(2)	DCONMS	LU	LPR	PL	LS	OAL	SSC(3)	
DCM 075-026-8B-3.5D	7.50	7.90	8.00	26.0	33.7	1.360	43.0	76.70	8.0	K DCM- 8
DCM 080-028-8B-3.5D	8.00	8.40	8.00	28.0	35.9	1.460	43.0	78.90	8.0	K DCM- 8
DCM 085-029-9B-3.5D	8.50	8.90	9.00	29.0	36.8	1.549	43.0	79.90	8.0	K DCM- 8
DCM 090-031-9B-3.5D	9.00	9.40	9.00	31.0	39.1	1.640	43.0	82.10	9.0	K DCM- 9
DCM 095-033-10B-3.5D	9.50	9.90	10.00	33.0	40.3	1.730	43.0	83.30	9.0	K DCM- 9
DCM 100-033-10B-3.5D	10.00	10.40	10.00	33.0	42.9	1.829	43.0	86.00	10.0	K DCM-10
DCM 105-034-11B-3.5D	10.50	10.90	11.00	34.0	44.8	1.910	43.0	87.80	10.0	K DCM-10
DCM 110-036-11B-3.5D	11.00	11.40	11.00	36.0	46.9	2.000	43.0	89.90	11.0	K DCM-11
DCM 115-038-12B-3.5D	11.50	11.90	12.00	38.0	48.6	2.090	43.0	91.60	11.0	K DCM-11
DCM 120-042-12B-3.5D	12.00	12.40	12.00	42.0	50.8	2.184	43.0	93.80	12.0	K DCM-12
DCM 125-042-13B-3.5D	12.50	12.90	13.00	42.0	52.6	2.270	43.0	95.60	12.0	K DCM-12
DCM 130-042-13B-3.5D	13.00	13.40	13.00	42.0	54.6	2.362	45.0	99.50	13.0	K DCM-13
DCM 135-044-14B-3.5D	13.50	13.90	14.00	44.0	56.1	2.464	45.0	101.20	13.0	K DCM-13
DCM 140-048-14B-3.5D	14.00	14.40	14.00	48.0	59.2	2.540	45.0	104.20	14.0	K DCM-14
DCM 145-050-15B-3.5D	14.50	14.90	15.00	50.0	60.9	2.640	45.0	105.90	14.0	K DCM-14
DCM 150-052-15B-3.5D	15.00	15.90	15.00	52.0	63.0	2.718	45.0	108.10	15.0	K DCM-15
DCM 160-052-16B-3.5D	16.00	16.90	16.00	52.0	67.1	2.921	48.0	115.00	16.0	K DCM-16
DCM 170-055-17B-3.5D	17.00	17.90	17.00	55.0	73.6	3.090	48.0	121.60	17.0	K DCM-17
DCM 180-060-18B-3.5D	18.00	18.90	18.00	60.0	78.2	3.277	48.0	126.30	18.0	K DCM-18
DCM 190-062-19B-3.5D	19.00	19.90	19.00	62.5	81.8	3.460	54.0	135.80	19.0	K DCM-19
DCM 200-066-20B-3.5D	20.00	20.90	20.00	66.0	84.6	3.632	54.0	138.60	20.0	K DCM-20

• Do not mount smaller drilling heads other than the specified range of the drill body • Drill tolerance: k7 • For user guide and cutting conditions, see pages 101-105

(1) Cutting diameter minimum

(2) Cutting diameter maximum

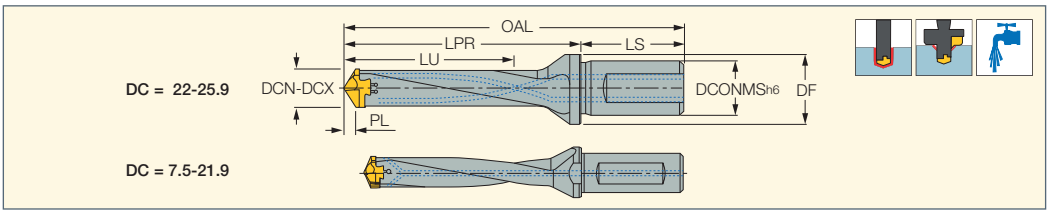
(3) Seat size code

For inserts, see pages: IDI-SG (94) • IDI-SK (98)

CHAMDRILL

DCM-5D (7.5-25.9 mm)

Exchangeable Head Drills with One Flat Shank, Drilling Depth 5xD



Designation	DCN(1)	DCX(2)	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC(3)	
DCM 075-037-12A-5D	7.50	7.90	12.00	16.00	37.0	48.1	1.360	45.0	93.10	8.0	K DCM- 8
DCM 080-040-12A-5D	8.00	8.40	12.00	16.00	40.0	51.0	1.460	45.0	96.00	8.0	K DCM- 8
DCM 085-042-12A-5D	8.50	8.90	12.00	16.00	42.0	54.0	1.550	45.0	99.00	8.0	K DCM- 8
DCM 090-045-12A-5D	9.00	9.40	12.00	16.00	45.0	57.1	1.640	45.0	102.10	9.0	K DCM- 9
DCM 095-047-12A-5D	9.50	9.90	12.00	16.00	47.0	60.1	1.730	45.0	105.10	9.0	K DCM- 9
DCM 100-050-16A-5D	10.00	10.40	16.00	20.00	50.0	64.0	1.820	48.0	112.00	10.0	K DCM-10
DCM 105-052-16A-5D	10.50	10.90	16.00	20.00	52.0	67.0	1.910	48.0	115.00	10.0	K DCM-10
DCM 110-055-16A-5D	11.00	11.40	16.00	20.00	55.0	70.1	2.000	48.0	118.10	11.0	K DCM-11
DCM 115-057-16A-5D	11.50	11.90	16.00	20.00	57.0	73.0	2.090	48.0	121.00	11.0	K DCM-11
DCM 120-060-16A-5D	12.00	12.40	16.00	20.00	60.0	76.2	2.180	48.0	124.20	12.0	K DCM-12
DCM 125-062-16A-5D	12.50	12.90	16.00	20.00	62.0	79.2	2.270	48.0	127.20	12.0	K DCM-12
DCM 130-065-16A-5D	13.00	13.40	16.00	20.00	65.0	82.5	2.370	48.0	130.50	13.0	K DCM-13
DCM 135-067-16A-5D	13.50	13.90	16.00	20.00	67.0	85.5	2.460	48.0	133.50	13.0	K DCM-13
DCM 140-070-16A-5D	14.00	14.40	16.00	20.00	70.0	89.2	2.550	48.0	137.20	14.0	K DCM-14
DCM 145-072-16A-5D	14.50	14.90	16.00	20.00	72.0	92.2	2.640	48.0	140.20	14.0	K DCM-14
DCM 150-075-20A-5D	15.00	15.90	20.00	25.00	75.0	95.7	2.730	50.0	145.70	15.0	K DCM-15
DCM 160-080-20A-5D	16.00	16.90	20.00	25.00	80.0	102.0	2.910	50.0	152.00	16.0	K DCM-16
DCM 170-085-20A-5D	17.00	17.90	20.00	25.00	85.0	107.5	3.090	50.0	157.50	17.0	K DCM-17
DCM 180-090-25A-5D	18.00	18.90	25.00	32.00	90.0	114.3	3.280	56.0	170.30	18.0	K DCM-18
DCM 190-095-25A-5D	19.00	19.90	25.00	32.00	95.0	120.3	3.460	56.0	176.30	19.0	K DCM-19
DCM 200-100-25A-5D	20.00	20.90	25.00	32.00	100.0	127.0	3.640	56.0	183.00	20.0	K DCM-20
DCM 210-105-25A-5D	21.00	21.90	25.00	32.00	105.0	132.8	3.820	56.0	188.80	21.0	K DCM-21
DCM 220-110-25A-5D	22.00	22.90	25.00	32.00	110.0	139.1	4.000	56.0	195.10	22.0	K DCM-22
DCM 230-115-25A-5D	23.00	23.90	25.00	32.00	115.0	145.5	4.190	56.0	201.50	23.0	K DCM-23
DCM 240-120-25A-5D	24.00	24.90	25.00	32.00	120.0	151.6	4.370	56.0	207.60	24.0	K DCM-24
DCM 250-125-25A-5D	25.00	25.90	25.00	32.00	125.0	159.0	4.550	56.0	215.00	25.0	K DCM-25

• Do not mount smaller drilling heads other than the specified range of the drill body • Drill tolerance: k7 • For user guide and cutting conditions, see pages 101-105

(1) Cutting diameter minimum

(2) Cutting diameter maximum

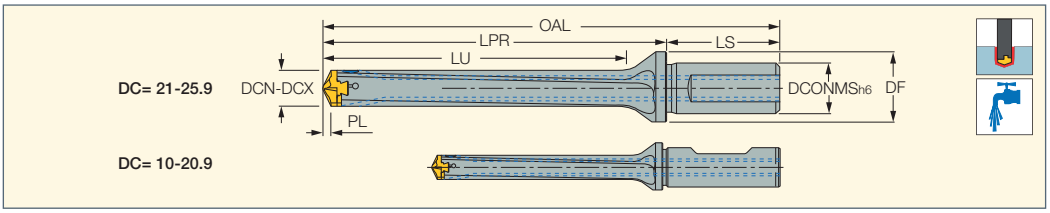
(3) Seat size code

For inserts, see pages: IDI-SG (94) • IDI-SK (98)

CHAMDRILL

DCM-8D (10-25.9 mm)

CHAMDRILL Exchangeable Head Drills with One Flat Shank, Drilling Depth: 8xD



Designation	DCN(1)	DCX(2)	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC(3)	
DCM 100-080-16A-8D	10.00	10.90	16.00	20.00	80.0	94.0	1.820	48.0	142.00	10.0	K DCM-10
DCM 110-088-16A-8D	11.00	11.90	16.00	20.00	88.0	103.2	2.000	48.0	151.20	11.0	K DCM-11
DCM 120-096-16A-8D	12.00	12.90	16.00	20.00	96.0	112.3	2.180	48.0	160.30	12.0	K DCM-12
DCM 130-104-16A-8D	13.00	13.90	16.00	20.00	104.0	121.5	2.370	48.0	169.50	13.0	K DCM-13
DCM 140-112-16A-8D	14.00	14.90	16.00	20.00	112.0	131.2	2.550	48.0	179.20	14.0	K DCM-14
DCM 150-120-20A-8D	15.00	15.90	20.00	25.00	120.0	140.7	2.730	50.0	190.70	15.0	K DCM-15
DCM 160-128-20A-8D	16.00	16.90	20.00	25.00	128.0	150.0	2.910	50.0	200.00	16.0	K DCM-16
DCM 170-136-20A-8D	17.00	17.90	20.00	25.00	136.0	158.5	3.090	50.0	208.50	17.0	K DCM-17
DCM 180-144-25A-8D	18.00	18.90	25.00	32.00	144.0	168.3	3.280	56.0	224.30	18.0	K DCM-18
DCM 190-152-25A-8D	19.00	19.90	25.00	32.00	152.0	177.3	3.460	56.0	233.30	19.0	K DCM-19
DCM 200-160-25A-8D	20.00	20.90	25.00	32.00	160.0	187.2	3.640	56.0	243.20	20.0	K DCM-20
DCM 210-168-25A-8D	21.00	21.90	25.00	32.00	168.0	196.2	3.820	56.0	252.20	21.0	K DCM-21
DCM 220-176-25A-8D	22.00	22.90	25.00	32.00	176.0	205.2	4.000	56.0	261.20	22.0	K DCM-22
DCM 230-184-25A-8D	23.00	23.90	25.00	32.00	184.0	215.1	4.190	56.0	271.10	23.0	K DCM-23
DCM 240-192-25A-8D	24.00	24.90	25.00	32.00	192.0	224.5	4.370	56.0	280.50	24.0	K DCM-24
DCM 250-200-25A-8D	25.00	25.90	25.00	32.00	200.0	233.7	4.550	56.0	289.70	25.0	K DCM-25

• Do not mount smaller drilling heads other than the specified range of the drill body • Drill tolerance: k7 • For user guide and cutting conditions, see pages 101-105

(1) Cutting diameter minimum

(2) Cutting diameter maximum

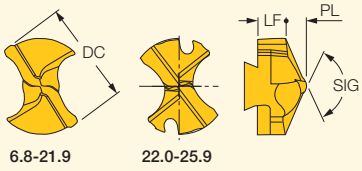
(3) Seat size code

For inserts, see pages: IDI-SG (94) • IDI-SK (98)

CHAMDRILL

IDI-SG

General Use DCM Drill Heads



Designation	Dimensions					IC908
	DC	LF	PL	SIG	SSC(1)	
IDI 068-SG	6.80	2.86	1.240	140	6.8	•
IDI 075-SG	7.50	2.74	1.360	140	8.0	•
IDI 076-SG	7.60	2.72	1.380	140	8.0	•
IDI 077-SG	7.70	2.70	1.400	140	8.0	•
IDI 078-SG	7.80	2.68	1.420	140	8.0	•
IDI 079-SG	7.90	2.66	1.440	140	8.0	•
IDI 080-SG	8.00	2.64	1.460	140	8.0	•
IDI 081-SG	8.10	2.63	1.470	140	8.0	•
IDI 082-SG	8.20	2.61	1.490	140	8.0	•
IDI 083-SG	8.30	2.59	1.510	140	8.0	•
IDI 084-SG	8.40	2.57	1.530	140	8.0	•
IDI 085-SG	8.50	2.55	1.550	140	8.0	•
IDI 086-SG	8.60	2.53	1.570	140	8.0	•
IDI 087-SG	8.70	2.52	1.580	140	8.0	•
IDI 088-SG	8.80	2.50	1.600	140	8.0	•
IDI 089-SG	8.90	2.48	1.620	140	8.0	•
IDI 090-SG	9.00	2.66	1.640	140	9.0	•
IDI 091-SG	9.10	2.64	1.660	140	9.0	•
IDI 092-SG	9.20	2.63	1.670	140	9.0	•
IDI 093-SG	9.30	2.61	1.690	140	9.0	•
IDI 094-SG	9.40	2.59	1.710	140	9.0	•
IDI 095-SG	9.50	2.57	1.730	140	9.0	•
IDI 096-SG	9.60	2.55	1.750	140	9.0	•
IDI 097-SG	9.70	2.53	1.770	140	9.0	•
IDI 098-SG	9.80	2.52	1.780	140	9.0	•
IDI 099-SG	9.90	2.50	1.800	140	9.0	•
IDI 100-SG	10.00	3.48	1.820	140	10.0	•
IDI 101-SG	10.10	3.46	1.840	140	10.0	•
IDI 102-SG	10.20	3.44	1.860	140	10.0	•
IDI 103-SG	10.30	3.43	1.870	140	10.0	•
IDI 104-SG	10.40	3.41	1.890	140	10.0	•
IDI 105-SG	10.50	3.39	1.910	140	10.0	•
IDI 106-SG	10.60	3.37	1.930	140	10.0	•
IDI 107-SG	10.70	3.35	1.950	140	10.0	•
IDI 108-SG	10.80	3.33	1.970	140	10.0	•
IDI 109-SG	10.90	3.32	1.980	140	10.0	•
IDI 110-SG	11.00	3.50	2.000	140	11.0	•
IDI 111-SG	11.10	3.48	2.020	140	11.0	•
IDI 112-SG	11.20	3.46	2.040	140	11.0	•
IDI 113-SG	11.30	3.44	2.060	140	11.0	•
IDI 114-SG	11.40	3.43	2.070	140	11.0	•
IDI 115-SG	11.50	3.41	2.090	140	11.0	•
IDI 116-SG	11.60	3.39	2.110	140	11.0	•
IDI 117-SG	11.70	3.37	2.130	140	11.0	•
IDI 118-SG	11.80	3.35	2.150	140	11.0	•
IDI 119-SG	11.90	3.33	2.170	140	11.0	•
IDI 120-SG	12.00	3.62	2.180	140	12.0	•
IDI 121-SG	12.10	3.60	2.200	140	12.0	•
IDI 122-SG	12.20	3.58	2.220	140	12.0	•
IDI 123-SG	12.30	3.56	2.240	140	12.0	•
IDI 124-SG	12.40	3.54	2.260	140	12.0	•
IDI 125-SG	12.50	3.53	2.270	140	12.0	•
IDI 126-SG	12.60	3.51	2.290	140	12.0	•
IDI 127-SG	12.70	3.49	2.310	140	12.0	•
IDI 128-SG	12.80	3.47	2.330	140	12.0	•
IDI 129-SG	12.90	3.45	2.350	140	12.0	•

• For cutting conditions see pages 101-105

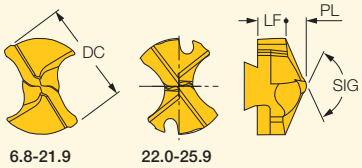
(1) Seat size code

For tools, see pages: DCM-3.5D (7.5-20.9 mm) (92) • DCM-3D (7.5-25.9 mm) (92) • DCM-5D (7.5-25.9 mm) (93) • DCM-8D (10-25.9 mm) (93) • DCT (M8-M24) (134)

CHAMDRILL

IDI-SG (continued)

General Use DCM Drill Heads



Designation	Dimensions					IC908
	DC	LF	PL	SIG	SSC(1)	
IDI 130-SG	13.00	3.63	2.370	140	13.0	•
IDI 131-SG	13.10	3.62	2.380	140	13.0	•
IDI 132-SG	13.20	3.60	2.400	140	13.0	•
IDI 133-SG	13.30	3.58	2.420	140	13.0	•
IDI 134-SG	13.40	3.56	2.440	140	13.0	•
IDI 135-SG	13.50	3.54	2.460	140	13.0	•
IDI 136-SG	13.60	3.53	2.470	140	13.0	•
IDI 137-SG	13.70	3.51	2.490	140	13.0	•
IDI 138-SG	13.80	3.49	2.510	140	13.0	•
IDI 139-SG	13.90	3.47	2.530	140	13.0	•
IDI 140-SG	14.00	4.25	2.550	140	14.0	•
IDI 141-SG	14.10	4.23	2.570	140	14.0	•
IDI 142-SG	14.20	4.22	2.580	140	14.0	•
IDI 143-SG	14.30	4.20	2.600	140	14.0	•
IDI 144-SG	14.40	4.18	2.620	140	14.0	•
IDI 145-SG	14.50	4.16	2.640	140	14.0	•
IDI 146-SG	14.60	4.14	2.660	140	14.0	•
IDI 147-SG	14.70	4.12	2.680	140	14.0	•
IDI 148-SG	14.80	4.11	2.690	140	14.0	•
IDI 149-SG	14.90	4.09	2.710	140	14.0	•
IDI 150-SG	15.00	4.67	2.730	140	15.0	•
IDI 151-SG	15.10	4.65	2.750	140	15.0	•
IDI 152-SG	15.20	4.63	2.770	140	15.0	•
IDI 153-SG	15.30	4.62	2.780	140	15.0	•
IDI 154-SG	15.40	4.60	2.800	140	15.0	•
IDI 155-SG	15.50	4.58	2.820	140	15.0	•
IDI 156-SG	15.60	4.56	2.840	140	15.0	•
IDI 157-SG	15.70	4.54	2.860	140	15.0	•
IDI 158-SG	15.80	4.52	2.880	140	15.0	•
IDI 159-SG	15.90	4.51	2.890	140	15.0	•
IDI 160-SG	16.00	4.99	2.910	140	16.0	•
IDI 161-SG	16.10	4.97	2.930	140	16.0	•
IDI 162-SG	16.20	4.95	2.950	140	16.0	•
IDI 163-SG	16.30	4.93	2.970	140	16.0	•
IDI 164-SG	16.40	4.92	2.980	140	16.0	•
IDI 165-SG	16.50	4.90	3.000	140	16.0	•
IDI 166-SG	16.60	4.88	3.020	140	16.0	•
IDI 167-SG	16.70	4.86	3.040	140	16.0	•
IDI 168-SG	16.80	4.84	3.060	140	16.0	•
IDI 169-SG	16.90	4.82	3.080	140	16.0	•
IDI 170-SG	17.00	4.31	3.090	140	17.0	•
IDI 171-SG	17.10	4.29	3.110	140	17.0	•
IDI 172-SG	17.20	4.27	3.130	140	17.0	•
IDI 173-SG	17.30	4.25	3.150	140	17.0	•
IDI 174-SG	17.40	4.23	3.170	140	17.0	•
IDI 175-SG	17.50	4.22	3.180	140	17.0	•
IDI 176-SG	17.60	4.20	3.200	140	17.0	•
IDI 177-SG	17.70	4.18	3.220	140	17.0	•
IDI 178-SG	17.80	4.16	3.240	140	17.0	•
IDI 179-SG	17.90	4.14	3.260	140	17.0	•
IDI 180-SG	18.00	5.02	3.280	140	18.0	•
IDI 181-SG	18.10	5.01	3.290	140	18.0	•
IDI 182-SG	18.20	4.99	3.310	140	18.0	•
IDI 183-SG	18.30	4.97	3.330	140	18.0	•
IDI 184-SG	18.40	4.95	3.350	140	18.0	•
IDI 185-SG	18.50	4.93	3.370	140	18.0	•
IDI 186-SG	18.60	4.92	3.380	140	18.0	•

• For cutting conditions see pages 101-105

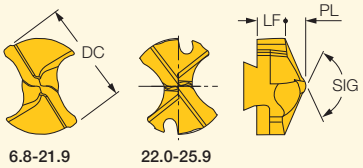
(1) Seat size code

For tools, see pages: DCM-3.5D (7.5-20.9 mm) (92) • DCM-3D (7.5-25.9 mm) (92) • DCM-5D (7.5-25.9 mm) (93) • DCM-8D (10-25.9 mm) (93) • DCT (M8-M24) (134)

CHAMDRILL

IDI-SG (continued)

General Use DCM Drill Heads



Designation	Dimensions					IC908
	DC	LF	PL	SIG	SSC(1)	
IDI 187-SG	18.70	4.90	3.400	140	18.0	•
IDI 188-SG	18.80	4.88	3.420	140	18.0	•
IDI 189-SG	18.90	4.86	3.440	140	18.0	•
IDI 190-SG	19.00	5.04	3.460	140	19.0	•
IDI 1905-SG	19.05	5.03	3.470	140	19.0	•
IDI 191-SG	19.10	5.02	3.480	140	19.0	•
IDI 192-SG	19.20	5.01	3.490	140	19.0	•
IDI 193-SG	19.30	4.99	3.510	140	19.0	•
IDI 194-SG	19.40	4.97	3.530	140	19.0	•
IDI 195-SG	19.50	4.95	3.550	140	19.0	•
IDI 196-SG	19.60	4.93	3.570	140	19.0	•
IDI 197-SG	19.70	4.91	3.590	140	19.0	•
IDI 198-SG	19.80	4.90	3.600	140	19.0	•
IDI 199-SG	19.90	4.88	3.620	140	19.0	•
IDI 200-SG	20.00	5.66	3.640	140	20.0	•
IDI 201-SG	20.10	5.64	3.660	140	20.0	•
IDI 202-SG	20.20	5.62	3.680	140	20.0	•
IDI 203-SG	20.30	5.61	3.690	140	20.0	•
IDI 204-SG	20.40	5.59	3.710	140	20.0	•
IDI 205-SG	20.50	5.57	3.730	140	20.0	•
IDI 206-SG	20.60	5.55	3.750	140	20.0	•
IDI 207-SG	20.70	5.53	3.770	140	20.0	•
IDI 208-SG	20.80	5.51	3.790	140	20.0	•
IDI 209-SG	20.90	5.50	3.800	140	20.0	•
IDI 210-SG	21.00	5.68	3.820	140	21.0	•
IDI 211-SG	21.10	5.66	3.840	140	21.0	•
IDI 212-SG	21.20	5.64	3.860	140	21.0	•
IDI 213-SG	21.30	5.62	3.880	140	21.0	•
IDI 214-SG	21.40	5.61	3.890	140	21.0	•
IDI 215-SG	21.50	5.59	3.910	140	21.0	•
IDI 216-SG	21.60	5.57	3.930	140	21.0	•
IDI 217-SG	21.70	5.55	3.950	140	21.0	•
IDI 218-SG	21.80	5.53	3.970	140	21.0	•
IDI 219-SG	21.90	5.51	3.990	140	21.0	•
IDI 220-SG	22.00	6.30	4.000	140	22.0	•
IDI 221-SG	22.10	6.28	4.020	140	22.0	•
IDI 222-SG	22.20	6.30	4.000	140	22.0	•
IDI 2222-SG	22.22	6.26	4.040	140	22.0	•
IDI 223-SG	22.30	6.24	4.060	140	22.0	•
IDI 224-SG	22.40	6.22	4.080	140	22.0	•
IDI 225-SG	22.50	6.21	4.090	140	22.0	•
IDI 226-SG	22.60	6.19	4.110	140	22.0	•
IDI 227-SG	22.70	6.17	4.130	140	22.0	•
IDI 228-SG	22.80	6.15	4.150	140	22.0	•
IDI 229-SG	22.90	6.13	4.170	140	22.0	•
IDI 230-SG	23.00	6.21	4.190	140	23.0	•
IDI 231-SG	23.10	6.20	4.200	140	23.0	•
IDI 232-SG	23.20	6.18	4.220	140	23.0	•
IDI 233-SG	23.30	6.16	4.240	140	23.0	•
IDI 234-SG	23.40	6.14	4.260	140	23.0	•
IDI 235-SG	23.50	6.12	4.280	140	23.0	•
IDI 237-SG	23.70	6.09	4.310	140	23.0	•
IDI 238-SG	23.80	6.07	4.330	140	23.0	•
IDI 239-SG	23.90	6.05	4.350	140	23.0	•
IDI 240-SG	24.00	6.43	4.370	140	24.0	•
IDI 241-SG	24.10	6.41	4.390	140	24.0	•
IDI 242-SG	24.20	6.40	4.400	140	24.0	•

• For cutting conditions see pages 101-105

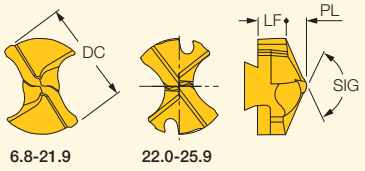
(1) Seat size code

For tools, see pages: DCM-3.5D (7.5-20.9 mm) (92) • DCM-3D (7.5-25.9 mm) (92) • DCM-5D (7.5-25.9 mm) (93) • DCM-8D (10-25.9 mm) (93) • DCT (M8-M24) (134)

CHAMDRILL

IDI-SG (continued)

General Use DCM Drill Heads



Designation	Dimensions					IC908
	DC	LF	PL	SIG	SSC(1)	
IDI 243-SG	24.30	6.38	4.420	140	24.0	●
IDI 244-SG	24.40	6.36	4.440	140	24.0	●
IDI 245-SG	24.50	6.34	4.460	140	24.0	●
IDI 246-SG	24.60	6.32	4.480	140	24.0	●
IDI 247-SG	24.70	6.30	4.500	140	24.0	●
IDI 248-SG	24.80	6.29	4.510	140	24.0	●
IDI 249-SG	24.90	6.27	4.530	140	24.0	●
IDI 250-SG	25.00	6.45	4.550	140	25.0	●
IDI 251-SG	25.10	6.43	4.570	140	25.0	●
IDI 252-SG	25.20	6.41	4.590	140	25.0	●
IDI 253-SG	25.30	6.40	4.600	140	25.0	●
IDI 254-SG	25.40	6.38	4.620	140	25.0	●
IDI 255-SG	25.50	6.36	4.640	140	25.0	●
IDI 256-SG	25.60	6.34	4.660	140	25.0	●
IDI 257-SG	25.70	6.32	4.680	140	25.0	●
IDI 258-SG	25.80	6.30	4.700	140	25.0	●
IDI 259-SG	25.90	6.29	4.710	140	25.0	●

• For cutting conditions see pages 101-105

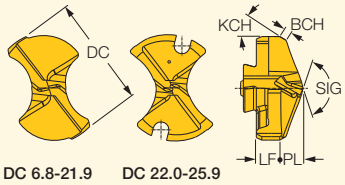
(1) Seat size code

For tools, see pages: DCM-3.5D (7.5-20.9 mm) (92) • DCM-3D (7.5-25.9 mm) (92) • DCM-5D (7.5-25.9 mm) (93) • DCM-8D (10-25.9 mm) (93) • DCT (M8-M24) (134)

CHAMDRILL

IDI-SK

DCM Drill Heads for Cast Iron



Designation	Dimensions							IC908
	DC	LF	PL	BCH	KCH	SIG	SSC(1)	
IDI 068-SK	6.80	2.86	1.240	0.48	30.0	140	6.8	•
IDI 080-SK	8.00	2.64	1.460	0.56	30.0	140	8.0	•
IDI 081-SK	8.10	2.63	1.470	0.57	30.0	140	8.0	•
IDI 085-SK	8.50	2.55	1.550	0.60	30.0	140	8.0	•
IDI 087-SK	8.70	2.52	1.580	0.61	30.0	140	8.0	•
IDI 088-SK	8.80	2.50	1.600	0.62	30.0	140	8.0	•
IDI 090-SK	9.00	2.66	1.640	0.63	30.0	140	9.0	•
IDI 091-SK	9.10	2.64	1.660	0.64	30.0	140	9.0	•
IDI 095-SK	9.50	2.57	1.730	0.67	30.0	140	9.0	•
IDI 100-SK	10.00	3.48	1.820	0.70	30.0	140	10.0	•
IDI 102-SK	10.20	3.44	1.860	0.71	30.0	140	10.0	•
IDI 103-SK	10.30	3.43	1.870	0.72	30.0	140	10.0	•
IDI 105-SK	10.50	3.39	1.910	0.74	30.0	140	10.0	•
IDI 106-SK	10.60	3.37	1.930	0.74	30.0	140	10.0	•
IDI 107-SK	10.70	3.35	1.950	0.75	30.0	140	10.0	•
IDI 108-SK	10.80	3.33	1.970	0.76	30.0	140	10.0	•
IDI 109-SK	10.90	3.32	1.980	0.76	30.0	140	10.0	•
IDI 110-SK	11.00	3.50	2.000	0.77	30.0	140	11.0	•
IDI 111-SK	11.10	3.48	2.020	0.78	30.0	140	11.0	•
IDI 112-SK	11.20	3.46	2.040	0.78	30.0	140	11.0	•
IDI 113-SK	11.30	3.44	2.060	0.79	30.0	140	11.0	•
IDI 115-SK	11.50	3.41	2.090	0.81	30.0	140	11.0	•
IDI 116-SK	11.60	3.39	2.110	0.81	30.0	140	11.0	•
IDI 118-SK	11.80	3.35	2.150	0.83	30.0	140	11.0	•
IDI 120-SK	12.00	3.62	2.180	0.84	30.0	140	12.0	•
IDI 122-SK	12.20	3.58	2.220	0.85	30.0	140	12.0	•
IDI 123-SK	12.30	3.56	2.240	0.86	30.0	140	12.0	•
IDI 124-SK	12.40	3.54	2.260	0.87	30.0	140	12.0	•
IDI 125-SK	12.50	3.53	2.270	0.88	30.0	140	12.0	•
IDI 127-SK	12.70	3.49	2.310	0.89	30.0	140	12.0	•
IDI 130-SK	13.00	3.63	2.370	0.91	30.0	140	13.0	•
IDI 131-SK	13.10	3.62	2.380	0.92	30.0	140	13.0	•
IDI 132-SK	13.20	3.60	2.400	0.92	30.0	140	13.0	•
IDI 133-SK	13.30	3.58	2.420	0.93	30.0	140	13.0	•
IDI 135-SK	13.50	3.54	2.460	0.95	30.0	140	13.0	•
IDI 136-SK	13.60	3.53	2.470	0.95	30.0	140	13.0	•
IDI 137-SK	13.70	3.51	2.490	0.96	30.0	140	13.0	•
IDI 138-SK	13.80	3.49	2.510	0.97	30.0	140	13.0	•
IDI 139-SK	13.90	3.47	2.530	0.97	30.0	140	13.0	•
IDI 140-SK	14.00	4.25	2.550	0.98	30.0	140	14.0	•
IDI 141-SK	14.10	4.23	2.570	0.99	30.0	140	14.0	•
IDI 142-SK	14.20	4.22	2.580	0.99	30.0	140	14.0	•
IDI 143-SK	14.30	4.20	2.600	1.00	30.0	140	14.0	•
IDI 144-SK	14.40	4.18	2.620	1.01	30.0	140	14.0	•
IDI 145-SK	14.50	4.16	2.640	1.02	30.0	140	14.0	•
IDI 146-SK	14.60	4.14	2.660	1.02	30.0	140	14.0	•
IDI 147-SK	14.70	4.12	2.680	1.03	30.0	140	14.0	•
IDI 148-SK	14.80	4.11	2.690	1.04	30.0	140	14.0	•
IDI 150-SK	15.00	4.67	2.730	1.05	30.0	140	15.0	•
IDI 151-SK	15.10	4.65	2.750	1.06	30.0	140	15.0	•
IDI 152-SK	15.20	4.63	2.770	1.06	30.0	140	15.0	•
IDI 153-SK	15.30	4.62	2.780	1.07	30.0	140	15.0	•
IDI 154-SK	15.40	4.60	2.800	1.08	30.0	140	15.0	•
IDI 155-SK	15.50	4.58	2.820	1.09	30.0	140	15.0	•
IDI 156-SK	15.60	4.56	2.840	1.09	30.0	140	15.0	•
IDI 157-SK	15.70	4.54	2.860	1.10	30.0	140	15.0	•

• For cutting conditions see pages 101-105

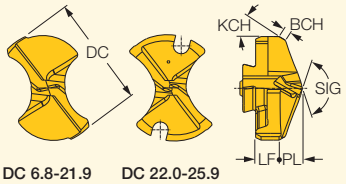
(1) Seat size code

For tools, see pages: DCM-3.5D (7.5-20.9 mm) (92) • DCM-3D (7.5-25.9 mm) (92) • DCM-5D (7.5-25.9 mm) (93) • DCM-8D (10-25.9 mm) (93) • DCT (M8-M24) (134)

CHAMDRILL

IDI-SK (continued)

DCM Drill Heads for Cast Iron



DC 6.8-21.9 DC 22.0-25.9

Designation	Dimensions							IC908
	DC	LF	PL	BCH	KCH	SIG	SSC(1)	
IDI 158-SK	15.80	5.02	2.880	1.11	30.0	140	15.0	•
IDI 159-SK	15.90	5.01	2.890	1.11	30.0	140	15.0	•
IDI 160-SK	16.00	4.99	2.910	1.12	30.0	140	16.0	•
IDI 161-SK	16.10	4.97	2.930	1.13	30.0	140	16.0	•
IDI 162-SK	16.20	4.95	2.950	1.13	30.0	140	16.0	•
IDI 163-SK	16.30	4.93	2.970	1.14	30.0	140	16.0	•
IDI 165-SK	16.50	4.90	3.000	1.16	30.0	140	16.0	•
IDI 166-SK	16.60	4.88	3.020	1.16	30.0	140	16.0	•
IDI 167-SK	16.70	4.86	3.040	1.17	30.0	140	16.0	•
IDI 168-SK	16.80	4.84	3.060	1.18	30.0	140	16.0	•
IDI 169-SK	16.90	4.82	3.080	1.18	30.0	140	16.0	•
IDI 170-SK	17.00	4.31	3.090	1.19	30.0	140	17.0	•
IDI 171-SK	17.10	4.29	3.110	1.20	30.0	140	17.0	•
IDI 172-SK	17.20	4.27	3.130	1.20	30.0	140	17.0	•
IDI 173-SK	17.30	4.25	3.150	1.21	30.0	140	17.0	•
IDI 174-SK	17.40	4.23	3.170	1.22	30.0	140	17.0	•
IDI 175-SK	17.50	4.22	3.180	1.23	30.0	140	17.0	•
IDI 176-SK	17.60	4.20	3.200	1.23	30.0	140	17.0	•
IDI 177-SK	17.70	4.18	3.220	1.24	30.0	140	17.0	•
IDI 178-SK	17.80	4.16	3.240	1.25	30.0	140	17.0	•
IDI 179-SK	17.90	4.14	3.260	1.25	30.0	140	17.0	•
IDI 180-SK	18.00	5.02	3.280	1.26	30.0	140	18.0	•
IDI 181-SK	18.10	5.01	3.290	1.27	30.0	140	18.0	•
IDI 182-SK	18.20	4.99	3.310	1.27	30.0	140	18.0	•
IDI 183-SK	18.30	4.97	3.330	1.28	30.0	140	18.0	•
IDI 185-SK	18.50	4.93	3.370	1.30	30.0	140	18.0	•
IDI 186-SK	18.60	4.92	3.380	1.30	30.0	140	18.0	•
IDI 187-SK	18.70	4.90	3.400	1.31	30.0	140	18.0	•
IDI 188-SK	18.80	4.88	3.420	1.32	30.0	140	18.0	•
IDI 190-SK	19.00	5.04	3.460	1.33	30.0	140	19.0	•
IDI 1905-SK	19.05	5.03	3.470	1.33	30.0	140	19.0	•
IDI 191-SK	19.10	5.02	3.480	1.34	30.0	140	19.0	•
IDI 194-SK	19.40	4.97	3.530	1.36	30.0	140	19.0	•
IDI 195-SK	19.50	4.95	3.550	1.37	30.0	140	19.0	•
IDI 197-SK	19.70	4.91	3.590	1.38	30.0	140	19.0	•
IDI 198-SK	19.80	4.90	3.600	1.39	30.0	140	19.0	•
IDI 200-SK	20.00	5.66	3.640	1.40	30.0	140	20.0	•
IDI 201-SK	20.10	5.64	3.660	1.41	30.0	140	20.0	•
IDI 202-SK	20.20	5.62	3.680	1.41	30.0	140	20.0	•
IDI 203-SK	20.30	5.61	3.690	1.42	30.0	140	20.0	•
IDI 205-SK	20.50	5.57	3.730	1.44	30.0	140	20.0	•
IDI 206-SK	20.60	5.55	3.750	1.44	30.0	140	20.0	•
IDI 210-SK	21.00	5.68	3.820	1.47	30.0	140	21.0	•
IDI 211-SK	21.10	5.66	3.840	1.48	30.0	140	21.0	•
IDI 212-SK	21.20	5.64	3.860	1.48	30.0	140	21.0	•
IDI 214-SK	21.40	5.61	3.890	1.50	30.0	140	21.0	•
IDI 215-SK	21.50	5.59	3.910	1.51	30.0	140	21.0	•
IDI 216-SK	21.60	5.57	3.930	1.51	30.0	140	21.0	•
IDI 217-SK	21.70	5.55	3.950	1.52	30.0	140	21.0	•
IDI 219-SK	21.90	5.51	3.990	1.53	30.0	140	21.0	•
IDI 220-SK	22.00	6.30	4.000	1.54	30.0	140	22.0	•
IDI 221-SK	22.10	6.28	4.020	1.55	30.0	140	22.0	•
IDI 223-SK	22.30	6.24	4.060	1.56	30.0	140	22.0	•
IDI 224-SK	22.40	6.22	4.080	1.57	30.0	140	22.0	•
IDI 225-SK	22.50	6.21	4.090	1.58	30.0	140	22.0	•
IDI 230-SK	23.00	6.21	4.190	1.61	30.0	140	23.0	•
IDI 231-SK	23.10	6.20	4.200	1.62	30.0	140	23.0	•

• For cutting conditions see pages 101-105

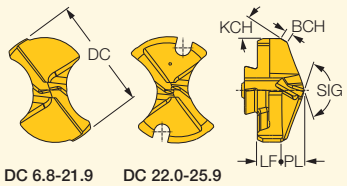
(1) Seat size code

For tools, see pages: DCM-3.5D (7.5-20.9 mm) (92) • DCM-3D (7.5-25.9 mm) (92) • DCM-5D (7.5-25.9 mm) (93) • DCM-8D (10-25.9 mm) (93) • DCT (M8-M24) (134)

CHAMDRILL

IDI-SK (continued)

DCM Drill Heads for Cast Iron



Designation	Dimensions							IC908
	DC	LF	PL	BCH	KCH	SIG	SSC[1]	
IDI 232-SK	23.20	6.18	4.220	1.62	30.0	140	23.0	●
IDI 234-SK	23.40	6.14	4.260	1.64	30.0	140	23.0	●
IDI 236-SK	23.60	6.11	4.290	1.65	30.0	140	23.0	●
IDI 237-SK	23.70	6.09	4.310	1.66	30.0	140	23.0	●
IDI 238-SK	23.80	6.07	4.330	1.67	30.0	140	23.0	●
IDI 240-SK	24.00	6.43	4.370	1.68	30.0	140	24.0	●
IDI 241-SK	24.10	6.41	4.390	1.69	30.0	140	24.0	●
IDI 243-SK	24.30	6.38	4.420	1.70	30.0	140	24.0	●
IDI 244-SK	24.40	6.36	4.440	1.71	30.0	140	24.0	●
IDI 245-SK	24.50	6.34	4.460	1.72	30.0	140	24.0	●
IDI 249-SK	24.90	6.27	4.530	1.74	30.0	140	24.0	●
IDI 250-SK	25.00	6.45	4.550	1.75	30.0	140	25.0	●
IDI 251-SK	25.10	6.43	4.570	1.76	30.0	140	25.0	●
IDI 254-SK	25.40	6.38	4.620	1.78	30.0	140	25.0	●
IDI 255-SK	25.50	6.36	4.640	1.79	30.0	140	25.0	●
IDI 258-SK	25.80	6.30	4.700	1.81	30.0	140	25.0	●
IDI 259-SK	25.90	6.29	4.710	1.81	30.0	140	25.0	●

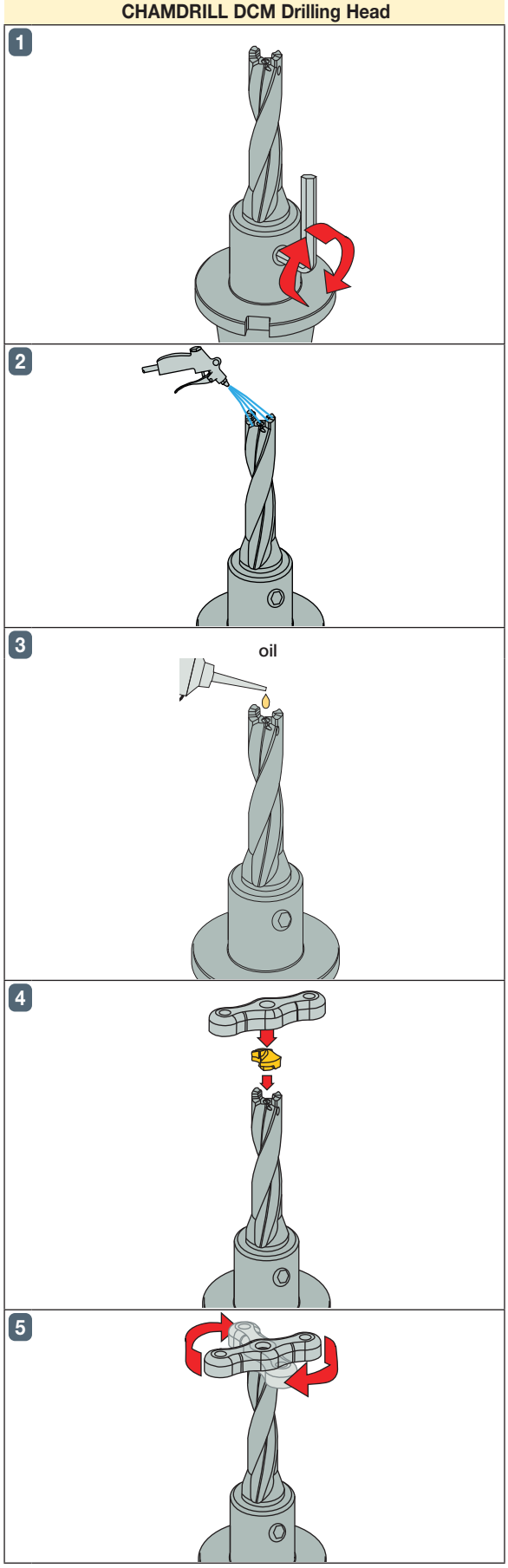
• For cutting conditions see pages 101-105

[1] Seat size code

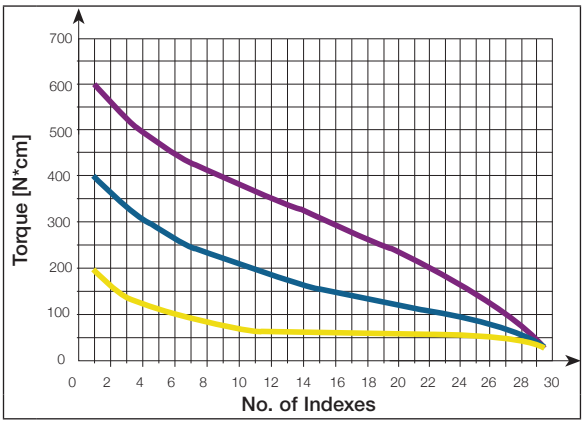
For tools, see pages: DCM-3.5D (7.5-20.9 mm) (92) • DCM-3D (7.5-25.9 mm) (92) • DCM-5D (7.5-25.9 mm) (93) • DCM-8D (10-25.9 mm) (93) • DCT (M8-M24) (134)

Drilling Head Mounting Procedure

CHAMDRILL DCM Drilling Head



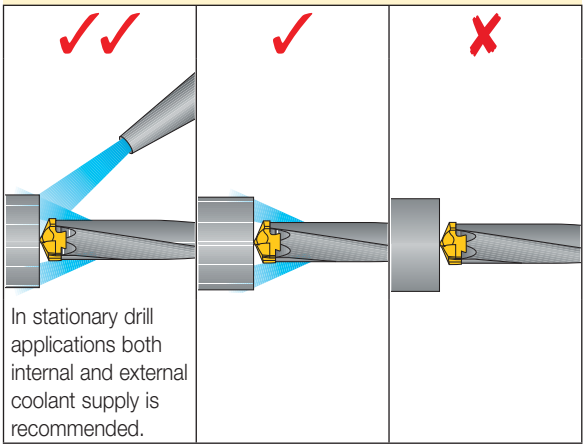
CHAMDRILL Unlocking Change in Torque
Typical Unlocking Torque Range



- Dia. 17-25.9 mm
- Dia. 11-16 mm
- Dia. 7.5-10.5 mm

The number of indexing changes according to machine/ clamping rigidity, machining conditions, workpiece material, coolant, cooling pressure and correct usage.

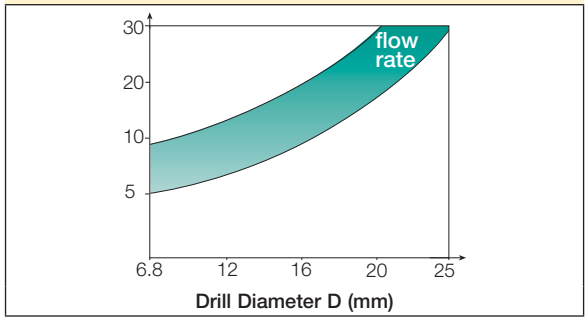
Coolant



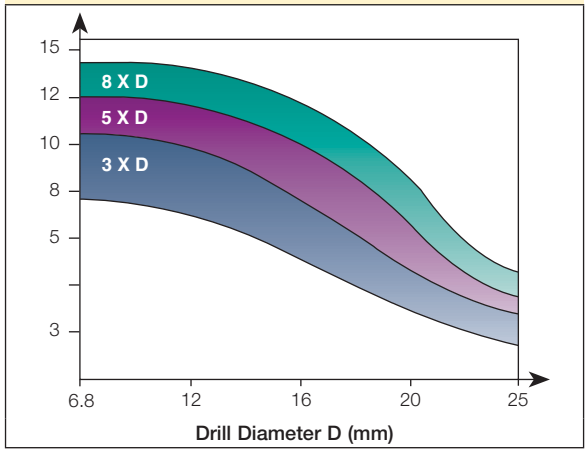
In stationary drill applications both internal and external coolant supply is recommended.

Recommended Coolant Pressure and Flow Rate

Coolant Flow Rate (liter/min)



Minimum Coolant Pressure (bar)



* For special drills more than 8xD, it is recommended to use higher coolant pressure 15–70 bar.

To guarantee chip evacuation, the coolant must always flow through the tool. If the machine is not equipped with coolant through the spindle, we recommend using a coolant inducer. External coolant supply can be used if hole depth is less than 1xD and reduced cutting data is applied. The diagram shows the coolant flow rates for different drills and pressures.

Coolant Mix

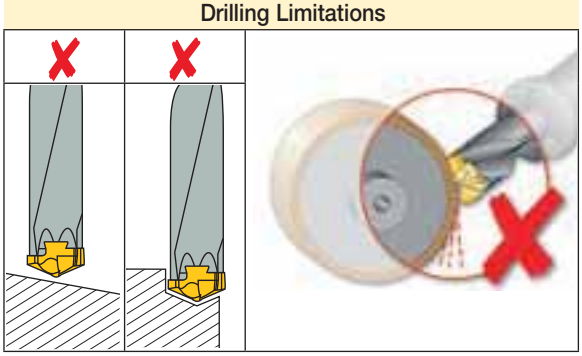
Recommended emulsion mix is 6-8%.
When drilling in stainless and high strength steels, a mix of 10% is recommended.

When using the IDI drilling head, high pressure oil or 7-15% mineral or vegetable based oil emulsion is highly recommended for drilling stainless steel and high temperature alloys.

Dry Drilling

It is possible to drill without coolant in cast iron.
Oil mist through the drill is then required (for 2xD max).

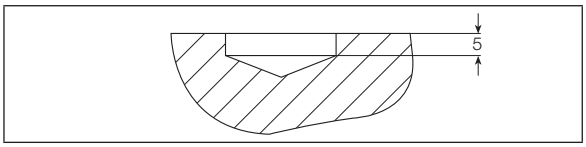
Drilling Limitations



Regrinding of drill head is not recommended, it may cause drill malfunction.

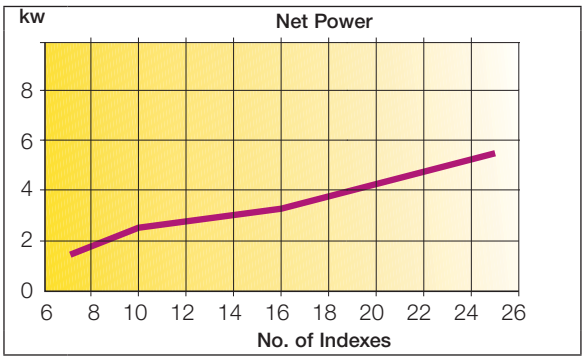
Centering Hole Data for DCM 8xD

We strongly recommend the use of DCN 1.5D drill of the same diameter to drill a centering pre-hole. The use of the centering pre-hole improves hole location, accuracy, roundness, straightness and surface finish and reliability.



Use internal coolant with at least 15 bar pressure.

Power/Force Requirements



Material: SAE 4340
Speed: 100 m/min
Feed: 0.2 mm/rev

Values change for different materials and drilling conditions.

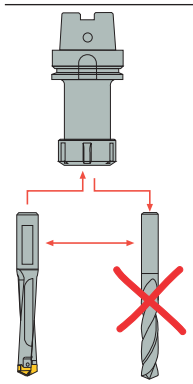
Material Groups

Recommended Machining Conditions

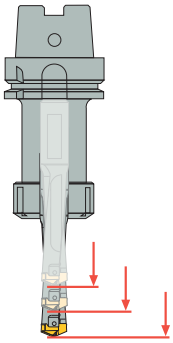
ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material No.	Cutting Speed V_c m/min	Feed vs. Drill Diameter mm/rev				
								D=6.8-10.9	D=11-12.9	D=13-14.9	D=15-16.9	D=17-20.9	D=21-25.9
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	50-130	0.12-0.2	0.15-0.25	0.2-0.3	0.25-0.35	0.25-0.45	0.25-0.45
		≥ 0.25 %C	Annealed	650	190	2	100-120						
		< 0.55 %C	Quenched and tempered	850	250	3	90-110						
		≥ 0.55 %C	Annealed	750	220	4	90-120						
			Quenched and tempered	1000	300	5	70-90						
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	80-130	0.12-0.2	0.15-0.25	0.2-0.3	0.25-0.35	0.3-0.4	0.3-0.45
			Quenched and tempered	930	275	7	70-110						
				1000	300	8	60-90						
				1200	350	9	40-70						
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10	50-80	0.12-0.2	0.12-0.22	0.15-0.25	0.2-0.28	0.25-0.33	0.25-0.35
			Quenched and tempered	1100	325	11	40-70						
	Stainless steel and cast steel		Ferritic/ martensitic	680	200	12	20-50	0.08-0.14	0.12-0.22	0.12-0.15	0.14-0.20	0.16-0.24	0.15-0.28
			Martensitic	820	240	13							
M	Stainless steel and cast steel		Austenitic, duplex	600	180	14	20-50	0.08-0.14	0.12-0.22	0.12-0.15	0.14-0.20	0.16-0.24	0.15-0.28
K	Gray cast iron (GG)		Ferritic / pearlitic		180	15	90-140	0.2-0.3	0.25-0.35	0.3-0.4	0.35-0.45	0.4-0.5	0.4-0.6
			Pearlitic / martensitic		260	16	80-130						
	Nodular cast iron (GGG)		Ferritic		160	17	100-180						
			Pearlitic		250	18	90-160						
	Malleable cast iron		Ferritic		130	19							
			Pearlitic		230	20							
N	Aluminum-wrought alloys		Not hardenable		60	21	90-160	0.2-0.35	0.25-0.4	0.3-0.45	0.35-0.5	0.4-0.6	0.4-0.65
			Hardenable		100	22	80-120						
	Aluminum-cast alloys	≤12% Si	Not hardenable		75	23	90-160						
			Hardenable		90	24							
		>12% Si	High temperature		130	25							
	Copper alloys	>1% Pb	Free cutting		110	26							
			Brass		90	27							
			Electrolytic copper		100	28							
	Non metallic		Duroplastics, fiber plastics			29							
			Hard rubber			30							
S	High temperature alloys	Fe based	Annealed		200	31	30-50	0.05-0.1	0.08-0.13	0.1-0.15	0.12-0.18	0.12-0.2	0.12-0.22
			Hardened		280	32	20-40						
		Ni or Co based	Annealed		250	33	20-50	0.06-0.12	0.09-0.15	0.12-0.18	0.15-0.2	0.15-0.23	0.15-0.25
			Hardened		350	34							
			Cast		320	35							
	Titanium alloys		Pure	400		36							
			Alpha+beta alloys, hardened	1050		37							
H	Hardened steel		Hardened		55 HRC	38	20-50	0.06-0.12	0.09-0.15	0.12-0.18	0.15-0.2	0.15-0.23	0.15-0.25
			Hardened		60 HRC	39							
	Chilled cast iron		Cast		400	40	20-50	0.06-0.12	0.09-0.15	0.12-0.18	0.15-0.2	0.15-0.23	0.15-0.25
	Cast iron		Hardened		55 HRC	41							

• When using external coolant supply only, reduce cutting speed by 10% • When using more than 5XD drill ratio, reduce cutting parameters by 10% As a starting value, the middle of the recommended machining range should be used. Then, according to the wear results, conditions can be changed to optimize performance. The data refers to IC908. For IC1008, cutting speed should be increased by 15%.

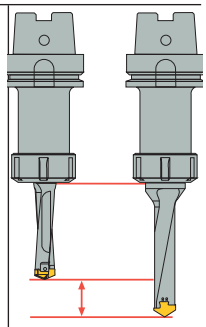
Applications for DCM 3.5D



Replaces solid carbide drils without changing any holding components

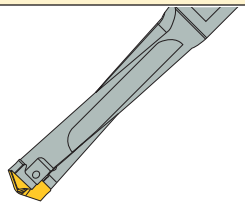
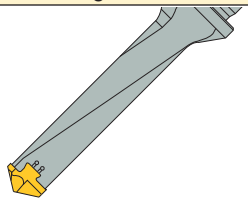
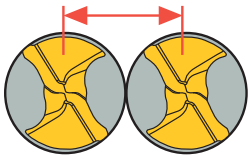
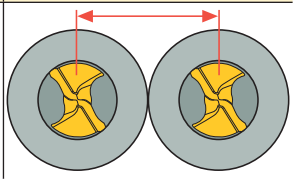


When using SUMOUNICHAM, the drill's projection can be adjusted



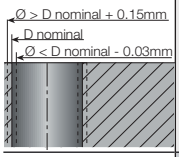
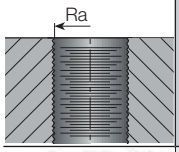
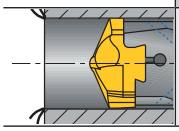
Shorter projection compared to CHAMDRILL when required

For better stability in rough applications and interrupted cuts

UNICHAMDRILL Moderate Helix	CHAMDRILL High Helix
	
UNICHAMDRILL	**CHAMDRILL**
	

Can be used on multi-spindle applications for close spacing between adjacent drills

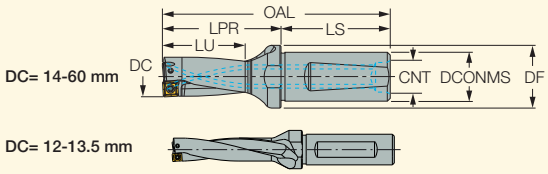
Troubleshooting

	**Cutting Edge Chipping** 1 Check the stability of the machine spindle, tool and workpiece clamping rigidity. 2 Reduce feed rate, increase speed. 3 If the drill vibrates, reduce cutting speed and increase feed rate. 4 When drilling rough, hard or sloped surfaces (up to 6°), reduce the feed rate by 30-50% when entering and exiting. 5 Check cooling lubricant and increase coolant pressure. In case of external coolant supply, improve jet direction and add cooling jets.
	**Excessive Flank Wear** 1 Check that the correct geometry is used. 2 Reduce cutting speed. 3 Increase internal coolant pressure.
	**Chisel Area Chipping** 1 Reduce feed rate. 2 Increase coolant pressure. 3 Check the adaptation. Use hydraulic clamping chuck, maxin power chuck or side lock systems. 4 Increase workpiece chucking force.
	**Excessive Flute Land Wear** 1 Check that the correct geometry is used. 2 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial). 3 Reduce cutting speed. 4 When drilling rough, hard or sloped surfaces (up to 6°), reduce the feed rate by 30-50% when entering and exiting. 5 Increase coolant pressure. 6 Check the chisel point runout and make sure it is within 0.02 mm T.I.R. 7 Increase workpiece chucking force stability and rigidity. 8 If there is low pocket gripping force - replace drill body.
	**Built-Up Edge** 1 Increase cutting speed. 2 Increase coolant pressure.
	**Deviation of Hole Tolerance** 1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial cutting points). 2 Reduce feed rate. 3 Check the chisel point runout and make sure that it is within 0.02 mm T.I.R. 4 Wrong cutting edge. Replace head. 5 Increase workpiece chucking force. 6 Check the adaptation. Use hydraulic clamping chuck, maxin power chuck or side clamping systems. 7 Increase internal coolant pressure.
	**Surface Finish Too Rough** 1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial). 2 Adjust the feed for improved chip formation. 3 In case of chip jamming - increase the coolant flow and/or reduce the cutting speed. 4 Increase the coolant pressure. 5 Check the chisel point runout and make sure it is within 0.02 mm T.I.R. 6 Use pecking cycle.
	**Insufficient Pocket Gripping Torque** 1 Check unlocking gripping torque with TK DCM torque key. If there is no click indication - replace drill head. 2 Increase coolant pressure.
	Inaccurate Hole Position 1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial). 2 Check the stability of the machine spindle, tool and workpiece clamping rigidity. 3 When drilling rough, hard or sloped surfaces (up to 6°), reduce the feed rate by 30-50% when entering. 4 Drill a pre-hole with a 140° point angle for centering. 5 Check the chisel point runout and make sure it is within 0.02 mm T.I.R.
	**Burrs on Exit** 1 Reduce the feed rate by 30-50% when exiting. 2 Replace the worn head. 3 Check the adaptation. Use hydraulic clamping chuck, maxin power chuck or side clamping systems.

DR-TWIST
INDEXABLE DRILL LINE

DR-2D-N

Indexable Square Insert Drills with Coolant Holes, Drilling Depth 2xD



Designation	DC	DCX[1]	LU	LPR	LS	OAL	DCONMS	DF	CNT	MIID[2]
DR120-024-16-04-2D-N	12.00	12.40	24.0	42.0	48.0	90.00	16.00	20.00	-	AOMT 04
DR125-025-16-04-2D-N	12.50	12.90	25.0	43.0	48.0	91.00	16.00	20.00	-	AOMT 04
DR130-026-16-04-2D-N	13.00	13.40	26.0	44.0	48.0	92.00	16.00	20.00	-	AOMT 04
DR135-027-16-04-2D-N	13.50	13.90	27.0	45.0	48.0	93.00	16.00	20.00	-	AOMT 04
DR140-028-20-05-2D-N	14.00	16.80	28.0	46.0	50.0	96.00	20.00	25.00	G1/4"	SOMX 05
DR145-029-20-05-2D-N	14.50	17.10	29.0	47.0	50.0	97.00	20.00	25.00	G1/4"	SOMX 05
DR150-030-20-05-2D-N	15.00	17.40	30.0	48.0	50.0	98.00	20.00	25.00	G1/4"	SOMX 05
DR155-031-20-05-2D-N	15.50	17.60	31.0	49.0	50.0	99.00	20.00	25.00	G1/4"	SOMX 05
DR160-032-20-05-2D-N	16.00	17.80	32.0	50.0	50.0	100.00	20.00	25.00	G1/4"	SOMX 05
DR165-033-20-05-2D-N	16.50	18.10	33.0	51.0	50.0	101.00	20.00	25.00	G1/4"	SOMX 05
DR170-034-20-05-2D-N	17.00	18.30	34.0	52.0	50.0	102.00	20.00	25.00	G1/4"	SOMX 05
DR175-035-20-05-2D-N	17.50	18.50	35.0	53.0	50.0	103.00	20.00	25.00	G1/4"	SOMX 05
DR180-036-25-06-2D-N	18.00	20.30	36.0	56.0	56.0	112.00	25.00	32.00	G3/8"	SOMX 06
DR185-037-25-06-2D-N	18.50	20.50	37.0	57.0	56.0	113.00	25.00	32.00	G3/8"	SOMX 06
DR190-038-25-06-2D-N	19.00	20.80	38.0	58.0	56.0	114.00	25.00	32.00	G3/8"	SOMX 06
DR195-039-25-06-2D-N	19.50	21.00	39.0	59.0	56.0	115.00	25.00	32.00	G3/8"	SOMX 06
DR200-040-25-06-2D-N	20.00	21.30	40.0	60.0	56.0	116.00	25.00	32.00	G3/8"	SOMX 06
DR205-041-25-06-2D-N	20.50	21.60	41.0	61.0	56.0	117.00	25.00	32.00	G3/8"	SOMX 06
DR210-042-25-07-2D-N	21.00	24.50	42.0	62.0	56.0	118.00	25.00	32.00	G3/8"	SOMX 07
DR215-043-25-07-2D-N	21.50	24.70	43.0	63.0	56.0	119.00	25.00	32.00	G3/8"	SOMX 07
DR220-044-25-07-2D-N	22.00	25.00	44.0	64.0	56.0	120.00	25.00	32.00	G3/8"	SOMX 07
DR225-045-25-07-2D-N	22.50	25.20	45.0	65.0	56.0	121.00	25.00	32.00	G3/8"	SOMX 07
DR230-046-25-07-2D-N	23.00	25.50	46.0	66.0	56.0	122.00	25.00	32.00	G3/8"	SOMX 07
DR235-047-25-07-2D-N	23.50	25.70	47.0	67.0	56.0	123.00	25.00	32.00	G3/8"	SOMX 07
DR240-048-25-07-2D-N	24.00	26.00	48.0	68.0	56.0	124.00	25.00	32.00	G3/8"	SOMX 07
DR025-050-32-09-2D-N	25.00	29.50	50.0	82.0	58.0	140.00	32.00	42.00	G1/2"	SOMT 09
DR026-052-32-09-2D-N	26.00	30.00	52.0	84.0	58.0	142.00	32.00	42.00	G1/2"	SOMT 09
DR027-054-32-09-2D-N	27.00	30.50	54.0	86.0	58.0	144.00	32.00	42.00	G1/2"	SOMT 09
DR028-056-32-09-2D-N	28.00	31.00	56.0	88.0	58.0	146.00	32.00	42.00	G1/2"	SOMT 09
DR029-058-32-09-2D-N	29.00	31.50	58.0	90.0	58.0	148.00	32.00	42.00	G1/2"	SOMT 09
DR030-060-32-09-2D-N	30.00	32.00	60.0	92.0	58.0	150.00	32.00	42.00	G1/2"	SOMT 09
DR031-062-32-09-2D-N	31.00	32.50	62.0	94.0	58.0	152.00	32.00	42.00	G1/2"	SOMT 09
DR032-064-32-09-2D-N	32.00	33.00	64.0	96.0	58.0	154.00	32.00	42.00	G1/2"	SOMT 09
DR033-066-32-09-2D-N	33.00	34.00	66.0	98.0	58.0	156.00	32.00	42.00	G1/2"	SOMT 09
DR034-068-32-09-2D-N	34.00	34.50	68.0	100.0	58.0	158.00	32.00	42.00	G1/2"	SOMT 09
DR035-070-32-12-2D-N	35.00	40.50	70.0	106.0	58.0	164.00	32.00	50.00	G1/2-1	SOMT 12
DR036-072-32-12-2D-N	36.00	41.00	72.0	108.0	58.0	166.00	32.00	50.00	G1/2-1	SOMT 12
DR037-074-32-12-2D-N	37.00	41.50	74.0	110.0	58.0	168.00	32.00	50.00	G1/2-1	SOMT 12
DR038-076-32-12-2D-N	38.00	42.00	76.0	112.0	58.0	170.00	32.00	50.00	G1/2-1	SOMT 12
DR039-078-32-12-2D-N	39.00	42.50	78.0	114.0	58.0	172.00	32.00	50.00	G1/2-1	SOMT 12
DR040-080-40-12-2D-N	40.00	43.00	80.0	116.0	68.0	184.00	40.00	50.00	G3/4-14	SOMT 12
DR041-082-40-12-2D-N	41.00	43.50	82.0	118.0	68.0	186.00	40.00	50.00	G3/4-14	SOMT 12
DR042-084-40-12-2D-N	42.00	44.00	84.0	120.0	68.0	188.00	40.00	50.00	G3/4-14	SOMT 12
DR043-086-40-12-2D-N	43.00	44.50	86.0	122.0	68.0	190.00	40.00	50.00	G3/4-14	SOMT 12
DR044-088-40-12-2D-N	44.00	45.00	88.0	124.0	68.0	192.00	40.00	50.00	G3/4-14	SOMT 12
DR045-090-40-16-2D-N	45.00	51.00	90.0	126.0	68.0	194.00	40.00	60.00	G3/4-14	SOMT 16
DR046-092-40-16-2D-N	46.00	51.50	92.0	128.0	68.0	196.00	40.00	60.00	G3/4-14	SOMT 16
DR047-094-40-16-2D-N	47.00	52.00	94.0	130.0	68.0	198.00	40.00	60.00	G3/4-14	SOMT 16

• Hole tolerance D+0.15/-0.05 in average conditions. However it can be higher or lower according to machine and tooling conditions • For eccenter sleeves (used with tool diameter range of 14.00-60.00 only), see page 118. • For user guide and cutting conditions, see pages 117-128

[1] The hole diameter can be enlarged by shifting the drill center along the lathe X-axis, or by using eccentric sleeves in drill rotating applications

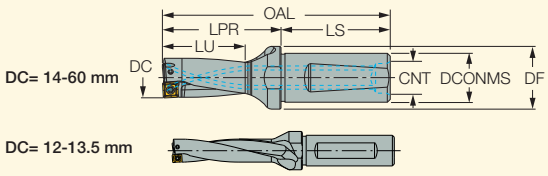
[2] Master insert identification

For inserts, see pages: AOMT/AOGT (114) • SOGX/T-AL (115) • SOMT-DT (116) • SOMT-GF (115) • SOMT-HD (116) • SOMX-DT (114) • SOMX-GF (114) • SOMX-HD (115)

DR-TWIST
INDEXABLE DRILL LINE

DR-2D-N (continued)

Indexable Square Insert Drills with Coolant Holes, Drilling Depth 2xD



Designation	DC	DCX[1]	LU	LPR	LS	OAL	DCONMS	DF	CNT	MIID[2]
DR048-096-40-16-2D-N	48.00	52.50	96.0	132.0	68.0	200.00	40.00	60.00	G3/4-14	SOMT 16
DR049-098-40-16-2D-N	49.00	53.00	98.0	134.0	68.0	202.00	40.00	60.00	G3/4-14	SOMT 16
DR050-100-40-16-2D-N	50.00	54.00	100.0	136.0	68.0	204.00	40.00	60.00	G3/4-14	SOMT 16
DR051-102-40-16-2D-N	51.00	54.50	102.0	138.0	68.0	206.00	40.00	60.00	G3/4-14	SOMT 16
DR052-104-40-16-2D-N	52.00	55.00	104.0	140.0	68.0	208.00	40.00	60.00	G3/4-14	SOMT 16
DR053-106-40-16-2D-N	53.00	55.50	106.0	142.0	68.0	210.00	40.00	60.00	G3/4-14	SOMT 16
DR054-108-40-16-2D-N	54.00	56.00	108.0	144.0	68.0	212.00	40.00	60.00	G3/4-14	SOMT 16
DR055-110-40-16-2D-N	55.00	56.50	110.0	146.0	68.0	214.00	40.00	60.00	G3/4-14	SOMT 16
DR056-112-40-16-2D-N	56.00	57.00	112.0	148.0	68.0	216.00	40.00	60.00	G3/4-14	SOMT 16
DR057-114-40-16-2D-N	57.00	57.50	114.0	150.0	68.0	218.00	40.00	60.00	G3/4-14	SOMT 16
DR058-116-40-16-2D-N	58.00	58.00	116.0	152.0	68.0	220.00	40.00	60.00	G3/4-14	SOMT 16
DR059-118-40-16-2D-N	59.00	59.00	118.0	154.0	68.0	222.00	40.00	60.00	G3/4-14	SOMT 16
DR060-120-40-16-2D-N	60.00	60.00	120.0	156.0	68.0	224.00	40.00	60.00	G3/4-14	SOMT 16

• Hole tolerance D+0.15/-0.05 in average conditions. However it can be higher or lower according to machine and tooling conditions • For eccenter sleeves (used with tool diameter range of 14.00-60.00 only), see page 118 • For user guide and cutting conditions, see pages 117-128

[1] The hole diameter can be enlarged by shifting the drill center along the lathe X-axis, or by using eccentric sleeves in drill rotating applications

[2] Master insert identification

For inserts, see pages: AOMT/AOGT (114) • SOGX/T-AL (115) • SOMT-DT (116) • SOMT-GF (115) • SOMT-HD (116) • SOMX-DT (114) • SOMX-GF (114) • SOMX-HD (115)

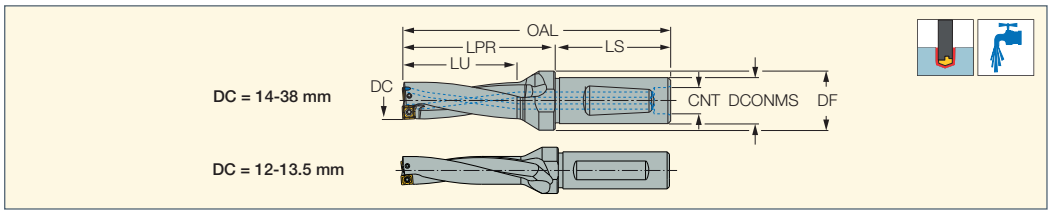
Spare Parts

Designation						
DR(120-135)...-04-2D-N	SR 34-533	T-6/5				
DR(140-175)...-05-2D-N	SR 34-533/L	T-6/5				
DR(180-205)...-06-2D-N	SR 34-505/L		T-7/51			
DR(210-240)...-07-2D-N	SR 14-560		T-8/53			
DR(025-034)...-09-2D-N	SR 34-506			BLD T09/M7-BW4	BW4-SD	
DR(035-044)...-12-2D-N	SR 14-544/S			BLD T15/B7	BW6-SD	
DR(044-060)...-16-2D-N	SR 76-961			BLD T15/M7		BW6-T

DR-TWIST
INDEXABLE DRILL LINE

DR-3D-N

Indexable Square Insert Drills with Coolant Holes, Drilling Depth 3xD



Designation	DC	DCX(1)	LU	LPR	LS	OAL	DCONMS	DF	CNT	MIID(2)
DR120-036-16-04-3D-N	12.00	12.40	36.0	54.0	48.0	102.00	16.00	20.00	-	AOMT 040204-90DT
DR125-038-16-04-3D-N	12.50	12.90	38.0	55.5	48.0	103.50	16.00	20.00	-	AOMT 040204-90DT
DR130-039-16-04-3D-N	13.00	13.40	39.0	57.0	48.0	105.00	16.00	20.00	-	AOMT 040204-90DT
DR135-041-16-04-3D-N	13.50	13.90	41.0	58.5	48.0	106.50	16.00	20.00	-	AOMT 040204-90DT
DR140-042-20-05-3D-N	14.00	16.80	42.0	60.0	50.0	110.00	20.00	25.00	G1/4"	SOMX 050204-DT
DR145-044-20-05-3D-N	14.50	17.10	43.5	61.5	50.0	111.50	20.00	25.00	G1/4"	SOMX 050204-DT
DR150-045-20-05-3D-N	15.00	17.40	45.0	63.0	50.0	113.00	20.00	25.00	G1/4"	SOMX 050204-DT
DR155-047-20-05-3D-N	15.50	17.60	46.5	64.5	50.0	114.50	20.00	25.00	G1/4"	SOMX 050204-DT
DR160-048-20-05-3D-N	16.00	17.80	48.0	66.0	50.0	116.00	20.00	25.00	G1/4"	SOMX 050204-DT
DR165-050-20-05-3D-N	16.50	18.10	49.5	67.5	50.0	117.50	20.00	25.00	G1/4"	SOMX 050204-DT
DR170-051-20-05-3D-N	17.00	18.30	51.0	69.0	50.0	119.00	20.00	25.00	G1/4"	SOMX 050204-DT
DR175-053-20-05-3D-N	17.50	18.50	52.5	70.5	50.0	120.50	20.00	25.00	G1/4"	SOMX 050204-DT
DR180-054-25-06-3D-N	18.00	20.30	54.0	74.0	56.0	130.00	25.00	32.00	G3/8"	SOMX 060304-DT
DR185-056-25-06-3D-N	18.50	20.50	55.5	75.5	56.0	131.50	25.00	32.00	G3/8"	SOMX 060304-DT
DR190-057-25-06-3D-N	19.00	20.80	57.0	77.0	56.0	133.00	25.00	32.00	G3/8"	SOMX 060304-DT
DR195-059-25-06-3D-N	19.50	21.00	58.5	78.5	56.0	134.50	25.00	32.00	G3/8"	SOMX 060304-DT
DR200-060-25-06-3D-N	20.00	21.30	60.0	80.0	56.0	136.00	25.00	32.00	G3/8"	SOMX 060304-DT
DR205-062-25-06-3D-N	20.50	21.60	61.5	81.5	56.0	137.50	25.00	32.00	G3/8"	SOMX 060304-DT
DR210-063-25-07-3D-N	21.00	24.50	63.0	83.0	56.0	139.00	25.00	32.00	G3/8"	SOMX 070305-DT
DR215-065-25-07-3D-N	21.50	24.70	64.5	84.5	56.0	140.50	25.00	32.00	G3/8"	SOMX 070305-DT
DR220-066-25-07-3D-N	22.00	25.00	66.0	86.0	56.0	142.00	25.00	32.00	G3/8"	SOMX 070305-DT
DR225-068-25-07-3D-N	22.50	25.20	67.5	87.5	56.0	143.50	25.00	32.00	G3/8"	SOMX 070305-DT
DR230-069-25-07-3D-N	23.00	25.50	69.0	89.0	56.0	145.00	25.00	32.00	G3/8"	SOMX 070305-DT
DR235-071-25-07-3D-N	23.50	25.70	70.5	90.5	56.0	146.50	25.00	32.00	G3/8"	SOMX 070305-DT
DR240-072-25-07-3D-N	24.00	26.00	72.0	92.0	56.0	148.00	25.00	32.00	G3/8"	SOMX 070305-DT
DR025-075-32-09-3D-N	25.00	29.50	75.0	107.0	58.0	165.00	32.00	42.00	G1/2"	SOMT 09T306-DT
DR026-078-32-09-3D-N	26.00	30.00	78.0	110.0	58.0	168.00	32.00	42.00	G1/2"	SOMT 09T306-DT
DR027-081-32-09-3D-N	27.00	30.50	81.0	113.0	58.0	171.00	32.00	42.00	G1/2"	SOMT 09T306-DT
DR028-084-32-09-3D-N	28.00	31.00	84.0	116.0	58.0	174.00	32.00	42.00	G1/2"	SOMT 09T306-DT
DR029-087-32-09-3D-N	29.00	31.50	87.0	119.0	58.0	177.00	32.00	42.00	G1/2"	SOMT 09T306-DT
DR030-090-32-09-3D-N	30.00	32.00	90.0	122.0	58.0	180.00	32.00	42.00	G1/2"	SOMT 09T306-DT
DR031-093-32-09-3D-N	31.00	32.50	93.0	125.0	58.0	183.00	32.00	42.00	G1/2"	SOMT 09T306-DT
DR032-096-32-09-3D-N	32.00	33.00	96.0	128.0	58.0	186.00	32.00	42.00	G1/2"	SOMT 09T306-DT
DR033-099-32-09-3D-N	33.00	34.00	99.0	131.0	58.0	189.00	32.00	42.00	G1/2"	SOMT 09T306-DT
DR034-102-32-09-3D-N	34.00	34.50	102.0	134.0	58.0	192.00	32.00	42.00	G1/2"	SOMT 09T306-DT
DR035-105-32-12-3D-N	35.00	40.50	105.0	141.0	58.0	199.00	32.00	50.00	G1/2-14	SOMT 120408-DT
DR036-108-32-12-3D-N	36.00	41.00	108.0	144.0	58.0	202.00	32.00	50.00	G1/2-14	SOMT 120408-DT
DR037-111-32-12-3D-N	37.00	41.50	111.0	147.0	58.0	205.00	32.00	50.00	G1/2-14	SOMT 120408-DT
DR038-114-32-12-3D-N	38.00	42.00	114.0	150.0	58.0	208.00	32.00	50.00	G1/2-14	SOMT 120408-DT

• Hole tolerance D+0.25/-0.05 in average conditions. However it can be higher or lower according to machine and tooling conditions • For eccenter sleeves (used with tool diameter range of 14.00-38.00 only), see page 118 • For user guide and cutting conditions, see pages 117-128

(1) The hole diameter can be enlarged by shifting the drill center along the lathe X-axis, or by using eccentric sleeves in drill rotating applications

(2) Master insert identification

For inserts, see pages: AOMT/AOGT (114) • SOGX/T-AL (115) • SOMT-DT (116) • SOMT-GF (115) • SOMT-HD (116) • SOMX-DT (114) • SOMX-GF (114) • SOMX-HD (115)

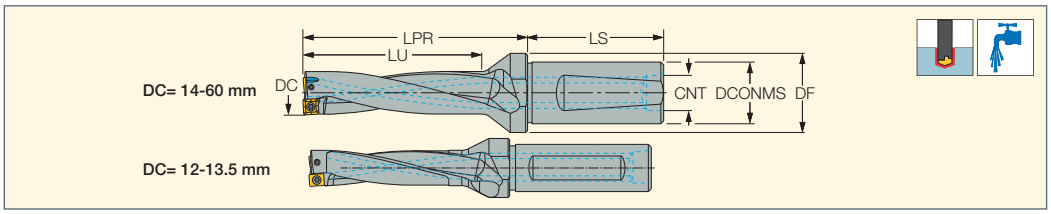
Spare Parts

Designation					
DR(120-135)...-04-3D-N	SR 34-533	T-9/5			
DR(140-175)...-05-3D-N	SR 34-533/L	T-9/5			
DR(180-205)...-06-3D-N	SR 34-508/L		T-7/51		
DR(210-240)...-07-3D-N	SR 14-560		T-8/53		
DR(025-034)...-09-3D-N	SR 34-506			BLD T09/M7-3W4	SW4-SD
DR(035-038)...-12-3D-N	SR 14-544/3			BLD T15/B7	SW6-SD

DR-TWIST
INDEXABLE DRILL LINE

DR-4D-N

Indexable Square Insert Drills with Coolant Holes, Drilling Depth 4xD



Designation	DC	DCX(1)	LU	LPR	LS	DCONMS	DF	CNT	MIID(2)
DR120-048-16-04-4D-N	12.00	12.40	48.0	66.0	48.0	16.00	20.00	-	AOMT 040204-90DT
DR125-050-16-04-4D-N	12.50	12.90	50.0	68.0	48.0	16.00	20.00	-	AOMT 040204-90DT
DR130-052-16-04-4D-N	13.00	13.40	52.0	70.0	48.0	16.00	20.00	-	AOMT 040204-90DT
DR135-054-16-04-4D-N	13.50	13.90	54.0	72.0	48.0	16.00	20.00	-	AOMT 040204-90DT
DR140-056-20-05-4D-N	14.00	16.80	56.0	74.0	50.0	20.00	25.00	G1/4"	SOMX 050204-DT
DR145-058-20-05-4D-N	14.50	17.10	58.0	76.0	50.0	20.00	25.00	G1/4"	SOMX 050204-DT
DR150-060-20-05-4D-N	15.00	17.40	60.0	78.0	50.0	20.00	25.00	G1/4"	SOMX 050204-DT
DR155-062-20-05-4D-N	15.50	17.60	62.0	80.0	50.0	20.00	25.00	G1/4"	SOMX 050204-DT
DR160-064-20-05-4D-N	16.00	17.80	64.0	82.0	50.0	20.00	25.00	G1/4"	SOMX 050204-DT
DR165-066-20-05-4D-N	16.50	18.10	66.0	84.0	50.0	20.00	25.00	G1/4"	SOMX 050204-DT
DR170-068-20-05-4D-N	17.00	18.30	68.0	86.0	50.0	20.00	25.00	G1/4"	SOMX 050204-DT
DR175-070-20-05-4D-N	17.50	18.50	70.0	88.0	50.0	20.00	25.00	G1/4"	SOMX 050204-DT
DR180-072-25-06-4D-N	18.00	20.30	72.0	92.0	56.0	25.00	32.00	G3/8"	SOMX 060304-DT
DR185-074-25-06-4D-N	18.50	20.50	74.0	94.0	56.0	25.00	32.00	G3/8"	SOMX 060304-DT
DR190-076-25-06-4D-N	19.00	20.80	76.0	96.0	56.0	25.00	32.00	G3/8"	SOMX 060304-DT
DR195-078-25-06-4D-N	19.50	21.00	78.0	98.0	56.0	25.00	32.00	G3/8"	SOMX 060304-DT
DR200-080-25-06-4D-N	20.00	21.30	80.0	100.0	56.0	25.00	32.00	G3/8"	SOMX 060304-DT
DR205-082-25-06-4D-N	20.50	21.60	82.0	102.0	56.0	25.00	32.00	G3/8"	SOMX 060304-DT
DR210-084-25-07-4D-N	21.00	24.50	84.0	104.0	56.0	25.00	32.00	G3/8"	SOMX 070305-DT
DR215-086-25-07-4D-N	21.50	24.70	86.0	106.0	56.0	25.00	32.00	G3/8"	SOMX 070305-DT
DR220-088-25-07-4D-N	22.00	25.00	88.0	108.0	56.0	25.00	32.00	G3/8"	SOMX 070305-DT
DR225-090-25-07-4D-N	22.50	25.20	90.0	110.0	56.0	25.00	32.00	G3/8"	SOMX 070305-DT
DR230-092-25-07-4D-N	23.00	25.50	92.0	112.0	56.0	25.00	32.00	G3/8"	SOMX 070305-DT
DR235-094-25-07-4D-N	23.50	25.70	94.0	114.0	56.0	25.00	32.00	G3/8"	SOMX 070305-DT
DR240-096-25-07-4D-N	24.00	26.00	96.0	116.0	56.0	25.00	32.00	G3/8"	SOMX 070305-DT
DR025-100-32-09-4D-N	25.00	29.50	100.0	132.0	58.0	32.00	42.00	G1/2"	SOMT 09T306-DT
DR026-104-32-09-4D-N	26.00	30.00	104.0	136.0	58.0	32.00	42.00	G1/2"	SOMT 09T306-DT
DR027-108-32-09-4D-N	27.00	30.50	108.0	140.0	58.0	32.00	42.00	G1/2"	SOMT 09T306-DT
DR028-112-32-09-4D-N	28.00	31.00	112.0	144.0	58.0	32.00	42.00	G1/2"	SOMT 09T306-DT
DR029-116-32-09-4D-N	29.00	31.50	116.0	148.0	58.0	32.00	42.00	G1/2"	SOMT 09T306-DT
DR030-120-32-09-4D-N	30.00	32.00	120.0	152.0	58.0	32.00	42.00	G1/2"	SOMT 09T306-DT
DR031-124-32-09-4D-N	31.00	32.50	124.0	156.0	58.0	32.00	42.00	G1/2"	SOMT 09T306-DT
DR032-128-32-09-4D-N	32.00	33.00	128.0	160.0	58.0	32.00	42.00	G1/2"	SOMT 09T306-DT
DR033-132-32-09-4D-N	33.00	34.00	132.0	164.0	58.0	32.00	42.00	G1/2"	SOMT 09T306-DT
DR034-136-32-09-4D-N	34.00	34.50	136.0	168.0	58.0	32.00	42.00	G1/2"	SOMT 09T306-DT
DR035-140-32-12-4D-N	35.00	40.50	140.0	176.0	58.0	32.00	50.00	G 1/2"-14	SOMT 120408-DT
DR036-144-32-12-4D-N	36.00	41.00	144.0	180.0	58.0	32.00	50.00	G 1/2"-14	SOMT 120408-DT
DR037-148-32-12-4D-N	37.00	41.50	148.0	184.0	58.0	32.00	50.00	G 1/2"-14	SOMT 120408-DT
DR038-152-32-12-4D-N	38.00	42.00	152.0	188.0	58.0	32.00	50.00	G 1/2"-14	SOMT 120408-DT
DR039-156-32-12-4D-N	39.00	42.50	156.0	192.0	58.0	32.00	50.00	G 1/2"-14	SOMT 120408-DT
DR040-160-40-12-4D-N	40.00	43.00	160.0	196.0	68.0	40.00	50.00	G 3/4"-14	SOMT 120408-DT
DR041-164-40-12-4D-N	41.00	43.50	164.0	200.0	68.0	40.00	50.00	G 3/4"-14	SOMT 120408-DT
DR042-168-40-12-4D-N	42.00	44.00	168.0	204.0	68.0	40.00	50.00	G 3/4"-14	SOMT 120408-DT
DR043-172-40-12-4D-N	43.00	44.50	172.0	208.0	68.0	40.00	50.00	G 3/4"-14	SOMT 120408-DT
DR044-176-40-12-4D-N	44.00	45.00	176.0	212.0	68.0	40.00	50.00	G 3/4"-14	SOMT 120408-DT
DR045-180-40-16-4D-N	45.00	51.00	180.0	215.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR046-184-40-16-4D-N	46.00	51.50	184.0	219.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR047-188-40-16-4D-N	47.00	52.00	188.0	223.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR048-192-40-16-4D-N	48.00	52.50	192.0	227.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR049-196-40-16-4D-N	49.00	53.00	196.0	231.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR050-200-40-16-4D-N	50.00	54.00	200.0	235.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT

• Hole tolerance D+0.35/-0.05 in average conditions. However it can be higher or lower according to machine and tooling conditions • For eccenter sleeves (used with tool diameter range of 14.00-60.00 only), see page 118 • For user guide and cutting conditions, see pages 117-128

(1) The hole diameter can be enlarged by shifting the drill center along the lathe X-axis, or by using eccentric sleeves in drill rotating applications

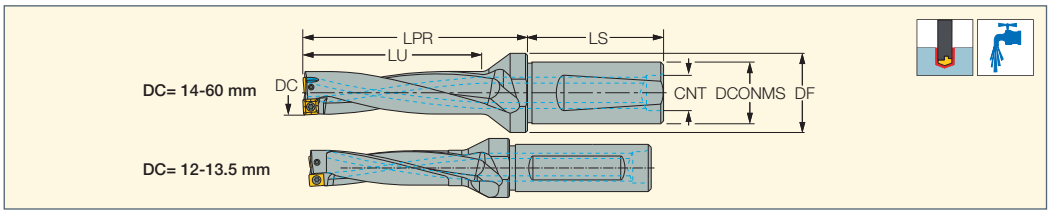
(2) Master insert identification

For inserts, see pages: AOMT/AOGT (114) • SOGX/T-AL (115) • SOMT-DT (116) • SOMT-GF (115) • SOMT-HD (116) • SOMX-DT (114) • SOMX-GF (114) • SOMX-HD (115)

DR-TWIST
INDEXABLE DRILL LINE

DR-4D-N (continued)

Indexable Square Insert Drills with Coolant Holes, Drilling Depth 4xD



Designation	DC	DCX[1]	LU	LPR	LS	DCONMS	DF	CNT	MIID[2]
DR051-204-40-16-4D-N	51.00	54.50	204.0	239.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR052-208-40-16-4D-N	52.00	55.00	208.0	243.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR053-212-40-16-4D-N	53.00	55.50	212.0	247.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR054-216-40-16-4D-N	54.00	56.00	216.0	251.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR055-220-40-16-4D-N	55.00	56.50	220.0	255.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR056-224-40-16-4D-N	56.00	57.00	224.0	259.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR057-228-40-16-4D-N	57.00	57.50	228.0	263.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR058-232-40-16-4D-N	58.00	58.00	232.0	267.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR059-236-40-16-4D-N	59.00	59.00	236.0	271.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT
DR060-240-40-16-4D-N	60.00	60.00	240.0	275.0	68.0	40.00	60.00	G 3/4"-14	SOMT 160512-DT

• Hole tolerance D+0.35/-0.05 in average conditions. However it can be higher or lower according to machine and tooling conditions • For eccenter sleeves (used with tool diameter range of 14.00-60.00 only), see page 118 • For user guide and cutting conditions, see pages 117-128

[1] The hole diameter can be enlarged by shifting the drill center along the lathe X-axis, or by using eccentric sleeves in drill rotating applications

[2] Master insert identification

For inserts, see pages: AOMT/AOGT (114) • SOGX/T-AL (115) • SOMT-DT (116) • SOMT-GF (115) • SOMT-HD (116) • SOMX-DT (114) • SOMX-GF (114) • SOMX-HD (115)

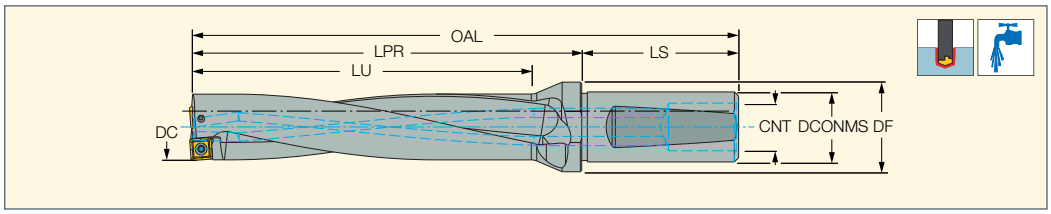
Spare Parts

Designation					
DR(120-135)...-04-4D-N	SR 34-533	T-6/5			
DR(140-175)...-05-4D-N	SR 34-533/L	T-6/5			
DR(180-205)...-06-4D-N	SR 34-506/L		T-7/51		
DR(210-240)...-07-4D-N	SR 14-560		T-8/53		
DR(025-034)...-09-4D-N	SR 34-506			BLD T0Q/MT-BM4	BM4-3D
DR(035-044)...-12-4D-N	SR 14-544/3			BLD T15/87	BM6-3D
DR(045-060)...-16-4D-N	SR 76-961			BLD T15/M7	BM8-T

DR-TWIST
INDEXABLE DRILL LINE

DR-5D-N

Indexable Square Insert Drills with Coolant Holes, Drilling Depth 5xD



Designation	DC	DCX[1]	LU	LPR	LS	OAL	DCONMS	DF	CNT	MIID[2]
DR140-070-20-05-5D-N	14.00	16.10	70.0	88.0	50.0	138.00	20.00	25.00	G1/4"	SOMX 050204-DT
DR150-075-20-05-5D-N	15.00	16.80	75.0	93.0	50.0	143.00	20.00	25.00	G1/4"	SOMX 050204-DT
DR160-080-20-05-5D-N	16.00	17.35	80.0	98.0	50.0	148.00	20.00	25.00	G1/4"	SOMX 050204-DT
DR170-085-20-05-5D-N	17.00	17.98	85.0	103.0	50.0	153.00	20.00	25.00	G1/4"	SOMX 050204-DT
DR180-090-25-06-5D-N	18.00	19.73	90.0	110.0	56.0	166.00	25.00	32.00	G3/8"	SOMX 060304-DT
DR190-095-25-06-5D-N	19.00	20.35	95.0	115.0	56.0	171.00	25.00	32.00	G3/8"	SOMX 060304-DT
DR200-100-25-06-5D-N	20.00	20.98	100.0	120.0	56.0	176.00	25.00	32.00	G3/8"	SOMX 060304-DT
DR210-105-25-07-5D-N	21.00	23.63	105.0	125.0	56.0	181.00	25.00 [3]	32.00	G3/8"	SOMX 070305-DT
DR220-110-25-07-5D-N	22.00	24.25	110.0	130.0	56.0	186.00	25.00 [3]	32.00	G3/8"	SOMX 070305-DT
DR230-115-25-07-5D-N	23.00	24.88	115.0	135.0	56.0	191.00	25.00 [3]	32.00	G3/8"	SOMX 070305-DT
DR240-120-25-07-5D-N	24.00	25.50	120.0	140.0	56.0	196.00	25.00 [3]	32.00	G3/8"	SOMX 070305-DT

- Hole tolerance D+0.35/-0.05 in average conditions. However it can be higher or lower according to machine and tooling conditions
- For eccenter sleeves, see page 118
- For user guide and cutting conditions, see pages 117-128

[1] The hole diameter can be enlarged by shifting the drill center along the lathe X-axis, or by using eccentric sleeves in drill rotating applications

[2] Master insert identification

[3] One flat shank

For inserts, see pages: SOGX/T-AL (115) • SOMX-DT (114) • SOMX-GF (114) • SOMX-HD (115)

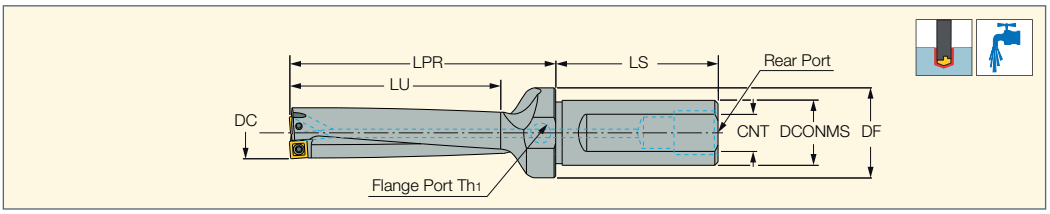
Spare Parts

Designation		
DR140-070-20-05-5D-N	SR 34-533/L	T-6/5
DR150-075-20-05-5D-N	SR 34-533/L	T-6/5
DR160-080-20-05-5D-N	SR 34-533/L	T-6/5
DR170-085-20-05-5D-N	SR 34-533/L	T-6/5
DR180-090-25-06-5D-N	SR 34-508/L	T-7/51
DR190-095-25-06-5D-N	SR 34-508/L	T-7/51
DR200-100-25-06-5D-N	SR 34-508/L	T-7/51
DR210-105-25-07-5D-N	SR 14-560	T-8/53
DR220-110-25-07-5D-N	SR 14-560	T-8/53
DR230-115-25-07-5D-N	SR 14-560	T-8/53
DR240-120-25-07-5D-N	SR 14-560	T-8/53

DR-TWIST
INDEXABLE DRILL LINE

DR-4D-T

Indexable Insert Drills for Non-Rotating Applications with Coolant Holes and One Flat Shank, Drilling Depth 4xD



Designation	DC	DCX[1]	LU	LPR	LS	DCONMS	DF	CNT	Th1	MIID[2]
DR140-056-20-05-4D-T	14.00	15.90	56.0	77.0	50.0	20.00	27.70	NPT 1/4-18	NPT 1/16-27	SOMX 050204-DT
DR160-064-20-05-4D-T	16.00	17.90	64.0	82.0	50.0	20.00	27.70	NPT 1/4-18	NPT 1/16-27	SOMX 050204-DT
DR180-072-25-06-4D-T	18.00	20.90	72.0	94.0	56.0	25.00	32.00	NPT 3/8-18	NPT 1/16-27	SOMX 060304-DT
DR210-084-25-07-4D-T	21.00	24.90	84.0	109.0	56.0	25.00	32.00	NPT 3/8-18	NPT 1/16-27	SOMX 070305-DT
DR250-100-32-09-4D-T	25.00	27.90	100.0	133.0	58.0	32.00	42.00	NPT 1/2-14	NPT 1/16-27	SOMT 09T306-DT
DR280-112-32-09-4D-T	28.00	30.90	112.0	144.0	58.0	32.00	42.00	NPT 1/2-14	NPT 1/16-27	SOMT 09T306-DT
DR310-124-32-09-4D-T	31.00	31.90	124.0	157.0	58.0	32.00	42.00	NPT 1/2-14	NPT 1/16-27	SOMT 09T306-DT
DR320-128-32-09-4D-T	32.00	32.90	128.0	161.0	58.0	32.00	42.00	NPT 1/2-14	NPT 1/16-27	SOMT 09T306-DT
DR350-140-32-12-4D-T	35.00	39.90	140.0	177.0	58.0	32.00	50.00	NPT 1/2-14	NPT 1/16-27	SOMT 120408-DT
DR400-160-40-12-4D-T	40.00	44.90	160.0	197.0	68.0	40.00	50.00	NPT 3/4-14	NPT 1/4-18	SOMT 120408-DT
DR450-180-40-16-4D-T	45.00	51.90	180.0	215.0	68.0	40.00	60.00	NPT 3/4-14	NPT 1/4-18	SOMT 160512-DT
DR520-208-40-16-4D-T	52.00	55.90	208.0	243.0	68.0	40.00	60.00	NPT 3/4-14	NPT 1/4-18	SOMT 160512-DT
DR560-224-40-16-4D-T	56.00	57.90	224.0	259.0	68.0	40.00	60.00	NPT 3/4-14	NPT 1/4-18	SOMT 160512-DT
DR580-232-40-16-4D-T	58.00	58.90	232.0	267.0	68.0	40.00	60.00	NPT 3/4-14	NPT 1/4-18	SOMT 160512-DT
DR590-236-40-16-4D-T	59.00	60.00	236.0	271.0	68.0	40.00	60.00	NPT 3/4-14	NPT 1/4-18	SOMT 160512-DT

- Hole tolerance D+0.35/-0.05 in average conditions. However it can be higher or lower according to machine and tooling conditions
- For eccenter sleeves, see page 118
- For user guide and cutting conditions, see pages 117-128

[1] The hole diameter can be enlarged by shifting the drill center along the lathe X-axis, or by using eccentric sleeves in drill rotating applications

[2] Master insert identification

For inserts, see pages: SOGX/T-AL (115) • SOMT-DT (116) • SOMT-GF (115) • SOMT-HD (116) • SOMX-DT (114) • SOMX-GF (114) • SOMX-HD (115)

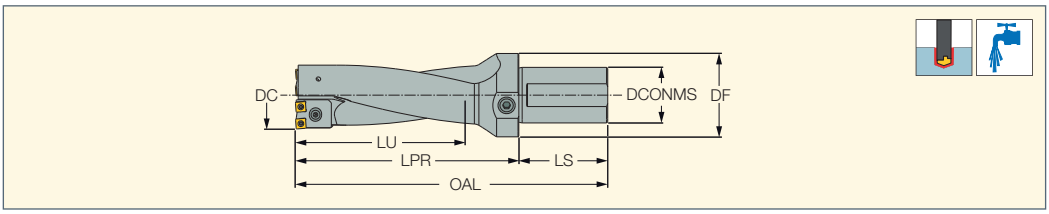
Spare Parts

Designation						
DR140-056-20-05-4D-T	SR 34-533/L	T-6/5			PLG 1/16PTF	PLG 1/4PTF Z C
DR160-064-20-05-4D-T	SR 34-533/L	T-6/5			PLG 1/16PTF	PLG 1/4PTF Z C
DR180-072-25-06-4D-T	SR 34-508/L	T-7/51			PLG 1/16PTF	PLG 3/8PTF
DR210-084-25-07-4D-T	SR 14-560	T-8/53			PLG 1/16PTF	PLG 3/8PTF
DR250-100-32-09-4D-T	SR 34-506		BLD T09/M7-SW4	SW4-SD	PLG 1/16PTF	PLG 1/2PTF
DR280-112-32-09-4D-T	SR 34-506		BLD T09/M7-SW4	SW4-SD	PLG 1/16PTF	PLG 1/2PTF
DR310-124-32-09-4D-T	SR 34-506		BLD T09/M7-SW4	SW4-SD	PLG 1/16PTF	PLG 1/2PTF
DR320-128-32-09-4D-T	SR 34-506		BLD T09/M7-SW4	SW4-SD	PLG 1/16PTF	PLG 1/2PTF
DR350-140-32-12-4D-T	SR 14-544/S		BLD T15/S7	SW6-SD	PLG 1/16PTF	PLG 1/2PTF
DR400-160-40-12-4D-T	SR 14-544/S		BLD T15/S7	SW6-SD	PLG 3/4PTF	PLG 1/4PTF Z C
DR450-180-40-16-4D-T	SR 76-961		BLD T15/M7	SW6-T	PLG 3/4PTF	PLG 1/4PTF Z C
DR520-208-40-16-4D-T	SR 76-961		BLD T15/M7	SW6-T	PLG 3/4PTF	PLG 1/4PTF Z C
DR560-224-40-16-4D-T	SR 76-961		BLD T15/M7	SW6-T	PLG 3/4PTF	PLG 1/4PTF Z C
DR580-232-40-16-4D-T	SR 76-961		BLD T15/M7	SW6-T	PLG 3/4PTF	PLG 1/4PTF Z C
DR590-236-40-16-4D-T	SR 76-961		BLD T15/M7	SW6-T	PLG 3/4PTF	PLG 1/4PTF Z C

DR-TWIST
INDEXABLE DRILL LINE

DR-CA

DR Large Diameter Drills (57-80 mm) with Cartridges and One Flat Shank



Designation	Dimensions						DCX(1)	Shim Plate	Cartridges	Inserts	Insert Clamping Screw	Key Blade & Handle
	DC	LU	DCONMS	DF	LPR	LS						
DR057>062-155-50-10/11CA	57	155	50	75	201	50	63	ISP-10-D058	Internal: CA57>62-IN-10/10	On internal cartridge: Ext.-SOMT 100408 Int.-SOMT 100408	On internal cartridge: Ext.&Int.-SR 14-571	On internal cartridge: Ext.&Int.-BLD T10/97
	58	155	50	75	201	50		ISP-10-D059				
	59	155	50	75	201	50		ISP-10-D060	External: CA57>62-EX-10/11	On external cartridge: Ext.-SOMT 110408 Int.-SOMT 100408	On external cartridge: Ext.-SR 14-544/8 Int.-SR 14-571	On external cartridge: Ext.-BLD T15/97 Int.-BLD T10/97
	60	155	50	75	201	50		ISP-10-D061				
	61	155	50	75	201	50		ISP-10-D062				
	62	155	50	75	201	50						
DR063>066-165-50-10/11CA	63	165	50	75	215	50	67	ISP-10-D064	Internal: CA63>66-IN-10/10	On internal cartridge: Ext.-SOMT 100408 Int.-SOMT 100408	On internal cartridge: Ext.&Int.-SR 14-571	On internal cartridge: Ext.&Int.-BLD T10/97
	64	165	50	75	215	50		ISP-10-D065				
	65	165	50	75	215	50		ISP-10-D066	External: CA63>66-EX-10/11	On external cartridge: Ext.-SOMT 110408 Int.-SOMT 100408	On external cartridge: Ext.-SR 14-544/8 Int.-SR 14-571	On external cartridge: Ext.-BLD T15/97 Int.-BLD T10/97
	66	165	50	75	215	50						
DR067>073-183-50-11/12CA	67	183	50	75	240	50	74	ISP-11-D068	Internal: CA67>73-IN-11/11	On internal cartridge: Ext.-SOMT 110408 Int.-SOMT 110408	On internal cartridge: Ext. & Int. SR 14-544/8	On internal cartridge: Ext.&Int.-BLD T15/97
	68	183	50	75	240	50		ISP-11-D069				
	69	183	50	75	240	50		ISP-11-D070				
	70	183	50	75	240	50		ISP-11-D071	External: CA67>73-EX-11/12	On external cartridge: Ext.-SOMT 120408 Int.-SOMT 110408	On external cartridge: Ext.-SR 14-544/8 Int.-SR 14-544/8	On external cartridge: Ext.&Int.-BLD T15/97
	71	183	50	75	240	50		ISP-11-D072				
	72	183	50	75	240	50		ISP-11-D073				
	73	183	50	75	240	50						
DR074>080-200-50-12/14CA	74	200	50	75	250	50	81	ISP-12-D075	Internal: CA74>80-IN-12/12	On internal cartridge: Ext.-SOMT 120408 Int.-SOMT 120408	On internal cartridge: Ext.&Int.-SR 14-544/8	On internal cartridge: Ext.&Int.-BLD T15/97
	75	200	50	75	250	50		ISP-12-D076				
	76	200	50	75	250	50		ISP-12-D077				
	77	200	50	75	250	50		ISP-12-D078	External: CA74>80-EX-12/14	On external cartridge: Ext.-SOMT 140512 Int.-SOMT 120408	On external cartridge: Ext.-SD 50930 Int.-SR 14-544/8	On external cartridge: Ext.-BLD T20/97 Int.-BLD T15/97
	78	200	50	75	250	50		ISP-12-D079				
	79	200	50	75	250	50		ISP-12-D080				
	80	200	50	75	250	50						

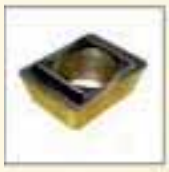
- Hole tolerance: $D^{\pm 0.5}$ in average conditions. However, it can be higher or lower according to machine and tooling conditions
- For user guide and cutting conditions, see pages 117-128

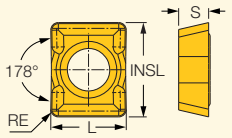
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Max. dia. on lathe, with the thickest shim plate

For inserts, see pages: SOMT-DT (116) • SOMT-GF (115) • SOMT-HD (116)

DR-TWIST INDEXABLE DRILL LINE

AOMT/AOGT
Inserts for DR Drills





Designation	Dimensions L	S	RE	INSL	Tough ↔ Hard IC08	IC1008	IC808	IC908
AOGT 040204-90AL	4.00	1.60	0.40	5.00	•			
AOMT 040204-90DT	4.00	1.60	0.40	5.00		•	•	•
AOMT 040204-90HD (1)	4.00	1.60	0.40	5.00			•	

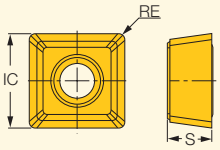
• Used on 12-13.5 mm DR drills • For user guide and cutting conditions, see pages 117-128

(1) For low carbon steel and soft materials.

For tools, see pages: DR-2D-N (106) • DR-3D-N (108) • DR-4D-N (109)

DR-TWIST INDEXABLE DRILL LINE

SOMX-DT
Inserts for DR Drills with a DT General Use Chipformer



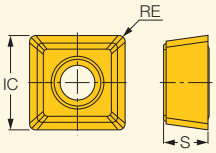
Designation	Dimensions IC	S	RE	Tough ↔ Hard IC5500	IC808	IC908	IC8080	IC9080
SOMX 050204-DT	5.40	2.40	0.40		•	•	•	•
SOMX 060304-DT	6.20	3.20	0.40	•	•	•	•	•
SOMX 070305-DT	7.70	3.60	0.50	•	•	•	•	•
SOMX 160512-DT	16.00	5.56	1.20			•		

• DT - a general use chipformer for medium to high feed rates • For user guide and cutting conditions, see pages 117-128

For tools, see pages: DR-2D-N (106) • DR-3D-N (108) • DR-4D-N (109) • DR-4D-T (112) • DR-5D-N (111) • MD-DR-DH-HEAD (83)

DR-TWIST INDEXABLE DRILL LINE

SOMX-GF
Inserts with a GF Chipformer for Soft Materials Used on DR Drills



Designation	Dimensions IC	S	RE	IC908
SOMX 050204-GF	5.40	2.40	0.40	•
SOMX 060304-GF	6.20	3.20	0.40	•
SOMX 070305-GF	7.70	3.60	0.50	•

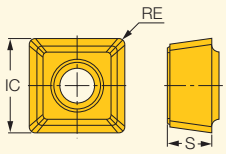
• GF - a narrow chipformer for use on soft materials at low to medium feed rates • For user guide and cutting conditions, see pages 117-128

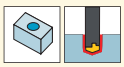
For tools, see pages: DR-2D-N (106) • DR-3D-N (108) • DR-4D-N (109) • DR-4D-T (112) • DR-5D-N (111) • MD-DR-DH-HEAD (83)

DR-TWIST INDEXABLE DRILL LINE

SOMX-HD

Inserts for DR Drills for Carbon Steel and Soft Materials





Designation	Dimensions IC	S	RE	IC808
SOMX 050204-HD	5.40	2.40	0.40	●
SOMX 060304-HD	6.20	3.20	0.40	●
SOMX 070305-HD	7.70	3.60	0.50	●

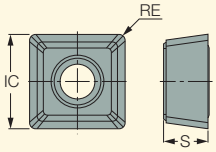
• For user guide and cutting conditions, see pages 117-128

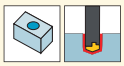
For tools, see pages: DR-2D-N (106) • DR-3D-N (108) • DR-4D-N (109) • DR-4D-T (112) • DR-5D-N (111) • MD-DR-DH-HEAD (83)

DR-TWIST INDEXABLE DRILL LINE

SOGX/T-AL

Inserts for DR Drills for Aluminum





Designation	Dimensions IC	S	RE	IC08
SOGX 050204-AL	5.40	2.40	0.40	●
SOGX 060304-AL	6.20	3.20	0.40	●
SOGX 070305-AL	7.70	3.60	0.50	●
SOGT 09T306-AL	9.00	3.81	0.60	●
SOGT 120408-AL	12.70	4.76	0.80	●

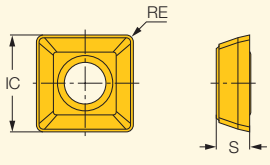
• Sharp cutting edge with polished rake for aluminum • For user guide and cutting conditions, see pages 117-128

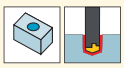
For tools, see pages: CR SOMT (411) • DR-2D-N (106) • DR-3D-N (108) • DR-4D-N (109) • DR-4D-T (112) • DR-5D-N (111)

DR-TWIST INDEXABLE DRILL LINE

SOMT-GF

Inserts for DR Drills for Soft Materials at Low-to-Medium Feeds





Designation	Dimensions IC	S	RE	Tough ↔ Hard IC328	IC908
SOMT 09T306-GF	9.00	3.81	0.60	●	●
SOMT 120408-GF	12.70	4.76	0.80		●
SOMT 160512-GF	16.00	5.56	1.20		●

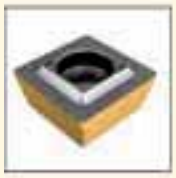
• For user guide and cutting conditions, see pages 117-128

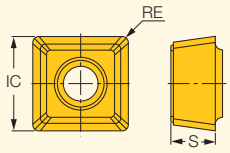
For tools, see pages: CR SOMT (411) • DR-2D-N (106) • DR-3D-N (108) • DR-4D-N (109) • DR-4D-T (112) • DR-CA (113)

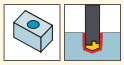
DR-TWIST INDEXABLE DRILL LINE

SOMT-HD

Inserts for DR Drills for Carbon Steel and Soft Materials







Designation	Dimensions IC	S	RE	IC808
SOMT 09T306-HD	9.00	3.81	0.60	●
SOMT 100408-HD	9.80	4.30	0.80	●
SOMT 110408-HD	11.50	4.80	0.80	●
SOMT 120408-HD	12.70	4.76	0.80	●
SOMT 160512-HD	16.00	5.56	1.20	●

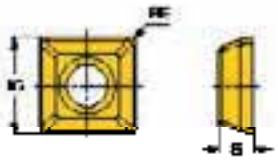
• For user guide and cutting conditions, see pages 117-128

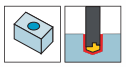
For tools, see pages: CR SOMT (411) • DR-2D-N (106) • DR-3D-N (108) • DR-4D-N (109) • DR-4D-T (112) • DR-CA (113)

DR-TWIST INDEXABLE DRILL LINE

SOMT-DT

Inserts for DR Drills for General Applications at Medium-to-High Feeds





Designation	Dimensions IC	S	RE	Tough ↔ Hard IC328	IC5500	IC808	IC908	IC8080	IC9080
SOMT 060204-DT	6.00	1.96	0.40	●		●	●		
SOMT 09T306-DT	9.00	3.81	0.60		●	●	●	●	●
SOMT 100408-DT	9.80	4.30	0.80			●	●	●	
SOMT 110408-DT	11.50	4.80	0.80			●	●		
SOMT 120408-DT	12.70	4.76	0.80			●	●	●	●
SOMT 140512-DT	14.30	5.20	1.20			●	●	●	
SOMT 160512-DT	16.00	5.56	1.20			●	●		●

• For user guide and cutting conditions, see pages 117-128

For tools, see pages: CR SOMT (411) • DR-2D-N (106) • DR-3D-N (108) • DR-4D-N (109) • DR-4D-T (112) • DR-CA (113)

Specially Tailored Designation Code Key

Metric
MN - SUMOCHAM heads
MNC - COMBICHAM
MF - CHAM-IQ-DRILL
M3N - LOGIQ-3-CHAM
MD - IDI Heads
MR - XOMT/SOMT/SOMX Inserts
MC - Assembly
MH - Combi Holder

Metric
#.##

Metric
#.##

Other Characteristics
F - Cartridge
A - Adjustable Cartridge
R - No Cartridge
L - Left-Hand Drill
B - Boring Tool
S - Stacked Plates
T - Flat Bottom
C - Frontal Coolant
H - Heavy Metal
P - Combi Head
Y - Combi Assembly
M - Twisted

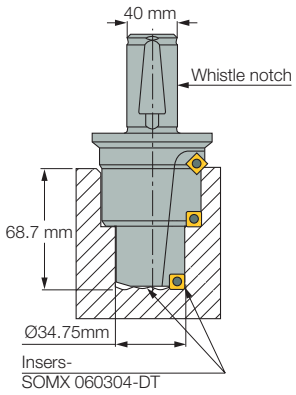
Inch
IN - SUMOCHAM heads
INC - COMBICHAM
IF - CHAM-IQ-DRILL
I3N - LOGIQ-3-CHAM
ID - IDI Heads
IR - XOMT/SOMT/SOMX Inserts
IC - Assembly
IH - Combi Heads

Inch
#.##

Inch
#.##

ANSI	ISO
A - 2	SOMT 06
F - 3	SOMT 09
H - 4	SOMT 12
K - 5	SOMT 16
T - 4	AOMT 04
P - 5	SOMX 05
Q - 6	SOMX 06
R - 7	SOMX 07
J - 10	SOMT 10
I - 11	SOMT 11
L - 14	SOMT 14
N - DCN/D3N Pocket	
E - DCM Pocket	

Line	Drill Diameter		Drilling Depth		Shank/Flange Code		Insert Size		Insert Qty	Other
M	R	3	4	8	-	0	6	9	N	D	-	Q	4	R



Shank Type Code	
F	One Parallel Flat
D	Two Parallel Flats (DZ Metric Type)
E	Extended Lengh (For Coolant Ring)
N	Whistle Notch (DR Metric Type)
L	One Flat (ISO 9266 Cham Shank)
R	Round (Fully Rounded)
W	Weldon
M	Morse
H	HSK
X	Special
P	CLICKFIT
B	BBS (ABS Compatible)(1)
K	IM (ISO 26622-1 standard)
C	CAMFIX
V	VDI (ISO 26623-1 standard)

Other types on request

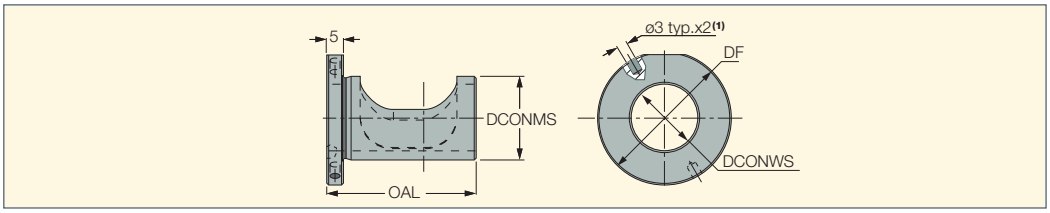
(1) The trademark ABS® is owned by the KOMET GROUP

Shank/Diameter Type Code			
P	10 mm	Z	.375"
S	12 mm	T	.437"
Q	14 mm	V	.500"
R	16 mm	W	.562"
H	18 mm	U	.625"
A	20 mm	J	.750"
B	25 mm	K	1.000"
C	32 mm	L	1.250"
D	40 mm	M	1.500"
E	50 mm	N	2.000"
F	63 mm	2	MT2
G	80 mm	3	MT3
X	Special	4	MT4
		5	MT5

Accessories

Drilling Eccenter Sleeves

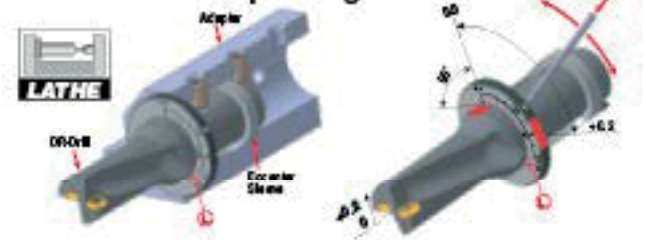
Bushings for Enlarging or Reducing DR Nominal Drilling Diameters by Shifting the Drill Off-Center



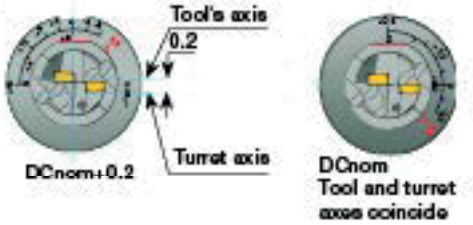
Designation	DCONWS	DCONMS	DF	OAL
ECCENTER SLEEVE 20X25	20.00	25.00	40.00	44.00
ECCENTER SLEEVE 25X32	25.00	32.00	50.00	46.00
ECCENTER SLEEVE 32X40	32.00	40.00	65.00	55.00
ECCENTER SLEEVE 40X50	40.00	50.00	75.00	77.00

- (1) Holes for inserting a pin, used to facilitate radial adjustment of the sleeve (pin not supplied)

Eccenter Sleeve Operating Instructions

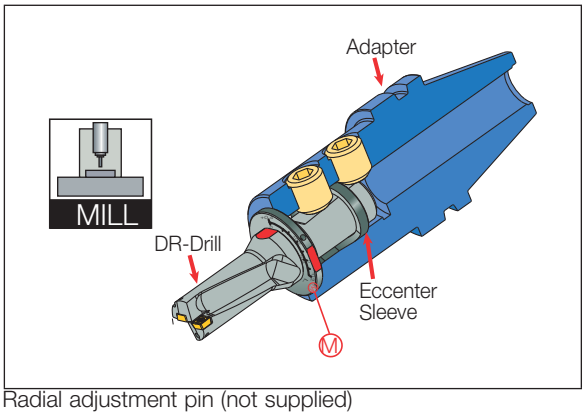


Operation on a Lathe

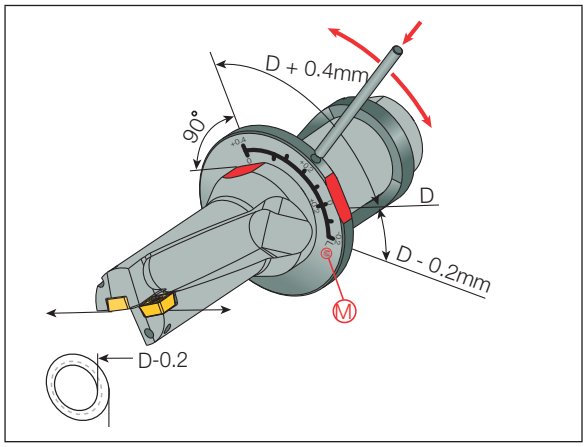


On a lathe, the eccenter sleeve can shift the drill's axis to coincide with the spindle axis. The eccentric sleeve enables alignment of the drill's axis with the spindle axis within a 0.2 mm range (turn the sleeve counterclockwise to raise it).

On a milling machine, the drill's nominal diameter can be changed by shifting the drill's axis out of the tool spindle.

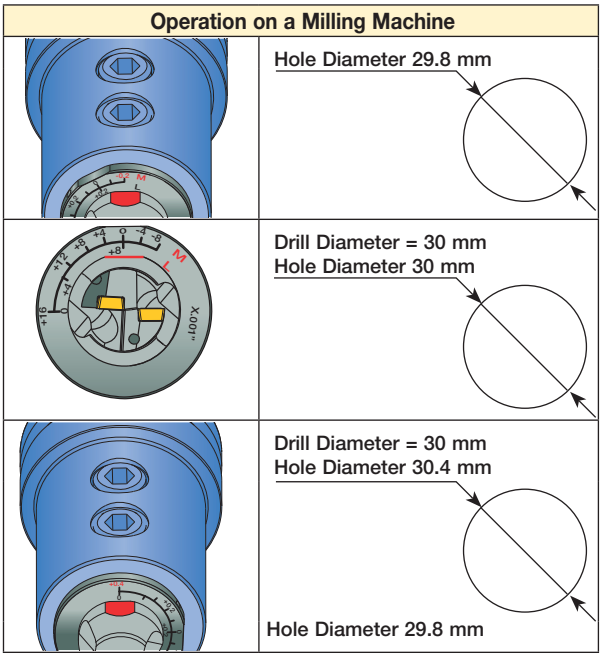


Radial adjustment pin (not supplied)

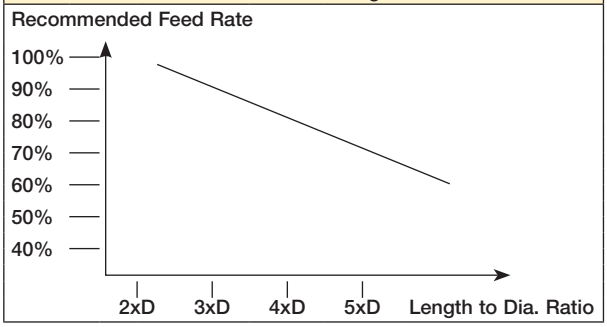


To enlarge the diameter, turn the sleeve clockwise

Operation on a Milling Machine



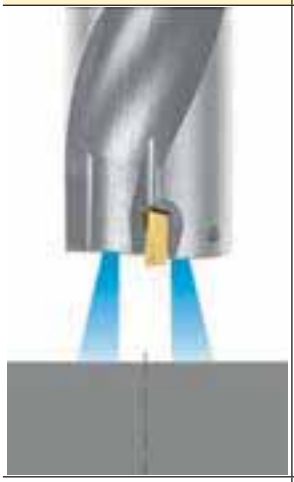
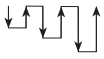
Recommended Feed When Using Eccenter Sleeves



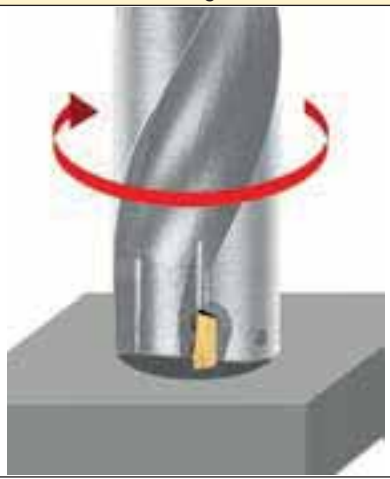
Machining Conditions

Cooling Methods

Directing the coolant through the tool is essential for reliable machining. This method prevents chip pile up, insert damage or breakage, and damage to the workpiece surface.

Internal Coolant	External Coolant
	
Apply standard cutting data.	Drilling depth is limited to 1.5xD. For larger depths, a pecking cycle is recommended. 

Rotating Drills



For best results:

1 Check adapter rigidity.
2 Minimize drill runout in relation to spindle center line.
3 Use recommended cutting conditions.

How to Select Cutting Parameters

Step 1 - Prior to Drilling

- Use charts on pages 122-124 to select feed and speed according to workpiece material.
- For the first grade choice, in general we recommend selecting IC808.

Step 2 - Initial Test Hole Drilling

- Evaluate chip evacuation. If not satisfactory, adjust feed and speed, using example photos below.
- If chip evacuation is still a problem, i.e. chips are too long, change the chipbreaker to GF as shown below.

SOMT/SOMX

Too Tight	Optimal Shape	Too Long
		
may cause insert damage		may cause tool damage

Optimizing Chip Shape

Chip control is one of the most important factors for tool performance in order to facilitate chip evacuation and avoid tool damage.
Cutting conditions must be adjusted to achieve optimal chip shape.

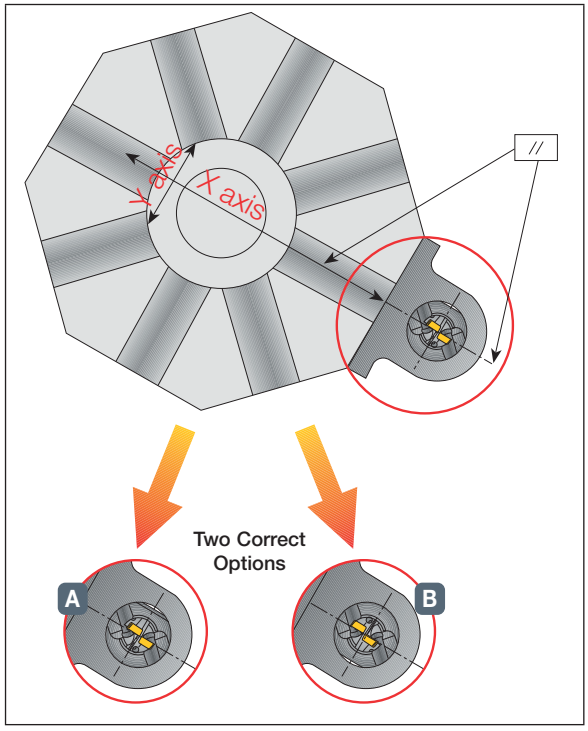
How To Achieve Optimal Chip Shape

Too Tight		Too Long
Increase speed within recommended limits. If not satisfactory, decrease feed.	→ Optimal Shape ←	If machining at high speed, first reduce speed. If unsatisfactory, increase feed, but do not exceed upper limit.

Setup of Non-Rotating Drills

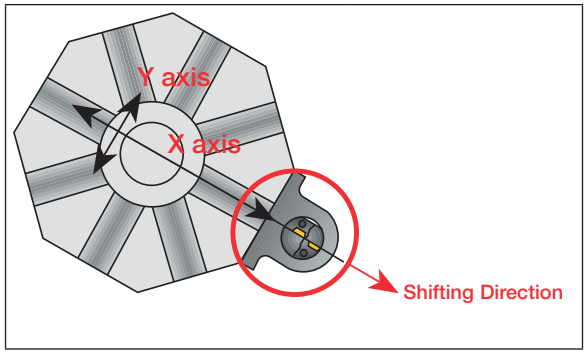
Drill Positioning on Turret Lathe

The peripheral insert cutting edge should be parallel to the machine X-axis.



The drill can be mounted on the X-axis or on a 180º rotation.

For better chip evacuation it is recommended to apply option **A** peripheral insert position.



Change hole diameter by shifting drill's center along lathe x-axis.

Diameter Change by Center Shift

DR-06	
D Nominal	**D Max. on Lathe**
16	19.5
17	20.0
18	20.5
19	21.0
20	21.5
21	22.0
22	23.0

DR-09	
D Nominal	**D Max. on Lathe**
23	28.5
24	29.0
25	29.5
26	30.0
27	30.5
28	31.0
29	31.5
30	32.0
31	32.5
32	33.3
33	34.0
34	34.5
35	35.0

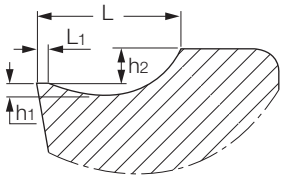
DR-12	
D Nominal	**D Max. on Lathe**
34	39.5
35	40.0
36	40.5
37	41.0
38	41.5
39	42.0
40	42.5
41	43.0
42	43.5
43	44.0
44	44.5
45	51.0
46	51.5
47	52.0
48	52.5
49	53.0
50	54.0
51	54.5
52	55.0
53	55.5
54	56.0
55	56.5
56	57.0
57	57.5
58	58.0
59	59.0
60	60.0

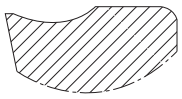
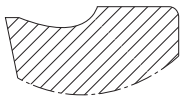
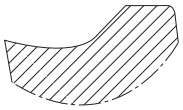
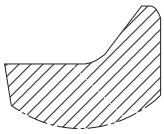
Applicable only when using SOMT inserts

Setup of Non-Rotating Drills

Machining Conditions

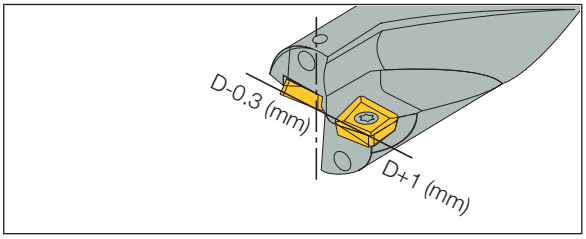
Optimizing Chip Shape for DR Drills



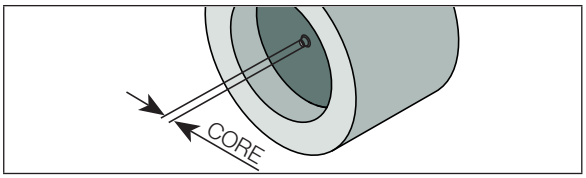
DT	GF
	
General use **For ISO – P/M/K/H/S materials** **For medium up to high feed rates** L – open H2 – low L1 – medium H1 – shallow	**For low up to medium feed rates** **For ISO – P material** L – close H2 – high L1 – small H1 – deep
AL	**HD**
	
For medium up to high feed rates **For ISO – N material** L – open H2 – high L1 – non H1 – deep	**For low up to medium feed rates** **For ISO – P material** L – open H2 – high L1 – non H1 – non

Make sure the center line of the drill is aligned with the spindle center line. It is recommended to verify the setup according to the instructions shown below.

DR-06



Under regular conditions it is possible to adjust the center line of the drill (X-axis of the machine) in order to change hole diameter size.

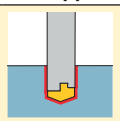


1 Drill a hole 6 mm deep with the drill center line aligned with the spindle center line.
2 Check the existing core. If there is no core, check the alignment of the Y-axis of the drill and spindle. Correct by checking the adapter or adjusting the Y-axis.
3 Check that the hole diameter equals the drill diameter +0.0- +0.2 mm. If not, adjust the X-axis.
4 Note: In some operations, part of the core may break. If this occurs, use finger contact to verify if any core remains

Warning: As the drill goes all the way through a workpiece, it ejects a disc.
For worker safety, guards should be used..

Drilling Insert Grades

Grades for Applications and Materials

Material Groups / Main Applications		ISO P		ISO M	ISO K	ISO N	ISO S	ISO H
		1-11	12-13	14	15-20	21-28	31-37	38-41
		Steel	Stainless Steel Ferritic & Martensitic	Stainless Steel Austenitic & Duplex (Ferritic-Austenitic)	Cast Iron	Nonferrous	High Temp	Hard Steel
 DRILLING	Harder							
		IC808 (908)	IC808 (908)	IC808 (908)	IC8080[1] (9080)	IC808 (908)	IC808 (908)	IC808 (908)
		IC5500			IC808 (908)			
	Tougher							

[1] Use for an outer insert on DR drills

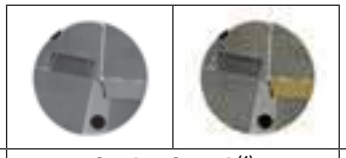
Default recommendation

Machining Data for DR Drills

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Group No.(1)
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1
		≥ 0.25 %C	Annealed	650	190	2
		< 0.55 %C	Quenched and tempered	850	250	3
		≥ 0.55 %C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel and cast steel		Austenitic, duplex	600	180	14
K	Gray cast iron (GG)		Ferritic / pearlitic		180	15
			Pearlitic / martensitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloys		Not hardenable		60	21
			Hardenable		100	22
	Aluminum-cast alloys	≤12% Si	Not hardenable		75	23
			Hardenable		90	24
		>12% Si	High temperature		130	25
	Copper alloys	>1% Pb	Free cutting		110	26
			Brass		90	27
			Electrolytic copper		100	28
	Non metallic		Duroplastics, fiber plastics			29
			Hard rubber			30
S	High temperature alloys	Fe based	Annealed		200	31
			Hardened		280	32
		Ni or Co based	Annealed		250	33
			Hardened		350	34
			Cast		320	35
	Titanium alloys		Pure	400		36
			Alpha+beta alloys, hardened	1050		37
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

- This table refers to 2/3xD drill ratio usage. For 4xD ratio decrease cutting data by 15%
- Chipformer should be selected based on our geometry range recommendations
- When using external coolant supply only, reduce cutting speed by 10%
- Use internal coolant supply when machining austenitic stainless steel

(1) For workpiece materials list, see pages 495-524



Mat. No.	Cutting Speed (1)			Feed vs. Drill Diameter mm/rev					
	V_c m/min IC808/ 908 external	V_c m/min IC8080 /9080 external	DR-04 AL/DT/HD	DR-05 GF/DT/AL/HD	DR-06 GF/DT/AL/HD	DR-07 GF/DT/AL/HD	DR-09/10 GF/DT/AL/HD	DR-11/12 GF/DT/AL/HD	DR-14/16 GF/DT/AL/HD
1	200-300	260-390	0.04-0.08 0.02-0.06	0.06-0.10 0.10-0.15 0.04-0.08	0.07-0.12 0.10-0.16 0.04-0.08	0.08-0.12 0.12-0.18 0.05-0.10	0.10-0.15 0.14-0.22 0.05-0.10	0.12-0.16 0.15-0.25 0.08-0.15	0.14-0.17 0.16-0.26 0.08-0.15
2									
3	150-200	190-260							
4									
5									
6	150-220	190-290		0.06-0.10 0.10-0.14 0.04-0.08	0.07-0.12 0.10-0.15 0.04-0.08	0.08-0.12 0.10-0.16 0.05-0.10	0.10-0.14 0.14-0.20 0.05-0.10	0.12-0.15 0.14-0.22 0.08-0.15	0.14-0.16 0.15-0.24 0.08-0.15
7	120-180	160-230							
8									
9									
10	120-190	160-250		0.06-0.10 0.10-0.14 0.08-0.112	0.06-0.10 0.10-0.14 0.08-0.112	0.06-0.10 0.10-0.14 0.08-0.112	0.08-0.12 0.12-0.18 0.096-0.144	0.10-0.15 0.14-0.20 0.112-0.160	0.14-0.17 0.16-0.24 0.128-0.192
11	100-160	210-310							
12	160-240	210-310		0.06-0.10 0.048-0.08	0.06-0.10 0.048-0.08	0.06-0.12 0.048-0.096	0.08-0.12 0.064-0.096	0.10-0.14 0.08-0.112	0.12-0.20 0.096-0.160
13									
14	160-240	210-310	0.04-0.08	0.06-0.10	0.06-0.10	0.06-0.12	0.08-0.12	0.10-0.14	0.12-0.20
15	150-250	190-320	0.08-0.16	0.10-0.22	0.10-0.22	0.10-0.22	0.15-0.25	0.18-0.30	0.20-0.34
16									
17	120-180	160-230							
18									
19									
20									
21	150-300	190-390	0.08-0.24	0.12-0.25	0.12-0.25	0.12-0.25	0.20-0.30	0.2-0.35	0.28-0.45
22									
23									
24									
25									
26									
27									
28									
29									
30									
31	20-50	30-60	0.03-0.07	0.04-0.08	0.04-0.08	0.05-0.09	0.07-0.10	0.08-0.12	0.10-0.14
32									
33									
34									
35									
36	50-60	60-80							
37									
38	20-50	30-60	0.04-0.08	0.05-0.08	0.05-0.08	0.06-0.09	0.07-0.10	0.08-0.12	0.10-0.14
39									
40									
41									

(1) Central insert should always be IC808/IC908

- This table refers to 2/3xD drill lengths. For 4xD and 5XD drills, decrease cutting data by 15%
- When using only external coolant supply, reduce cutting speed by 10%
- Use internal coolant supply when machining austenitic stainless steel

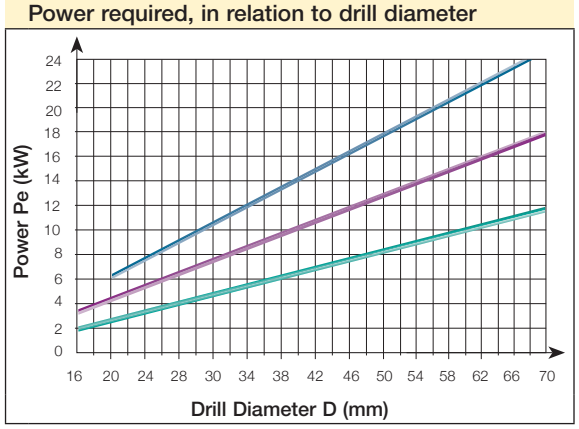
Machining Conditions for Large Diameter DR-TWIST Drills

Material	V_c (m/min)	Feed (mm/rev)		
		57-66 dia.	67-73 dia.	74-80 dia.
Low Carbon Steel (<0.3% C)	180-250	0.08-0.12	0.08-0.12	0.09-0.14
Carbon Steel (>0.3% C)	160-220	0.12-0.18	0.12-0.18	0.14-0.21
Low Alloy Steel (<HB300)	150-220	0.10-0.18	0.10-0.18	0.12-0.21
High Alloy Steel (>HB300)	130-180	0.10-0.15	0.10-0.15	0.12-0.17
Stainless Steel	170-240	0.08-0.15	0.08-0.15	0.09-0.17
Cast Iron	180-250	0.15-0.22	0.15-0.22	0.17-0.25
Ductile Cast Iron	130-200	0.10-0.20	0.10-0.20	0.12-0.23
Aluminum	330-380	0.15-0.25	0.15-0.25	0.17-0.29
Ti Alloy (Ti 6Al)	30-60	0.12-0.16	0.12-0.16	0.14-0.18

Machining Conditions

Machine Power and Feed Force Requirements

Power required, in relation to drill diameter



f=0.25
f=0.18
f=0.1

Required Machine Power
Material: SAE 4140

Cutting speed: 100 m/min

For different cutting speeds, use factor as follows:

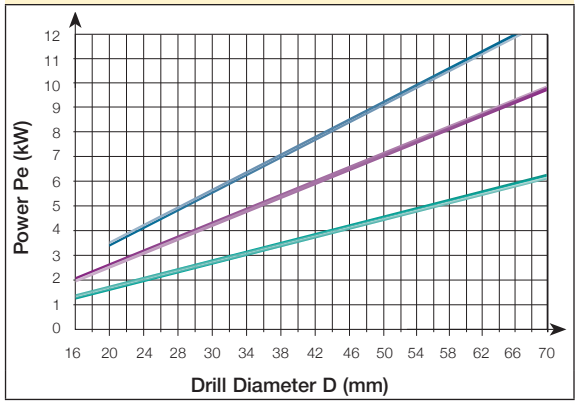
Machine Power

$$P = \frac{Pe \cdot C}{\eta}$$

V_c [m/min]	100	150	200
C	1.0	1.5	2.0

η=Machine efficiency

Feed force (thrust force) required, in relation to drill diameter



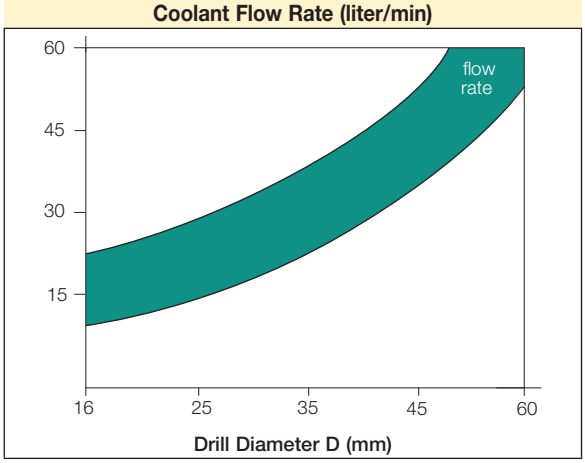
f=0.25
f=0.18
f=0.1

Required Feed Force
Material: SAE 4140

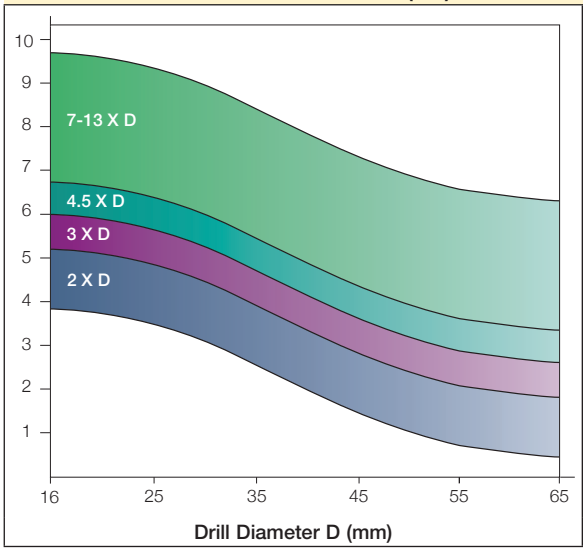
Internal Coolant Pressure

Selecting Coolant Pressure and Flow Rate

Coolant Flow Rate (liter/min)



Minimum Coolant Pressure (bar)



* For special drills more than 4xD, it is recommended to use high coolant pressure 15–70 bar

Troubleshooting

Irregular Conditions for DR Drills

If surface slope exceeds 5º, reduce feed by 50% during penetration or when exiting. It is preferred to pre-face the surface to eliminate slope.

1 Drilling into a pre-hole reduces feed to eliminate deflection(1) of the drill body.
2 Drilling an interrupted cut reduces feed during crossing to eliminate deflection(1) of the drill body.
3 Insufficient stability of workpiece requires additional support. Reduce feed.

(1) Deflection may be observed by a mark on the drill body.
Note: For irregular applications, use DR drills with XOMT inserts as a first priority.

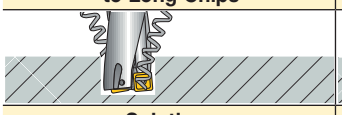
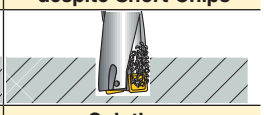
Stacked Plates

Drilling operation is not recommended, but may be done by specially designed drills in 16-60 mm range. Apply standard cutting data.

Regular Conditions for DR Drills

Note: For irregular applications, use DR drills with XOMT inserts as a first priority.

Indexable Insert Drills - Troubleshooting DR Chips

Chip Jamming due to Long Chips	Chip Jamming despite Short Chips
	
Solutions	**Solutions**
1 Increase feed. If drilling a very soft material, reduce feed and increase speed. 2 Choose a geometry with a tighter chipbreaker for lower feeds (GF). 3 Long chips that rotate around the drill are problematic. If chip formation can not be improved by changing the machining conditions, use a pecking cycle. 	1 Increase coolant pressure/volume. 2 Reduce cutting speed.

Chipping Along Cutting Edge	Machine Troubleshooting Vibrations
Solutions	**Solutions**
1 Reduce entrance feed. 2 Choose a tougher grade. 3 Choose a geometry with open chip breaking for higher feeds. (SOMT, WOLH) 4 Reduce feed.* 5 Reduce cutting speed. 6 Increase coolant pressure.	1 Check mounting of drill. 2 Check mounting of workpiece. 3 Increase feed. If drilling a very soft material, reduce feed and increase speed.* 4 Reduce cutting speed.

Chipping of Center Insert	Insufficient Torque
Solutions	**Solutions**
1 Check mounting of drill. 2 Check mounting of workpiece. 3 Reduce entrance feed. 4 Reduce cutting speed. 5 Check drill runout (should be 0.05 mm maximum).	1 Reduce feed.* 2 Choose a geometry with a looser chipformer.

Excessive Flank Wear	Insufficient Power
Solutions	**Solutions**
1 Reduce cutting speed. 2 Increase coolant pressure/volume. 3 Choose a better wear resistant grade.	1 Reduce cutting speed. 2 Reduce feed.* 3 Choose a geometry with a looser chipformer.

* Use GF chipformer

Troubleshooting

Undersized holes / Oversized holes

Rotating drill
- Check that overlapping is correct between inner and outer inserts
- Check inner insert over center
- Increase coolant pressure
- Change the insert chipbreaker

Non-rotating drill
- Check misalignment
- Check that overlapping is correct between inner and outer inserts
- Check inner insert over center
- Rotate drill 180 degrees
- Increase coolant pressure
- Change the insert chipbreaker

Pin in hole / Vibrations

Rotating drill
- Use shorter drill overhang (if possible)
- Reduce feed by 30-50%
- Check that overlapping is correct between inner and outer inserts
- Check inner insert is positioned over center within its limits
- Increase coolant pressure
- Change the insert chipbreaker

Non-rotating drill
- Check misalignment
- Check that overlapping is correct between inner and outer inserts
- Check inner insert over center
- Rotate drill 180 degrees
- Increase coolant pressure
- Change the insert chipbreaker

Cone Hole

Rotating drill
- Use shorter drill overhang (if possible)
- Reduce feed by 30-50%
- Check that overlapping is correct between inner and outer inserts
- Check inner insert is positioned over center within its limits
- Increase coolant pressure
- Change the insert chipbreaker

Non-rotating drill
- Check misalignment
- Check that overlapping is correct between inner and outer inserts
- Check inner insert is positioned over center within its limits
- Rotate drill 180 degrees
- Increase coolant pressure
- Change the insert chipbreaker

Bad Surface Finish

Rotating drill
- Improve chip formation (change chipbreaker type or cutting condition)
- Increase coolant pressure
- Increase speed and reduce feed
- Stabilize clamping device

Non-rotating drill
- Improve chip formation (change chipbreaker type or cutting condition)
- Increase coolant pressure
- Increase speed and reduce feed
- Stabilize clamping device

Chip jamming

Rotating drill
- Improve chip formation (change chipbreaker type or cutting condition)
- Increase coolant pressure

Non-rotating drill
- Improve chip formation (change chipbreaker type or cutting condition)
- Increase coolant pressure

Deflection

Rotating drill
- Use shorter drill overhang (if possible)
- Reduce feed by 30-50%
- Check that overlapping is correct between inner and outer inserts
- Check inner insert is positioned over center within its limits
- Increase coolant pressure
- Change the insert chipbreaker
- Stabilize clamping device

Non-rotating drill
- Check misalignment
- Check that overlapping is correct between inner and outer inserts
- Check inner insert is positioned over center within its limits
- Rotate drill 180 degrees
- Increase coolant pressure
- Change the insert chipbreaker

Broken Screw

- Use recommended torque wrench
- Lubricate the screw before tightening

Insufficient machine power-

- Reduce speed and feed
- Use recommended chipbreaker for low feed

Insufficient machine torque

- Reduce feed
- Use recommended chipbreaker for low feed

Chip Formation Problems

Long chip/ Chip jamming:
This typical problem with stainless or low carbon steel, can affect hole quality, especially on surface finish, and in some cases can cause insert or tool breakage.

Optimal Shape	Too Long	Too Tight
		
	If machining at high speed, first reduce speed. If unsatisfactory, increase feed, but do not exceed upper limit.	Increase speed within recommended limits. If not satisfactory, decrease feed.

DR-DH Deep Drills for Milling Centers and Lathe Machines

DR-DH are drills for a drilling depth-to-diameter ratio of 7xD and up, to be used on standard horizontal milling centers, turning, and multi-task machines. Use of supplementary machine and setup can be avoided. These drills can be used with the existing adaptations, not requiring any special coolant pressure or extra pump capacity.

DR-DH drills are available as semi-standard items in the diameter range of 25.4 to 69.5 mm.

Features

- High feed drilling: up to 0.35 mm/rev for high productivity
- Excellent surface quality: Ra = 0.6 – 2.0 [µm]
- Good hole cylindricity: 50-80 [µm]
- Hole tolerance: IT10
- Large drilling depth: L=7xD and higher – up to 800 mm
- Carries standard SOMX/SOMT indexable inserts with 4 cutting edges
- No dedicated machine or extra setup needed
- Standard coolant pressure as used in general drilling
- Standard indexable, double-ended guide pads
- Used for steel (ISO P) and cast iron (ISO K) materials

ISCAR offers two drill versions:

Single Flute
DR-DH-31.65-0350NC-2FS

- Very rigid tool
- Designed for easy to cut materials such as cast iron and low alloyed steel
- Patented chip gullet design

Double Flute
DR-DH-31.65-0350NC-2FD

- Double chip gullet for improved chip flow
- Designed for drilling gummy materials such as non-alloyed steel and high temperature alloys

Designation

Metric

DR - DH	-	31.65	-	0350	N	C	-	2	F	D
Family		Dia. (mm)		Drilling depth (mm)	Shank Type	Shank dia.		No. of Pads	F=Cartridge R= No cartridge	D=Double flute S=Single flute

Inch

DR - DH	-	1.500	-	12.00	N	C	-	2	F	D

- The **DR-DH** drills will be supplied upon request. For a quotation, please contact **ISCAR** headquarters, providing all necessary hole and drill details (See following requested information form).

Requested Information Form for Deep Hole Drill Design

Company name _____ **Telephone no.** _____

Address _____ **Date** _____

Contact person _____ **Customer no.** _____

Workpiece

Product name: _____ Hole diameter: _____

Hole depth: _____ No. of holes: _____ Tolerance (of hole): _____

Surface finish (Rz, Ra...): _____ Deviation (mm/100): _____ Straightness (mm/100): _____

Material

Material (DIN, AISI, JIS...): _____

Hardness (HB, HS, HRC...): _____

Condition: o Quenched o Tempered o Cast o Annealed

o Other _____

Machine

Machine supplier name: _____

Machine type/model: o NC lathe o Machining center o Horizontal o Vertical

Rigidity: o Good o Normal o Poor

Spindle power (kW): _____

Tool and/or workpiece rotation (TR/WR):

o Tool and workpiece o Rotating workpiece (WR) o Rotating tool (TR)

Type of Coolant

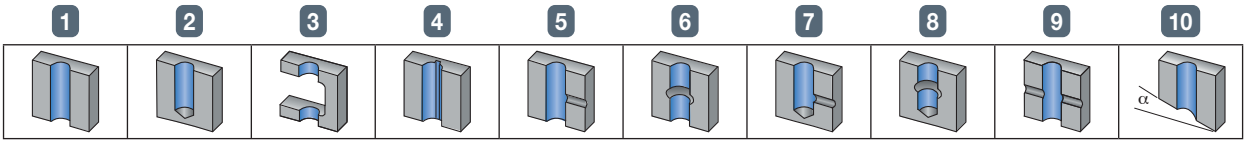
Water based: o Soluble o Emulsion _____%

Oil based: o Coolant Pressure (bar): Coolant Volume (L/min):

Hole Data

Need a pre-hole drill quoation o Pre-drilled hole size _____% (mm/inch)

Bore Type



Please sketch your drilling application

General Production Information

Quantity of parts per year _____

Grade, tool life, etc _____

Cutting data _____

Perfomance expectation V_c = _____ m/min N = _____ RPM F = _____ mm/min f = _____ mm/rev

Description of present system in use _____

Please fill in and return to your ISCAR representative.

User Guide

1 A short pre-hole 20 mm long (minimum) with **H8** hole tolerance should be prepared to guide the long drill (a standard **DR** drill or an endmill can be used).

Option No.1

1.1 Penetration with an endmill

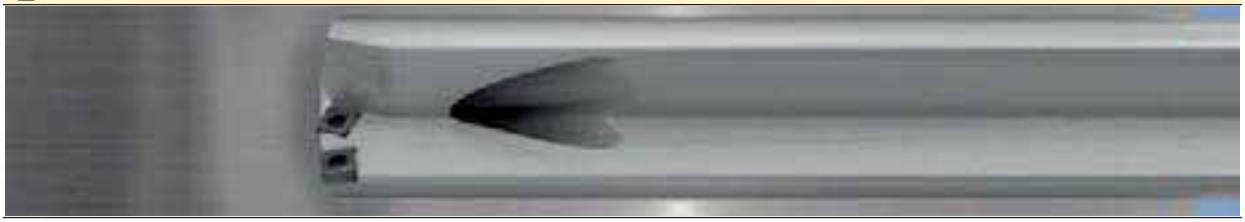
1.2 Enlargement with the endmill

Option No.2

2.1 Penetration by drilling

2.2 DRG-MF boring

3 Deep hole drilling with DR-DH



2 The **DR-DH** drill should enter into the pre-hole at slow rotation speed and with coolant supply.

DR-DH Insert Mounting Configuration vs. Drill Diameter

DR-DH ø##.# [mm]	Central Insert	Intermediate Insert	Peripheral Insert	Guiding Pad
25.4-28.5	SOMX 050204...	SOMX 050204...	SOMX 050204...	GPS-06-20-075
28.6-30.0	SOMX 050204...	SOMX 060304...	SOMX 050204...	GPS-07-20-120
30.1-33.0	SOMX 060304...	SOMX 060304...	SOMX 060304...	GPS-07-20-120
33.1-37.5	SOMX 060304...	SOMX 070305...	SOMX 060304...	GPS-08-25-155
37.6-40.5	SOMX 070305...	SOMX 070305...	SOMX 070305...	GPS-08-25-155
40.6-42.9	SOMX 070305...	SOMT 09T306...	SOMX 070305...	GPS-08-25-155
43.0-47.5	SOMT 09T306...	SOMT 09T306...	SOMT 09T306...	GPS-08-25-155
47.6-51.0	SOMT 100408...	SOMT 100408...	SOMT 100408...	GPS-10-30-200
51.1-54.0	SOMT 100408...	SOMT 110408...	SOMT 100408...	GPS-10-30-200
54.1-57.4	SOMT 100408...	SOMT 110408...	SOMT 110408...	GPS-10-30-200
57.5-61.0	SOMT 110408...	SOMT 110408...	SOMT 110408...	GPS-14-40-250
61.1-63.0	SOMT 110408...	SOMT 120408...	SOMT 110408...	GPS-14-40-250
63.1-69.5	SOMT 120408...	SOMT 120408...	SOMT 120408...	GPS-14-40-250

Spare Parts

Insert	Screw	Key
SOMX 050204...	SR 34-533/L	T-6/51
SOMX 060304...	SR 34-508/L	T-7/51
SOMX 070305...	SR 14-560	T-8/51
SOMT 09T306...	SR 34-506	T-9/51
SOMT 100408...	SR 14-571	T-10/51
SOMT 110408...	SR 14-544/S	T-15/51
SOMT 120408...	SR 14-544/S	T-15/51

Guiding Pad	Clamping Screw	Key
GPS-06-20-075	SR 11201753-1	T-7
GPS-06-20-085	SR 11201753-1	T-7
GPS-06-20-100	SR 11201753-1	T-7
GPS-14-40-250	SR 11201752-2	T-15
GPS-07-20-120	SR 11201753-4	T-9
GPS-10-30-200	SR 11201753-6	T-15

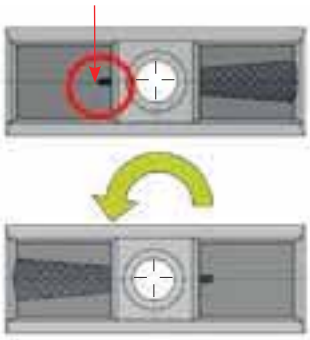
- DR-DH drills can be used with any type of adaptation. However, concentric adapters such as hydraulic chucks are advantageous for better runout. When machining high temperature alloys or applying very high machining loads, it is advisable to use strong gripping adapters such as: side lock adapters, power / hydraulic chucks.
- In case of chip formation or chip evacuation problems, the following sequence is recommended:

1 Reduce cutting speed by 10%
2 Increase internal coolant pressure
3 Apply a pecking cycle
4 Interrupted cut will have a direct influence on hole accuracy, quality and drill life. (Sometimes even tool breakage can occur).

Double-ended Pad

Worn support pads provide poor surface finish in a drilled hole. In this case, pads should be rotated or replaced.

Rotate when wear shows on the back side of the pad



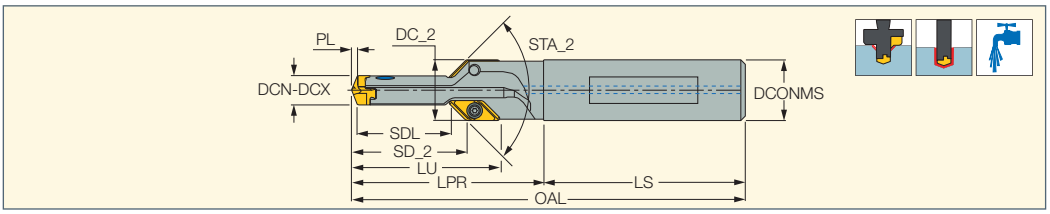
DR-DH Machining Recommendations

ISO	Material		Condition	Tensile Strength Rm [N/mm²]	Hardness HB	Mtl. No.	Cutting Speed v_c m/min	Feed mm/rev
P	Non-alloy steel and cast steel, free cutting steel	0.1 - 0.25 %C	Annealed	420	125	1	100-150	0.10-0.25
		0.25 - 0.25 %C	Annealed	650	190	2		0.10-0.25
		0.25 - 0.25 %C	Quenched and tempered	850	250	3	80-150	0.15-0.30
		0.55 - 0.80 %C	Annealed	750	220	4		0.15-0.30
		0.55 - 0.80 %C	Quenched and tempered	1000	300	5		0.15-0.30
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6		0.15-0.30
			Quenched and tempered	930	275	7	70-120	0.15-0.30
				1000	300	8		0.15-0.30
				1200	350	9		0.15-0.30
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10	80-150	0.10-0.25
			Quenched and tempered	1100	325	11	70-120	0.10-0.25
K	Grey cast iron (GG)		Ferritic / pearlitic		180	15	180-300	0.18-0.35
			Pearlitic / martensitic		260	16		0.18-0.35
	Nodular cast iron (GGG)		Ferritic		160	17	150-250	0.15-0.30
			Pearlitic		250	18		0.15-0.30
	Malleable cast iron		Ferritic		130	19		0.15-0.35
			Pearlitic		230	20		0.15-0.35

PRETHREAD

DCT (M8-M24)

Exchangeable Head Drills with Chamfering Inserts Mainly for Pre-Thread Holes



Designation	DCN[2]	Dnominal[3]	DCX[4]	DC_2	DCONMS	SDL	LU	LPR	OAL	LS	STA_2	PL	SSC[5]	Th[6]	SD_2			
DCT 068-021-14B-M8 [1]	6.80	6.80	7.40	13.90	14.00	20.9	31.70	43.10	88.14	45.0	90.0	1.240	6.8	M8	25.74	SR 34-508	T-7/51	K DCM- 8
DCT 085-026-14B-M10	8.30	8.50	8.90	14.00	14.00	26.3	36.60	48.00	93.05	45.0	90.0	1.550	8.0	M10	30.55	SR 34-508	T-7/51	K DCM- 8
DCT 102-030-14B-M12	10.00	10.20	10.90	14.00	14.00	30.0	39.80	53.90	98.86	45.0	90.0	1.860	10.0	M12	33.76	SR 34-508	T-7/51	K DCM-10
DCT 120-035-16B-M14	12.00	12.00	12.90	16.00	16.00	34.9	45.10	60.20	108.18	48.0	90.0	2.180	12.0	M14	39.08	SR 34-508	T-7/51	K DCM-12
DCT 140-039-18B-M16	14.00	14.00	14.90	18.00	18.00	39.0	49.60	62.50	110.55	48.0	90.0	2.550	14.0	M16	43.55	SR 34-508	T-7/51	K DCM-14
DCT 175-042-20B-M20	17.30	17.50	17.90	21.00	20.00	42.0	53.00	66.20	116.18	50.0	90.0	3.180	17.0	M20	46.98	SR 34-508	T-7/51	K DCM-17
DCT 210-048-25B-M24	21.00	21.00	21.90	25.50	25.00	48.2	60.30	72.80	128.82	56.0	90.0	3.820	21.0	M24	54.32	SR 34-508	T-7/51	K DCM-21

• Hole tolerance: D+0.05 in average conditions. However, it can be higher or lower according to machine and tooling conditions • Do not mount smaller drilling heads other than the specified range of the drill body • For user guide and cutting conditions, see page 135

(1) Reduce recommended feed for DCT 6.8 mm drills by 10%

(2) Cutting diameter minimum

(3) Pre-thread hole diameter

(4) Cutting diameter maximum

(5) Seat size code

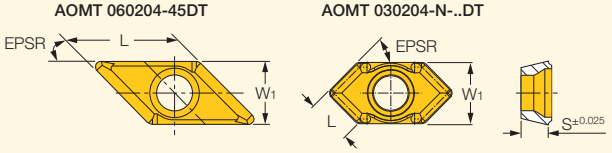
(6) Used for standard thread size

For inserts, see pages: AOMT-Chamfering (134) • IDI-SG (94) • IDI-SK (98)

PRETHREAD

AOMT-Chamfering

Chamfering Inserts



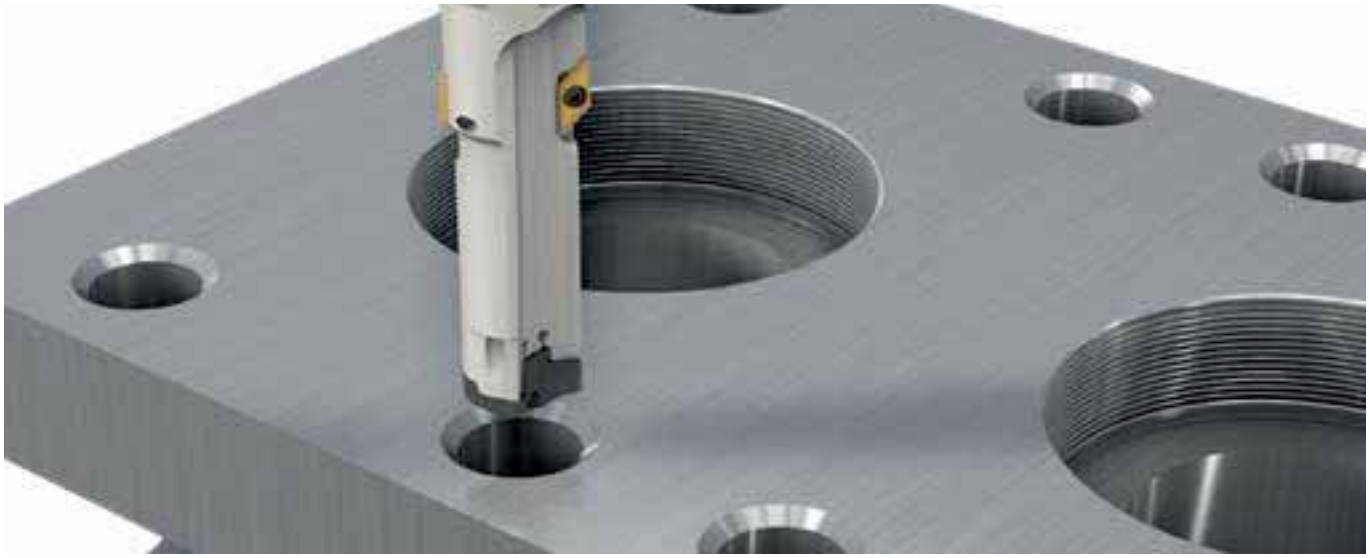
Designation	Dimensions L	W1	S	EPSR	Tough ↔ Hard IC1008	IC508	IC908
AOMT 060204-45DT	5.66	4.50	1.96	45.5		•	•
AOMT 060204-45HD [1]	5.66	4.50	1.96	45.5			•
AOMT 030204-N-45DT [2]	2.80	4.00	1.59	45.5	•		
AOMT 030204-N-30DT [2]	4.00	4.00	1.59	30.5	•		

• The cutting speed is dependent on the drilling insert being used

(1) For low carbon steel

(2) Used for specially tailored tools

For tools, see pages: DCNT (M8-M24) (136) • DCT (M8-M24) (134)

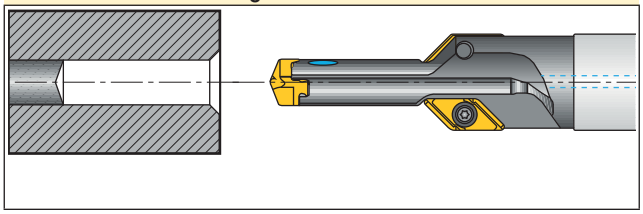


Pre-Thread DCT Drills

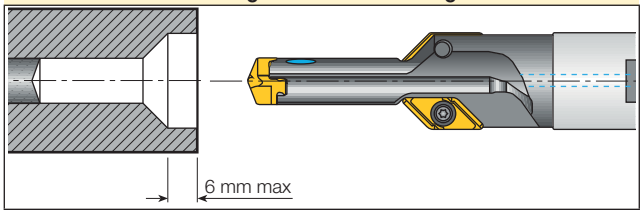
There are two main applications for pre-thread hole drilling:

Drilling pre-thread **blind** and **through holes**:

Drilling with a 45° Chamfer



Drilling and Counter Boring



Pre-Thread DCT Metric Threads Recommended Diameters

Drill Designation	Dia. Range	M Thread	Head Dia.	MF Head	Head Dia.	TR Thread	Head Dia.	M Helicoil Thread	Head Dia.
DCT 068-021-14B-M8	6.80-7.49	M8	6.8	MF8X0.75	7.20	TR10X3	7.49		
				MF8X1	7.00				
DCT 085-026-14B-M10	8.30-8.99	M10	8.5	MF10X1	8.99	TR10X1.5	8.60	M8	8.40
				MF10X1.25	8.80				
DCT 102-030-14B-M12	10.0-10.99	M12	10.2	MF11X1	10.00	TR12X2	10.20	M10	10.50
				MF12X1	10.99	TR14X4	10.50		
				MF12X1.25	10.80				
				MF12X1.5	10.50				
DCT 120-035-16B-M14	12.0-12.99	M14	12.0	MF13X1	12.00	TR14X2	12.20	M12	12.50
				MF14X1	12.99	TR16X4	12.30		
				MF14X1.25	12.80				
				MF14X1.5	12.50				
DCT 140-039-18B-M16	14.0-14.99	M16	14.0	MF14X1	14.00	TR18X4	14.30	M14	14.99
				MF16X1	14.99				
				MF16X1.5	14.50				
DCT 175-042-20B-M20	17.3-17.99	M20	17.5			TR22X5	17.30		
				MF20X2	17.99				
DCT 210-048-25B-M24	21.0-21.99	M24	21.0	MF22X1	21.00				

Inch Threads

Drill Designation	Dia. Range	UNF Thread	Head Dia.	UNC Thread	Head Dia.	UNC Helicoil Thread	Head Dia.	BSW Thread	Head Dia.	BSF Thread	Head Dia.
DCT 085-026-14B-M10	8.30-8.99	UNF3/8-24	8.5			UNC5/16-18	8.4				
DCT 102-030-14B-M12	10.0-10.99			UNC1/2-13	10.8			BSW1/2-12	10.5	BSF1/2-16	10.99
DCT 120-035-16B-M14	12.0-12.99			UNC9/16-12	12.3					BSF9/16-16	12.50
DCT 140-039-18B-M16	14.0-14.99	UNF5/8-18	14.5								
DCT 175-042-20B-M20	17.3-17.99	UNF3/4-16	17.5								

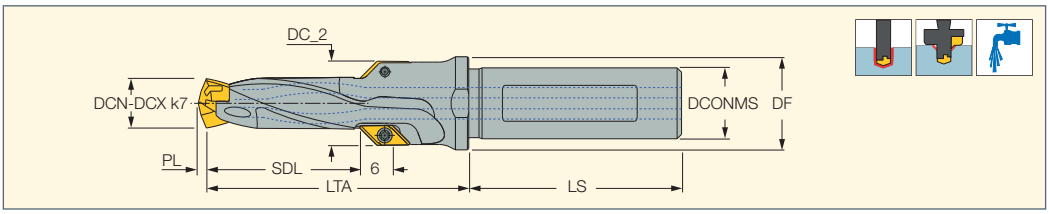
Inch Threads

Drill Designation	Dia. Range	NPT Thread	Head Dia.	BSF Thread	Head Dia.	BSP Thread	Head Dia.	UNEF Thread	Head Dia.	UNJF Helicoil Thread	Head Dia.
DCT 085-026-14B-M10	8.30-8.99	NPT1/8-27	8.5			G1/8-28	8.8	UNEF3/8-32	8.7	UNJF3/8-24	8.6
DCT 102-030-14B-M12	10.0-10.99			BSF1/2-16	10.99						
DCT 120-035-16B-M14	12.0-12.99			BSF9/16-16	12.50						
DCT 140-039-18B-M16	14.0-14.99	NPT3/8-18	14.5					UNEF5/8-24	14.8	UNJF5/8-18	14.5
DCT 175-042-20B-M20	17.3-17.99	NPT1/2-14	17.5					UNEF3/4-20	17.8		

PRETHREAD

DCNT (M8-M24)

Exchangeable Head Drills with Chamfering Inserts Mainly for Pre-Thread Holes



Designation	Dnominal[1]	Th[2]	DCN[3]	DCX[4]	DC_2	SDL	PL	LTA	DCONMS	DF	LS	SSC[5]
DCNT 068-021-12A-M8	6.80	M8	6.50	6.90	13.50	21.00	1.240	43.80	12.00	16.00	45.0	6.5
DCNT 085-026-12A-M10	8.50	M10	8.50	8.90	15.50	26.00	1.200	48.80	12.00	17.00	45.0	8.0
DCNT 102-030-16A-M12	10.20	M12	10.00	10.40	17.00	30.00	1.500	52.50	16.00	20.00	48.0	10.0
DCNT 120-035-16A-M14	12.00	M14	12.00	12.40	19.00	35.00	1.800	61.00	16.00	21.00	48.0	12.0
DCNT 140-039-16A-M16	14.00	M16	14.00	14.40	21.00	39.00	2.100	66.90	16.00	23.00	48.0	14.0
DCNT 175-042-20A-M20	17.50	M20	17.00	17.90	24.00	42.00	2.700	69.30	20.00	25.00	50.0	17.0
DCNT 210-048-25A-M24	21.00	M24	21.00	21.90	28.00	48.00	3.200	80.00	25.00	32.00	56.0	21.0

• Hole tolerance: D+0.05 in average conditions. However, it can be higher or lower according to machine and tooling conditions • Do not mount smaller drilling heads other than the specified range of the drill body. • For user guide and cutting conditions, see page 136

(1) Pre-thread hole diameter

(2) Used for standard thread size

(3) Cutting diameter minimum

(4) Cutting diameter maximum

(5) Pocket size

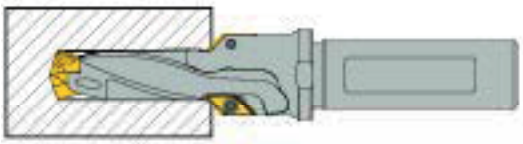
For inserts, see pages: ICP (18) • ICP-2M (24) • ICK (28) • ICK-2M (32) • ICM (36) • ICN (42) • QCP-2M (43) • HCP-IQ (47) • FCP (52) • ICG (57) • AOMT-Chamfering (134)

Spare Parts

Designation			
DCNT 068-021-12A-M8	SR 34-508	T-7/51	K DCN 6-9.99-Y
DCNT 085-026-12A-M10	SR 34-508	T-7/51	K DCN 6-9.99
DCNT 102-030-16A-M12	SR 34-508	T-7/51	K DCN 10-13.99
DCNT 120-035-16A-M14	SR 34-508	T-7/51	K DCN 10-13.99
DCNT 140-039-16A-M16	SR 34-508	T-7/51	K DCN 14-17.99
DCNT 175-042-20A-M20	SR 34-508	T-7/51	K DCN 14-17.99
DCNT 210-048-25A-M24	SR 34-508	T-7/51	K DCN 18-21.99

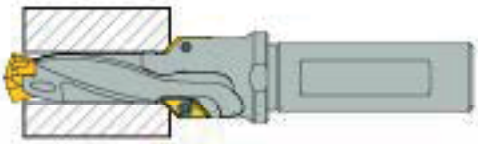
1. Drilling pre-thread blind holes:

Drilling with a 45° chamfer



2. Drilling pre-thread through holes:

Drilling with a 45° chamfer



Pre-Thread Recommended Hole Diameters with DCNT Drills

Drill Designation	Dia. Range	M Thread	Head Dia.	MF Head	Head Dia.	TR Thread	Head Dia.	M Helicoil Thread	Head Dia.
DCNT 068-021-12A-M8	6.5-6.99	M8	6.8						
DCNT 085-026-12A-M10	8.5-8.99	M10	8.5	MF10x1	8.99	TR10x1.5	8.6		
				MF10x1.25	8.8				
DCNT 102-030-16A-M12	10.0-10.99	M12	10.2	MF11x1	10.0	TR12x2	10.2	M10	10.5
				MF12x1	10.99				
				MF12x1.25	10.8	TR14x4	10.5		
				MF12x1.5	10.5				
DCNT 120-035-16A-M14	12.0-12.99	M14	12.0	MF13x1	12.0	TR14x2	12.2	M12	12.5
				MF14x1	12.99				
				MF14x1.25	12.8	TR16x4	12.3		
				MF14x1.5	12.5				
DCNT 140-039-16A-M16	14.0-14.99	M16	14.0		14.0	TR18x4	14.3	M14	14.99
				MF16x1	14.99				
				MF16x1.5	14.5				
DCNT 175-042-20A-M20	17.0-17.99	M20	17.5	MF20x2	17.99	TR22x5	17.3		
DCNT 210-048-25A-M24	21.0-21.99	M24	21.0	MF22x1	21.0				

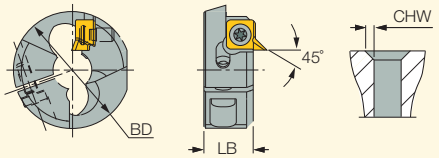
Drill Designation	Dia. Range	UNF Thread	Head Dia.	UNC Thread	Head Dia.	BSW Thread	Head Dia.	BSF Thread	Head Dia.
DCNT 068-021-12A-M8	6.5-6.99								
DCNT 085-026-12A-M10	8.5-8.99	UNF5/8-24	8.5						
DCNT 102-030-16A-M12	10.0-10.99			UNC1/2-13	10.8	BSW1/2-12	10.5	BSF1/2-16	10.99
DCNT 120-035-16A-M14	12.0-12.99			UNC9/16-12	12.3			BSFA/16-16	12.5
DCNT 140-039-16A-M16	14.0-14.99	UNF5/8-18	14.5						
DCNT 175-042-20A-M20	17.0-17.99	UNF3/4-16	17.5						
DCNT 210-048-25A-M24	21.0-21.99								

Drill Designation	Dia. Range	NPT Thread	Head Dia.	BSP Thread	Head Dia.	UNEF Thread	Head Dia.	UNJF Helicoil Thread	Head Dia.
DCNT 068-021-12A-M8	6.5-6.99								
DCNT 085-026-12A-M10	8.5-8.99	NPT1/8-27	8.5	G1/8-28	8.8	UNEF3/8-32	8.7	UNJF3/8-24	8.6
DCNT 102-030-16A-M12	10.0-10.99								
DCNT 120-035-16A-M14	12.0-12.99								
DCNT 140-039-16A-M16	14.0-14.99	NPT3/8-18	14.5			UNEF5/8-24	14.8	UNJF5/8-18	14.5
DCNT 175-042-20A-M20	17.0-17.99	NPT1/2-14	17.5			UNEF3/4-20	17.8		
DCNT 210-048-25A-M24	21.0-21.99								

CHAMDRILL

RING DCM

Chamfering Ring Mounted on CHAMDRILL Drills for Drilling and Chamfering in One Operation



Designation	SS[1]	DCN[2]	DCX[3]	BD[4]	LB	Ch	CHW	MIID[5]
RING DCM 100	DCM 100	10.00	10.40	33.00	14.3	1.5	1.50	XOGX
RING DCM 105	DCM 105	10.50	10.90	33.00	14.3	1.5	1.50	XOGX
RING DCM 110	DCM 110	11.00	11.40	35.00	14.5	1.5	1.50	XOGX
RING DCM 115	DCM 115	11.50	11.90	35.00	14.5	1.5	1.50	XOGX
RING DCM 120	DCM 120	12.00	12.40	37.50	14.6	1.5	1.50	XOGX
RING DCM 125	DCM 125	12.50	12.90	37.50	14.6	1.5	1.50	XOGX
RING DCM 130	DCM 130	13.00	13.40	39.00	14.6	1.5	1.50	XOGX
RING DCM 135	DCM 135	13.50	13.90	39.00	14.6	1.5	1.50	XOGX
RING DCM 140	DCM 140	14.00	14.40	41.00	15.3	1.5	1.50	XOGX
RING DCM 145	DCM 145	14.50	14.90	41.00	15.3	1.5	1.50	XOGX
RING DCM 150	DCM 150	15.00	15.90	43.00	16.5	1.5	1.50	XOGX
RING DCM 160	DCM 160	16.00	16.90	45.00	17.0	2.0	2.00	XOGX
RING DCM 170	DCM 170	17.00	17.90	47.00	17.5	2.0	2.00	XOGX
RING DCM 180	DCM 180	18.00	18.90	48.00	18.0	2.0	2.00	XOGX
RING DCM 200	DCM 200	20.00	20.90	52.00	18.0	2.0	2.00	XOGX

• RING DCM can be mounted only on DCM 3XD and DCM 5XD drills • For mounting instructions, see page 138

[1] Drill size

[2] Cutting diameter minimum

[3] Cutting diameter maximum

[4] BD=D ring

[5] Master insert identification

For inserts, see pages: XOGX-DT (137)

Spare Parts

Designation						
RING DCM 100	SR 14-544/S	BLD T15/S7	SR M5X15 TORX 25[b]	BLD T25/S7		SW6-T
RING DCM 105	SR 14-544/S	BLD T15/S7	SR M5X15 TORX 25[b]	BLD T25/S7		SW6-T
RING DCM 110	SR 14-544/S	BLD T15/S7	SR M5X15 TORX 25[b]	BLD T25/S7		SW6-T
RING DCM 115	SR 14-544/S	BLD T15/S7	SR M5X15 TORX 25[b]	BLD T25/S7		SW6-T
RING DCM 120	SR 14-544/S	BLD T15/S7	SR M5X15 TORX 25[b]	BLD T25/S7		SW6-T
RING DCM 125	SR 14-544/S	BLD T15/S7	SR M5X15 TORX 25[b]	BLD T25/S7		SW6-T
RING DCM 130	SR 14-544/S	BLD T15/S7	SR M5X15 TORX 25[b]	BLD T25/S7		SW6-T
RING DCM 135	SR 14-544/S	BLD T15/S7	SR M5X15 TORX 25[b]	BLD T25/S7		SW6-T
RING DCM 140	SR 14-544/S	BLD T15/S7	SR M5X15 TORX 25[b]	BLD T25/S7		SW6-T
RING DCM 145	SR 14-544/S	BLD T15/S7	SR M5X15 TORX 25[b]	BLD T25/S7		SW6-T
RING DCM 150	SR 14-544/S	BLD T15/S7	SR M5X15 TORX 25[b]	BLD T25/S7		SW6-T
RING DCM 160	SR 14-544/S	BLD T15/S7	SR M6X20 DIN912[a]		HEX BIT HW5	SW6-T
RING DCM 170	SR 14-544/S	BLD T15/S7	SR M6X20 DIN912[a]		HEX BIT HW5	SW6-T
RING DCM 180	SR 14-544/S	BLD T15/S7	SR M6X20 DIN912[a]		HEX BIT HW5	SW6-T
RING DCM 200	SR 14-544/S	BLD T15/S7	SR M6X20 DIN912[a]		HEX BIT HW5	SW6-T

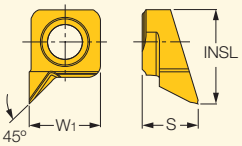
[a] Maximum tightening torque 10 N*m

[b] Maximum tightening torque 7 N*m

CHAMDRILL

XOGX-DT

Inserts Used on Chamfering Rings

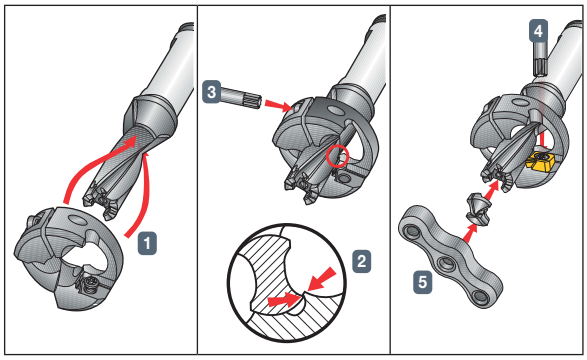


Designation	Dimensions			IC830
	W1	S	INSL	
XOGX 090700-45DT	9.00	7.00	12.00	•

For tools, see pages: RING DCM (137)

Chamfering Ring

Drilling and Chamfering in One Operation for DCM 3xD and 5xD Drills



Mounting Instructions

1. Insert the chamfering ring on the drill body and slide to the desired position(1).
2. Rotate the ring clockwise until the stopper engages the flute edge.
3. Tighten the ring screw according to the maximum tightening torque indicated on page 137.
4. Mount the chamfering insert.
5. Mount the **CHAMDRILL** head.

Chamfering Ring Position Range

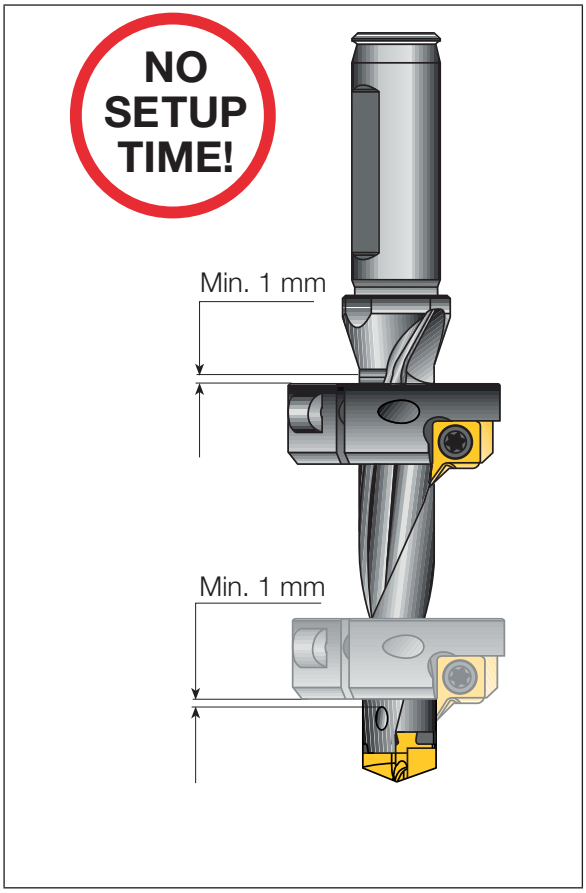
Drill Diameter	Drill Body 3xD L (min-max)	Drill Body 5xD L (min-max)	Maximum Chamfer Size
10	8-16	15-36	1.5
10.5	8-18	17-39	
11	8-19	18-41	
11.5	8-21	20-44	
12	8-22	21-46	
12.5	8-24	23-49	
13	8-25	24-51	
13.5	8-27	26-54	
14	9-29	28-57	
14.5	9-30	29-60	
15	9-31	30-60	
16	9-33	32-65	2.0
17	11-35	34-69	
18	11-38	34-74	
19	11-42	41-80	
20	11-45	44-85	

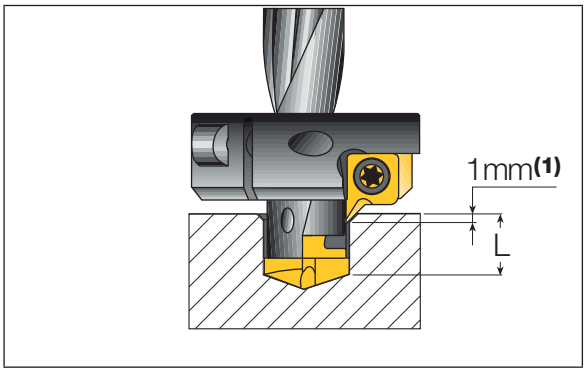
User Guide

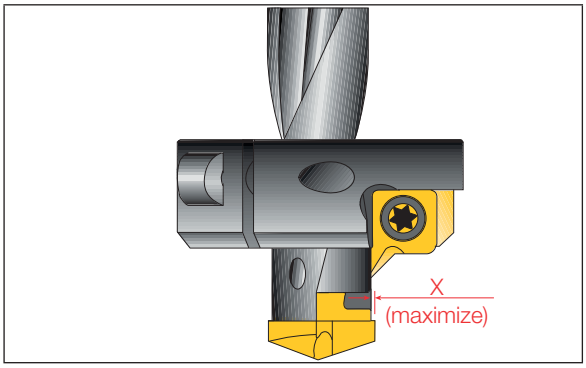
Recommendations for better stability:

1 Use 3xD drill instead of 5xD, if possible.
2 Mount the chamfering ring as close as possible to the drill shank.
3 For better chamfering insert life, apply a coolant to the chamfering insert, in addition to the internal and/or external coolant.
4 A wider gap "**X**" between the drill and the head size is preferred (i.e. for a 14.6 mm head, use a 14 mm body rather than 14.5 mm). A slightly larger "**X**" dimension can dramatically increase the chamfering insert life.

(1) The "**L**" dimension shown is relative to the common 1 mm chamfer. For other sizes, adjust "**L**" accordingly.

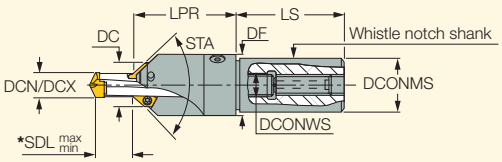






CHAMRING

CHAMRING
Drill Holders for Drilling and Chamfering in One Operation



Designation		DCN	DCX	DCNS 3D SDL min	DCNS 3D SDL max	DCM 3.5D SDL min	DCM 3.5D SDL max	DCNS 5D SDL min	DCNS 5D SDL max	DCONWS	DF	DC_2	LPR	LS	DCONMS	Inserts
CHAMRING 080-WN20-06	DC.. 075	7.5	7.9	12.7	18.6	12.4	21.9	15.7	33.6	8	25	18.8	47.4	50	20	XCGT 06..
	DC.. 080	8	8.4	13.6	19.2	14	23	23.6	40.9							
CHAMRING 090-WN20-06	DC.. 085	8.5	8.9	12.9	21.1	15.1	26.6	18.7	38.1	9	25	19.8	47.4	50	20	XCGT 06..
	DC.. 090	9	9.4	12.8	23.1	15.6	27.1	21.8	41.1							
CHAMRING 100-WN32-09	DC.. 095	9.5	9.9	12.2	22.8	17.2	29.2	26.8	42.2	10	35	24.9	67.3	60	32	XCGT 09..
	DC.. 100	10	10.4	12.6	28.2	14.3	28.3	32.8	48.2							
CHAMRING 110-WN32-09	DC.. 105	10.5	10.9	13.9	29.8	14.4	29.4	31.7	50.6	11	35	25.9	67.3	60	32	XCGT 09..
	DC.. 110	11	11.4	14.4	31.4	15	31	34.7	53.4							
CHAMRING 120-WN32-09	DC.. 115	11.5	11.9	14.1	31.4	15.6	33.1	34.0	54.4	12	35	26.9	67.3	60	32	XCGT 09..
	DC.. 120	12	12.4	15.1	33.4	19.2	35.2	36.9	57.3							
CHAMRING 130-WN32-09	DC.. 125	12.5	12.9	15.6	35.8	19.3	37.3	40.6	60.6	13	35	27.9	67.3	60	32	XCGT 09..
	DC.. 130	13	13.4	17.8	37.6	21.4	39.4	43.6	64.1							
CHAMRING 140-WN32-09	DC.. 135	13.5	13.9	16.1	38.2	19.5	39.5	42.8	65.2	14	35	28.4	67.3	60	32	XCGT 09..
	DC.. 140	14	14.4	18.0	40.8	21.5	41.5	46.0	69.3							
CHAMRING 150-WN32-09	DC.. 145	14.5	14.9	16.4	39.7	20.1	42.1	45.3	68.7	15	35	29.4	67.3	60	32	XCGT 09..
	DC.. 150	15	15.9	18.5	41.9	25.2	43.7	48.5	71.9							
CHAMRING 160-WN32-09	DC.. 160	16	16.9	26.2	51.6	26.3	49.3	54.2	83.6	16	35	30.4	67.3	60	32	XCGT 09..
CHAMRING 170-WN32-09	DC.. 170	17	17.9	22.6	49.0	28.4	52.4	56.6	83.0	17	35	31.4	67.3	60	32	XCGT 09..
CHAMRING 180-WN32-09	DC.. 180	18	18.9	25.1	52.5	31	57	61.1	88.5	18	35	32.4	67.3	60	32	XCGT 09..
CHAMRING 190-WN32-09	DC.. 190	19	19.9	28.3	58.3	32.3	59.3	66.3	96.3	19	35	33.4	75	60	32	XCGT 09..
CHAMRING 200-WN32-09	DC.. 200	20	20.9	36.3	68.4	36.6	67.1	73.3	108.3	20	35	34.4	75	60	32	XCGT 09..
CHAMRING 210-WN40-09	DC.. 210	21	21.9	33.9	63.3			75.9	105.3	21	50	35.4	84.4	68	40	XCGT 09..
CHAMRING 220-WN40-09	DC.. 220	22	22.9	37.3	66.7			81.3	110.7	22	50	36.4	84.4	68	40	XCGT 09..
CHAMRING 230-WN40-09	DC.. 230	23	23.9	40.7	70.1			86.7	116.1	23	50	37.4	84.4	68	40	XCGT 09..
CHAMRING 240-WN40-09	DC.. 240	24	24.9	44.2	73.6			92.2	121.6	24	50	38.4	84.4	68	40	XCGT 09..
CHAMRING 250-WN40-09	DC.. 250	25	25.9	47.6	77.0			97.6	127.0	25	50	39.4	84.4	68	40	XCGT 09..

- It is recommended to apply external coolant on the chamfering inserts
- Reduce the recommended feed and speed by 50% when machining maximum chamfer size
- *SDLmin & SDLmax dimensions are based on the 45° chamfering insert
- Chamfering angle (STA) depends on the chamfering insert being used

For inserts, see pages: XCGT-DT (140)

For UNICHAMDRILLS, see pages: DCM-3.5D (7.5-20.9 mm 3.5xD) (92) , DCNS-3D (15), DCNS-5D (16)

Assembly Instructions
- Insert the UNICHAMDRILL into the CHAMRING prior to clamping the chamfering inserts
- Adjust the UNICHAMDRILL protrusion by using the rear screw, then correct adjustment using the side clamping screw
- Attach the chamfering inserts

Adjustment of UNICHAMDRILL Protrusion
- Loosen the chamfering inserts clamping screws
- Loosen the side clamping screw
- Adjust the UNICHAMDRILL protrusion by using the rear screw, then correct adjustment using the side clamping screw
- Re-tighten the chamfering inserts

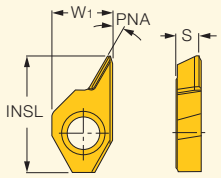
Spare Parts

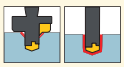
Designation								
CHAMRING 6-9	SR M6X8 DIN 916	HW 5.0	SR M5X18	SW5-T-SH	SR 14-560	T-8/53		
CHAMRING 10-20	SR M10X10 DIN 916	HW 6.0	SR M10X1.5S	SW6-T-SH	SR 14-544/S		BLD T15/37	SW6-SD
CHAMRING 21-25	SR M12X16 DIN 835-B	HW 8.0	SR M12X1.75S	SW6-T-SH	SR 14-544/S		BLD T15/37	SW6-SD

CHAMRING

XCGT-DT

Inserts used on Chamfering Drill Holders for Chamfering and Drilling in One Operation





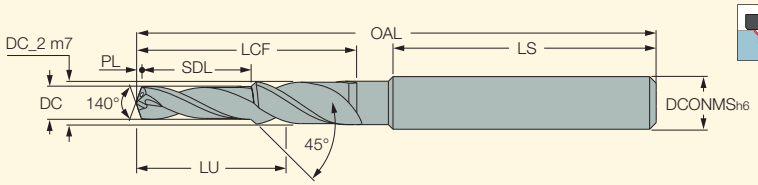
Designation	Dimensions W1	INSL	S	PNA	Tough ↔ Hard IC08	IC808
XCGT 060300-30DT	6.18	12.30	2.80	30.0	●	●
XCGT 060300-45DT	6.18	12.30	2.80	45.0	●	●
XCGT 060300-60DT	6.18	12.30	2.80	60.0	●	●
XCGT 090300-30DT	8.50	16.00	3.30	30.0	●	●
XCGT 090300-45DT	8.50	16.00	3.30	45.0	●	●
XCGT 090300-60DT	8.50	16.00	3.30	60.0	●	●

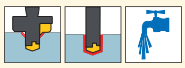
For tools, see pages: CHAMRING (139)

SOLIDDRILL PRETHREAD

SCDT

Pre-Thread Solid Carbide Drills with Coolant Holes



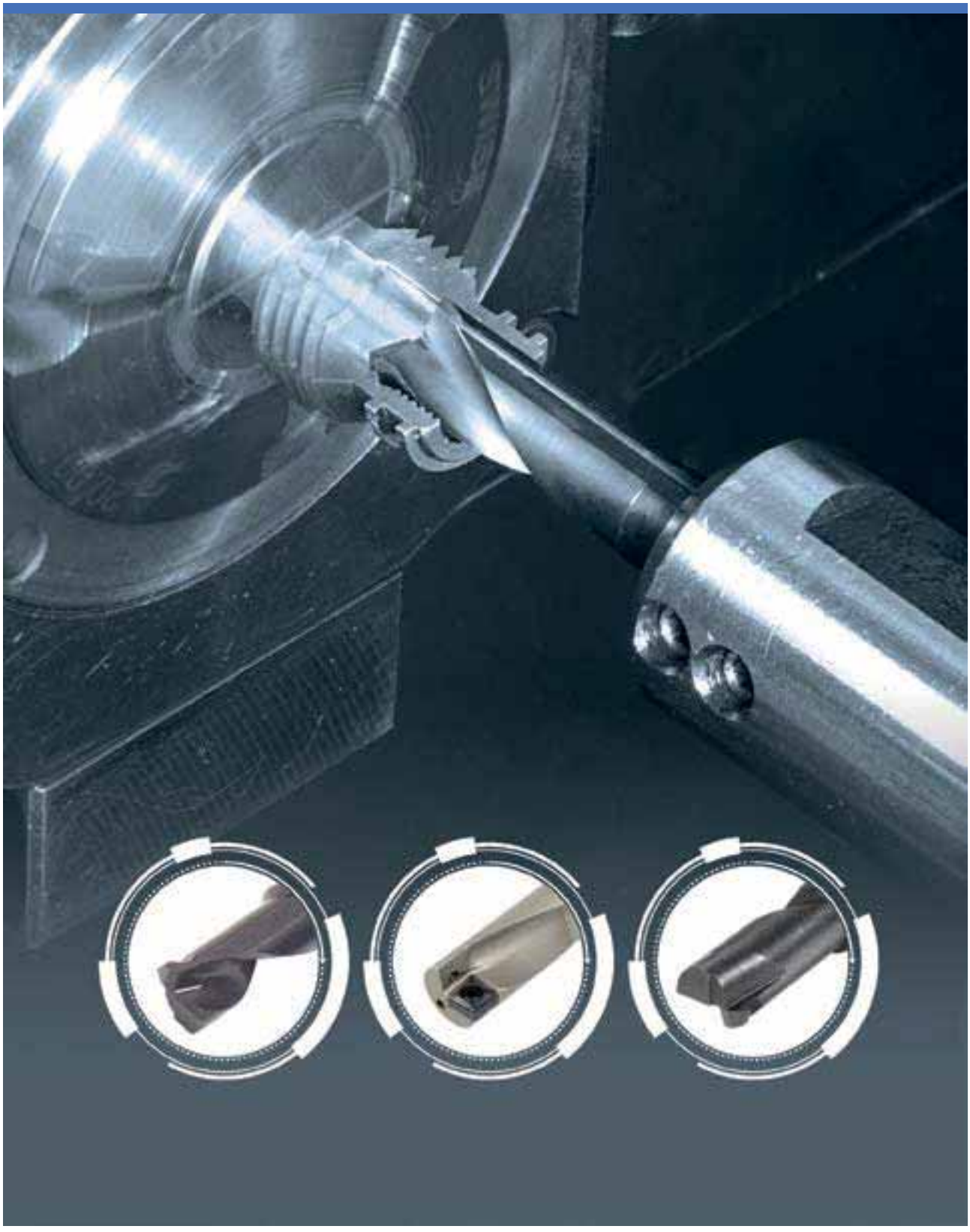


Designation	Dimensions DC	SDL	DCONMS	FTDZ(1)	DC_2	PL	LU	LCF	OAL	LS	IC908
SCDT 025-009-060-M3	2.50	8.8	6.00	M3	4.00	0.450	16.00	20.0	62.00	36.0	●
SCDT 033-011-060-M4	3.30	11.4	6.00	M4	4.50	0.600	19.00	24.0	62.00	36.0	●
SCDT 042-014-060-M5	4.20	13.6	6.00	M5	5.50	0.760	22.00	28.0	66.00	36.0	●
SCDT 050-017-080-M6	5.00	16.5	8.00	M6	6.60	0.910	27.00	34.0	79.00	40.0	●
SCDT 068-021-100-M8	6.80	21.0	10.00	M8	9.00	1.240	38.00	47.0	89.00	40.0	●
SCDT 085-026-120-M10	8.50	25.5	12.00	M10	11.00	1.550	45.00	55.0	102.00	40.0	●

• For user guide and cutting conditions, see pages 175-184

(1) Used for standard thread size

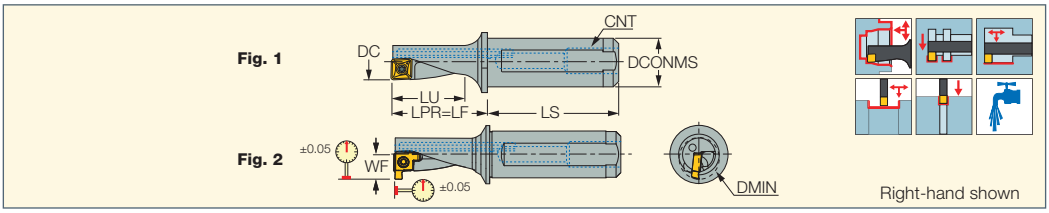
MULTIFUNCTION TOOLS



MULTIFUNCTION TOOLS

DRG-MF

Multifunction Drilling, Boring, Facing, External Turning and Internal Grooving Tools

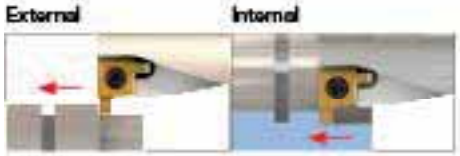


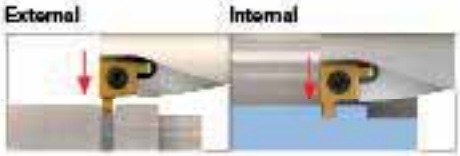
Designation	DC	DMIN	WF	LU	LPR	LS	DCONMS	CNT	Insert	Fig.		
DR-MF-08R/L-2.25D-12A-04	8.00	8.00	-	18.0	22.5	42.0	12.00	G 1/16	XCMT 04...	1	SR 18034/HG-P	IP-6/5
DRG-MF-10R/L-2.25D-12A-05	10.00	12.00	7.10	22.5	27.5	42.0	12.00	G 1/16	XCMT 05...	2	SR 20038/HG-P	IP-6/5
DRG-MF-12R/L-2.25D-16A-06	12.00	14.50	8.50	27.0	33.0	45.0	16.00	G 1/8	XCMT 06...	2	SR 22052/HG-P	IP-7/5
DRG-MF-14R/L-2.25D-16A-07	14.00	16.50	9.50	31.5	38.5	45.0	16.00	G 1/8	XCMT 07...	2	SR 25064/HG-P	IP-8/5
DRG-MF-16R/L-2.25D-20A-08	16.00	19.00	11.10	36.0	44.0	50.0	20.00	G 1/8	XCMT 08...	2	SR 30070/HG-P	IP-9/151
DRG-MF-20R/L-2.25D-25A-10	20.00	23.50	13.20	45.0	55.0	56.0	25.00	G 1/8	XCMT 10...	2	SR 35088I/HG-P	IP-10/151
DRG-MF-25R/L-2.25D-32A-13	25.00	29.00	16.50	56.5	69.0	61.0	32.00	G 1/8	XCMT 13...	2	SR 45A100I/HG	IP-20/51
DRG-MF-32R/L-2.25D-40A-17	32.00	36.50	20.50	72.0	86.0	74.0	40.00	G 1/8	XCMT 17...	2	SR 45A100I/HG	IP-20/51

• In non-rotating applications, hole diameter can be adjusted within the specified range by shifting drill's center line along machine's X-axis • The tools feature internal coolant holes

For inserts, see pages: XCMT-MF (143) • XCMT-MG (143)

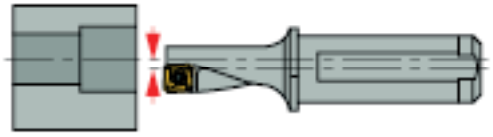
Typical Applications





Radial Adjustment (off-center drilling)

Radial adjustment is dependent on drill diameter



Holder	Drill dia.	Dmin	Dmax
DRG-MF 8	8	7.86	8.35
DRG-MF 10	10	9.82	10.60
DRG-MF 12	12	11.82	12.60
DRG-MF 14	14	13.80	14.60
DRG-MF16	16	15.76	16.50
DRG-MF 20	20	19.80	20.60
DRG-MF 25	25	24.80	25.80
DRG-MF 32	32	31.80	33.00

MULTIFUNCTION TOOLS

XCMT-MF

Inserts for DR-MF Multifunction Tools with Two Cutting Edges for Hard Materials and Interrupted Cut

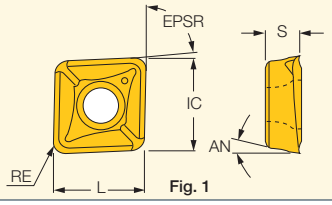


Fig. 1

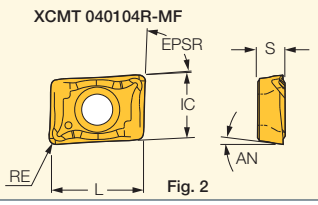


Fig. 2

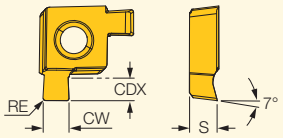
Designation	Dimensions IC	L	S	RE	AN	EPSR	Fig.	IC908
XCMT 040104R/L-MF	4.40	6.37	1.70	0.40	7.0	83.5	2	●
XCMT 050204-MF	5.60	5.60	2.10	0.40	7.0	83.5	1	●
XCMT 060204-MF	6.40	6.40	2.38	0.40	7.0	83.5	1	●
XCMT 070304-MF	7.50	7.50	3.18	0.40	7.0	83.5	1	●
XCMT 080304-MF	8.40	8.40	3.18	0.40	7.0	83.5	1	●
XCMT 10T304-MF	10.50	10.50	3.97	0.40	7.0	83.5	1	●
XCMT 10T308-MF	10.50	10.50	3.97	0.80	7.0	83.5	1	●
XCMT 130404-MF	13.40	13.40	4.76	0.40	7.0	83.5	1	●
XCMT 130408-MF	13.40	13.40	4.76	0.80	7.0	83.5	1	●
XCMT 170508-MF	17.40	17.40	5.56	0.80	7.0	83.5	1	●

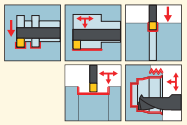
For tools, see pages: DRG-MF (142)

MULTIFUNCTION TOOLS

XCMT-MG

Two Cutting Edged Internal Grooving Inserts for DR-MF Multifunction Tools





Designation	Dimensions CW	CDX(1)	CWTOL(2)	RE	S	Tough ↔ Hard IC808	IC808G	Recommended Machining Data f turn (mm/rev)	f groove (mm/rev)
XCMT 05R-15718015MG	1.57	1.80	0.02	0.15	2.28	●		0.03-0.07	0.03-0.06
XCMT 05R-201802-MG	2.00	1.80	0.02	0.20	2.28		●	0.05-0.10	0.04-0.07
XCMT 06R-17820018MG	1.78	1.80	0.02	0.18	2.28	●		0.04-0.08	0.04-0.07
XCMT 06R-202002-MG	2.00	2.00	0.02	0.20	2.65		●	0.05-0.10	0.04-0.07
XCMT 07R-19620015MG	1.96	1.80	0.02	0.15	2.28	●		0.05-0.10	0.04-0.07
XCMT 07R-252002-MG	2.50	2.00	0.02	0.20	3.41		●	0.07-0.12	0.05-0.10
XCMT 08R-22125015MG	2.21	2.00	0.02	0.15	3.41	●		0.06-0.11	0.04-0.08
XCMT 08R-252502-MG	2.50	2.50	0.02	0.20	3.50		●	0.07-0.12	0.05-0.10
XCMT 10R-23930015MG	2.39	2.00	0.02	0.15	3.41	●		0.07-0.12	0.05-0.10
XCMT 10R-303003-MG	3.00	3.00	0.02	0.30	4.34		●	0.14-0.18	0.06-0.12
XCMT 13R-31835020MG	3.18	3.50	0.02	0.20	5.18	●		0.14-0.18	0.06-0.12
XCMT 13R-353503-MG	3.50	3.50	0.02	0.30	5.25		●	0.14-0.20	0.07-0.14
XCMT 17R-404004-MG	4.00	4.00	0.02	0.40	6.00		●	0.15-0.21	0.08-0.15

(1) Cutting depth maximum

(2) Cutting width tolerance (+/-)

For tools, see pages: DRG-MF (142)

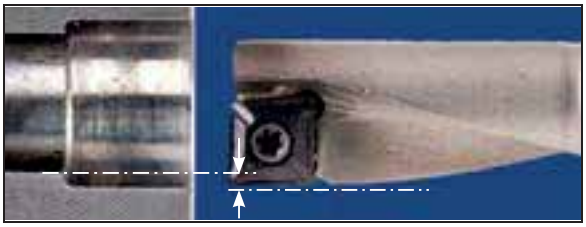
User guide for DRG-MF

Coolant Pressure

- Apply above 6 Bar in 2.25xD tools (optimal pressure is above 10 Bar).

Radial Adjustment (off-center drilling)

- Radial adjustment is dependent on drill diameter



Optimization of Chip Shape

- Apply high-speed machining on low carbon steel
- Produce thin chips, as most problems are caused by thick chips
- Regulate chips produced by machining medium-to-high carbon steel
- If too tight, either increase speed and reduce feed, or reduce speed and increase feed
- If too long, reduce speed and increase feed

Tool	Drill Dia.	Dmin	Dmax
DRG-MF-10	10	9.82	10.60
DRG-MF-12	12	11.82	12.60
DRG-MF-14	14	13.80	14.60
DRG-MF-16	16	15.76	16.50
DRG-MF-20	20	19.80	20.60
DRG-MF-25	25	24.80	25.80
DRG-MF-32	32	31.80	33.00

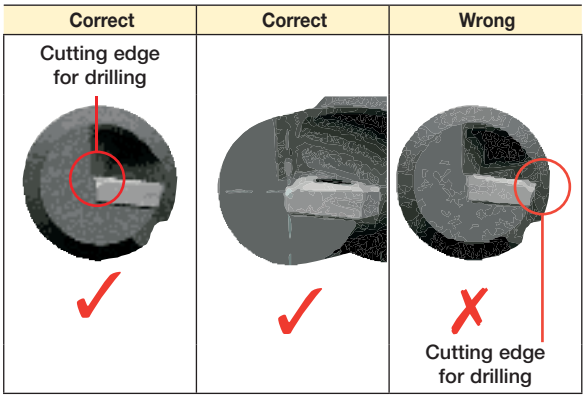
Troubleshooting

Problem	Solution
Chipping caused by built-up edge	• Increase cutting speed • Reduce feed • Check tool and workpiece rigidity • Reduce tool and workpiece overhang
Excessive flank wear	• Reduce cutting speed • Use a harder grade (special) • Increase coolant flow • Check cutting edge height
Edge deformation	• Reduce cutting speed • Use a harder grade (special) • Increase coolant flow • Reduce feed
Poor surface quality	• Reduce feed • Increase coolant flow • Check tool and workpiece rigidity • Increase cutting speed
Long chips	• Increase feed • Reduce cutting speed • Increase coolant flow
Tight chips	• Reduce feed
Vibrations	• Check tool and workpiece rigidity • Reduce tool and workpiece overhang • Reduce cutting speed • Increase feed • Check cutting edge height • Reduce feed and increase cutting speed on very soft materials

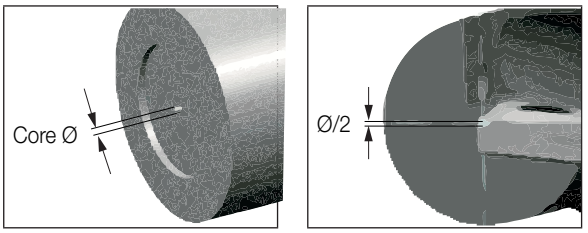
User Guide for Turn-Mill Machines

Insert Positioning

For drilling, cutting edge should be positioned in the center of tool body.



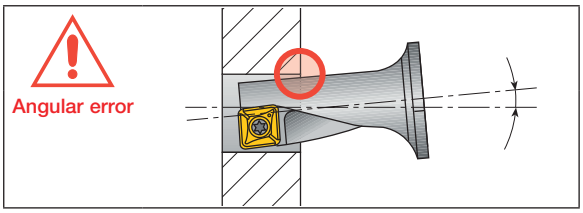
Setup

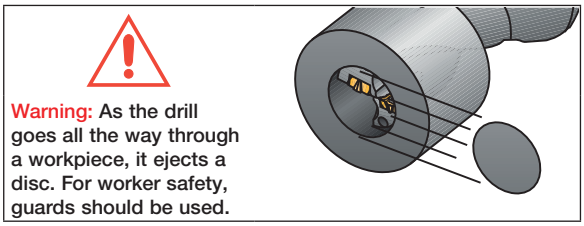


Check formation of core and its size after drilling 3 mm to 6 mm depth. The diameter of the core should be within 0.15-0.45 mm.

Adjust Y-axis of the tool body by using the new adjustable clamping unit (if available) or rotate the tool body 180° and secure it into a turret. Check the core again.

Important: If a core does not appear, this can cause breakage of insert vibration when drilling or turning. If the size of the core is over the recommended size, it will cause overload and vibration.





Recommended Cutting Conditions for XCMT-MF Inserts

Cutting speed (V_c)

Workpiece Materials	Material No. VDI 3323	Hardness (BHN)	Cutting speed: V_c (m/min) for IC908	
			Drilling	Turning & Boring
Low carbon steel (<0.25% C)	1	~150	130-240	150-270
Carbon steel (≥0.25% C)	2	150-250	90-160	100-180
Low alloy steel	6	~180	120-210	140-230
Medium alloy steel	7	200-250	70-140	80-160
High alloy steel	8, 9	250-350	50-100	60-120
Martensitic stainless steel	12	200	110-180	130-200
Austenitic stainless steel	14	200	90-160	100-180
Grey cast iron	17, 18	180-220	110-180	120-200
Ductile cast iron	15, 16	200-240	90-160	100-180
Aluminum alloy	21-24	60-130	100-500	150-600
Copper alloy	26-28	90-100	100-400	100-500

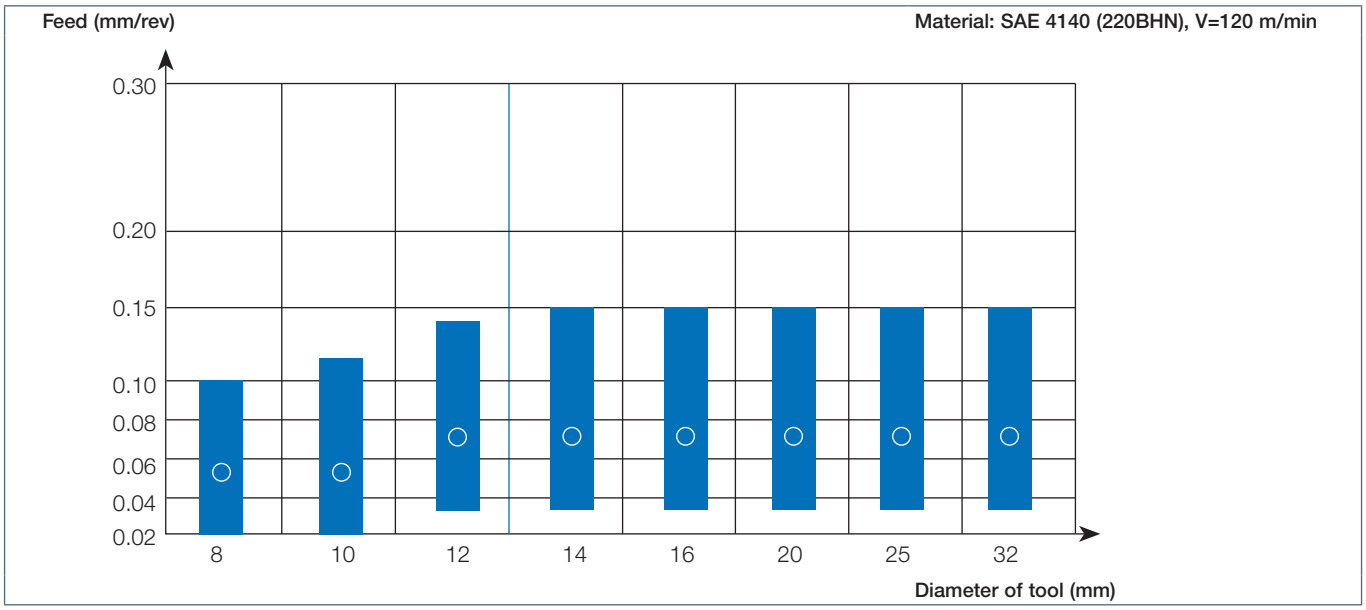
Recommended Cutting Conditions

Insert	Machining Type	Cutting Conditions	
		a_p (mm)	f (mm/rev)
XCMT 040104	External Turning	0.6 (0.2-1.8)	0.05 (0.02-0.15)
	Drilling	-	0.06 (0.02-0.10)
XCMT 050204	External Turning	0.8 (0.2-2.5)	0.08 (0.02-0.15)
	Face Turning	0.6 (0.2-1.7)	0.06 (0.02-0.13)
	Drilling	-	0.05 (0.02-0.10)
XCMT 060204	External Turning	1.0 (0.2-3.0)	0.10 (0.03-0.20)
	Face Turning	0.8 (0.2-2.5)	0.07 (0.03-0.15)
	Drilling	-	0.05 (0.02-0.10)
XCMT 070304	External Turning	1.3 (0.3-3.5)	0.12 (0.03-0.20)
	Face Turning	1.0 (0.25-3.0)	0.10 (0.03-0.18)
	Drilling	-	0.06 (0.03-0.12)
XCMT 0803..	Face Turning	1.5 (0.35-4.0)	0.14 (0.06-0.25)
	External Turning	1.2 (0.3-3.5)	0.12 (0.06-0.24)
	Drilling	-	0.08 (0.05-0.16)
XCMT 10T304	External Turning	1.8 (0.5-3.5)	0.12 (0.06-0.30)
	Face Turning	1.8 (0.5-3.5)	0.12 (0.06-0.30)
	Drilling	-	0.08 (0.03-0.15)
XCMT 10T308	External Turning	1.8 (0.5-3.5)	0.20 (0.10-0.40)
	Face Turning	1.8 (0.5-3.5)	0.20 (0.10-0.40)
	Drilling	-	0.08 (0.03-0.15)
XCMT 130404	External Turning	2.0 (0.6-4.3)	0.15 (0.07-0.32)
	Face Turning	2.0 (0.6-4.3)	0.15 (0.07-0.32)
	Drilling	-	0.08 (0.03-0.15)
XCMT 130408	External Turning	2.0 (0.6-4.3)	0.20 (0.10-0.40)
	Face Turning	2.0 (0.6-4.3)	0.20 (0.10-0.40)
	Drilling	-	0.08 (0.03-0.15)
XCMT 170508	External Turning	3.0 (0.7-5.3)	0.22 (0.10-0.40)
	Face Turning	3.0 (0.7-5.3)	0.22 (0.10-0.40)
	Drilling	-	0.08 (0.03-0.15)

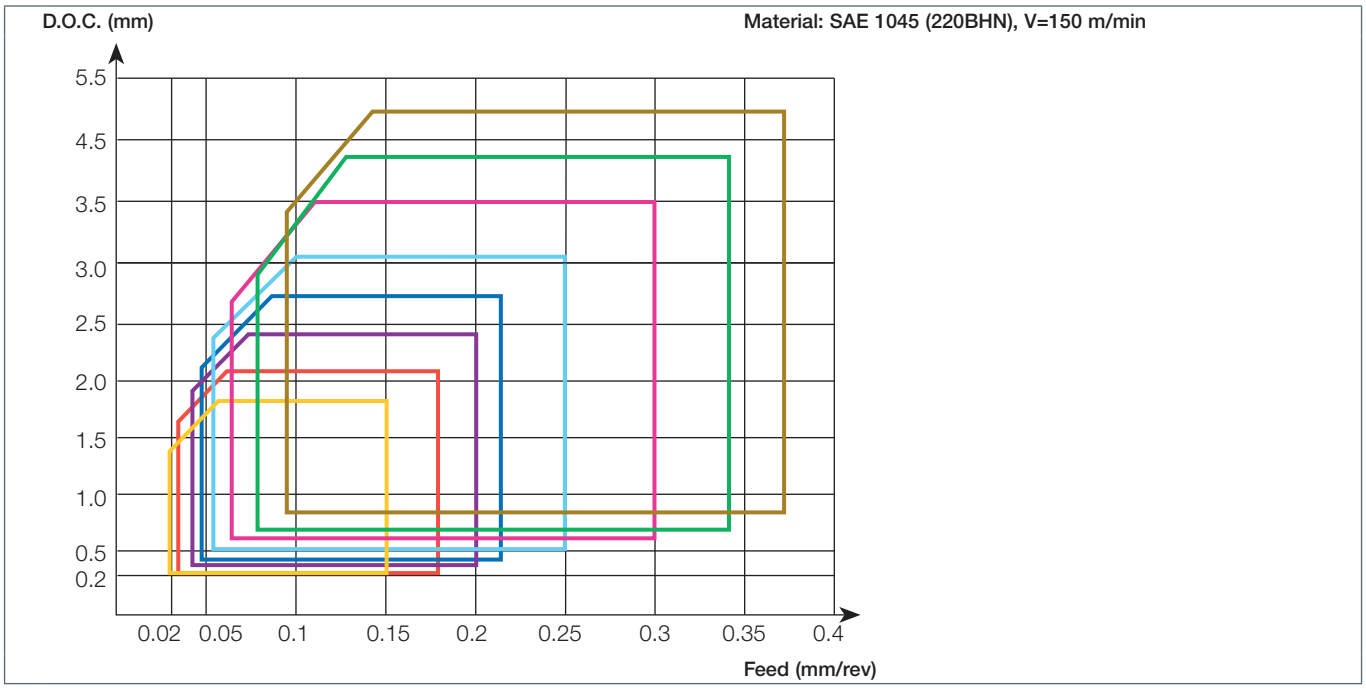
Cutting parameters are for 2.25xD steel shank
Internal coolant supply is recommended

Chip Control Range for DRG-MF

Drilling



Turning

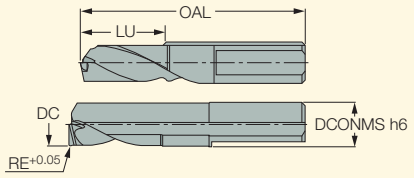


- XCMT 050204
- XCMT 050204
- XCMT 060204
- XCMT 070304
- XCMT 080304
- XCMT 100304
- XCMT 130304
- XCMT 170304

MULTIFUNCTION TOOLS

PICCO-MF

Multifunction Solid Carbide Tools for Drilling, Facing, Internal and External Turning on Swiss and Small CNC Machines



Right-hand shown

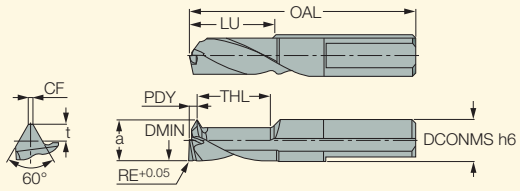
Designation	Dimensions DC	LU	OAL	DCONMS	RE	IC908
PICCO R-MF 6-3 L06	3.00	6.0	28.00	6.00	0.10	●
PICCO R/L-MF 6-4 L08	4.00	8.0	30.00	6.00	0.10	●
PICCO R/L-MF 6-4 L12	4.00	12.0	34.00	6.00	0.20	●
PICCO R/L-MF 6-5 L10	5.00	10.0	32.00	6.00	0.10	●
PICCO R/L-MF 6-5 L15	5.00	15.0	41.00	6.00	0.30	●
PICCO R/L-MF 6-6 L12	6.00	12.0	34.00	6.00	0.10	●
PICCO R/L-MF 6-6 L18	6.00	18.0	43.00	6.00	0.30	●
PICCO R/L-MF 8-7 L14	7.00	14.0	41.00	8.00	0.10	●
PICCO R/L-MF 8-7 L21	7.00	21.0	55.00	8.00	0.30	●
PICCO R/L-MF 8-8 L16	8.00	16.0	43.00	8.00	0.10	●
PICCO R/L-MF 8-8 L24	8.00	24.0	58.50	8.00	0.30	●

• Dmin can be 0.1 mm smaller by shifting tool center • Applications: drilling; face turning; internal chamfering; internal turning/ boring; internal profiling; external chamfering; external turning

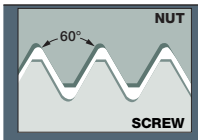
MULTIFUNCTION TOOLS

PICCO-MFT

Solid Carbide Tools for Drilling, Facing, Internal and External Turning and Threading on Swiss and Small CNC Machines



Right-hand shown



Designation	Dimensions DCONMS	DMIN	LU	TPN(2)	TPX(3)	t	a	CF	THL	OAL	PDY	RE	IC908
PICCO R/L-MFT60 6-4 L08	6.00	4.00	8.0	0.500	0.750	0.46	3.90	0.06	7.3	30.00	1.3	0.10	●
PICCO R-MFT60 6-4 L12	6.00	4.00	12.0	0.500	0.750	0.46	3.90	0.06	11.6	34.00	1.2	0.20	●
PICCO R/L-MFT60 6-5 L10	6.00	5.00	10.0	0.500	1.000	0.61	4.90	0.06	9.0	32.00	1.4	0.10	●
PICCO R/L-MFT60 6-5 L15 (1)	6.00	5.00	15.0	0.500	1.000	0.61	4.90	0.06	14.4	37.00	1.4	0.30	●
PICCO R/L-MFT60 6-6 L18 (1)	6.00	6.00	18.0	0.500	1.000	0.61	5.90	0.06	17.3	43.00	1.4	0.30	●
PICCO R-MFT60 6-6 L12	6.00	6.00	12.0	0.500	1.000	0.61	5.90	0.06	11.0	34.00	1.4	0.10	●
PICCO R/L-MFT60 8-7 L14	8.00	7.00	14.0	0.750	1.250	0.76	6.90	0.09	13.0	41.00	1.5	0.10	●
PICCO R-MFT60 8-7 L21	8.00	7.00	21.0	0.750	1.250	0.76	6.90	0.09	20.0	55.00	1.5	0.30	●
PICCO R/L-MFT60 8-8 L16	8.00	8.00	16.0	0.900	1.500	0.92	7.90	0.11	15.0	43.00	1.5	0.10	●
PICCO L-MFT60 8-8 L24 (1)	8.00	8.00	24.0	0.900	1.500	0.92	7.90	0.11	23.0	57.00	1.5	0.30	●
PICCO R-MFT60 8-8 L24	8.00	8.00	24.0	0.900	1.500	0.92	7.90	0.11	23.0	51.00	1.5	0.30	●

• Applications: Drilling; face turning; internal chamfering; internal turning/boring; internal profiling; external chamfering; external turning; internal and external 60° threading (right- and left-hand)

(1) Available on request

(2) Thread pitch minimum (mm)

(3) Thread pitch maximum (mm)

PICCO-MF Recommended Cutting Conditions

Cutting speed (V_c)

Workpiece Materials	Material No. VDI 3323	Hardness (BHN)	Cutting Speed: V_c (m/min) for IC908	
			Drilling	Turning & Boring
Low carbon steel (<0.25% C)	1	~150	40-100	40-180
Carbon steel (≥0.25% C)	2	150-250	40-100	40-180
Low alloy steel	6	~180	40-80	40-140
Medium alloy steel	7	200-250	40-80	40-140
High alloy steel	8, 9	250-350	40-60	40-120
Martensitic stainless steel	12	200	20-60	40-140
Austenitic stainless steel	14	200	20-60	40-140
Grey cast iron	15,16	180-220	40-140	40-140
Ductile cast iron	17,18	200-240	40-150	40-150
Aluminum alloy	21-24	60-130	50-200	150-320
Copper alloy	26-28	90-100	50-200	150-320

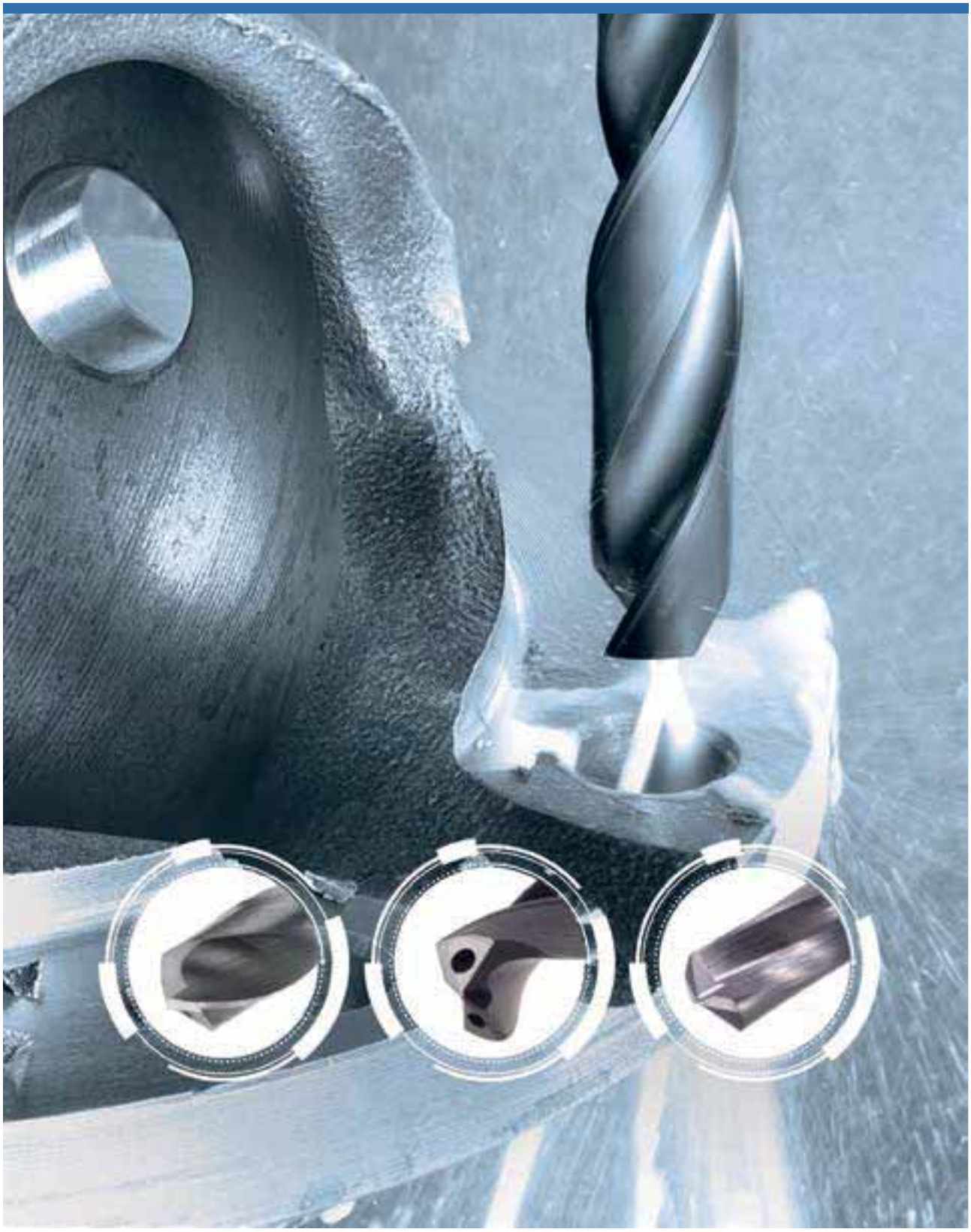
Feed (f) and depth of cut (a_p) 2xD

Tool Diameter (mm)	Machining Type	Cutting Conditions	
		a_p (mm)	f (mm/rev)
3-4	External Turning	0.8 (0.2-2.5)	0.04 (0.01-0.08)
	Face Turning	0.6 (0.02-1.7)	0.03 (0.01-0.06)
	Drilling	-	0.02 (0.01-0.06)
5-6	External Turning	1.0 (0.2-3.0)	0.04 (0.01-0.08)
	Face Turning	0.8 (0.2-2.5)	0.03 (0.01-0.06)
	Drilling	-	0.03 (0.01-0.08)
7-8	External Turning	1.3 (0.3-3.5)	0.04 (0.01-0.08)
	Face Turning	1.0 (0.25-0.3)	0.04 (0.01-0.07)
	Drilling	-	0.04 (0.01-0.10)

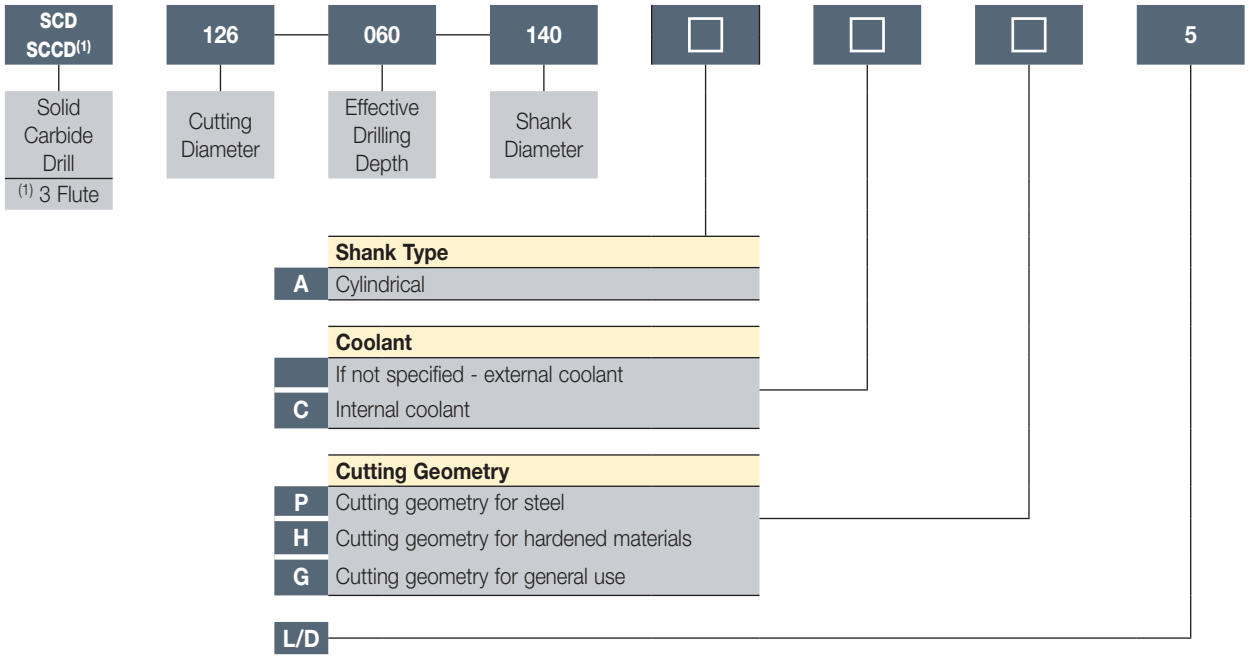
Feed (f) and depth of cut (a_p) 4xD

Tool Diameter (mm)	Machining Type	Cutting Conditions	
		a_p (mm)	f (mm/rev)
3-4	External Turning	0.8 (0.2-2.5)	0.03 (0.01-0.07)
	Face Turning	0.6 (0.02-1.7)	0.02 (0.01-0.04)
	Drilling	-	0.02 (0.01-0.05)
5-6	External Turning	1.0 (0.2-3.0)	0.03 (0.01-0.07)
	Face Turning	0.8 (0.2-2.5)	0.02 (0.01-0.04)
	Drilling	-	0.02 (0.01-0.06)
7-8	External Turning	1.3 (0.3-3.5)	0.03 (0.01-0.07)
	Face Turning	1.0 (0.25-0.3)	0.02 (0.01-0.04)
	Drilling	-	0.03 (0.01-0.08)

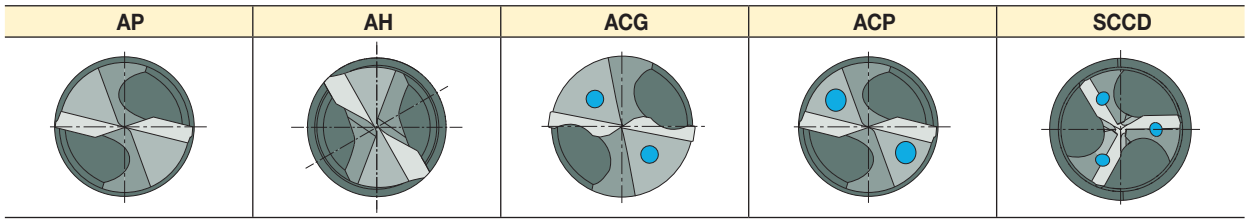
SOLID CARBIDE DRILLS



Identification System



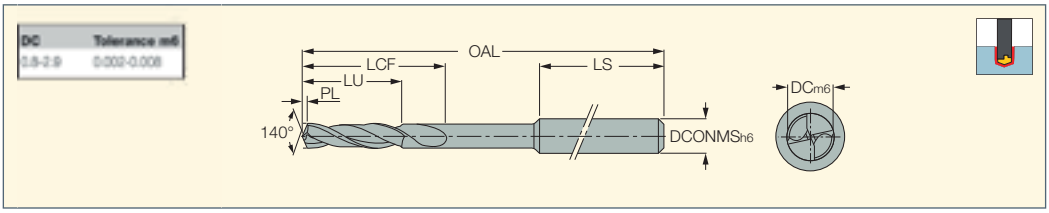
Cutting Edge Configurations



SOLIDDRILL

SCD-AP4 (4xD)

DIN 6537 Solid Carbide
Drills without Coolant Holes,
Drilling Depth 4xD



Designation	Dimensions								IC908
	DC	DCONMS	LU	LCF	LS	OAL	FTDZ(1)	PL	
SCD 008-003-030 AP4	0.80	3.00	3.2	4.8	37.2	46.00	-	0.150	•
SCD 009-003-030 AP4	0.90	3.00	3.6	5.4	36.6	46.00	-	0.160	•
SCD 010-004-030 AP4	1.00	3.00	4.0	6.0	36.0	46.00	-	0.180	•
SCD 011-004-030 AP4	1.10	3.00	4.4	6.6	35.4	46.00	M1.4	0.200	•
SCD 012-004-030 AP4	1.20	3.00	4.8	7.2	34.8	46.00	-	0.220	•
SCD 013-005-030 AP4	1.30	3.00	5.2	7.8	34.2	46.00	-	0.240	•
SCD 014-005-030 AP4	1.40	3.00	5.6	8.4	33.6	46.00	-	0.250	•
SCD 015-006-030 AP4	1.50	3.00	6.0	9.0	33.0	46.00	-	0.270	•
SCD 016-006-030 AP4	1.60	3.00	6.4	9.6	32.4	46.00	M2	0.290	•
SCD 017-006-030 AP4	1.70	3.00	6.8	10.2	31.8	46.00	-	0.310	•
SCD 018-007-030 AP4	1.80	3.00	7.2	10.8	31.2	46.00	-	0.330	•
SCD 019-007-030 AP4	1.90	3.00	7.6	11.4	30.6	46.00	-	0.350	•
SCD 020-008-030 AP4	2.00	3.00	8.0	12.0	44.0	60.00	-	0.360	•
SCD 021-008-030 AP4	2.10	3.00	8.4	12.6	43.4	60.00	-	0.380	•
SCD 022-008-030 AP4	2.20	3.00	8.8	13.2	42.8	60.00	-	0.400	•
SCD 023-009-030 AP4	2.30	3.00	9.2	13.8	42.2	60.00	-	0.420	•
SCD 024-009-030 AP4	2.40	3.00	9.6	14.4	41.6	60.00	-	0.440	•
SCD 025-010-030 AP4	2.50	3.00	10.0	15.0	41.0	60.00	M3	0.450	•
SCD 026-010-030 AP4	2.60	3.00	10.4	15.6	40.4	60.00	-	0.470	•
SCD 027-010-030 AP4	2.70	3.00	10.8	16.2	39.8	60.00	-	0.490	•
SCD 028-011-030 AP4	2.80	3.00	11.2	16.8	39.2	60.00	-	0.510	•
SCD 029-011-030 AP4	2.90	3.00	11.6	17.4	38.6	60.00	M3.5	0.530	•

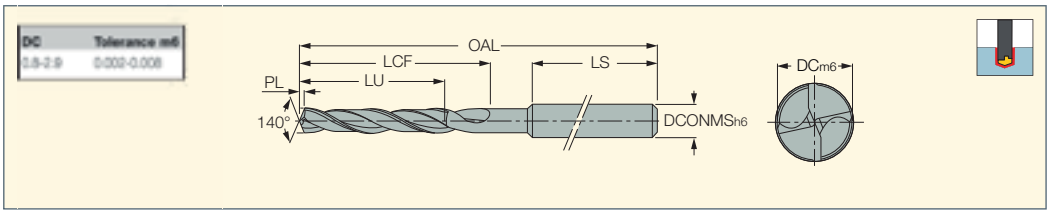
• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

(1) Used for standard thread size

SOLIDDRILL

SCD-AP6 (6xD)

DIN 6537 Solid Carbide
Drills without Coolant Holes,
Drilling Depth 6xD



Designation	Dimensions								IC908
	DC	DCONMS	LU	LCF	LS	OAL	FTDZ(1)	PL	
SCD 008-004-030 AP6	0.80	3.00	4.8	6.4	35.5	46.00	-	0.150	•
SCD 009-005-030 AP6	0.90	3.00	5.4	7.2	34.5	46.00	-	0.160	•
SCD 010-006-030 AP6	1.00	3.00	6.0	8.0	33.8	46.00	-	0.180	•
SCD 011-006-030 AP6	1.10	3.00	6.6	8.8	33.0	46.00	M1.4	0.200	•
SCD 012-007-030 AP6	1.20	3.00	7.2	9.6	32.3	46.00	-	0.220	•
SCD 013-007-030 AP6	1.30	3.00	7.8	10.4	31.5	46.00	-	0.240	•
SCD 014-008-030 AP6	1.40	3.00	8.4	11.2	30.8	46.00	-	0.250	•
SCD 015-009-030 AP6	1.50	3.00	9.0	12.0	30.0	46.00	-	0.270	•
SCD 016-009-030 AP6	1.60	3.00	9.6	12.8	29.3	46.00	M2	0.290	•
SCD 017-010-030 AP6	1.70	3.00	10.2	13.6	42.5	60.00	-	0.310	•
SCD 018-010-030 AP6	1.80	3.00	10.8	14.4	41.8	60.00	-	0.330	•
SCD 019-011-030 AP6	1.90	3.00	11.4	15.2	41.1	60.00	-	0.350	•
SCD 020-012-030 AP6	2.00	3.00	12.0	16.0	40.3	60.00	-	0.360	•
SCD 021-012-030 AP6	2.10	3.00	12.6	16.8	39.6	60.00	-	0.380	•
SCD 022-013-030 AP6	2.20	3.00	13.2	17.6	38.9	60.00	-	0.400	•
SCD 023-013-030 AP6	2.30	3.00	13.8	18.4	38.2	60.00	-	0.420	•
SCD 024-014-030 AP6	2.40	3.00	14.4	19.2	37.5	60.00	-	0.440	•
SCD 025-015-030 AP6	2.50	3.00	15.0	20.0	36.8	60.00	M3	0.450	•
SCD 026-015-030 AP6	2.60	3.00	15.6	20.8	36.1	60.00	-	0.470	•
SCD 027-016-030 AP6	2.70	3.00	16.2	21.6	35.5	60.00	-	0.490	•
SCD 028-016-030 AP6	2.80	3.00	16.8	22.4	34.8	60.00	-	0.510	•
SCD 029-017-030 AP6	2.90	3.00	17.4	23.2	34.4	60.00	M3.5	0.530	•

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

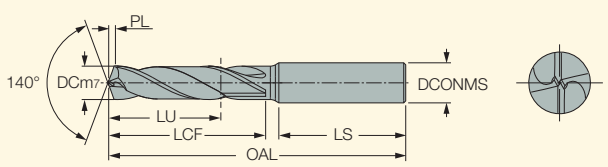
(1) Used for standard thread size

SOLIDDRILL

SCD-AP3N (3xD)

DIN 6537 Solid Carbide
Drills without Coolant Holes,
Drilling Depth 3xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.008-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC908
	DC	DCONMS	OAL	LU	LCF	PL	LS	FTDZ[1]	
SCD 030-014-060 AP3N	3.00	6.00	62.00	14.00	20.0	0.500	34.0	-	●
SCD 031-014-060 AP3N	3.10	6.00	62.00	14.00	20.0	0.500	34.0	-	●
SCD 032-014-060 AP3N	3.20	6.00	62.00	14.00	20.0	0.500	34.0	-	●
SCD 033-014-060 AP3N	3.30	6.00	62.00	14.00	20.0	0.500	34.0	M4	●
SCD 034-014-060 AP3N	3.40	6.00	62.00	14.00	20.0	0.500	34.0	-	●
SCD 035-014-060 AP3N	3.50	6.00	62.00	14.00	20.0	0.600	34.0	-	●
SCD 036-014-060 AP3N	3.60	6.00	62.00	14.00	20.0	0.600	34.0	-	●
SCD 037-014-060 AP3N	3.70	6.00	62.00	14.00	20.0	0.600	34.0	-	●
SCD 038-017-060 AP3N	3.80	6.00	66.00	17.00	24.0	0.600	35.0	-	●
SCD 039-017-060 AP3N	3.90	6.00	66.00	17.00	24.0	0.600	35.0	-	●
SCD 040-017-060 AP3N	4.00	6.00	66.00	17.00	24.0	0.600	35.0	-	●
SCD 041-017-060 AP3N	4.10	6.00	66.00	17.00	24.0	0.700	35.0	-	●
SCD 042-017-060 AP3N	4.20	6.00	66.00	17.00	24.0	0.700	35.0	M5	●
SCD 043-017-060 AP3N	4.30	6.00	66.00	17.00	24.0	0.700	35.0	-	●
SCD 044-017-060 AP3N	4.40	6.00	66.00	17.00	24.0	0.700	35.0	-	●
SCD 045-017-060 AP3N	4.50	6.00	66.00	17.00	24.0	0.700	35.0	-	●
SCD 046-017-060 AP3N	4.60	6.00	66.00	17.00	24.0	0.700	35.0	-	●
SCD 047-017-060 AP3N	4.70	6.00	66.00	17.00	24.0	0.800	35.0	-	●
SCD 048-020-060 AP3N	4.80	6.00	66.00	20.00	28.0	0.800	36.0	-	●
SCD 049-020-060 AP3N	4.90	6.00	66.00	20.00	28.0	0.800	36.0	-	●
SCD 050-020-060 AP3N	5.00	6.00	66.00	20.00	28.0	0.800	36.0	M6	●
SCD 051-020-060 AP3N	5.10	6.00	66.00	20.00	28.0	0.800	36.0	-	●
SCD 052-020-060 AP3N	5.20	6.00	66.00	20.00	28.0	0.800	36.0	-	●
SCD 053-020-060 AP3N	5.30	6.00	66.00	20.00	28.0	0.800	36.0	-	●
SCD 054-020-060 AP3N	5.40	6.00	66.00	20.00	28.0	0.800	36.0	-	●
SCD 055-020-060 AP3N	5.50	6.00	66.00	20.00	28.0	0.900	36.0	-	●
SCD 056-020-060 AP3N	5.60	6.00	66.00	20.00	28.0	0.900	36.0	-	●
SCD 057-020-060 AP3N	5.70	6.00	66.00	20.00	28.0	0.900	36.0	-	●
SCD 058-020-060 AP3N	5.80	6.00	66.00	20.00	28.0	0.900	36.0	-	●
SCD 059-020-060 AP3N	5.90	6.00	66.00	20.00	28.0	0.900	36.0	-	●
SCD 060-020-060 AP3N	6.00	6.00	66.00	20.00	28.0	0.900	36.0	M7	●
SCD 061-024-080 AP3N	6.10	8.00	79.00	24.00	34.0	1.000	36.0	-	●
SCD 062-024-080 AP3N	6.20	8.00	79.00	24.00	34.0	1.000	36.0	-	●
SCD 063-024-080 AP3N	6.30	8.00	79.00	24.00	34.0	1.000	36.0	-	●
SCD 064-024-080 AP3N	6.40	8.00	79.00	24.00	34.0	1.000	36.0	-	●
SCD 065-024-080 AP3N	6.50	8.00	79.00	24.00	34.0	1.000	36.0	-	●
SCD 066-024-080 AP3N	6.60	8.00	79.00	24.00	34.0	1.000	36.0	-	●
SCD 067-024-080 AP3N	6.70	8.00	79.00	24.00	34.0	1.100	36.0	-	●
SCD 068-024-080 AP3N	6.80	8.00	79.00	24.00	34.0	1.100	36.0	M8	●
SCD 069-024-080 AP3N	6.90	8.00	79.00	24.00	34.0	1.100	36.0	-	●
SCD 070-024-080 AP3N	7.00	8.00	79.00	24.00	34.0	1.100	36.0	-	●
SCD 071-029-080 AP3N	7.10	8.00	79.00	29.00	41.0	1.100	36.0	-	●
SCD 072-029-080 AP3N	7.20	8.00	79.00	29.00	41.0	1.100	36.0	-	●
SCD 073-029-080 AP3N	7.30	8.00	79.00	29.00	41.0	1.100	36.0	-	●
SCD 074-029-080 AP3N	7.40	8.00	79.00	29.00	41.0	1.200	36.0	-	●
SCD 075-029-080 AP3N	7.50	8.00	79.00	29.00	41.0	1.200	36.0	-	●
SCD 076-029-080 AP3N	7.60	8.00	79.00	29.00	41.0	1.200	36.0	-	●
SCD 077-029-080 AP3N	7.70	8.00	79.00	29.00	41.0	1.200	36.0	-	●
SCD 078-029-080 AP3N	7.80	8.00	79.00	29.00	41.0	1.200	36.0	M9	●
SCD 079-029-080 AP3N	7.90	8.00	79.00	29.00	41.0	1.300	36.0	-	●
SCD 080-029-080 AP3N	8.00	8.00	79.00	29.00	41.0	1.300	36.0	-	●
SCD 081-035-100 AP3N	8.10	10.00	89.00	35.00	47.0	1.300	40.0	-	●
SCD 082-035-100 AP3N	8.20	10.00	89.00	35.00	47.0	1.300	40.0	-	●
SCD 083-035-100 AP3N	8.30	10.00	89.00	35.00	47.0	1.300	40.0	-	●
SCD 084-035-100 AP3N	8.40	10.00	89.00	35.00	47.0	1.300	40.0	-	●
SCD 085-035-100 AP3N	8.50	10.00	89.00	35.00	47.0	1.300	40.0	M10	●
SCD 086-035-100 AP3N	8.60	10.00	89.00	35.00	47.0	1.400	40.0	-	●
SCD 087-035-100 AP3N	8.70	10.00	89.00	35.00	47.0	1.400	40.0	-	●

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

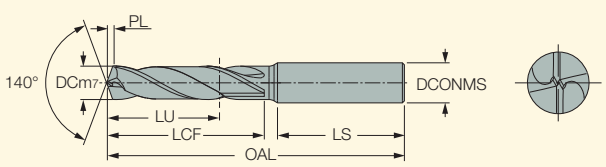
[1] Used for standard thread size

SOLIDDRILL

SCD-AP3N (3xD) (continued)

DIN 6537 Solid Carbide Drills without Coolant Holes, Drilling Depth 3xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.008-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



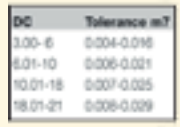
Designation	Dimensions								IC908
	DC	DCONMS	OAL	LU	LCF	PL	LS	FTDZ[1]	
SCD 088-035-100 AP3N	8.80	10.00	89.00	35.00	47.0	1.400	40.0	-	●
SCD 089-035-100 AP3N	8.90	10.00	89.00	35.00	47.0	1.400	40.0	-	●
SCD 090-035-100 AP3N	9.00	10.00	89.00	35.00	47.0	1.400	40.0	-	●
SCD 091-035-100 AP3N	9.10	10.00	89.00	35.00	47.0	1.400	40.0	-	●
SCD 092-035-100 AP3N	9.20	10.00	89.00	35.00	47.0	1.400	40.0	-	●
SCD 093-035-100 AP3N	9.30	10.00	89.00	35.00	47.0	1.500	40.0	-	●
SCD 094-035-100 AP3N	9.40	10.00	89.00	35.00	47.0	1.500	40.0	-	●
SCD 095-035-100 AP3N	9.50	10.00	89.00	35.00	47.0	1.500	40.0	M11	●
SCD 096-035-100 AP3N	9.60	10.00	89.00	35.00	47.0	1.500	40.0	-	●
SCD 097-035-100 AP3N	9.70	10.00	89.00	35.00	47.0	1.500	40.0	-	●
SCD 098-035-100 AP3N	9.80	10.00	89.00	35.00	47.0	1.600	40.0	-	●
SCD 099-035-100 AP3N	9.90	10.00	89.00	35.00	47.0	1.600	40.0	-	●
SCD 100-035-100 AP3N	10.00	10.00	89.00	35.00	47.0	1.600	40.0	-	●
SCD 101-040-120 AP3N	10.10	12.00	101.00	40.00	55.0	1.600	45.0	-	●
SCD 102-040-120 AP3N	10.20	12.00	101.00	40.00	55.0	1.600	45.0	M12	●
SCD 103-040-120 AP3N	10.30	12.00	101.00	40.00	55.0	1.600	45.0	-	●
SCD 104-040-120 AP3N	10.40	12.00	101.00	40.00	55.0	1.600	45.0	-	●
SCD 105-040-120 AP3N	10.50	12.00	101.00	40.00	55.0	1.600	45.0	-	●
SCD 106-040-120 AP3N	10.60	12.00	101.00	40.00	55.0	1.700	45.0	-	●
SCD 107-040-120 AP3N	10.70	12.00	101.00	40.00	55.0	1.700	45.0	-	●
SCD 108-040-120 AP3N	10.80	12.00	101.00	40.00	55.0	1.700	45.0	-	●
SCD 109-040-120 AP3N	10.90	12.00	101.00	40.00	55.0	1.700	45.0	-	●
SCD 110-040-120 AP3N	11.00	12.00	101.00	40.00	55.0	1.700	45.0	-	●
SCD 111-040-120 AP3N	11.10	12.00	101.00	40.00	55.0	1.700	45.0	-	●
SCD 112-040-120 AP3N	11.20	12.00	101.00	40.00	55.0	1.800	45.0	-	●
SCD 113-040-120 AP3N	11.30	12.00	101.00	40.00	55.0	1.800	45.0	-	●
SCD 114-040-120 AP3N	11.40	12.00	101.00	40.00	55.0	1.800	45.0	-	●
SCD 115-040-120 AP3N	11.50	12.00	101.00	40.00	55.0	1.800	45.0	-	●
SCD 116-040-120 AP3N	11.60	12.00	101.00	40.00	55.0	1.800	45.0	-	●
SCD 117-040-120 AP3N	11.70	12.00	101.00	40.00	55.0	1.900	45.0	-	●
SCD 118-040-120 AP3N	11.80	12.00	101.00	40.00	55.0	1.900	45.0	-	●
SCD 119-040-120 AP3N	11.90	12.00	101.00	40.00	55.0	1.900	45.0	-	●
SCD 120-040-120 AP3N	12.00	12.00	101.00	40.00	55.0	1.900	45.0	M14	●

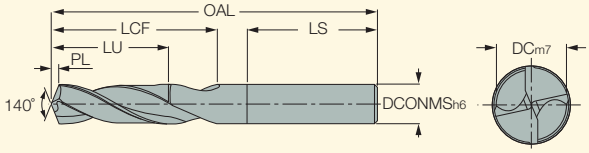
• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

[1] Used for standard thread size

SOLIDDRILL

SCD-AP3 (3xD)
DIN 6537 Solid Carbide
Drills without Coolant Holes,
Drilling Depth 3xD





Designation	Dimensions								IC908
	DC	DCONMS	LU	LCF	OAL	LS	FTDZ[1]	PL	
SCD 121-043-140 AP3	12.10	14.00	43.0	60.0	107.00	45.0	-	2.200	●
SCD 122-043-140 AP3	12.20	14.00	43.0	60.0	107.00	45.0	-	2.220	●
SCD 123-043-140 AP3	12.30	14.00	43.0	60.0	107.00	45.0	-	2.240	●
SCD 124-043-140 AP3	12.40	14.00	43.0	60.0	107.00	45.0	-	2.260	●
SCD 125-043-140 AP3	12.50	14.00	43.0	60.0	107.00	45.0	-	2.270	●
SCD 126-043-140 AP3	12.60	14.00	43.0	60.0	107.00	45.0	-	2.290	●
SCD 127-043-140 AP3	12.70	14.00	43.0	60.0	107.00	45.0	-	2.310	●
SCD 128-043-140 AP3	12.80	14.00	43.0	60.0	107.00	45.0	-	2.330	●
SCD 129-043-140 AP3	12.90	14.00	43.0	60.0	107.00	45.0	-	2.350	●
SCD 130-043-140 AP3	13.00	14.00	43.0	60.0	107.00	45.0	-	2.370	●
SCD 131-043-140 AP3	13.10	14.00	43.0	60.0	107.00	45.0	-	2.380	●
SCD 132-043-140 AP3	13.20	14.00	43.0	60.0	107.00	45.0	-	2.400	●
SCD 133-043-140 AP3	13.30	14.00	43.0	60.0	107.00	45.0	-	2.420	●
SCD 135-043-140 AP3	13.50	14.00	43.0	60.0	107.00	45.0	-	2.460	●
SCD 136-043-140 AP3	13.60	14.00	43.0	60.0	107.00	45.0	-	2.470	●
SCD 137-043-140 AP3	13.70	14.00	43.0	60.0	107.00	45.0	-	2.490	●
SCD 138-043-140 AP3	13.80	14.00	43.0	60.0	107.00	45.0	-	2.510	●
SCD 139-043-140 AP3	13.90	14.00	43.0	60.0	107.00	45.0	-	2.530	●
SCD 140-043-140 AP3	14.00	14.00	43.0	60.0	107.00	45.0	M16	2.550	●
SCD 141-045-160 AP3	14.10	16.00	45.0	65.0	115.00	45.0	-	2.570	●
SCD 142-045-160 AP3	14.20	16.00	45.0	65.0	115.00	45.0	-	2.580	●
SCD 143-045-160 AP3	14.30	16.00	45.0	65.0	115.00	45.0	-	2.600	●
SCD 144-045-160 AP3	14.40	16.00	45.0	65.0	115.00	45.0	-	2.620	●
SCD 145-045-160 AP3	14.50	16.00	45.0	65.0	115.00	45.0	-	2.640	●
SCD 146-045-160 AP3	14.60	16.00	45.0	65.0	115.00	45.0	-	2.660	●
SCD 147-045-160 AP3	14.70	16.00	45.0	65.0	115.00	45.0	-	2.680	●
SCD 148-045-160 AP3	14.80	16.00	45.0	65.0	115.00	45.0	-	2.690	●
SCD 149-045-160 AP3	14.90	16.00	45.0	65.0	115.00	45.0	-	2.710	●
SCD 150-045-160 AP3	15.00	16.00	45.0	65.0	115.00	45.0	-	2.730	●
SCD 151-045-160 AP3	15.10	16.00	45.0	65.0	115.00	45.0	-	2.750	●
SCD 152-045-160 AP3	15.20	16.00	45.0	65.0	115.00	45.0	-	2.770	●
SCD 153-045-160 AP3	15.30	16.00	45.0	65.0	115.00	45.0	-	2.780	●
SCD 154-045-160 AP3	15.40	16.00	45.0	65.0	115.00	45.0	-	2.800	●
SCD 155-045-160 AP3	15.50	16.00	45.0	65.0	115.00	45.0	M18	2.820	●
SCD 156-045-160 AP3	15.60	16.00	45.0	65.0	115.00	45.0	-	2.840	●
SCD 157-045-160 AP3	15.70	16.00	45.0	65.0	115.00	45.0	-	2.860	●
SCD 158-045-160 AP3	15.80	16.00	45.0	65.0	115.00	45.0	-	2.880	●
SCD 159-045-160 AP3	15.90	16.00	45.0	65.0	115.00	45.0	-	2.890	●
SCD 160-045-160 AP3	16.00	16.00	45.0	65.0	115.00	45.0	-	2.910	●
SCD 161-051-180 AP3	16.10	18.00	51.0	73.0	123.00	48.0	-	2.930	●
SCD 162-051-180 AP3	16.20	18.00	51.0	73.0	123.00	48.0	-	2.950	●
SCD 163-051-180 AP3	16.30	18.00	51.0	73.0	123.00	48.0	-	2.970	●
SCD 164-051-180 AP3	16.40	18.00	51.0	73.0	123.00	48.0	-	2.980	●
SCD 165-051-180 AP3	16.50	18.00	51.0	73.0	123.00	48.0	-	3.000	●
SCD 166-051-180 AP3	16.60	18.00	51.0	73.0	123.00	48.0	-	3.020	●
SCD 167-051-180 AP3	16.70	18.00	51.0	73.0	123.00	48.0	-	3.040	●
SCD 168-051-180 AP3	16.80	18.00	51.0	73.0	123.00	48.0	-	3.060	●
SCD 169-051-180 AP3	16.90	18.00	51.0	73.0	123.00	48.0	-	3.080	●
SCD 170-051-180 AP3	17.00	18.00	51.0	73.0	123.00	48.0	-	3.090	●
SCD 171-051-180 AP3	17.10	18.00	51.0	73.0	123.00	48.0	-	3.110	●
SCD 172-051-180 AP3	17.20	18.00	51.0	73.0	123.00	48.0	-	3.130	●
SCD 173-051-180 AP3	17.30	18.00	51.0	73.0	123.00	48.0	-	3.150	●
SCD 174-051-180 AP3	17.40	18.00	51.0	73.0	123.00	48.0	-	3.170	●
SCD 175-051-180 AP3	17.50	18.00	51.0	73.0	123.00	48.0	M20	3.180	●
SCD 176-051-180 AP3	17.60	18.00	51.0	73.0	123.00	48.0	-	3.200	●
SCD 177-051-180 AP3	17.70	18.00	51.0	73.0	123.00	48.0	-	3.220	●
SCD 178-051-180 AP3	17.80	18.00	51.0	73.0	123.00	48.0	-	3.240	●

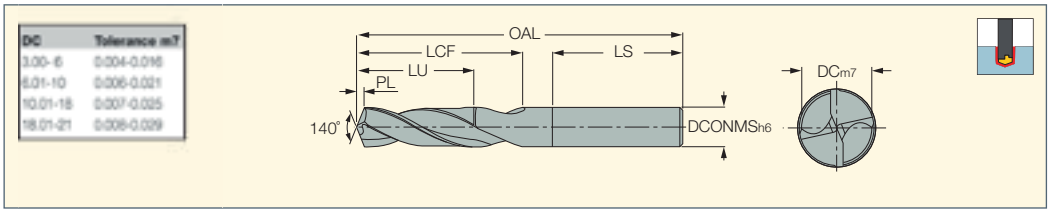
• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

(1) Used for standard thread size

SOLIDDRILL

SCD-AP3 (3xD) (continued)

DIN 6537 Solid Carbide Drills without Coolant Holes, Drilling Depth 3xD



Designation	Dimensions								IC908
	DC	DCONMS	LU	LCF	OAL	LS	FTDZ(1)	PL	
SCD 179-051-180 AP3	17.90	18.00	51.0	73.0	123.00	48.0	-	3.260	●
SCD 180-051-180 AP3	18.00	18.00	51.0	73.0	123.00	48.0	-	3.280	●
SCD 181-055-200 AP3	18.10	20.00	55.0	79.0	131.00	48.0	-	3.290	●
SCD 182-055-200 AP3	18.20	20.00	55.0	79.0	131.00	48.0	-	3.310	●
SCD 183-055-200 AP3	18.30	20.00	55.0	79.0	131.00	48.0	-	3.330	●
SCD 184-055-200 AP3	18.40	20.00	55.0	79.0	131.00	48.0	-	3.350	●
SCD 185-055-200 AP3	18.50	20.00	55.0	79.0	131.00	48.0	-	3.370	●
SCD 186-055-200 AP3	18.60	20.00	55.0	79.0	131.00	48.0	-	3.380	●
SCD 187-055-200 AP3	18.70	20.00	55.0	79.0	131.00	48.0	-	3.400	●
SCD 188-055-200 AP3	18.80	20.00	55.0	79.0	131.00	48.0	-	3.420	●
SCD 189-055-200 AP3	18.90	20.00	55.0	79.0	131.00	48.0	-	3.440	●
SCD 190-055-200 AP3	19.00	20.00	55.0	79.0	131.00	48.0	-	3.460	●
SCD 191-055-200 AP3	19.10	20.00	55.0	79.0	131.00	48.0	-	3.480	●
SCD 192-055-200 AP3	19.20	20.00	55.0	79.0	131.00	48.0	-	3.490	●
SCD 193-055-200 AP3	19.30	20.00	55.0	79.0	131.00	48.0	-	3.510	●
SCD 194-055-200 AP3	19.40	20.00	55.0	79.0	131.00	48.0	-	3.530	●
SCD 195-055-200 AP3	19.50	20.00	55.0	79.0	131.00	48.0	M22	3.550	●
SCD 197-055-200 AP3	19.70	20.00	55.0	79.0	131.00	48.0	-	3.590	●
SCD 198-055-200 AP3	19.80	20.00	55.0	79.0	131.00	48.0	-	3.600	●
SCD 199-055-200 AP3	19.90	20.00	55.0	79.0	131.00	48.0	-	3.620	●
SCD 200-055-200 AP3	20.00	20.00	55.0	79.0	131.00	48.0	-	3.640	●

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

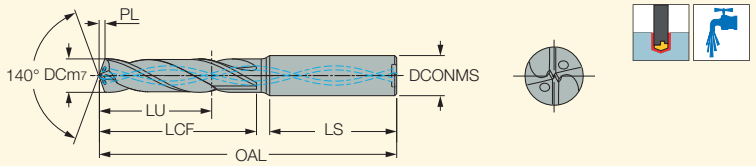
(1) Used for standard thread size

SOLIDDRILL

SCD-ACP3N (3XD)

DIN 6537 Solid Carbide Drills with Coolant Holes, Drilling Depth 3xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.008-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC908
	DC	DCONMS	OAL	LU	LCF	PL	LS	FTDZ[1]	
SCD 030-014-060 ACP3N	3.00	6.00	62.00	14.00	20.0	0.500	34.0	-	●
SCD 031-014-060 ACP3N	3.10	6.00	62.00	14.00	20.0	0.500	34.0	-	●
SCD 032-014-060 ACP3N	3.20	6.00	62.00	14.00	20.0	0.500	34.0	-	●
SCD 033-014-060 ACP3N	3.30	6.00	62.00	14.00	20.0	0.500	34.0	M4	●
SCD 034-014-060 ACP3N	3.40	6.00	62.00	14.00	20.0	0.500	34.0	-	●
SCD 035-014-060 ACP3N	3.50	6.00	62.00	14.00	20.0	0.600	34.0	-	●
SCD 036-014-060 ACP3N	3.60	6.00	62.00	14.00	20.0	0.600	34.0	-	●
SCD 037-014-060 ACP3N	3.70	6.00	62.00	14.00	20.0	0.600	34.0	-	●
SCD 038-017-060 ACP3N	3.80	6.00	66.00	17.00	24.0	0.600	35.0	-	●
SCD 039-017-060 ACP3N	3.90	6.00	66.00	17.00	24.0	0.600	35.0	-	●
SCD 040-017-060 ACP3N	4.00	6.00	66.00	17.00	24.0	0.600	35.0	-	●
SCD 041-017-060 ACP3N	4.10	6.00	66.00	17.00	24.0	0.700	35.0	-	●
SCD 042-017-060 ACP3N	4.20	6.00	66.00	17.00	24.0	0.700	35.0	M5	●
SCD 043-017-060 ACP3N	4.30	6.00	66.00	17.00	24.0	0.700	35.0	-	●
SCD 044-017-060 ACP3N	4.40	6.00	66.00	17.00	24.0	0.700	35.0	-	●
SCD 045-017-060 ACP3N	4.50	6.00	66.00	17.00	24.0	0.700	35.0	-	●
SCD 046-017-060 ACP3N	4.60	6.00	66.00	17.00	24.0	0.700	35.0	-	●
SCD 047-017-060 ACP3N	4.70	6.00	66.00	17.00	24.0	0.800	35.0	-	●
SCD 048-020-060 ACP3N	4.80	6.00	66.00	20.00	28.0	0.800	36.0	-	●
SCD 049-020-060 ACP3N	4.90	6.00	66.00	20.00	28.0	0.800	36.0	-	●
SCD 050-020-060 ACP3N	5.00	6.00	66.00	20.00	28.0	0.800	36.0	M6	●
SCD 051-020-060 ACP3N	5.10	6.00	66.00	20.00	28.0	0.800	36.0	-	●
SCD 052-020-060 ACP3N	5.20	6.00	66.00	20.00	28.0	0.800	36.0	-	●
SCD 053-020-060 ACP3N	5.30	6.00	66.00	20.00	28.0	0.800	36.0	-	●
SCD 054-020-060 ACP3N	5.40	6.00	66.00	20.00	28.0	0.800	36.0	-	●
SCD 055-020-060 ACP3N	5.50	6.00	66.00	20.00	28.0	0.900	36.0	-	●
SCD 056-020-060 ACP3N	5.60	6.00	66.00	20.00	28.0	0.900	36.0	-	●
SCD 057-020-060 ACP3N	5.70	6.00	66.00	20.00	28.0	0.900	36.0	-	●
SCD 058-020-060 ACP3N	5.80	6.00	66.00	20.00	28.0	0.900	36.0	-	●
SCD 059-020-060 ACP3N	5.90	6.00	66.00	20.00	28.0	0.900	36.0	-	●
SCD 060-020-060 ACP3N	6.00	6.00	66.00	20.00	28.0	0.900	36.0	M7	●
SCD 061-024-080 ACP3N	6.10	8.00	79.00	24.00	34.0	1.000	36.0	-	●
SCD 062-024-080 ACP3N	6.20	8.00	79.00	24.00	34.0	1.000	36.0	-	●
SCD 063-024-080 ACP3N	6.30	8.00	79.00	24.00	34.0	1.000	36.0	-	●
SCD 064-024-080 ACP3N	6.40	8.00	79.00	24.00	34.0	1.000	36.0	-	●
SCD 065-024-080 ACP3N	6.50	8.00	79.00	24.00	34.0	1.000	36.0	-	●
SCD 066-024-080 ACP3N	6.60	8.00	79.00	24.00	34.0	1.000	36.0	-	●
SCD 067-024-080 ACP3N	6.70	8.00	79.00	24.00	34.0	1.100	36.0	-	●
SCD 068-024-080 ACP3N	6.80	8.00	79.00	24.00	34.0	1.100	36.0	M8	●
SCD 069-024-080 ACP3N	6.90	8.00	79.00	24.00	34.0	1.100	36.0	-	●
SCD 070-024-080 ACP3N	7.00	8.00	79.00	24.00	34.0	1.100	36.0	-	●
SCD 071-029-080 ACP3N	7.10	8.00	79.00	29.00	41.0	1.100	36.0	-	●
SCD 072-029-080 ACP3N	7.20	8.00	79.00	29.00	41.0	1.100	36.0	-	●
SCD 073-029-080 ACP3N	7.30	8.00	79.00	29.00	41.0	1.100	36.0	-	●
SCD 074-029-080 ACP3N	7.40	8.00	79.00	29.00	41.0	1.200	36.0	-	●
SCD 075-029-080 ACP3N	7.50	8.00	79.00	29.00	41.0	1.200	36.0	-	●
SCD 076-029-080 ACP3N	7.60	8.00	79.00	29.00	41.0	1.200	36.0	-	●
SCD 077-029-080 ACP3N	7.70	8.00	79.00	29.00	41.0	1.200	36.0	-	●
SCD 078-029-080 ACP3N	7.80	8.00	79.00	29.00	41.0	1.200	36.0	M9	●
SCD 079-029-080 ACP3N	7.90	8.00	79.00	29.00	41.0	1.300	36.0	-	●
SCD 080-029-080 ACP3N	8.00	8.00	79.00	29.00	41.0	1.300	36.0	-	●
SCD 081-035-100 ACP3N	8.10	10.00	89.00	35.00	47.0	1.300	40.0	-	●
SCD 082-035-100 ACP3N	8.20	10.00	89.00	35.00	47.0	1.300	40.0	-	●
SCD 083-035-100 ACP3N	8.30	10.00	89.00	35.00	47.0	1.300	40.0	-	●
SCD 084-035-100 ACP3N	8.40	10.00	89.00	35.00	47.0	1.300	40.0	-	●
SCD 085-035-100 ACP3N	8.50	10.00	89.00	35.00	47.0	1.300	40.0	M10	●
SCD 086-035-100 ACP3N	8.60	10.00	89.00	35.00	47.0	1.400	40.0	-	●

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

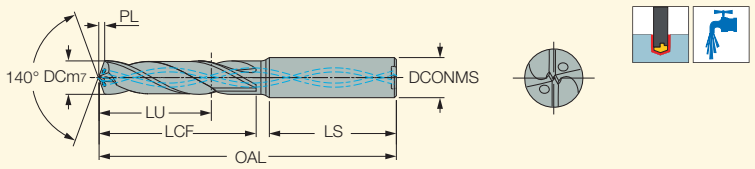
[1] Used for standard thread size

SOLIDDRILL

SCD-ACP3N (3XD) (continued)

DIN 6537 Solid Carbide Drills with Coolant Holes, Drilling Depth 3xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.008-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC908
	DC	DCONMS	OAL	LU	LCF	PL	LS	FTDZ(1)	
SCD 087-035-100 ACP3N	8.70	10.00	89.00	35.00	47.0	1.400	40.0	-	●
SCD 088-035-100 ACP3N	8.80	10.00	89.00	35.00	47.0	1.400	40.0	-	●
SCD 089-035-100 ACP3N	8.90	10.00	89.00	35.00	47.0	1.400	40.0	-	●
SCD 090-035-100 ACP3N	9.00	10.00	89.00	35.00	47.0	1.400	40.0	-	●
SCD 091-035-100 ACP3N	9.10	10.00	89.00	35.00	47.0	1.400	40.0	-	●
SCD 092-035-100 ACP3N	9.20	10.00	89.00	35.00	47.0	1.400	40.0	-	●
SCD 093-035-100 ACP3N	9.30	10.00	89.00	35.00	47.0	1.500	40.0	-	●
SCD 094-035-100 ACP3N	9.40	10.00	89.00	35.00	47.0	1.500	40.0	-	●
SCD 095-035-100 ACP3N	9.50	10.00	89.00	35.00	47.0	1.500	40.0	M11	●
SCD 096-035-100 ACP3N	9.60	10.00	89.00	35.00	47.0	1.500	40.0	-	●
SCD 097-035-100 ACP3N	9.70	10.00	89.00	35.00	47.0	1.500	40.0	-	●
SCD 098-035-100 ACP3N	9.80	10.00	89.00	35.00	47.0	1.600	40.0	-	●
SCD 099-035-100 ACP3N	9.90	10.00	89.00	35.00	47.0	1.600	40.0	-	●
SCD 100-035-100 ACP3N	10.00	10.00	89.00	35.00	47.0	1.600	40.0	-	●
SCD 101-040-120 ACP3N	10.10	12.00	102.00	40.00	55.0	1.600	45.0	-	●
SCD 102-040-120 ACP3N	10.20	12.00	102.00	40.00	55.0	1.600	45.0	M12	●
SCD 103-040-120 ACP3N	10.30	12.00	102.00	40.00	55.0	1.600	45.0	-	●
SCD 104-040-120 ACP3N	10.40	12.00	102.00	40.00	55.0	1.600	45.0	-	●
SCD 105-040-120 ACP3N	10.50	12.00	102.00	40.00	55.0	1.600	45.0	-	●
SCD 106-040-120 ACP3N	10.60	12.00	102.00	40.00	55.0	1.700	45.0	-	●
SCD 108-040-120 ACP3N	10.80	12.00	102.00	40.00	55.0	1.700	45.0	-	●
SCD 109-040-120 ACP3N	10.90	12.00	102.00	40.00	55.0	1.700	45.0	-	●
SCD 110-040-120 ACP3N	11.00	12.00	102.00	40.00	55.0	1.700	45.0	-	●
SCD 111-040-120 ACP3N	11.10	12.00	102.00	40.00	55.0	1.700	45.0	-	●
SCD 112-040-120 ACP3N	11.20	12.00	102.00	40.00	55.0	1.800	45.0	-	●
SCD 113-040-120 ACP3N	11.30	12.00	102.00	40.00	55.0	1.800	45.0	-	●
SCD 114-040-120 ACP3N	11.40	12.00	102.00	40.00	55.0	1.800	45.0	-	●
SCD 115-040-120 ACP3N	11.50	12.00	102.00	40.00	55.0	1.800	45.0	-	●
SCD 116-040-120 ACP3N	11.60	12.00	102.00	40.00	55.0	1.800	45.0	-	●
SCD 117-040-120 ACP3N	11.70	12.00	102.00	40.00	55.0	1.900	45.0	-	●
SCD 118-040-120 ACP3N	11.80	12.00	102.00	40.00	55.0	1.900	45.0	-	●
SCD 119-040-120 ACP3N	11.90	12.00	102.00	40.00	55.0	1.900	45.0	-	●
SCD 120-040-120 ACP3N	12.00	12.00	102.00	40.00	55.0	1.900	45.0	M14	●

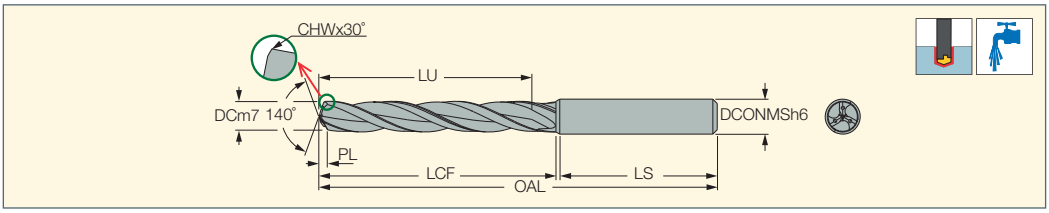
- For user guide and cutting conditions, see pages 175-184
- For regrinding instructions, see page 181

(1) Used for standard thread size

SOLIDDRILL

SCCD-ACP3

Three Flute Solid Carbide Drills with Coolant Holes, Drilling Depth 3xD



Designation	Dimensions										IC908
	DC	DCONMS	LU	LCF	OAL	LS	PL	KCH	CHW	FTDZ[1]	
SCCD 040-017-060 ACP3	4.00	6.00	17.0	25.0	66.00	35.0	0.820	30.0	0.30		•
SCCD 045-017-060 ACP3	4.50	6.00	17.0	25.0	66.00	35.0	0.880	30.0	0.30		•
SCCD 050-020-060 ACP3	5.00	6.00	20.0	29.0	66.00	36.0	0.960	30.0	0.30	M6	•
SCCD 051-020-060 ACP3	5.10	6.00	20.0	29.0	66.00	36.0	0.980	30.0	0.30	M7	•
SCCD 055-020-060 ACP3	5.50	6.00	20.0	29.0	66.00	36.0	1.080	30.0	0.40		•
SCCD 060-020-060 ACP3	6.00	6.00	20.0	29.0	66.00	36.0	1.170	30.0	0.40		•
SCCD 065-024-080 ACP3	6.50	8.00	24.0	35.0	79.00	36.0	1.260	30.0	0.40		•
SCCD 068-024-080 ACP3	6.80	8.00	24.0	35.0	79.00	36.0	1.310	30.0	0.40	M8	•
SCCD 070-024-080 ACP3	7.00	8.00	24.0	35.0	79.00	36.0	1.350	30.0	0.40		•
SCCD 075-029-080 ACP3	7.50	8.00	29.0	42.0	79.00	36.0	1.400	30.0	0.40		•
SCCD 080-029-080 ACP3	8.00	8.00	29.0	42.0	79.00	36.0	1.490	30.0	0.40		•
SCCD 085-035-100 ACP3	8.50	10.00	35.0	48.0	89.00	40.0	1.630	30.0	0.50	M10	•
SCCD 086-035-100 ACP3	8.60	10.00	35.0	48.0	89.00	40.0	1.650	30.0	0.50		•
SCCD 090-035-100 ACP3	9.00	10.00	35.0	48.0	89.00	40.0	1.720	30.0	0.50		•
SCCD 095-035-100 ACP3	9.50	10.00	35.0	48.0	89.00	40.0	1.750	30.0	0.50	M11	•
SCCD 100-035-100 ACP3	10.00	10.00	35.0	48.0	89.00	40.0	1.850	30.0	0.50		•
SCCD 103-040-120 ACP3	10.30	12.00	40.0	55.0	102.00	45.0	1.940	30.0	0.60		•
SCCD 105-040-120 ACP3	10.50	12.00	40.0	55.0	102.00	45.0	1.980	30.0	0.60		•
SCCD 110-040-120 ACP3	11.00	12.00	40.0	55.0	102.00	45.0	2.070	30.0	0.60		•
SCCD 115-040-120 ACP3	11.50	12.00	40.0	56.0	102.00	45.0	2.120	30.0	0.60		•
SCCD 120-040-120 ACP3	12.00	12.00	40.0	56.0	102.00	45.0	2.210	30.0	0.60	M14	•

• For user guide, see pages 175-184 • For regrinding instructions, see page 182

[1] Used for standard thread size

Recommended Machining Conditions for SCCD-ACP Solid Carbide Drills

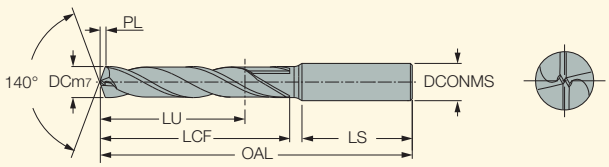
ISO	Material No.	Material		Material Condition	Cutting Speed V_c, m/min	Cutting Diameter Feed f, mm/rev				
						Ø4-Ø5	Ø5.1-Ø6	Ø6.1-Ø8	Ø8.1-Ø10	Ø10.1-Ø12
P	1	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	80-140	0.15-0.25	0.20-0.35	0.25-0.45	0.30-0.55	0.35-0.60
P	2		>= 0.25 %C	Annealed	80-130					
P	3		< 0.55 %C	Quenched and tempered	80-120					
P	4		>= 0.55 %C	Annealed	70-110					
P	5			Quenched and tempered	50-90					
P	6	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	80-120			0.25-0.40	0.30-0.50	0.35-0.55
P	7			Quenched and tempered	70-110					
P	8				50-90					
P	9				40-70					
P	10	High alloyed steel, cast steel, and tool steel		Annealed	50-90	0.15-0.20	0.20-0.30	0.25-0.35	0.30-0.45	0.35-0.50
P	11			Quenched and tempered	40-80					
K	15	Grey cast iron		Ferritic/pearlitic	80-140	0.20-0.30	0.25-0.45	0.35-0.55	0.40-0.60	0.45-0.65
K	16			Pearlitic	70-120					
K	17	Nodular cast iron		Ferritic	80-120		0.20-0.40	0.30-0.50	0.35-0.55	0.40-0.60
K	18			Pearlitic	70-110					
K	19	Malleable cast iron		Ferritic	80-120					
K	20			Pearlitic	70-110					

SOLIDDRILL

SCD-AP5N (5xD)

DIN 6537 Solid Carbide
Drills without Coolant Holes,
Drilling Depth 5xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.008-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC908
	DC	DCONMS	OAL	LU	LCF	PL	LS	FTDZ(1)	
SCD 030-023-060 AP5N	3.00	6.00	66.00	23.00	28.0	0.500	34.0	-	●
SCD 031-023-060 AP5N	3.10	6.00	66.00	23.00	28.0	0.500	34.0	-	●
SCD 032-023-060 AP5N	3.20	6.00	66.00	23.00	28.0	0.500	34.0	-	●
SCD 033-023-060 AP5N	3.30	6.00	66.00	23.00	28.0	0.500	34.0	M4	●
SCD 034-023-060 AP5N	3.40	6.00	66.00	23.00	28.0	0.500	34.0	-	●
SCD 035-023-060 AP5N	3.50	6.00	66.00	23.00	28.0	0.600	34.0	-	●
SCD 036-023-060 AP5N	3.60	6.00	66.00	23.00	28.0	0.600	34.0	-	●
SCD 037-023-060 AP5N	3.70	6.00	66.00	23.00	28.0	0.600	34.0	-	●
SCD 038-029-060 AP5N	3.80	6.00	74.00	29.00	36.0	0.600	35.0	-	●
SCD 039-029-060 AP5N	3.90	6.00	74.00	29.00	36.0	0.600	35.0	-	●
SCD 040-029-060 AP5N	4.00	6.00	74.00	29.00	36.0	0.600	35.0	-	●
SCD 041-029-060 AP5N	4.10	6.00	74.00	29.00	36.0	0.700	35.0	-	●
SCD 042-029-060 AP5N	4.20	6.00	74.00	29.00	36.0	0.700	35.0	M5	●
SCD 043-029-060 AP5N	4.30	6.00	74.00	29.00	36.0	0.700	35.0	-	●
SCD 044-029-060 AP5N	4.40	6.00	74.00	29.00	36.0	0.700	35.0	-	●
SCD 045-029-060 AP5N	4.50	6.00	74.00	29.00	36.0	0.700	35.0	-	●
SCD 046-029-060 AP5N	4.60	6.00	74.00	29.00	36.0	0.700	35.0	-	●
SCD 047-029-060 AP5N	4.70	6.00	74.00	29.00	36.0	0.800	35.0	-	●
SCD 048-035-060 AP5N	4.80	6.00	74.00	35.00	44.0	0.800	36.0	-	●
SCD 049-035-060 AP5N	4.90	6.00	82.00	35.00	44.0	0.800	36.0	-	●
SCD 050-035-060 AP5N	5.00	6.00	82.00	35.00	44.0	0.800	36.0	M6	●
SCD 051-035-060 AP5N	5.10	6.00	82.00	35.00	44.0	0.800	36.0	-	●
SCD 052-035-060 AP5N	5.20	6.00	82.00	35.00	44.0	0.800	36.0	-	●
SCD 053-035-060 AP5N	5.30	6.00	82.00	35.00	44.0	0.800	36.0	-	●
SCD 054-035-060 AP5N	5.40	6.00	82.00	35.00	44.0	0.800	36.0	-	●
SCD 055-035-060 AP5N	5.50	6.00	82.00	35.00	44.0	0.900	36.0	-	●
SCD 056-035-060 AP5N	5.60	6.00	82.00	35.00	44.0	0.900	36.0	-	●
SCD 057-035-060 AP5N	5.70	6.00	82.00	35.00	44.0	0.900	36.0	-	●
SCD 058-035-060 AP5N	5.80	6.00	82.00	35.00	44.0	0.900	36.0	-	●
SCD 059-035-060 AP5N	5.90	6.00	82.00	35.00	44.0	0.900	36.0	-	●
SCD 060-035-060 AP5N	6.00	6.00	82.00	35.00	44.0	0.900	36.0	M7	●
SCD 061-043-080 AP5N	6.10	8.00	91.00	43.00	53.0	1.000	36.0	-	●
SCD 062-043-080 AP5N	6.20	8.00	91.00	43.00	53.0	1.000	36.0	-	●
SCD 063-043-080 AP5N	6.30	8.00	91.00	43.00	53.0	1.000	36.0	-	●
SCD 064-043-080 AP5N	6.40	8.00	91.00	43.00	53.0	1.000	36.0	-	●
SCD 065-043-080 AP5N	6.50	8.00	91.00	43.00	53.0	1.000	36.0	-	●
SCD 066-043-080 AP5N	6.60	8.00	91.00	43.00	53.0	1.000	36.0	-	●
SCD 067-043-080 AP5N	6.70	8.00	91.00	43.00	53.0	1.100	36.0	-	●
SCD 068-043-080 AP5N	6.80	8.00	91.00	43.00	53.0	1.100	36.0	M8	●
SCD 069-043-080 AP5N	6.90	8.00	91.00	43.00	53.0	1.100	36.0	-	●
SCD 070-043-080 AP5N	7.00	8.00	91.00	43.00	53.0	1.100	36.0	-	●
SCD 071-043-080 AP5N	7.10	8.00	91.00	43.00	53.0	1.100	36.0	-	●
SCD 072-043-080 AP5N	7.20	8.00	91.00	43.00	53.0	1.100	36.0	-	●
SCD 073-043-080 AP5N	7.30	8.00	91.00	43.00	53.0	1.100	36.0	-	●
SCD 074-043-080 AP5N	7.40	8.00	91.00	43.00	53.0	1.200	36.0	-	●
SCD 075-043-080 AP5N	7.50	8.00	91.00	43.00	53.0	1.200	36.0	-	●
SCD 076-043-080 AP5N	7.60	8.00	91.00	43.00	53.0	1.200	36.0	-	●
SCD 077-043-080 AP5N	7.70	8.00	91.00	43.00	53.0	1.200	36.0	-	●
SCD 078-043-080 AP5N	7.80	8.00	91.00	43.00	53.0	1.200	36.0	M9	●
SCD 079-043-080 AP5N	7.90	8.00	91.00	43.00	53.0	1.300	36.0	-	●
SCD 080-043-080 AP5N	8.00	8.00	91.00	43.00	53.0	1.300	36.0	-	●
SCD 081-049-100 AP5N	8.10	10.00	103.00	49.00	61.0	1.300	40.0	-	●
SCD 082-049-100 AP5N	8.20	10.00	103.00	49.00	61.0	1.300	40.0	-	●
SCD 083-049-100 AP5N	8.30	10.00	103.00	49.00	61.0	1.300	40.0	-	●
SCD 084-049-100 AP5N	8.40	10.00	103.00	49.00	61.0	1.300	40.0	-	●
SCD 085-049-100 AP5N	8.50	10.00	103.00	49.00	61.0	1.300	40.0	M10	●
SCD 086-049-100 AP5N	8.60	10.00	103.00	49.00	61.0	1.400	40.0	-	●
SCD 087-049-100 AP5N	8.70	10.00	103.00	49.00	61.0	1.400	40.0	-	●

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

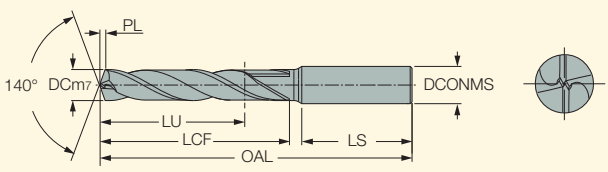
(1) Used for standard thread size

SOLIDDRILL

SCD-AP5N (5xD) (continued)

DIN 6537 Solid Carbide Drills without Coolant Holes, Drilling Depth 5xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.008-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC908
	DC	DCONMS	OAL	LU	LCF	PL	LS	FTDZ(1)	
SCD 088-049-100 AP5N	8.80	10.00	103.00	49.00	61.0	1.400	40.0	-	●
SCD 089-049-100 AP5N	8.90	10.00	103.00	49.00	61.0	1.400	40.0	-	●
SCD 090-049-100 AP5N	9.00	10.00	103.00	49.00	61.0	1.400	40.0	-	●
SCD 091-049-100 AP5N	9.10	10.00	103.00	49.00	61.0	1.400	40.0	-	●
SCD 092-049-100 AP5N	9.20	10.00	103.00	49.00	61.0	1.400	40.0	-	●
SCD 093-049-100 AP5N	9.30	10.00	103.00	49.00	61.0	1.500	40.0	-	●
SCD 094-049-100 AP5N	9.40	10.00	103.00	49.00	61.0	1.500	40.0	-	●
SCD 095-049-100 AP5N	9.50	10.00	103.00	49.00	61.0	1.500	40.0	M11	●
SCD 096-049-100 AP5N	9.60	10.00	103.00	49.00	61.0	1.500	40.0	-	●
SCD 097-049-100 AP5N	9.70	10.00	103.00	49.00	61.0	1.500	40.0	-	●
SCD 098-049-100 AP5N	9.80	10.00	103.00	49.00	61.0	1.600	40.0	-	●
SCD 099-049-100 AP5N	9.90	10.00	103.00	49.00	61.0	1.600	40.0	-	●
SCD 100-049-100 AP5N	10.00	10.00	103.00	49.00	61.0	1.600	40.0	-	●
SCD 101-056-120 AP5N	10.10	12.00	118.00	56.00	71.0	1.600	45.0	-	●
SCD 102-056-120 AP5N	10.20	12.00	118.00	56.00	71.0	1.600	45.0	M12	●
SCD 103-056-120 AP5N	10.30	12.00	118.00	56.00	71.0	1.600	45.0	-	●
SCD 104-056-120 AP5N	10.40	12.00	118.00	56.00	71.0	1.600	45.0	-	●
SCD 105-056-120 AP5N	10.50	12.00	118.00	56.00	71.0	1.600	45.0	-	●
SCD 106-056-120 AP5N	10.60	12.00	118.00	56.00	71.0	1.700	45.0	-	●
SCD 107-056-120 AP5N	10.70	12.00	118.00	56.00	71.0	1.700	45.0	-	●
SCD 108-056-120 AP5N	10.80	12.00	118.00	56.00	71.0	1.700	45.0	-	●
SCD 109-056-120 AP5N	10.90	12.00	118.00	56.00	71.0	1.700	45.0	-	●
SCD 110-056-120 AP5N	11.00	12.00	118.00	56.00	71.0	1.700	45.0	-	●
SCD 111-056-120 AP5N	11.10	12.00	118.00	56.00	71.0	1.700	45.0	-	●
SCD 112-056-120 AP5N	11.20	12.00	118.00	56.00	71.0	1.800	45.0	-	●
SCD 113-056-120 AP5N	11.30	12.00	118.00	56.00	71.0	1.800	45.0	-	●
SCD 114-056-120 AP5N	11.40	12.00	118.00	56.00	71.0	1.800	45.0	-	●
SCD 115-056-120 AP5N	11.50	12.00	118.00	56.00	71.0	1.800	45.0	-	●
SCD 116-056-120 AP5N	11.60	12.00	118.00	56.00	71.0	1.800	45.0	-	●
SCD 117-056-120 AP5N	11.70	12.00	118.00	56.00	71.0	1.900	45.0	-	●
SCD 118-056-120 AP5N	11.80	12.00	118.00	56.00	71.0	1.900	45.0	-	●
SCD 119-056-120 AP5N	11.90	12.00	118.00	56.00	71.0	1.900	45.0	-	●
SCD 120-056-120 AP5N	12.00	12.00	118.00	56.00	71.0	1.900	45.0	M14	●

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

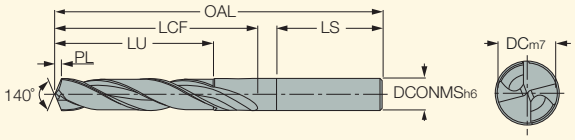
(1) Used for standard thread size

SOLIDDRILL

SCD-AP5 (5xD)

Solid Carbide Drills without Coolant Holes, Drilling Depth 5xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.008-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC908
	DC	DCONMS	LU	LCF	OAL	LS	FTDZ[1]	PL	
SCD 121-060-140 AP5	12.10	14.00	60.0	77.0	124.00	45.0	-	2.200	•
SCD 122-060-140 AP5	12.20	14.00	60.0	77.0	124.00	45.0	-	2.220	•
SCD 124-060-140 AP5	12.40	14.00	60.0	77.0	124.00	45.0	-	2.260	•
SCD 125-060-140 AP5	12.50	14.00	60.0	77.0	124.00	45.0	-	2.270	•
SCD 127-060-140 AP5	12.70	14.00	60.0	77.0	124.00	45.0	-	2.310	•
SCD 128-060-140 AP5	12.80	14.00	60.0	77.0	124.00	45.0	-	2.330	•
SCD 130-060-140 AP5	13.00	14.00	60.0	77.0	124.00	45.0	-	2.370	•
SCD 131-060-140 AP5	13.10	14.00	60.0	77.0	124.00	45.0	-	2.380	•
SCD 132-060-140 AP5	13.20	14.00	60.0	77.0	124.00	45.0	-	2.400	•
SCD 133-060-140 AP5	13.30	14.00	60.0	77.0	124.00	45.0	-	2.420	•
SCD 135-060-140 AP5	13.50	14.00	60.0	77.0	124.00	45.0	-	2.460	•
SCD 136-060-140 AP5	13.60	14.00	60.0	77.0	124.00	45.0	-	2.470	•
SCD 137-060-140 AP5	13.70	14.00	60.0	77.0	124.00	45.0	-	2.490	•
SCD 138-060-140 AP5	13.80	14.00	60.0	77.0	124.00	45.0	-	2.510	•
SCD 139-060-140 AP5	13.90	14.00	60.0	77.0	124.00	45.0	-	2.530	•
SCD 140-060-140 AP5	14.00	14.00	60.0	77.0	124.00	45.0	M16	2.550	•
SCD 141-063-160 AP5	14.10	16.00	63.0	83.0	133.00	45.0	-	2.570	•
SCD 142-063-160 AP5	14.20	16.00	63.0	83.0	133.00	45.0	-	2.580	•
SCD 143-063-160 AP5	14.30	16.00	63.0	83.0	133.00	45.0	-	2.600	•
SCD 145-063-160 AP5	14.50	16.00	63.0	83.0	133.00	45.0	-	2.640	•
SCD 146-063-160 AP5	14.60	16.00	63.0	83.0	133.00	45.0	-	2.660	•
SCD 147-063-160 AP5	14.70	16.00	63.0	83.0	133.00	45.0	-	2.680	•
SCD 148-063-160 AP5	14.80	16.00	63.0	83.0	133.00	45.0	-	2.690	•
SCD 149-063-160 AP5	14.90	16.00	63.0	83.0	133.00	45.0	-	2.710	•
SCD 150-063-160 AP5	15.00	16.00	63.0	83.0	133.00	45.0	-	2.730	•
SCD 151-063-160 AP5	15.10	16.00	63.0	83.0	133.00	45.0	-	2.750	•
SCD 152-063-160 AP5	15.20	16.00	63.0	83.0	133.00	45.0	-	2.770	•
SCD 153-063-160 AP5	15.30	16.00	63.0	83.0	133.00	45.0	-	2.780	•
SCD 155-063-160 AP5	15.50	16.00	63.0	83.0	133.00	45.0	M18	2.820	•
SCD 157-063-160 AP5	15.70	16.00	63.0	83.0	133.00	45.0	-	2.860	•
SCD 158-063-160 AP5	15.80	16.00	63.0	83.0	133.00	45.0	-	2.880	•
SCD 159-063-160 AP5	15.90	16.00	63.0	83.0	133.00	45.0	-	2.890	•
SCD 160-063-160 AP5	16.00	16.00	63.0	83.0	133.00	45.0	-	2.910	•
SCD 161-071-180 AP5	16.10	18.00	71.0	93.0	143.00	48.0	-	2.930	•
SCD 164-071-180 AP5	16.40	18.00	71.0	93.0	143.00	48.0	-	2.980	•
SCD 165-071-180 AP5	16.50	18.00	71.0	93.0	143.00	48.0	-	3.000	•
SCD 166-071-180 AP5	16.60	18.00	71.0	93.0	143.00	48.0	-	3.020	•
SCD 167-071-180 AP5	16.70	18.00	71.0	93.0	143.00	48.0	-	3.040	•
SCD 168-071-180 AP5	16.80	18.00	71.0	93.0	143.00	48.0	-	3.060	•
SCD 169-071-180 AP5	16.90	18.00	71.0	93.0	143.00	48.0	-	3.080	•
SCD 170-071-180 AP5	17.00	18.00	71.0	93.0	143.00	48.0	-	3.090	•
SCD 171-071-180 AP5	17.10	18.00	71.0	93.0	143.00	48.0	-	3.110	•
SCD 172-071-180 AP5	17.20	18.00	71.0	93.0	143.00	48.0	-	3.130	•
SCD 173-071-180 AP5	17.30	18.00	71.0	93.0	143.00	48.0	-	3.150	•
SCD 174-071-180 AP5	17.40	18.00	71.0	93.0	143.00	48.0	-	3.170	•
SCD 175-071-180 AP5	17.50	18.00	71.0	93.0	143.00	48.0	M20	3.180	•
SCD 176-071-180 AP5	17.60	18.00	71.0	93.0	143.00	48.0	-	3.200	•
SCD 177-071-180 AP5	17.70	18.00	71.0	93.0	143.00	48.0	-	3.220	•
SCD 178-071-180 AP5	17.80	18.00	71.0	93.0	143.00	48.0	-	3.240	•
SCD 179-071-180 AP5	17.90	18.00	71.0	93.0	143.00	48.0	-	3.260	•
SCD 180-071-180 AP5	18.00	18.00	71.0	93.0	143.00	48.0	-	3.280	•
SCD 182-077-200 AP5	18.20	20.00	77.0	101.0	153.00	48.0	-	3.310	•
SCD 183-077-200 AP5	18.30	20.00	77.0	101.0	153.00	48.0	-	3.330	•
SCD 184-077-200 AP5	18.40	20.00	77.0	101.0	153.00	48.0	-	3.350	•
SCD 185-077-200 AP5	18.50	20.00	77.0	101.0	153.00	48.0	-	3.370	•
SCD 186-077-200 AP5	18.60	20.00	77.0	101.0	153.00	48.0	-	3.380	•
SCD 187-077-200 AP5	18.70	20.00	77.0	101.0	153.00	48.0	-	3.400	•
SCD 188-077-200 AP5	18.80	20.00	77.0	101.0	153.00	48.0	-	3.420	•

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

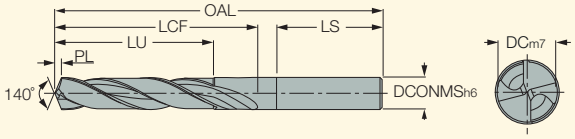
[1] Used for standard thread size

SOLIDDRILL

SCD-AP5 (5xD) (continued)

Solid Carbide Drills without Coolant Holes, Drilling Depth 5xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.008-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions DC	DCONMS	LU	LCF	OAL	LS	FTDZ(1)	PL	IC908
SCD 189-077-200 AP5	18.90	20.00	77.0	101.0	153.00	48.0	-	3.440	●
SCD 190-077-200 AP5	19.00	20.00	77.0	101.0	153.00	48.0	-	3.460	●
SCD 191-077-200 AP5	19.10	20.00	77.0	101.0	153.00	48.0	-	3.480	●
SCD 192-077-200 AP5	19.20	20.00	77.0	101.0	153.00	48.0	-	3.490	●
SCD 193-077-200 AP5	19.30	20.00	77.0	101.0	153.00	48.0	-	3.510	●
SCD 194-077-200 AP5	19.40	20.00	77.0	101.0	153.00	48.0	-	3.530	●
SCD 195-077-200 AP5	19.50	20.00	77.0	101.0	153.00	48.0	M22	3.550	●
SCD 196-077-200 AP5	19.60	20.00	77.0	101.0	153.00	48.0	-	3.570	●
SCD 197-077-200 AP5	19.70	20.00	77.0	101.0	153.00	48.0	-	3.590	●
SCD 198-077-200 AP5	19.80	20.00	77.0	101.0	153.00	48.0	-	3.600	●
SCD 199-077-200 AP5	19.90	20.00	77.0	101.0	153.00	48.0	-	3.620	●
SCD 200-077-200 AP5	20.00	20.00	77.0	101.0	153.00	48.0	-	3.640	●

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

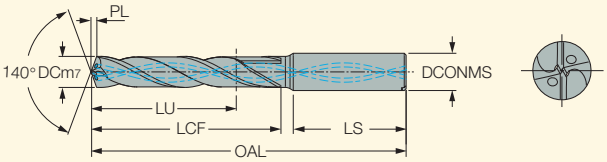
(1) Used for standard thread size

SOLIDDRILL

SCD-ACP5N (5xD)

DIN 6537 Solid Carbide Drills with Coolant Holes, Drilling Depth 5xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.008-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions DC	DCONMS	OAL	LU	LCF	PL	LS	FTDZ(1)	IC908
SCD 030-023-060 ACP5N	3.00	6.00	66.00	23.00	28.0	0.550	34.0	-	●
SCD 031-023-060 ACP5N	3.10	6.00	66.00	23.00	28.0	0.560	34.0	-	●
SCD 032-023-060 ACP5N	3.20	6.00	66.00	23.00	28.0	0.580	34.0	-	●
SCD 033-023-060 ACP5N	3.30	6.00	66.00	23.00	28.0	0.600	34.0	M4	●
SCD 034-023-060 ACP5N	3.40	6.00	66.00	23.00	28.0	0.620	34.0	-	●
SCD 035-023-060 ACP5N	3.50	6.00	66.00	23.00	28.0	0.640	34.0	-	●
SCD 036-023-060 ACP5N	3.60	6.00	66.00	23.00	28.0	0.660	34.0	-	●
SCD 037-023-060 ACP5N	3.70	6.00	66.00	23.00	28.0	0.670	34.0	-	●
SCD 038-029-060 ACP5N	3.80	6.00	74.00	29.00	36.0	0.690	35.0	-	●
SCD 039-029-060 ACP5N	3.90	6.00	74.00	29.00	36.0	0.710	35.0	-	●
SCD 040-029-060 ACP5N	4.00	6.00	74.00	29.00	36.0	0.730	35.0	-	●
SCD 041-029-060 ACP5N	4.10	6.00	74.00	29.00	36.0	0.750	35.0	-	●
SCD 042-029-060 ACP5N	4.20	6.00	74.00	29.00	36.0	0.760	35.0	M5	●
SCD 043-029-060 ACP5N	4.30	6.00	74.00	29.00	36.0	0.780	35.0	-	●
SCD 044-029-060 ACP5N	4.40	6.00	74.00	29.00	36.0	0.800	35.0	-	●
SCD 045-029-060 ACP5N	4.50	6.00	74.00	29.00	36.0	0.820	35.0	-	●
SCD 046-029-060 ACP5N	4.60	6.00	74.00	29.00	36.0	0.840	35.0	-	●
SCD 047-029-060 ACP5N	4.70	6.00	74.00	29.00	36.0	0.860	35.0	-	●
SCD 048-035-060 ACP5N	4.80	6.00	82.00	35.00	44.0	0.870	36.0	-	●
SCD 049-035-060 ACP5N	4.90	6.00	82.00	35.00	44.0	0.890	36.0	-	●
SCD 050-035-060 ACP5N	5.00	6.00	82.00	35.00	44.0	0.910	36.0	M6	●
SCD 051-035-060 ACP5N	5.10	6.00	82.00	35.00	44.0	0.930	36.0	-	●
SCD 052-035-060 ACP5N	5.20	6.00	82.00	35.00	44.0	0.950	36.0	-	●
SCD 053-035-060 ACP5N	5.30	6.00	82.00	35.00	44.0	0.960	36.0	-	●
SCD 054-035-060 ACP5N	5.40	6.00	82.00	35.00	44.0	0.980	36.0	-	●
SCD 055-035-060 ACP5N	5.50	6.00	82.00	35.00	44.0	1.000	36.0	-	●
SCD 056-035-060 ACP5N	5.60	6.00	82.00	35.00	44.0	1.020	36.0	-	●
SCD 057-035-060 ACP5N	5.70	6.00	82.00	35.00	44.0	1.040	36.0	-	●
SCD 058-035-060 ACP5N	5.80	6.00	82.00	35.00	44.0	1.060	36.0	-	●
SCD 059-035-060 ACP5N	5.90	6.00	82.00	35.00	44.0	1.070	36.0	-	●

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

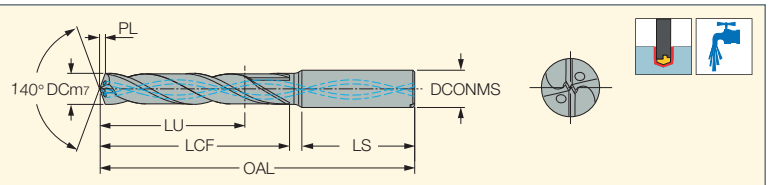
(1) Used for standard thread size

SOLIDDRILL

SCD-ACP5N (5xD) (continued)

DIN 6537 Solid Carbide Drills with Coolant Holes, Drilling Depth 5xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.008-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC908
	DC	DCONMS	OAL	LU	LCF	PL	LS	FTDZ[1]	
SCD 060-035-060 ACP5N	6.00	6.00	82.00	35.00	44.0	1.090	36.0	M7	●
SCD 061-043-080 ACP5N	6.10	8.00	91.00	43.00	53.0	1.110	36.0	-	●
SCD 062-043-080 ACP5N	6.20	8.00	91.00	43.00	53.0	1.130	36.0	-	●
SCD 063-043-080 ACP5N	6.30	8.00	91.00	43.00	53.0	1.150	36.0	-	●
SCD 064-043-080 ACP5N	6.40	8.00	91.00	43.00	53.0	1.160	36.0	-	●
SCD 065-043-080 ACP5N	6.50	8.00	91.00	43.00	53.0	1.000	36.0	-	●
SCD 066-043-080 ACP5N	6.60	8.00	91.00	43.00	53.0	1.200	36.0	-	●
SCD 067-043-080 ACP5N	6.70	8.00	91.00	43.00	53.0	1.220	36.0	-	●
SCD 068-043-080 ACP5N	6.80	8.00	91.00	43.00	53.0	1.240	36.0	M8	●
SCD 069-043-080 ACP5N	6.90	8.00	91.00	43.00	53.0	1.260	36.0	-	●
SCD 070-043-080 ACP5N	7.00	8.00	91.00	43.00	53.0	1.270	36.0	-	●
SCD 071-043-080 ACP5N	7.10	8.00	91.00	43.00	53.0	1.290	36.0	-	●
SCD 072-043-080 ACP5N	7.20	8.00	91.00	43.00	53.0	1.310	36.0	-	●
SCD 073-043-080 ACP5N	7.30	8.00	91.00	43.00	53.0	1.330	36.0	-	●
SCD 074-043-080 ACP5N	7.40	8.00	91.00	43.00	53.0	1.350	36.0	-	●
SCD 075-043-080 ACP5N	7.50	8.00	91.00	43.00	53.0	1.360	36.0	-	●
SCD 076-043-080 ACP5N	7.60	8.00	91.00	43.00	53.0	1.380	36.0	-	●
SCD 077-043-080 ACP5N	7.70	8.00	91.00	43.00	53.0	1.400	36.0	-	●
SCD 078-043-080 ACP5N	7.80	8.00	91.00	43.00	53.0	1.420	36.0	M9	●
SCD 079-043-080 ACP5N	7.90	8.00	91.00	43.00	53.0	1.300	36.0	-	●
SCD 080-043-080 ACP5N	8.00	8.00	91.00	43.00	53.0	1.460	36.0	-	●
SCD 081-049-100 ACP5N	8.10	10.00	103.00	49.00	61.0	1.470	40.0	-	●
SCD 082-049-100 ACP5N	8.20	10.00	103.00	49.00	61.0	1.490	40.0	-	●
SCD 083-049-100 ACP5N	8.30	10.00	103.00	49.00	61.0	1.510	40.0	-	●
SCD 084-049-100 ACP5N	8.40	10.00	103.00	49.00	61.0	1.530	40.0	-	●
SCD 085-049-100 ACP5N	8.50	10.00	103.00	49.00	61.0	1.550	40.0	M10	●
SCD 086-049-100 ACP5N	8.60	10.00	103.00	49.00	61.0	1.570	40.0	-	●
SCD 087-049-100 ACP5N	8.70	10.00	103.00	49.00	61.0	1.580	40.0	-	●
SCD 088-049-100 ACP5N	8.80	10.00	103.00	49.00	61.0	1.600	40.0	-	●
SCD 089-049-100 ACP5N	8.90	10.00	103.00	49.00	61.0	1.620	40.0	-	●
SCD 090-049-100 ACP5N	9.00	10.00	103.00	49.00	61.0	1.640	40.0	-	●
SCD 091-049-100 ACP5N	9.10	10.00	103.00	49.00	61.0	1.660	40.0	-	●
SCD 092-049-100 ACP5N	9.20	10.00	103.00	49.00	61.0	1.670	40.0	-	●
SCD 093-049-100 ACP5N	9.30	10.00	103.00	49.00	61.0	1.690	40.0	-	●
SCD 094-049-100 ACP5N	9.40	10.00	103.00	49.00	61.0	1.710	40.0	-	●
SCD 095-049-100 ACP5N	9.50	10.00	103.00	49.00	61.0	1.730	40.0	M11	●
SCD 096-049-100 ACP5N	9.60	10.00	103.00	49.00	61.0	1.750	40.0	-	●
SCD 097-049-100 ACP5N	9.70	10.00	103.00	49.00	61.0	1.770	40.0	-	●
SCD 098-049-100 ACP5N	9.80	10.00	103.00	49.00	61.0	1.780	40.0	-	●
SCD 099-049-100 ACP5N	9.90	10.00	103.00	49.00	61.0	1.800	40.0	-	●
SCD 100-049-100 ACP5N	10.00	10.00	103.00	49.00	61.0	1.820	40.0	-	●
SCD 101-056-120 ACP5N	10.10	12.00	118.00	56.00	71.0	1.840	45.0	-	●
SCD 102-056-120 ACP5N	10.20	12.00	118.00	56.00	71.0	1.860	45.0	M12	●
SCD 103-056-120 ACP5N	10.30	12.00	118.00	56.00	71.0	1.870	45.0	-	●
SCD 104-056-120 ACP5N	10.40	12.00	118.00	56.00	71.0	1.890	45.0	-	●
SCD 105-056-120 ACP5N	10.50	12.00	118.00	56.00	71.0	1.910	45.0	-	●
SCD 106-056-120 ACP5N	10.60	12.00	118.00	56.00	71.0	1.930	45.0	-	●
SCD 107-056-120 ACP5N	10.70	12.00	118.00	56.00	71.0	1.950	45.0	-	●
SCD 108-056-120 ACP5N	10.80	12.00	118.00	56.00	71.0	1.970	45.0	-	●
SCD 109-056-120 ACP5N	10.90	12.00	118.00	56.00	71.0	1.980	45.0	-	●
SCD 110-056-120 ACP5N	11.00	12.00	118.00	56.00	71.0	2.000	45.0	-	●
SCD 111-056-120 ACP5N	11.10	12.00	118.00	56.00	71.0	2.020	45.0	-	●
SCD 112-056-120 ACP5N	11.20	12.00	118.00	56.00	71.0	2.040	45.0	-	●
SCD 113-056-120 ACP5N	11.30	12.00	118.00	56.00	71.0	1.800	45.0	-	●
SCD 114-056-120 ACP5N	11.40	12.00	118.00	56.00	71.0	2.070	45.0	-	●
SCD 115-056-120 ACP5N	11.50	12.00	118.00	56.00	71.0	2.090	45.0	-	●
SCD 116-056-120 ACP5N	11.60	12.00	118.00	56.00	71.0	2.110	45.0	-	●
SCD 117-056-120 ACP5N	11.70	12.00	118.00	56.00	71.0	2.130	45.0	-	●
SCD 118-056-120 ACP5N	11.80	12.00	118.00	56.00	71.0	2.150	45.0	-	●
SCD 119-056-120 ACP5N	11.90	12.00	118.00	56.00	71.0	2.170	45.0	-	●
SCD 120-056-120 ACP5N	12.00	12.00	118.00	56.00	71.0	2.180	45.0	M14	●

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

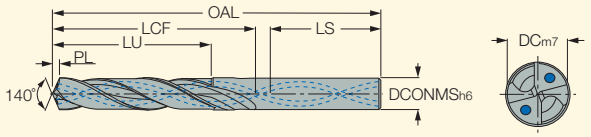
(1) Used for standard thread size

SOLIDDRILL

SCD-ACP5 (5xD)

Solid Carbide Drills with Coolant Holes, Drilling Depth 5xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.008-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC908
	DC	DCONMS	LU	LCF	OAL	FTDZ(1)	LS	PL	
SCD 121-060-140 ACP5	12.10	14.00	60.0	77.0	124.00	-	45.0	2.200	•
SCD 122-060-140 ACP5	12.20	14.00	60.0	77.0	124.00	M14	45.0	2.220	•
SCD 124-060-140 ACP5	12.40	14.00	60.0	77.0	124.00	-	45.0	2.260	•
SCD 125-060-140 ACP5	12.50	14.00	60.0	77.0	124.00	-	45.0	2.270	•
SCD 126-060-140 ACP5	12.60	14.00	60.0	77.0	124.00	-	45.0	2.290	•
SCD 127-060-140 ACP5	12.70	14.00	60.0	77.0	124.00	-	45.0	2.310	•
SCD 128-060-140 ACP5	12.80	14.00	60.0	77.0	124.00	-	45.0	2.330	•
SCD 129-060-140 ACP5	12.90	14.00	60.0	77.0	124.00	-	45.0	2.350	•
SCD 130-060-140 ACP5	13.00	14.00	60.0	77.0	124.00	-	45.0	2.370	•
SCD 131-060-140 ACP5	13.10	14.00	60.0	77.0	124.00	-	45.0	2.380	•
SCD 132-060-140 ACP5	13.20	14.00	60.0	77.0	124.00	-	45.0	2.400	•
SCD 133-060-140 ACP5	13.30	14.00	60.0	77.0	124.00	-	45.0	2.420	•
SCD 135-060-140 ACP5	13.50	14.00	60.0	77.0	124.00	-	45.0	2.460	•
SCD 136-060-140 ACP5	13.60	14.00	60.0	77.0	124.00	-	45.0	2.470	•
SCD 137-060-140 ACP5	13.70	14.00	60.0	77.0	124.00	-	45.0	2.490	•
SCD 138-060-140 ACP5	13.80	14.00	60.0	77.0	124.00	-	45.0	2.510	•
SCD 140-060-140 ACP5	14.00	14.00	60.0	77.0	124.00	M16	45.0	2.550	•
SCD 141-063-160 ACP5	14.10	16.00	63.0	83.0	133.00	-	45.0	2.570	•
SCD 142-063-160 ACP5	14.20	16.00	63.0	83.0	133.00	-	45.0	2.580	•
SCD 143-063-160 ACP5	14.30	16.00	63.0	83.0	133.00	-	45.0	2.600	•
SCD 145-063-160 ACP5	14.50	16.00	63.0	83.0	133.00	-	45.0	2.640	•
SCD 146-063-160 ACP5	14.60	16.00	63.0	83.0	133.00	-	45.0	2.660	•
SCD 147-063-160 ACP5	14.70	16.00	63.0	83.0	133.00	-	45.0	2.680	•
SCD 148-063-160 ACP5	14.80	16.00	63.0	83.0	133.00	-	45.0	2.690	•
SCD 149-063-160 ACP5	14.90	16.00	63.0	83.0	133.00	-	45.0	2.710	•
SCD 150-063-160 ACP5	15.00	16.00	63.0	83.0	133.00	-	45.0	2.730	•
SCD 151-063-160 ACP5	15.10	16.00	63.0	83.0	133.00	-	45.0	2.750	•
SCD 152-063-160 ACP5	15.20	16.00	63.0	83.0	133.00	-	45.0	2.770	•
SCD 153-063-160 ACP5	15.30	16.00	63.0	83.0	133.00	-	45.0	2.780	•
SCD 155-063-160 ACP5	15.50	16.00	63.0	83.0	133.00	M18	45.0	2.820	•
SCD 156-063-160 ACP5	15.60	16.00	63.0	83.0	133.00	-	45.0	2.840	•
SCD 157-063-160 ACP5	15.70	16.00	63.0	83.0	133.00	-	45.0	2.860	•
SCD 158-063-160 ACP5	15.80	16.00	63.0	83.0	133.00	-	45.0	2.880	•
SCD 160-063-160 ACP5	16.00	16.00	63.0	83.0	133.00	-	45.0	2.910	•
SCD 161-071-180 ACP5	16.10	18.00	71.0	93.0	143.00	-	48.0	2.930	•
SCD 162-071-180 ACP5	16.20	18.00	71.0	93.0	143.00	-	48.0	2.950	•
SCD 163-071-180 ACP5	16.30	18.00	71.0	93.0	143.00	-	48.0	2.970	•
SCD 164-071-180 ACP5	16.40	18.00	71.0	93.0	143.00	-	48.0	2.980	•
SCD 165-071-180 ACP5	16.50	18.00	71.0	93.0	143.00	-	48.0	3.000	•
SCD 167-071-180 ACP5	16.70	18.00	71.0	93.0	143.00	-	48.0	3.040	•
SCD 168-071-180 ACP5	16.80	18.00	71.0	93.0	143.00	-	48.0	3.060	•
SCD 169-071-180 ACP5	16.90	18.00	71.0	93.0	143.00	-	48.0	3.080	•
SCD 170-071-180 ACP5	17.00	18.00	71.0	93.0	143.00	-	48.0	3.090	•
SCD 171-071-180 ACP5	17.10	18.00	71.0	93.0	143.00	-	48.0	3.110	•
SCD 172-071-180 ACP5	17.20	18.00	71.0	93.0	143.00	-	48.0	3.130	•
SCD 174-071-180 ACP5	17.40	18.00	71.0	93.0	143.00	-	48.0	3.170	•
SCD 175-071-180 ACP5	17.50	18.00	71.0	93.0	143.00	-	48.0	3.180	•
SCD 176-071-180 ACP5	17.60	18.00	71.0	93.0	143.00	-	48.0	3.200	•
SCD 177-071-180 ACP5	17.70	18.00	71.0	93.0	143.00	-	48.0	3.220	•
SCD 178-071-180 ACP5	17.80	18.00	71.0	93.0	143.00	-	48.0	3.240	•
SCD 179-071-180 ACP5	17.90	18.00	71.0	93.0	143.00	-	48.0	3.260	•
SCD 180-071-180 ACP5	18.00	18.00	71.0	93.0	143.00	-	48.0	3.280	•
SCD 181-077-200 ACP5	18.10	20.00	77.0	101.0	153.00	-	48.0	3.290	•
SCD 182-077-200 ACP5	18.20	20.00	77.0	101.0	153.00	-	48.0	3.310	•
SCD 183-077-200 ACP5	18.30	20.00	77.0	101.0	153.00	-	48.0	3.330	•
SCD 184-077-200 ACP5	18.40	20.00	77.0	101.0	153.00	-	48.0	3.350	•
SCD 185-077-200 ACP5	18.50	20.00	77.0	101.0	153.00	-	48.0	3.370	•

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

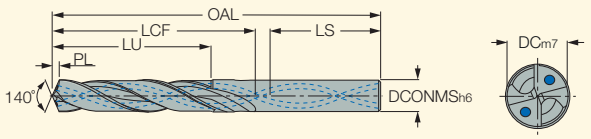
(1) Used for standard thread size

SOLIDDRILL

SCD-ACP5 (5xD) (continued)

Solid Carbide Drills with Coolant Holes, Drilling Depth 5xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.008-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC908
	DC	DCONMS	LU	LCF	OAL	FTDZ(1)	LS	PL	
SCD 186-077-200 ACP5	18.60	20.00	77.0	101.0	153.00	-	48.0	3.380	●
SCD 187-077-200 ACP5	18.70	20.00	77.0	101.0	153.00	-	48.0	3.400	●
SCD 188-077-200 ACP5	18.80	20.00	77.0	101.0	153.00	-	48.0	3.420	●
SCD 189-077-200 ACP5	18.90	20.00	77.0	101.0	153.00	-	48.0	3.440	●
SCD 191-077-200 ACP5	19.10	20.00	77.0	101.0	153.00	-	48.0	3.480	●
SCD 192-077-200 ACP5	19.20	20.00	77.0	101.0	153.00	-	48.0	3.490	●
SCD 193-077-200 ACP5	19.30	20.00	77.0	101.0	153.00	-	48.0	3.510	●
SCD 194-077-200 ACP5	19.40	20.00	77.0	101.0	153.00	-	48.0	3.530	●
SCD 195-077-200 ACP5	19.50	20.00	77.0	101.0	153.00	M22	48.0	3.550	●
SCD 196-077-200 ACP5	19.60	20.00	77.0	101.0	153.00	-	48.0	3.570	●
SCD 197-077-200 ACP5	19.70	20.00	77.0	101.0	153.00	-	48.0	3.590	●
SCD 198-077-200 ACP5	19.80	20.00	77.0	101.0	153.00	-	48.0	3.600	●
SCD 199-077-200 ACP5	19.90	20.00	77.0	101.0	153.00	-	48.0	3.620	●
SCD 200-077-200 ACP5	20.00	20.00	77.0	101.0	153.00	-	48.0	3.640	●

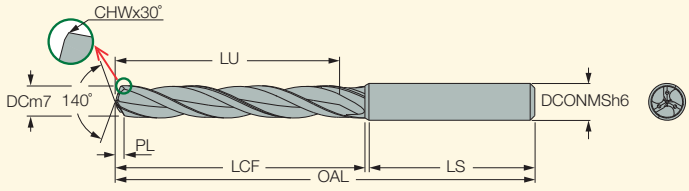
• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

(1) Used for standard thread size

SOLIDDRILL

SCCD-ACP5

Three Flute Solid Carbide Drills with Coolant Holes, Drilling Depth 5xD



Designation	Dimensions										IC908
	DC	DCONMS	LU	LCF	OAL	LS	PL	KCH	CHW	FTDZ(1)	
SCCD 040-029-060 ACP5	4.00	6.00	29.0	37.0	74.00	35.0	0.820	30.0	0.30		●
SCCD 045-029-060 ACP5	4.50	6.00	29.0	37.0	74.00	35.0	0.880	30.0	0.30		●
SCCD 050-035-060 ACP5	5.00	6.00	35.0	45.0	82.00	36.0	0.960	30.0	0.30	M6	●
SCCD 051-035-060 ACP5	5.10	6.00	35.0	45.0	82.00	36.0	0.980	30.0	0.30		●
SCCD 055-035-060 ACP5	5.50	6.00	35.0	45.0	82.00	36.0	1.080	30.0	0.40		●
SCCD 060-035-060 ACP5	6.00	6.00	35.0	45.0	82.00	36.0	1.170	30.0	0.40	M7	●
SCCD 065-043-080 ACP5	6.50	8.00	43.0	54.0	91.00	36.0	1.260	30.0	0.40		●
SCCD 068-043-080 ACP5	6.80	8.00	43.0	54.0	91.00	36.0	1.310	30.0	0.40	M8	●
SCCD 070-043-080 ACP5	7.00	8.00	43.0	54.0	91.00	36.0	1.350	30.0	0.40		●
SCCD 075-043-080 ACP5	7.50	8.00	43.0	54.0	91.00	36.0	1.400	30.0	0.40		●
SCCD 080-043-080 ACP5	8.00	8.00	43.0	54.0	91.00	36.0	1.490	30.0	0.40		●
SCCD 085-049-100 ACP5	8.50	10.00	49.0	62.0	103.00	40.0	1.630	30.0	0.50	M10	●
SCCD 086-049-100 ACP5	8.60	10.00	49.0	62.0	103.00	40.0	1.650	30.0	0.50		●
SCCD 090-049-100 ACP5	9.00	10.00	49.0	62.0	103.00	40.0	1.720	30.0	0.50		●
SCCD 095-049-100 ACP5	9.50	10.00	49.0	62.0	103.00	40.0	1.750	30.0	0.50	M11	●
SCCD 100-049-100 ACP5	10.00	10.00	49.0	62.0	103.00	40.0	1.850	30.0	0.50		●
SCCD 103-056-120 ACP5	10.30	12.00	56.0	71.0	118.00	45.0	1.940	30.0	0.60		●
SCCD 105-056-120 ACP5	10.50	12.00	56.0	71.0	118.00	45.0	1.980	30.0	0.60		●
SCCD 110-056-120 ACP5	11.00	12.00	56.0	71.0	118.00	45.0	2.070	30.0	0.60		●
SCCD 115-056-120 ACP5	11.50	12.00	56.0	72.0	118.00	45.0	2.120	30.0	0.60		●
SCCD 120-056-120 ACP5	12.00	12.00	56.0	72.0	118.00	45.0	2.210	30.0	0.60	M14	●

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

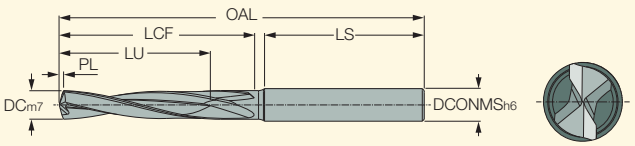
(1) Used for standard thread size

SOLIDDRILL

SCD-AH5 (5xD)

Solid Carbide Drills for Hard Materials, Drilling Depth 5xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.008-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC903
	DC	LU	LCF	DCONMS	LS	OAL	FTDZ[1]	PL	
SCD 030-015-060 AH5	3.00	15.0	26.0	6.00	35.0	66.00	-	0.550	●
SCD 033-017-060 AH5	3.30	16.5	26.0	6.00	35.0	66.00	M4	0.600	●
SCD 040-020-060 AH5	4.00	20.0	29.0	6.00	32.0	66.00	-	0.730	●
SCD 042-021-060 AH5	4.20	21.0	32.0	6.00	46.0	82.00	M5	0.760	●
SCD 045-023-060 AH5	4.50	22.5	32.0	6.00	46.0	82.00	-	0.820	●
SCD 050-025-060 AH5	5.00	25.0	37.0	6.00	41.0	82.00	M6	0.910	●
SCD 053-027-060 AH5	5.30	26.5	39.0	6.00	37.0	82.00	-	0.960	●
SCD 060-030-060 AH5	6.00	30.0	43.0	6.00	37.0	82.00	M7	1.090	●
SCD 068-034-080 AH5	6.80	34.0	49.0	8.00	39.0	91.00	M8	1.240	●
SCD 070-035-080 AH5	7.00	35.0	49.0	8.00	39.0	91.00	-	1.270	●
SCD 078-039-080 AH5	7.80	42.0	55.0	8.00	34.0	91.00	M9	1.420	●
SCD 080-040-080 AH5	8.00	40.0	55.0	8.00	34.0	91.00	-	1.460	●
SCD 085-043-100 AH5	8.50	42.5	59.0	10.00	46.0	112.00	M10	1.550	●
SCD 088-044-100 AH5	8.80	44.0	63.0	10.00	46.0	112.00	-	1.600	●
SCD 090-045-100 AH5	9.00	45.0	63.0	10.00	46.0	112.00	-	1.640	●
SCD 095-048-100 AH5	9.50	47.5	66.0	10.00	39.0	112.00	M11	1.730	●
SCD 100-050-100 AH5	10.00	50.0	70.0	10.00	39.0	112.00	-	1.820	●
SCD 105-053-120 AH5	10.50	52.5	71.0	12.00	45.0	122.00	-	1.910	●

• For user guide see pages 175-184 • For regrinding instructions, see page 182

[1] Used for standard thread size

Recommended Machining Conditions for SCD-AH5 Solid Carbide Drills

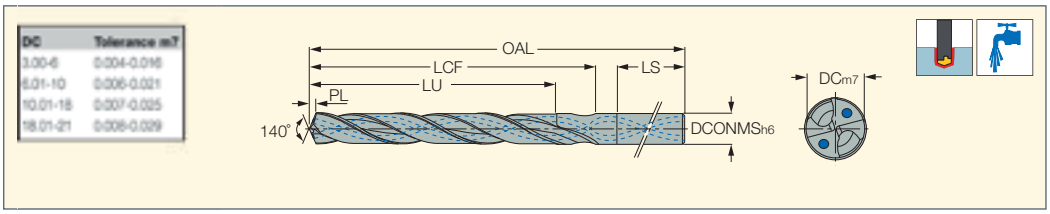
ISO	Material	Hardness	Material No.	Cutting Speed	Feed vs. Drill Diameter (mm/rev)		
				V_c (m/min)	Ø3-5	Ø5.1-8	Ø8.1-12
H	Hardened steel	50-55 HRc	38	25-40	0.04-0.07	0.05-0.08	0.06-0.10
	Hardened steel	56-60 HRc	39	15-25	0.03-0.06	0.04-0.07	0.05-0.08
	Hardened steel	61-70 HRc	39	10-15	0.02-0.04	0.03-0.05	0.03-0.05

Materials over 50 HRc must be used with external cooling while machining.
Use of semi-synthetic or emulsion with more than 6% oil concentration is highly recommended to extend tool life and hole quality.

SOLIDDRILL

SCD-ACG8 (8xD)

DIN 6537 Solid Carbide Drills with Coolant Holes, Drilling Depth 8xD



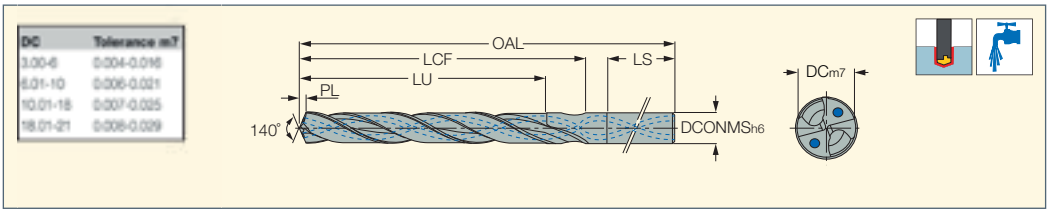
Designation	Dimensions DC	DCONMS	LU	LCF	OAL	LS	PL	IC908
SCD 084-080-100 ACG8	8.40	10.00	80.0	95.0	142.00	38.0	1.530	●
SCD 089-080-100 ACG8	8.90	10.00	80.0	95.0	142.00	38.0	1.620	●
SCD 096-080-100 ACG8	9.60	10.00	80.0	95.0	142.00	38.0	1.750	●

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

SOLIDDRILL

SCD-ACP8 (8xD)

Solid Carbide Drills with Coolant Holes, Drilling Depth 8xD



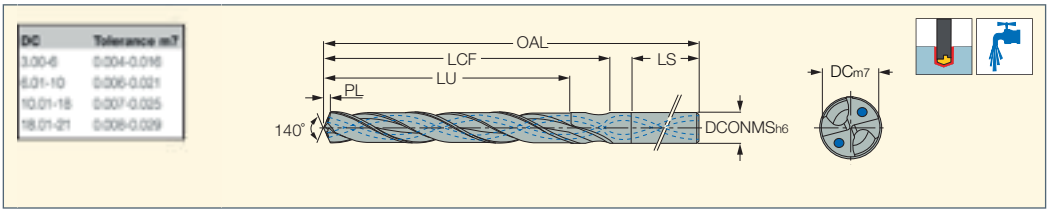
Designation	Dimensions DC	DCONMS	LU	LCF	OAL	LS	PL	IC908
SCD 051-048-060 ACP8	5.10	6.00	48.0	57.0	95.00	35.0	0.930	●
SCD 054-048-060 ACP8	5.40	6.00	48.0	57.0	95.00	35.0	0.980	●
SCD 057-048-060 ACP8	5.70	6.00	48.0	57.0	95.00	35.0	1.040	●
SCD 066-064-080 ACP8	6.60	8.00	64.0	76.0	114.00	35.0	1.200	●
SCD 073-064-080 ACP8	7.30	8.00	64.0	76.0	114.00	35.0	1.330	●
SCD 098-080-100 ACP8	9.80	10.00	80.0	95.0	142.00	38.0	1.780	●

• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

SOLIDDRILL

SCD-ACP8N (8xD)

Solid Carbide Drills with Coolant Holes, Drilling Depth 8xD



Designation	Dimensions								IC908
	DC	DCONMS	LU	LCF	OAL	LS	FTDZ(1)	PL	
SCD 030-029-060 ACP8N	3.00	6.00	29.00	34.0	72.00	34.0	-	0.550	•
SCD 031-029-060 ACP8N	3.10	6.00	29.00	34.0	72.00	34.0	-	0.560	•
SCD 032-029-060 ACP8N	3.20	6.00	29.00	34.0	72.00	34.0	-	0.580	•
SCD 033-029-060 ACP8N	3.30	6.00	29.00	34.0	72.00	34.0	M4	0.600	•
SCD 034-029-060 ACP8N	3.40	6.00	29.00	34.0	72.00	34.0	-	0.620	•
SCD 035-029-060 ACP8N	3.50	6.00	29.00	34.0	72.00	34.0	-	0.640	•
SCD 036-029-060 ACP8N	3.60	6.00	29.00	34.0	72.00	34.0	-	0.660	•
SCD 037-029-060 ACP8N	3.70	6.00	29.00	34.0	72.00	34.0	-	0.670	•
SCD 038-036-060 ACP8N	3.80	6.00	36.00	43.0	81.00	35.0	-	0.690	•
SCD 039-036-060 ACP8N	3.90	6.00	36.00	43.0	81.00	35.0	-	0.710	•
SCD 040-036-060 ACP8N	4.00	6.00	36.00	43.0	81.00	35.0	-	0.730	•
SCD 041-036-060 ACP8N	4.10	6.00	36.00	43.0	81.00	35.0	-	0.750	•
SCD 042-036-060 ACP8N	4.20	6.00	36.00	43.0	81.00	35.0	M5	0.760	•
SCD 043-036-060 ACP8N	4.30	6.00	36.00	43.0	81.00	35.0	-	0.780	•
SCD 044-036-060 ACP8N	4.40	6.00	36.00	43.0	81.00	35.0	-	0.800	•
SCD 045-036-060 ACP8N	4.50	6.00	36.00	43.0	81.00	35.0	-	0.820	•
SCD 046-036-060 ACP8N	4.60	6.00	36.00	43.0	81.00	35.0	-	0.840	•
SCD 047-036-060 ACP8N	4.70	6.00	36.00	43.0	81.00	35.0	-	0.860	•
SCD 048-048-060 ACP8N	4.80	6.00	48.00	57.0	95.00	36.0	-	0.870	•
SCD 049-048-060 ACP8N	4.90	6.00	48.00	57.0	95.00	36.0	-	0.890	•
SCD 050-048-060 ACP8N	5.00	6.00	48.00	57.0	95.00	36.0	M6	0.910	•
SCD 051-048-060 ACP8N	5.10	6.00	48.00	57.0	95.00	36.0	-	0.930	•
SCD 052-048-060 ACP8N	5.20	6.00	48.00	57.0	95.00	36.0	-	0.950	•
SCD 053-048-060 ACP8N	5.30	6.00	48.00	57.0	95.00	36.0	-	0.960	•
SCD 054-048-060 ACP8N	5.40	6.00	48.00	57.0	95.00	36.0	-	0.980	•
SCD 055-048-060 ACP8N	5.50	6.00	48.00	57.0	95.00	36.0	-	1.000	•
SCD 056-048-060 ACP8N	5.60	6.00	48.00	57.0	95.00	36.0	-	1.020	•
SCD 057-048-060 ACP8N	5.70	6.00	48.00	57.0	95.00	36.0	-	1.040	•
SCD 058-048-060 ACP8N	5.80	6.00	48.00	57.0	95.00	36.0	-	1.060	•
SCD 059-048-060 ACP8N	5.90	6.00	48.00	57.0	95.00	36.0	-	0.900	•
SCD 060-048-060 ACP8N	6.00	6.00	48.00	57.0	95.00	36.0	M7	1.090	•
SCD 061-064-080 ACP8N	6.10	8.00	64.00	76.0	114.00	36.0	-	1.110	•
SCD 062-064-080 ACP8N	6.20	8.00	64.00	76.0	114.00	36.0	-	1.130	•
SCD 063-064-080 ACP8N	6.30	8.00	64.00	76.0	114.00	36.0	-	1.150	•
SCD 064-064-080 ACP8N	6.40	8.00	64.00	76.0	114.00	36.0	-	1.160	•
SCD 065-064-080 ACP8N	6.50	8.00	64.00	76.0	114.00	36.0	-	1.180	•
SCD 066-064-080 ACP8N	6.60	8.00	64.00	76.0	114.00	36.0	-	1.200	•
SCD 067-064-080 ACP8N	6.70	8.00	64.00	76.0	114.00	36.0	-	1.220	•
SCD 068-064-080 ACP8N	6.80	8.00	64.00	76.0	114.00	36.0	M8	1.240	•
SCD 069-064-080 ACP8N	6.90	8.00	64.00	76.0	114.00	36.0	-	1.260	•
SCD 070-064-080 ACP8N	7.00	8.00	64.00	76.0	114.00	36.0	-	1.270	•
SCD 071-064-080 ACP8N	7.10	8.00	64.00	76.0	114.00	36.0	-	1.290	•
SCD 072-064-080 ACP8N	7.20	8.00	64.00	76.0	114.00	36.0	-	1.310	•
SCD 073-064-080 ACP8N	7.30	8.00	64.00	76.0	114.00	36.0	-	1.330	•
SCD 074-064-080 ACP8N	7.40	8.00	64.00	76.0	114.00	36.0	-	1.350	•
SCD 075-064-080 ACP8N	7.50	8.00	64.00	76.0	114.00	36.0	-	1.360	•
SCD 076-064-080 ACP8N	7.60	8.00	64.00	76.0	114.00	36.0	-	1.380	•
SCD 077-064-080 ACP8N	7.70	8.00	64.00	76.0	114.00	36.0	-	1.400	•
SCD 078-064-080 ACP8N	7.80	8.00	64.00	76.0	114.00	36.0	M9	1.420	•
SCD 079-064-080 ACP8N	7.90	8.00	64.00	76.0	114.00	36.0	-	1.440	•
SCD 080-064-080 ACP8N	8.00	8.00	64.00	76.0	114.00	36.0	-	1.460	•
SCD 081-080-100 ACP8N	8.10	10.00	80.00	95.0	142.00	40.0	-	1.470	•
SCD 082-080-100 ACP8N	8.20	10.00	80.00	95.0	142.00	40.0	-	1.490	•
SCD 083-080-100 ACP8N	8.30	10.00	80.00	95.0	142.00	40.0	-	1.510	•
SCD 084-080-100 ACP8N	8.40	10.00	80.00	95.0	142.00	40.0	-	1.530	•
SCD 085-080-100 ACP8N	8.50	10.00	80.00	95.0	142.00	40.0	M10	1.550	•
SCD 086-080-100 ACP8N	8.60	10.00	80.00	95.0	142.00	40.0	-	1.570	•

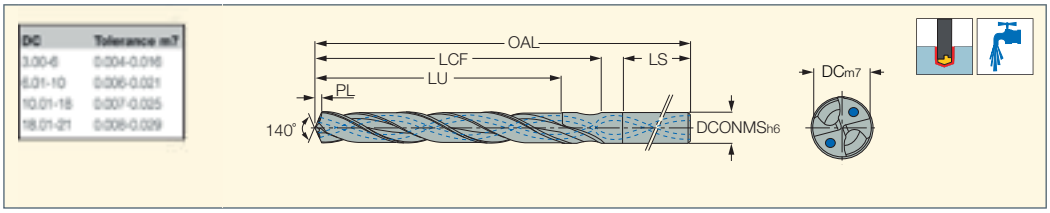
• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

(1) Used for standard thread size

SOLIDDRILL

SCD-ACP8N (8xD) (continued)

Solid Carbide Drills with Coolant Holes, Drilling Depth 8xD



Designation	Dimensions								IC908
	DC	DCONMS	LU	LCF	OAL	LS	FTDZ(1)	PL	
SCD 087-080-100 ACP8N	8.70	10.00	80.00	95.0	142.00	40.0	-	1.580	●
SCD 088-080-100 ACP8N	8.80	10.00	80.00	95.0	142.00	40.0	-	1.600	●
SCD 089-080-100 ACP8N	8.90	10.00	80.00	95.0	142.00	40.0	-	1.620	●
SCD 090-080-100 ACP8N	9.00	10.00	80.00	95.0	142.00	40.0	-	1.640	●
SCD 091-080-100 ACP8N	9.10	10.00	80.00	95.0	142.00	40.0	-	1.660	●
SCD 092-080-100 ACP8N	9.20	10.00	80.00	95.0	142.00	40.0	-	1.670	●
SCD 093-080-100 ACP8N	9.30	10.00	80.00	95.0	142.00	40.0	-	1.690	●
SCD 094-080-100 ACP8N	9.40	10.00	80.00	95.0	142.00	40.0	-	1.710	●
SCD 095-080-100 ACP8N	9.50	10.00	80.00	95.0	142.00	40.0	M11	1.730	●
SCD 096-080-100 ACP8N	9.60	10.00	80.00	95.0	142.00	40.0	-	1.750	●
SCD 097-080-100 ACP8N	9.70	10.00	80.00	95.0	142.00	40.0	-	1.770	●
SCD 098-080-100 ACP8N	9.80	10.00	80.00	95.0	142.00	40.0	-	1.780	●
SCD 100-080-100 ACP8N	10.00	10.00	80.00	95.0	142.00	40.0	-	1.820	●

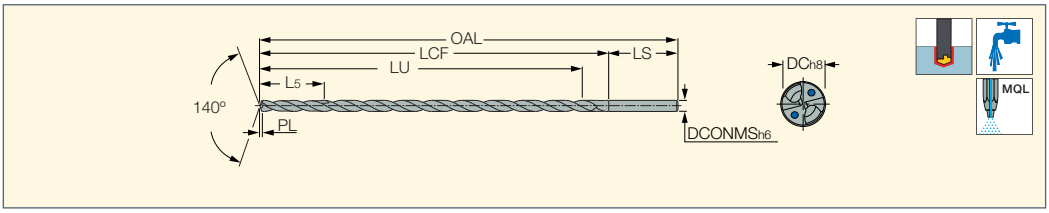
• For user guide and cutting conditions, see pages 175-184 • For regrinding instructions, see page 181

(1) Used for standard thread size

SOLIDDRILL

SCD-ACP20 (20xD)

Solid Carbide Drills with Coolant Holes, Drilling Depth 20xD



Designation	Dimensions								IC908
	DC	LU	OAL	LCF	LS	L5(1)	DCONMS	PL	
SCD 050-100-050ACP20	5.00	100.0	165.00	115.0	50.0	40.00	5.00	0.910	●
SCD 060-120-060ACP20	6.00	120.0	190.00	140.0	50.0	40.00	6.00	1.090	●
SCD 070-140-070ACP20	7.00	140.0	210.00	160.0	50.0	55.00	7.00	1.270	●
SCD 080-160-080ACP20	8.00	160.0	230.00	180.0	50.0	55.00	8.00	1.460	●
SCD 090-180-090ACP20	9.00	180.0	265.00	205.0	60.0	55.00	9.00	1.640	●
SCD 100-200-100ACP20	10.00	200.0	285.00	225.0	60.0	55.00	10.00	1.820	●

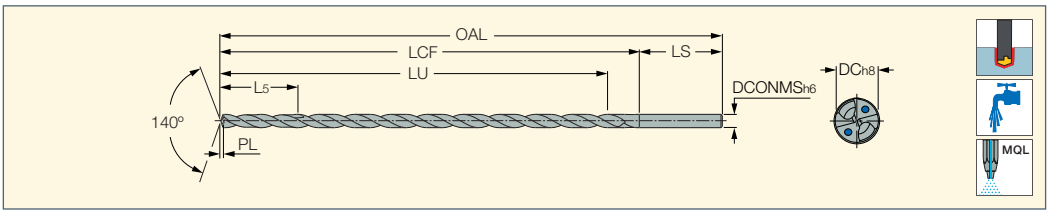
• For user guide and cutting conditions, see pages 170, 175-184

(1) 50% of the four margin leading portion may be used for regrinding

SOLIDDRILL

SCD-ACP-CS (20xD)

Solid Carbide Drills with Coolant Holes for Automotive Crankshaft Applications, Drilling Depth 20-22xD



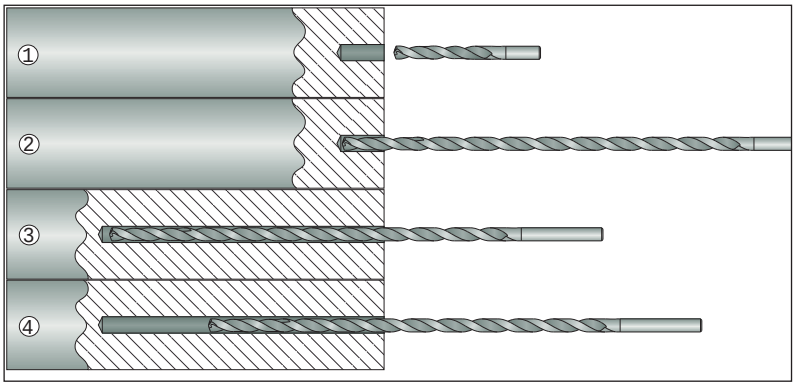
Designation	Dimensions								IC908
	DC	LU	LCF	OAL	DCONMS	PL	LS	L5(1)	
SCD 050-103-060ACP-CS	5.00	103.0	118.0	156.00	6.00	0.910	38.0	40.00	●
SCD 060-120-060ACP-CS	6.00	120.0	140.0	178.00	6.00	1.090	38.0	40.00	●

• For user guide, see pages 175-184

(1) Up to 50% of this length may be used to regrind

Recommended Drilling Procedure for Deep Hole Drilling (20XD)

1 Drill a pilot hole 1-2*D deep with a short drill. The pilot drill should be 0.03-0.05 mm larger than the long drill and its point angle should also be larger (over 140°).
2 Enter the pre-hole using low speed and feed, until it engages the material.
3 Increase cutting speed and feed to recommended conditions – **no pecking is required!**
4 After having reached the required depth, reduce speed by more than 50% while retracting from the hole.



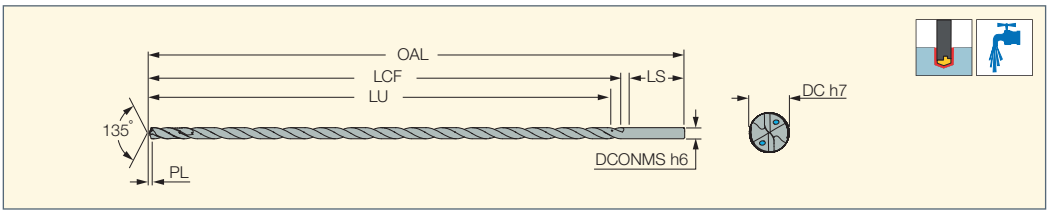
Recommended Machining Conditions for Solid Carbide 20xD Drills

Drill Dia. (mm)	Carbon Steel (30 HRc)		Alloy Steel (45 HRc)		Stainless Steel		Cast Iron (GG25)		Ductile Cast Iron (GG45)	
	V(m/min)	f(mm/rev)	V(m/min)	f(mm/rev)	V(m/min)	f(mm/rev)	V(m/min)	f(mm/rev)	V(m/min)	f(mm/rev)
5	60-120	0.12-0.25	50-100	0.1-0.20	30-60	0.08-0.15	60-120	0.15-0.30	40-80	0.15-0.25
6	60-120	0.14-0.25	50-100	0.14-0.25	30-60	0.10-0.18	60-120	0.14-0.25	40-80	0.14-0.25
7-8	60-120	0.16-0.30	50-100	0.16-0.30	30-60	0.10-0.20	60-120	0.16-0.30	40-80	0.16-0.30
9-10	60-120	0.16-0.30	50-100	0.10-0.20	30-60	0.08-0.115	60-120	0.20-0.35	40-80	0.20-0.35

SOLIDDRILL

SCD-SXC30

Solid Carbide Drills with Internal Coolant Channels, Drilling Depth 30xD



Designation	Dimensions								IC908
	DC	DCONMS	OAL	LU	LCF	LS	PL	ULDR(2)	
SCD 030-097-060 SXC30	3.00	6.00	150.00	97.00	105.0	40.0	0.495	30.0	•
SCD 032-097-060 SXC30	3.20	6.00	150.00	97.00	105.0	40.0	0.528	30.0	•
SCD 033-127-060 SXC30	3.30	6.00	185.00	127.00	135.0	45.0	0.544	30.0	•
SCD 035-127-060 SXC30	3.50	6.00	185.00	127.00	135.0	45.0	0.578	30.0	•
SCD 038-127-060 SXC30 (1)	3.80	6.00	185.00	127.00	135.0	45.0	0.627	30.0	•
SCD 040-127-060 SXC30	4.00	6.00	185.00	127.00	135.0	45.0	0.660	30.0	•
SCD 042-127-060 SXC30	4.20	6.00	185.00	127.00	135.0	45.0	0.693	30.0	•
SCD 045-157-060 SXC30	4.50	6.00	215.00	157.00	165.0	45.0	0.743	30.0	•
SCD 047-157-060 SXC30 (1)	4.70	6.00	215.00	157.00	165.0	45.0	0.775	30.0	•
SCD 048-157-060 SXC30	4.80	6.00	215.00	157.00	165.0	45.0	0.792	30.0	•
SCD 050-157-060 SXC30	5.00	6.00	215.00	157.00	165.0	45.0	0.825	30.0	•
SCD 055-172-060 SXC30	5.50	6.00	230.00	172.00	180.0	45.0	0.907	30.0	•
SCD 058-172-060 SXC30 (1)	5.80	6.00	230.00	172.00	180.0	45.0	0.957	30.0	•
SCD 060-172-060 SXC30	6.00	6.00	230.00	172.00	180.0	45.0	0.990	30.0	•
SCD 065-207-080 SXC30	6.50	8.00	280.00	207.00	215.0	60.0	1.072	30.0	•
SCD 068-222-080 SXC30	6.80	8.00	280.00	222.00	230.0	45.0	1.122	30.0	•
SCD 070-222-080 SXC30	7.00	8.00	280.00	222.00	230.0	45.0	1.155	30.0	•
SCD 075-222-080 SXC30 (1)	7.50	8.00	280.00	222.00	230.0	45.0	1.238	30.0	•
SCD 078-257-080 SXC30 (1)	7.80	8.00	315.00	257.00	265.0	45.0	1.287	30.0	•
SCD 080-257-080 SXC30	8.00	8.00	315.00	257.00	265.0	45.0	1.320	30.0	•
SCD 085-287-100 SXC30	8.50	10.00	350.00	287.00	295.0	50.0	1.402	30.0	•
SCD 088-322-100 SXC30 (1)	8.80	10.00	380.00	322.00	330.0	45.0	1.452	30.0	•
SCD 090-322-100 SXC30	9.00	10.00	380.00	322.00	330.0	45.0	1.485	30.0	•
SCD 098-322-100 SXC30	9.80	10.00	380.00	322.00	330.0	45.0	1.617	30.0	•
SCD 100-322-100 SXC30	10.00	10.00	380.00	322.00	330.0	45.0	1.650	30.0	•

• For user guide, see pages 175-184

(1) On request

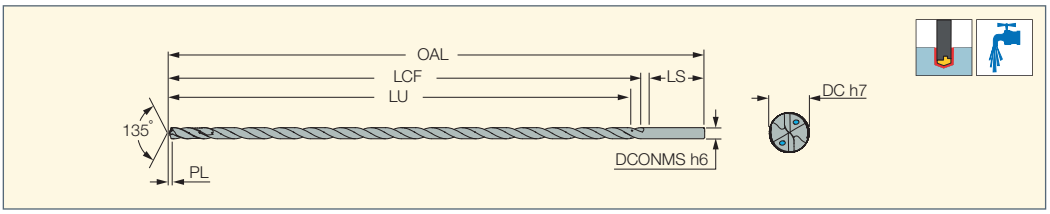
(2) Usable length diameter ratio

Recommended Machining Conditions for SCD-SXC30 Solid Carbide Drills

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material No.	Cutting Speed V_c (m/min)	Cutting Diameter / Feed (mm/rev) 3.0-5.0	5.0-8.0	8.0-10.0
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	65-70	0.09-0.11	0.12-0.17	0.18-0.22
		>= 0.25 %C	Annealed	650	190	2				
		< 0.55 %C	Quenched and tempered	850	250	3				
		>= 0.55 %C	Annealed	750	220	4				
		>= 0.55 %C	Quenched and tempered	1000	300	5				
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6				
			Quenched and tempered	930	275	7				
				1000	300	8				
				1200	350	9				
	High alloyed steel, cast steel, and tool steel		Annealed	680	200	10	60-65			
			Quenched and tempered	1100	325	11				
	Stainless steel and cast steel		Ferritic/martensitic.	680	200	12	45-50	0.07-0.09	0.10-0.14	0.13-0.17
			Martensitic	820	240	13				
M	Stainless steel and cast steel		Austenitic	600	180	14	40-45	0.07-0.09	0.10-0.14	0.13-0.17
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15	75-85	0.18-0.22	0.20-0.30	0.30-0.40
			Pearlitic		260	16				
	Cast iron nodular (GGG)		Ferritic		160	17				
			Pearlitic		250	18				
	Malleable cast iron		Ferritic		130	19				
			Pearlitic		230	20				
S	High temp. alloys	Fe based	Annealed		200	31	45-50	0.07-0.09	0.10-0.14	0.13-0.17
			Cured		280	32				
		Ni or Co based	Annealed		250	33	40-45	0.05-0.07	0.07-0.10	0.10-0.13
			Cured		350	34				
			Cast		320	35				
	Titanium Ti alloys		Pure	RM 400	110	36	45-50	0.06-0.08	0.08-0.12	0.12-0.15
			Alpha+beta alloys cured	RM 1050	310	37				

SOLIDDRILL

SCD-SXC40
Solid Carbide Drills with Internal Coolant Channels, Drilling Depth 40xD



Designation	Dimensions DC	DCONMS	OAL	LU	LCF	LS	PL	ULDR(2)	IC908
SCD 030-132-060 SXC40	3.00	6.00	190.00	132.00	140.0	45.0	0.495	40.0	•
SCD 038-172-060 SXC40 (1)	3.80	6.00	230.00	172.00	180.0	45.0	0.627	40.0	•
SCD 040-172-060 SXC40	4.00	6.00	230.00	172.00	180.0	45.0	0.660	40.0	•
SCD 042-172-060 SXC40	4.20	6.00	230.00	172.00	180.0	45.0	0.693	40.0	•
SCD 045-212-060 SXC40	4.50	6.00	270.00	212.00	220.0	45.0	0.743	40.0	•
SCD 047-212-060 SXC40 (1)	4.70	6.00	270.00	212.00	220.0	45.0	0.775	40.0	•
SCD 048-212-060 SXC40	4.80	6.00	270.00	212.00	220.0	45.0	0.792	40.0	•
SCD 050-212-060 SXC40	5.00	6.00	270.00	212.00	220.0	45.0	0.825	40.0	•
SCD 055-232-060 SXC40	5.50	6.00	290.00	232.00	240.0	45.0	0.907	40.0	•
SCD 058-232-060 SXC40 (1)	5.80	6.00	290.00	232.00	240.0	45.0	0.957	40.0	•
SCD 060-232-060 SXC40	6.00	6.00	290.00	232.00	240.0	45.0	0.990	40.0	•
SCD 065-282-080 SXC40	6.50	8.00	340.00	282.00	290.0	45.0	1.072	40.0	•
SCD 068-312-080 SXC40	6.80	8.00	370.00	312.00	320.0	45.0	1.122	40.0	•
SCD 070-312-080 SXC40	7.00	8.00	370.00	312.00	320.0	45.0	1.155	40.0	•
SCD 075-312-080 SXC40 (1)	7.50	8.00	370.00	312.00	320.0	45.0	1.238	40.0	•
SCD 078-342-080 SXC40 (1)	7.80	8.00	400.00	342.00	350.0	45.0	1.287	40.0	•
SCD 080-342-080 SXC40	8.00	8.00	400.00	342.00	350.0	45.0	1.320	40.0	•

• For user guide, see pages 175-184
(1) On request
(2) Usable length diameter ratio

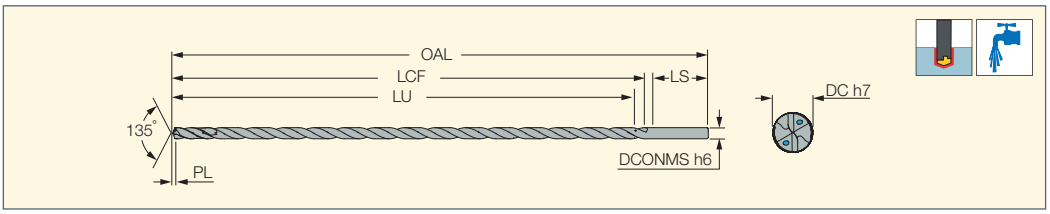
Recommended Machining Conditions for SCD-SXC40 Solid Carbide Drills

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material No.	Cutting Speed Vc (m/min)	Cutting Diameter / Feed (mm/rev) 3.0-4.0	4.1-5.0	5.1-6.0	6.1-7.0	7.1-8.0
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	55-65	0.043-0.048	0.058-0.063	0.068-0.078	0.083-0.093	0.093-0.117
		>= 0.25 %C	Annealed	650	190	2						
		< 0.55 %C	Quenched and tempered	850	250	3						
		>= 0.55 %C	Annealed	750	220	4						
		>= 0.55 %C	Quenched and tempered	1000	300	5						
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	45-55	0.023-0.043	0.033-0.058	0.043-0.068	0.053-0.083	0.065-0.103
			Quenched and tempered	930	275	7						
				1000	300	8						
				1200	350	9						
	High alloyed steel, cast steel, and tool steel		Annealed	680	200	10	35-45	0.02-0.029	0.03-0.033	0.04-0.043	0.05-0.055	0.06-0.071
			Quenched and tempered	1100	325	11						
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12	30-35	0.02-0.029	0.03-0.033	0.04-0.043	0.051-0.055	0.06-0.071
			Martensitic	820	240	13						
M	Stainless steel and cast steel		Austenitic	600	180	14	25-30	0.02-0.029	0.03-0.033	0.04-0.043	0.051-0.055	0.06-0.071
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15	60-70	0.035-0.071	0.05-0.098	0.06-0.121	0.075-0.150	0.085-0.198
			Pearlitic		260	16						
	Cast iron nodular (GGG)		Ferritic		160	17	55-60					
			Pearlitic		250	18						
	Malleable cast iron		Ferritic		130	19	50-55					
			Pearlitic		230	20						
S	High temp. alloys	Fe based	Annealed		200	31	30-35	0.02-0.029	0.03-0.033	0.04-0.043	0.051-0.055	0.063-.0.71
			Cured		280	32						
		Ni or Co based	Annealed		250	33	25-30	0.017-0.02	0.027-0.03	0.037-0.04	0.047-0.05	0.06-0.066
			Cured		350	34						
			Cast		320	35						
	Titanium Ti alloys		Pure	RM 400	110	36	30-35	0.018-0.021	0.028-0.031	0.038-0.041	0.048-0.051	0.062-0.069
			Alpha+beta alloys cured	RM 1050	310	37						

SOLIDDRILL

SCD-SXC50

Solid Carbide Drills with Internal Coolant Channels, Drilling Depth 50xD



Designation	Dimensions DC	DCONMS	OAL	LU	LCF	LS	PL	ULDR(2)	IC908
SCD 040-217-060 SXC50	4.00	6.00	270.00	217.00	225.0	40.0	0.660	50.0	•
SCD 042-217-060 SXC50	4.20	6.00	270.00	217.00	225.0	40.0	0.693	50.0	•
SCD 045-267-060 SXC50	4.50	6.00	320.00	267.00	275.0	40.0	0.743	50.0	•
SCD 047-267-060 SXC50 (1)	4.70	6.00	320.00	267.00	275.0	40.0	0.775	50.0	•
SCD 048-267-060 SXC50	4.80	6.00	320.00	267.00	275.0	40.0	0.792	50.0	•
SCD 050-267-060 SXC50	5.00	6.00	320.00	267.00	275.0	40.0	0.825	50.0	•
SCD 055-302-060 SXC50	5.50	6.00	360.00	302.00	310.0	45.0	0.907	50.0	•
SCD 058-302-060 SXC50 (1)	5.80	6.00	360.00	302.00	310.0	45.0	0.957	50.0	•
SCD 060-302-060 SXC50	6.00	6.00	360.00	302.00	310.0	45.0	0.990	50.0	•

• For user guide, see pages 175-184

(1) On request

(2) Usable length diameter ratio

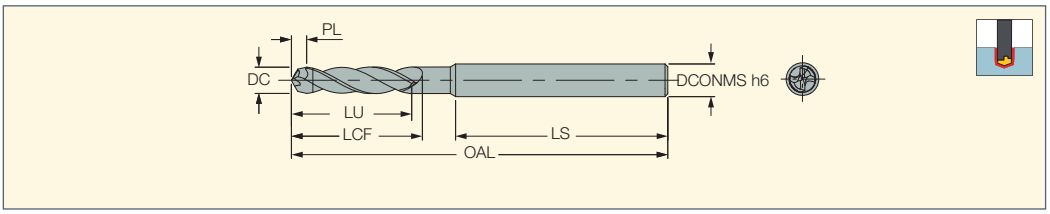
Recommended Machining Conditions for SCD-SXC50 Solid Carbide Drills

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material No.	Cutting Speed Vc (m/min)	Cutting Diameter Feed (mm/rev) 3.0-4.0	4.1-5.0	5.1-6.0	6.1-7.0	7.1-8.0
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	55-65	0.043-0.048	0.058-0.063	0.068-0.078	0.083-0.093	0.093-0.117
		>= 0.25 %C	Annealed	650	190	2						
		< 0.55 %C	Quenched and tempered	850	250	3						
		>= 0.55 %C	Annealed	750	220	4						
		>= 0.55 %C	Quenched and tempered	1000	300	5						
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	45-55	0.023-0.043	0.033-0.058	0.043-0.068	0.053-0.083	0.065-0.103
			Quenched and tempered	930	275	7						
				1000	300	8						
				1200	350	9						
	High alloyed steel, cast steel, and tool steel		Annealed	680	200	10	35-45	0.02-0.023	0.03-0.033	0.04-0.043	0.05-0.055	0.06-0.071
			Quenched and tempered	1100	325	11						
	Stainless steel and cast steel		Ferritic/ martensitic	680	200	12	30-35	0.02-0.023	0.03-0.033	0.04-0.043	0.051-0.065	0.06-0.071
			Martensitic	820	240	13						
M	Stainless steel and cast steel		Austenitic	600	180	14	25-30	0.02-0.023	0.03-0.033	0.04-0.043	0.051-0.065	0.06-0.071
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15	60-70	0.035-0.071	0.05-0.098	0.06-0.121	0.075-0.150	0.095-0.198
			Pearlitic		260	16						
	Cast iron nodular (GGG)		Ferritic		160	17	55-60					
			Pearlitic		250	18						
	Malleable cast iron		Ferritic		130	19	50-55					
			Pearlitic		230	20						
S	High temp. alloys	Fe based	Annealed		200	31	30-35	0.02-0.023	0.03-0.033	0.04-0.043	0.051-0.065	0.063-.0.71
			Cured		280	32						
		Ni or Co based	Annealed		250	33	25-30	0.017-0.02	0.027-0.03	0.037-0.04	0.047-0.05	0.06-0.066
			Cured		350	34						
			Cast		320	35						
	Titanium Ti alloys		Pure	RM 400	110	36	30-35	0.018-0.021	0.028-0.031	0.038-0.041	0.048-0.051	0.062-0.069
			Alpha+beta alloys cured	RM 1050	310	37						

SOLIDDRILL

SCD-FNPCD

Solid Carbide Drills with PCD Full Nib Insert for Composite Materials (CFRP) and Stack Machining



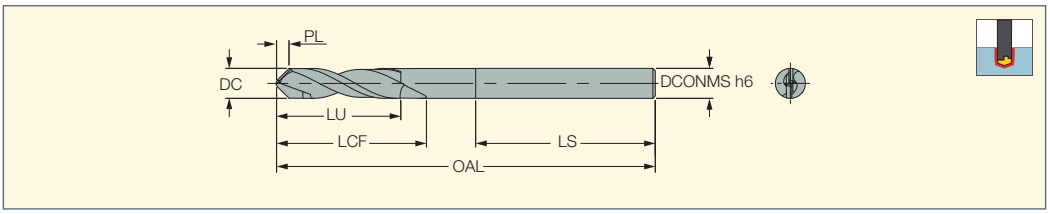
Designation	DC	DCONMS	LU	LCF	LS	OAL	PL
SCD 0330-025-040 FNPCD	3.30	4.00	25.00	30.0	36.0	70.00	3.000
SCD 0419-028-060 FNPCD	4.19	6.00	28.00	34.3	34.0	70.00	2.100
SCD 0485-028-060 FNPCD	4.85	6.00	28.00	35.3	34.0	70.00	2.430
SCD 0637-032-080 FNPCD	6.37	8.00	32.00	41.6	32.0	76.00	3.190

• For user guide and cutting conditions, see pages 175-184

SOLIDDRILL

SCD-WPCD

Solid Carbide Drills with PCD Insert for Composite Materials (CFRP) and Stack Machining



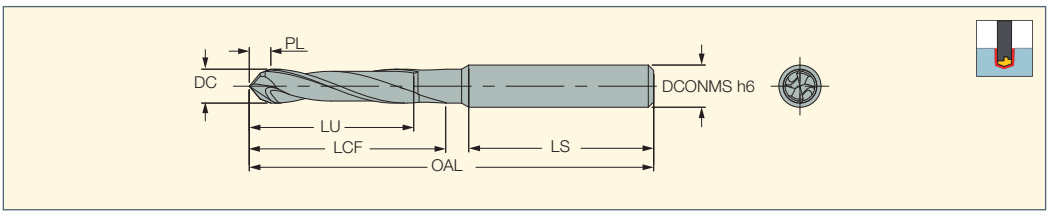
Designation	DC	DCONMS	LU	LCF	LS	OAL	PL
SCD 0419-028-060 WPCD	4.19	6.00	28.00	34.3	34.0	70.00	2.100
SCD 0485-028-060 WPCD	4.85	6.00	28.00	35.3	34.0	70.00	2.430
SCD 0637-032-080 WPCD	6.37	8.00	32.00	41.6	32.0	75.00	3.190
SCD 0794-032-080 WPCD	7.94	8.00	32.00	43.9	30.0	75.00	3.970
SCD 1000-040-100 WPCD	10.00	10.00	40.00	50.0	40.0	84.00	5.000
SCD 1200-045-120 WPCD	12.00	12.00	45.00	55.0	40.0	89.00	6.000

• For user guide and cutting conditions, see pages 175-184

SOLIDDRILL

SCD-CVD

Solid Carbide Drills with CVD Coating for Composite Materials (CFRP) and Stack Machining



Designation	DC	DCONMS	LU	LCF	LS	OAL	PL
SCD 0330-025-040 CVD	3.30	4.00	25.00	30.0	36.0	70.00	3.000
SCD 0419-028-060 CVD	4.19	6.00	28.00	34.0	32.0	70.00	3.500
SCD 0485-028-060 CVD	4.85	6.00	28.00	35.0	32.0	70.00	4.000
SCD 0637-032-080 CVD	6.37	8.00	32.00	42.0	32.0	76.00	5.400
SCD 0794-032-080 CVD	7.94	8.00	32.00	44.0	30.0	76.00	6.700

• For user guide and cutting conditions, see pages 175-184

General Recommendations

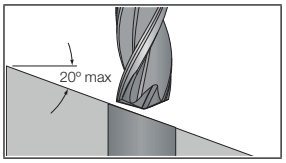
- It is mostly recommended to use an external coolant jet at a minimum pressure of 10 to15 bar during drilling for prolonged tool life and to facilitate chip evacuation.
- When machining alloy and stainless steel, it is mostly recommended to use **ER JET** 2 collet to prolong tool life and prevent built-up edge.
- Semi-synthetic or emulsion lubricants should be used to extend tool life.
- Drilling stainless steel or high temperature alloys requires high oil pressure and 7-15% mineral or vegetable based oil emulsion for prolonged tool life. Dry machining may badly affect hole quality and drill tool life.
- In case of chip evacuation problems or when poor surface finish is obtained, it is most recommended to use pecking cycle.
- For optimal performance, it is recommended to use the 3 flute, 5xD solid carbide drills in rotating or stationary applications with a maximum of 0.02 mm runout. Larger runout will reduce drill performance and badly affect hole quality.
- The solid drills can be clamped into any of **ISCAR**'s tooling systems such as:

1 Collet chucks
2 Thermal shrink chucks
3 ISCAR MAXIN power chucks

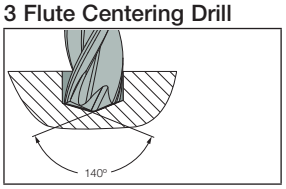
- It is recommended to use the solid drills in SHORTIN adapters with AA super precision collets to obtain a high level of hole quality and prolonged drill tool life. Balanceable adapters should be used for applications above 10,000 RPM in order to minimize vibrations and gain a reliable and prolonged cutting edge life.
- Interrupted cut applications reduce hole accuracy, quality and drill life.
- See pages 179-180 for troubleshooting guide for common problems.
- Solid carbide drills can be used on a wide range of materials and different cutting conditions with high reliability and performance repeatability. This can reduce tool inventory and logistic costs.

3 Flute Solid Carbide Drills

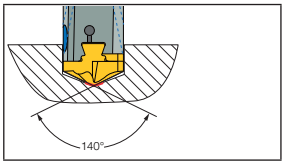
Three flute drills are used extensively on nonferrous metals because of their excellent performance on these materials. These solid carbide drills were designed with a special cutting edge geometry that can be used on a broad spectrum of materials including steel, stainless steel, high temperature alloys, cast iron and nonferrous materials. Their dimensions are according to DIN 6537 standard. The SCCD drills are manufactured in m7 diameter tolerance, with cylindrical shanks according to DIN 6535 HA standard, 30° spiral flute helix, 140° head point angle and a reinforced web taper.
The drills can be used on surface applications of up to 20° sloped entry/exit. (In this case, the drill should be held in a thermal shrink collet or a **MAXIN** power chuck). The 3 flute solid carbide drills cannot be used on radial drill adjustment diameter devices such as our **FITBORE** adapter.



3 Flute Centering Drill



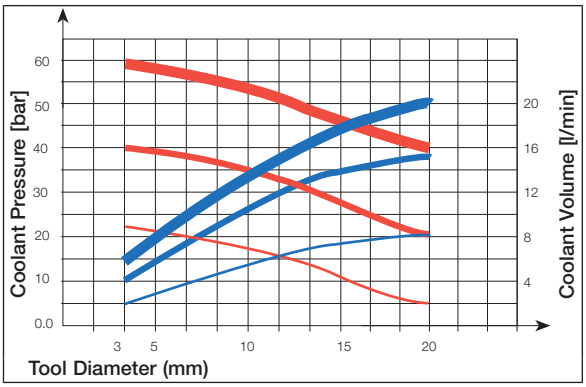
Followed by a CHAMDRILL SUMOCHAM/CHAMGUN



Advantages

The drills provide higher hole cylindricity, roundness, straightness, concentricity and surface finish when compared to 2 flute solid carbide drills.
The 3 flute solid carbide drills with a 140° point head can serve as centering drills for **CHAMDRILL**/ **SUMOCHAM** or **CHAMGUN** if necessary.

Coolant Pressure and Volume Recommendations

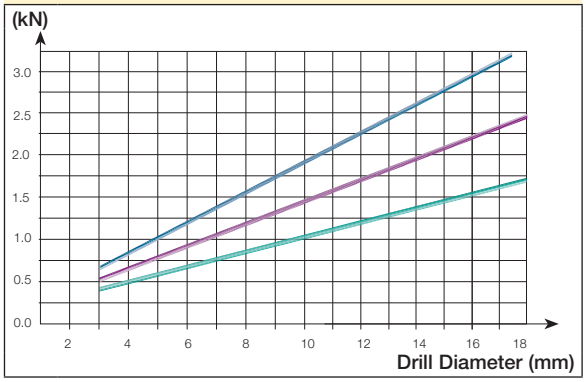


Required Coolant Pressure	Required Coolant Volume
Optimum pressure	Optimum volume
Good pressure	Good volume
Minimum pressure	Minimum pressure

Required coolant pressure and volume for **SCD** drills with internal coolant spiral nozzles.

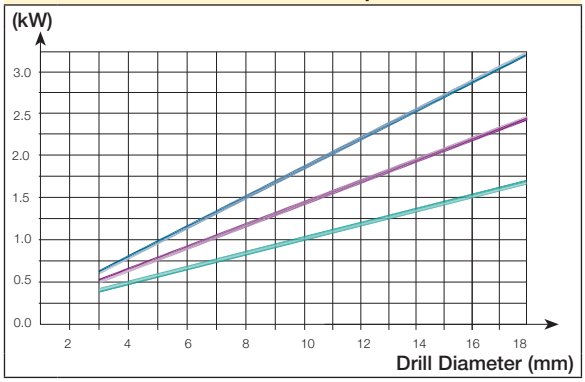
Force and Power Characteristics

Feed Force



- f=0.30 mm/rev
- f=0.25 mm/rev
- f=0.20 mm/rev

Net Power Consumption



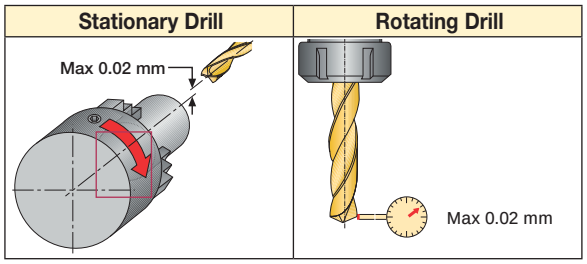
- f=0.30 mm/rev
- f=0.25 mm/rev
- f=0.20 mm/rev

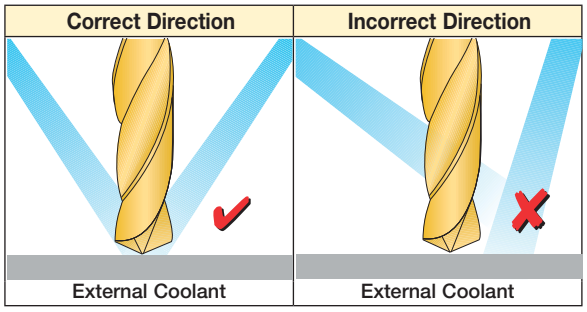
Material: SAE 4340
Speed: 100 m/min

Values may change for different materials and drilling conditions.

Stability

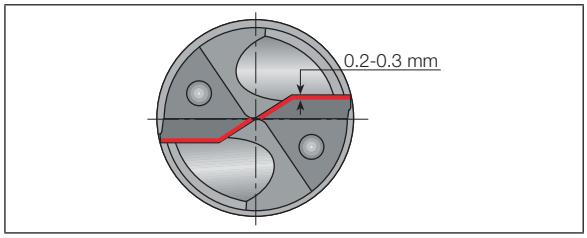
The stability of the application volume is important in order to obtain the very best tool life and hole accuracy. Check the condition of the machine spindle, fixture and fixturing of the component to secure maximum stability and rigidity. Unstable conditions can cause tool breakage.





Tool Life

Drills should not be used with flank wear exceeding 0.2-0.3 mm.



Recommended Machining Conditions for Solid Carbide Drills D=0.8-2.9 mm

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material No.(1)	Cutting Speed V_c (m/min)	Feed (mm/rev) vs. Drill Diameter			
								Ø0.8-1.4	Ø1.5-1.9	Ø2-2.4	Ø2.5-2.9
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	50-100	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
		>= 0.25 %C	Annealed	650	190	2	40-100	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
		< 0.55 %C	Quenched and tempered	850	250	3	40-85	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
		>= 0.55 %C	Annealed	750	220	4	40-85	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
			Quenched and tempered	1000	300	5	40-85	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	40-75	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
			Quenched and tempered	930	275	7	40-60	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
				1000	300	8	40-60	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
				1200	350	9	40-60	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10	30-50	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
			Quenched and tempered	1100	325	11	30-50	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
	Stainless steel and cast steel		Ferritic/ martensitic	680	200	12	20-35	0.03-0.06	0.04-0.08	0.05-0.10	0.06-0.10
			Martensitic	820	240	13	20-35	0.03-0.06	0.04-0.08	0.05-0.10	0.06-0.10
M	Stainless steel		Austenitic	600	180	14	20-35	0.03-0.06	0.04-0.08	0.05-0.10	0.06-0.10
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15	40-80	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
			Pearlitic		260	16	40-70	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
	Nodular cast iron (GGG)		Ferritic		160	17	40-95	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
			Pearlitic		250	18	50-95	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
	Malleable cast iron		Ferritic		130	19	40-80	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
			Pearlitic		230	20	40-80	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
N	Aluminum- wrought alloy		Not cureable		60	21	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
			Cured		100	22	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
			Cured		90	24	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
		>12% Si	High temperature		130	25	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
	Copper alloys	>1% Pb	Free cutting		110	26	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
			Brass		90	27	50-150	0.05-0.12	0.07-0.15	0.08-0.18	0.09-0.18
			Electrolitic copper		100	28	60-160	0.05-0.15	0.07-0.18	0.08-0.20	0.09-0.22
	Non-metallic		Duroplastics, fiber plastics			29					
			Hard rubber			30					
S	High temp. alloys	Fe based	Annealed		200	31	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
			Cured		280	32	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
		Ni or Co based	Annealed		250	33	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
			Cured		350	34	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
			Cast		320	35	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
	Titanium Ti alloys			RM 400		36	10-20	0.02-0.03	0.02-0.03	0.03-0.04	0.03-0.04
			Alpha+beta alloys cured	RM 1050		37	10-20	0.02-0.03	0.02-0.03	0.03-0.04	0.03-0.04
H	Hardened steel		Hardened		55 HRC	38	10-20	0.01-0.02	0.01-0.02	0.02-0.03	0.02-0.03
			Hardened		60 HRC	39	10-20	0.01-0.02	0.01-0.02	0.02-0.03	0.02-0.03
	Chilled cast iron		Cast		400	40	10-20	0.01-0.02	0.01-0.02	0.02-0.03	0.02-0.03
	Cast iron		Hardened		55 HRC	41	10-20	0.01-0.02	0.01-0.02	0.02-0.03	0.02-0.03

- For drill with lengh to diameter ratio larger than 6xD, reduce feed by 20%
- If the RPM exceeds 10,000, a dynamic balance should be done to the system
- Maximal radial and axial runout should not exceed 0.01 mm
- As a starting value, the middle of the recommended machining range should be used, then (according to wear results), conditions can be changed in order to optimize performance.

(1) For workpiece materials list, see pages 495-524

Recommended Machining Conditions for Solid Carbide Drills D=3.0-20.0 mm

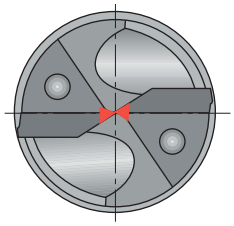
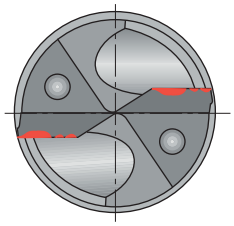
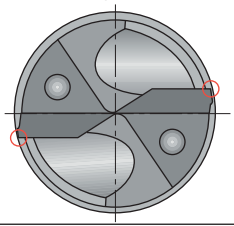
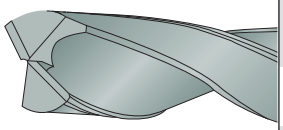
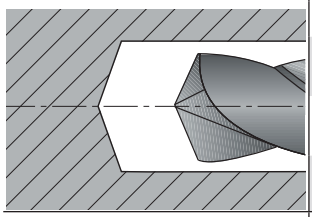
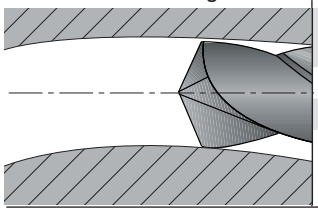
ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material No.(1)	Cutting Speed V_c m/min	Feed (mm/rev) vs. Drill Diameter				
								Ø3-5	Ø5.1-8	Ø8.1-12	Ø12.1-16	Ø16.1-20
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	80-120	0.10-0.18	0.15-0.25	0.2-0.30	0.20-0.35	0.25-0.40
		>= 0.25 %C	Annealed	650	190	2	80-110	0.10-0.18	0.15-0.25	0.2-0.30	0.20-0.35	0.25-0.40
		< 0.55 %C	Quenched and tempered	850	250	3	70-100	0.10-0.20	0.15-0.28	0.2-0.35	0.20-0.38	0.25-0.42
		>= 0.55 %C	Annealed	750	220	4						
			Quenched and tempered	1000	300	5						
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	70-90	0.10-0.18	0.15-0.25	0.2-0.30	0.20-0.35	0.25-0.40
			Quenched and tempered	930	275	7						
				1000	300	8	60-80	0.10-0.18	0.15-0.25	0.2-0.30	0.20-0.35	0.25-0.40
				1200	350	9	50-70	0.10-0.20	0.15-0.28	0.2-0.35	0.20-0.38	0.25-0.42
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10	60-80	0.10-0.20	0.15-0.28	0.18-0.35	0.20-0.38	0.25-0.42
			Quenched and tempered	1100	325	11	50-70	0.10-0.15	0.12-0.20	0.14-0.25	0.16-0.30	0.18-0.32
	Stainless steel and cast steel		Ferritic/ martensitic	680	200	12	25-75	0.04-0.10	0.05-0.15	0.05-0.18	0.08-0.20	0.10-0.20
			Martensitic	820	240	13	25-75	0.04-0.10	0.05-0.15	0.05-0.18	0.08-0.20	0.10-0.20
M	Stainless steel		Austenitic	600	180	14	25-75	0.04-0.10	0.05-0.15	0.05-0.18	0.08-0.20	0.10-0.20
K	Grey cast iron (GG)		Ferritic/ pearlitic		180	15	85-105	0.15-0.25	0.20-0.35	0.25-0.45	0.30-0.50	0.35-0.55
			Pearlitic		260	16	75-90	0.15-0.25	0.20-0.35	0.25-0.45	0.30-0.50	0.35-0.55
	Nodular cast iron (GGG)		Ferritic		160	17	65-80	0.12-0.20	0.15-0.25	0.20-0.35	0.25-0.40	0.30-0.45
			Pearlitic		250	18						
	Malleable cast iron		Ferritic		130	19						
			Pearlitic		230	20						
N	Aluminum- wrought alloy		Not cureable		60	21	70-300	0.10-0.25	0.15-0.35	0.25-0.45	0.30-0.50	0.35-0.55
			Cured		100	22	70-200					
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23	70-300	0.07-0.18	0.12-0.25	0.20-0.35	0.25-0.45	0.30-0.50
			Cured		90	24						
		>12% Si	High temperature		130	25						
	Copper alloys	>1% Pb	Free cutting		110	26						
			Brass		90	27						
			Electrolitic copper		100	28						
	Non-metallic		Duroplastics, fiber plastics			29						
			Hard rubber			30						
S	High temp. alloys	Fe based	Annealed		200	31						
			Cured		280	32						
		Ni or Co based	Annealed		250	33						
			Cured		350	34						
			Cast		320	35						
	Titanium Ti alloys			RM 400		36						
			Alpha+beta alloys cured	RM 1050		37	15-35	0.02-0.07	0.04-0.10	0.06-0.12	0.08-0.15	0.08-0.18
H	Hardened steel		Hardened		55 HRC	38	40-70	0.06-0.10	0.08-0.12	0.10-0.14	0.12-0.16	0.14-0.18
			Hardened		60 HRC	39						
	Chilled cast iron		Cast		400	40						
	Cast iron		Hardened		55 HRC	41						

As a starting value, the middle of the recommended machining range should be used, then (according to wear results), conditions can be changed in order to optimize performance.

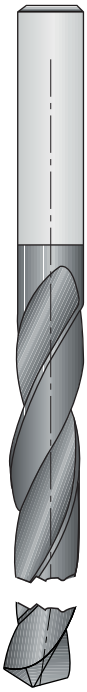
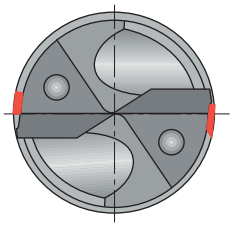
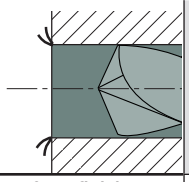
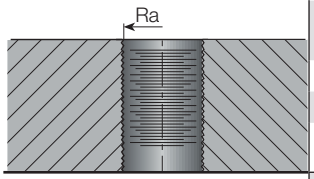
- When using external coolant supply only, reduce cutting speed by 10%
- Use internal coolant supply when machining austenitic stainless steel

(1) For workpiece materials list, see pages 495-524

Troubleshooting

Problem	Cause	Solution
Chipping on the chisel edge 	• Poor clamping of the chuck	• Check the clamping. Use hydraulic clamping chuck, maxin power chuck or a shrink system.
	• Unsuitable cutting conditions	• Decrease feed, increase coolant pressure.
	• Chisel runout	• Check or replace the clamping adaptation.
	• Workpiece movement	• Increase workpiece chucking force.
Chipping on the cutting edges / built-up edge 	• Poor clamping of the chuck	• Check the clamping. Use hydraulic clamping chuck, maxin power chuck or a shrink system.
	• Unsuitable cutting conditions	• Increase cutting speed, reduce feed rate.
	• Insufficient coolant	• Check cooling lubricant. Increase coolant pressure. In the case of external coolant supply, improve jet direction and add cooling jets.
	• Rough application	• Reduce feed rate by 30-50% during entry and exiting.
Excessive wear on the cutting corners 	• Insufficient coolant	• Check cooling lubricant. Increase coolant pressure. In the case of external coolant supply, improve jet direction and add coolant jets.
	• Large runout	• Check if the runout is within 0.02 mm T.I.R. (radial & axial)
	• Unsuitable cutting conditions	• Reduce cutting speed, increase feed.
	• Rough application	• Reduce feed rate by 30-50% during entry and exit.
	• Poor clamping of the chuck	• Check the clamping. Use hydraulic clamping chuck, maxin power chuck or a shrink system.
Chipping on the lands 	• Workpiece movement	• Increase workpiece chucking force.
	• Insufficient coolant	• Check cooling lubricant. Increase coolant pressure. In the case of external coolant supply, improve jet direction and add coolant jets.
	• Wrong drill	• Check drill type, drilling depth, cooling system and workpiece material.
	• Unsuitable cutting conditions	• Increase feed. When spot drilling, reduce feed.
Hole diameter out of tolerance 	• Unsuitable cutting conditions	• If hole size is too large, increase cutting speed or reduce feed. If hole size is too small, reduce cutting speed or increase feed.
	• Poor clamping of the chuck	• Check the clamping. Use hydraulic clamping chuck, maxin power chuck or a shrink system.
	• Large runout	• Make sure that the drill's runout is within 0.02 mm (radial & axial).
	• Worn out center point (chisel)	• Regrind cutting edge or replace the drill.
Hole not straight 	• Insufficient chip evacuation	• Use pecking cycle.
	• Poor clamping of the chuck	• Check the clamping. Use hydraulic clamping chuck, maxin power chuck or a shrink system.
	• Workpiece rigidity	• Increase workpiece chucking force.
	• Worn out drill center point (chisel)	• Regrind cutting edge.
	• Unsuitable cutting conditions	• Increase feed. When spot drilling, reduce feed.

Troubleshooting

Problem	Cause	Solution
Drill breakage 	• Poor clamping of the chuck	• Check the clamping. Use hydraulic clamping chuck, maxin power chuck or a shrink system.
	• Workpiece movement	• Increase workpiece chucking force.
	• Wrong drill	• Check drill type and drilling depth, cooling system and workpiece material.
	• Insufficient coolant	• Check cooling lubricant. Increase coolant pressure. In the case of external coolant supply, improve jet direction and add cooling jets.
	• Unsuitable cutting conditions	• Reduce feed.
	• Worn out drill center point (chisel)	• Regrind cutting edge.
	• Insufficient chip evacuation	• Use pecking cycle.
Chipping on the cutting corners 	• Poor clamping of the chuck	• Check the clamping and adaptation. Use hydraulic clamping chuck, maxin power chuck or a shrink system.
	• Workpiece movement	• Increase workpiece chucking force.
	• Wrong drill	• Check drill type and drilling depth, cooling system and workpiece material. Possibly use longer drill.
	• Insufficient coolant	• Check cooling lubricant. Increase coolant pressure. In the case of external coolant supply, improve jet direction and add cooling jets.
	• Unsuitable cutting conditions	• Check cutting parameters, and possibly reduce feed.
	• Worn out or broken cutting corner	• Replace drill or regrind cutting edge.
Problem: Burrs on exit 	• Unsuitable cutting conditions	• Reduce feed by 30-50% during exit.
	• Worn out drill	• Replace drill.
Rough surface finish 	• Unsuitable cutting conditions	• Adjust feed to improve chip flow.
	• Large runout	• Make sure that the drill's runout is within 0.02 mm (radial & axial).
	• Chip jamming	• Reduce cutting speed.
		• Increase coolant pressure.
		• Apply pecking procedure.
Deviation of hole position 	• Large runout	• Make sure that the drill runout is within 0.02 mm (radial & axial).
	• Poor stability	• Check and improve drill and workpiece clamping rigidity.
	• Rough application	• When drilling hard materials or sloped surfaces, reduce feed by 30-50% during entrance.
		• Use a short pilot drill with 140° point angle.

Regrinding Instructions

Regrinding Instructions for AP and ACP Geometries

For each grinding operation, rotate the drill 180° and repeat the grinding procedure.

1 Primary Clearance

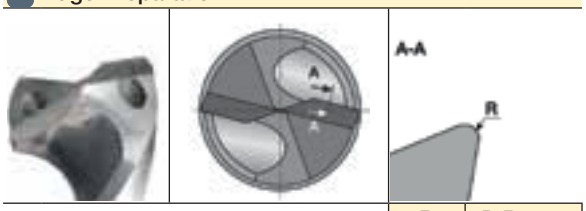
a°	D Range
7	0.8-6.0
10	>6.1

2 Secondary Clearance

3 Chisel

a°	D Range
100	3.0-4.8
105	4.9-10
95	10.1-20

4 Edge Preparation



R	D Range
0.02	0.8-6.0
0.03	6.1-18.0
0.04	18.1>UP

Grinding Wheel Recommended Specifications:

1 Diameter grinding wheel: GA2
2 Grinding wheel bond: synthetic resin
3 Grit size: 325/400 mesh (45/38µ)
4 Diamond concentration: C-75 (3.3 carat/cm^3)
5 Cutting fluid emulsion 3%

Regrinding Instructions for AG and ACG Geometries

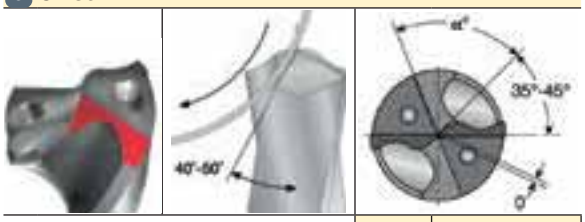
For each grinding operation, rotate the drill 180° and repeat the grinding procedure.

1 Primary Clearance

a°	D Range
7	0.8-6.0
10	>6.1

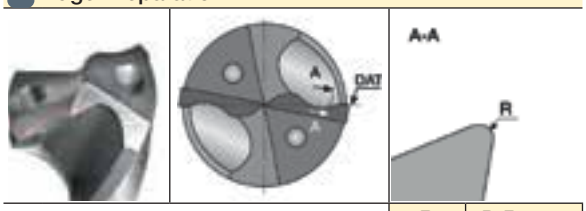
2 Secondary Clearance

3 Chisel



a°	D Range
100	3.0-4.8
105	4.9-10
95	10.1-20

4 Edge Preparation



R	D Range
0.02	0.8-6.0
0.03	6.1-18.0
0.04	18.1>UP

Grinding Wheel Recommended Specifications:

1 Diameter grinding wheel: GA2
2 Grinding wheel bond: synthetic resin
3 Grit size: 325/400 mesh (45/38µ)
4 Diamond concentration: C-75 (3.3 carat/cm^3)
5 Cutting fluid emulsion 3%

Regrinding Instructions

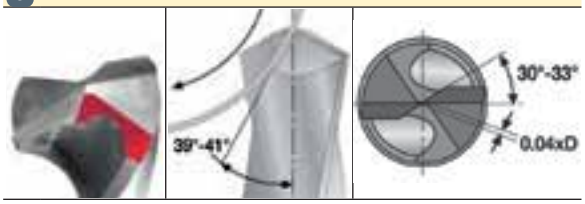
Regrinding Instructions for AH Geometry

For each grinding operation, rotate the drill 180° and repeat the grinding procedure.

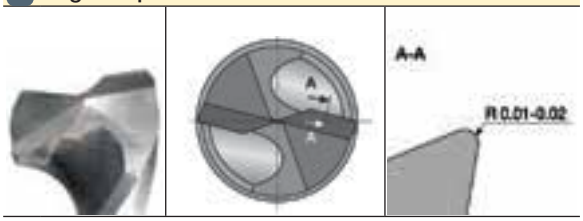
1 Primary Clearance

2 Secondary Clearance

3 Chisel



4 Edge Preparation



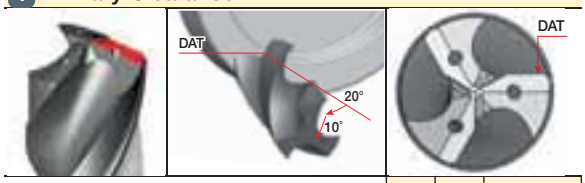
Grinding Wheel Recommended Specifications:

1 Diameter grinding wheel: GA2
2 Grinding wheel bond: synthetic resin
3 Grit size: 325/400 mesh (45/38µ)
4 Diamond concentration: C-75 (3.3 carat/cm^3)
5 Cutting fluid emulsion 3%

Regrinding Instructions for 3 Flute SCCD Drills

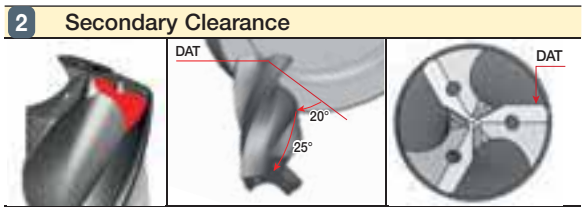
For each grinding operation, rotate the drill 180° and repeat the grinding procedure.

1 Primary Clearance

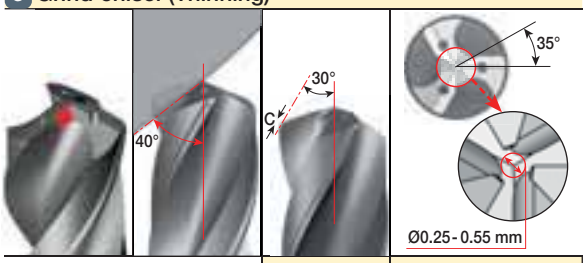


↗	0.02	Shank

2 Secondary Clearance

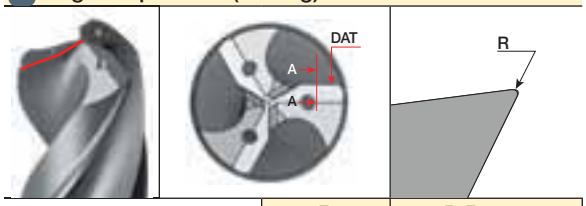


3 Grind chisel (Thinning)



C	D range
0.3-0.4	4.00-8.00
0.5-0.6	8.01-12.00

4 Edge Preparation (Honing)



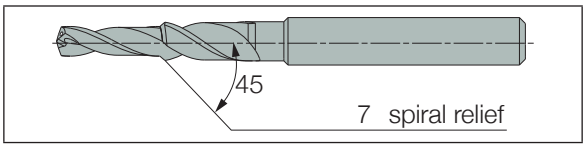
R	D Range
0.035-0.045	4.00-6.00
0.045-0.055	6.01-12.00

Grinding Wheel Recommended Specifications:

1 Diameter grinding wheel: GA2
2 Grinding wheel bond: synthetic resin
3 Grit size: 325/400 mesh (45/38µ)
4 Diamond concentration: C-75 (3.3 carat/cm^3)
5 Cutting fluid emulsion 3

Regrinding Instructions for SCDT Pre-Thread Solid Drills

For each grinding operation, rotate the drill 180° and repeat the grinding procedure.

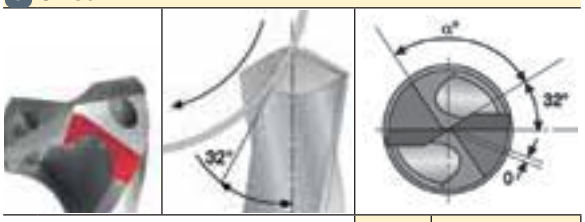


1 Primary Clearance

a°	D Range
7	0.8-6.0
10	>6.1

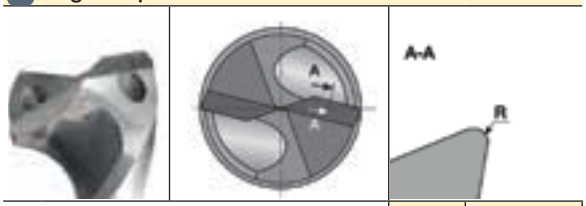
2 Secondary Clearance

3 Chisel



a°	D Range
100	3.0-4.8
105	4.9-10
95	10.1-20

4 Edge Preparation



R	D Range
0.02	0.8-6.0
0.03	6.1-18.0
0.04	18.1>UP

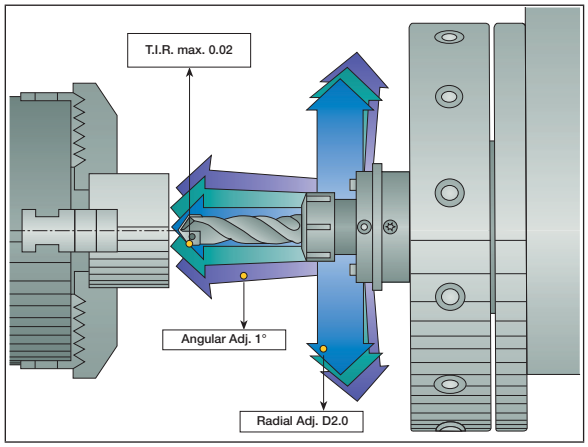
Grinding Wheel Recommended Specifications:

1 Diameter grinding wheel: GA2
2 Grinding wheel bond: synthetic resin
3 Grit size: 325/400 mesh (45/38µ)
4 Diamond concentration: C-75 (3.3 carat/cm^3)
5 Cutting fluid emulsion 3%

GYRO Auxiliary Devices for Lathe Machines

Designed to Correct Misalignment on Stationary Operation

Drills can be used on sloped surfaces up to 6°. When drilling sloped surfaces of more than 6°, reduce feed by 30-50% during penetration of up to 5 mm depth, or use a spot or pre-hole drill to avoid drill deviation or poor drill performance.



General - Calculations

Spindle Speed (min^{-1})

$$n = \frac{v_c \cdot 1000}{\pi \cdot D}$$

Cutting Speed (m/min)

$$v_c = \frac{\pi \cdot D \cdot n}{1000}$$

Table Feed (mm/min)

$$v_f = f \cdot n$$

Material Removal Rate (cm^3/min)

$$Q = \frac{v_f \cdot \pi \cdot D^2}{4000}$$

Power Requirement (kW)

$$Pc = \frac{Q}{60.000 \cdot \eta} \cdot kc \cdot \sin k$$

Torque (Nm)

$$M_c = \frac{f \cdot k_c}{1000} \cdot \frac{D^2}{8} \cdot \sin k \cdot km$$

Feed Force (approx.) (N)

$$F_f = 0.63 \cdot \frac{D}{2} \cdot f \cdot kc \cdot \sin k \cdot kf$$

Machining Time (min/piece)

$$T_c = \frac{L+h}{v_f}$$

Machining Cost ($/piece)

$$C_c = \frac{C_{Mh}}{60} \cdot Tc$$

f	Feed/rev mm/rev
k_c	Material specific cutting force N/mm^2
h	Distance from drill point to workpiece before feeding mm
L	Depth of hole mm
C_{Mh}	Cost/machine hour $/h
η	Machine efficiency %
k	90° }180° bottom drills
sin k	1 DR...
k	70° }140° point angle drills
sin k	0.94

	Drill Geometry Coeficient		
	DCM	DCN	SCD
km	1	0.85	0.85
kf1	0.85	0.85	

Example

Drill DR 220-044-25-07-2D-N (Ø22 mm) - Material No. 4

k_c=2200 N/mm^2 k=90°, sin k=1
v_c=200 m/min C_{Mh}=50 $/h η=0.75
km=1 kf=1 f=0.15 mm/rev L=25 mm h=10 mm

$$n = \frac{vc \cdot 1000}{\pi \cdot D} \cdot \frac{200 \cdot 1000}{\pi \cdot 22} = 2894 \text{ min}^{-1}$$

$$v_f = f \cdot n = 0.15 \cdot 2894 = 434 \text{ mm/min}$$

$$Q = \frac{vf \cdot \pi \cdot D^2}{4000} = \frac{434 \cdot 3.14 \cdot (22)^2}{4000}$$

$$= 165 \text{ cm}^3\text{/min}$$

$$P_c = \frac{Q}{60.000 \cdot \eta} \cdot K_c \cdot \sin k$$

$$= \frac{65}{60.000 \cdot 0.75} \cdot 2200 \cdot 1 = 8.06 \text{ kW}$$

$$M_c = \frac{f \cdot Kc}{10000} \cdot \frac{D^2}{8} \cdot \sin k$$

$$= \frac{0.15 \cdot 2200}{10000} \cdot \frac{222}{8} \cdot 1 \cdot 1 = 20 \text{ Nm}$$

$$F_f = 0.63 \cdot \frac{D}{2} \cdot f \cdot K_c \cdot \sin k$$

$$= 0.63 \cdot \frac{22}{2} \cdot 0.15 \cdot 2200 \cdot 1 \cdot 1 = 2286 \text{ n}$$

$$T_c = \frac{L+h}{V_f} = \frac{25+10}{434} = 0.08 \text{ min/piece}$$

$$C_c = \frac{CMh}{60} \cdot Tc = \frac{50 \cdot 0.08}{60}$$

$$= 0.067 \text{ \$/piece}$$

k_c Values

Material Group	k_c Value
1	2000
2	2100
3	2150
4	2200
5	2200
6	2100
7	2100
8	2100
9	2100
10	2500
11	3250
12	2300
13	2800
14	2600
15	1100
16	1300
17	1100
18	1800

Material Group	k_c Value
19	900
20	1000
21	500
22	800
23	800
26	700
27	700
28	1700
31	3000
32	3100
33	3300
34	3300
35	3200
36	1700
37	1700
38	4600
39	4700
40	4600
41	4500

DEEP DRILLING
BTA SYSTEM

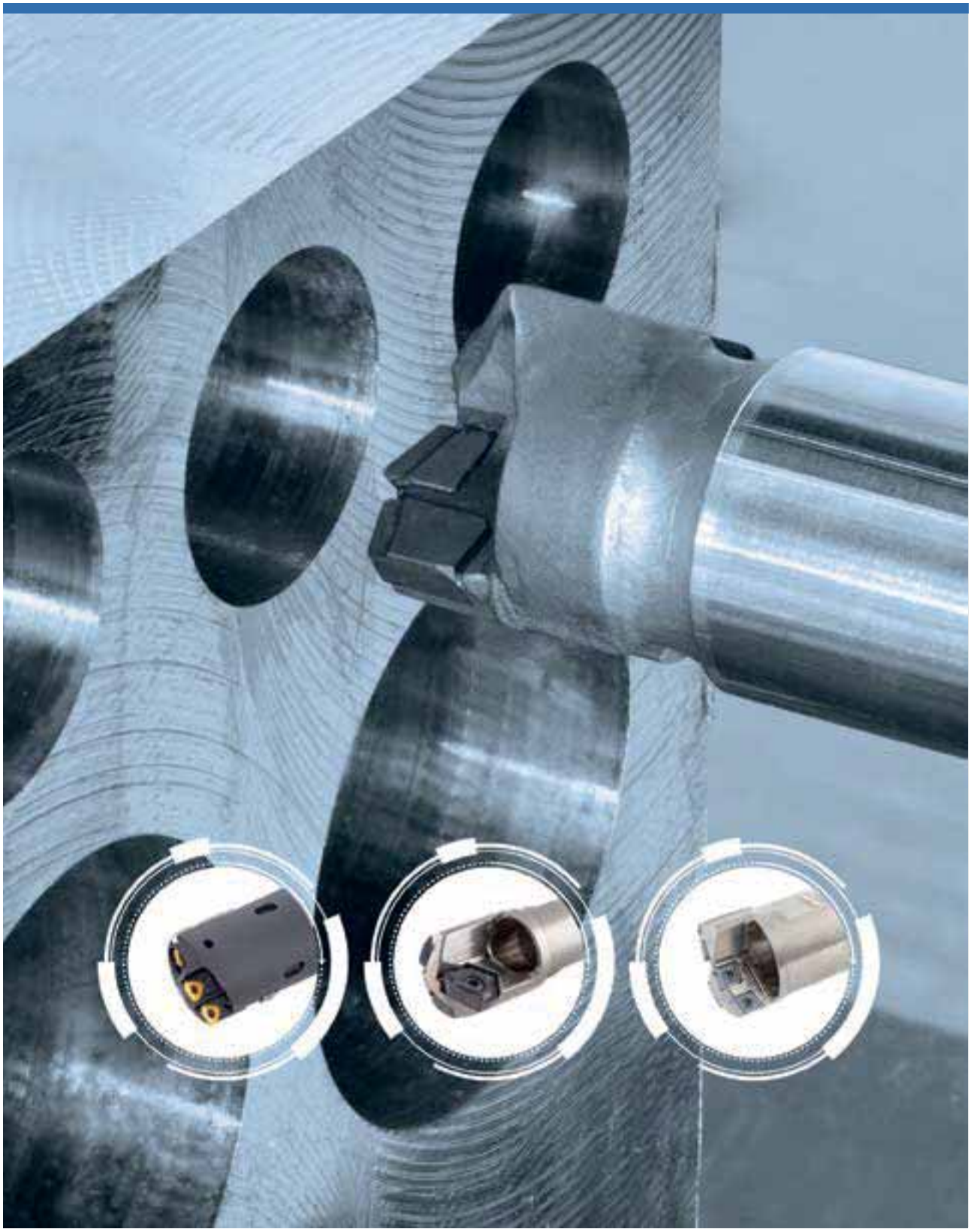


TABLE OF CONTENTS

Indexable Drill Heads

Applications			STS (Single Tube System)			DTS (Double Tube System)		
			TRIDEEP DEEP DRILLING	FINEBEAM	ISCARDEEPDRILL	TRIDEEP DEEP DRILLING	FINEBEAM	ISCARDEEPDRILL
			DSD...FT	DSD...FB	DSD-EC\IC	DDD...FT	DDD...FB	DDD-EC
Drill heads for solid drilling								
Drill diameter (mm)			ø16 - 40	ø25 - 89	ø38 - 291.99	ø18.4 - 28	ø25 - 65	ø38 - 183.99
Thread types	External 4-start thread		3	3	3	3	3	3
	Internal single-start thread		3	3	3	-	-	-
Hole tolerance			IT10	IT10	IT10	IT10	IT10	IT10
Surface finish Ra (µm)			2	2	3	2	2	3
Machines	Deep hole drilling machines		3	3	3	3	3	3
	NC machines		-	-	-	3	3	3
	Lathes		-	-	-	3	3	3
	Machining centers M/C		-	-	-	3	3	3
Workpiece materials	P	Steel	•••	•••	•••	•••	•••	•••
	M	Stainless	•••	•••	•••	•••	•••	•••
	K	Cast iron	•••	•••	•••	•••	•••	•••
	N	Non-ferrous	•••	•••	•••	•••	•••	•••
	S	Superalloys	••	••	••	••	••	••
	H	Hard materials (≥40HRC)	••	••	••	••	••	••
Insert type			TOGT	NPHT / NPMT	NPMX / TPMX	TOGT	NPHT / NPMT	NPMX / TPMX
Plus Cartridge and Guide pad +1 mm - +5 mm			-	-	3	-	-	3
Page			192	201	209	193	202	211

••• (Excellent) ◄—► • (Standard)

Brazed Drill Heads

Applications			STS (Single Tube System)			DTS (Double Tube System)
			DSD-E0	DSD-E1	DSD-E2/E3	DDD-E3
Brazed drill heads						
Drill diameter (mm)			ø8 - 14.79	ø12.6 - 20	ø12.6 - 65	ø18.4 - 65
Thread type	External single-start thread		3	-	-	-
	External 2-start thread		-	ø12.6 - 15.59 mm	ø12.6 - 15.59 mm	-
	External 4-start thread		-	ø15.6 - 20 mm	ø15.6 - 65 mm	3
Hole tolerance			IT9	IT9	IT9	IT9
Surface finish Ra (µm)			2	2	2	2
Machine	Deep hole drilling machines		3	3	3	3
	NC machines		-	-	-	3
	Lathes		-	-	-	3
	Machining centers M/C		-	-	-	3
Workpiece material	P	Steel	•••	•••	•••	•••
	M	Stainless	•••	•••	•••	•••
	K	Cast iron	•••	•••	•••	•••
	N	Non-ferrous	•••	•••	•••	•••
	S	Superalloys	••	••	••	••
	H	Hard materials (≥40HRC)	••	••	••	••
Page			230	230	231	232

••• (Excellent) ◄—► • (Standard)

Indexable Counterboring Heads

Applications			STS (Single Tube System)				DTS (Double Tube System)	
			DSC - EA	DSC - EC	DSC – IA/IC		DDC - EA/EC	
Drill head								
Drill diameter (mm)			ø25 - 39.99	ø40 - 291.99	ø25 - 39.99	ø40 - 293.99	ø25 - 39.99	ø40 - 183.99
Thread type	External 4-start thread		3	3	-	-	3	3
	Internal single-start thread		-	-	3	3	-	-
Hole tolerance			IT10	IT10	IT10	IT10	IT10	IT10
Surface finish Ra (µm)			2	2	2	2	2	2
Machine	Deep hole drilling machines		3	3	3	3	3	3
	NC machines		-	-	-	-	3	3
	Lathes		-	-	-	-	3	3
	Machining centers M/C		-	-	-	-	3	3
Workpiece material	P	Steel	●●●	●●●	●●●	●●●	●●●	●●●
	M	Stainless	●●●	●●●	●●●	●●●	●●●	●●●
	K	Cast iron	●●●	●●●	●●●	●●●	●●●	●●●
	N	Non-ferrous	●●●	●●●	●●●	●●●	●●●	●●●
	S	Superalloys	●●	●●	●●	●●	●●	●●
	H	Hard materials (≥40HRC)	●●	●●	●●	●●	●●	●●
Insert type			XPMT	TPMX	XPMT	TPMX	XPMT	TPMX
Plus Cartridge and Guide pad +1 mm - +5 mm			-	3	-	3	-	3
Page			233	236	240	242	246	249

●●●(Excellent) ◄► ●(Standard)

Indexable Trepanning Heads

Applications			STS (Single Tube System)	
			DSTR	
			EC	IC
Drill head				
Drill diameter (mm)			ø100 - 328	ø100 - 305.99
Thread type	External 4-start thread		3	-
	Internal single-start thread		-	3
Hole tolerance			IT10	IT10
Surface finish Ra (µm)			2	2
Machine	Deep hole drilling machines		3	3
	Lathes		-	-
	Machining centers M/C		-	-
Workpiece material	P	Steel	•••	•••
	M	Stainless	•••	•••
	K	Cast iron	•••	•••
	N	Non-ferrous	•••	•••
	S	Superalloys	••	••
	H	Hard materials (≥40HRC)	••	••
Insert type			TPMX	TPMX
Page			255	258

•••(Excellent) ◄► •(Standard)

DEEP HOLE DRILLING Index

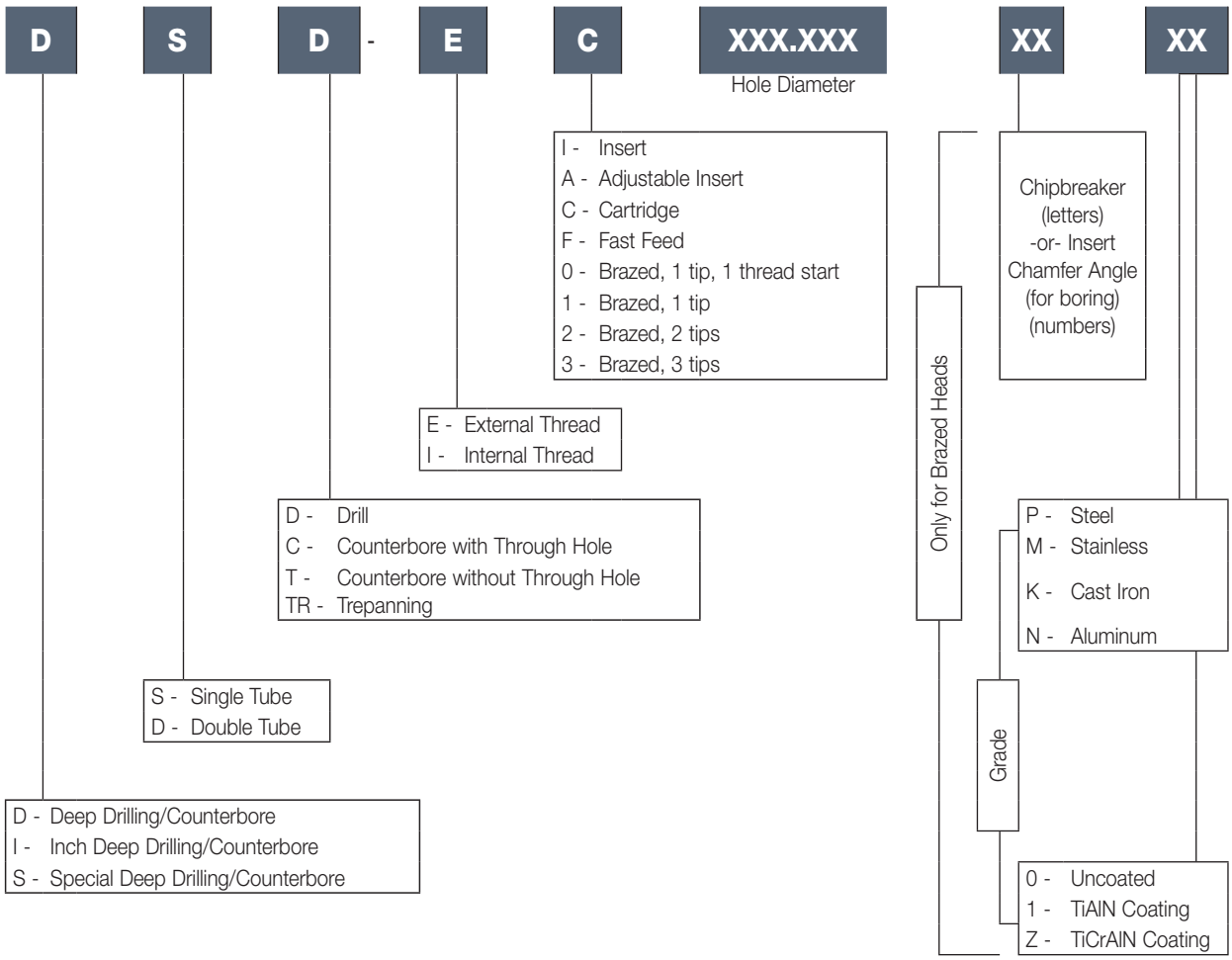
Single Tube System

Single Tube System (STS) –
Cooling fluid is induced through the gap between the drill and the hole. Conveying the chips through the tube requires the use of dedicated machines.

Double Tube System

Double Tube System (DTS) -
Cooling fluid is induced between the coaxial tubes, conveying the chips through the inner tube and can be applied on standard machines.

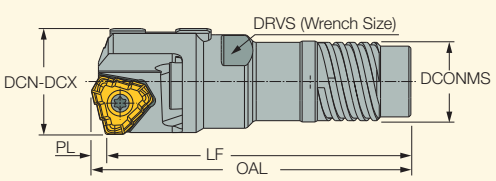
Deep Drilling Heads Identification System



TRIDEEP DEEP DRILLING

DSD-EF-FT

Deep Single Tube Drills with External 4-Start Thread Connection Carrying Triangular Inserts (16-40 dia.)



Designation	DCN(1)	DCX(2)	LF	OAL	PL	DCONMS	THOD(3)
DSD-EF 16.00-16.70-FT	16.00	16.70	55.00	57.20	2.20	12.60	TS-I0
DSD-EF 16.71-17.70-FT	16.71	17.70	55.00	57.20	2.20	13.60	TS-I1
DSD-EF 17.71-18.90-FT	17.71	18.90	56.00	59.00	3.00	14.50	TS-I2
DSD-EF 18.91-20.00-FT	18.91	20.00	56.00	59.00	3.00	15.50	TS-I3
DSD-EF 20.01-21.80-FT	20.01	21.80	60.00	63.20	3.20	16.00	TS-I4
DSD-EF 21.81-21.99-FT	21.81	21.99	63.50	66.70	3.20	18.00	TS-I5
DSD-EF 22.00-24.10-FT	22.00	24.10	65.50	68.90	3.40	18.00	TS-I5
DSD-EF 24.11-25.00-FT	24.11	25.00	65.50	68.90	3.40	19.50	TS-I6
DSD-EF 25.01-26.40-FT	25.01	26.40	67.50	71.10	3.60	19.50	TS-I6
DSD-EF 26.41-28.00-FT	26.41	28.00	67.50	71.10	3.60	21.00	TS-I7
DSD-EF 28.01-28.70-FT	28.01	28.70	70.00	74.57	4.57	21.00	TS-I7
DSD-EF 28.71-31.00-FT	28.71	31.00	75.00	79.57	4.57	23.50	TS-I8
DSD-EF 31.01-32.00-FT	31.01	32.00	75.00	79.57	4.57	25.50	TS-I9
DSD-EF 32.01-33.30-FT	32.01	33.30	74.50	74.93	5.43	25.50	TS-I9
DSD-EF 33.31-36.20-FT	33.31	36.20	79.50	84.93	5.43	28.00	TS-I10
DSD-EF 36.21-39.60-FT	36.21	39.60	89.50	94.93	5.43	30.00	TS-I11
DSD-EF 39.61-40.00-FT	39.61	40.00	94.50	99.93	5.43	33.00	TS-I12

• Note: Each item in the attached catalog page represents a diameter range • For spare parts, insert information and user guide, see pages 196-200 • Inserts and guide pads should be ordered separately • Ordering example: DSD-EF 16.50-FT

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Tube designation

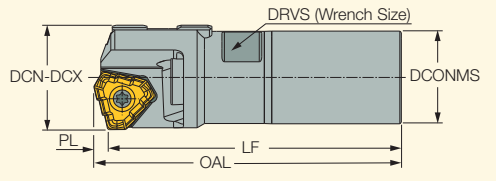
For inserts, see pages: TOGT-DT (194) • TOGT-GF (194)

For holders, see pages: TS-I** (264)

TRIDEEP DEEP DRILLING

DSD-IF-FT

Deep Single Tube Drills with Internal Single-Start Thread Connection Carrying Triangular Inserts (16-32 dia.)



Designation	DCN(1)	DCX(2)	LF	OAL	PL	DCONMS	THID(3)
DSD-IF 16.01-16.50-FT	16.00	16.50	53.50	55.70	2.20	12.70	TS-O_3
DSD-IF 16.51-17.25-FT	16.51	17.25	53.50	55.70	2.20	13.40	TS-O4
DSD-IF 17.26-18.00-FT	17.26	18.00	53.50	55.70	2.20	13.70	TS-O5
DSD-IF 18.01-19.00-FT	18.01	19.00	53.50	56.50	3.00	14.40	TS-O6
DSD-IF 19.01-19.99-FT	19.01	19.99	53.50	56.70	3.20	15.40	TS-O7
DSD-IF 20.00-21.99-FT	20.00	21.99	58.00	61.20	3.20	16.50	TS-O8
DSD-IF 22.00-24.99-FT	22.00	24.99	60.00	63.40	3.40	19.00	TS-O9
DSD-IF 25.00-26.99-FT	25.00	26.99	65.00	68.60	3.60	20.00	TS-10
DSD-IF 27.00-28.00-FT	27.00	28.00	65.00	68.60	3.60	22.00	TS-11
DSD-IF 28.01-29.99-FT	28.01	29.99	75.00	79.57	4.57	22.00	TS-12
DSD-IF 30.00-31.99-FT	30.00	31.99	75.00	79.57	4.57	24.00	TS-13
DSD-IF 32.00-FT	32.00	32.00	75.00	79.57	4.57	26.00	TS-14

• Note: Each item in the attached catalog page represents a diameter range • For spare parts, insert information and user guide, see pages 196-200 • Inserts and guide pads should be ordered separately • Ordering example: DSD-IF 18.50-FT

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Tube designation

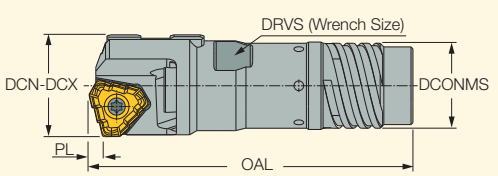
For inserts, see pages: TOGT-DT (194) • TOGT-GF (194)

For holders, see pages: TS-O** (265)

TRIDEEP DEEP DRILLING

DDD-EF-FT

Deep Double Tube Drills with External 4-Start Thread Connection Carrying Triangular Inserts (18.4-28 dia.)



Designation	DCN(1)	DCX(2)	PL	OAL	DCONMS	THOD(3)	THID(4)
DDD-EF 18.40-20.00-FT	18.41	20.00	3.00	64.00	16.00	TDO-I0	TDI-N0
DDD-EF 20.01-21.80-FT	20.01	21.80	3.20	66.70	18.00	TDO-I1	TDI-N1
DDD-EF 21.81-21.99-FT	21.81	21.99	3.20	66.70	19.50	TDO-I2	TDI-N2
DDD-EF 22.00-24.10-FT	22.00	24.10	3.40	68.90	19.50	TDO-I2	TDI-N2
DDD-EF 24.11-25.00-FT	24.11	25.00	3.40	68.90	21.00	TDO-I3	TDI-N3
DDD-EF 25.01-26.40-FT	25.01	26.40	3.60	71.10	21.00	TDO-I3	TDI-N3
DDD-EF 26.01-28.00-FT	26.41	28.00	3.60	74.10	23.50	TDO-I4	TDI-N4

• Note: Each item in the attached catalog page represents a diameter range. • For spare parts, insert information and user guide, see pages 196-200 • Inserts and guide pads should be ordered separately • Ordering example: DDD-EF 18.50-FT

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Outer tube designation

(4) Inner tube designation

For inserts, see pages: TOGT-DT (194) • TOGT-GF (194)

For holders, see pages: TDO-I (D18.41-65.00) (266)

Universal Marking for Deep Drilling Tools

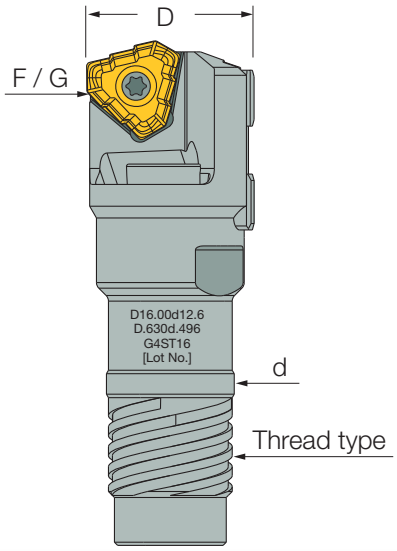
D- **Tool diameter**
Metric- D16.00
Inch- D.630

d- Pilot diameter
Metric- d12.6
Inch- d.496

Tool style
F- Fixed pocket 3-5 cutting edges
G- Fixed pocket single cutting edge

Thread type
4ST- Four-start thread single tube
1ST- Single-start thread single tube
4DT- Four-start thread double tube

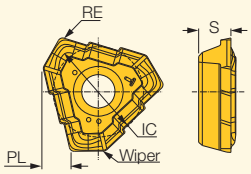
16- Tube diameter

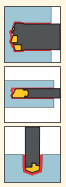


TRIDEEP DEEP DRILLING

TOGT-DT

Deep Drilling Inserts with 3 Chip Splitting Cutting Edges, a Positive Rake Chipbreaker and a Wiper





Designation	Dimensions IC	RE	PL	S	Fig.	IC908
TOGT 070304-DT	7.69	0.40	1.95	2.30	1	●
TOGT 080305-DT	8.55	0.50	2.20	2.80	1	●
TOGT 090305-DT	8.32	0.50	3.00	3.00	2	●
TOGT 100305-DT	9.23	0.50	3.20	3.30	2	●
TOGT 110405-DT	10.40	0.50	3.40	3.80	2	●
TOGT 120405-DT	11.59	0.50	3.60	4.30	2	●
TOGT 130408-DT	12.85	0.80	4.57	4.76	2	●
TOGT 140510-DT	16.85	1.00	5.43	5.26	2	●

For tools, see pages: DDD-EF-FT (193) • DSD-EF-FT (192) • DSD-IF-FT (192) • GD-DH (285) • GDH-MKT (287)

TRIDEEP DEEP DRILLING

TOGT-GF

Deep Drilling Inserts with 3 Chip Splitting Cutting Edges, a Positive Rake Chipbreaker and a Wiper

Fig. 1

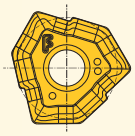
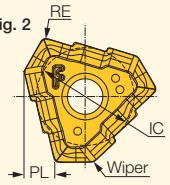
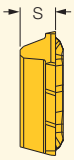
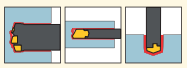


Fig. 2



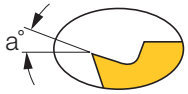




Designation	Dimensions IC	RE	PL	S	Fig.	IC908
TOGT 070304-GF	7.69	0.40	1.95	2.30	1	●
TOGT 080305-GF	8.55	0.50	2.20	2.80	1	●
TOGT 090305-GF	8.32	0.50	3.00	3.00	2	●
TOGT 100305-GF	9.23	0.50	3.20	3.30	2	●
TOGT 110405-GF	10.40	0.50	3.40	3.80	2	●
TOGT 120405-GF	11.59	0.50	3.60	4.30	2	●
TOGT 130408-GF	12.85	0.80	4.57	4.76	2	●

For tools, see pages: DDD-EF-FT (193) • DSD-EF-FT (192) • DSD-IF-FT (192) • GD-DH (285) • GDH-MKT (287)

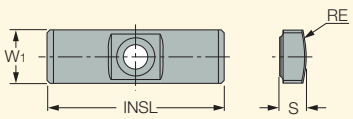
Chipbreaker Appearances

		GF	DT
1	Rake angle 	a°=25°	a°=20°
2	ID mark 	F 	T 

TRIDEEP DEEP DRILLING

GPS

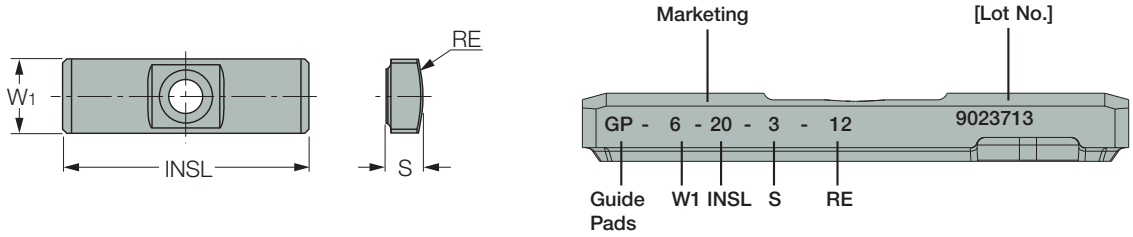
Deep Drilling Solid Carbide Guide Pads



Designation	Dimensions W1	INSL	S	RE	Tough ↔ Hard IC928	IC950	IC908
GPS-04-16-055-DC	4.0	16.00	2.00	5.50	•		•
GPS-05-18-060-DC	5.0	18.00	2.50	6.00	•		•
GPS-05-18-075-DC	5.0	18.00	2.50	7.50	•		•
GPS-06-20-075-DC	6.0	20.00	3.00	7.50			•
GPS-06-20-075	6.0	20.00	3.00	7.50		•	
GPS-06-20-085-DC	6.0	20.00	3.00	8.50	•		•
GPS-06-20-085	6.0	20.00	3.00	8.50		•	
GPS-06-20-100-DC	6.0	20.00	3.00	10.00	•		•
GPS-06-20-100	6.0	20.00	3.00	10.00		•	
GPS-06-20-120-DC	6.0	20.00	3.00	12.00	•		•
GPS-06-20-120	6.0	20.00	3.00	12.00		•	
GPS-07-20-120-DC	7.0	20.00	3.50	12.00	•		•
GPS-07-20-120	7.0	20.00	3.50	12.00		•	
GPS-08-25-155-DC	8.0	25.00	4.50	15.50	•		•
GPS-08-25-155	8.0	25.00	4.50	15.50		•	
GPS-10-30-200-DC	10.0	30.00	4.50	20.00	•		•
GPS-10-30-200	10.0	30.00	4.50	20.00		•	
GPS-10-35-200-DC	10.0	35.00	6.00	20.00	•		•
GPS-10-35-200	10.0	35.00	6.00	20.00		•	
GPS-12-35-250-DC	12.0	35.00	5.50	25.00	•		•
GPS-12-35-250	12.0	35.00	5.50	25.00		•	
GPS-14-40-250-DC	14.0	40.00	7.50	25.00	•		•
GPS-14-40-250	14.0	40.00	7.50	25.00		•	
GPS-18-40-300-DC	18.0	40.00	9.00	30.00	•		•

• DC- Double Chamfer

Universal Marking for Deep Drilling Tools



Guide Pad Grade Recommendation

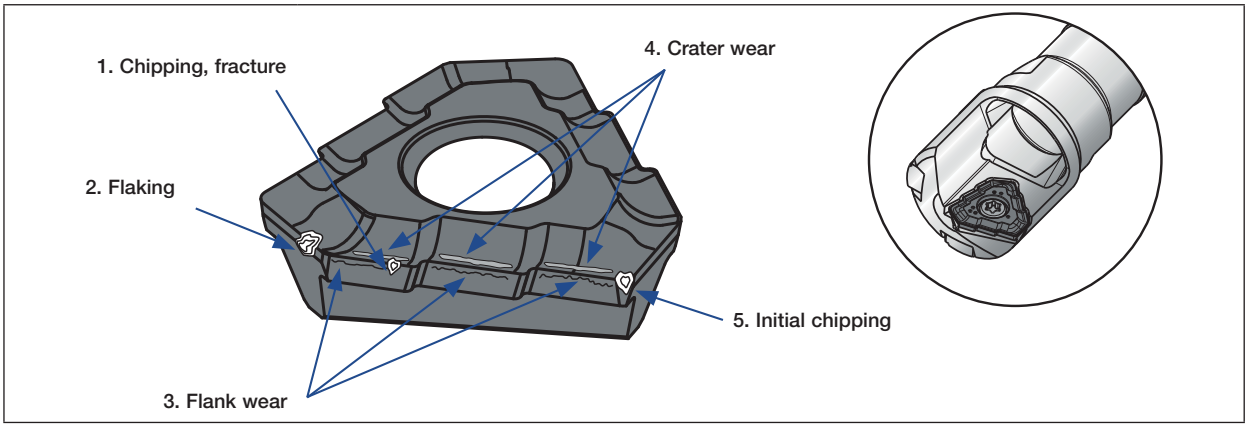
	Oil Coolant			Water Based Coolant		
Priority	1	2	3	1	2	3
ISO-P	IC950	IC908	IC928	IC928	IC908	-
ISO-K	IC950	IC908	IC928	IC928	IC908	-
ISO-M	IC928	IC908	IC950	IC928	IC908	-
ISO-S	IC928	IC908	IC950	IC928	IC908	-

Spare Parts

Diameter Range	Insert	Insert Clamping Screw	Key	N*m	Solid Carbide Guide Pad	Guide Pad Clamping Screw	Key
14.00-15.99	TOGT 070304-DT/GF	SR 14-560/S	T-8	1.2	GPS-05-18-060-DC	SR 34-508	T-7
16.00-18.00	TOGT 080305-DT/GF	SR 14-560/S	T-8	1.2	GPS-06-20-075-DC		
18.01-20.00	TOGT 090305-DT/GF	SR 14-560/S	T-8	1.2	GPS-06-20-085-DC		
20.01-20.99	TOGT 100305-DT/GF	SR 34-506	T-9	2.0	GPS-06-20-085-DC		
21.00-21.99	TOGT 100305-DT/GF				GPS-06-20-100-DC		
22.00-25.00	TOGT 110405-DT/GF	SR 14-571/S	T-15	4.8	GPS-06-20-100-DC		
25.01-28.00	TOGT 120405-DT/GF	SR 14-506	T-15	4.8	GPS-06-20-120-DC		
28.01-29.99	TOGT 130408-DT/GF	SR 16-212/L10	T20/5	10	GPS-06-20-120-DC	SR 34-508	T-7/5
30.00-32.00	TOGT 130408-DT/GF				GPS-07-20-120-DC	SR11201753-4	T-9/5
32.01-39.01	TOGT 140510-DT/GF				GPS-07-20-120-DC		
39.01-40.00	TOGT 140510-DT/GF				GPS-08-25-155-DC		

Troubleshooting for Insert Damage

Examples of trouble with the cutting edge



Problem	Cause	Solution	
		Grade	Cutting conditions / other
1. Chipping, fracture	• Excessive vibration or impact • Torn away built-up edge	• Use a tough grade	• Reduce the feed rate • Eliminate the vibration
2. Flaking	• Excessive vibration or impact	• Use a tough grade	• Reduce the feed rate • Eliminate the vibration
3. Flank wear	• Cutting speed too high • Inadequate tool toughness	• Use a grade with high wear resistance • Use a coated grade	• Reduce the cutting speed • Reduce the feed rate • Use coolant properly
4. Crater wear	• Cutting speed too high • Feed rate too high • Inadequate tool toughness	• Use a grade with high wear resistance • Use a coated grade	• Reduce the cutting speed • Reduce the feed rate • Use coolant properly
5. Initial chipping	• Inappropriate guide bush or pilot hole • Misalignment	• Use a tough grade	• Adjust or change the guide bushing or pilot hole • Reduce the feed rate • Correct the misalignment

Machining Recommendations for TRIDEEP BTA Drilling Heads

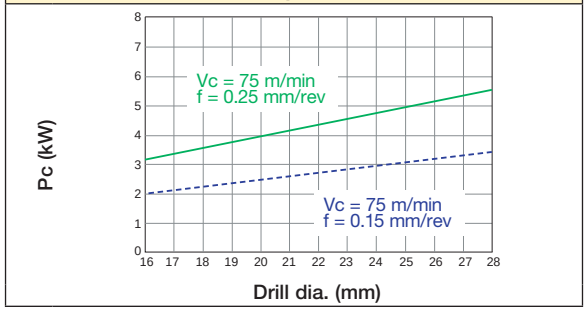
ISO	Material		Condition	Tensile Strength [N/mm²]	Material Group No. (1)	Hardness (HB)	Chipbreaker	Cutting speed V_c (m/min)	Feed : f (mm/rev) Drill dia. (mm) Ø16-18	Ø18.01-40
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	1	125	GF	50-100	0.03-0.10	0.03-0.10
							DT	80-140	0.05-0.10	0.05-0.10
		>= 0.25 %C	Annealed	650	2	190	GF	50-100	0.03-0.10	0.03-0.10
							DT	80-140	0.05-0.10	0.05-0.10
		< 0.55 %C	Quenched and tempered	850	3	250	GF	50-100	0.03-0.10	0.03-0.12
							DT	80-140	0.05-0.16	0.05-0.20
		>= 0.55 %C	Annealed	750	4	220	GF	50-100	0.03-0.10	0.03-0.12
							DT	80-140	0.05-0.16	0.05-0.20
			Quenched and tempered	1000	5	300	GF	50-100	0.03-0.10	0.03-0.12
							DT	80-140	0.05-0.16	0.05-0.20
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	6	200	GF	50-100	0.03-0.10	0.03-0.10
							DT	80-140	0.05-0.10	0.05-0.10
			Quenched and tempered	930	7	275	GF	50-100	0.03-0.10	0.03-0.10
							DT	80-140	0.05-0.10	0.05-0.10
				1000	8	300	GF	50-100	0.03-0.10	0.03-0.10
							DT	80-140	0.05-0.10	0.05-0.10
				1200	9	350	GF	50-100	0.03-0.10	0.03-0.10
							DT	80-140	0.05-0.10	0.05-0.10
	High alloyed steel, cast steel and tool steel		Annealed	680	10	200	GF	50-100	0.03-0.10	0.03-0.12
							DT	80-120	0.05-0.16	0.05-0.20
			Quenched and tempered	1100	11	325	GF	50-100	0.03-0.10	0.03-0.12
							DT	80-120	0.05-0.16	0.05-0.20
	Stainless steel and cast steel		Ferritic/martensitic	680	12	200	GF	50-100	0.03-0.06	0.03-0.06
							DT	60-100	0.05-0.10	0.05-0.10
			Martensitic	820	13	240	GF	50-100	0.03-0.06	0.03-0.06
							DT	60-100	0.05-0.10	0.05-0.10
M	Stainless steel and cast steel		Austenitic, duplex	600	14	180	GF	50-100	0.03-0.06	0.03-0.06
							DT	60-100	0.05-0.10	0.05-0.10
K	Grey cast iron (GG)		Ferritic/pearlitic		15	180	GF	50-100	0.03-0.15	0.05-0.18
							DT	80-140	0.05-0.25	0.05-0.3
			Pearlitic/martensitic		16	260	GF	50-100	0.03-0.15	0.05-0.18
							DT	80-140	0.05-0.25	0.05-0.3
	Nodular cast iron (GGG)		Ferritic		17	160	GF	50-100	0.03-0.15	0.05-0.18
							DT	80-140	0.05-0.25	0.05-0.3
			Pearlitic		18	250	GF	50-100	0.03-0.15	0.05-0.18
							DT	80-140	0.05-0.25	0.05-0.3
	Malleable cast iron		Ferritic		19	130	GF	50-100	0.03-0.15	0.05-0.18
							DT	80-140	0.05-0.25	0.05-0.3
			Pearlitic		20	230	GF	50-100	0.03-0.15	0.05-0.18
							DT	80-140	0.05-0.25	0.05-0.3
N	Aluminum-wrought alloys		Not hardenable		21	60	GF	80-160	0.03-0.15	0.03-0.015
							DT	100-200	0.05-0.20	0.05-0.20
			Hardenable		22	100	GF	80-160	0.03-0.15	0.03-0.015
							DT	100-200	0.05-0.20	0.05-0.20
	Aluminum-cast alloys	≤ 12% Si	Not hardenable		23	75	GF	80-160	0.03-0.15	0.03-0.015
							DT	100-200	0.05-0.20	0.05-0.20
			Hardenable		24	90	GF	80-160	0.03-0.15	0.03-0.015
							DT	100-200	0.05-0.20	0.05-0.20
		>12% Si	High temperature		25	130	GF	80-160	0.03-0.15	0.03-0.015
							DT	100-200	0.05-0.20	0.05-0.20
	Copper alloys	>1% Pb	Free cutting		26	110	GF	80-160	0.03-0.15	0.03-0.015
							DT	100-200	0.05-0.20	0.05-0.20
			Brass		27	90	GF	80-160	0.03-0.15	0.03-0.015
							DT	100-200	0.05-0.20	0.05-0.20
			Electrolitic copper		28	100	GF	80-160	0.03-0.15	0.03-0.015
							DT	100-200	0.05-0.20	0.05-0.20
S	High temp. alloys	Fe base	Annealed		31	200	GF	50-100	0.03-0.06	0.03-0.06
							DT	60-100	0.05-0.10	0.05-0.10
			Hardened		32	280	GF	50-100	0.03-0.06	0.03-0.06
							DT	60-100	0.05-0.10	0.05-0.10
		Ni / Co base	Annealed		33	250	GF	20-50	0.03-0.06	0.03-0.08
							DT	20-50	0.04-0.08	0.04-0.10
			Hardened		34	350	GF	20-50	0.03-0.06	0.03-0.08
							DT	20-50	0.04-0.08	0.04-0.10
			Cast		35	320	GF	20-50	0.03-0.06	0.03-0.08
							DT	20-50	0.04-0.08	0.04-0.10
	Titanium alloys		Pure	400	36		GF	30-60	0.03-0.10	0.03-0.12
							DT	30-60	0.05-0.13	0.05-0.15
			Alpha+beta alloys hardened	1050	37		GF	30-60	0.03-0.10	0.03-0.12
							DT	30-60	0.05-0.13	0.05-0.15
H	Hardened steel	≥ 40HRC	Hardened		38		GF	40-100	0.03-0.08	0.03-0.08
							DT	50-100	0.04-0.08	0.04-0.10

(1) For material groups see pages 495-524

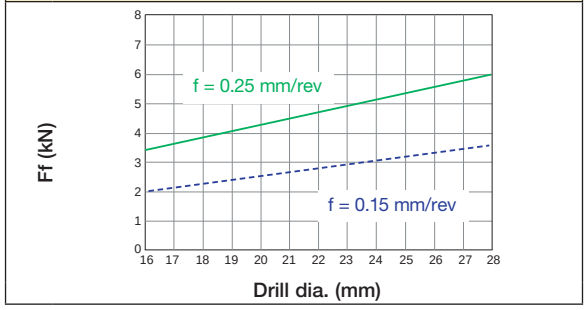
Technical Guide

STS - Machine setting for single tube system

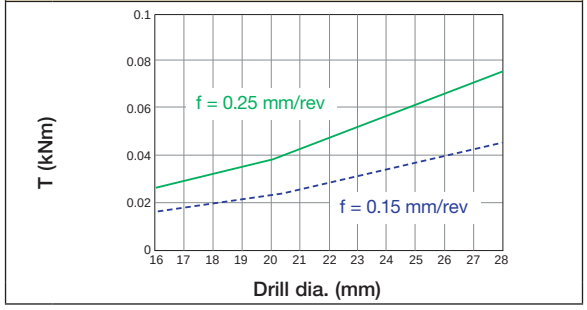
Net power



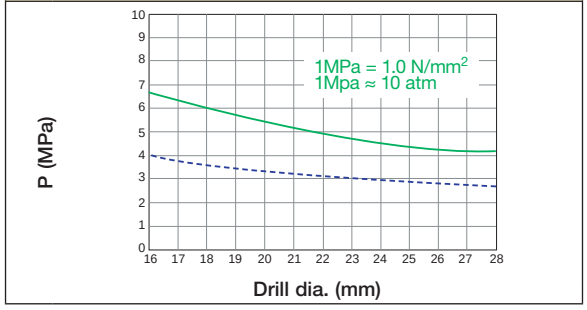
Feed force



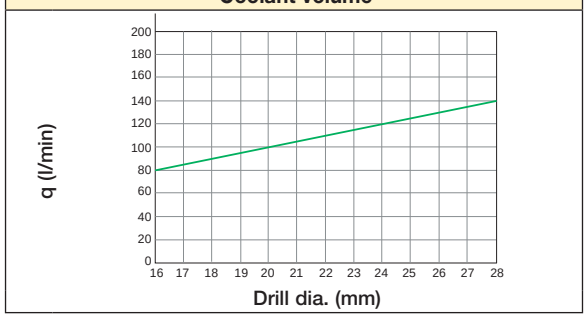
Torque



Coolant pressure

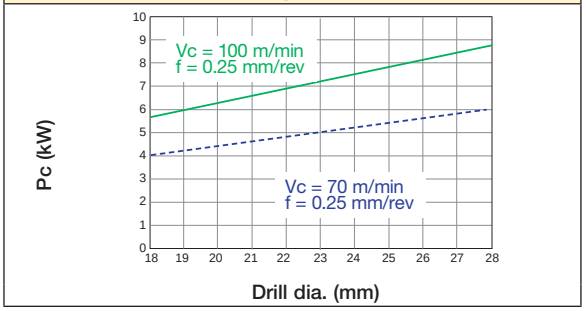


Coolant volume

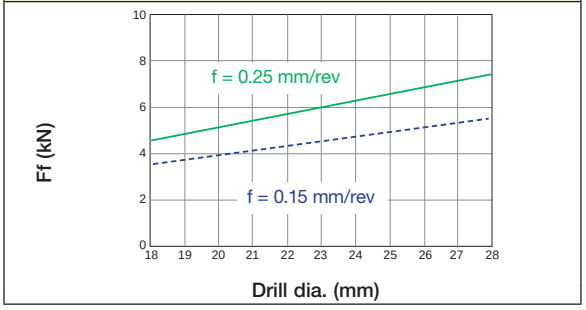


DTS - Machine setting for double tube system

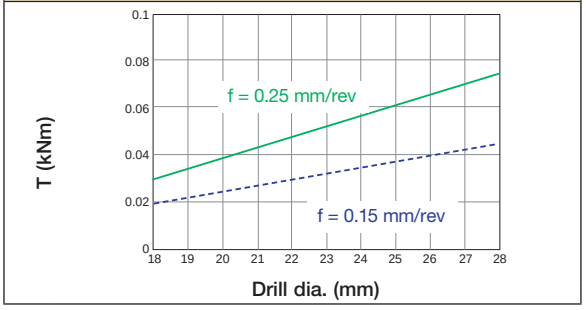
Net power



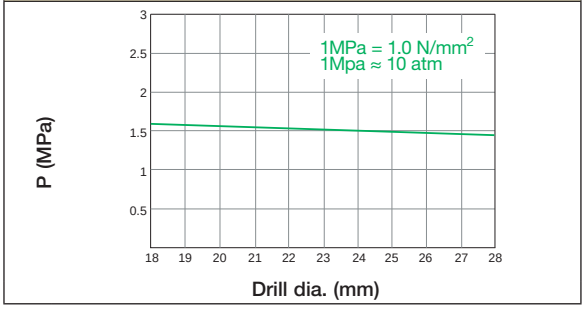
Feed force



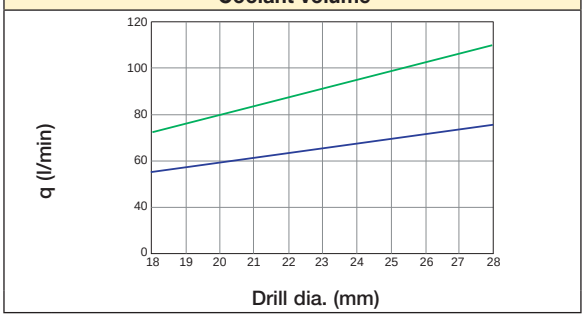
Torque



Coolant pressure



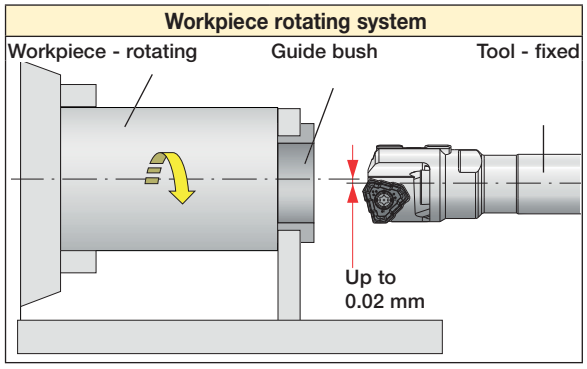
Coolant volume



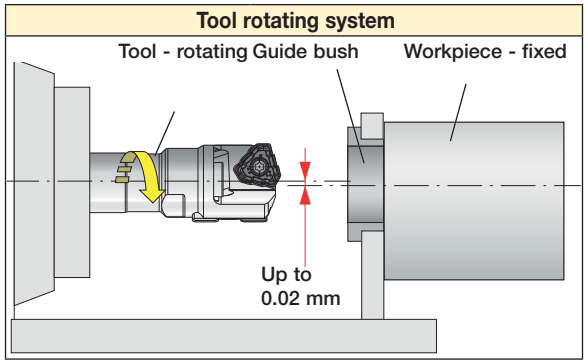
The above values should not be used as the exact recommendations.
They may need modification depending on the machining conditions, materials, etc.

Machine Setup

STS and DTS



- Only used when the workpiece and the tool axis are on the same line.
- Better hole straightness and wear resistance on guide bush are provided compared to the tool rotating system.
- Keep the alignment between guide bush and spindle within 0.02 mm.

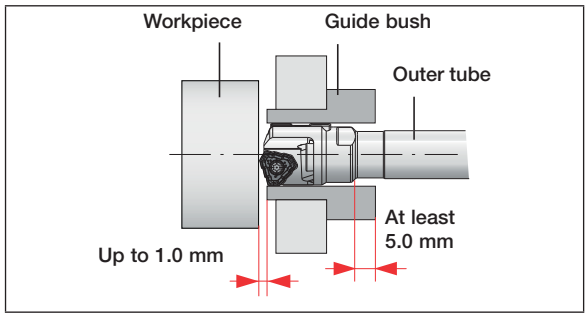


- Can be used when the workpiece and the tool axis are not on the same line.
- Keep the alignment between guide bush and spindle within 0.02 mm.

DTS

Positioning of outer tube and guide bush
Be sure to set the outer tube more than 5.0 mm into the guide bush to properly supply the coolant.

Positioning of workpiece material and guide bush
Sealing is not required for DTS because of the vacuum effect, but keep the gap between workpiece material and guide bush within 1.0 mm.



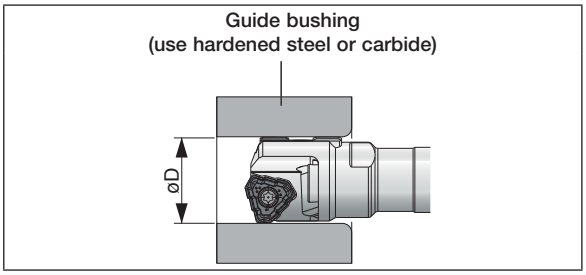
Guide bush

Tolerance
Guide bush tolerance should be G6 in order to keep consistent tool life and cutting accuracy. Diameters for G6 tolerance are shown on the right.

øD (mm)	G6 tolerance (mm)
16.00 - 18.00	+0.006 - +0.017
18.01 - 30.00	+0.007 - +0.020
30.01 - 40.00	+0.009 - +0.025

Material

Guide bush material	System	Advantage
Hardened steel	Workpiece rotating	Cost efficient (inexpensive)
Tungsten carbide	Tool rotating Workpiece rotating	Long life guide bush



Coolant

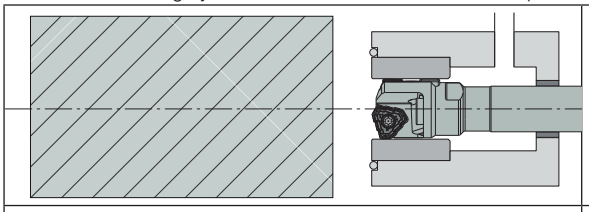
Temperature
The proper coolant temperature is 30 - 40°C (90 - 100°F). If the temperature exceeds this range, the coolant will deteriorate easily and may shorten tool life and generate poor surface finish.

Filtration
The coolant must be filtered properly in order to protect guide pads and workpiece surface.

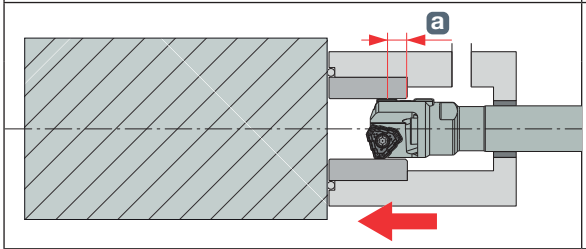
Water-soluble type
Around 10% (dilution rate 1/10) is recommended for the concentration of water-soluble coolant in order to protect guide pads.

CNC Drilling Cycle Operations

Use the CNC drilling cycle as instructed below in order to optimize the tool performance safely.

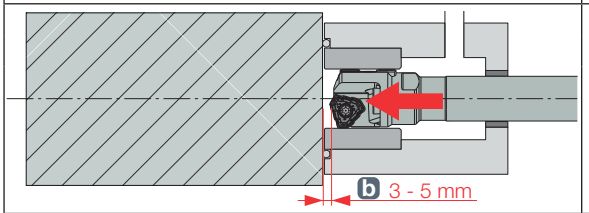


1. Start the CNC cycle operation



2. Move the oil pressure head and securely seal onto the face of the workpiece.

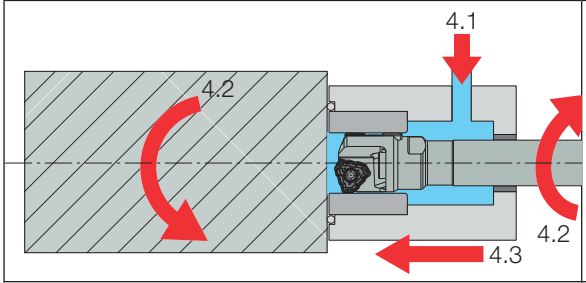
a Make sure to position the drill so that the guide pads remain inside the guide bushing when the pressure head is moved towards the workpiece face.



3. Move the BTA drill toward the workpiece

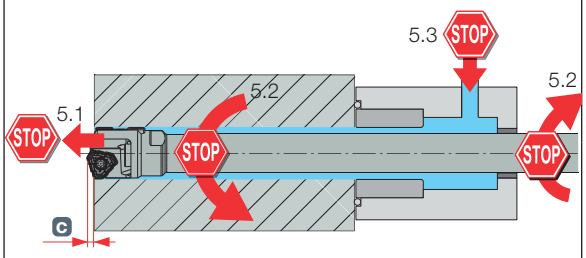
b Keep the drill 3 - 5 mm* off the face of the workpiece.

* If the machine allows this drill setting in Step 1, move on to Step 4.



4. Start the cutting

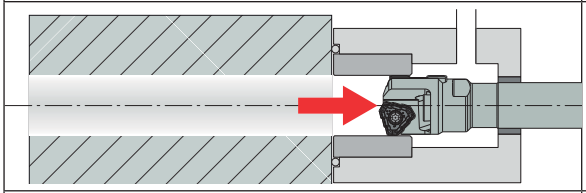
4.1 Activate the coolant supply.
4.2 Start the rotation (of the drill, the workpiece, or the drill+workpiece).
4.3 Start the drill feed.



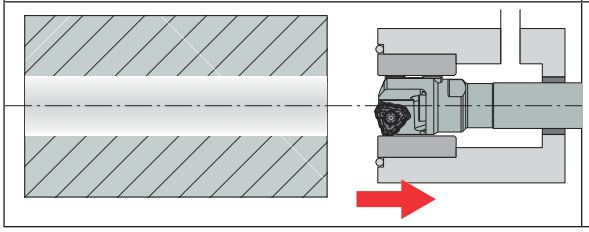
5. Stop the cutting

5.1 Stop the drill feed.
5.2 Stop the rotation.
5.3 Stop the coolant supply.

c Stop the cutting when the drill shoulder is completely through the end face of the workpiece.



6. Return the drill to the starting point

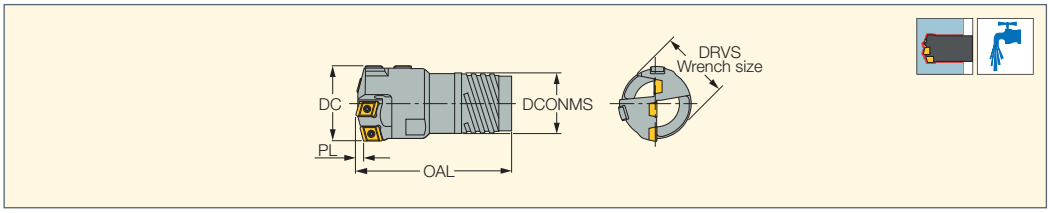


7. Return the oil pressure head to the starting point

FINEBEAM

DSD-EF-FB

Deep Single Tube Drills with External 4-Start Thread Connection for High Feed (25-89 dia.)



Designation	DCN(1)	DCX(2)	OAL	PL	DCONMS	DRVS(3)	Ts(4)
DSD-EF 25.00-26.40-FB	25.00	26.40	70.00	3.00	19.50	19.0	TS-I6
DSD-EF 26.41-28.70-FB	26.41	28.70	70.00	3.00	21.00	21.0	TS-I7
DSD-EF 28.71-31.00-FB	28.71	31.00	75.00	3.00	23.50	24.0	TS-I8
DSD-EF 31.01-33.30-FB	31.01	33.30	78.00	3.00	25.50	26.0	TS-I9
DSD-EF 33.31-36.20-FB	33.31	36.20	80.00	3.00	28.00	28.0	TS-I10
DSD-EF 36.21-39.60-FB	36.21	39.60	90.00	3.00	30.00	30.0	TS-I11
DSD-EF 39.61-43.00-FB	39.61	43.00	95.00	4.00	33.00	32.0	TS-I12
DSD-EF 43.01-47.00-FB	43.01	47.00	100.00	4.00	36.00	36.0	TS-I13
DSD-EF 47.01-51.70-FB	47.01	51.70	100.00	4.00	39.00	38.0	TS-I14
DSD-EF 51.71-56.20-FB	51.71	56.20	110.00	4.00	43.00	46.0	TS-I15
DSD-EF 56.21-60.60-FB	56.21	60.60	115.00	5.00	47.00	50.0	TS-I16
DSD-EF 60.61-65.00-FB	60.61	65.00	115.00	5.00	51.00	54.0	TS-I17
DSD-EF 65.01-66.99-FB	65.01	66.99	149.00	8.00	52.00	63.0	TS-I18
DSD-EF 67.00-72.99-FB	67.00	72.99	149.00	8.00	58.00	69.0	TS-I19
DSD-EF 73.00-79.99-FB	73.00	79.99	150.00	9.00	63.00	76.0	TS-I20
DSD-EF 80.00-86.99-FB	80.00	86.99	173.00	9.00	70.00	83.0	TS-I21
DSD-EF 87.00-89.00-FB	87.00	89.00	173.00	9.00	77.00	86.0	TS-I22

• For spare parts and insert information, see page 206 • For user guide and quotation form, see pages 207-208, 279-280 • Inserts and guide pads should be ordered separately • Ordering example: DSD-EF 43.10-FB

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Torque key size

(4) Tube designation

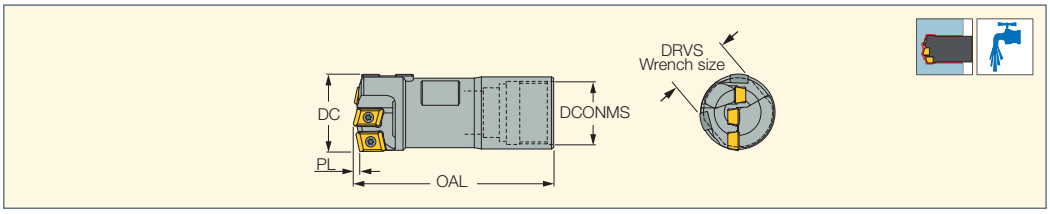
For inserts, see pages: NPHT (203) • NPMT (204)

For holders, see pages: TS-I** (264)

FINEBEAM

DSD-IF-FB

Deep Single Tube Drills with Internal Single-Start Thread Connection (25-89 dia.)



Designation	DCN(1)	DCX(2)	OAL	PL	DCONMS	Ts(3)
DSD-IF 25.00-26.99-FB	25.00	26.99	70.00	3.00	20.00	TS-010
DSD-IF 27.00-29.00-FB	27.00	29.00	70.00	3.00	22.00	TS-011
DSD-IF 29.01-29.99-FB	29.01	29.99	70.00	3.00	22.00	TS-011
DSD-IF 30.00-31.99-FB	30.00	31.99	75.00	3.00	24.00	TS-012
DSD-IF 32.00-33.99-FB	32.00	33.99	75.00	3.00	26.00	TS-013
DSD-IF 34.00-36.99-FB	34.00	36.99	90.00	3.00	27.00	TS-014
DSD-IF 37.00-39.99-FB	37.00	39.99	95.00	3.00	30.00	TS-015
DSD-IF 40.00-43.99-FB	40.00	43.99	100.00	4.00	33.00	TS-016
DSD-IF 44.00-46.99-FB	44.00	46.99	105.00	4.00	37.00	TS-017
DSD-IF 47.00-51.99-FB	47.00	51.99	105.00	4.00	41.00	TS-018
DSD-IF 52.00-56.99-FB	52.00	56.99	110.00	4.00	44.00	TS-019
DSD-IF 57.00-60.99-FB	57.00	60.99	115.00	5.00	49.00	TS-020
DSD-IF 61.00-65.00-FB	61.00	65.00	115.00	5.00	53.00	TS-021
DSD-IF 65.01-67.99-FB	65.01	67.99	112.00	8.00	53.00	TS-021
DSD-IF 68.00-74.99-FB	68.00	74.99	113.00	9.00	59.00	TS-022
DSD-IF 75.00-80.99-FB	75.00	80.99	143.00	9.00	65.00	TS-023
DSD-IF 81.00-89.00-FB	81.00	89.00	143.00	9.00	71.00	TS-024

• For spare parts and insert information, see page 206 • For user guide and quotation form, see pages 207-208, 279-280 • Inserts and guide pads should be ordered separately • Ordering example: DSD-IF 43.10-FB

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Tube designation

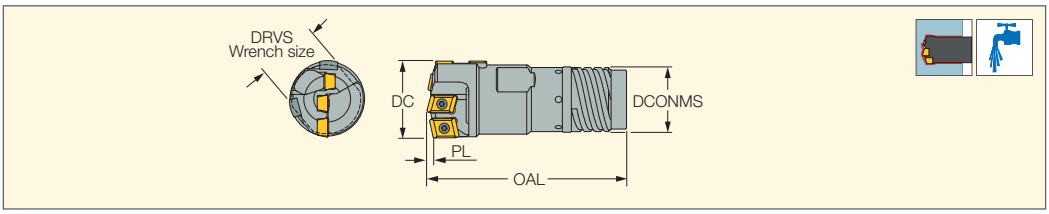
For inserts, see pages: NPHT (203) • NPMT (204)

For holders, see pages: TS-O** (265)

FINEBEAM

DDD-EF-FB

Deep Double Tube Drills with External 4-Start Thread Connection for High Feed (25-65 dia.)



Designation	DCN(1)	DCX(2)	OAL	PL	DCONMS	DRVS(3)	Ts(4)	Tsi(5)
DDD-EF 25.00-26.40-FB	25.00	26.40	70.00	3.00	21.00	19.0	TDO-I3	TDI-N3
DDD-EF 26.41-28.70-FB	26.41	28.70	75.00	3.00	23.50	21.0	TDO-I4	TDI-N4
DDD-EF 28.71-31.00-FB	28.71	31.00	75.00	3.00	25.50	24.0	TDO-I5	TDI-N5
DDD-EF 31.01-33.30-FB	31.01	33.30	80.00	3.00	28.00	26.0	TDO-I6	TDI-N6
DDD-EF 33.31-36.20-FB	33.31	36.20	90.00	3.00	30.00	28.0	TDO-I7	TDI-N7
DDD-EF 36.21-39.60-FB	36.21	39.60	95.00	4.00	33.00	30.0	TDO-I8	TDI-N8
DDD-EF 39.61-43.00-FB	39.61	43.00	100.00	4.00	36.00	32.0	TDO-I9	TDI-N9
DDD-EF 43.01-47.00-FB	43.01	47.00	100.00	4.00	39.00	36.0	TDO-I10	TDI-N10
DDD-EF 47.01-51.70-FB	47.01	51.70	110.00	4.00	43.00	38.0	TDO-I11	TDI-N11
DDD-EF 51.71-56.20-FB	51.71	56.20	115.00	5.00	47.00	46.0	TDO-I12	TDI-N12
DDD-EF 56.21-60.60-FB	56.21	60.60	115.00	5.00	51.00	50.0	TDO-I13	TDI-N13
DDD-EF 60.61-65.00-FB	60.61	65.00	115.00	5.00	51.00	54.0	TDO-I13	TDI-N13

• For spare parts and insert information, see page 206 • For user guide and quotation form see pages 207-208, 279-280 • Inserts and guide pads should be ordered separately • Ordering example: DDD-EF 43.00-FB

(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Torque key size
(4) Outer tube designation
(5) Inner tube designation

For inserts, see pages: NPHT (203) • NPMT (204)
For holders, see pages: TDO-I (D18.41-65.00) (266)

Universal Marking for Deep Drilling Tools

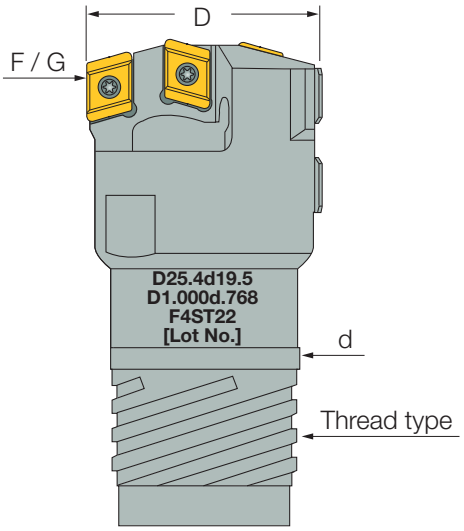
D- Tool diameter
Metric- D25.4
Inch- D1.000

d- Pilot diameter
Metric- d19.5
Inch- d.768

Tool style
F- Fixed pocket 3-5 cutting edge
G- Fixed pocket single cutting edge

Thread type
4ST- Four-start thread single tube
1ST- Single-start thread single tube
4DT- Four-start thread double tube

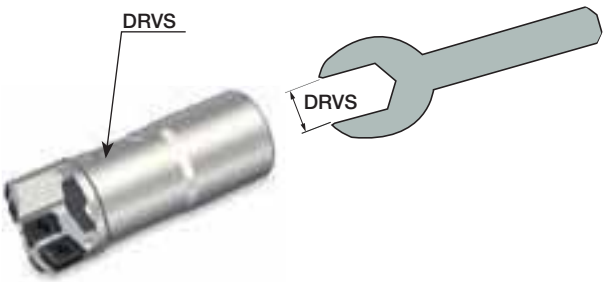
22- Tube diameter



Wrench Size

Diameter Dc (mm)	Wrench size DRVS (mm)
25.00 -26.40	19
26.41 -28.70	21
28.71 -31.00	24
31.01 -33.30	26
33.31 -36.20	28
36.21 -39.60	30
39.61 -43.00	32
43.01 -47.00	36
47.01 -51.70	38
51.71 -56.20	46
56.21 -60.60	50
60.61 -65.00	54
65.01 -67.99	64
68.00 -74.99	71
75.00 -80.99	77
81.00 -89.00	86

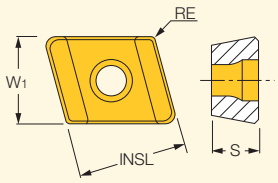
For diameter DC range larger than 65mm use hook spanner



FINEBEAM

NPHT

Peripheral Precision Inserts
for Drilling Heads DSD-EF-FB
/ DDD-EF-FB / DSD-IF-FB



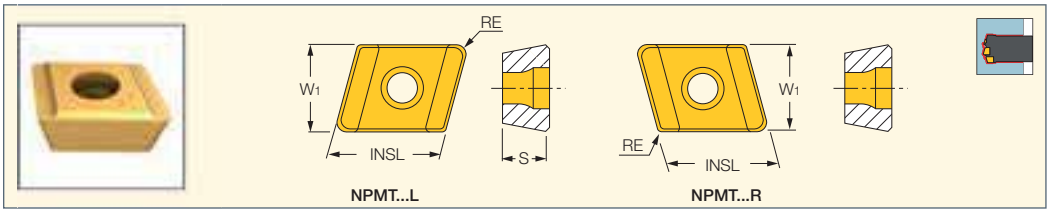
Designation	Dimensions				Tough ↔ Hard		
	W1	INSL	S	RE	IC908	IC520	IC806
NPHT 060304R-G-P	6.00	8.00	3.00	0.40	●	●	
NPHT 070404R-G-P	7.50	10.00	4.00	0.40	●	●	
NPHT 090404R-G-P	9.00	10.00	4.00	0.40	●	●	
NPHT 110404R-G-P	11.00	10.00	4.00	0.40	●	●	
NPHT 130404R-G-P	13.00	10.00	4.00	0.40	●	●	
NPHT 060308R-G-P	6.00	8.00	3.00	0.80	●		●
NPHT 070408R-G-P	7.50	10.00	4.00	0.80	●		●
NPHT 090408R-G-P	9.00	10.00	4.00	0.80	●		●
NPHT 110408R-G-P	11.00	10.00	4.00	0.80	●		●
NPHT 130408R-G-P	13.00	10.00	4.00	0.80	●		●
NPHT 060308R-HF-P	6.00	8.00	3.00	0.80	●		●
NPHT 070408R-HF-P	7.50	10.00	4.00	0.80	●		●
NPHT 090408R-HF-P	9.00	10.00	4.00	0.80	●		●
NPHT 110408R-HF-P	11.00	10.00	4.00	0.80	●		●
NPHT 130408R-HF-P	13.00	10.00	4.00	0.80	●		●

For tools, see pages: DDD-EF-FB (202) • DSD-EF-FB (201) • DSD-IF-FB (201)

FINEBEAM

NPMT

Internal and Central Inserts for Drilling Heads DSD-EF-FB / DDD-EF-FB



Designation	Dimensions W1	INSL	S	RE	Tough ↔ Hard IC9025	IC908	IC520	IC806
NPMT 050304R-G-I	5.50	8.00	3.00	0.40		●	●	●
NPMT 060404R-G-I	6.50	10.00	4.00	0.40	●	●	●	●
NPMT 080404R-G-I	8.00	10.00	4.00	0.40	●	●	●	●
NPMT 090404R-G-I	9.50	10.00	4.00	0.40	●	●	●	●
NPMT 120404R-G-I	12.50	10.00	4.00	0.40	●	●	●	●
NPMT 050304R-HF-I	5.50	8.00	3.00	0.40		●		●
NPMT 060404R-HF-I	6.50	10.00	4.00	0.40		●		●
NPMT 080404R-HF-I	8.00	10.00	4.00	0.40		●		●
NPMT 090404R-HF-I	9.50	10.00	4.00	0.40		●		●
NPMT 120404R-HF-I	12.50	10.00	4.00	0.40		●		●
NPMT 050308L-G-C	5.50	8.00	3.00	0.80		●	●	●
NPMT 060408L-G-C	6.50	10.00	4.00	0.80	●	●	●	●
NPMT 080408L-G-C	8.00	10.00	4.00	0.80	●	●	●	●
NPMT 090408L-G-C	9.50	10.00	4.00	0.80	●	●	●	●
NPMT 120408L-G-C	12.50	10.00	4.00	0.80	●	●	●	●
NPMT 050308L-HF-C	5.50	8.00	3.00	0.80		●		●
NPMT 060408L-HF-C	6.50	10.00	4.00	0.80		●		●
NPMT 080408L-HF-C	8.00	10.00	4.00	0.80		●		●
NPMT 090408L-HF-C	9.50	10.00	4.00	0.80		●		●
NPMT 120408L-HF-C	12.50	10.00	4.00	0.80		●		●

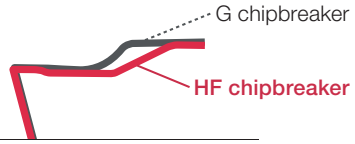
For tools, see pages: DDD-EF-FB (202) • DSD-EF-FB (201) • DSD-IF-FB (201)

	NPMT & NPHT		
	IC908	IC520	IC806
P	●●●	○	○○
M	○○	○	●●●
K	●●●	○	○○
N	●●●		○○
S	○○	○	●●●
H	○○		●●●

••• First priority

Chipbreaker comparison

HF - Provides drilling stability at high feed rates



Chipbreaker cross-section

Chipbreaker type:
G - General
HF – High feed

Insert Size
Corner Radius Size

NP#T ## ## ## #-##-# IC###

Insert type:
M – pressed (central & intermediate)
H – grounded (peripheral)

Thickness

L - Left
R – Right

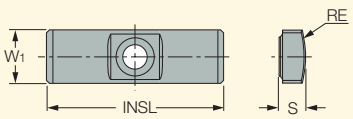
Insert position:
P - peripheral
I - Intermediate
C - center

Grade

FINEBEAM

GPS

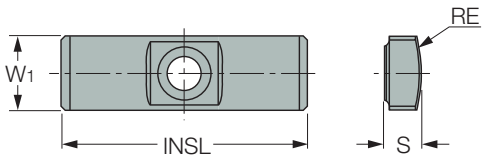
Deep Drilling Solid Carbide Guide Pads

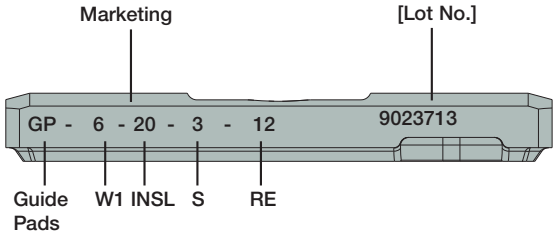


Designation	Dimensions W1	INSL	S	RE	Tough ↔ Hard IC928	IC950	IC908
GPS-04-16-055-DC	4.0	16.00	2.00	5.50	•		•
GPS-05-18-060-DC	5.0	18.00	2.50	6.00	•		•
GPS-05-18-075-DC	5.0	18.00	2.50	7.50	•		•
GPS-06-20-075-DC	6.0	20.00	3.00	7.50			•
GPS-06-20-075	6.0	20.00	3.00	7.50		•	
GPS-06-20-085-DC	6.0	20.00	3.00	8.50	•		•
GPS-06-20-085	6.0	20.00	3.00	8.50		•	
GPS-06-20-100-DC	6.0	20.00	3.00	10.00	•		•
GPS-06-20-100	6.0	20.00	3.00	10.00		•	
GPS-06-20-120-DC	6.0	20.00	3.00	12.00	•		•
GPS-06-20-120	6.0	20.00	3.00	12.00		•	
GPS-07-20-120-DC	7.0	20.00	3.50	12.00	•		•
GPS-07-20-120	7.0	20.00	3.50	12.00		•	
GPS-08-25-155-DC	8.0	25.00	4.50	15.50	•		•
GPS-08-25-155	8.0	25.00	4.50	15.50		•	
GPS-10-30-200-DC	10.0	30.00	4.50	20.00	•		•
GPS-10-30-200	10.0	30.00	4.50	20.00		•	
GPS-10-35-200-DC	10.0	35.00	6.00	20.00	•		•
GPS-10-35-200	10.0	35.00	6.00	20.00		•	
GPS-12-35-250-DC	12.0	35.00	5.50	25.00	•		•
GPS-12-35-250	12.0	35.00	5.50	25.00		•	
GPS-14-40-250-DC	14.0	40.00	7.50	25.00	•		•
GPS-14-40-250	14.0	40.00	7.50	25.00		•	
GPS-18-40-300-DC	18.0	40.00	9.00	30.00	•		•

• DC- Double Chamfer

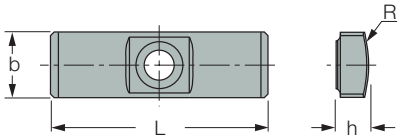
Universal Marking for Deep Drilling Tools





Guide Pad Grade Recommendation

	Oil Coolant			Water Based Coolant		
Priority	1	2	3	1	2	3
ISO-P	IC950	IC908	IC928	IC928	IC908	-
ISO-K	IC950	IC908	IC928	IC928	IC908	-
ISO-M	IC928	IC908	IC950	IC928	IC908	-
ISO-S	IC928	IC908	IC950	IC928	IC908	-

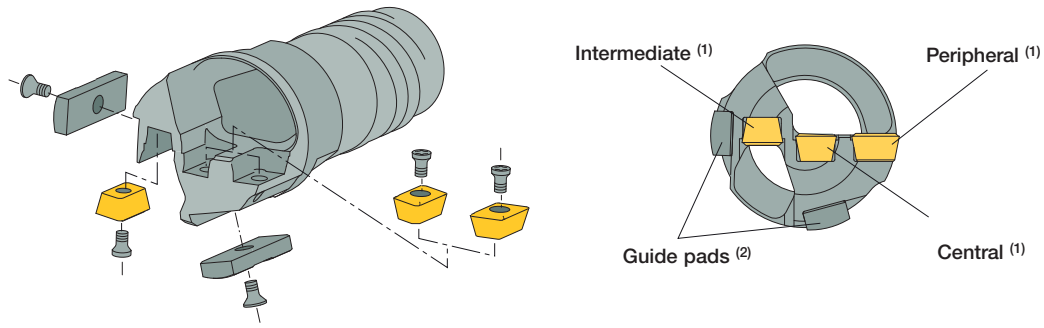


	Tool Diameter		Dimensions (mm)				Solid Carbide
	Min	Max	W1	INSL	RE	h	Description
FINEBEAM	25.00	29.99	6	20	12	3	GPS-06-20-120
	30.00	39.00	7	20	12	3.5	GPS-07-20-120
	39.01	45.00	8	25	15.5	4.5	GPS-08-25-155
	45.01	57.00	10	30	20	4.5	GPS-10-30-200
	57.01	89.00	12	35	25	5.5	GPS-12-35-250

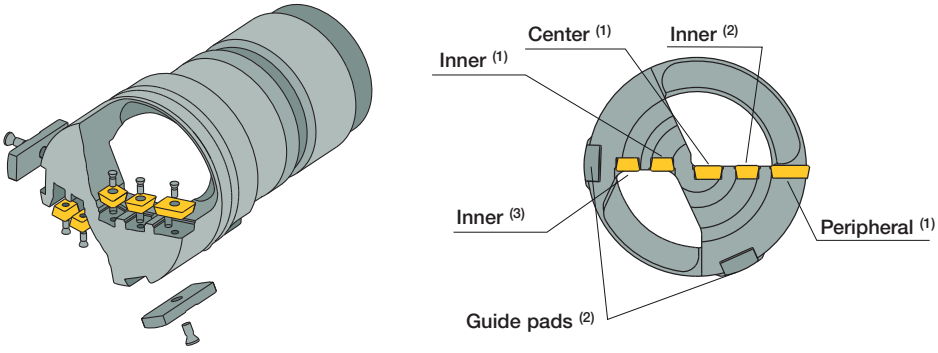
FINEBEAM

DSD-EF-FB / DDD-EF-FB / DSD-IF-FB

Spare Parts List



Drill Diameter	Insert									Guide Pad		
	Peripheral Insert	Screw	Key	Intermediate Insert	Screw	Key	Central Insert	Screw	Key		Screw	Key
25.00 - 28.00	NPHT 060308R-G-P	SR11201753-2	T-7/5	NPMT 050304R-G-I	SR11201753-2	T-7/5	NPMT 050308L-G-C	SR11201753-2	T-7/5	GPS-06	SR11201753-1	T-7/5
	NPHT 060308R-HF-P	SR11201753-2	T-7/5	NPMT 050304R-HF-I	SR11201753-2	T-7/5	NPMT 050308L-HF-C	SR11201753-2	T-7/5	GPS-06	SR11201753-1	T-7/5
28.01 - 29.99	NPHT 060308R-G-P	SR11201753-2	T-7/5	NPMT 050304R-G-I	SR11201753-2	T-7/5	NPMT 060408L-G-C	SR 14-560-HG	T-8/5	GPS-06	SR11201753-1	T-7/5
	NPHT 060308R-HF-P	SR11201753-2	T-7/5	NPMT 050304R-HF-I	SR11201753-2	T-7/5	NPMT 060408L-HF-C	SR 14-560-HG	T-8/5	GPS-06	SR11201753-1	T-7/5
30.00 - 35.00	NPHT 070408R-G-P	SR 14-560-HG	T-8/5	NPMT 060404R-G-I	SR 14-560-HG	T-8/5	NPMT 060408L-G-C	SR 14-560-HG	T-8/5	GPS-07	SR11201753-4	T-9/5
	NPHT 070408R-HF-P	SR 14-560-HG	T-8/5	NPMT 060404R-HF-I	SR 14-560-HG	T-8/5	NPMT 060408L-HF-C	SR 14-560-HG	T-8/5	GPS-07	SR11201753-4	T-9/5
35.01 - 38.00	NPHT 070408R-G-P	SR 14-560-HG	T-8/5	NPMT 060404R-G-I	SR 14-560-HG	T-8/5	NPMT 080408L-G-C	SR 14-560-HG	T-8/5	GPS-07	SR11201753-4	T-9/5
	NPHT 070408R-HF-P	SR 14-560-HG	T-8/5	NPMT 060404R-HF-I	SR 14-560-HG	T-8/5	NPMT 080408L-HF-C	SR 14-560-HG	T-8/5	GPS-07	SR11201753-4	T-9/5
38.01 - 39.00	NPHT 090408R-G-P	SR 14-560-HG	T-8/5	NPMT 060404R-G-I	SR 14-560-HG	T-8/5	NPMT 080408L-G-C	SR 14-560-HG	T-8/5	GPS-07	SR11201753-4	T-9/5
	NPHT 090408R-HF-P	SR 14-560-HG	T-8/5	NPMT 060404R-HF-I	SR 14-560-HG	T-8/5	NPMT 080408L-HF-C	SR 14-560-HG	T-8/5	GPS-07	SR11201753-4	T-9/5
39.01 - 41.00	NPHT 090408R-G-P	SR 14-560-HG	T-8/5	NPMT 060404R-G-I	SR 14-560-HG	T-8/5	NPMT 080408L-G-C	SR 14-560-HG	T-8/5	GPS-08	SR11201753-4	T-9/5
	NPHT 090408R-HF-P	SR 14-560-HG	T-8/5	NPMT 060404R-HF-I	SR 14-560-HG	T-8/5	NPMT 080408L-HF-C	SR 14-560-HG	T-8/5	GPS-08	SR11201753-4	T-9/5
41.01 - 44.00	NPHT 090408R-G-P	SR 14-560-HG	T-8/5	NPMT 080404R-G-I	SR 14-560-HG	T-8/5	NPMT 080408L-G-C	SR 14-560-HG	T-8/5	GPS-08	SR11201753-4	T-9/5
	NPHT 090408R-HF-P	SR 14-560-HG	T-8/5	NPMT 080404R-HF-I	SR 14-560-HG	T-8/5	NPMT 080408L-HF-C	SR 14-560-HG	T-8/5	GPS-08	SR11201753-4	T-9/5
44.01 - 45.00	NPHT 090408R-G-P	SR 14-560-HG	T-8/5	NPMT 080404R-G-I	SR 14-560-HG	T-8/5	NPMT 090408L-G-C	SR 14-560-HG	T-8/5	GPS-08	SR11201753-4	T-9/5
	NPHT 090408R-HF-P	SR 14-560-HG	T-8/5	NPMT 080404R-HF-I	SR 14-560-HG	T-8/5	NPMT 090408L-HF-C	SR 14-560-HG	T-8/5	GPS-08	SR11201753-4	T-9/5
45.01 - 47.00	NPHT 090408R-G-P	SR 14-560-HG	T-8/5	NPMT 080404R-G-I	SR 14-560-HG	T-8/5	NPMT 090408L-G-C	SR 14-560-HG	T-8/5	GPS-10	SR11201753-6	T-15/5
	NPHT 090408R-HF-P	SR 14-560-HG	T-8/5	NPMT 080404R-HF-I	SR 14-560-HG	T-8/5	NPMT 090408L-HF-C	SR 14-560-HG	T-8/5	GPS-10	SR11201753-6	T-15/5
47.01 - 51.00	NPHT 110408R-G-P	SR 14-560-HG	T-8/5	NPMT 080404R-G-I	SR 14-560-HG	T-8/5	NPMT 090408L-G-C	SR 14-560-HG	T-8/5	GPS-10	SR11201753-6	T-15/5
	NPHT 110408R-HF-P	SR 14-560-HG	T-8/5	NPMT 080404R-HF-I	SR 14-560-HG	T-8/5	NPMT 090408L-HF-C	SR 14-560-HG	T-8/5	GPS-10	SR11201753-6	T-15/5
51.01 - 54.00	NPHT 110408R-G-P	SR 14-560-HG	T-8/5	NPMT 090404R-G-I	SR 14-560-HG	T-8/5	NPMT 090408L-G-C	SR 14-560-HG	T-8/5	GPS-10	SR11201753-6	T-15/5
	NPHT 110408R-HF-P	SR 14-560-HG	T-8/5	NPMT 090404R-HF-I	SR 14-560-HG	T-8/5	NPMT 090408L-HF-C	SR 14-560-HG	T-8/5	GPS-10	SR11201753-6	T-15/5
54.01 - 57.00	NPHT 110408R-G-P	SR 14-560-HG	T-8/5	NPMT 090404R-G-I	SR 14-560-HG	T-8/5	NPMT 120408L-G-C	SR 14-560-HG	T-8/5	GPS-10	SR11201753-6	T-15/5
	NPHT 110408R-HF-P	SR 14-560-HG	T-8/5	NPMT 090404R-HF-I	SR 14-560-HG	T-8/5	NPMT 120408L-HF-C	SR 14-560-HG	T-8/5	GPS-10	SR11201753-6	T-15/5
57.01 - 60.00	NPHT 110408R-G-P	SR 14-560-HG	T-8/5	NPMT 090404R-G-I	SR 14-560-HG	T-8/5	NPMT 120408L-G-C	SR 14-560-HG	T-8/5	GPS-12	SR11201753-6	T-15/5
	NPHT 110408R-HF-P	SR 14-560-HG	T-8/5	NPMT 090404R-HF-I	SR 14-560-HG	T-8/5	NPMT 120408L-HF-C	SR 14-560-HG	T-8/5	GPS-12	SR11201753-6	T-15/5
60.01 - 64.00	NPHT 130408R-G-P	SR 14-560-HG	T-8/5	NPMT 090404R-G-I	SR 14-560-HG	T-8/5	NPMT 120408L-G-C	SR 14-560-HG	T-8/5	GPS-12	SR11201753-6	T-15/5
	NPHT 130408R-HF-P	SR 14-560-HG	T-8/5	NPMT 090404R-HF-I	SR 14-560-HG	T-8/5	NPMT 120408L-HF-C	SR 14-560-HG	T-8/5	GPS-12	SR11201753-6	T-15/5
64.01 - 65.00	NPHT 130408R-G-P	SR 14-560-HG	T-8/5	NPMT 120404R-G-I	SR 14-560-HG	T-8/5	NPMT 120408L-G-C	SR 14-560-HG	T-8/5	GPS-12	SR11201753-6	T-15/5
	NPHT 130408R-HF-P	SR 14-560-HG	T-8/5	NPMT 120404R-HF-I	SR 14-560-HG	T-8/5	NPMT 120408L-HF-C	SR 14-560-HG	T-8/5	GPS-12	SR11201753-6	T-15/5



Tool Dia		Insert						Guide Pad		Wrench	
Min	Max	Center	Inner 1	Inner 2	Inner 3	Peripheral	Screw X 5 pcs	GPS X 2 pcs	Screw X 2 pcs	Insert	Pad
65.01	71.00	NPMT09....L-**-C	NPMT08....R-**-I	NPMT08....R-**-I	NPMT06....R-**-I	NPHT11....R-**-P	SR 14-560-HG	GPS12	SR 14-571/S	T-8/5	T-15/5
70.01	83.00				NPMT08....R-**-I	NPHT13....R-**-P					
83.01	90.00	NPMT12....L-**-C	NPMT08....R-**-I	NPMT08....R-**-I	NPMT08....R-**-I	NPHT13....R-**-P					

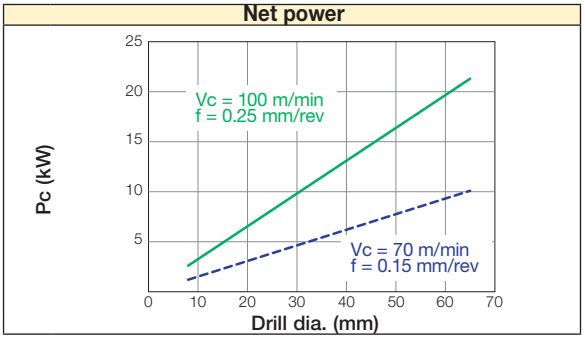
Machining Recommendations for FINEBEAM Drills

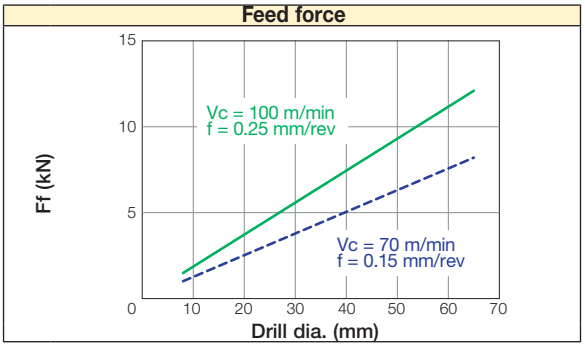
ISO	Material		Condition	Tensile Strength [N/mm²]	Material Group No.(1)	Hardness (HB)	Chipbreaker	Cutting speed V_c (m/min)	Feed : f (mm/rev) Drill dia. (mm) 25.00 - 43.00	Feed : f (mm/rev) Drill dia. (mm) 43.01 - 89.00
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	1	125	HF	70 - 130	0.11 - 0.41	0.14-0.45
							G	70-130	0.10-0.30	0.12-0.35
		>= 0.25 %C	Annealed	650	2	190	HF	70-130	0.11-0.41	0.14-0.45
							G	70-130	0.10-0.30	0.12-0.35
		< 0.55 %C	Quenched and tempered	850	3	250	HF	70-130	0.11-0.41	0.14-0.45
							G	70-130	0.10-0.30	0.12-0.35
		>= 0.55 %C	Annealed	750	4	220	HF	70-130	0.11-0.41	0.14-0.45
							G	70-130	0.10-0.30	0.12-0.35
			Quenched and tempered	1000	5	300	HF	70-130	0.11-0.41	0.14-0.45
							G	70-130	0.10-0.30	0.12-0.35
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	6	200	HF	70-120	0.11-0.41	0.20-0.45
							G	70-120	0.10-0.30	0.12-0.35
			Quenched and tempered	930	7	275	HF	55-110	0.11-0.41	0.20-0.45
							G	60-120	0.10-0.30	0.12-0.35
				1000	8	300	HF	55-110	0.11-0.41	0.20-0.45
							G	60-120	0.10-0.30	0.12-0.35
				1200	9	350	HF	55-110	0.11-0.41	0.20-0.45
							G	60-120	0.10-0.30	0.12-0.35
	High alloyed steel, cast steel and tool steel		Annealed	680	10	200	HF	55-110	0.11-0.38	0.20-0.40
							G	70-130	0.10-0.30	0.12-0.35
			Quenched and tempered	1100	11	325	HF	55-110	0.11-0.38	0.20-0.40
							G	70-130	0.10-0.30	0.12-0.35
	Stainless steel and cast steel		Ferritic/martensitic	680	12	200	HF	40-110	0.11-0.41	0.20-0.45
							G	70-130	0.10-0.30	0.12-0.35
			Martensitic	820	13	240	HF	40-110	0.11-0.41	0.20-0.45
							G	70-130	0.10-0.30	0.12-0.35
M	Stainless steel and cast steel		Austenitic, duplex	600	14	180	HF	40-110	0.11-0.41	0.20-0.45
							G	70-130	0.10-0.30	0.12-0.35
K	Grey cast iron (GG)		Ferritic/pearlitic		15	180	HF	50-110	0.11-0.38	0.24-0.41
							G	50-110	0.10-0.25	0.12-0.35
			Pearlitic/martensitic		16	260	HF	50-110	0.11-0.38	0.24-0.41
							G	50-110	0.10-0.25	0.12-0.35
	Nodular cast iron (GGG)		Ferritic		17	160	HF	50-110	0.11-0.38	0.24-0.41
							G	50-110	0.10-0.25	0.12-0.35
			Pearlitic		18	250	HF	50-110	0.11-0.38	0.24-0.41
							G	50-110	0.10-0.25	0.12-0.35
	Malleable cast iron		Ferritic		19	130	HF	50-110	0.11-0.38	0.24-0.41
							G	50-110	0.10-0.25	0.12-0.35
			Pearlitic		20	230	HF	50-110	0.11-0.38	0.24-0.41
							G	50-110	0.10-0.25	0.12-0.35
N	Aluminum-wrought alloys		Not hardenable		21	60	HF	65-150	0.09-0.33	0.24-0.35
							G	65-130	0.10-0.25	0.12-0.35
			Hardenable		22	100	HF	65-150	0.09-0.33	0.24-0.35
							G	65-130	0.08-0.23	0.12-0.27
	Aluminum-cast alloys	≤ 12% Si	Not hardenable		23	75	HF	65-150	0.09-0.33	0.24-0.35
							G	65-130	0.08-0.23	0.12-0.27
			Hardenable		24	90	HF	65-150	0.09-0.33	0.24-0.35
							G	65-130	0.08-0.23	0.12-0.27
		>12% Si	High temperature		25	130	HF	65-150	0.09-0.33	0.24-0.35
							G	65-130	0.08-0.23	0.12-0.27
	Copper alloys	>1% Pb	Free cutting		26	110	HF	65-150	0.09-0.33	0.24-0.35
							G	65-130	0.08-0.23	0.12-0.27
			Brass		27	90	HF	65-150	0.09-0.33	0.24-0.35
							G	65-130	0.08-0.23	0.12-0.27
			Electrolitic copper		28	100	HF	65-150	0.09-0.33	0.24-0.35
							G	65-130	0.08-0.23	0.12-0.27
S	High temp. alloys	Fe base	Annealed		31	200	HF	20-55	0.09-0.30	0.20-0.33
							G	20-50	0.08-0.23	0.12-0.27
			Hardened		32	280	HF	20-55	0.09-0.30	0.20-0.33
							G	20-50	0.08-0.23	0.12-0.27
		Ni / Co base	Annealed		33	250	HF	20-55	0.09-0.30	0.20-0.33
							G	20-50	0.08-0.23	0.12-0.27
			Hardened		34	350	HF	20-55	0.09-0.30	0.20-0.33
							G	20-50	0.08-0.23	0.12-0.27
			Cast		35	320	HF	20-55	0.09-0.30	0.20-0.33
							G	20-50	0.08-0.23	0.12-0.27
	Titanium alloys		Pure	400	36		HF	30-60	0.09-0.30	0.20-0.33
							G	30-60	0.08-0.23	0.12-0.27
			Alpha+beta alloys hardened	1050	37		HF	30-60	0.09-0.30	0.20-0.33
							G	30-60	0.08-0.23	0.12-0.27
H	Hardened steel	≥ 40HRC	Hardened		38		HF	30-60	0.09-0.30	0.20-0.33
							G	30-60	0.08-0.23	0.12-0.27

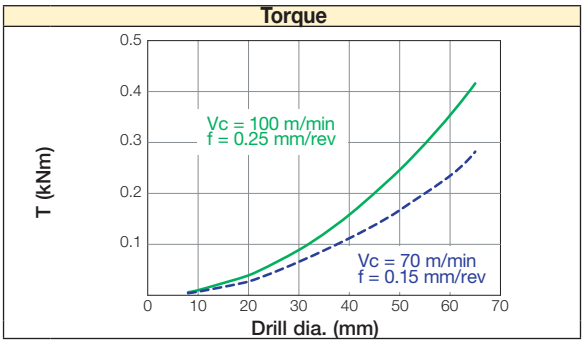
(1) For material groups see pages 495-524

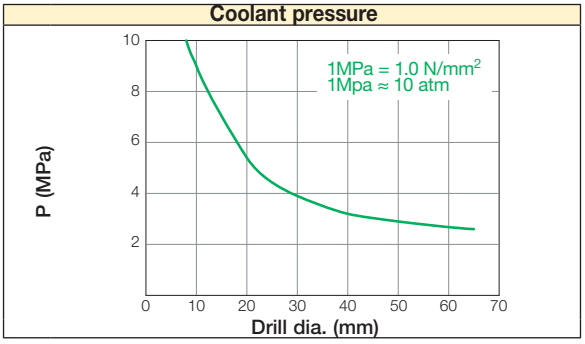
Technical Guide

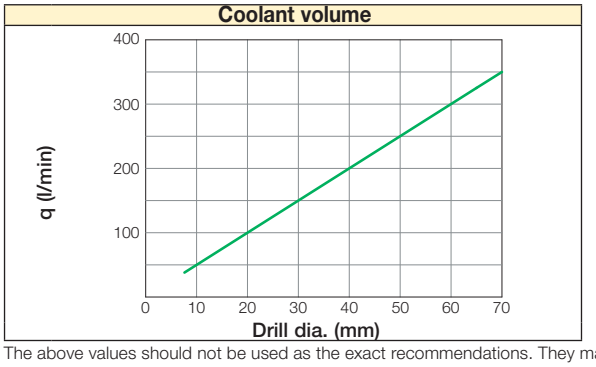
STS - Setting guidelines for cutting loads, fluid pressure and flow rate during STS operation



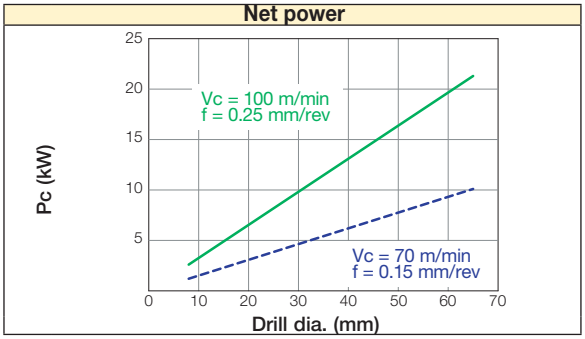


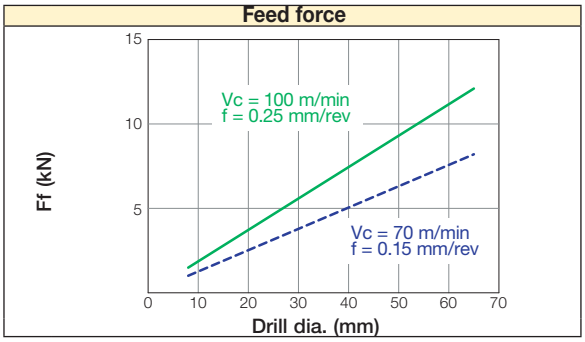


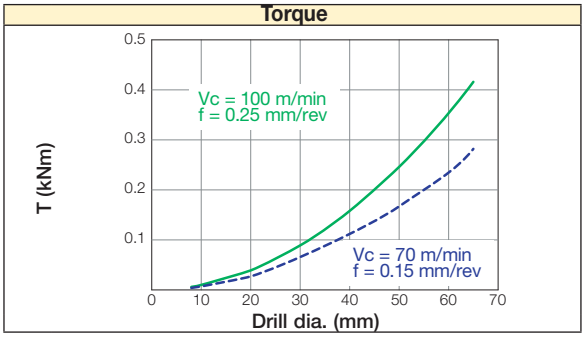


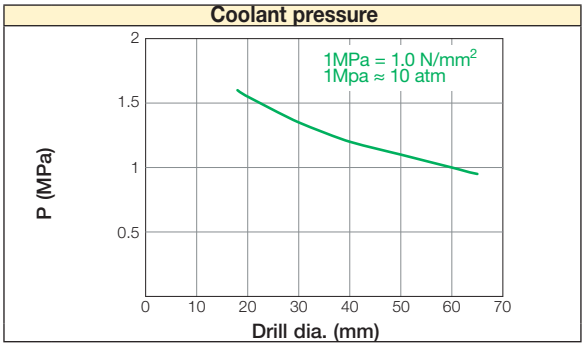


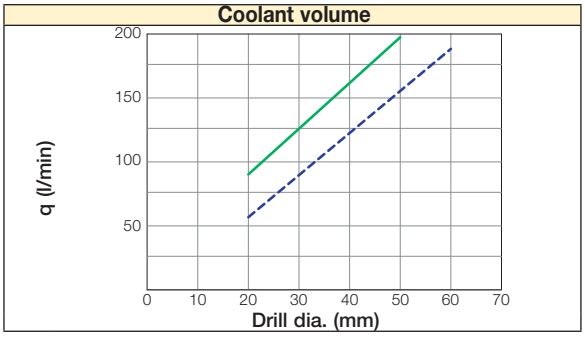
DTS - Setting guidelines for cutting loads, fluid pressure and flow rate during DTS operation









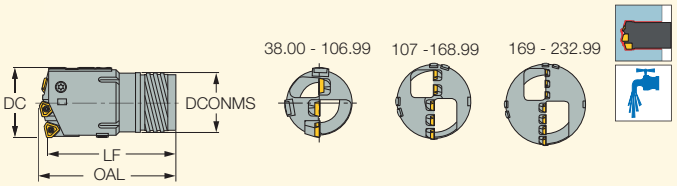


The above values should not be used as the exact recommendations. They may need modification depending on the machining conditions, materials, etc.

ISCARDEEPDRILL

DSD-EC

Deep Single Tube Drills with External 4-Start Thread Connection and Cartridges (38-292 dia.)



Designation	DCN(1)	DCX(2)	OAL	LF	DCONMS	Ts(3)
DSD-EC 38.00-39.60	38.00	39.60	90.00	85.00	30.00	TS-I11
DSD-EC 39.61-43.00	39.61	43.00	91.00	85.00	33.00	TS-I12
DSD-EC 43.01-47.00	43.01	47.00	101.00	95.00	36.00	TS-I13
DSD-EC 47.01-51.70	47.01	51.70	102.00	95.00	39.00	TS-I14
DSD-EC 51.71-56.20	51.71	56.20	107.00	100.00	43.00	TS-I15
DSD-EC 56.21-60.60	56.21	60.60	118.00	110.00	47.00	TS-I16
DSD-EC 60.61-64.99	60.61	64.99	119.00	110.00	51.00	TS-I17
DSD-EC 65.00-66.99	65.00	66.99	159.00	150.00	52.00	TS-I18
DSD-EC 67.00-72.99	67.00	72.99	159.00	150.00	58.00	TS-I19
DSD-EC 73.00-79.99	73.00	79.99	160.00	150.00	63.00	TS-I20
DSD-EC 80.00-86.99	80.00	86.99	191.00	180.00	70.00	TS-I21
DSD-EC 87.00-99.99	87.00	99.99	193.00	180.00	77.00	TS-I22
DSD-EC 100.00-106.99	100.00	106.99	193.00	180.00	89.00	TS-I23
DSD-EC 107.00-111.99	107.00	111.99	197.00	180.00	89.00	TS-I23
DSD-EC 112.00-123.99	112.00	123.99	221.00	205.00	101.00	TS-I24
DSD-EC 124.00-135.99	124.00	135.99	222.00	205.00	113.00	TS-I25
DSD-EC 136.00-147.99	136.00	147.99	223.00	205.00	125.00	TS-I26
DSD-EC 148.00-159.99	148.00	159.99	245.00	225.00	137.00	TS-I27
DSD-EC 160.00-168.99	160.00	168.99	246.00	225.00	149.00	TS-I28
DSD-EC 169.00-171.99	169.00	171.99	246.00	230.00	149.00	TS-I28
DSD-EC 172.00-183.99	172.00	183.99	247.00	230.00	161.00	TS-I29
DSD-EC 184.00-195.99	184.00	195.99	267.00	250.00	173.00	TS-I30
DSD-EC 196.00-207.99	196.00	207.99	270.00	250.00	185.00	TS-I31
DSD-EC 208.00-219.99	208.00	219.99	271.00	250.00	197.00	TS-I32
DSD-EC 220.00-231.99	220.00	231.99	293.00	270.00	208.00	TS-I33
DSD-EC 233.00-243.99	233.00	243.99	294.00	265.00	220.00	TS-I34
DSD-EC 244.00-255.99	244.00	255.99	294.00	265.00	232.00	TS-I35
DSD-EC 256.00-267.99	256.00	267.99	322.00	290.00	244.00	TS-I36
DSD-EC 268.00-279.99	268.00	279.99	323.00	290.00	256.00	TS-I37
DSD-EC 280.00-291.99	280.00	291.99	325.00	290.00	268.00	TS-I38

- Important: The specified drilling range using the original outer cartridge and pad may be enlarged by using optional outer cartridges and pads as specified on page 221
- For quotation form and user guide, see pages 279-280, 216-218, 222-226 • For spare parts, see pages 212-213 • Ordering example: DSD-EC 67.30

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Tube designation

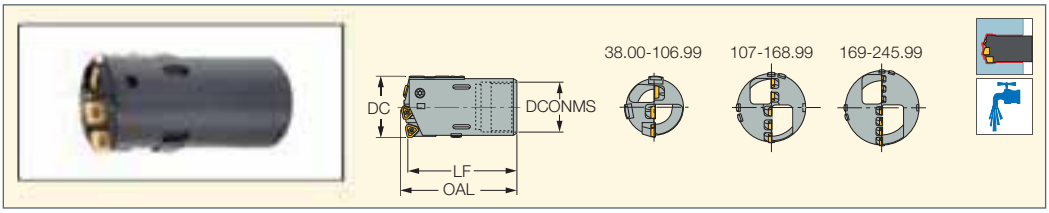
For inserts, see pages: NPMX 0803 RB/RG (214) • TPMX (214)

For holders, see pages: TS-I** (264)

ISCARDEEPDRILL

DSD-IC

Deep Single Tube Drills with Internal Single-Start Thread Connection and Cartridges (38-294 dia.)



Designation	DCN(1)	DCX(2)	OAL	LF	DCONMS	Ts(3)
DSD-IC 38.00-39.99	38.00	39.99	85.00	80.00	30.00	TS-O15
DSD-IC 40.00-43.99	40.00	43.99	86.00	80.00	33.00	TS-O16
DSD-IC 44.00-46.99	44.00	46.99	96.00	90.00	37.00	TS-O17
DSD-IC 47.00-51.99	47.00	51.99	97.00	90.00	41.00	TS-O18
DSD-IC 52.00-56.99	52.00	56.99	107.00	100.00	44.00	TS-O19
DSD-IC 57.00-60.99	57.00	60.99	118.00	110.00	49.00	TS-O20
DSD-IC 61.00-67.99	61.00	67.99	119.00	110.00	53.00	TS-O21
DSD-IC 68.00-74.99	68.00	74.99	129.00	120.00	59.00	TS-O22
DSD-IC 75.00-80.99	75.00	80.99	161.00	150.00	65.00	TS-O23
DSD-IC 81.00-90.99	81.00	90.99	162.00	150.00	71.00	TS-O24
DSD-IC 91.00-98.99	91.00	98.99	162.00	150.00	79.00	TS-O25
DSD-IC 99.00-106.99	99.00	106.99	163.00	150.00	90.00	TS-O26
DSD-IC 107.00-110.99	107.00	110.99	164.00	150.00	90.00	TS-O26
DSD-IC 111.00-122.99	111.00	122.99	165.00	150.00	102.00	TS-O27
DSD-IC 123.00-134.99	123.00	134.99	167.00	150.00	114.00	TS-O28
DSD-IC 135.00-148.99	135.00	148.99	168.00	150.00	126.00	TS-O29
DSD-IC 149.00-161.99	149.00	161.99	170.00	150.00	139.00	TS-O30
DSD-IC 162.00-168.99	162.00	168.99	211.00	190.00	151.00	TS-O31
DSD-IC 169.00-173.99	169.00	173.99	211.00	190.00	151.00	TS-O31
DSD-IC 174.00-185.99	174.00	185.99	213.00	190.00	163.00	TS-O32
DSD-IC 186.00-197.99	186.00	197.99	212.00	190.00	175.00	TS-O33
DSD-IC 198.00-209.99	198.00	209.99	215.00	190.00	187.00	TS-O34
DSD-IC 210.00-221.99	210.00	221.99	217.00	190.00	199.00	TS-O35
DSD-IC 222.00-233.99	222.00	233.99	218.00	190.00	211.00	TS-O36
DSD-IC 246.00-257.99	246.00	257.99	221.00	190.00	235.00	TS-O38
DSD-IC 258.00-269.99	258.00	269.99	242.00	210.00	245.00	TS-O39
DSD-IC 270.00-281.99	270.00	281.99	244.00	210.00	259.00	TS-O40
DSD-IC 282.00-293.99	282.00	293.99	245.00	210.00	271.00	TS-O41

- Important: The specified drilling range using the original outer cartridge and pad may be enlarged by using optional outer cartridges and pads as specified on page 221
- For spare parts and insert information, see pages 212-213 • For user guide and quotation form, see pages 279-280, 216-218, 222-226
- Ordering example: DSD-IC 67.30

(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For inserts, see pages: NPMX 0803 RB/RG (214) • TPMX (214)
For holders, see pages: TS-O** (265)

Universal Marking for Deep Drilling Tools

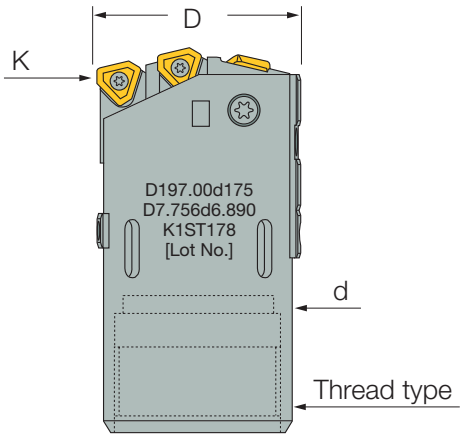
D- **Tool diameter**
Metric- D197.00
Inch- D7.756

d- Pilot diameter
Metric- d175
Inch- d6.890

Tool style
K- Solid drill cartridge style

Thread type
4ST- Four-start thread single tube
1ST- Single-start thread single tube
4DT- Four-start thread double tube

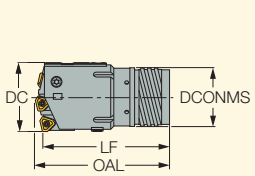
178- Tube diameter

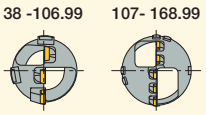


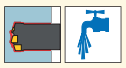
ISCARDEEPDRILL

DDD-EC

Deep Double Tube Drills with External 4-Start Thread Connection and Cartridges (38-184 dia.)







Designation	DCN(1)	DCX(2)	OAL	LF	DCONMS	Ts(3)	Tsi(4)
DDD-EC 38.00-39.60	38.00	39.60	90.00	85.00	33.00	TDO-I8	TDI-N8
DDD-EC 39.61-43.00	39.61	43.00	91.00	85.00	36.00	TDO-I9	TDI-N9
DDD-EC 43.01-47.00	43.01	47.00	101.00	95.00	39.00	TDO-I10	TDI-N10
DDD-EC 47.01-51.70	47.01	51.70	102.00	100.00	43.00	TDO-I11	TDI-N11
DDD-EC 51.71-56.20	51.71	56.20	107.00	100.00	47.00	TDO-I12	TDI-N12
DDD-EC 56.21-65.00	56.21	65.00	119.00	110.00	51.00	TDO-I13	TDI-N13
DDD-EC 65.00-66.99	65.00	66.99	159.00	150.00	52.00	TDO-I14	TDI-N14
DDD-EC 67.00-72.99	67.00	72.99	159.00	150.00	58.00	TDO-I15	TDI-N15
DDD-EC 73.00-79.99	73.00	79.99	160.00	150.00	63.00	TDO-I16	TDI-N16
DDD-EC 80.00-86.99	80.00	86.99	191.00	180.00	70.00	TDO-I17	TDI-N17
DDD-EC 87.00-99.99	87.00	99.99	193.00	180.00	77.00	TDO-I18	TDI-N18
DDD-EC 100.00-106.99	100.00	106.99	193.00	180.00	89.00	TDO-I19	TDI-N19
DDD-EC 107.00-111.99	107.00	111.99	197.00	180.00	89.00	TDO-I19	TDI-N19
DDD-EC 112.00-123.99	112.00	123.99	221.00	205.00	101.00	TDO-I20	TDI-N20
DDD-EC 124.00-135.99	124.00	135.99	222.00	205.00	113.00	TDO-I21	TDI-N21
DDD-EC 136.00-147.99	136.00	147.99	223.00	205.00	125.00	TDO-I22	TDI-N22
DDD-EC 148.00-159.99	148.00	159.99	245.00	225.00	137.00	TDO-I23	TDI-N23
DDD-EC 160.00-168.99	160.00	168.99	246.00	225.00	149.00	TDO-I24	TDI-N24
DDD-EC 169.00-171.99	169.00	171.99	246.00	225.00	149.00	TDO-I24	TDI-N24
DDD-EC 172.00-183.99	172.00	183.99	247.00	225.00	161.00	TDO-I25	TDI-N25

- Important: The specified drilling range using the original outer cartridge and pad may be enlarged by using optional outer cartridges and pads as specified on page 221
- For spare parts and insert information, see pages 212-213 • For user guide and quotation form see pages 279-280, 216-218, 222-226
- Ordering example: DDD-EC 148.00

(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Outer tube designation
(4) Inner tube designation

For inserts, see pages: NPMX 0803 RB/RG (214) • TPMX (214)
For holders, see pages: TDO-I (D18.41-65.00) (266) • TDO-I (D65.00-171.99) (267)

Universal Marking for Deep Drilling Tools

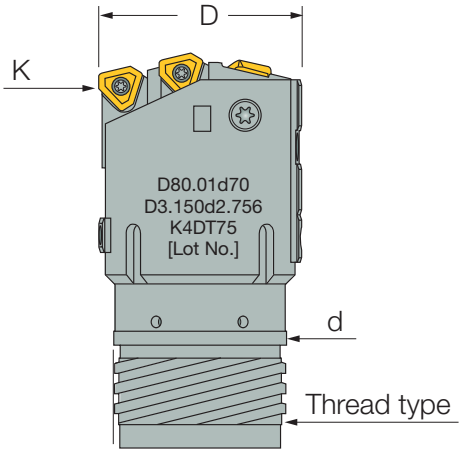
D- Tool diameter
Metric- D80.0
Inch- D3.150

d- Pilot diameter
Metric- d70
Inch- d2.756

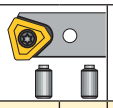
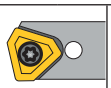
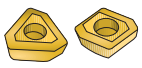
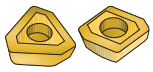
Tool style
K- Cartridge style solid drill

Thread type
4ST- Four-start thread single tube
1ST- Single-start thread single tube
4DT- Four-start thread double tube

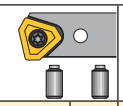
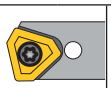
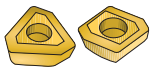
75- Tube diameter



Spare Parts

DSD-EC / DDD-EC / DSD-IC														
Diameter	Peripheral	Qty.	Inner/ Central	Qty.	Guide Pad	Qty.	Guide Pad Protectors	Qty.	Sub Guide Pad	Qty.	Peripheral Insert	Qty.	Inner/ Central Insert	Qty.
38.00-39.99	CAOD-080	1	CAID-080	1	GPS-08-25-155	2	GPP-06	2	SGP-02	1	NPMX 08**R..	1	NPMX 08**R..	1
			CAID-080	1									NPMX 08**R..	1
40.00-44.99	CAOD-0845	1	CAID-080	1	GPS-08-25-155	2	GPP-06	2	SGP-02	1	TPMX 14**R..	1	NPMX 08**R..	1
			CAID-080	1									NPMX 08**R..	1
45.00-47.99	CAOD-0845	1	CAID-080	1	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 14**R..	1	NPMX 08**R..	1
			CAID-0845	1									TPMX 14**R..	1
48.00-51.99	CAOD-0845	1	CAID-0845	1	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 14**R..	1	TPMX 14**R..	1
			CAID-0845	1									TPMX 14**R.	1
52.00-54.99	CAOD-103	1	CAID-0845	1	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 17**R..	1	TPMX 14**R..	1
			CAID-0845	1									TPMX 14**R..	1
55.00-57.99	CAOD-103	1	CAID-0845	1	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 17**R..	1	TPMX 14**R..	1
			CAID-103	1									TPMX 17**R..	1
58.00-59.99	CAOD-103	1	CAID-103	1	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 17**R..	1	TPMX 17**R..	1
			CAID-103	1									TPMX 17**R..	1
60.00-63.99	CAOD-103	1	CAID-103	1	GPS-14-40-250	2	GPP-08	2	SGP-02	1	TPMX 17**R..	1	TPMX 17**R..	1
			CAID-103	1									TPMX 17**R..	1
64.00-67.99	CAOD-142	1	CAID-103	1	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 24**R..	1	TPMX 17**R..	1
			CAID-103	1									TPMX 17**R..	1
68.00-77.99	CAOD-103	1	CAID-142	1	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 17**R..	1	TPMX 24**R..	1
			CAID-142	1									TPMX 24**R..	1
78.00-84.99	CAOD-142	1	CAID-142	1	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 24**R..	1	TPMX 24**R..	1
			CAID-142	1									TPMX 24**R..	1
85.00-91.99	CAOD-170	1	CAID-142	1	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 28**R..	1	TPMX 24**R..	1
			CAID-142	1									TPMX 24**R..	1
92.00-98.99	CAOD-142	1	CAID-170	1	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 24**R..	1	TPMX 28**R..	1
			CAID-170	1									TPMX 28**R..	1
99.00-106.99	CAOD-170	1	CAID-170	1	GPS-18-40-300	2	GPP-09	2	SGP-04	1	TPMX 28**R..	1	TPMX 28**R..	1
			CAID-170	1									TPMX 28**R..	1
107.00-117.99	CAOD-142	1	CAID-103	3	GPS-18-40-300	2	GPP-09	2	SGP-04	1	TPMX 24**R..	1	TPMX 17**R..	3
			CAID-142	1									TPMX 24**R..	1
118.00-135.99	CAOD-142	1	CAID-142	3	GPS-18-40-300	2	GPP-09	2	SGP-04	1	TPMX 24**R..	1	TPMX 24**R..	3
			CAID-142	1									TPMX 24**R..	1
136.00-144.99	CAOD-142	1	CAID-142	3	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 24**R..	1	TPMX 24**R..	3
			CAID-170	1									TPMX 28**R..	1
145.00-150.99	CAOD-142	1	CAID-142	2	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 24**R..	1	TPMX 24**R..	2
			CAID-170	1									TPMX 28**R..	1
			CAID-170	1									TPMX 28**R..	1
151.00-156.99	CAOD-170	1	CAID-142	2	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 24**R..	2
			CAID-170	1									TPMX 28**R..	1
			CAID-170	1									TPMX 28**R..	1
157.00-162.99	CAOD-170	1	CAID-142	1	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 24**R..	1
			CAID-170	2									TPMX 28**R..	2
			CAID-170	1									TPMX 28**R..	1
163.00-168.99	CAOD-170	1	CAID-170	3	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 28**R..	3
			CAID-170	1									TPMX 28**R..	1
169.00-188.99	CAOD-142	1	CAID-142	5	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 24**R..	1	TPMX 24**R..	5
			CAID-142	1									TPMX 24**R..	1
189.00-196.99	CAOD-142	1	CAID-142	5	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 24**R..	1	TPMX 24**R..	5
			CAID-170	1									TPMX 28**R..	1
197.00-202.99	CAOD-142	1	CAID-142	4	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 24**R..	1	TPMX 24**R..	4
			CAID-170	1									TPMX 28**R..	1
			CAID-170	1									TPMX 28**R..	1
203.00-208.99	CAOD-142	1	CAID-142	3	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 24**R..	1	TPMX 24**R..	3
			CAID-170	2									TPMX 28**R..	2
			CAID-170	1									TPMX 28**R..	1
209.00-214.99	CAOD-170	1	CAID-142	3	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 24**R..	3
			CAID-170	2									TPMX 28**R..	2
			CAID-170	1									TPMX 28**R..	1

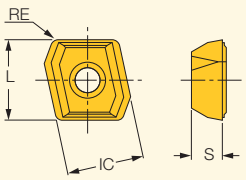
Spare Parts

DSD-EC / DDD-EC / DSD-IC														
Diameter	Peripheral	Qty.	Inner/ Central	Qty.	Guide Pad	Qty.	Guide Pad Protectors	Qty.	Sub Guide Pad	Qty.	Peripheral Insert	Qty.	Inner/ Central Insert	Qty.
215.00-220.99	CAOD-170	1	CAID-142	2	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 24**R..	2
			CAID-170	3									TPMX 28**R..	3
			CAID-170	1									TPMX 28**R..	1
221.00-226.99	CAOD-170	1	CAID-142	1	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 24**R..	1
			CAID-170	4									TPMX 28**R..	4
			CAID-170	1									TPMX 28**R..	1
227.00-232.99	CAOD-170	1	CAID-170	5	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 28**R..	5
			CAID-170	1									TPMX 28**R..	1
233.00-247.99	CAOD-142	1	CAID-142	7	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 24**R..	1	TPMX 24**R..	7
			CAID-170	1									TPMX 28**R..	1
248.00-253.99	CAOD-170	1	CAID-142	7	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 24**R..	7
			CAID-170	1									TPMX 28**R..	1
254.00-258.99	CAOD-170	1	CAID-142	6	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 24**R..	6
			CAID-170	1									TPMX 28**R..	1
			CAID-170	1									TPMX 28**R..	1
259.00-264.99	CAOD-170	1	CAID-142	5	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 24**R..	5
			CAID-170	2									TPMX 28**R..	2
			CAID-170	1									TPMX 28**R..	1
265.00-271.99	CAOD-170	1	CAID-142	4	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 24**R..	4
			CAID-170	3									TPMX 28**R..	3
			CAID-170	1									TPMX 28**R..	1
272.00-275.99	CAOD-170	1	CAID-142	3	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 24**R..	3
			CAID-170	4									TPMX 28**R..	4
			CAID-170	1									TPMX 28**R..	1
276.00-284.99	CAOD-170	1	CAID-142	2	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 24**R..	2
			CAID-170	5									TPMX 28**R..	5
			CAID-170	1									TPMX 28**R..	1
285.00-289.99	CAOD-170	1	CAID-142	1	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 24**R..	1
			CAID-170	6									TPMX 28**R..	6
			CAID-170	1									TPMX 28**R..	1
290.00-293.99	CAOD-170	1	CAID-170	7	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 28**R..	1	TPMX 28**R..	7
			CAID-170	1									TPMX 28**R..	1

ISCARDEEPDRILL

NPMX 0803 RB/RG

Inserts for Drilling Heads
DSD-EC / DDD-EC / DSD-IC

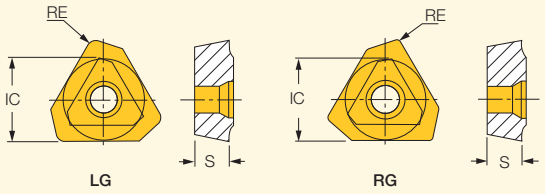


Designation	Dimensions IC	S	RE	L	Tough ↔ Hard IC9025	IC908	IC520
NPMX 080304R-B	8.00	3.18	0.40	8.36		●	●
NPMX 080308R-G	8.00	3.18	0.80	8.36	●		●

ISCARDEEPDRILL

TPMX

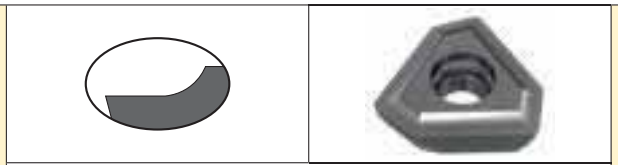
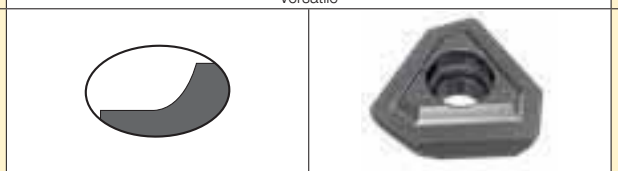
Inserts for Drilling Heads
DSD-EC / DDD-EC /
DSD-IC / DSC-EC / DSC-IC



Designation	Dimensions IC	S	RE	Tough ↔ Hard IC920	IC5500	IC9025	IC508	IC908	IC520	IC806
TPMX 140304R-B	8.45	3.50	0.40	●		●		●	●	●
TPMX 140308R-DT	8.45	3.50	0.80			●		●		
TPMX 140308R-G	8.45	3.50	0.80		●	●	●	●	●	●
TPMX 140308R-B	8.45	3.50	0.80							●
TPMX 170404R-B	10.30	4.00	0.40	●		●		●	●	●
TPMX 170408R-B	10.30	4.00	0.80							●
TPMX 170408R-BG	10.30	4.00	0.80					●	●	●
TPMX 170408R-DT	10.30	4.00	0.80			●		●	●	
TPMX 170408R-G	10.30	4.00	0.80		●		●	●	●	●
TPMX 240504R-B	14.20	5.50	0.40	●		●		●	●	●
TPMX 240512R-BG	14.20	5.50	1.20			●		●	●	●
TPMX 240512R-DT	14.20	5.50	1.20			●		●	●	
TPMX 240512R-G	14.20	5.50	1.20		●		●	●	●	●
TPMX 240512R-B	14.20	5.50	1.20							●
TPMX 280708R-B	17.00	7.50	0.80	●		●		●		●
TPMX 280716R-BG	17.00	7.50	1.60					●	●	●
TPMX 280716R-DT	17.00	7.50	1.60					●	●	
TPMX 280716R-G	17.00	7.50	1.60		●		●	●	●	●
TPMX 280716R-B	17.00	7.50	1.60							●

For tools, see pages: DDC-EC (249) • DSTR-EC (255) • DSTR-IC (258)

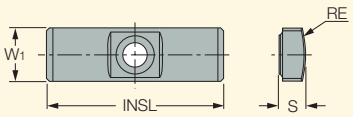
Chipbreaker Selection

G	 Versatile	B  Good chip control for heat-resistant alloy
BG	 Chip control for difficult-to-cut steel	DT  To reduce machine load

ISCARDEEPDRILL

GPS

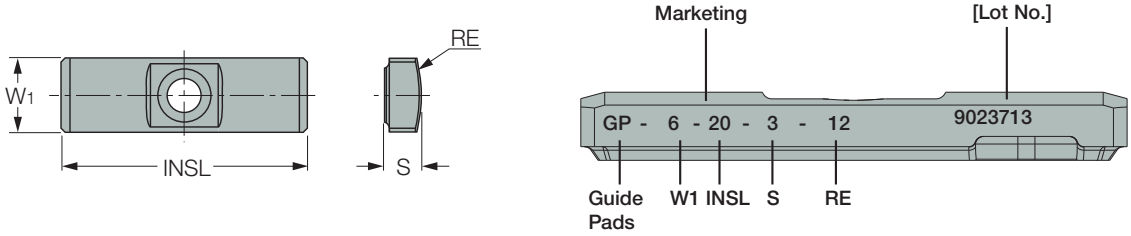
Deep Drilling Solid
Carbide Guide Pads



Designation	Dimensions W1	INSL	S	RE	Tough ↔ Hard IC928	IC950	IC908
GPS-04-16-055-DC	4.0	16.00	2.00	5.50	•		•
GPS-05-18-060-DC	5.0	18.00	2.50	6.00	•		•
GPS-05-18-075-DC	5.0	18.00	2.50	7.50	•		•
GPS-06-20-075-DC	6.0	20.00	3.00	7.50			•
GPS-06-20-075	6.0	20.00	3.00	7.50		•	
GPS-06-20-085-DC	6.0	20.00	3.00	8.50	•		•
GPS-06-20-085	6.0	20.00	3.00	8.50		•	
GPS-06-20-100-DC	6.0	20.00	3.00	10.00	•		•
GPS-06-20-100	6.0	20.00	3.00	10.00		•	
GPS-06-20-120-DC	6.0	20.00	3.00	12.00	•		•
GPS-06-20-120	6.0	20.00	3.00	12.00		•	
GPS-07-20-120-DC	7.0	20.00	3.50	12.00	•		•
GPS-07-20-120	7.0	20.00	3.50	12.00		•	
GPS-08-25-155-DC	8.0	25.00	4.50	15.50	•		•
GPS-08-25-155	8.0	25.00	4.50	15.50		•	
GPS-10-30-200-DC	10.0	30.00	4.50	20.00	•		•
GPS-10-30-200	10.0	30.00	4.50	20.00		•	
GPS-10-35-200-DC	10.0	35.00	6.00	20.00	•		•
GPS-10-35-200	10.0	35.00	6.00	20.00		•	
GPS-12-35-250-DC	12.0	35.00	5.50	25.00	•		•
GPS-12-35-250	12.0	35.00	5.50	25.00		•	
GPS-14-40-250-DC	14.0	40.00	7.50	25.00	•		•
GPS-14-40-250	14.0	40.00	7.50	25.00		•	
GPS-18-40-300-DC	18.0	40.00	9.00	30.00	•		•

• DC- Double Chamfer

Universal Marking for Deep Drilling Tools



Guide Pad Grade Recommendation

	Oil Coolant			Water Based Coolant		
Priority	1	2	3	1	2	3
ISO-P	IC950	IC908	IC928	IC928	IC908	-
ISO-K	IC950	IC908	IC928	IC928	IC908	-
ISO-M	IC928	IC908	IC950	IC928	IC908	-
ISO-S	IC928	IC908	IC950	IC928	IC908	-

Chip Form General Information

Chip form in deep hole drilling

Chip form plays a key role in STS (Single tube system) and DTS (Double tube system) while large-volume and high-pressure coolant do so as well. Because chips are removed through the tube with coolant, proper chip formation is essential for smooth and steady evacuation.

Chip formation

Chip formation is affected by multiple factors, such as workpiece material, chipbreaker geometry, cutting speed, feed, type of coolant, and coolant temperature. Suitable chip formation depends on cutting operation but is controllable by changing the cutting conditions.

How to decide the chip form

Generally the chip length should be 3 - 4 times its width, but tends to be longer with difficult-to-cut materials. In this case, chip evacuation can be improved by making the chips thinner, which is normally done by reducing the feed rate.

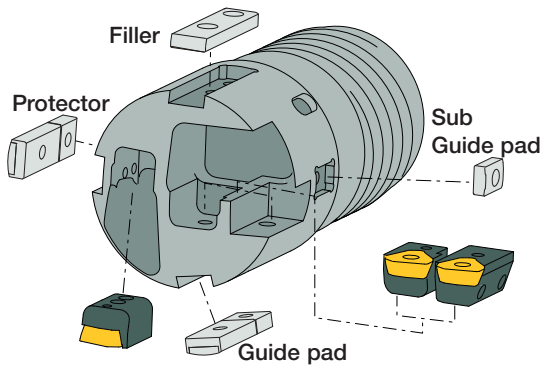
The graph below shows chip formation for different cutting speeds and feeds. Short chips are created by reducing the cutting speed or increasing the feed.

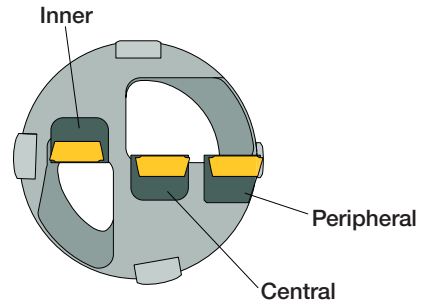
Table 1

		Central	Intermediate	Peripheral
Cutting speed: V_c (m/min)	110			
	90			
	70			
	50			
Condition		0.10	0.15	0.20
		Feed: f (mm/rev)		

From left to right in each box the order is central, intermediate and peripheral chip.

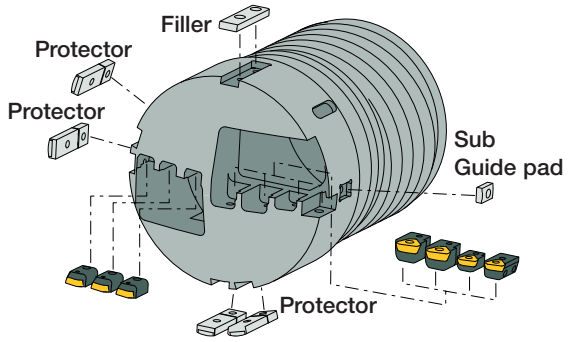
Ø38.00-106.99 mm

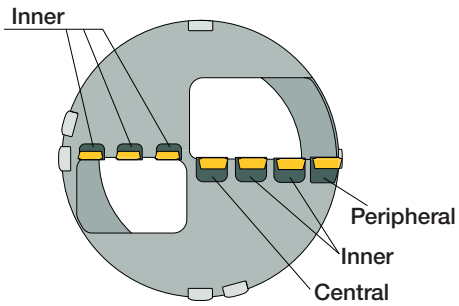




Part positions may vary depending on the drill size.

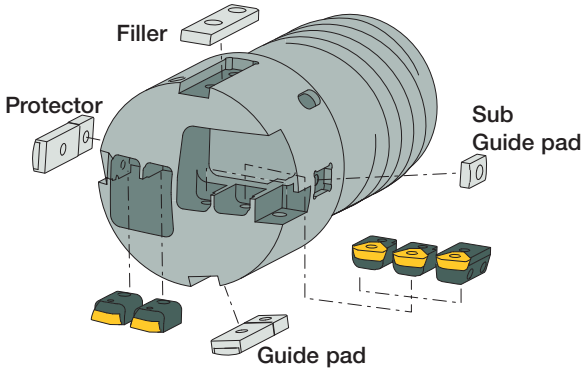
Ø169.00-232.99 mm

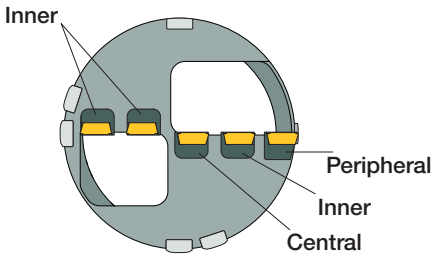




Part positions may vary depending on the drill size.

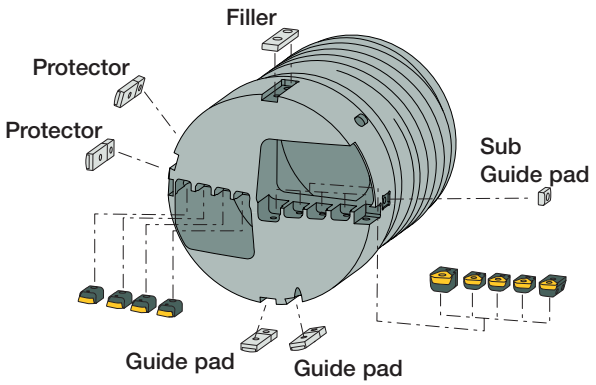
Ø107.00-168.99 mm

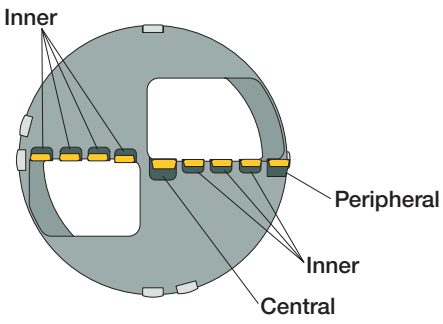




Part positions may vary depending on the drill size.

Ø233.00-291.99 mm





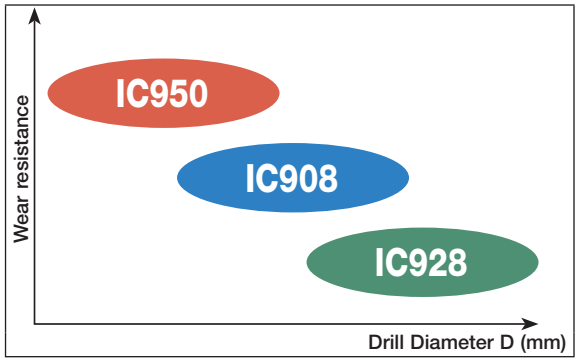
Part positions may vary depending on the drill size.

*For more information regarding the filler please see page 218

Guide pads

Guide pads are subject to wear, like inserts.

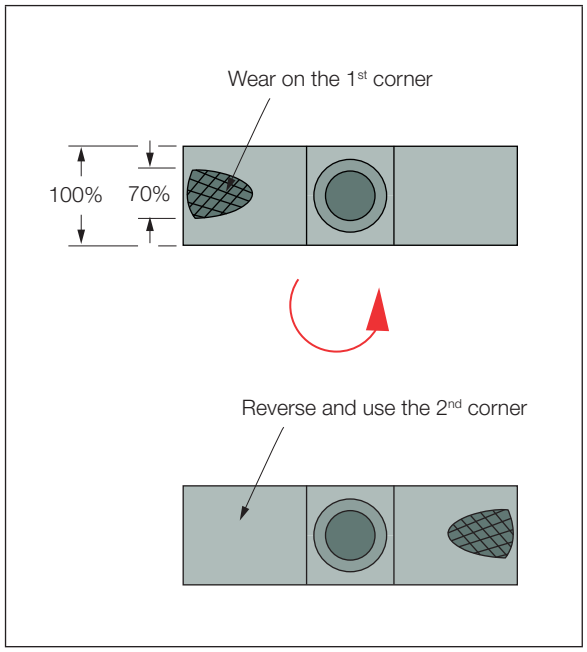
- Each guide pad can be used on two sides. When the first corner wears out 70% of the width, reverse the guide pad to use the second corner.
- Replace with a new guide pad when the second corner wears out.



For higher wear resistance
- High wear-resistant grade

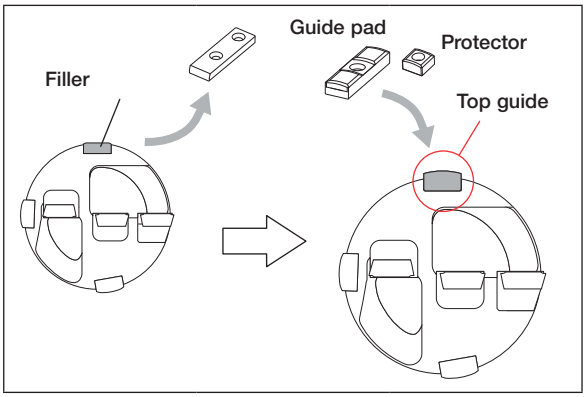
First recommendation
- Suitable for various workpiece materials
- Long tool life due to unique substrate and coating

For higher fracture resistance
- High fracture-resistant grade



Please replace the filler with the top guide pad when:

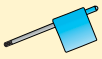
- High hole accuracy is required
- L/D (hole length-to-diameter) ratio is greater than 50:1
- Drilling a workpiece which has a tail stock hole
- The DOC required is greater than the range of the peripheral insert for counterboring. *See chart below.



*Maximum DOC of peripheral insert

Cartridge	DOC (mm)	Guide pad
CAOD-0845	6.4	GPS-08.../GPS-10...
CAOD-103	7.2	GPS-10.../GPS-14...
CAOD-142	10.4	GPS-14.../GPS-18...
CAOD-170	12.0	GPS-18...

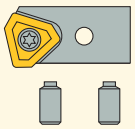
For diameter less than 92 mm, the drill head is semi-standard using the top guide pad.
Please contact your dealer for further information.

Guide Pad		
	Screw	Key
		
GPS-05	SR 34-508 M2.2X0.45	T-7/5
GPS-06	SR 11201753-1	T-7/5
GPS-07	SR 11201753-4	T-9/5
GPS-08	SR 11201753-4	T-9/5
GPS-10	SR 11201753-8	T-15/5
GPS-12	SR 11201753-8	T-15/5
GPS-14	SR 11201752-2	T-15/5
GPS-18	SR 11201756-7S	T-15/5

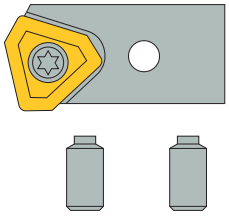
ISCARDEEPDRILL

CAOD

Drilling Head Peripheral Cartridge



Universal Marking for Deep Drilling Tools



CA - P - DR - 0800 - R

- CA – Peripheral Cartridge
- P – DR : Drilling, CB : Counter Bore
- DR – DR : Drilling, CB : Counter Bore
- 0800 – IC
- R – L/R HAND

Spare Parts

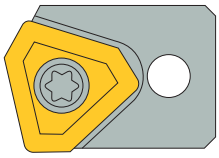
Designation	Adjustment Screw	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAOD-080	SR 11201755-4	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-0845	SR 11201755-6	HW 2.0	SR 11201756-10	HW 2.5	TPMX 1403..R-G	SR 11201753-3
CAOD-085	SR 11201755-7	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-103	SR 11201755-8	HW 2.5	SR 11201756-12	HW 3.0	TPMX 1704..R-G	SR 11201753-7
CAOD-142	SR 11201755-9	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405..R-G	SR 11201753-9
CAOD-170	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 2807..R-G	SR 11201753-10

ISCARDEEPDRILL

CAID

Drilling Head Inner Cartridge

Universal Marking for Deep Drilling Tools



CA - I - 0845 - R

- CA – Internal Cartridge
- I – Internal Cartridge
- 0845 – IC
- R – L/R HAND

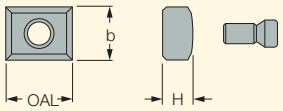
Spare Parts

Designation	Locking Screw	Key	Insert	Insert Clamping Screw	Key
CAID-080	SR 11201753-5	T-9/51	NPMX 0803..R-G	SR 11201753-2	T-7/51
CAID-0845	SR 11201753-6	T-15/51	TPMX 1403..R-G	SR 11201753-3	T-8/51
CAID-085	SR 11201753-5	T-9/51	NPMX 0803..R-G	SR 11201753-2	T-7/51
CAID-103	SR 11201752-1	T-15/51	TPMX 1704..R-G	SR 11201753-7	T-9/51
CAID-142	SR 11201756-7	HW 3.0	TPMX 2405..R-G	SR 11201753-9	T-15/51
CAID-170	SR 11201756-7	HW 3.0	TPMX 2807..R-G	SR 11201753-10	T-20/51

ISCARDEEPDRILL

SGP

Drilling Head Sub-Guide Pads



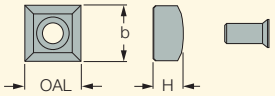
Designation	OAL	b	H
SGP-01	10.00	6.0	3.0
SGP-02	10.00	8.0	4.5
SGP-03	10.00	10.0	5.0
SGP-04	20.00	14.0	7.0

- Select an outer cartridge and pad for the required enlarged diameter.

ISCARDEEPDRILL

GPP

Drilling Head Guide Pad Protectors



Designation	OAL	b	H
GPP-04	8.00	8.0	4.4
GPP-05	8.00	8.0	3.5
GPP-06	8.00	8.0	4.5
GPP-07	10.00	10.0	6.0
GPP-08	14.00	14.0	7.5
GPP-09	18.00	18.0	9.0

- Select an outer cartridge and pad for the required enlarged diameter.

Recomended claming torque

Insert Screw	
	(N·m)
SR 11201753-2	1
SR 11201753-3	1.3
SR 11201753-7	2.3
SR 11201753-9	3.5
SR 11201753-7	5

Cartridge Screw	
	(N·m)
SR 11201752-1	3.5
SR 11201753-5	2.3
SR 11201753-5	3.5
SR 11201756-7	3
SR 11201756-10	2.2
SR 11201756-11	2.2
SR 11201756-12	3
SR 11201756-15	5

Guide Pad Screw	
	(N·m)
SR 14-571/5	3.5
SR 34-506-C	2.3
LS1206SSS	3

(+) Plus Parts for Diameter Enlargement.

By exchanging only the peripheral cartridge and guide pads, the original head diameter can be increased up to 5 mm.
(Standard plus parts = 1 mm, 2 mm , 3 mm , 4 mm , 5 mm)

+ Plus						
	+1	+2	+3	+4	+5	
	0.039”	0.079”	0.118”	0.157”	0.197”	

Plus Cartidge - CAOD

Original	+1 mm	+2 mm	+3 mm	+4 mm	+5 mm
CAOD-080	CAOD-080+1	CAOD-080+2	-	-	-
CAOD-0845	CAOD-0845+1	CAOD-0845+2	CAOD-0845+3	-	-
CAOD-103	CAOD-103+1	CAOD-103+2	CAOD-103+3	CAOD-103+4	-
CAOD-142	CAOD-142+1	CAOD-142+2	CAOD-142+3	CAOD-142+4	CAOD-142+5
CAOD-170	CAOD-170+1	CAOD-170+2	CAOD-170+3	CAOD-170+4	CAOD-170+5

Plus Cartidge - CAORC

Original Cartridge	+1 mm	+2 mm	+3 mm	+4 mm	+5 mm
CAORC-0845	CAORC-0845+1	CAORC-0845+2	CAORC-0845+3	-	-
CAORC-103	CAORC-103+1	CAORC-103+2	CAORC-103+3	CAORC-103+4	-
CAORC-142	CAORC-142+1	CAORC-142+2	CAORC-142+3	CAORC-142+4	CAORC-142+5
CAORC-170	CAORC-170+1	CAORC-170+2	CAORC-170+3	CAORC-170+4	CAORC-170+5

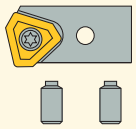
Plus Guide Pad

Original Pad	+1 mm	+2 mm	+3 mm	+4 mm	+5 mm
GPS-08-25-155	GPB-08-25-155+1	GPB-08-25-155+2	GPB-08-25-155+3	-	-
GPS-10-35-200	GPB-10-35-200+1	GPB-10-35-200+2	GPB-10-35-200+3	GPB-10-35-200+4	-
GPS-14-40-250	GPB-14-40-250+1	GPB-14-40-250+2	GPB-14-40-250+3	GPB-14-40-250+4	GPB-14-40-250+5
GPS-18-40-300	GPB-18-40-300+1	GPB-18-40-300+2	GPB-18-40-300+3	GPB-18-40-300+4	GPB-18-40-300+5

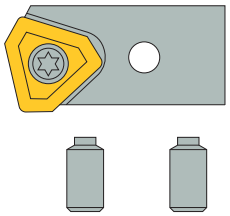
ISCARDEEPDRILL

CAOD

Drilling Head Peripheral Cartridge



Universal Marking for Deep Drilling Tools



CA - P - DR - 0800 - R

- CA: Peripheral Cartridge
- P: DR : Drilling, CB : Counter Bore
- DR: IC
- 0800: IC
- R: L/R HAND

Spare Parts

Designation	Adjustment Screw	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAOD-080+1	SR 11201755-4	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-080+2	SR 11201755-4	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-085+1	SR 11201755-7	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-085+2	SR 11201755-7	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-085+3	SR 11201755-7	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-103+1	SR 11201755-8	HW 2.5	SR 11201756-12	HW 3.0	TPMX 1704..R-G	SR 11201753-7
CAOD-103+2	SR 11201755-8	HW 2.5	SR 11201756-12	HW 3.0	TPMX 1704..R-G	SR 11201753-7
CAOD-103+3	SR 11201755-8	HW 2.5	SR 11201756-12	HW 3.0	TPMX 1704..R-G	SR 11201753-7
CAOD-103+4	SR 11201755-8	HW 2.5	SR 11201756-12	HW 3.0	TPMX 1704..R-G	SR 11201753-7
CAOD-142+1	SR 11201755-9	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405..R-G	SR 11201753-9
CAOD-142+2	SR 11201755-9	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405..R-G	SR 11201753-9
CAOD-142+3	SR 11201755-9	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405..R-G	SR 11201753-9
CAOD-142+4	SR 11201755-9	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405..R-G	SR 11201753-9
CAOD-142+5	SR 11201755-9	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405..R-G	SR 11201753-9
CAOD-170+1	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 2807..R-G	SR 11201753-10
CAOD-170+2	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 2807..R-G	SR 11201753-10
CAOD-170+3	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 2807..R-G	SR 11201753-10
CAOD-170+4	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 2807..R-G	SR 11201753-10
CAOD-170+5	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 2807..R-G	SR 11201753-10

Machining Recommendations

ISO	Material		Condition	Tensile Strength [N/mm²]	Material Group No.(1)	Hardness HB	Chipbreaker		
								Troubleshooting	
							First Choice	Fracture	Wear
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	1	125	G IC908	BG IC806	B IC9025
		>= 0.25 %C	Annealed	650	2	190			
		< 0.55 %C	Quenched and tempered	850	3	250			
		>= 0.55 %C	Annealed	750	4	220			
			Quenched and tempered	1000	5	300			
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	6	200	G IC908	BG IC806	B IC9025
			Quenched and tempered	930	7	275			
				1000	8	300			
				1200	9	350			
	High alloyed steel, cast steel and tool steel		Annealed	680	10	200	G IC908	BG IC806	B IC9025
			Quenched and tempered	1100	11	325			
	Stainless steel and cast steel		Ferritic/martensitic	680	12	200	G IC908	BG IC806	B IC9025
			Martensitic	820	13	240			
M	Stainless steel and cast steel		Austenitic, duplex	600	14	180	G IC806	B IC908	B IC9025
K	Grey cast iron (GG)		Ferritic/pearlitic		15	180	G IC908	G IC806	B IC9025
			Pearlitic/martensitic		16	260			
	Nodular cast iron (GGG)		Ferritic		17	160			
			Pearlitic		18	250			
	Malleable cast iron		Ferritic		19	130			
			Pearlitic		20	230			
N	Aluminum-wrought alloys		Not hardenable		21	60	G IC908	G IC806	B IC9025
			Hardenable		22	100			
	Aluminum-cast alloys	<=12% Si	Not hardenable		23	75			
			Hardenable		24	90			
		>12% Si	High temperature		25	130			
	Copper alloys	>1% Pb	Free cutting		26	110			
			Brass		27	90			
			Electrolitic copper		28	100			
	Non-metallic		Duroplastics, fiber plastics		29				
			Hard rubber		30				
S	High temp. alloys	Fe based	Annealed		31	200	B IC806	B IC908	B IC9025
			Hardened		32	280			
		Ni or Co based	Annealed		33	250			
			Hardened		34	350			
			Cast		35	320			
	Titanium alloys		Pure	400	36				
			Alpha+beta alloys hardened	1050	37				
H	Hardened steel		Hardened 55 HRC		38		B IC806	B IC908	B IC908
			Hardened 60 HRC		39				
	Chilled cast iron		Cast		40	400			
	Cast iron		Hardened 55 HRC		41				

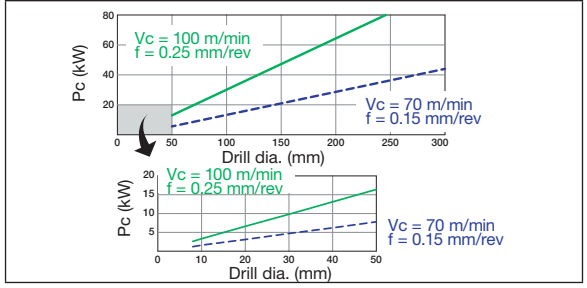
(1) For material groups see pages 495-524

Adjustable Solid Drill Heads DSD-EC, DDD-EC, DSD-IC					
Dia. Range	**38.00-39.99**	**40.00-51.99**	**52.00-63.99**	**64.00-84.99**	**85.00-293.00**
V_c (m/min)	**Feed Rate f (mm/rev)**				
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
50-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
50-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-110	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-110	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-110	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
80-140	0.20-0.30	0.20-0.30	0.24-0.32	0.24-0.32	0.25-0.40
80-140	0.20-0.30	0.20-0.30	0.24-0.32	0.24-0.32	0.25-0.40
80-140	0.20-0.30	0.20-0.30	0.24-0.32	0.24-0.32	0.25-0.40
80-140	0.20-0.30	0.20-0.30	0.24-0.32	0.24-0.32	0.25-0.40
80-140	0.20-0.30	0.20-0.30	0.24-0.32	0.24-0.32	0.25-0.40
80-140	0.20-0.30	0.20-0.30	0.24-0.32	0.24-0.32	0.25-0.40
100-200	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
100-200	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
100-200	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
100-200	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
100-200	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
100-200	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
100-200	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
100-200	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
20-65	0.06-0.13	0.08-0.18	0.13-0.23	0.13-0.23	0.18-0.28
20-65	0.06-0.13	0.08-0.18	0.13-0.23	0.13-0.23	0.18-0.28
20-65	0.06-0.13	0.08-0.18	0.13-0.23	0.13-0.23	0.18-0.28
30-100	0.06-0.13	0.08-0.18	0.13-0.23	0.13-0.23	0.18-0.28
30-100	0.06-0.13	0.08-0.18	0.13-0.23	0.13-0.23	0.18-0.28
30-60	0.06-0.13	0.08-0.18	0.13-0.23	0.13-0.23	0.18-0.28
30-60	0.06-0.13	0.08-0.18	0.13-0.23	0.13-0.23	0.18-0.28
30-80	0.06-0.13	0.08-0.18	0.13-0.23	0.13-0.23	0.15-0.28
30-80	0.06-0.13	0.08-0.18	0.13-0.23	0.13-0.23	0.15-0.28
30-80	0.06-0.13	0.08-0.18	0.13-0.23	0.13-0.23	0.15-0.28
30-80	0.06-0.13	0.08-0.18	0.13-0.23	0.13-0.23	0.15-0.28

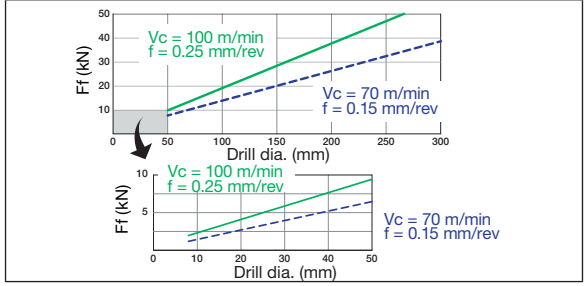
Technical Guide

Setting guidelines for cutting loads, fluid pressure and flow rate during STS operation

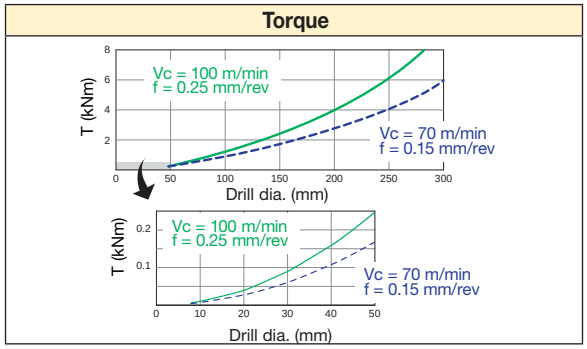
Net power



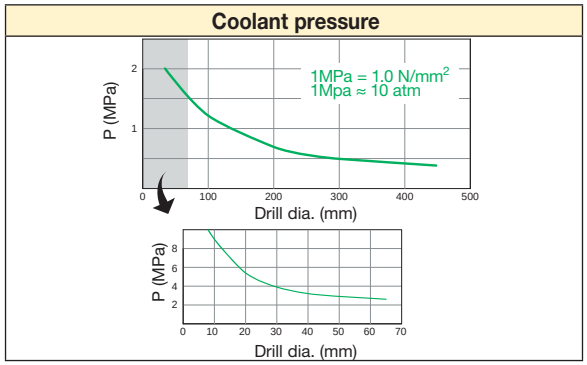
Feed force



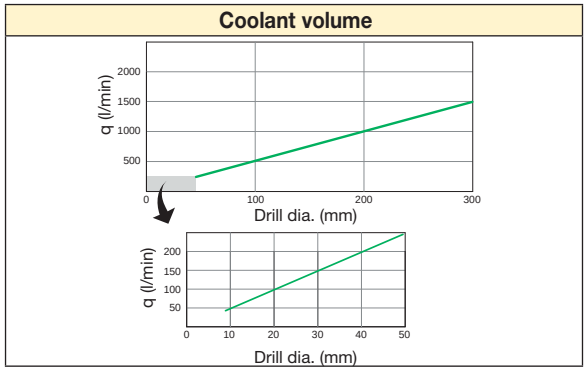
Torque



Coolant pressure

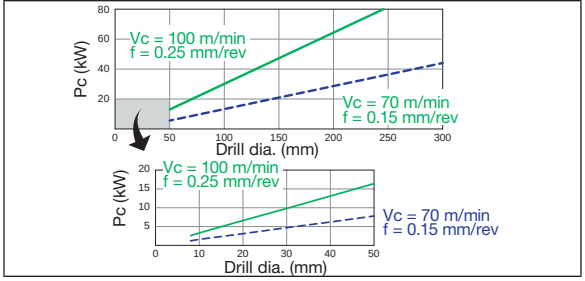


Coolant volume

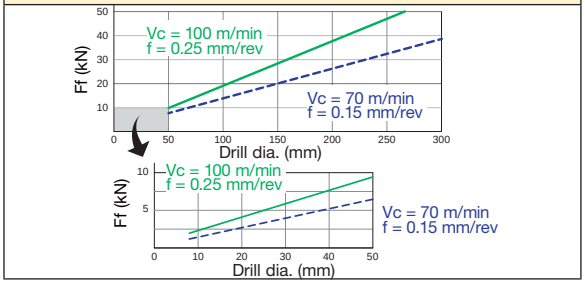


Setting guidelines for cutting loads, fluid pressure and flow rate during DTS operation

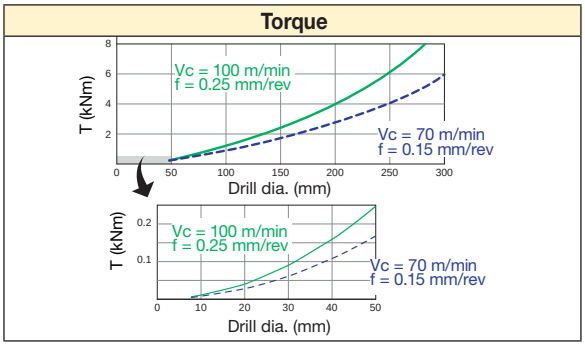
Net power



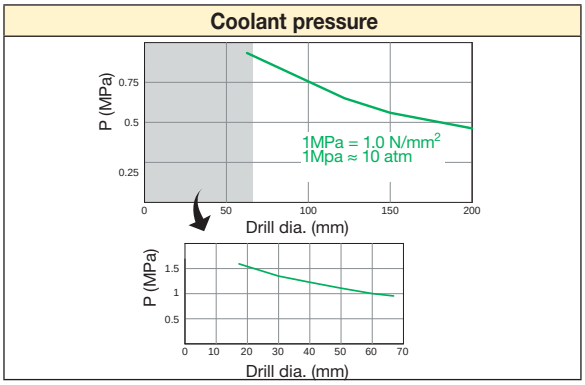
Feed force



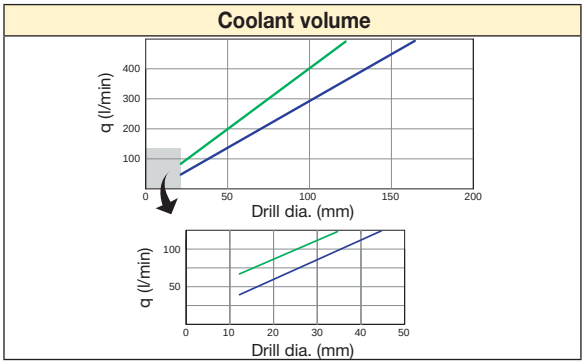
Torque



Coolant pressure



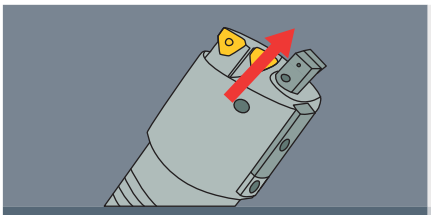
Coolant volume



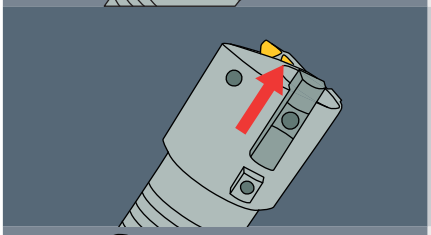
Technical Information - Cartridge Style Drill Head Diameter Settings

The drill head diameter is set and inspected with a master insert in our final inspection. However, the inserts in the market have a tolerance fluctuation so each time you index the insert, the diameter must be adjusted as per the following method.

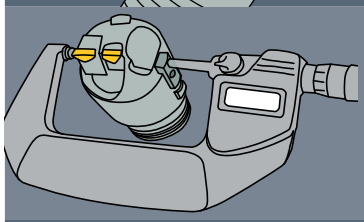
Note: When a corner change is made on the insert, it must be adjusted to the correct size or damage can be caused to the head body or workpiece material.



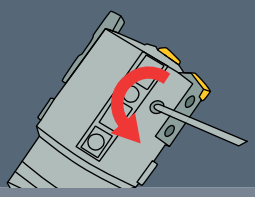
1. Remove the inner cartridge to avoid interference with the guide screw.



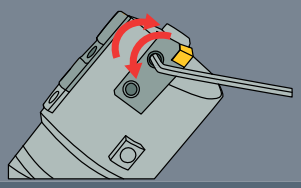
2. The dimensional guide pad must be slid forward to measure the diameter.
   2.1 Loosen the lock screw and slide the guide pad forward.
   2.2 Re-tighten the lock screw at the measuring position.



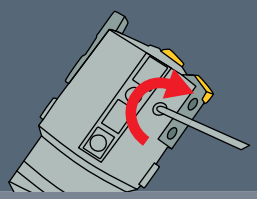
3. Measure the diameter with a micrometer. We recommend setting the tool diameter at h8 tolerance to the cutting diameter. If the diameter is incorrect, go to step 4 below. If it's correct, go to step 5 below.



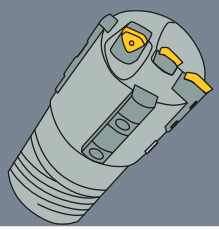
4. Adjust the outer cartridge
   4.1 First loosen the lock screw of the outer cartridge and then tighten it slightly.



4.2 Proceed to adjust the diameter, using the 2 adjustment screws and measure with a micrometer.



4.3 When set to the size, re-tighten the lock screw.
4.4 Recheck the diameter with a micrometer. If it is still out of tolerance, repeat the procedure from steps 1-4.
Note: Please make sure to tighten the lock screw firmly before use. If loose, the cartridge may move and cause serious problems during machining.



5. Slide the dimensional guide pad back to the original position and tighten the lock screw.
6. Replace the inner cartridge and tighten the lock screw.
   Note: Please check that all lock screws are firmly tightened, as they may come loose if vibration occurs during drilling.

Brazed Drilling Head

Single tube system – external thread:

DSD-E0 - Deep Single Tube Drills with External Single Thread Connection and a Brazed Single Tip (8-14.8 dia.)

DSD-E1 - Deep Single Tube Drills with External 2 and 4 Start Thread Connections and a Single Brazed Tip (12.6-20 dia.)

DSD-E2/E3 - Deep Single Tube Drills with External 2 and 4 Start Thread Connections and 2 or 3 Brazed Tips (12.6-65 dia.)

Double tube system:

DDD-E3 - Deep Double Tube Drills with External 4 Start Thread Connection and Brazed Tips (18.4-65 dia.)

Grade of Brazed Heads

D	S	D	-	E	3	25.28	DT	-	PZXT

D	Deep drilling / Counter boring
I	Inch - Deep drilling / Counter boring
S	Special - Deep drilling / Counter boring

Drill Diameter

Chipbreaker
Brazed drill

S	Single Tube
D	Double Tube

D	Drill
C	Counterbore with Through Hole
T	Counterbore w/o Through Hole
TR	Trepanning

E	External Thread
I	Internal Thread

A	Adjustable Insert
C	Cartridge
F	Fast Feed
0	Brazed, 1 tip, 1 thread start (MBU type)
1	Brazed, 1 tip (UTE type)
2	Brazed, 2 tip (BTU type)
3	Brazed, 3 tip (BTU, ETU type)

Grade
Brazed drill

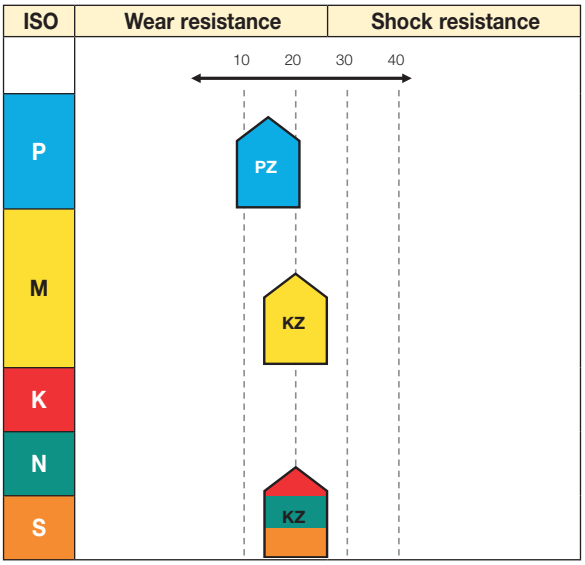
FB	Fixed pocket (FNBM Type)
FT	Fixed pocket (FNTR Type)

Grade of Brazed Heads

DSD-E0

DSD-E0 (MBU style) STS

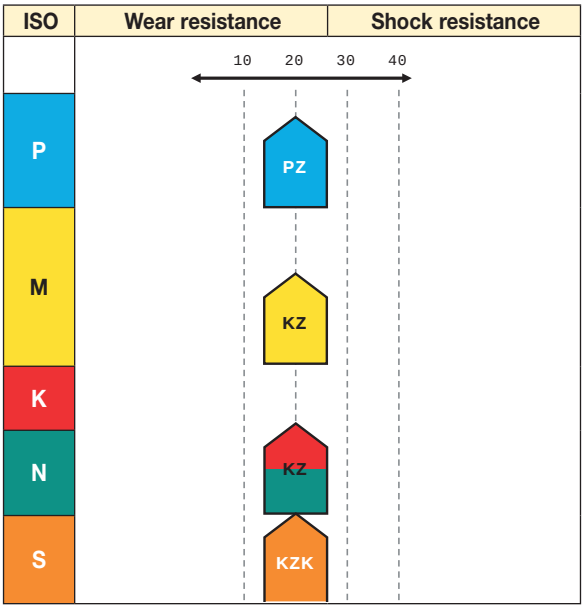
Ø8 -14.79 mm (Ø.315– .582")



DSD-E1

DSD-E1 (UTE style) STS

Ø12.60 ~ 20.00 mm (Ø.496" ~ .787")



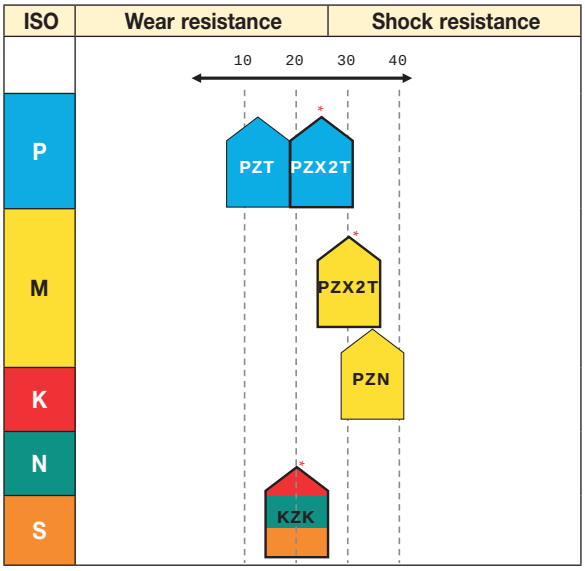
DSD-E2

DSD-E2 (BTU 2tip style) STS

Ø12.60 ~ 20.00 mm (Ø.496" ~ .787")

DSD-E3

DSD-E3 (BTU style) STS	DDD-E3 (ETU style) STS
	
Ø15.60 ~ 65.00mm (Ø.615" ~ 2.559")	Ø18.40 ~ 65.00mm (Ø.725" ~ 2.559")



* indicates the first recommendation

Tool Grades

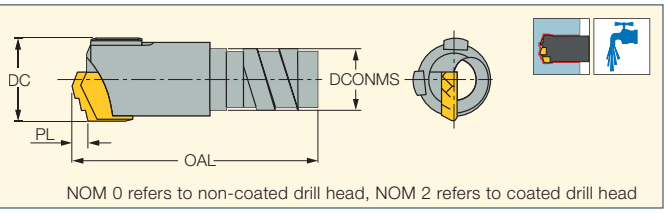
Application	Grade	Coating		Features	Brazed Drill Heads			
		Main composition	Thickness / µm		DSD-E0	DSD-E1	DSD-E2/E3	DDD-E3
								
1122		TiAlCr	2.5	• High wear resistance • Suitable for steel, cast iron, and difficult-to-cut material	✓	✓	✓	✓
P	P10 - P30							
K	K15 - K25							
N	N15 - N25							
S	S15 - S25							
H	H15 - H25							
1132		TiAlCr	2.5	• Good balance between wear and chipping resistance • Suitable for steel and stainless steel under general cutting conditions			✓	✓
P	P20 - P30							
M	M25 - M35							
2122		TiAlCr	2.5	• High fracture resistance • Suitable for stainless steel			✓	✓
M	M30 - M40							
3112		TiAlCr	2.5	• Good balance between wear and fracture resistance	✓	✓		
M	M15 - M25							
K	K10 - K20							
N	N15 - N25							
S	S15 - S25							
H	H15 - H25							
3132		TiAlCr	2.5	• First choice for heat-resistant alloy under general cutting conditions		✓	✓	✓
K	K15 - K25							
N	N10 - N20							
S	S15 - S25							
H	H15 - H25							

Note: Being brazed tools, the grade codes represent the grade combination of the brazed carbide tip and guide pad grades.
They do not represent the individual grade of carbide tips or guide pads.

ISCARDEEPDRILL

DSD-E0

Deep Single Tube Drills with External Single Thread Connection and a Brazed Single Tip (8-14.8 dia.)



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head

Designation	DCN(1)	DCX(2)	OAL	DCONMS	PL	Ts(3)
DSD-E0 8.00-8.99 NOM 0	8.00	8.99	35.00	6.00	2.00	TS001
DSD-E0 8.00-8.99 NOM 2	8.00	8.99	35.00	6.00	2.00	TS001
DSD-E0 9.00-9.99 NOM 0	9.00	9.99	35.00	7.20	2.00	TS002
DSD-E0 9.00-9.99 NOM 2	9.00	9.99	35.00	7.20	2.00	TS002
DSD-E0 10.00-10.99 NOM 0	10.00	10.99	35.20	7.60	2.20	TS003
DSD-E0 10.00-10.99 NOM 2	10.00	10.99	35.20	7.60	2.20	TS003
DSD-E0 11.00-11.99 NOM 0	11.00	11.99	35.20	8.60	2.20	TS004
DSD-E0 11.00-11.99 NOM 2	11.00	11.99	35.20	8.60	2.20	TS004
DSD-E0 12.00-13.49 NOM 0	12.00	13.49	35.30	9.10	2.30	TS005
DSD-E0 12.00-13.49 NOM 2	12.00	13.49	35.30	9.10	2.30	TS005
DSD-E0 13.50-14.79 NOM 0	13.50	14.79	35.40	10.80	2.40	TS006
DSD-E0 13.50-14.79 NOM 2	13.50	14.79	35.40	10.80	2.40	TS006

- The drill tip is supplied in a grade that is suitable to machine the material group indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron.
- For user guide and quotation form, see pages 268-269, 274-280 • Ordering example: DSD-E0 11.30 DT-PO

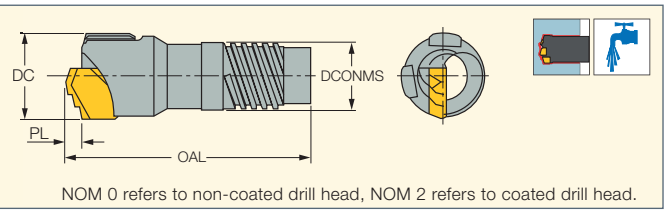
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For holders, see pages: TS*** (263)

ISCARDEEPDRILL

DSD-E1

Deep Single Tube Drills with External 2 and 4 Start Thread Connections and a Single Brazed Tip (12.6-20 dia.)



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	DCN(1)	DCX(2)	OAL	DCONMS	PL	Threads(3)	Ts(4)
DSD-E1 12.60-13.60 NOM 0	12.60	13.60	42.50	9.60	2.30	2	TS-I01
DSD-E1 12.60-13.60 NOM 2	12.60	13.60	42.50	9.60	2.30	2	TS-I01
DSD-E1 13.61-14.60 NOM 0	13.61	14.60	42.70	10.60	2.40	2	TS-I02
DSD-E1 13.61-14.60 NOM 2	13.61	14.60	42.70	10.60	2.40	2	TS-I02
DSD-E1 14.61-15.59 NOM 0	14.61	15.59	42.70	11.60	3.00	2	TS-I03
DSD-E1 14.61-15.59 NOM 2	14.61	15.59	42.70	11.60	3.00	2	TS-I03
DSD-E1 15.60-16.70 NOM 0	15.60	16.70	42.70	11.60	2.40	4	TS-I0
DSD-E1 15.60-16.70 NOM 2	15.60	16.70	42.70	11.60	2.40	4	TS-I0
DSD-E1 16.71-17.70 NOM 0	16.71	17.70	43.20	13.60	3.00	4	TS-I1
DSD-E1 16.71-17.70 NOM 2	16.71	17.70	43.20	13.60	3.00	4	TS-I1
DSD-E1 17.71-18.90 NOM 0	17.71	18.90	43.60	14.50	3.30	4	TS-I2
DSD-E1 17.71-18.90 NOM 2	17.71	18.90	43.60	14.50	3.30	4	TS-I2
DSD-E1 18.91-20.00 NOM 0	18.91	20.00	43.60	15.50	3.30	4	TS-I3
DSD-E1 18.91-20.00 NOM 2	18.91	20.00	43.60	15.50	3.30	4	TS-I3

- The drill tip is supplied in a grade that is suitable to machine the material group indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron.
- For user guide and quotation form, see pages 268-269, 274-280 • Ordering example: DSD-E1 14.50 DT-PO

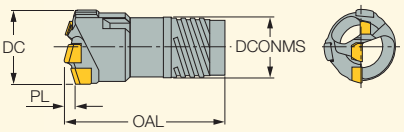
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) No. of thread starts
(4) Tube designation

For holders, see pages: TS-I** (264)

ISCARDEEPDRILL

DSD-E2/E3

Deep Single Tube Drills with External 2 and 4 Start Thread Connections and 2 or 3 Brazed Tips (12.6-65 dia.)



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	DCN[1]	DCX[2]	OAL	DCONMS	PL	Threads[3]	Ts[4]
DSD-E2 12.60-13.10 NOM 0	12.60	13.10	43.00	9.60	1.10	2	TS-I01
DSD-E2 12.60-13.10 NOM 2	12.60	13.10	43.00	9.60	1.10	2	TS-I01
DSD-E2 13.11-13.60 NOM 0	13.11	13.60	43.00	9.60	1.10	2	TS-I01
DSD-E2 13.11-13.60 NOM 2	13.11	13.60	43.00	9.60	1.10	2	TS-I01
DSD-E2 13.61-14.10 NOM 0	13.61	14.10	43.00	10.60	1.20	2	TS-I02
DSD-E2 13.61-14.10 NOM 2	13.61	14.10	43.00	10.60	1.20	2	TS-I02
DSD-E2 14.11-14.60 NOM 0	14.11	14.60	43.00	10.60	1.20	2	TS-I02
DSD-E2 14.11-14.60 NOM 2	14.11	14.60	43.00	10.60	1.20	2	TS-I02
DSD-E2 14.61-15.10 NOM 0	14.61	15.10	43.00	11.60	1.30	2	TS-I03
DSD-E2 14.61-15.10 NOM 2	14.61	15.10	43.00	11.60	1.30	2	TS-I03
DSD-E2 15.11-15.59 NOM 0	15.11	15.59	43.00	11.60	1.30	2	TS-I03
DSD-E2 15.11-15.59 NOM 2	15.11	15.59	43.00	11.60	1.30	2	TS-I03
DSD-E3 15.60-16.20 NOM 0	15.60	16.20	43.00	12.60	2.70	4	TS-I0
DSD-E3 15.60-16.20 NOM 2	15.60	16.20	43.00	12.60	2.70	4	TS-I0
DSD-E3 16.21-16.70 NOM 0	16.21	16.70	43.00	12.60	2.70	4	TS-I0
DSD-E3 16.21-16.70 NOM 2	16.21	16.70	43.00	12.60	2.70	4	TS-I0
DSD-E3 16.71-17.20 NOM 0	16.71	17.20	43.00	13.60	2.70	4	TS-I1
DSD-E3 16.71-17.20 NOM 2	16.71	17.20	43.00	13.60	2.70	4	TS-I1
DSD-E3 17.21-17.70 NOM 0	17.21	17.70	43.00	13.60	2.70	4	TS-I1
DSD-E3 17.21-17.70 NOM 2	17.21	17.70	43.00	13.60	2.70	4	TS-I1
DSD-E3 17.71-18.40 NOM 0	17.71	18.40	47.00	14.50	2.80	4	TS-I2
DSD-E3 17.71-18.40 NOM 2	17.71	18.40	47.00	14.50	2.80	4	TS-I2
DSD-E3 18.41-18.90 NOM 0	18.41	18.90	47.00	14.50	2.90	4	TS-I2
DSD-E3 18.41-18.90 NOM 2	18.41	18.90	47.00	14.50	2.90	4	TS-I2
DSD-E3 18.91-20.00 NOM 0	18.91	20.00	47.00	15.50	2.90	4	TS-I3
DSD-E3 18.91-20.00 NOM 2	18.91	20.00	47.00	15.50	2.90	4	TS-I3
DSD-E3 20.01-21.80 NOM 0	20.01	21.80	52.50	16.00	3.20	4	TS-I4
DSD-E3 20.01-21.80 NOM 2	20.01	21.80	52.50	16.00	3.20	4	TS-I4
DSD-E3 21.81-24.10 NOM 0	21.81	24.10	56.00	18.00	3.20	4	TS-I5
DSD-E3 21.81-24.10 NOM 2	21.81	24.10	56.00	18.00	3.20	4	TS-I5
DSD-E3 24.11-26.40 NOM 0	24.11	26.40	57.50	19.50	3.50	4	TS-I6
DSD-E3 24.11-26.40 NOM 2	24.11	26.40	57.50	19.50	3.50	4	TS-I6
DSD-E3 26.41-28.70 NOM 0	26.41	28.70	57.50	21.00	3.70	4	TS-I7
DSD-E3 26.41-28.70 NOM 2	26.41	28.70	57.50	21.00	3.70	4	TS-I7
DSD-E3 28.71-31.00 NOM 0	28.71	31.00	63.50	23.50	4.00	4	TS-I8
DSD-E3 28.71-31.00 NOM 2	28.71	31.00	63.50	23.50	4.00	4	TS-I8
DSD-E3 31.01-33.30 NOM 0	31.01	33.30	63.50	25.50	4.30	4	TS-I9
DSD-E3 31.01-33.30 NOM 2	31.01	33.30	63.50	25.50	4.30	4	TS-I9
DSD-E3 33.31-36.20 NOM 0	33.31	36.20	63.50	28.00	4.50	4	TS-I10
DSD-E3 33.31-36.20 NOM 2	33.31	36.20	63.50	28.00	4.50	4	TS-I10
DSD-E3 36.21-39.60 NOM 0	36.21	39.60	73.50	30.00	4.80	4	TS-I11
DSD-E3 36.21-39.60 NOM 2	36.21	39.60	73.50	30.00	4.80	4	TS-I11
DSD-E3 39.61-43.00 NOM 0	39.61	43.00	73.50	33.00	5.60	4	TS-I12
DSD-E3 39.61-43.00 NOM 2	39.61	43.00	73.50	33.00	5.60	4	TS-I12
DSD-E3 43.01-47.00 NOM 0	43.01	47.00	75.00	36.00	5.40	4	TS-I13
DSD-E3 43.01-47.00 NOM 2	43.01	47.00	75.00	36.00	5.40	4	TS-I13
DSD-E3 47.01-51.70 NOM 0	47.01	51.70	75.00	39.00	6.10	4	TS-I14
DSD-E3 47.01-51.70 NOM 2	47.01	51.70	75.00	39.00	6.10	4	TS-I14
DSD-E3 51.71-56.20 NOM 0	51.71	56.20	82.00	43.00	6.50	4	TS-I15
DSD-E3 51.71-56.20 NOM 2	51.71	56.20	82.00	43.00	6.50	4	TS-I15
DSD-E3 56.21-60.60 NOM 0	56.21	60.60	84.00	47.00	6.60	4	TS-I16
DSD-E3 56.21-60.60 NOM 2	56.21	60.60	84.00	47.00	6.60	4	TS-I16
DSD-E3 60.61-65.00 NOM 0	60.61	65.00	84.00	47.00	7.00	4	TS-I17
DSD-E3 60.61-65.00 NOM 2	60.61	65.00	84.00	47.00	7.00	4	TS-I17

• The drill tip is supplied in a grade that is suitable to machine the material group indicated in the drill head designation: ISO P, K, M, N materials • For user guide and quotation form, see pages 268-269, 274-280 • Ordering example: DSD-E3 43.30 DT-PO

[1] Cutting diameter minimum

[2] Cutting diameter maximum

[3] Number of thread starts

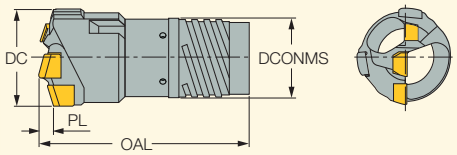
[4] Tube designation

For holders, see pages: TS-I** (264)

ISCARDEEPDRILL

DDD-E3

Deep Double Tube Drills with External 4 Start Thread Connection and Brazed Tips (18.4-65 dia.)



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	DCN(1)	DCX(2)	OAL	DCONMS	PL	Ts(3)	Tsi(4)
DDD-E3 18.41-20.00 NOM 0	18.41	20.00	50.00	16.00	2.90	TDO-I0	TDI-N0
DDD-E3 18.41-20.00 NOM 2	18.41	20.00	50.00	16.00	2.90	TDO-I0	TDI-N0
DDD-E3 20.01-21.80 NOM 0	20.01	21.80	56.00	18.00	3.20	TDO-I1	TDI-N1
DDD-E3 20.01-21.80 NOM 2	20.01	21.80	56.00	18.00	3.20	TDO-I1	TDI-N1
DDD-E3 21.81-24.10 NOM 0	21.81	24.10	56.00	19.50	3.20	TDO-I2	TDI-N2
DDD-E3 21.81-24.10 NOM 2	21.81	24.10	56.00	19.50	3.20	TDO-I2	TDI-N2
DDD-E3 24.11-26.40 NOM 0	24.11	26.40	57.50	21.00	3.50	TDO-I3	TDI-N3
DDD-E3 24.11-26.40 NOM 2	24.11	26.40	57.50	21.00	3.50	TDO-I3	TDI-N3
DDD-E3 26.41-28.70 NOM 0	26.41	28.70	60.50	23.50	3.70	TDO-I4	TDI-N4
DDD-E3 26.41-28.70 NOM 2	26.41	28.70	60.50	23.50	3.70	TDO-I4	TDI-N4
DDD-E3 28.71-31.00 NOM 0	28.71	31.00	63.50	25.50	4.00	TDO-I5	TDI-N5
DDD-E3 28.71-31.00 NOM 2	28.71	31.00	63.50	25.50	4.00	TDO-I5	TDI-N5
DDD-E3 31.01-33.30 NOM 0	31.01	33.30	63.50	28.00	4.10	TDO-I6	TDI-N6
DDD-E3 31.01-33.30 NOM 2	31.01	33.30	63.50	28.00	4.10	TDO-I6	TDI-N6
DDD-E3 33.31-36.20 NOM 0	33.31	36.20	70.50	30.00	4.50	TDO-I7	TDI-N7
DDD-E3 33.31-36.20 NOM 2	33.31	36.20	70.50	30.00	4.50	TDO-I7	TDI-N7
DDD-E3 36.21-39.60 NOM 0	36.21	39.60	73.50	33.00	4.80	TDO-I8	TDI-N8
DDD-E3 36.21-39.60 NOM 2	36.21	39.60	73.50	33.00	4.80	TDO-I8	TDI-N8
DDD-E3 39.61-43.00 NOM 0	39.61	43.00	73.50	36.00	5.30	TDO-I9	TDI-N9
DDD-E3 39.61-43.00 NOM 2	39.61	43.00	73.50	36.00	5.30	TDO-I9	TDI-N9
DDD-E3 43.01-47.00 NOM 0	43.01	47.00	75.00	39.00	5.50	TDO-I10	TDI-N10
DDD-E3 43.01-47.00 NOM 2	43.01	47.00	75.00	39.00	5.50	TDO-I10	TDI-N10
DDD-E3 47.01-51.70 NOM 0	47.01	51.70	79.00	43.00	6.10	TDO-I11	TDI-N11
DDD-E3 47.01-51.70 NOM 2	47.01	51.70	79.00	43.00	6.10	TDO-I11	TDI-N11
DDD-E3 51.71-56.20 NOM 0	51.71	56.20	82.00	47.00	6.50	TDO-I12	TDI-N12
DDD-E3 51.71-56.20 NOM 2	51.71	56.20	82.00	47.00	6.50	TDO-I12	TDI-N12
DDD-E3 56.21-65.00 NOM 0	56.21	65.00	84.00	51.00	6.60	TDO-I13	TDI-N13
DDD-E3 56.21-65.00 NOM 2	56.21	65.00	84.00	51.00	6.60	TDO-I13	TDI-N13

• The drill tip is supplied in a grade that is suitable to machine the material group indicated in the drill head designation: ISO P, K, M, N materials • NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head. • Ordering example: DDD-E3 47.10 OT-P0 • For quotation form and user guide, see pages 268-269, 274-280

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Outer tube designation

(4) Inner tube designation

For holders, see pages: TDO-I (D18.41-65.00) (266)

Universal Marking for Deep Drilling Tools

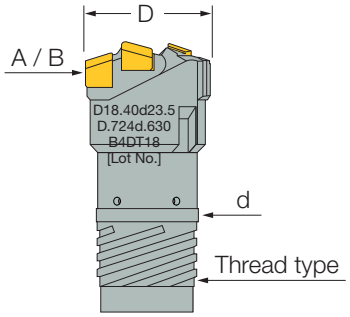
D- **Tool diameter**
Metric- D18.40
Inch- D.724

d- Pilot diameter
Metric- d23.5
Inch- d.630

Tool style
A- Single cutting edge
B- Multiple cutting edges

Thread type
1ST- Single-start thread single tube
2ST- Two-start thread single tube
4ST- Four-start thread single tube
4DT- Four-start thread double tube

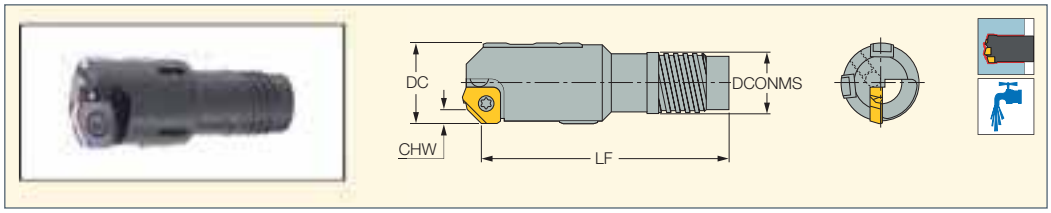
18- Tube diameter



ISCARDEEPDRILL

DSC-EA

Deep Single Tube Counterbore with Through Hole, External 4 Start Thread and Adjustable Diameter (25-40 dia.)



Designation	DCN(1)	DCX(2)	CHW	LF	DCONMS	Ts(3)
DSC-EA 25.00-26.40	25.00	26.40	3.5	70.00	19.50	TS-I6
DSC-EA 26.41-28.70	26.41	28.70	3.5	70.00	21.00	TS-I7
DSC-EA 28.71-31.00	28.71	31.00	3.5	75.00	23.50	TS-I8
DSC-EA 31.01-33.30	31.01	33.30	3.5	75.00	25.50	TS-I9
DSC-EA 33.31-36.20	33.31	36.20	3.5	75.00	28.00	TS-I10
DSC-EA 36.21-39.60	36.21	39.60	3.5	90.00	30.00	TS-I11
DSC-EA 39.61-39.99	39.61	39.99	3.5	90.00	33.00	TS-I12

- For user guide and quotation form, see pages 272-280 • Ordering example: DSC-EA 33.20

(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For inserts, see pages: XPMT-45 (234) • XPMT-UB (234)
For holders, see pages: TS-I** (264)

DSC-EA

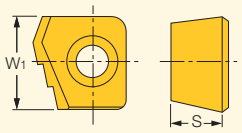
Diameter	Insert	Insert Clamping Screw	QTY	Guide Pads	QTY	SCREW	QTY	Key
25.00-29.99	XPMT 16002-45	SR 11201754-4	1 PCS	GPS-06-20-120	2 PCS	SR 34-508	2 PCS	T-7/5
30.00-37.99	XPMT 16002-45	SR 11201754-4	1 PCS	GPS-07-20-120	3 PCS	SR11201753-4	3 PCS	T-9/5
38.00-39.99	XPMT 16002-45	SR 11201754-4	1 PCS	GPS-08-25-155	3 PCS	SR 34-506-C	3 PCS	T-9/5

Diameter	Guide Pad Protectors	QTY	Screw	QTY	Key	Sub Guide Pad	QTY	Screw	QTY	Key
25.00-29.99	GPP-04	2 PCS	SR11201753-4	2 PCS	T-9/5	SGP-02	1 PCS	SR11201753-1	1 PCS	T-7/5
30.00-37.99	GPP-05	3 PCS	SR11201753-4	3 PCS	T-9/5	SGP-02	1 PCS	SR11201753-1	1 PCS	T-7/5
38.00-39.99	GPP-06	3 PCS	SR11201753-4	3 PCS	T-9/5	SGP-02	1 PCS	SR11201753-4	1 PCS	T-9/5

ISCARDEEPDRILL

XPMT-UB

Inserts for DSD/DSC
Drilling / Boring Heads



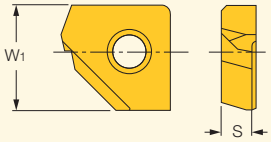
Designation	Dimensions W1	S	Tough ↔ Hard IC908	IC520M
XPMT 16002UB	9.50	2.80	●	
XPMT 18003UB	11.00	3.05	●	
XPMT21003UB	13.00	3.55		●
XPMT 25003UB	14.50	3.40	●	

For tools, see pages: DDC-EA (246) • DSC-EA (233) • DSC-IA (240)

ISCARDEEPDRILL

XPMT-45

Inserts for DSC Boring Heads



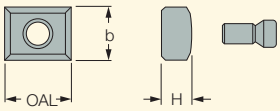
Designation	Dimensions W1	S	IC950
XPMT 16002-45	9.50	2.80	●

For tools, see pages: DDC-EA (246) • DSC-IA (240)

ISCARDEEPDRILL

SGP

Boring Head Sub-Guide Pads



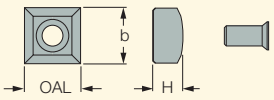
Designation	OAL	b	H
SGP-01	10.00	6.0	3.0
SGP-02	10.00	8.0	4.5
SGP-03	10.00	10.0	5.0
SGP-04	20.00	14.0	7.0

• Select an outer cartridge and pad for the required enlarged diameter.

ISCARDEEPDRILL

GPP

Boring Head Guide
Pad Protectors



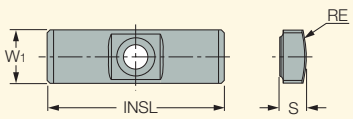
Designation	OAL	b	H
GPP-04	8.00	8.0	4.4
GPP-05	8.00	8.0	3.5
GPP-06	8.00	8.0	4.5
GPP-07	10.00	10.0	6.0
GPP-08	14.00	14.0	7.5
GPP-09	18.00	18.0	9.0

• Select an outer cartridge and pad for the required enlarged diameter.

ISCARDEEPDRILL

GPS

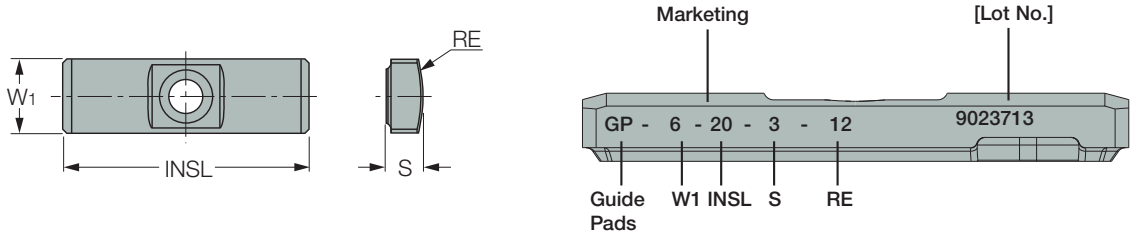
Deep Drilling Solid
Carbide Guide Pads



Designation	Dimensions				Tough ↔ Hard		
	W1	INSL	S	RE	IC928	IC950	IC908
GPS-04-16-055-DC	4.0	16.00	2.00	5.50	•		•
GPS-05-18-060-DC	5.0	18.00	2.50	6.00	•		•
GPS-05-18-075-DC	5.0	18.00	2.50	7.50	•		•
GPS-06-20-075-DC	6.0	20.00	3.00	7.50			•
GPS-06-20-075	6.0	20.00	3.00	7.50		•	
GPS-06-20-085-DC	6.0	20.00	3.00	8.50	•		•
GPS-06-20-085	6.0	20.00	3.00	8.50		•	
GPS-06-20-100-DC	6.0	20.00	3.00	10.00	•		•
GPS-06-20-100	6.0	20.00	3.00	10.00		•	
GPS-06-20-120-DC	6.0	20.00	3.00	12.00	•		•
GPS-06-20-120	6.0	20.00	3.00	12.00		•	
GPS-07-20-120-DC	7.0	20.00	3.50	12.00	•		•
GPS-07-20-120	7.0	20.00	3.50	12.00		•	
GPS-08-25-155-DC	8.0	25.00	4.50	15.50	•		•
GPS-08-25-155	8.0	25.00	4.50	15.50		•	
GPS-10-30-200-DC	10.0	30.00	4.50	20.00	•		•
GPS-10-30-200	10.0	30.00	4.50	20.00		•	
GPS-10-35-200-DC	10.0	35.00	6.00	20.00	•		•
GPS-10-35-200	10.0	35.00	6.00	20.00		•	
GPS-12-35-250-DC	12.0	35.00	5.50	25.00	•		•
GPS-12-35-250	12.0	35.00	5.50	25.00		•	
GPS-14-40-250-DC	14.0	40.00	7.50	25.00	•		•
GPS-14-40-250	14.0	40.00	7.50	25.00		•	
GPS-18-40-300-DC	18.0	40.00	9.00	30.00	•		•

• DC- Double Chamfer

Universal Marking for Deep Drilling Tools



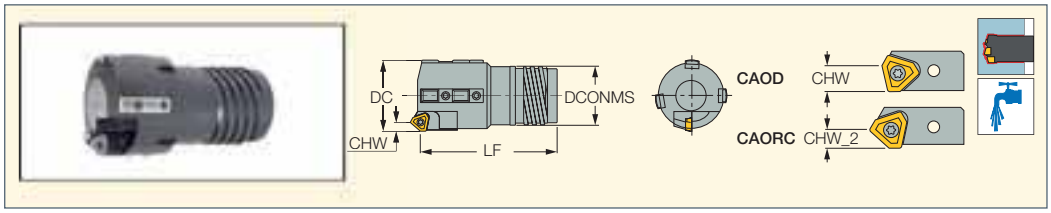
Guide Pad Grade Recommendation

	Oil Coolant			Water Based Coolant		
Priority	1	2	3	1	2	3
ISO-P	IC950	IC908	IC928	IC928	IC908	-
ISO-K	IC950	IC908	IC928	IC928	IC908	-
ISO-M	IC928	IC908	IC950	IC928	IC908	-
ISO-S	IC928	IC908	IC950	IC928	IC908	-

ISCARDEEPDRILL

DSC-EC

Deep Single Tube Counterbore with Through Hole, External 4 Start Thread Connection and a Cartridge (40-292 dia.)



Designation	DCN(1)	DCX(2)	CHW	CHW_2	LF	DCONMS	Ts(3)
DSC-EC 40.00-43.00	40.00	43.00	6.4	4.0	90.00	33.00	TS-I12
DSC-EC 43.01-47.00	43.01	47.00	6.4	4.0	95.00	36.00	TS-I13
DSC-EC 47.01-51.70	47.01	51.70	6.4	4.0	100.00	39.00	TS-I14
DSC-EC 51.71-56.20	51.71	56.20	6.4	4.0	100.00	43.00	TS-I15
DSC-EC 56.21-60.60	56.21	60.60	7.2	4.8	105.00	47.00	TS-I16
DSC-EC 60.61-65.00	60.61	65.00	7.2	4.8	110.00	51.00	TS-I17
DSC-EC 65.00-66.99	65.00	66.99	7.2	4.8	150.00	52.00	TS-I18
DSC-EC 67.00-72.99	67.00	72.99	10.4	6.4	150.00	58.00	TS-I19
DSC-EC 73.00-79.99	73.00	79.99	10.4	6.4	150.00	63.00	TS-I20
DSC-EC 80.00-86.99	80.00	86.99	10.4	6.4	180.00	70.00	TS-I21
DSC-EC 87.00-99.99	87.00	99.99	10.4	6.4	180.00	77.00	TS-I22
DSC-EC 100.00-111.99	100.00	111.99	10.4	6.4	180.00	89.00	TS-I23
DSC-EC 112.00-123.99	112.00	123.99	10.4	6.4	205.00	101.00	TS-I24
DSC-EC 124.00-135.99	124.00	135.99	10.4	6.4	205.00	113.00	TS-I25
DSC-EC 136.00-147.99	136.00	147.99	10.4	6.4	205.00	125.00	TS-I26
DSC-EC 148.00-159.99	148.00	159.99	10.4	6.4	225.00	137.00	TS-I27
DSC-EC 160.00-171.99	160.00	171.99	10.4	6.4	225.00	149.00	TS-I28
DSC-EC 172.00-183.99	172.00	183.99	10.4	6.4	225.00	161.00	TS-I29
DSC-EC 184.00-195.99	184.00	195.99	10.4	6.4	245.00	173.00	TS-I30
DSC-EC 196.00-207.99	196.00	207.99	10.4	6.4	245.00	185.00	TS-I31
DSC-EC 208.00-219.99	208.00	219.99	10.4	6.4	245.00	197.00	TS-I32
DSC-EC 220.00-231.99	220.00	231.99	10.4	6.4	265.00	208.00	TS-I33
DSC-EC 232.00-243.99	232.00	243.99	10.4	6.4	265.00	220.00	TS-I34
DSC-EC 244.00-255.99	244.00	255.99	10.4	6.4	265.00	232.00	TS-I35
DSC-EC 256.00-267.99	256.00	267.99	10.4	6.4	290.00	244.00	TS-I36
DSC-EC 268.00-279.99	268.00	279.99	10.4	6.4	290.00	256.00	TS-I37
DSC-EC 280.00-291.99	280.00	291.99	10.4	6.4	290.00	268.00	TS-I38

• CAOD - Rough boring cartridge (for large D.O.C.), supplied with the cartridge, unless ordered differently • CAORC - Precision boring cartridge • For quotation form and user guide, see pages 272-280 • Ordering example: DSC-EC 87.30

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Tube designation

For inserts, see pages: TPMX (214)

For holders, see pages: TS-I** (264)

DSC-EC

Diameter	Boring Head Central Cartridge	Central Cartridge Insert	Boring Head Peripheral Cartridge	Peripheral Cartridge Insert	Guide Pads	Sub Guide Pad	Guide Pad Protectors
40.00-45.99	CAORC-0845	TPMX 1403LG	CAOD-0845	TPMX 1403RG	GPS-08-25-155	SGP-02	GPP-06
46.00-51.99	CAORC-0845	TPMX 1403LG	CAOD-0845	TPMX 1403RG	GPS-10-35-200	SGP-02	GPP-07
52.00-56.99	CAORC-103	TPMX 1704LG	CAOD-103	TPMX 1704RG	GPS-10-35-200	SGP-02	GPP-07
57.00-59.99	CAORC-103	TPMX 1704LG	CAOD-103	TPMX 1704RG	GPS-10-35-200	SGP-02	GPP-07
60.00-66.99	CAORC-103	TPMX 1704LG	CAOD-103	TPMX 1704RG	GPS-14-40-250	SGP-03	GPP-08
67.00-80.99	CAORC-142	TPMX 2405LG	CAOD-142	TPMX 2405RG	GPS-14-40-250	SGP-03	GPP-08
81.00-90.99	CAORC-142	TPMX 2405LG	CAOD-142	TPMX 2405RG	GPS-14-40-250	SGP-03	GPP-08
91.00-99.99	CAORC-142	TPMX 2405LG	CAOD-142	TPMX 2405RG	GPS-14-40-250	SGP-03	GPP-08
100.00-291.99	CAORC-142	TPMX 2405LG	CAOD-142	TPMX 2405RG	GPS-18-40-300	SGP-04	GPP-09

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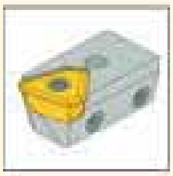
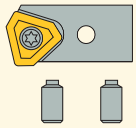
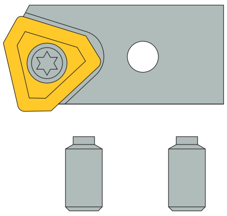
CAOD

Drilling / Boring head
Peripheral Cartridge





Universal Marking for Deep Drilling Tools



CA - P - DR - 0800 - R

- CA-P: Peripheral Cartridge
- DR: DR : Drilling / CB : Counter Bore
- 0800: IC
- R: L/R HAND

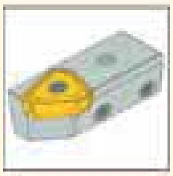
Spare Parts

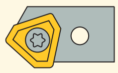
Designation	Adjustment Screw	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAOD-080	SR 11201755-4	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-0845	SR 11201755-6	HW 2.0	SR 11201756-10	HW 2.5	TPMX 1403..R-G	SR 11201753-3
CAOD-085	SR 11201755-7	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-103	SR 11201755-8	HW 2.5	SR 11201756-12	HW 3.0	TPMX 1704..R-G	SR 11201753-7
CAOD-142	SR 11201755-9	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405..R-G	SR 11201753-9
CAOD-170	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 2807..R-G	SR 11201753-10

ISCARDEEPDRILL

CAORC

Boring Head Central Cartridge





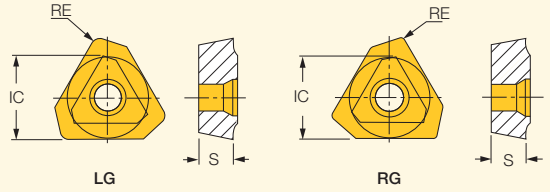
Spare Parts

Designation	Adjustment Screw	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAORC-0845	SR 11201755-6	HW 2.0	SR 11201756-10	HW 2.5	TPMX 140308L-G	SR 11201753-3
CAORC-103	SR 11201755-10	HW 2.5	SR 11201756-12	HW 3.0	TPMX 170408L-G	SR 11201753-7
CAORC-142	SR 11201755-11	HW 2.5	SR 11201756-15	HW 4.0	TPMX 240512L-G	SR 11201753-9
CAORC-170	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 280716L-G	SR 11201753-10

ISCARDEEPDRILL

TPMX

Inserts for Drilling / Boring Heads DSD-EC / DDD-EC / DSD-IC / DSC-EC / DSC-IC



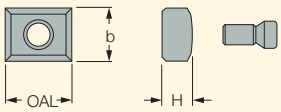
Designation	Dimensions IC	S	RE	Tough ↔ Hard IC920	IC5500	IC9025	IC508	IC908	IC520	IC806
TPMX 140304R-B	8.45	3.50	0.40	●		●		●	●	●
TPMX 140308R-DT	8.45	3.50	0.80			●		●		
TPMX 140308R-G	8.45	3.50	0.80		●	●	●	●	●	●
TPMX 140308R-B	8.45	3.50	0.80							●
TPMX 170404R-B	10.30	4.00	0.40	●		●		●	●	●
TPMX 170408R-B	10.30	4.00	0.80							●
TPMX 170408R-BG	10.30	4.00	0.80					●	●	●
TPMX 170408R-DT	10.30	4.00	0.80			●		●	●	
TPMX 170408R-G	10.30	4.00	0.80		●		●	●	●	●
TPMX 240504R-B	14.20	5.50	0.40	●		●		●	●	●
TPMX 240512R-BG	14.20	5.50	1.20			●		●	●	●
TPMX 240512R-DT	14.20	5.50	1.20			●		●	●	
TPMX 240512R-G	14.20	5.50	1.20		●		●	●	●	●
TPMX 240512R-B	14.20	5.50	1.20							●
TPMX 280708R-B	17.00	7.50	0.80	●		●		●		●
TPMX 280716R-BG	17.00	7.50	1.60					●	●	●
TPMX 280716R-DT	17.00	7.50	1.60					●	●	
TPMX 280716R-G	17.00	7.50	1.60		●		●	●	●	●
TPMX 280716R-B	17.00	7.50	1.60							●
TPMX 140308L-G	8.45	3.50	0.80			●		●		
TPMX 170404L-BG	10.30	4.00	0.40					●		
TPMX 170408L-DT	10.30	4.00	0.80					●		
TPMX 170408L-G	10.30	4.00	0.80			●		●	●	
TPMX 240504L-BG	14.20	5.50	0.40					●		
TPMX 240512L-DT	14.20	5.50	1.20					●		
TPMX 240512L-G	14.20	5.50	1.20			●		●	●	
TPMX 280708L-BG	17.00	7.50	0.80					●		
TPMX 280716L-G	17.00	7.50	1.60			●		●	●	

For tools, see pages: DDC-EC (249) • DSTR-EC (255) • DSTR-IC (258)

ISCARDEEPDRILL

SGP

Boring Head Sub-Guide Pads



Designation	OAL	b	H
SGP-01	10.00	6.0	3.0
SGP-02	10.00	8.0	4.5
SGP-03	10.00	10.0	5.0
SGP-04	20.00	14.0	7.0

• Select an outer cartridge and pad for the required enlarged diameter.

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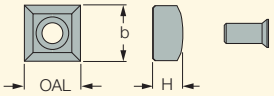
GPP

Boring Head Guide Pad Protectors



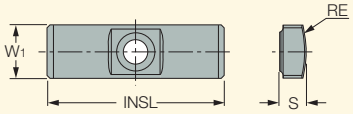
Designation	OAL	b	H
GPP-04	8.00	8.0	4.4
GPP-05	8.00	8.0	3.5
GPP-06	8.00	8.0	4.5
GPP-07	10.00	10.0	6.0
GPP-08	14.00	14.0	7.5
GPP-09	18.00	18.0	9.0

• Select an outer cartridge and pad for the required enlarged diameter.

ISCARDEEPDRILL

GPS

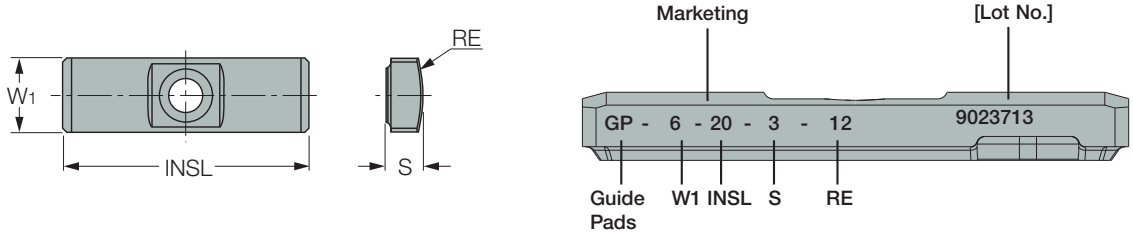
Deep Drilling Solid
Carbide Guide Pads



Designation	Dimensions W1	INSL	S	RE	Tough ↔ Hard IC928	IC950	IC908
GPS-04-16-055-DC	4.0	16.00	2.00	5.50	•		•
GPS-05-18-060-DC	5.0	18.00	2.50	6.00	•		•
GPS-05-18-075-DC	5.0	18.00	2.50	7.50	•		•
GPS-06-20-075-DC	6.0	20.00	3.00	7.50			•
GPS-06-20-075	6.0	20.00	3.00	7.50		•	
GPS-06-20-085-DC	6.0	20.00	3.00	8.50	•		•
GPS-06-20-085	6.0	20.00	3.00	8.50		•	
GPS-06-20-100-DC	6.0	20.00	3.00	10.00	•		•
GPS-06-20-100	6.0	20.00	3.00	10.00		•	
GPS-06-20-120-DC	6.0	20.00	3.00	12.00	•		•
GPS-06-20-120	6.0	20.00	3.00	12.00		•	
GPS-07-20-120-DC	7.0	20.00	3.50	12.00	•		•
GPS-07-20-120	7.0	20.00	3.50	12.00		•	
GPS-08-25-155-DC	8.0	25.00	4.50	15.50	•		•
GPS-08-25-155	8.0	25.00	4.50	15.50		•	
GPS-10-30-200-DC	10.0	30.00	4.50	20.00	•		•
GPS-10-30-200	10.0	30.00	4.50	20.00		•	
GPS-10-35-200-DC	10.0	35.00	6.00	20.00	•		•
GPS-10-35-200	10.0	35.00	6.00	20.00		•	
GPS-12-35-250-DC	12.0	35.00	5.50	25.00	•		•
GPS-12-35-250	12.0	35.00	5.50	25.00		•	
GPS-14-40-250-DC	14.0	40.00	7.50	25.00	•		•
GPS-14-40-250	14.0	40.00	7.50	25.00		•	
GPS-18-40-300-DC	18.0	40.00	9.00	30.00	•		•

• DC- Double Chamfer

Universal Marking for Deep Drilling Tools



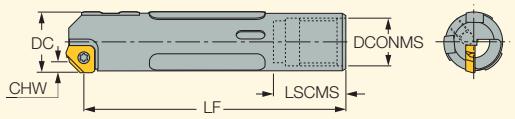
Guide Pad Grade Recommendation

	Oil Coolant			Water Based Coolant		
Priority	1	2	3	1	2	3
ISO-P	IC950	IC908	IC928	IC928	IC908	-
ISO-K	IC950	IC908	IC928	IC928	IC908	-
ISO-M	IC928	IC908	IC950	IC928	IC908	-
ISO-S	IC928	IC908	IC950	IC928	IC908	-

ISCARDEEPDRILL

DSC-IA

Deep Single Tube Counterbore with a Through Hole, Internal Single-Start Thread and Adjustable Diameter (25-40 dia.)



Designation	DCN(1)	DCX(2)	CHW	LF	LSCMS	DCONMS	Ts(3)
DSC-IA 25.00-26.99	25.00	26.99	2.8	110.00	25.00	20.00	TS-O10
DSC-IA 27.00-29.99	27.00	29.99	2.8	110.00	25.00	22.00	TS-O11
DSC-IA 30.00-31.99	30.00	31.99	2.8	110.00	25.00	24.00	TS-O12
DSC-IA 32.00-33.99	32.00	33.99	2.8	110.00	25.00	26.00	TS-O13
DSC-IA 34.00-36.99	34.00	36.99	2.8	135.00	40.00	27.00	TS-O14
DSC-IA 37.00-39.99	37.00	39.99	2.8	135.00	40.00	30.00	TS-O15

• For user guide and quotation form, see pages 272-280 • Ordering example: DSC-IA 30.35

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Tube designation

For inserts, see pages: XPMT-45 (234) • XPMT-UB (234)

For holders, see pages: TS-O** (265)

Universal Marking for Deep Drilling Tools

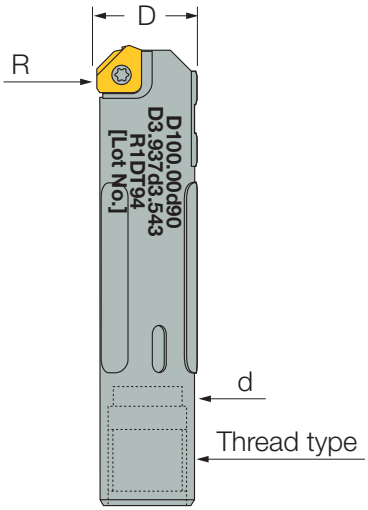
D- **Tool diameter**
Metric- D100.00
Inch- D3.937

d- Pilot diameter
Metric- d90
Inch- d3.543

Tool style
R- Cartridge style counter boring

Thread type
4ST- Four-start thread single tube
1ST- Single-start thread single tube
4DT- Four-start thread double tube

94- Tube diameter



DSC-IA

Diameter	Guide Pads (3 pcs)	Resin Guide Pads (3 pcs)	Close Tolerance Insert	Insert Clamping Screw
25.00-27.99	GPS-06-20-120	RGP01	XPMT 16002-45	SR 11201754-4
28.00-29.99	GPS-06-20-120	RGP02	XPMT 16002-45	SR 11201754-4
30.00-37.99	GPS-07-20-120	RGP02	XPMT 16002-45	SR 11201754-4
38.00-39.99	GPS-08-25-155	RGP03	XPMT 16002-45	SR 11201754-4

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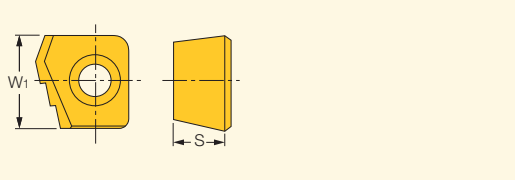
XPMT-UB

Inserts for DSD/DSC Drilling / Boring Heads



Designation	Dimensions W1	Dimensions S	Tough ↔ Hard IC908	Tough ↔ Hard IC520M
XPMT 16002UB	9.50	2.80	•	
XPMT 18003UB	11.00	3.05	•	
XPMT21003UB	13.00	3.55		•
XPMT 25003UB	14.50	3.40	•	

For tools, see pages: DDC-EA (246) • DSC-EA (233) • DSC-IA (240)

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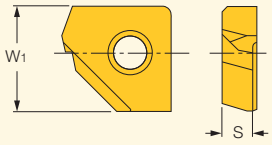
XPMT-45

Inserts for DSC Boring Heads



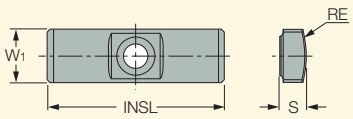
Designation	Dimensions W1	Dimensions S	IC950
XPMT 16002-45	9.50	2.80	●

For tools, see pages: DDC-EA (246) • DSC-IA (240)

ISCARDEEPDRILL

GPS

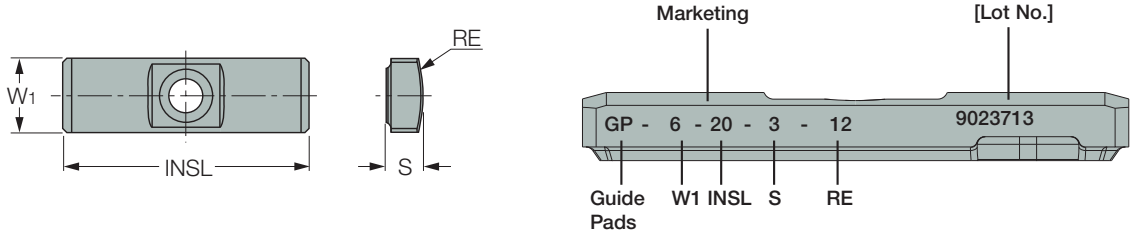
Deep Drilling Solid Carbide Guide Pads



Designation	Dimensions W1	INSL	S	RE	Tough ↔ Hard IC928	IC950	IC908
GPS-04-16-055-DC	4.0	16.00	2.00	5.50	●		●
GPS-05-18-060-DC	5.0	18.00	2.50	6.00	●		●
GPS-05-18-075-DC	5.0	18.00	2.50	7.50	●		●
GPS-06-20-075-DC	6.0	20.00	3.00	7.50			●
GPS-06-20-075	6.0	20.00	3.00	7.50		●	
GPS-06-20-085-DC	6.0	20.00	3.00	8.50	●		●
GPS-06-20-085	6.0	20.00	3.00	8.50		●	
GPS-06-20-100-DC	6.0	20.00	3.00	10.00	●		●
GPS-06-20-100	6.0	20.00	3.00	10.00		●	
GPS-06-20-120-DC	6.0	20.00	3.00	12.00	●		●
GPS-06-20-120	6.0	20.00	3.00	12.00		●	
GPS-07-20-120-DC	7.0	20.00	3.50	12.00	●		●
GPS-07-20-120	7.0	20.00	3.50	12.00		●	
GPS-08-25-155-DC	8.0	25.00	4.50	15.50	●		●
GPS-08-25-155	8.0	25.00	4.50	15.50		●	
GPS-10-30-200-DC	10.0	30.00	4.50	20.00	●		●
GPS-10-30-200	10.0	30.00	4.50	20.00		●	
GPS-10-35-200-DC	10.0	35.00	6.00	20.00	●		●
GPS-10-35-200	10.0	35.00	6.00	20.00		●	
GPS-12-35-250-DC	12.0	35.00	5.50	25.00	●		●
GPS-12-35-250	12.0	35.00	5.50	25.00		●	
GPS-14-40-250-DC	14.0	40.00	7.50	25.00	●		●
GPS-14-40-250	14.0	40.00	7.50	25.00		●	
GPS-18-40-300-DC	18.0	40.00	9.00	30.00	●		●

• DC- Double Chamfer

Universal Marking for Deep Drilling Tools



Guide Pad Grade Recommendation						
	Oil Coolant			Water Based Coolant		
Priority	1	2	3	1	2	3
ISO-P	IC950	IC908	IC928	IC928	IC908	-
ISO-K	IC950	IC908	IC928	IC928	IC908	-
ISO-M	IC928	IC908	IC950	IC928	IC908	-
ISO-S	IC928	IC908	IC950	IC928	IC908	-

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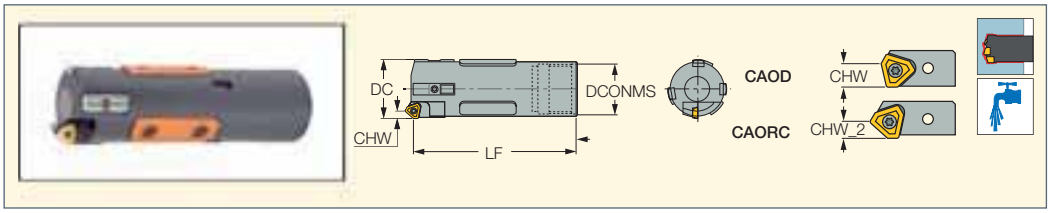
DSC-IC

Deep Single Tube Counterbore with a Through Hole, Internal Single Start Thread and a Cartridge (40-294 dia.)



Designation	DCN(1)	DCX(2)	CHW	CHW_2	LF	DCONMS	Ts(3)
DSC-IC 40.00-43.99	40.00	43.99	6.4	4.0	135.00	33.00	TS-O16
DSC-IC 44.00-46.99	44.00	46.99	6.4	4.0	135.00	37.00	TS-O17
DSC-IC 47.00-51.99	47.00	51.99	6.4	4.0	145.00	41.00	TS-O18
DSC-IC 52.00-56.99	52.00	56.99	7.2	4.8	145.00	44.00	TS-O19
DSC-IC 57.00-60.99	57.00	60.99	7.2	4.8	170.00	49.00	TS-O20
DSC-IC 61.00-67.99	61.00	67.99	7.2	4.8	170.00	53.00	TS-O21
DSC-IC 68.00-74.99	68.00	74.99	10.4	6.4	170.00	59.00	TS-O22
DSC-IC 75.00-80.99	75.00	80.99	10.4	6.4	205.00	65.00	TS-O23
DSC-IC 81.00-90.99	81.00	90.99	10.4	6.4	205.00	71.00	TS-024
DSC-IC 91.00-98.99	91.00	98.99	10.4	6.4	215.00	79.00	TS-O25
DSC-IC 99.00-110.99	99.00	110.99	10.4	6.4	225.00	90.00	TS-O26
DSC-IC 111.00-122.99	111.00	122.99	10.4	6.4	235.00	102.00	TS-O27
DSC-IC 123.00-134.99	123.00	134.99	10.4	6.4	265.00	104.00	TS-O28
DSC-IC 135.00-148.99	135.00	148.99	10.4	6.4	265.00	126.00	TS-O29
DSC-IC 149.00-161.99	149.00	161.99	10.4	6.4	265.00	139.00	TS-O30
DSC-IC 162.00-173.99	162.00	173.99	10.4	6.4	285.00	151.00	TS-O31
DSC-IC 186.00-197.99	186.00	197.99	10.4	6.4	310.00	175.00	TS-O33
DSC-IC 198.00-209.99	198.00	209.99	10.4	6.4	310.00	187.00	TS-O34
DSC-IC 210.00-221.99	210.00	221.99	10.4	6.4	320.00	199.00	TS-O35
DSC-IC 222.00-233.99	222.00	233.99	10.4	6.4	325.00	211.00	TS-O36
DSC-IC 234.00-245.99	234.00	245.99	10.4	6.4	325.00	223.00	TS-O37
DSC-IC 246.00-257.99	246.00	257.99	10.4	6.4	325.00	235.00	TS-O38
DSC-IC 258.00-269.99	258.00	269.99	10.4	6.4	360.00	245.00	TS-O39
DSC-IC 282.00-293.99	282.00	293.99	10.4	6.4	360.00	271.00	TS-O41

• CAOD - Rough boring cartridge (for large D.O.C.) supplied with the cartridge, unless ordered differently • CAORC - Precision boring cartridge • For user guide and quotation form, see pages 272-280 • Ordering example: DSC-IC 91.10

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Tube designation

For inserts, see pages: TPMX (214)

For holders, see pages: TS-O** (265)

Universal Marking for Deep Drilling Tools

D- **Tool diameter**

Metric- D100.00

Inch- D3.937

d- Pilot diameter

Metric- d90

Inch- d3.543

Tool style

R- Cartridge style counter boring

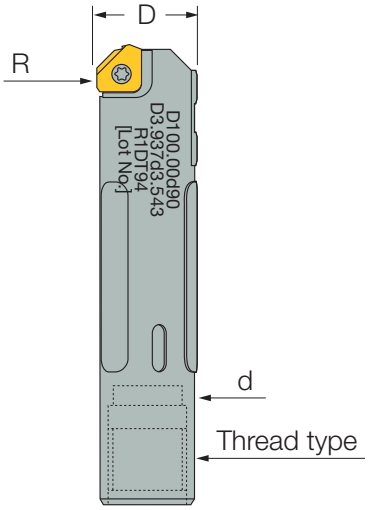
Thread type

4ST- Four-start thread single tube

1ST- Single-start thread single tube

4DT- Four-start thread double tube

94- Tube diameter



DSC-IC

Diameter	Close Tolerance Cartridge	Normal Tolerance Cartridge	Guide Pads (3 pcs)	Resin Guide Pads (3 pcs)	Close Tolerance Insert	Normal Tolerance Insert
40.00-45.99	CAORC-0845	CAOD-0845	GPS-08-25-155	RGP03	TPMX 1403LG	TPMX 1403RG
46.00-51.99	CAORC-0845	CAOD-0845	GPS-10-35-200	RGP03	TPMX 1403LG	TPMX 1403RG
52.00-56.99	CAORC-103	CAOD-103	GPS-10-35-200	RGP03	TPMX 1704LG	TPMX 1704RG
57.00-59.99	CAORC-103	CAOD-103	GPS-10-35-200	RGP03	TPMX 1704LG	TPMX 1704RG
60.00-66.99	CAORC-103	CAOD-103	GPS-14-40-250	RGP04	TPMX 1704LG	TPMX 1704RG
67.00-80.99	CAORC-142	CAOD-142	GPS-14-40-250	RGP04	TPMX 2405LG	TPMX 2405RG
81.00-90.99	CAORC-142	CAOD-142	GPS-14-40-250	RGP05	TPMX 2405LG	TPMX 2405RG
91.00-99.99	CAORC-142	CAOD-142	GPS-14-40-250	RGP06	TPMX 2405LG	TPMX 2405RG
100.00-122.99	CAORC-142	CAOD-142	GPS-18-40-300	RGP06	TPMX 2405LG	TPMX 2405RG

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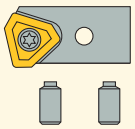
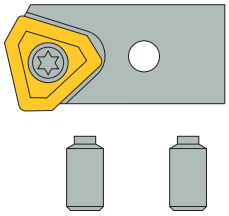
CAOD

Drilling Head Peripheral Cartridge



Universal Marking for Deep Drilling Tools



CA - P - DR - 0800 - R

- CA: Peripheral Cartridge
- P: DR : Drilling / CB : Counter Bore
- DR: IC
- 0800: IC
- R: L/R HAND

Spare Parts

Designation	Adjustment Screw	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAOD-080	SR 11201755-4	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-0845	SR 11201755-6	HW 2.0	SR 11201756-10	HW 2.5	TPMX 1403..R-G	SR 11201753-3
CAOD-085	SR 11201755-7	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-103	SR 11201755-8	HW 2.5	SR 11201756-12	HW 3.0	TPMX 1704..R-G	SR 11201753-7
CAOD-142	SR 11201755-9	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405..R-G	SR 11201753-9
CAOD-170	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 2807..R-G	SR 11201753-10

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CAORC

Boring Head Central Cartridge

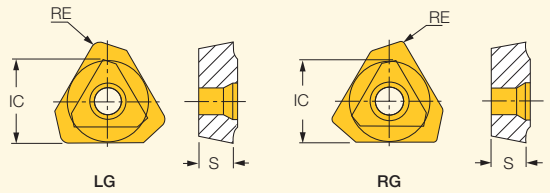
Spare Parts

Designation	Adjustment Screw	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAORC-0845	SR 11201755-6	HW 2.0	SR 11201756-10	HW 2.5	TPMX 140308L-G	SR 11201753-3
CAORC-103	SR 11201755-10	HW 2.5	SR 11201756-12	HW 3.0	TPMX 170408L-G	SR 11201753-7
CAORC-142	SR 11201755-11	HW 2.5	SR 11201756-15	HW 4.0	TPMX 240512L-G	SR 11201753-9
CAORC-170	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 280716L-G	SR 11201753-10

ISCARDEEPDRILL

TPMX

Inserts for Drilling Heads
DSD-EC / DDD-EC / DSD-IC / DSC-EC / DSC-IC



Designation	Dimensions IC	S	RE	Tough ↔ Hard IC920	IC5500	IC9025	IC508	IC908	IC520	IC806
TPMX 140304R-B	8.45	3.50	0.40	●		●		●	●	●
TPMX 140308R-DT	8.45	3.50	0.80			●		●		
TPMX 140308R-G	8.45	3.50	0.80		●	●	●	●	●	●
TPMX 140308R-B	8.45	3.50	0.80							●
TPMX 170404R-B	10.30	4.00	0.40	●		●		●	●	●
TPMX 170408R-B	10.30	4.00	0.80							●
TPMX 170408R-BG	10.30	4.00	0.80					●	●	●
TPMX 170408R-DT	10.30	4.00	0.80			●		●	●	
TPMX 170408R-G	10.30	4.00	0.80		●		●	●	●	●
TPMX 240504R-B	14.20	5.50	0.40	●		●		●	●	●
TPMX 240512R-BG	14.20	5.50	1.20			●		●	●	●
TPMX 240512R-DT	14.20	5.50	1.20			●		●	●	
TPMX 240512R-G	14.20	5.50	1.20		●		●	●	●	●
TPMX 240512R-B	14.20	5.50	1.20							●
TPMX 280708R-B	17.00	7.50	0.80	●		●		●		●
TPMX 280716R-BG	17.00	7.50	1.60					●	●	●
TPMX 280716R-DT	17.00	7.50	1.60					●	●	
TPMX 280716R-G	17.00	7.50	1.60		●		●	●	●	●
TPMX 280716R-B	17.00	7.50	1.60							●
TPMX 140308L-G	8.45	3.50	0.80			●		●		
TPMX 170404L-BG	10.30	4.00	0.40					●		
TPMX 170408L-DT	10.30	4.00	0.80					●		
TPMX 170408L-G	10.30	4.00	0.80			●		●	●	
TPMX 240504L-BG	14.20	5.50	0.40					●		
TPMX 240512L-DT	14.20	5.50	1.20					●		
TPMX 240512L-G	14.20	5.50	1.20			●		●	●	
TPMX 280708L-BG	17.00	7.50	0.80					●		
TPMX 280716L-G	17.00	7.50	1.60			●		●	●	

For tools, see pages: DDC-EC (249) • DSTR-EC (255) • DSTR-IC (258)

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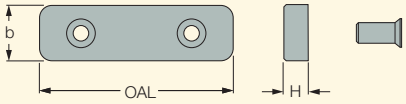
RGP

Boring Head Enlargement
Resin Pads



Designation	OAL	b	H
RGP01	40.00	10.0	4.0
RGP02	45.00	12.0	5.0
RGP03	50.00	15.0	5.8
RGP04	70.00	20.0	7.5
RGP05	80.00	30.0	12.5
RGP06	100.00	35.0	15.5

• Select an outer cartridge and pad for the required enlarged diameter.

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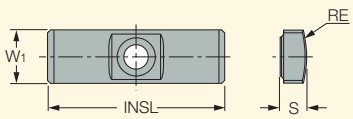
GPS

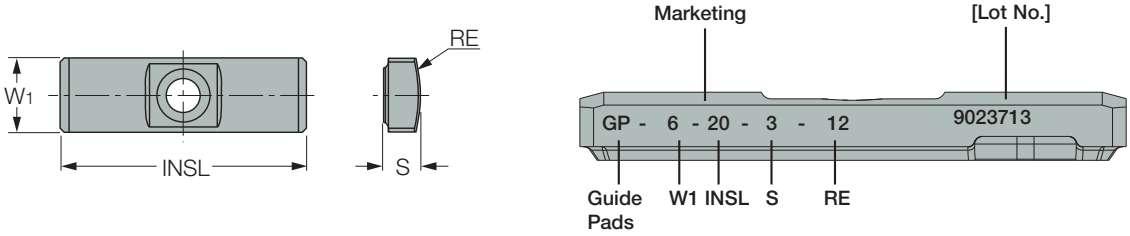
Deep Drilling Solid
Carbide Guide Pads



Designation	Dimensions W1	INSL	S	RE	Tough ↔ Hard IC928	IC950	IC908
GPS-04-16-055-DC	4.0	16.00	2.00	5.50	•		•
GPS-05-18-060-DC	5.0	18.00	2.50	6.00	•		•
GPS-05-18-075-DC	5.0	18.00	2.50	7.50	•		•
GPS-06-20-075-DC	6.0	20.00	3.00	7.50			•
GPS-06-20-075	6.0	20.00	3.00	7.50		•	
GPS-06-20-085-DC	6.0	20.00	3.00	8.50	•		•
GPS-06-20-085	6.0	20.00	3.00	8.50		•	
GPS-06-20-100-DC	6.0	20.00	3.00	10.00	•		•
GPS-06-20-100	6.0	20.00	3.00	10.00		•	
GPS-06-20-120-DC	6.0	20.00	3.00	12.00	•		•
GPS-06-20-120	6.0	20.00	3.00	12.00		•	
GPS-07-20-120-DC	7.0	20.00	3.50	12.00	•		•
GPS-07-20-120	7.0	20.00	3.50	12.00		•	
GPS-08-25-155-DC	8.0	25.00	4.50	15.50	•		•
GPS-08-25-155	8.0	25.00	4.50	15.50		•	
GPS-10-30-200-DC	10.0	30.00	4.50	20.00	•		•
GPS-10-30-200	10.0	30.00	4.50	20.00		•	
GPS-10-35-200-DC	10.0	35.00	6.00	20.00	•		•
GPS-10-35-200	10.0	35.00	6.00	20.00		•	
GPS-12-35-250-DC	12.0	35.00	5.50	25.00	•		•
GPS-12-35-250	12.0	35.00	5.50	25.00		•	
GPS-14-40-250-DC	14.0	40.00	7.50	25.00	•		•
GPS-14-40-250	14.0	40.00	7.50	25.00		•	
GPS-18-40-300-DC	18.0	40.00	9.00	30.00	•		•

• DC- Double Chamfer

Universal Marking for Deep Drilling Tools



Guide Pad Grade Recommendation

	Oil Coolant			Water Based Coolant		
Priority	1	2	3	1	2	3
ISO-P	IC950	IC908	IC928	IC928	IC908	-
ISO-K	IC950	IC908	IC928	IC928	IC908	-
ISO-M	IC928	IC908	IC950	IC928	IC908	-
ISO-S	IC928	IC908	IC950	IC928	IC908	-

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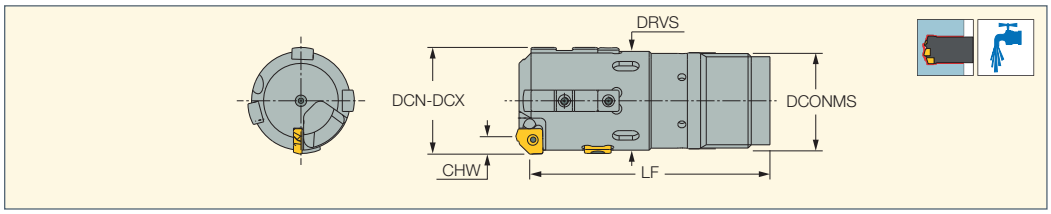
DDC-EA

Double Tube Counterboring Drills with Outer 4-Start Thread, Cartridges and Adjustable Diameter (25-40mm dia.)



Designation	DCN(1)	DCX(2)	CHW	DRVS(3)	LF	DCONMS
DDC-EA 25.00-26.40	25.00	26.40	2.80	24.0	72.50	21.00
DDC-EA 26.41-28.70	26.41	28.70	2.80	26.0	72.50	23.50
DDC-EA 28.71-31.00	28.71	31.00	2.80	28.0	75.50	25.50
DDC-EA 31.01-33.30	31.01	33.30	2.80	31.0	75.50	28.00
DDC-EA 33.31-36.20	33.31	36.20	2.80	34.0	75.50	30.00
DDC-EA 36.21-39.60	36.21	39.60	2.80	37.0	90.50	33.00
DDC-EA 39.61-39.99	39.61	39.99	2.80	37.0	90.50	36.00

• For user guide and quotation form, see pages 272-280 • Ordering example: DDC-EA 30.55

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Torque key size

For inserts, see pages: XPMT-45 (234) • XPMT-UB (234)

For holders, see pages: TDO-I (D18.41-65.00) (266)

DDC-EA

Diameter	Insert	Insert Clamping Screw	Qty	Guide Pads	Qty	Screw	Qty	Key
25.00-29.99	XPMT 16002-45	SR 11201754-4	1	GPS-06-20-120	2	SR 34-508	2	T-7/5
30.00-37.99	XPMT 16002-45	SR 11201754-4	1	GPS-07-20-120	3	SR11201753-4	3	T-9/5
38.00-39.99	XPMT 16002-45	SR 11201754-4	1	GPS-08-25-155	3	SR 34-506-C	3	T-9/5

DDC-EA (continued)

Diameter	Guide Pad Protectors	Qty	Screw	Qty	Key	Sub Guide Pad	Qty	Screw	Qty	Key
25.00-29.99	GPP-04	2	SR11201753-4	2	T-9/5	SGP-02	1	SR11201753-1	1	T-7/5
30.00-37.99	GPP-05	3	SR11201753-4	3	T-9/5	SGP-02	1	SR11201753-1	1	T-7/5
38.00-39.99	GPP-06	3	SR11201753-4	3	T-9/5	SGP-02	1	SR11201753-4	1	T-9/5

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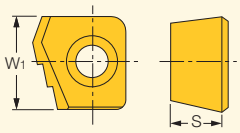
XPMT-UB

Inserts for DSD/DSC
Drilling / Boring Heads



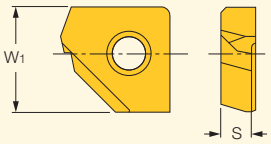
Designation	Dimensions W1	Dimensions S	Tough ↔ Hard IC908	Tough ↔ Hard IC520M
XPMT 16002UB	9.50	2.80	●	
XPMT 18003UB	11.00	3.05	●	
XPMT21003UB	13.00	3.55		●
XPMT 25003UB	14.50	3.40	●	

For tools, see pages: DDC-EA (246) • DSC-EA (233) • DSC-IA (240)

ISCARDEEPDRILL

XPMT-45

Inserts for DSC Boring Heads



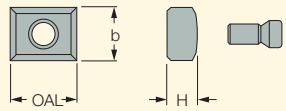
Designation	Dimensions W1	Dimensions S	IC950
XPMT 16002-45	9.50	2.80	●

For tools, see pages: DDC-EA (246) • DSC-IA (240)

ISCARDEEPDRILL

SGP

Boring Head Sub-Guide Pads



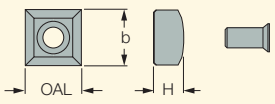
Designation	OAL	b	H
SGP-01	10.00	6.0	3.0
SGP-02	10.00	8.0	4.5
SGP-03	10.00	10.0	5.0
SGP-04	20.00	14.0	7.0

• Select an outer cartridge and pad for the required enlarged diameter.

ISCARDEEPDRILL

GPP

Boring Head Guide
Pad Protectors



Designation	OAL	b	H
GPP-04	8.00	8.0	4.4
GPP-05	8.00	8.0	3.5
GPP-06	8.00	8.0	4.5
GPP-07	10.00	10.0	6.0
GPP-08	14.00	14.0	7.5
GPP-09	18.00	18.0	9.0

• Select an outer cartridge and pad for the required enlarged diameter.

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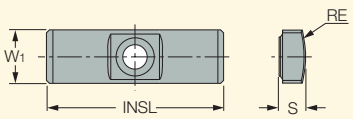
GPS

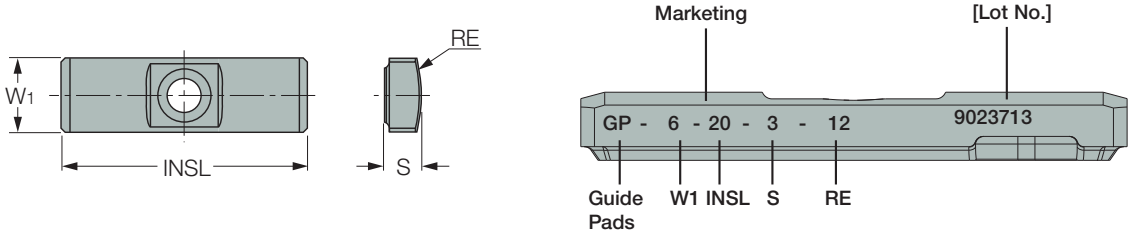
Deep Drilling Solid Carbide Guide Pads



Designation	Dimensions W1	INSL	S	RE	Tough ↔ Hard IC928	IC950	IC908
GPS-04-16-055-DC	4.0	16.00	2.00	5.50	•		•
GPS-05-18-060-DC	5.0	18.00	2.50	6.00	•		•
GPS-05-18-075-DC	5.0	18.00	2.50	7.50	•		•
GPS-06-20-075-DC	6.0	20.00	3.00	7.50			•
GPS-06-20-075	6.0	20.00	3.00	7.50		•	
GPS-06-20-085-DC	6.0	20.00	3.00	8.50	•		•
GPS-06-20-085	6.0	20.00	3.00	8.50		•	
GPS-06-20-100-DC	6.0	20.00	3.00	10.00	•		•
GPS-06-20-100	6.0	20.00	3.00	10.00		•	
GPS-06-20-120-DC	6.0	20.00	3.00	12.00	•		•
GPS-06-20-120	6.0	20.00	3.00	12.00		•	
GPS-07-20-120-DC	7.0	20.00	3.50	12.00	•		•
GPS-07-20-120	7.0	20.00	3.50	12.00		•	
GPS-08-25-155-DC	8.0	25.00	4.50	15.50	•		•
GPS-08-25-155	8.0	25.00	4.50	15.50		•	
GPS-10-30-200-DC	10.0	30.00	4.50	20.00	•		•
GPS-10-30-200	10.0	30.00	4.50	20.00		•	
GPS-10-35-200-DC	10.0	35.00	6.00	20.00	•		•
GPS-10-35-200	10.0	35.00	6.00	20.00		•	
GPS-12-35-250-DC	12.0	35.00	5.50	25.00	•		•
GPS-12-35-250	12.0	35.00	5.50	25.00		•	
GPS-14-40-250-DC	14.0	40.00	7.50	25.00	•		•
GPS-14-40-250	14.0	40.00	7.50	25.00		•	
GPS-18-40-300-DC	18.0	40.00	9.00	30.00	•		•

• DC- Double Chamfer

Universal Marking for Deep Drilling Tools



Guide Pad Grade Recommendation

	Oil Coolant			Water Based Coolant		
Priority	1	2	3	1	2	3
ISO-P	IC950	IC908	IC928	IC928	IC908	-
ISO-K	IC950	IC908	IC928	IC928	IC908	-
ISO-M	IC928	IC908	IC950	IC928	IC908	-
ISO-S	IC928	IC908	IC950	IC928	IC908	-

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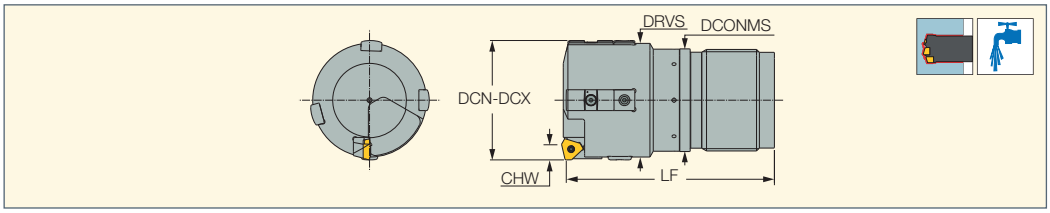
DDC-EC

Double Tube Counterboring Drills with Outer 4-Start Thread, Cartridges and Adjustable Diameter (40-184mm dia.)



Designation	DCN(1)	DCX(2)	CHW	DRVS(3)	LF	DCONMS	APMX	APMX_2
DDC-EC 40.00-43.00	40.00	43.00	6.40	40.0	91.00	36.00	6.40	4.00
DDC-EC 43.01-47.00	43.01	47.00	6.40	43.0	95.00	39.00	6.40	4.00
DDC-EC 47.01-51.70	47.01	51.70	6.40	48.0	100.00	43.00	6.40	4.00
DDC-EC 51.71-56.20	51.71	51.99	6.40	53.0	100.00	47.00	6.40	4.00
DDC-EC 56.21-65.00	56.21	65.00	7.20	61.0	110.00	51.00	7.20	4.80
DDC-EC 65.00-66.99	65.00	66.99	7.20	63.0	150.00	52.00	7.20	4.80
DDC-EC 67.00-72.99	67.00	72.99	10.40	69.0	150.00	58.00	10.40	6.40
DDC-EC 73.00-79.99	73.00	79.99	10.40	76.0	150.00	63.00	10.40	6.40
DDC-EC 80.00-86.99	80.00	86.99	10.40	83.0	180.00	70.00	10.40	6.40
DDC-EC 87.00-99.99	87.00	99.99	10.40	96.0	180.00	77.00	10.40	6.40
DDC-EC 100.00-111.99	100.00	111.99	10.40	107.0	180.00	89.00	10.40	6.40
DDC-EC 112.00-123.99	112.00	123.99	10.40	119.0	205.00	101.00	10.40	6.40
DDC-EC 124.00-135.99	124.00	135.99	10.40	131.0	205.00	113.00	10.40	6.40
DDC-EC 136.00-147.99	136.00	147.99	10.40	143.0	205.00	125.00	10.40	6.40
DDC-EC 148.00-159.99	148.00	159.99	10.40	155.0	225.00	137.00	10.40	6.40
DDC-EC 160.00-171.99	160.00	171.99	10.40	167.0	225.00	149.00	10.40	6.40
DDC-EC 172.00-183.99	172.00	183.99	10.40	179.0	225.00	161.00	10.40	6.40

• For user guide and quotation form, see pages 272-280 • Ordering example: DDC-EC 130.35

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Torque key size

For inserts, see pages: TPMX (214)

For holders, see pages: TDO-I (D18.41-65.00) (266) • TDO-I (D65.00-171.99) (267)

DDC-EC

Diameter	Boring Head Central Cartridge	Central Cartridge Insert	Boring Head Peripheral Cartridge	Peripheral Cartridge Insert	Guide Pads	Sub Guide Pad	Guide Pad Protectors
40.00-45.99	CAORC-0845	TPMX 1403LG	CAOD-0845	TPMX 1403RG	GPS-08-25-155	SGP-02	GPP-06
46.00-51.99	CAORC-0845	TPMX 1403LG	CAOD-0845	TPMX 1403RG	GPS-10-35-200	SGP-02	GPP-07
52.00-56.99	CAORC-103	TPMX 1704LG	CAOD-103	TPMX 1704RG	GPS-10-35-200	SGP-02	GPP-07
57.00-59.99	CAORC-103	TPMX 1704LG	CAOD-103	TPMX 1704RG	GPS-10-35-200	SGP-02	GPP-07
60.00-66.99	CAORC-103	TPMX 1704LG	CAOD-103	TPMX 1704RG	GPS-14-40-250	SGP-03	GPP-08
67.00-80.99	CAORC-142	TPMX 2405LG	CAOD-142	TPMX 2405RG	GPS-14-40-250	SGP-03	GPP-08
81.00-90.99	CAORC-142	TPMX 2405LG	CAOD-142	TPMX 2405RG	GPS-14-40-250	SGP-03	GPP-08
91.00-99.99	CAORC-142	TPMX 2405LG	CAOD-142	TPMX 2405RG	GPS-14-40-250	SGP-03	GPP-08
100.00-183.99	CAORC-142	TPMX 2405LG	CAOD-142	TPMX 2405RG	GPS-18-40-300	SGP-04	GPP-09

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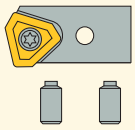
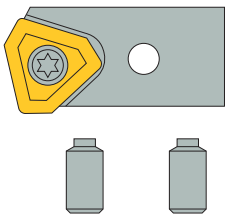
CAOD

Drilling Head Peripheral Cartridge



Universal Marking for Deep Drilling Tools



CA - P - DR - 0800 - R

- CA - P: Peripheral Cartridge
- DR: DR : Drilling, CB : Counter Bore
- 0800: IC
- R: L/R HAND

Spare Parts

Designation	Adjustment Screw	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAOD-080	SR 11201755-4	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-0845	SR 11201755-6	HW 2.0	SR 11201756-10	HW 2.5	TPMX 1403..R-G	SR 11201753-3
CAOD-085	SR 11201755-7	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-103	SR 11201755-8	HW 2.5	SR 11201756-12	HW 3.0	TPMX 1704..R-G	SR 11201753-7
CAOD-142	SR 11201755-9	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405..R-G	SR 11201753-9
CAOD-170	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 2807..R-G	SR 11201753-10

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CAORC

Boring Head Central Cartridge

Spare Parts

Designation	Adjustment Screw	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAORC-0845	SR 11201755-6	HW 2.0	SR 11201756-10	HW 2.5	TPMX 140308L-G	SR 11201753-3
CAORC-103	SR 11201755-10	HW 2.5	SR 11201756-12	HW 3.0	TPMX 170408L-G	SR 11201753-7
CAORC-142	SR 11201755-11	HW 2.5	SR 11201756-15	HW 4.0	TPMX 240512L-G	SR 11201753-9
CAORC-170	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 280716L-G	SR 11201753-10

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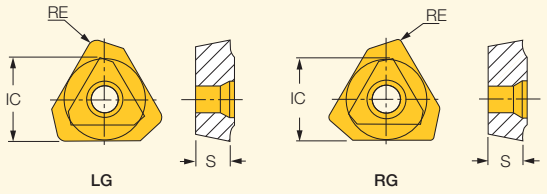
TPMX

Inserts for Drilling Heads
DSD-EC / DDD-EC /
DSD-IC / DSC-EC / DSC-IC



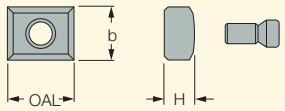
Designation	Dimensions IC	S	RE	Tough ↔ Hard IC920	IC5500	IC9025	IC508	IC908	IC520	IC806
TPMX 140304R-B	8.45	3.50	0.40	●		●		●	●	●
TPMX 140308R-DT	8.45	3.50	0.80			●		●		
TPMX 140308R-G	8.45	3.50	0.80		●	●	●	●	●	●
TPMX 140308R-B	8.45	3.50	0.80							●
TPMX 170404R-B	10.30	4.00	0.40	●		●		●	●	●
TPMX 170408R-B	10.30	4.00	0.80							●
TPMX 170408R-BG	10.30	4.00	0.80					●	●	●
TPMX 170408R-DT	10.30	4.00	0.80			●		●	●	
TPMX 170408R-G	10.30	4.00	0.80		●		●	●	●	●
TPMX 240504R-B	14.20	5.50	0.40	●		●		●	●	●
TPMX 240512R-BG	14.20	5.50	1.20			●		●	●	●
TPMX 240512R-DT	14.20	5.50	1.20			●		●	●	
TPMX 240512R-G	14.20	5.50	1.20		●		●	●	●	●
TPMX 240512R-B	14.20	5.50	1.20							●
TPMX 280708R-B	17.00	7.50	0.80	●		●		●		●
TPMX 280716R-BG	17.00	7.50	1.60					●	●	●
TPMX 280716R-DT	17.00	7.50	1.60					●	●	
TPMX 280716R-G	17.00	7.50	1.60		●		●	●	●	●
TPMX 280716R-B	17.00	7.50	1.60							●
TPMX 140308L-G	8.45	3.50	0.80			●		●		
TPMX 170404L-BG	10.30	4.00	0.40					●		
TPMX 170408L-DT	10.30	4.00	0.80					●		
TPMX 170408L-G	10.30	4.00	0.80			●		●	●	
TPMX 240504L-BG	14.20	5.50	0.40					●		
TPMX 240512L-DT	14.20	5.50	1.20					●		
TPMX 240512L-G	14.20	5.50	1.20			●		●	●	
TPMX 280708L-BG	17.00	7.50	0.80					●		
TPMX 280716L-G	17.00	7.50	1.60			●		●	●	

For tools, see pages: DDC-EC (249) • DSTR-EC (255) • DSTR-IC (258)

ISCARDEEPDRILL

SGP

Boring Head Sub-Guide Pads



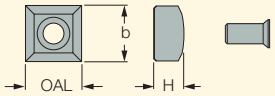
Designation	OAL	b	H
SGP-01	10.00	6.0	3.0
SGP-02	10.00	8.0	4.5
SGP-03	10.00	10.0	5.0
SGP-04	20.00	14.0	7.0

- Select an outer cartridge and pad for the required enlarged diameter.

ISCARDEEPDRILL

GPP

Boring Head Guide Pad Protectors



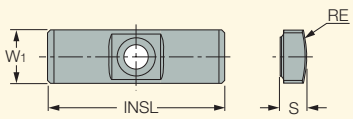
Designation	OAL	b	H
GPP-04	8.00	8.0	4.4
GPP-05	8.00	8.0	3.5
GPP-06	8.00	8.0	4.5
GPP-07	10.00	10.0	6.0
GPP-08	14.00	14.0	7.5
GPP-09	18.00	18.0	9.0

- Select an outer cartridge and pad for the required enlarged diameter.

ISCARDEEPDRILL

GPS

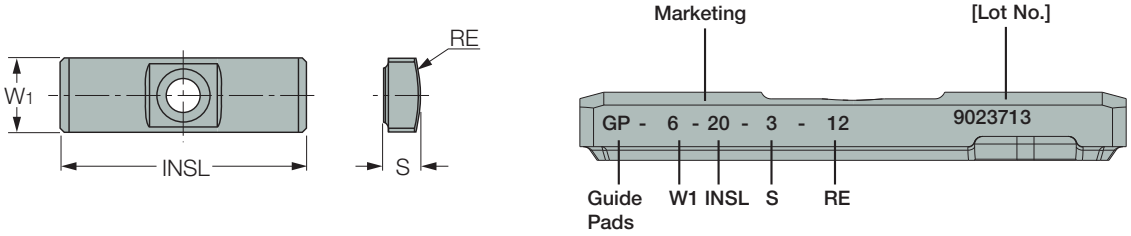
Deep Drilling Solid Carbide Guide Pads



Designation	Dimensions W1	INSL	S	RE	Tough ↔ Hard IC928	IC950	IC908
GPS-04-16-055-DC	4.0	16.00	2.00	5.50	•		•
GPS-05-18-060-DC	5.0	18.00	2.50	6.00	•		•
GPS-05-18-075-DC	5.0	18.00	2.50	7.50	•		•
GPS-06-20-075-DC	6.0	20.00	3.00	7.50			•
GPS-06-20-075	6.0	20.00	3.00	7.50		•	
GPS-06-20-085-DC	6.0	20.00	3.00	8.50	•		•
GPS-06-20-085	6.0	20.00	3.00	8.50		•	
GPS-06-20-100-DC	6.0	20.00	3.00	10.00	•		•
GPS-06-20-100	6.0	20.00	3.00	10.00		•	
GPS-06-20-120-DC	6.0	20.00	3.00	12.00	•		•
GPS-06-20-120	6.0	20.00	3.00	12.00		•	
GPS-07-20-120-DC	7.0	20.00	3.50	12.00	•		•
GPS-07-20-120	7.0	20.00	3.50	12.00		•	
GPS-08-25-155-DC	8.0	25.00	4.50	15.50	•		•
GPS-08-25-155	8.0	25.00	4.50	15.50		•	
GPS-10-30-200-DC	10.0	30.00	4.50	20.00	•		•
GPS-10-30-200	10.0	30.00	4.50	20.00		•	
GPS-10-35-200-DC	10.0	35.00	6.00	20.00	•		•
GPS-10-35-200	10.0	35.00	6.00	20.00		•	
GPS-12-35-250-DC	12.0	35.00	5.50	25.00	•		•
GPS-12-35-250	12.0	35.00	5.50	25.00		•	
GPS-14-40-250-DC	14.0	40.00	7.50	25.00	•		•
GPS-14-40-250	14.0	40.00	7.50	25.00		•	
GPS-18-40-300-DC	18.0	40.00	9.00	30.00	•		•

• DC- Double Chamfer

Universal Marking for Deep Drilling Tools



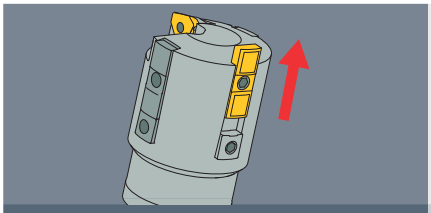
Guide Pad Grade Recommendation

	Oil Coolant			Water Based Coolant		
Priority	1	2	3	1	2	3
ISO-P	IC950	IC908	IC928	IC928	IC908	-
ISO-K	IC950	IC908	IC928	IC928	IC908	-
ISO-M	IC928	IC908	IC950	IC928	IC908	-
ISO-S	IC928	IC908	IC950	IC928	IC908	-

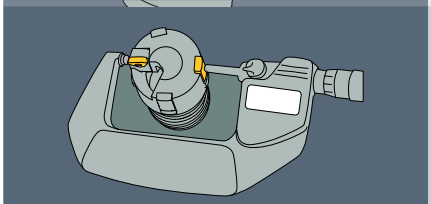
Technical Information - Cartridge Style Counter Boring Head Diameter Settings

The drill head diameter is set and inspected with a master insert in our final inspection. However, the inserts in the market have a tolerance fluctuation so each time you change or index the insert, the diameter must be adjusted as per the following method.

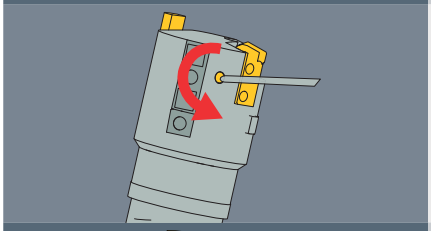
Note: When a corner change is made on the insert, it must be adjusted to the correct size or damage can be caused to the head body or work piece material.



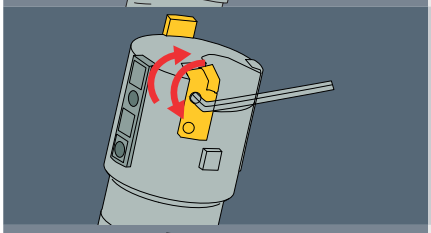
1. The dimensional guide pad must be slid forward to measure the diameter.
   1.1 Loosen the lock screw and slide the guide pad forward.
   1.2 Retighten the lock screw at the measuring position.



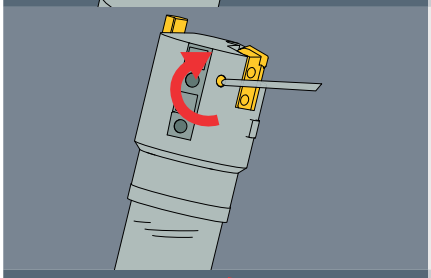
2. Measure the diameter with a micrometer. We recommend setting the tool diameter at h8 tolerance to the cutting diameter.
   Note: If the diameter is incorrect, go to **step 3**. If it's correct, go to **step 4**



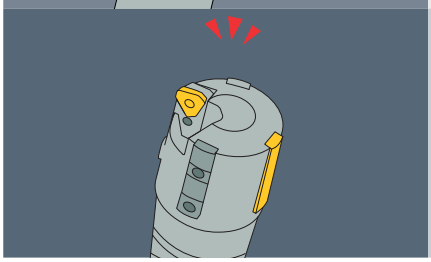
3. Adjust the outer cartridge
   3.1 First loosen the lock screw of the outer cartridge and then tighten it slightly.



3.2 Proceed to adjust the diameter, using the 2 adjustment screws and measure with a micrometer.



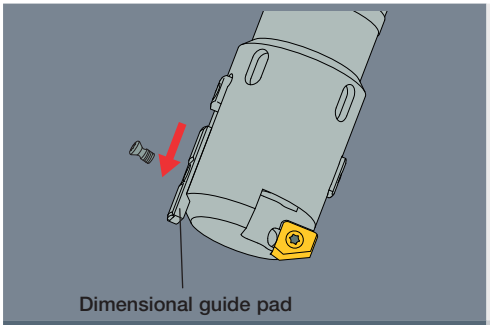
3.3 When set to the size, re-tighten the lock screw.
3.4 Recheck the diameter with a micrometer. If it is still out of tolerance, repeat the procedure from step 3.1.
Note: Please make sure to tighten the lock screw firmly before using. If loose, the cartridge may move and cause serious problems during machining.



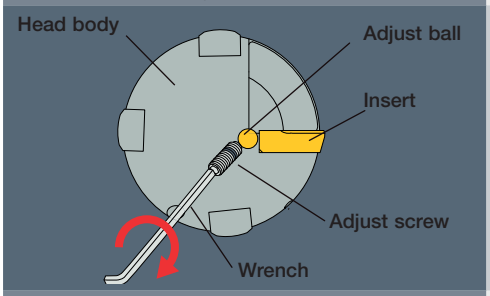
4. Slide the dimensional guide pad back to the original position and tighten the lock screw.
   Please check all the lock screws are firmly tightened as they may come loose if vibration occurs during drilling.

Technical Information - Adjustable Counter Boring Head Diameter Settings

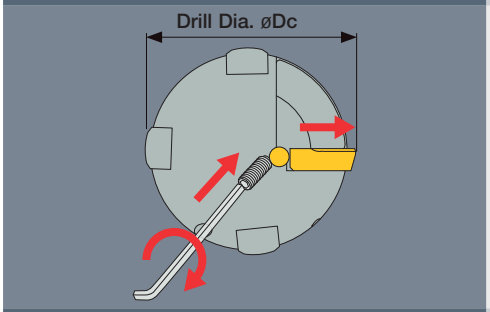
Drill diameter is adjusted with an adjust ball for diameter ø25 - ø39.99 mm with the following method.



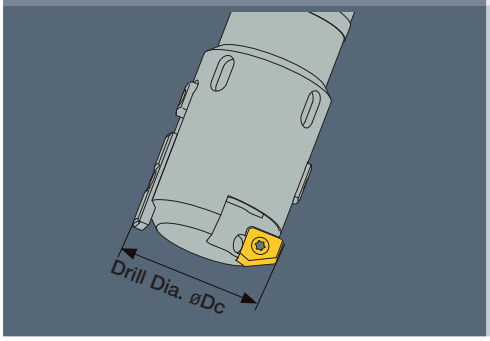
1. Slide the dimensional guide pad forward and then re-tighten the lock screw at the measuring position.



2. Tighten the adjust screw.



3. As the adjust screw moves forward, insert moves in a peripheral direction.

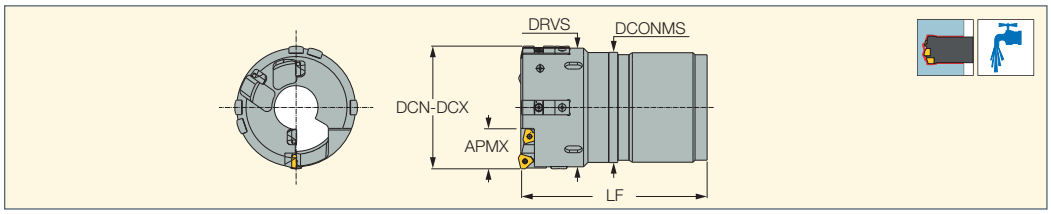


4. Measure the diameter with a micrometer. If the diameter is larger than expected, loosen the adjust screw and insert screw, then re-tighten the insert screw. Repeat the procedure from step 2.

ISCARDEEPDRILL

DSTR-EC

Single Tube Trepanning Drills with Outer 4-Start Thread, Cartridges, and Adjustable Diameter (100-328mm dia.)



Designation	DCN(1)	DCX(2)	APMX	DRVS(3)	LF	DCONMS
DSTR-EC 100.00-111.99	100.00	111.99	38.00	107.0	174.00	89.00
DSTR-EC 112.00-123.99	112.00	123.99	38.00	119.0	204.00	101.00
DSTR-EC 124.00-135.99	124.00	135.99	49.50	131.0	204.00	113.00
DSTR-EC 136.00-147.99	136.00	147.99	49.50	143.0	204.00	125.00
DSTR-EC 148.00-159.99	148.00	159.99	49.50	155.0	229.00	137.00
DSTR-EC 160.00-171.99	160.00	171.99	49.50	167.0	229.00	149.00
DSTR-EC 172.00-183.99	172.00	183.99	49.50	179.0	229.00	161.00
DSTR-EC 184.00-195.99	184.00	195.99	49.50	191.0	249.00	173.00
DSTR-EC 196.00-207.99	196.00	207.99	56.50	203.0	249.00	185.00
DSTR-EC 208.00-219.99	208.00	219.99	56.50	215.0	249.00	197.00
DSTR-EC 220.00-231.99	220.00	231.99	56.50	227.0	284.00	208.00
DSTR-EC 232.00-243.99	232.00	243.99	56.50	239.0	284.00	220.00
DSTR-EC 244.00-255.99	244.00	255.99	56.50	251.0	284.00	232.00
DSTR-EC 256.00-267.99	256.00	267.99	56.50	263.0	304.00	244.00
DSTR-EC 268.00-279.99	268.00	279.99	56.50	275.0	304.00	256.00
DSTR-EC 280.00-291.99	280.00	291.99	56.50	287.0	304.00	268.00
DSTR-EC 292.00-303.99	292.00	303.99	56.50	299.0	324.00	280.00
DSTR-EC 304.00-315.99	304.00	315.99	56.50	311.0	324.00	292.00
DSTR-EC 316.00-328.99	316.00	328.00	56.50	323.0	324.00	304.00

• For user guide and quotation form, see pages 272-280 • Ordering example: DSTR-EC 120.55

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Torque key size

For inserts, see pages: TPMX (214)

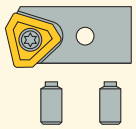
For holders, see pages: TS-I** (264)

Diameter	Peripheral Cartridge	Qty.	Peripheral Insert	Qty.	Inner/Central Cartridge	Qty.	Inner/ Central Insert	Qty.	Guide Pad	Qty.	Guide Pad Protectors	Qty.	Sub Guide Pad	Qty.
DSTR-EC 100.00-111.99	CAOD-103	1	TPMX 1704RG	1	CAID-103L	3	TPMX 1704RG	3	GPB-18-40-300	3	GPP-09	3	SGP-04	1
DSTR-EC 112.00-123.99	CAOD-103	1	TPMX 1704RG	1	CAID-103L	3	TPMX 1704RG	3	GPB-18-40-300	3	GPP-09	3	SGP-04	1
DSTR-EC 124.00-135.99	CAOD-142	1	TPMX 2405RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	3	GPP-09	3	SGP-04	1
DSTR-EC 136.00-147.99	CAOD-142	1	TPMX 2405RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	5	GPP-09	5	SGP-04	1
DSTR-EC 148.00-159.99	CAOD-142	1	TPMX 2405RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	5	GPP-09	5	SGP-04	1
DSTR-EC 160.00-171.99	CAOD-142	1	TPMX 2405RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	5	GPP-09	5	SGP-04	1
DSTR-EC 172.00-183.99	CAOD-142	1	TPMX 2405RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	5	GPP-09	5	SGP-04	1
DSTR-EC 184.00-195.99	CAOD-142	1	TPMX 2405RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	5	GPP-09	5	SGP-04	1
DSTR-EC 196.00-207.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	5	GPP-09	5	SGP-04	1
DSTR-EC 208.00-219.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-EC 220.00-231.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-EC 232.00-243.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-EC 244.00-255.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-EC 256.00-267.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-EC 268.00-279.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-EC 280.00-291.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-EC 292.00-303.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-EC 304.00-315.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-EC 316.00-328.00	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1

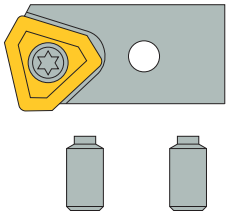
ISCARDEEPDRILL

CAOD

Boring Head Peripheral Cartridge



Universal Marking for Deep Drilling Tools



CA - P - DR - 0800 - R

- CA: Peripheral Cartridge
- P
- DR: DR : Drilling / CB : Counter Bore
- 0800: IC
- R: L/R HAND

Spare Parts

Designation	Adjustment Screw	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAOD-080	SR 11201755-4	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-0845	SR 11201755-6	HW 2.0	SR 11201756-10	HW 2.5	TPMX 1403..R-G	SR 11201753-3
CAOD-085	SR 11201755-7	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-103	SR 11201755-8	HW 2.5	SR 11201756-12	HW 3.0	TPMX 1704..R-G	SR 11201753-7
CAOD-142	SR 11201755-9	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405..R-G	SR 11201753-9
CAOD-170	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 2807..R-G	SR 11201753-10

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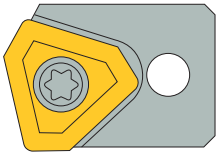
CAID

Drilling Head Inner Cartridge

Universal Marking for Deep Drilling Tools



CA - I - 0845 - R

- CA: Internal Cartridge
- I
- 0845: IC
- R: L/R HAND

Spare Parts

Designation	Locking Screw	Key	Insert	Insert Clamping Screw	Key
CAID-080	SR 11201753-5	T-9/51	NPMX 0803..R-G	SR 11201753-2	T-7/51
CAID-0845	SR 11201753-6	T-15/51	TPMX 1403..R-G	SR 11201753-3	T-8/51
CAID-085	SR 11201753-5	T-9/51	NPMX 0803..R-G	SR 11201753-2	T-7/51
CAID-103	SR 11201752-1	T-15/51	TPMX 1704..R-G	SR 11201753-7	T-9/51
CAID-142	SR 11201756-7	HW 3.0	TPMX 2405..R-G	SR 11201753-9	T-15/51
CAID-170	SR 11201756-7	HW 3.0	TPMX 2807..R-G	SR 11201753-10	T-20/51

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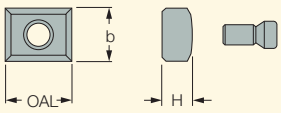
SGP

Drilling Head Sub-Guide Pads



Designation	OAL	b	H
SGP-01	10.00	6.0	3.0
SGP-02	10.00	8.0	4.5
SGP-03	10.00	10.0	5.0
SGP-04	20.00	14.0	7.0

- Select an outer cartridge and pad for the required enlarged diameter.

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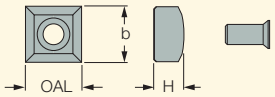
GPP

Drilling Head Guide Pad Protectors



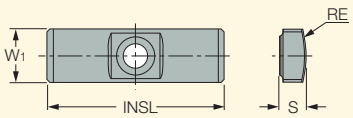
Designation	OAL	b	H
GPP-04	8.00	8.0	4.4
GPP-05	8.00	8.0	3.5
GPP-06	8.00	8.0	4.5
GPP-07	10.00	10.0	6.0
GPP-08	14.00	14.0	7.5
GPP-09	18.00	18.0	9.0

- Select an outer cartridge and pad for the required enlarged diameter.

ISCARDEEPDRILL

GPS

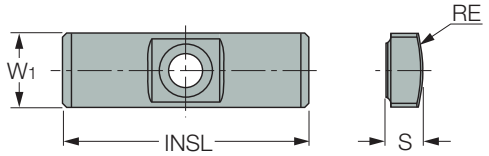
Deep Drilling Solid Carbide Guide Pads

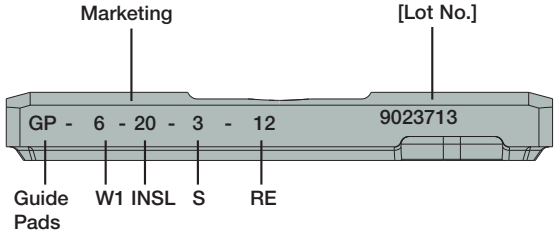


Designation	Dimensions W1	INSL	S	RE	Tough ↔ Hard IC928	IC950	IC908
GPS-04-16-055-DC	4.0	16.00	2.00	5.50	●		●
GPS-05-18-060-DC	5.0	18.00	2.50	6.00	●		●
GPS-05-18-075-DC	5.0	18.00	2.50	7.50	●		●
GPS-06-20-075-DC	6.0	20.00	3.00	7.50			●
GPS-06-20-075	6.0	20.00	3.00	7.50		●	
GPS-06-20-085-DC	6.0	20.00	3.00	8.50	●		●
GPS-06-20-085	6.0	20.00	3.00	8.50		●	
GPS-06-20-100-DC	6.0	20.00	3.00	10.00	●		●
GPS-06-20-100	6.0	20.00	3.00	10.00		●	
GPS-06-20-120-DC	6.0	20.00	3.00	12.00	●		●
GPS-06-20-120	6.0	20.00	3.00	12.00		●	
GPS-07-20-120-DC	7.0	20.00	3.50	12.00	●		●
GPS-07-20-120	7.0	20.00	3.50	12.00		●	
GPS-08-25-155-DC	8.0	25.00	4.50	15.50	●		●
GPS-08-25-155	8.0	25.00	4.50	15.50		●	
GPS-10-30-200-DC	10.0	30.00	4.50	20.00	●		●
GPS-10-30-200	10.0	30.00	4.50	20.00		●	
GPS-10-35-200-DC	10.0	35.00	6.00	20.00	●		●
GPS-10-35-200	10.0	35.00	6.00	20.00		●	
GPS-12-35-250-DC	12.0	35.00	5.50	25.00	●		●
GPS-12-35-250	12.0	35.00	5.50	25.00		●	
GPS-14-40-250-DC	14.0	40.00	7.50	25.00	●		●
GPS-14-40-250	14.0	40.00	7.50	25.00		●	
GPS-18-40-300-DC	18.0	40.00	9.00	30.00	●		●

- DC- Double Chamfer

Universal Marking for Deep Drilling Tools





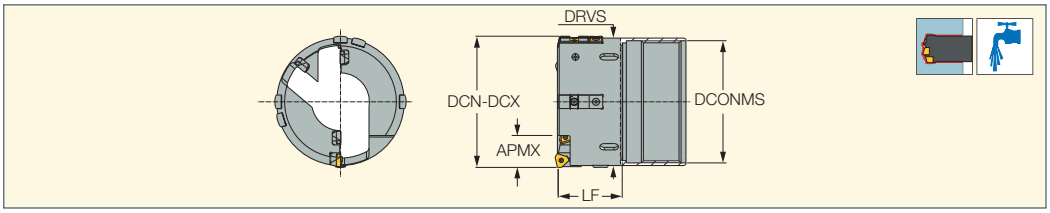
Guide Pad Grade Recommendation

	Oil Coolant			Water Based Coolant		
Priority	1	2	3	1	2	3
ISO-P	IC950	IC908	IC928	IC928	IC908	-
ISO-K	IC950	IC908	IC928	IC928	IC908	-
ISO-M	IC928	IC908	IC950	IC928	IC908	-
ISO-S	IC928	IC908	IC950	IC928	IC908	-

ISCARDEEPDRILL

DSTR-IC

Single Tube Trepanning Drills with Inner Single Start Thread, Cartridges and Adjustable Diameter (100-306mm dia.)



Designation	DCN(1)	DCX(2)	APMX	DRVS(3)	LF	DCONMS
DSTR-IC 100.00-110.99	100.00	110.99	38.00	106.0	139.00	90.00
DSTR-IC 111.00-122.99	111.00	122.99	38.00	118.0	149.00	102.00
DSTR-IC 123.00-123.99	123.00	123.99	38.00	119.0	149.00	114.00
DSTR-IC 124.00-134.99	124.00	134.99	49.50	130.0	149.00	114.00
DSTR-IC 135.00-148.99	135.00	148.99	49.50	144.0	149.00	126.00
DSTR-IC 149.00-161.99	149.00	161.99	49.50	157.0	149.00	139.00
DSTR-IC 162.00-173.99	162.00	173.99	49.50	169.0	169.00	151.00
DSTR-IC 174.00-185.99	174.00	185.99	49.50	181.0	169.00	163.00
DSTR-IC 186.00-195.99	186.00	195.99	49.50	191.0	169.00	175.00
DSTR-IC 196.00-197.99	196.00	197.99	56.50	193.0	169.00	175.00
DSTR-IC 198.00-209.99	198.00	209.99	56.50	205.0	169.00	187.00
DSTR-IC 210.00-221.99	210.00	221.99	56.50	217.0	189.00	199.00
DSTR-IC 222.00-233.99	222.00	233.99	56.50	229.0	189.00	211.00
DSTR-IC 234.00-245.99	234.00	245.99	56.50	241.0	189.00	223.00
DSTR-IC 246.00-257.99	246.00	257.99	56.50	253.0	189.00	235.00
DSTR-IC 258.00-266.99	258.00	266.99	56.50	262.0	209.00	245.00
DSTR-IC 267.00-281.99	267.00	281.99	56.50	277.0	209.00	259.00
DSTR-IC 282.00-293.99	282.00	293.99	56.50	289.0	209.00	271.00
DSTR-IC 294.00-305.99	294.00	305.99	56.50	301.0	209.00	283.00

• For user guide and quotation form, see pages 272-280 • Ordering example: DSTR-IC 120.55

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Torque key size

For inserts, see pages: TPMX (214)

For holders, see pages: TS-O** (265)

Diameter	Peripheral Cartridge	Qty.	Peripheral Insert	Qty.	Inner/ Central Cartridge	Qty.	Inner/ Central Insert	Qty.	Guide Pad	Qty.	Guide Pad Protectors	Qty.	Sub Guide Pad	Qty.
DSTR-IC 100.00-110.99	CAOD-103	1	TPMX 1704RG	1	CAID-103L	3	TPMX 1704RG	3	GPB-18-40-300	3	GPP-09	3	SGP-04	1
DSTR-IC 111.00-122.99	CAOD-103	1	TPMX 1704RG	1	CAID-103L	3	TPMX 1704RG	3	GPB-18-40-300	3	GPP-09	3	SGP-04	1
DSTR-IC 123.00-123.99	CAOD-142	1	TPMX 2405RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	3	GPP-09	3	SGP-04	1
DSTR-IC 124.00-134.99	CAOD-142	1	TPMX 2405RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	3	GPP-09	3	SGP-04	1
DSTR-IC 135.00-148.99	CAOD-142	1	TPMX 2405RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	5	GPP-09	5	SGP-04	1
DSTR-IC 149.00-161.99	CAOD-142	1	TPMX 2405RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	5	GPP-09	5	SGP-04	1
DSTR-IC 162.00-173.99	CAOD-142	1	TPMX 2405RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	5	GPP-09	5	SGP-04	1
DSTR-IC 174.00-185.99	CAOD-170	1	TPMX 2405RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	5	GPP-09	5	SGP-04	1
DSTR-IC 186.00-195.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-18-40-300	5	GPP-09	5	SGP-04	1
DSTR-IC 196.00-197.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	5	GPP-10	5	SGP-04	1
DSTR-IC 198.00-209.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	5	GPP-10	5	SGP-04	1
DSTR-IC 210.00-221.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-IC 222.00-233.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-IC 234.00-245.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-IC 246.00-257.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-IC 258.00-266.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-IC 267.00-281.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-IC 282.00-293.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1
DSTR-IC 294.00-305.99	CAOD-170	1	TPMX 2807RG	1	CAID-142L	3	TPMX 2405RG	3	GPB-22-50-750	3	GPP-10	3	SGP-04	1

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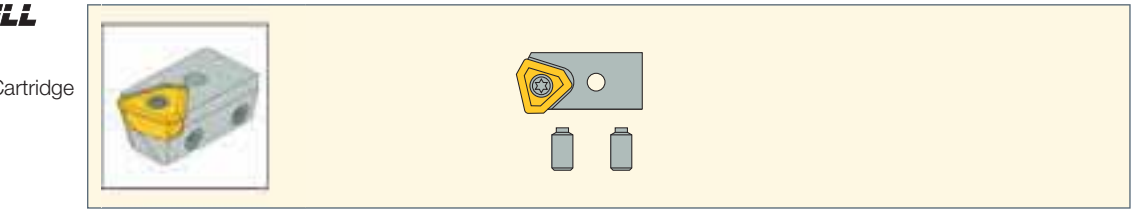
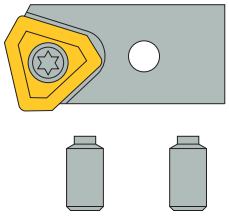
CAOD

Drilling Head Peripheral Cartridge



Universal Marking for Deep Drilling Tools



CA - P - DR - 0800 - R

- CA – P: Peripheral Cartridge
- DR: DR : Drilling, CB : Counter Bore
- 0800: IC
- R: L/R HAND

Spare Parts

Designation	Adjustment Screw	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAOD-080	SR 11201755-4	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-0845	SR 11201755-6	HW 2.0	SR 11201756-10	HW 2.5	TPMX 1403..R-G	SR 11201753-3
CAOD-085	SR 11201755-7	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803..R-G	SR 11201753-2
CAOD-103	SR 11201755-8	HW 2.5	SR 11201756-12	HW 3.0	TPMX 1704..R-G	SR 11201753-7
CAOD-142	SR 11201755-9	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405..R-G	SR 11201753-9
CAOD-170	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 2807..R-G	SR 11201753-10

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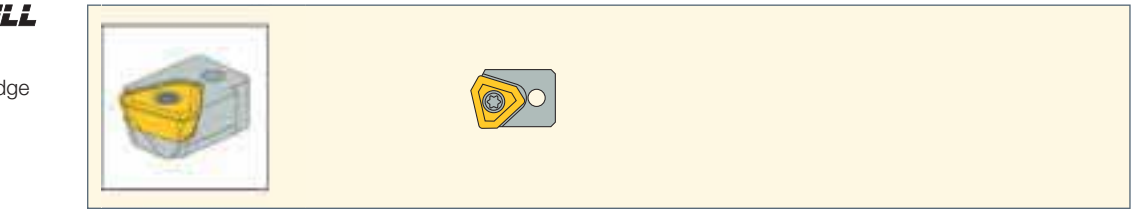
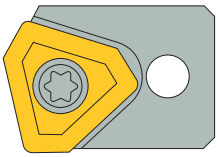
CAID

Drilling Head Inner Cartridge



Universal Marking for Deep Drilling Tools



CA - I - 0845 - R

- CA – I: Internal Cartridge
- 0845: IC
- R: L/R HAND

Spare Parts

Designation	Locking Screw	Key	Insert	Insert Clamping Screw	Key
CAID-080	SR 11201753-5	T-9/51	NPMX 0803..R-G	SR 11201753-2	T-7/51
CAID-0845	SR 11201753-6	T-15/51	TPMX 1403..R-G	SR 11201753-3	T-8/51
CAID-085	SR 11201753-5	T-9/51	NPMX 0803..R-G	SR 11201753-2	T-7/51
CAID-103	SR 11201752-1	T-15/51	TPMX 1704..R-G	SR 11201753-7	T-9/51
CAID-142	SR 11201756-7	HW 3.0	TPMX 2405..R-G	SR 11201753-9	T-15/51
CAID-170	SR 11201756-7	HW 3.0	TPMX 2807..R-G	SR 11201753-10	T-20/51

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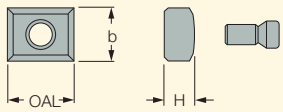
SGP

Drilling Head Sub-Guide Pads



Designation	OAL	b	H
SGP-01	10.00	6.0	3.0
SGP-02	10.00	8.0	4.5
SGP-03	10.00	10.0	5.0
SGP-04	20.00	14.0	7.0

- Select an outer cartridge and pad for the required enlarged diameter.

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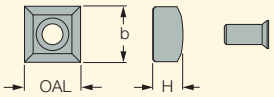
GPP

Drilling Head Guide Pad Protectors



Designation	OAL	b	H
GPP-04	8.00	8.0	4.4
GPP-05	8.00	8.0	3.5
GPP-06	8.00	8.0	4.5
GPP-07	10.00	10.0	6.0
GPP-08	14.00	14.0	7.5
GPP-09	18.00	18.0	9.0

- Select an outer cartridge and pad for the required enlarged diameter.

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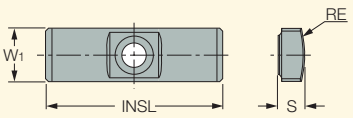
GPS

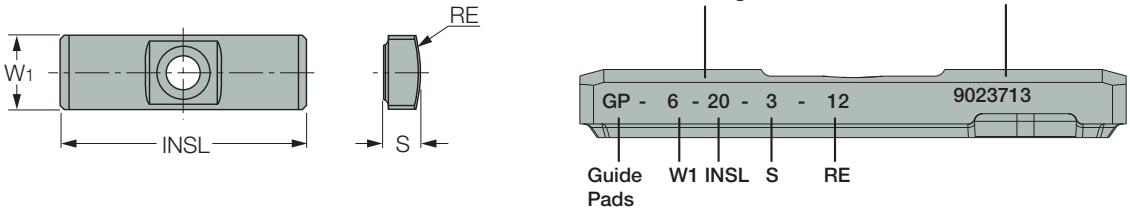
Deep Drilling Solid Carbide Guide Pads



Designation	Dimensions W1	INSL	S	RE	Tough ↔ Hard IC928	IC950	IC908
GPS-04-16-055-DC	4.0	16.00	2.00	5.50	●		●
GPS-05-18-060-DC	5.0	18.00	2.50	6.00	●		●
GPS-05-18-075-DC	5.0	18.00	2.50	7.50	●		●
GPS-06-20-075-DC	6.0	20.00	3.00	7.50			●
GPS-06-20-075	6.0	20.00	3.00	7.50		●	
GPS-06-20-085-DC	6.0	20.00	3.00	8.50	●		●
GPS-06-20-085	6.0	20.00	3.00	8.50		●	
GPS-06-20-100-DC	6.0	20.00	3.00	10.00	●		●
GPS-06-20-100	6.0	20.00	3.00	10.00		●	
GPS-06-20-120-DC	6.0	20.00	3.00	12.00	●		●
GPS-06-20-120	6.0	20.00	3.00	12.00		●	
GPS-07-20-120-DC	7.0	20.00	3.50	12.00	●		●
GPS-07-20-120	7.0	20.00	3.50	12.00		●	
GPS-08-25-155-DC	8.0	25.00	4.50	15.50	●		●
GPS-08-25-155	8.0	25.00	4.50	15.50		●	
GPS-10-30-200-DC	10.0	30.00	4.50	20.00	●		●
GPS-10-30-200	10.0	30.00	4.50	20.00		●	
GPS-10-35-200-DC	10.0	35.00	6.00	20.00	●		●
GPS-10-35-200	10.0	35.00	6.00	20.00		●	
GPS-12-35-250-DC	12.0	35.00	5.50	25.00	●		●
GPS-12-35-250	12.0	35.00	5.50	25.00		●	
GPS-14-40-250-DC	14.0	40.00	7.50	25.00	●		●
GPS-14-40-250	14.0	40.00	7.50	25.00		●	
GPS-18-40-300-DC	18.0	40.00	9.00	30.00	●		●

- DC- Double Chamfer

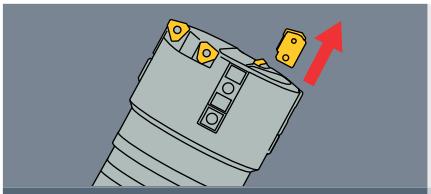
Universal Marking for Deep Drilling Tools



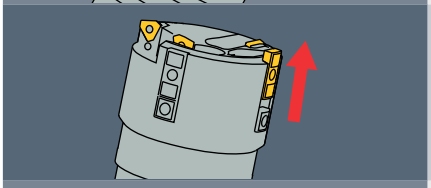
Guide Pad Grade Recommendation						
	Oil Coolant			Water Based Coolant		
Priority	1	2	3	1	2	3
ISO-P	IC950	IC908	IC928	IC928	IC908	-
ISO-K	IC950	IC908	IC928	IC928	IC908	-
ISO-M	IC928	IC908	IC950	IC928	IC908	-
ISO-S	IC928	IC908	IC950	IC928	IC908	-

Technical Information - Cartridge Style Trepanning Head Diameter Settings

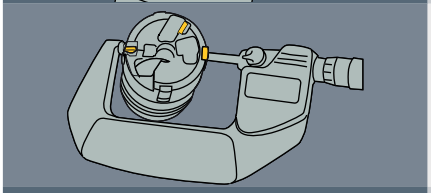
The Drill Head diameter is set and inspected with a master insert in our final inspection. However, the inserts in the market have a tolerance fluctuation so each time you change or index the insert, the diameter must be adjusted as per the following method.



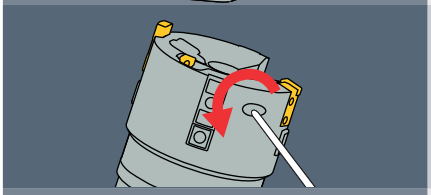
1. When a corner change is made on the insert, it must be adjusted to the correct size or damage can be caused to the head body or work piece material.



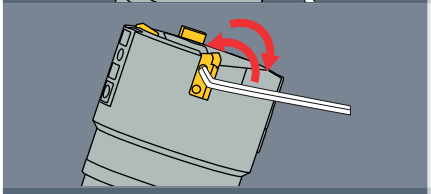
2. The dimensional guide pad must be slid forward to measure the diameter.
   2.1 Loosen the lock screw and slide the guide pad forward.
   2.2 Re-tighten the lock screw at the measuring position.



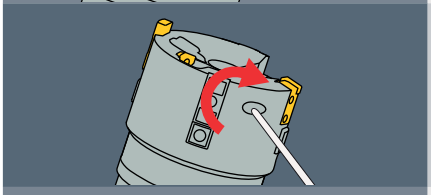
3. Measure the diameter with a micrometer.
   We recommend setting the tool diameter at h8 tolerance to the cutting diameter.
   If the diameter is incorrect, go to step 4
   If it's correct, go to step 5



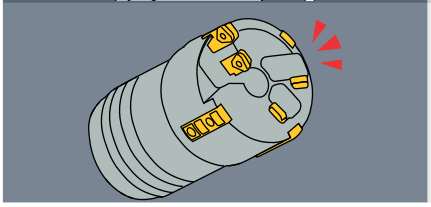
4. Adjust the peripheral cartridge
   4.1 First loosen the lock screw of the peripheral cartridge and then tighten it slightly.



4.2 Proceed to adjust the diameter, using the 2 adjust screws and measure with a micrometer.



4.3 When set to the size, retighten the lock screw.
4.4 Recheck the diameter with a micrometer. If it is still out of tolerance, repeat the procedure from step 4-1.
Please make sure to tighten the lock screw firmly before using. If loose, the cartridge may move and cause serious problems during machining.



5. Slide the dimensional guide pad back to the original position and tighten the lock screw.
6. Replace the inner cartridge and tighten the lock screw.
Please check that all the lock screws are firmly tightened as they may come loose if vibration occurs during drilling.

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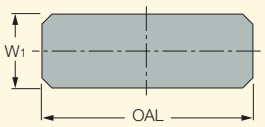
SHIM GPS

Shims for GPS Pads



Designation	W1	OAL
SHIMSET-GP04	4.00	15.90
SHIMSET-GP05	5.00	18.00
SHIMSET-GP06	6.00	20.00

• 5 shim set contains 5 shims in thicknesses of 0.01mm, 0.02mm, 0.03mm, 0.04 mm and 0.05mm respectively • Adjusting shims are sold by set only, and are not to be sold separately

Shim Combinations for Various Diameters

Diameter Adjustmemts (mm)	Shim (s) for Measuring Guide Pad	Shim (s) for Supporting Guide Pad	Number of Shim Sets Needed
+0.01	0.01	0.01	2
+0.02	0.02	0.02	2
+0.03	0.03	0.01+0.02	1
+0.04	0.04	0.01+0.03	1
+0.05	0.05	0.02+0.03	1
+0.06	0.01+0.05	0.02+0.04	1
+0.07	0.02+0.05	0.03+0.04	1
+0.08	0.03+0.05	0.04+0.04	2
+0.09	0.04+0.05	0.04+0.05	2
+0.10	0.05+0.05	0.04+0.04+0.02	2

Assembly Instructions

STEP 1

Measure the DTD drill diameter between the measuring guide pad and the insert cutting edge. If a pre setter is not available, use a micrometer or caliper. For a precise drill diameter measurement, it is recommended to test drill a hole and measure the hole diameter.

STEP 2

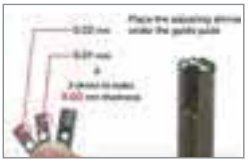
Select the shim combinations according to the chart above to obtain the required hole diameter. Take into consideration that the actual diameter of the drilled hole tends to be slightly larger (usually +20 µm to +30 µm) than the drill's nominal diameter — i.e. add 20 µm-30 µm to the measured drill diameter in Step 1 before the final drill diameter.

STEP 3

Remove the guide pads.

STEP 4

Install the adjusting shims underneath the guide pads, respectively. Put the guide pads back on the tool.

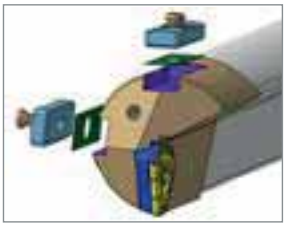


STEP 5

Measure the drill diameter again to confirm that the required diameter is obtained on the DTD.

STEP 6

Drill a hole to confirm that the required hole diameter is achieved.



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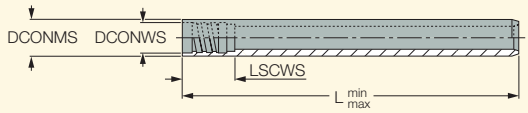
TS***

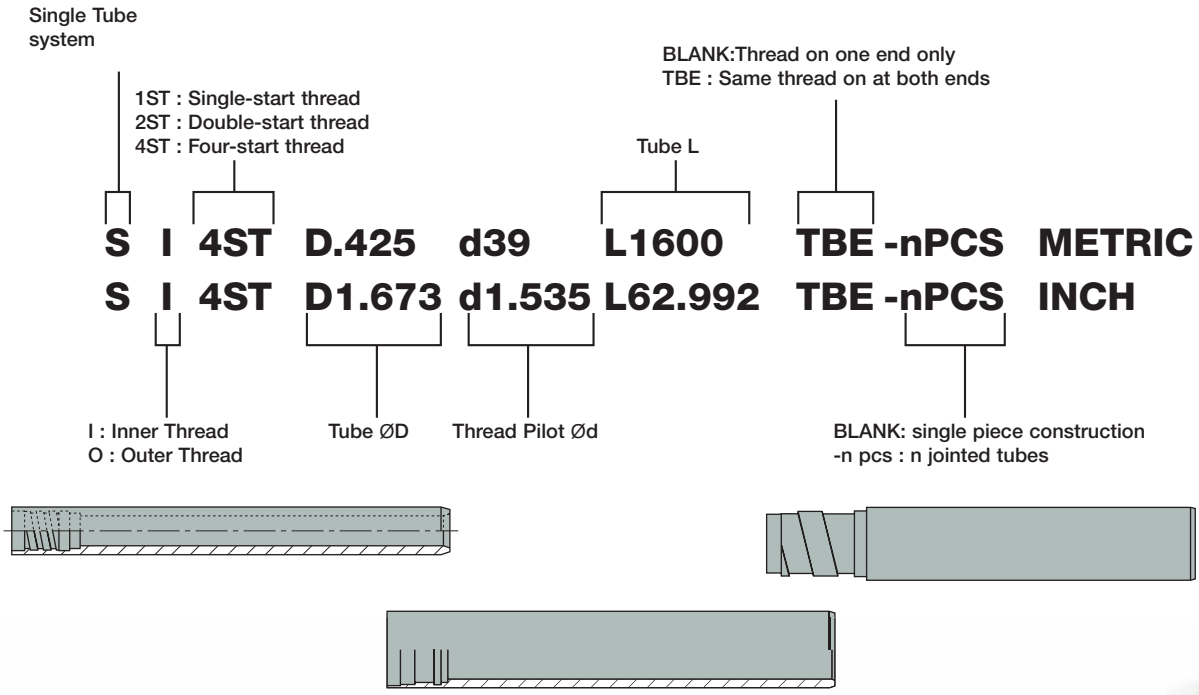
Drill Tubes - STS System - Inner Single-Start Thread Connection



Designation	d Range	DCONMS	DCONWS	LSCWS	L min	L max
TS001 L=(0-2950)MM	8.00-8.99	7.10	6.00	16.00	0.0	1749.0
TS002 L=(0-2950)MM	9.00-9.99	8.30	7.20	16.00	0.0	1749.0
TS003 L=(0-2950)MM	10.00-10.99	9.00	7.60	16.00	0.0	1749.0
TS004 L=(0-2950)MM	11.00-11.99	10.00	8.60	16.00	0.0	1749.0
TS005 L=(0-2950)MM	12.00-13.49	11.00	9.10	16.00	0.0	1749.0
TS006 L=(0-2950)MM	13.50-14.79	12.00	10.80	16.00	0.0	1749.0

• Indicate overall length (L) when ordering. • Ordering example: TS004-L1500

Universal Marking for Deep Drilling Tools



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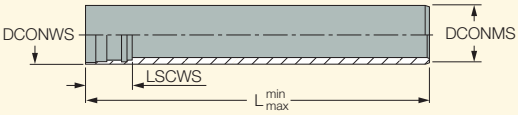
TS-I**

Drill Tubes - STS System - Inner 4-Start Thread Connection

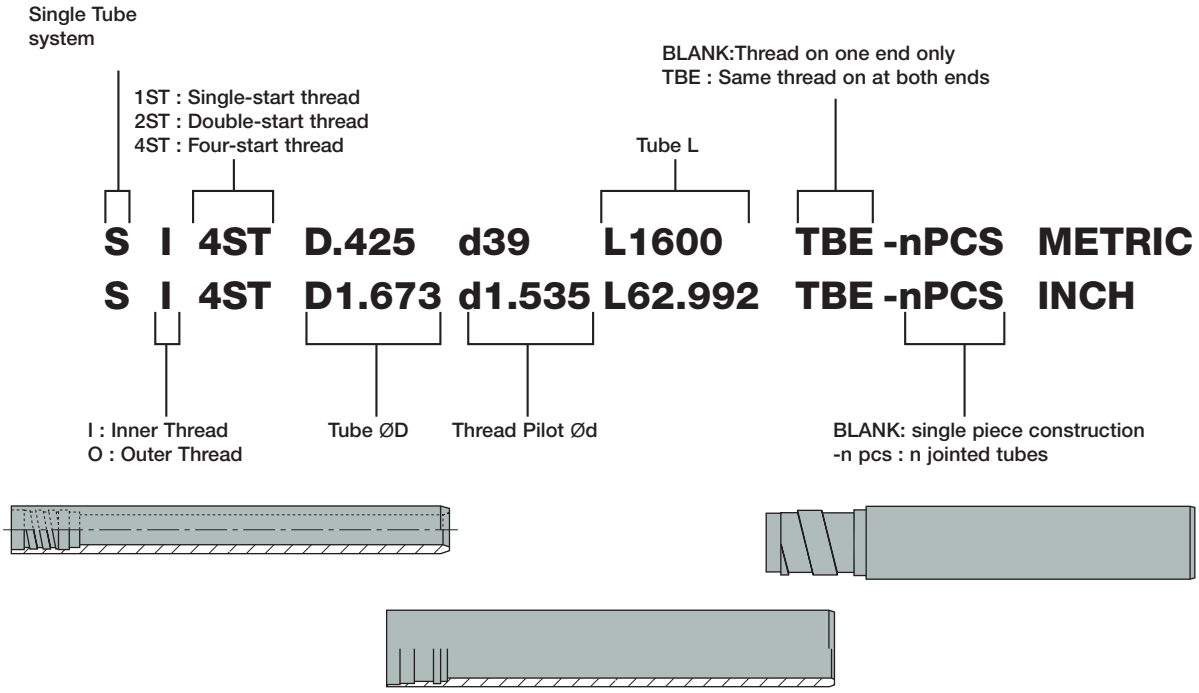


Designation	d Range	DCONMS	DCONWS	LSCWS	L min	L max
TS-I01 L=(0-3350)MM	12.60-13.60	11.00	9.60	22.00	0.0	1749.0
TS-I02 L=(0-3350)MM	13.61-14.60	12.00	10.60	22.00	0.0	1749.0
TS-I03 L=(0-3350)MM	14.61-15.59	13.00	11.60	22.00	0.0	1749.0
TS-I0 L=(0-3700)MM	15.60-16.70	14.00	12.60	21.00	0.0	1749.0
TS-I1 L=(0-3700)MM	16.71-17.70	15.00	13.60	21.00	0.0	1749.0
TS-I2 L=(0-3700)MM	17.71-18.90	16.00	14.50	22.00	0.0	1749.0
TS-I3 L=(0-3700)MM	18.91-20.00	17.00	15.50	22.00	0.0	1749.0
TS-I4 L=(0-3700)MM	20.01-21.80	18.00	16.00	27.50	0.0	1749.0
TS-I5 L=(0-3700)MM	21.81-24.10	20.00	18.00	30.00	0.0	1749.0
TS-I6 L=(0-3700)MM	24.11-26.40	22.00	19.50	30.00	0.0	1749.0
TS-I7 L=(0-3700)MM	26.41-28.70	24.00	21.00	30.00	0.0	1749.0
TS-I8 L=(0-3700)MM	28.71-31.00	26.00	23.50	33.00	0.0	1749.0
TS-I9 L=(0-3700)MM	31.01-33.30	28.00	25.50	33.00	0.0	1749.0
TS-I10 L=(0-3700)MM	33.31-36.20	30.00	28.00	33.00	0.0	1749.0
TS-I11 L=(037009)MM	36.21-39.60	33.00	30.00	40.00	0.0	1749.0
TS-I12 L=(0-3700)MM	39.61-43.00	36.00	33.00	40.00	0.0	1749.0
TS-I13 L=(037009)MM	43.01-47.00	39.00	36.00	40.00	0.0	1749.0
TS-I14 L=(0-3700)MM	47.01-51.70	43.00	39.00	40.00	0.0	1749.0
TS-I15 L=(0-3700)MM	51.71-56.20	47.00	43.00	44.00	0.0	1749.0
TS-I16 L=(0-3700)MM	56.21-60.60	51.00	47.00	44.00	0.0	1749.0
TS-I17 L=(0-3700)MM	60.61-64.99	56.00	51.00	44.00	0.0	1749.0
TS-I18 L=(0-3700)MM	65.00-66.99	56.00	52.00	75.00	0.0	1749.0
TS-I19 L=(0-2950)MM	67.00-72.99	62.00	58.00	75.00	0.0	1749.0
TS-I20 L=(0-3700)MM	73.00-79.99	68.00	63.00	75.00	0.0	1749.0
TS-I21 L=(0-3700)MM	80.00-86.99	75.00	70.00	97.00	0.0	1749.0
TS-I22 L=(0-3700)MM	87.00-99.99	82.00	77.00	97.00	0.0	1749.0
TS-I23 L=(0-3700)MM	100.00-111.99	94.00	89.00	97.00	0.0	1749.0
TS-I24 L=(0-3700)MM	112.00-123.99	106.00	101.00	118.00	0.0	1749.0
TS-I25 L=(0-3700)MM	124.00-135.99	118.00	113.00	118.00	0.0	1749.0
TS-I26 L=(0-3700)MM	136.00-147.99	130.00	125.00	118.00	0.0	1749.0
TS-I27 L=(0-3700)MM	148.00-159.99	142.00	137.00	139.00	0.0	1749.0
TS-I28 L=(0-3700)MM	160.00-171.99	154.00	149.00	139.00	0.0	1749.0
TS-I29 L=(0-3700)MM	172.00-183.99	166.00	161.00	139.00	0.0	1749.0
TS-I30 L=(0-3700)MM	184.00-195.99	178.00	173.00	144.00	0.0	1749.0
TS-I31 L=(0-3700)MM	196.00-207.99	190.00	185.00	144.00	0.0	1749.0
TS-I32 L=(0-3700)MM	208.00-219.99	202.00	197.00	144.00	0.0	1749.0
TS-I33 L=(0-3700)MM	220.00-231.99	214.00	208.00	164.00	0.0	1749.0
TS-I34 L=(0-3700)MM	232.00-243.99	226.00	220.00	164.00	0.0	1749.0

• Indicate overall length (L) when ordering. • Ordering example: TS-I12-L2000

For tools, see pages: DSD-EF-FB (201) • DSD-EF-FT (192) • DSTR-EC (255)

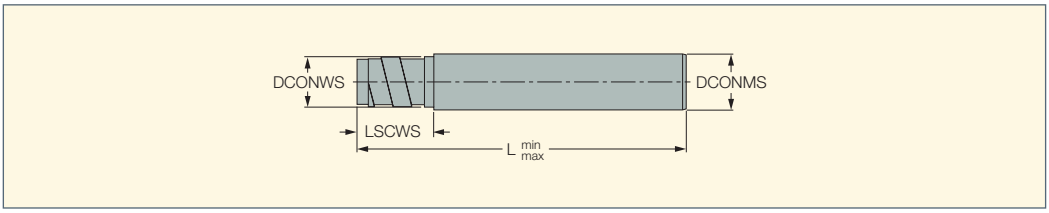
Universal Marking for Deep Drilling Tools



ISCARDEEPDRILL

TS-O**

Drill Tubes - STS System - Outer Single-Start Thread Connection

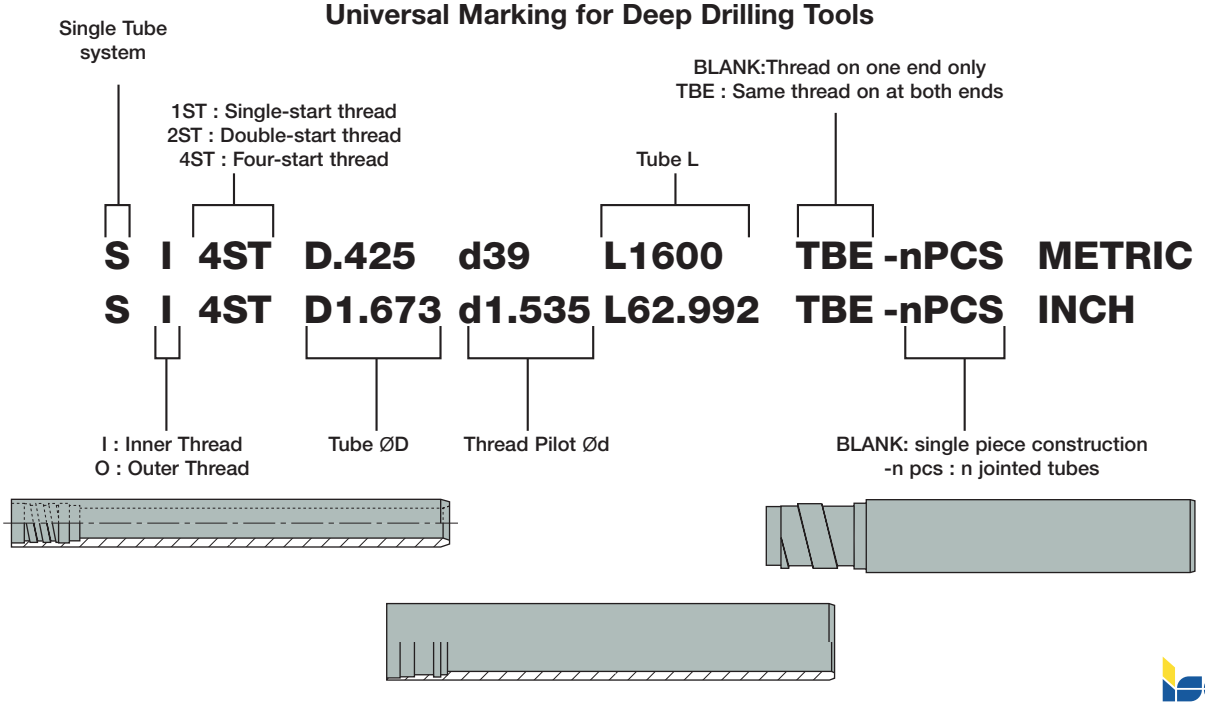


Designation	d Range	DCONMS	DCONWS	LSCWS	L min	L max
TS-O0 L=(0-3350)MM	14.50-15.00	12.00	11.50	23.00	0.0	3350.0
TS-O0 L=(661-1100)DEL	14.50-15.00	12.00	11.50	23.00	661.0	1100.0
TS-O1 L=(0-3350)MM	15.01-15.50	12.00	11.80	23.00	0.0	3350.0
TS-O1 L=(661-1100)DEL	15.01-15.50	12.00	11.80	23.00	661.0	1100.0
TS-O2 L=(0-3350)MM	15.51-16.00	13.00	12.40	23.00	0.0	3350.0
TS-O2 L=(661-1100)DEL	15.51-16.00	13.00	12.40	23.00	661.0	1100.0
TS-O3 L=(0-3700)MM	16.01-16.50	13.00	12.70	23.00	0.0	3700.0
TS-O4 L=(0-3700)MM	16.51-17.25	14.00	13.40	23.00	0.0	3700.0
TS-O5 L=(0-3700)MM	17.26-18.00	14.00	13.70	23.00	0.0	3700.0
TS-O6 L=(0-3700)MM	18.01-19.00	15.00	14.40	23.00	0.0	3700.0
TS-O7 L=(0-3700)MM	19.01-19.99	16.50	15.40	23.00	0.0	3700.0
TS-O8 L=(0-3700)MM	20.00-21.99	18.00	16.50	26.00	0.0	3700.0
TS-O9 L=(0-3700)MM	22.00-24.99	20.00	19.00	26.00	0.0	3700.0
TS-O10 L=(0-3700)MM	25.00-26.99	22.00	20.00	26.00	0.0	3700.0
TS-O11 L=(0-1749)MM	27.00-29.99	24.00	22.00	26.00	0.0	1749.0
TS-O11 L=(1750-2600)MM	27.00-29.99	24.00	22.00	26.00	1750.0	2600.0
TS-O12 L=(0-3700)MM	30.00-31.99	26.00	24.00	26.00	0.0	3700.0
TS-O13 L=(0-3700)MM	32.00-33.99	30.00	27.00	26.00	0.0	3700.0
TS-O14 L=(0-3700)MM	34.00-36.99	30.00	27.00	41.00	0.0	3700.0
TS-O15 L=(0-3700)MM	37.00-39.99	33.00	30.00	41.00	0.0	3700.0
TS-O16 L=(0-3700)MM	40.00-43.99	36.00	33.00	41.00	0.0	3700.0
TS-O17 L=(0-3700)MM	44.00-46.99	39.00	37.00	41.00	0.0	3700.0
TS-O18 L=(0-3700)MM	47.00-51.99	43.00	41.00	41.00	0.0	3700.0
TS-O19 L=(0-3700)MM	52.00-56.99	47.00	44.00	41.00	0.0	3700.0
TS-O20 L=(0-3700)MM	57.00-60.99	51.00	49.00	41.00	0.0	3700.0
TS-O21 L=(0-3700)MM	61.00-67.99	56.00	53.00	41.00	0.0	3700.0
TS-O22 L=(0-2950)MM	68.00-74.99	62.00	59.00	41.00	0.0	2950.0
TS-O23 L=(0-3700)MM	75.00-80.99	68.00	65.00	71.00	0.0	3700.0
TS-O24 L=(0-3700)MM	81.00-90.99	75.00	71.00	71.00	0.0	3700.0
TS-O25 L=(0-3700)MM	91.00-98.99	82.00	79.00	71.00	0.0	3700.0
TS-O26 L=(0-3700)MM	99.00-110.99	94.00	90.00	71.00	0.0	3700.0
TS-O27 L=(0-3700)MM	111.00-122.99	106.00	102.00	71.00	0.0	3700.0
TS-O28 L=(0-3700)MM	123.00-134.99	118.00	114.00	71.00	0.0	3700.0
TS-O29 L=(0-3700)MM	135.00-148.99	130.00	126.00	71.00	0.0	3700.0
TS-O30 L=(0-3700)MM	149.00-161.99	142.00	139.00	71.00	0.0	3700.0
TS-O31 L=(0-3700)MM	162.00-173.99	154.00	151.00	86.00	0.0	3700.0
TS-O32 L=(0-3700)MM	174.00-185.99	166.00	163.00	86.00	0.0	3700.0
TS-O33 L=(0-3700)MM	186.00-197.99	178.00	175.00	86.00	0.0	3700.0
TS-O34 L=(0-3700)MM	198.00-209.99	190.00	187.00	86.00	0.0	3700.0
TS-O35 L=(0-3700)MM	210.00-221.99	202.00	199.00	86.00	0.0	3700.0
TS-O36 L=(0-3700)MM	222.00-233.99	214.00	211.00	86.00	0.0	3700.0
TS-O37 L=(0-3700)MM	234.00-245.99	226.00	223.00	86.00	0.0	3700.0

• Indicate overall length (L) when ordering. • Ordering example: TS-036-L1100

For tools, see pages: DSD-IF-FB (201) • DSD-IF-FT (192) • DSTR-IC (258)

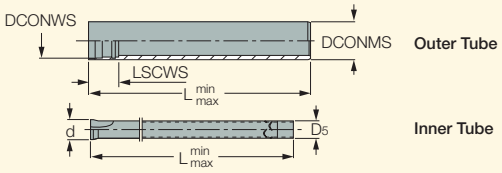
Universal Marking for Deep Drilling Tools



ISCARDEEPDRILL

TDO-I (D18.41-65.00)

Double Tube Drill System
with 4-Start Thread
Connection Outer Tubes

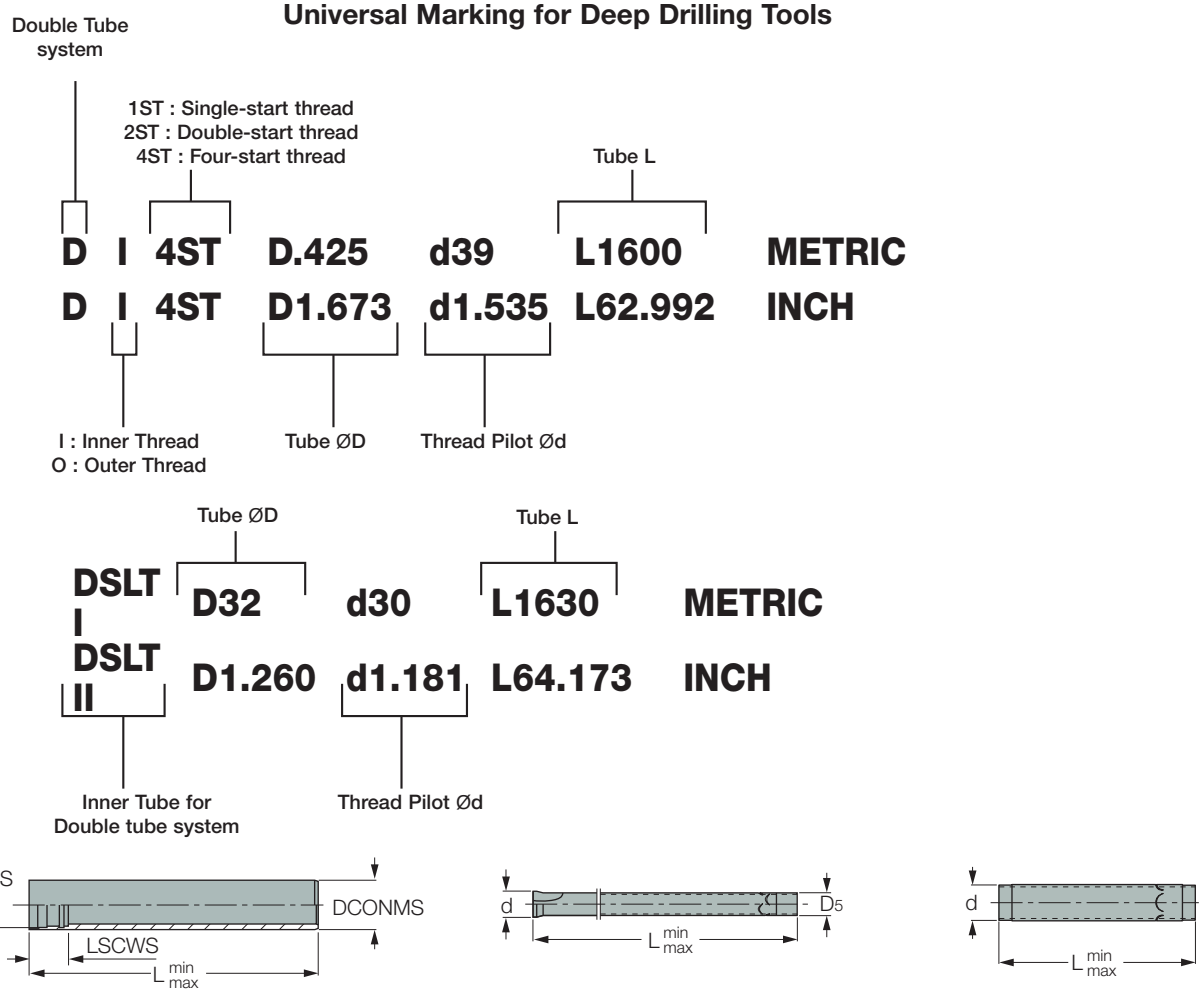


Designation	d Range	DCONMS	DCONWS	LSCWS	Int Tube	d	D5	L min	L max
TDO-I0 L=(0-3700)MM	18.41-20.00	18.00	16.00	27.50	TDI-N0	12.00	10.00	0.0	630.0
TDO-I1 L=(0-3700)MM	20.01-21.80	19.50	18.00	30.00	TDI-N1	14.00	12.00	0.0	630.0
TDO-I2 L=(0-3700)MM	21.81-24.10	21.50	19.50	30.00	TDI-N2	15.00	13.00	0.0	630.0
TDO-I3 L=(0-3700)MM	24.11-26.40	23.50	21.00	30.00	TDI-N3	16.00	14.00	0.0	630.0
TDO-I4 L=(0-3700)MM	26.41-28.70	26.00	23.50	33.00	TDI-N4	18.00	16.00	0.0	630.0
TDO-I5 L=(0-3700)MM	28.71-31.00	28.00	25.50	33.00	TDI-N5	20.00	18.00	0.0	630.0
TDO-I6 L=(0-3700)MM	31.01-33.30	30.50	28.00	33.00	TDI-N6	22.00	20.00	0.0	630.0
TDO-I7 L=(0-3700)MM	33.31-36.20	33.00	30.00	40.00	TDI-N7	24.00	22.00	0.0	630.0
TDO-I8 L=(0-3700)MM	36.21-39.60	35.50	33.00	40.00	TDI-N8	26.00	24.00	0.0	630.0
TDO-I9 L=(0-3700)MM	39.61-43.00	39.00	36.00	40.00	TDI-N9	29.00	27.00	0.0	630.0
TDO-I10 L=(0-3700)MM	43.01-47.00	42.50	39.00	40.00	TDI-N10	32.00	30.00	0.0	630.0
TDO-I11 L=(0-3700)MM	47.01-51.70	46.50	43.00	44.00	TDI-N11	35.00	32.00	0.0	630.0
TDO-I12 L=(0-3700)MM	51.71-56.20	51.00	47.00	44.00	TDI-N12	39.00	36.00	0.0	630.0
TDO-I13 L=(0-3700)MM	56.21-65.00	55.50	51.00	44.00	TDI-N13	43.00	40.00	0.0	630.0

• Please indicate overall length (L) when ordering • Ordering example: TDO-I13-L1100 • For 18.41-65.00 diameter range, the inner tube should be 30 mm longer than the outer tube

For tools, see pages: DDC-EA (246) • DDC-EC (249)

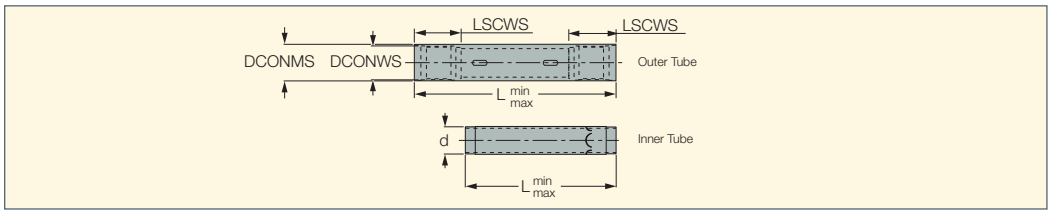
Universal Marking for Deep Drilling Tools



ISCARDEEPDRILL

TDO-I (D65.00-171.99)

Double Tube Drill System
with 4-Start Thread
Connection Outer Tubes



Designation	d Range	DCONMS	DCONWS	LSCWS	Int Tube	d	L min	L max
TDO-I14 L=(0-3700)MM	65.00-66.99	56.00	52.00	75.00	TDI-N14	40.00	0.0	660.0
TDO-I15 L=(0-2950)MM	67.00-72.99	62.00	58.00	75.00	TDI-N15	44.00	0.0	660.0
TDO-I16 L=(0-3700)MM	73.00-79.99	68.00	63.00	75.00	TDI-N16	48.00	0.0	630.0
TDO-I17 L=(0-3700)MM	80.00-86.99	75.00	70.00	97.00	TDI-N17	54.00	0.0	630.0
TDO-I18 L=(0-3700)MM	87.00-99.99	82.00	77.00	97.00	TDI-N18	60.00	0.0	630.0
TDO-I19 L=(0-3700)MM	100.00-111.99	94.00	89.00	97.00	TDI-N19	70.00	0.0	630.0
TDO-I20 L=(0-3700)MM	112.00-123.99	106.00	101.00	118.00	TDI-N20	80.00	0.0	630.0
TDO-I21 L=(0-630)MM	124.00-135.99	118.00	113.00	118.00	TDI-N21	80.00	0.0	630.0
TDO-I21 L=(631-1070)MM	124.00-135.99	118.00	113.00	118.00	TDI-N21	80.00	631.0	1070.0
TDO-I22 L=(0-630)MM	136.00-147.99	130.00	125.00	118.00	TDI-N22	90.00	0.0	630.0
TDO-I22 L=(631-1070)MM	136.00-147.99	130.00	125.00	118.00	TDI-N22	90.00	631.0	1070.0
TDO-I23 L=(0-630)MM	148.00-159.99	142.00	137.00	139.00	TDI-N23	100.00	0.0	630.0
TDO-I23 L=(631-1070)MM	148.00-159.99	142.00	137.00	139.00	TDI-N23	100.00	631.0	1070.0
TDO-I24 L=(0-630)MM	160.00-171.99	154.00	149.00	139.00	TDI-N24	120.00	0.0	630.0
TDO-I24 L=(631-1070)MM	160.00-171.99	154.00	149.00	139.00	TDI-N24	120.00	631.0	1070.0

• Indicate overall length (L) when ordering • Ordering example: TDO-I18-L1150 • For 65.00-123.99 diameter range, the inner tube should be 190 mm longer than the outer tube. • For 124.00-183.99 diameter range, the inner tube should be 220 mm longer than the outer tube.

For tools, see pages: DDC-EC (249) • DDD-EC (211)

Universal Marking for Deep Drilling Tools

Double Tube system

1ST : Single-start thread
2ST : Double-start thread
4ST : Four-start thread

Tube L

D	I	4ST	D.425	d39	L1600	METRIC
D	I	4ST	D1.673	d1.535	L62.992	INCH

I : Inner Thread
O : Outer Thread

Tube ØD

Thread Pilot Ød

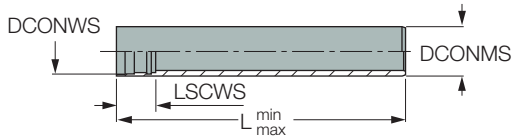
Tube ØD

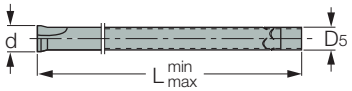
Tube L

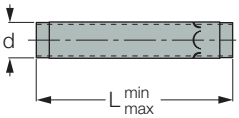
DSLT I	D32	d30	L1630	METRIC
DSLT II	D1.260	d1.181	L64.173	INCH

Inner Tube for Double tube system

Thread Pilot Ød







Recommended Machining Conditions

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material Group No.(1)
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1
		>= 0.25 %C	Annealed	650	190	2
		< 0.55 %C	Quenched and tempered	850	250	3
		>= 0.55 %C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel and cast steel		Austenitic, duplex	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic/martensitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloys		Not hardenable		60	21
			Hardenable		100	22
	Aluminum-cast alloys	<=12% Si	Not hardenable		75	23
			Hardenable		90	24
		>12% Si	High temperature		130	25
	Copper alloys	>1% Pb	Free cutting		110	26
			Brass		90	27
			Electrolitic copper		100	28
	Non-metallic		Duroplastics, fiber plastics			29
			Hard rubber			30
S	High temp. alloys	Fe based	Annealed		200	31
			Hardened		280	32
		Ni or Co based	Annealed		250	33
			Hardened		350	34
			Cast		320	35
	Titanium alloys		Pure	400		36
			Alpha+beta alloys hardened	1050		37
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

(1) Based on ISO 513 and VDI 3323 standards

Ground Brazed Solid Drill Heads DSD-E0, DSD-E1, DSD-E3, DDD-E3, DSD-I1						Adjustable Solid Drill Heads DSD-IA, DSD-EA		
Dia. Range	**8.00-20.00**	**15.60-20.00**	**20.01-31.00**	**31.01-43.00**	**43.01-65.00**	**Dia. Range**	**16.01-21.99**	**22.00-28.50**
V_c (m/min)	**Feed Rate f (mm/rev)**					**V_c (m/min)**	**Feed Rate f (mm/rev)**	
70-120	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	60-120	0.08-0.13	0.1-0.15
70-120	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	60-120	0.08-0.13	0.1-0.15
40-70	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	60-120	0.08-0.13	0.1-0.15
70-120	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	60-120	0.08-0.13	0.1-0.15
55-100	0.05-0.1	0.08-0.12	0.1-0.15	0.13-0.17	0.15-0.28	50-100	0.08-0.11	0.1-0.13
70-100	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	50-100	0.08-0.11	0.1-0.15
55-100	0.05-0.1	0.08-0.12	0.1-0.15	0.13-0.17	0.15-0.28	50-100	0.08-0.11	0.1-0.13
55-100	0.05-0.1	0.08-0.12	0.1-0.15	0.13-0.17	0.15-0.28	50-100	0.08-0.11	0.1-0.13
55-100	0.05-0.1	0.08-0.12	0.1-0.15	0.13-0.17	0.15-0.28	50-100	0.08-0.11	0.1-0.13
50-85	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	60-120	0.08-0.13	0.1-0.15
55-100	0.05-0.1	0.08-0.12	0.1-0.15	0.13-0.17	0.15-0.28	50-100	0.08-0.11	0.1-0.13
60-100	0.05-0.13	0.08-0.15	0.1-0.28	0.13-0.3	0.16-0.35	40-80	0.08-0.13	0.1-0.15
60-100	0.05-0.13	0.08-0.15	0.1-0.28	0.13-0.3	0.16-0.35	40-80	0.08-0.13	0.1-0.15
60-100	0.05-0.12	0.05-0.12	0.08-0.25	0.1-0.28	0.15-0.33	30-60	0.05-0.11	0.08-0.14
80-100	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	70-100	0.08-0.13	0.1-0.15
80-100	0.05-0.13	0.08-0.15	0.1-0.17	0.13-0.2	0.16-0.3	70-100	0.08-0.13	0.1-0.15
60-100	0.05-0.13	0.06-0.13	0.08-0.18	0.1-0.2	0.15-0.25	50-90	0.06-0.12	0.08-0.16
60-100	0.05-0.13	0.06-0.13	0.08-0.18	0.1-0.2	0.15-0.25	50-80	0.06-0.12	0.08-0.16
50-100	0.05-0.13	0.06-0.13	0.08-0.18	0.1-0.2	0.15-0.25	50-90	0.06-0.12	0.08-0.16
50-100	0.05-0.13	0.06-0.13	0.08-0.18	0.1-0.2	0.15-0.25	50-90	0.06-0.12	0.08-0.16
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
65-100	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-90	0.08-0.13	0.1-0.18
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
65-130	0.05-0.13	0.08-0.15	0.1-0.2	0.15-0.25	0.16-0.3	60-120	0.08-0.13	0.1-0.18
10-50	0.05-0.12	0.06-0.12	0.08-0.15	0.12-0.18	0.15-0.25	20-50	0.06-0.11	0.08-0.14
10-50	0.05-0.12	0.06-0.12	0.08-0.15	0.12-0.18	0.15-0.25	20-50	0.06-0.11	0.08-0.14
10-50	0.05-0.12	0.06-0.12	0.08-0.15	0.12-0.18	0.15-0.25	20-50	0.06-0.11	0.08-0.14
10-50	0.05-0.12	0.06-0.12	0.08-0.15	0.12-0.18	0.15-0.25	20-50	0.06-0.11	0.08-0.14
10-50	0.05-0.12	0.06-0.12	0.08-0.15	0.12-0.18	0.15-0.25	20-50	0.06-0.11	0.08-0.14
30-50	0.05-0.1	0.05-0.1	0.08-0.12	0.1-0.15	0.12-02	20-50	0.05-0.09	0.08-0.11
30-50	0.05-0.1	0.05-0.1	0.08-0.12	0.1-0.15	0.12-0.2	20-50	0.05-0.09	0.08-0.11

Recommended Machining Conditions

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material Group No.(1)
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1
		>= 0.25 %C	Annealed	650	190	2
		< 0.55 %C	Quenched and tempered	850	250	3
		>= 0.55 %C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel and cast steel		Austenitic, duplex	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic/martensitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloys		Not hardenable		60	21
			Hardenable		100	22
	Aluminum-cast alloys	<=12% Si	Not hardenable		75	23
			Hardenable		90	24
		>12% Si	High temperature		130	25
	Copper alloys	>1% Pb	Free cutting		110	26
			Brass		90	27
			Electrolitic copper		100	28
	Non-metallic		Duroplastics, fiber plastics			29
			Hard rubber			30
S	High temp. alloys	Fe based	Annealed		200	31
			Hardened		280	32
		Ni or Co based	Annealed		250	33
			Hardened		350	34
			Cast		320	35
	Titanium alloys		Pure	400		36
			Alpha+beta alloys hardened	1050		37
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

(1) Based on ISO 513 and VDI 3323 standards

Adjustable Solid Drill Heads DSD-EC, DDD-EC, DSD-IC					
Dia. Range	38.00-39.99	40.00-51.99	52.00-63.99	64.00-84.99	85.00-
V_c (m/min)	Feed Rate f (mm/rev)				
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
50-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
50-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-110	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-110	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-110	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
30-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
30-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3

Recommended Machining Conditions

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material Group No.(1)
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1
		>= 0.25 %C	Annealed	650	190	2
		< 0.55 %C	Quenched and tempered	850	250	3
		>= 0.55 %C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel and cast steel		Austenitic, duplex	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic/martensitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloys		Not hardenable		60	21
			Hardenable		100	22
	Aluminum-cast alloys	<=12% Si	Not hardenable		75	23
			Hardenable		90	24
		>12% Si	High temperature		130	25
	Copper alloys	>1% Pb	Free cutting		110	26
			Brass		90	27
			Electrolitic copper		100	28
	Non-metallic		Duroplastics, fiber plastics			29
			Hard rubber			30
S	High temp. alloys	Fe based	Annealed		200	31
			Hardened		280	32
		Ni or Co based	Annealed		250	33
			Hardened		350	34
			Cast		320	35
	Titanium alloys		Pure	400		36
			Alpha+beta alloys hardened	1050		37
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

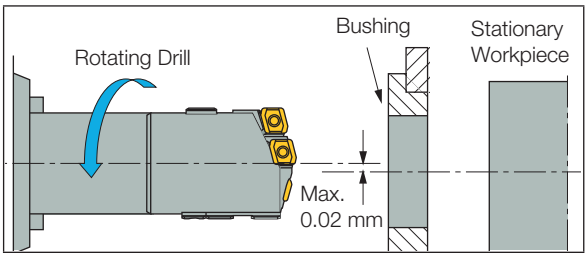
(1) Based on ISO 513 and VDI 3323 standards

Adjustable Counterboring Heads DSC-EA, DSC-EC, DSC-I1, DST-I1, DSC-IA, DSC-IC, DDC-EA, DDT-E1				Trepanning Heads		Ground Brazed Counterboring Heads DSC-E1, DST-E1, DSC-I1, DST-I1, DDC-E1		
Width of Cut (mm)	1-3	3-8	8-23	Dia. Range	120-400	Width of Cut (mm)	1-3	3-5
V_c (m/min)	Feed Rate f (mm/rev)			V_c (m/min)	Feed Rate f (mm/rev)	V_c (m/min)	Feed Rate f (mm/rev)	
60-140	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	60-140	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
50-100	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	50-100	0.1-0.3	0.15-0.3
50-100	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	50-100	0.1-0.3	0.15-0.3
60-130	0.1-0.3	0.15-0.3	0.1-0.3	70-100	0.12-0.3	60-130	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	70-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	60-100	0.12-0.3	60-100	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	60-100	0.12-0.3	60-100	0.1-0.3	0.15-0.3
50-100	0.1-0.3	0.15-0.3	0.1-0.3	70-100	0.12-0.3	50-100	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	60-100	0.12-0.3	60-100	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	50-90	0.12-0.3	60-100	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	50-90	0.12-0.3	60-100	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	50-90	0.12-0.3	60-100	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
50-120	0.1-0.3	0.15-0.3	0.1-0.3	60-100	0.12-0.3	50-120	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	50-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	50-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
60-120	0.1-0.3	0.15-0.3	0.1-0.3	80-100	0.12-0.3	60-120	0.1-0.3	0.15-0.3
70-200	0.1-0.4	0.15-0.3	0.1-0.3	65-130	0.1-0.3	70-200	0.1-0.4	0.15-0.3
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
60-200	0.1-0.4	0.1-0.4	0.1-0.4	65-130	0.1-0.3	60-200	0.1-0.4	0.1-0.4
40-80	0.1-0.3	0.15-0.3	0.1-0.3	20-65	0.1-0.2	40-80	0.1-0.3	0.15-0.3
40-80	0.1-0.3	0.15-0.3	0.1-0.3	20-65	0.1-0.2	40-80	0.1-0.3	0.15-0.3
40-80	0.1-0.3	0.15-0.3	0.1-0.3	20-65	0.1-0.2	40-80	0.1-0.3	0.15-0.3
40-80	0.1-0.3	0.15-0.3	0.1-0.3	20-65	0.1-0.2	40-80	0.1-0.3	0.15-0.3
40-80	0.1-0.3	0.15-0.3	0.1-0.3	20-65	0.1-0.2	40-80	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	30-100	0.1-0.2	60-100	0.1-0.3	0.15-0.3
60-100	0.1-0.3	0.15-0.3	0.1-0.3	30-100	0.1-0.2	60-100	0.1-0.3	0.15-0.3

Technical Information - Drill Setup

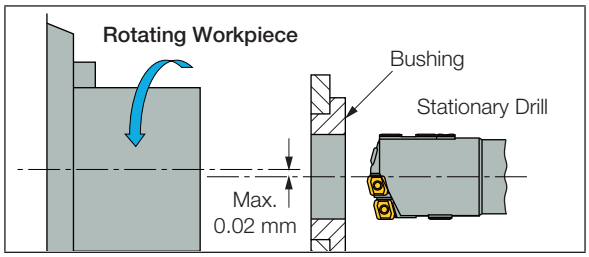
Rotating Drill

- Can be applied on symmetrical and non-symmetrical workpieces
- Drill to bushing center misalignment should not exceed 0.02 mm



Stationary Drill

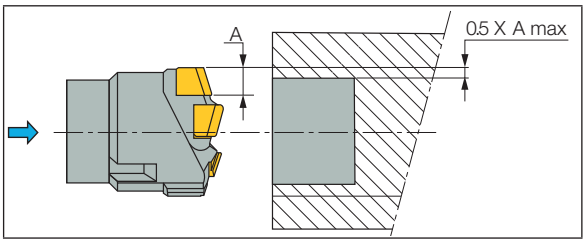
- Applied on symmetrical workpieces
- Improved hole straightness and bushing wear
- Drill to bushing center misalignment should not exceed 0.02 mm

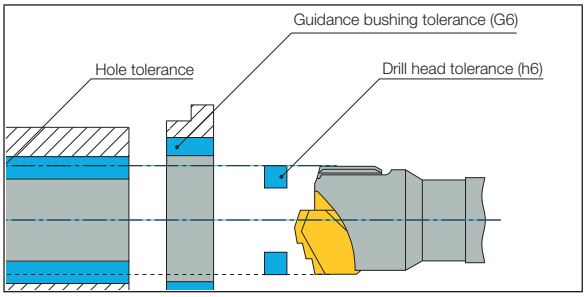


Drill Bushing and Workpiece Tolerance Relative Positioning

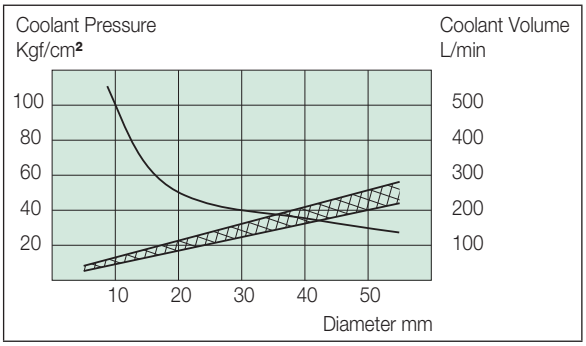
Pre-drilled Hole

A large pre-drilled hole (larger than D-a) ensures precise hole size and center location.

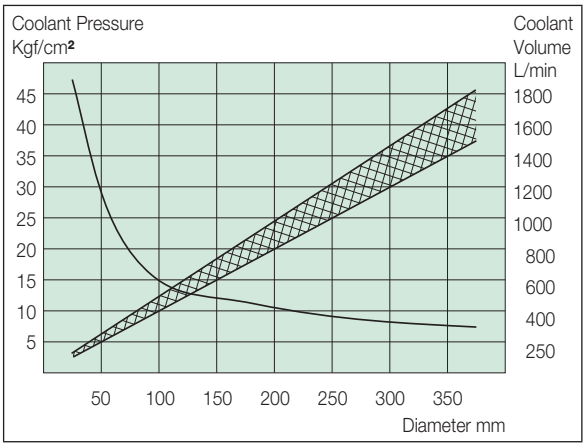




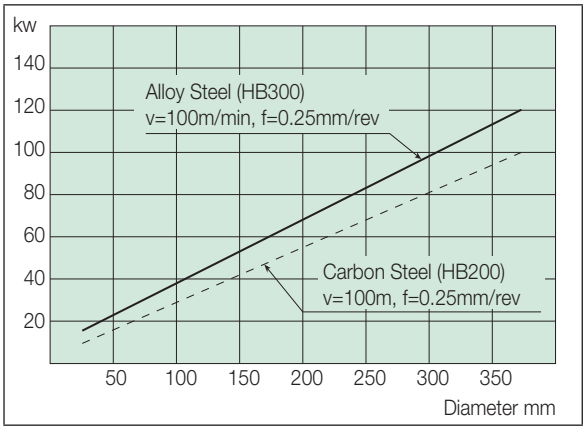
Recommended Coolant Pressure and Volume ≤50 mm



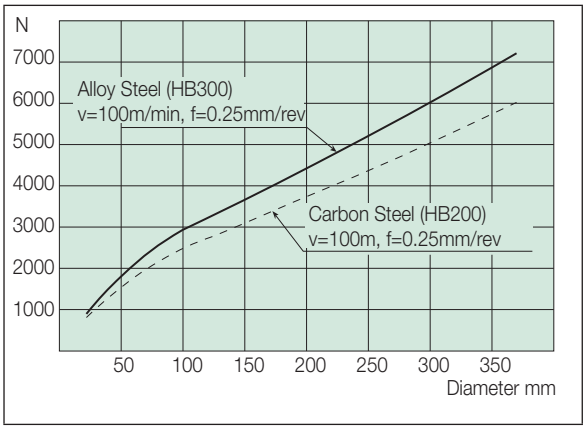
Recommended Coolant Pressure and Volume >50 mm



Machine Power

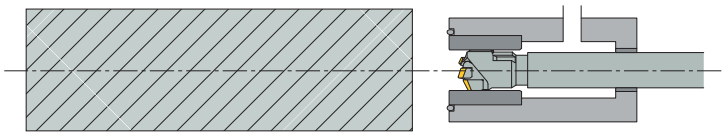


Machine Thrust Force

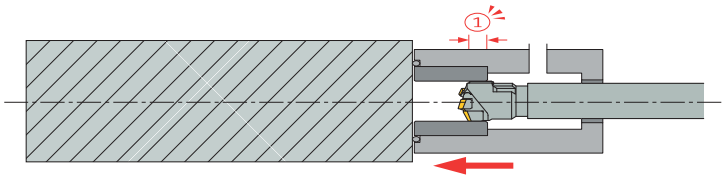


Technical Information - NC Cycle

Use the NC cycle as instructed below to optimize tool performance more safely.

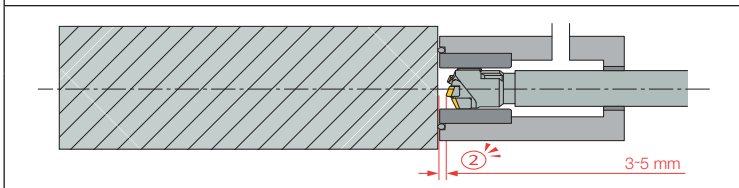


1. Start NC operation cycle



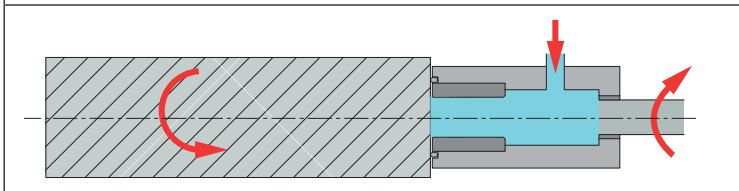
2. Oil pressure head moves until it touches the workpiece

① Set the starting point of the main axis of the tool so that the guide pad remains inside the guide bush when the oil pressure head moves forward.



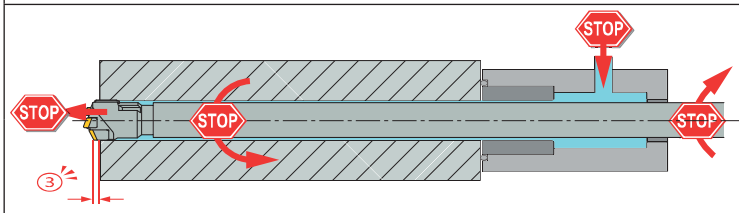
3. Move tool workpiece

② Move the tool 3 to 5 mm from the edge of the workpiece.
If the available NC machine can support this approach, the operation process may start from this point



4. Start cutting

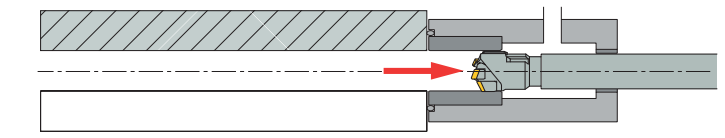
- Start coolant supply
- Start rotating (tool / workpiece / tool & workpiece)
- Start feeding



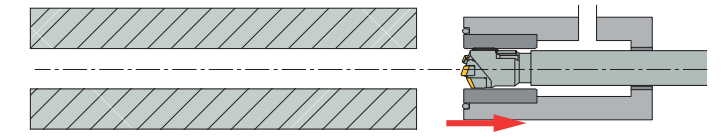
5. Stop cutting

- Stop feeding
- Stop rotating (tool / workpiece tool & workpiece)
- Stop coolant supply

③ Stop rotation when the outer tip is at the edge of the workpiece.



6. Tool main axis back to starting point

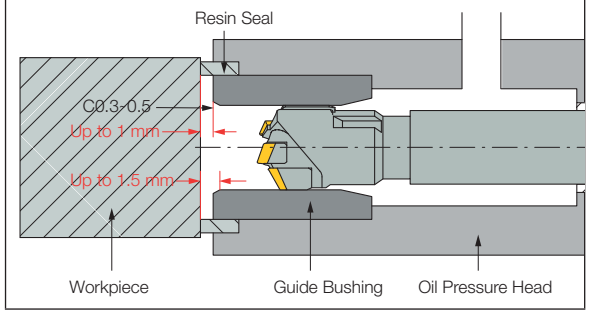


7. Oil pressure head back to starting point

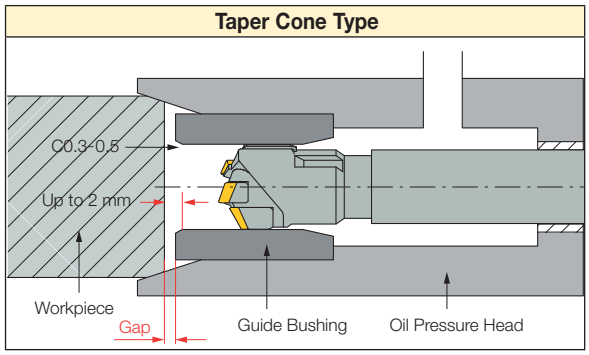
Technical Information - Notes for Guide Bushing Installation

Many of the problems in BTA drilling are caused by incorrect use of the guide bushing.
The shape, type and tolerance greatly affect cutting accuracy and tool life. Please note the following when using one in your application.

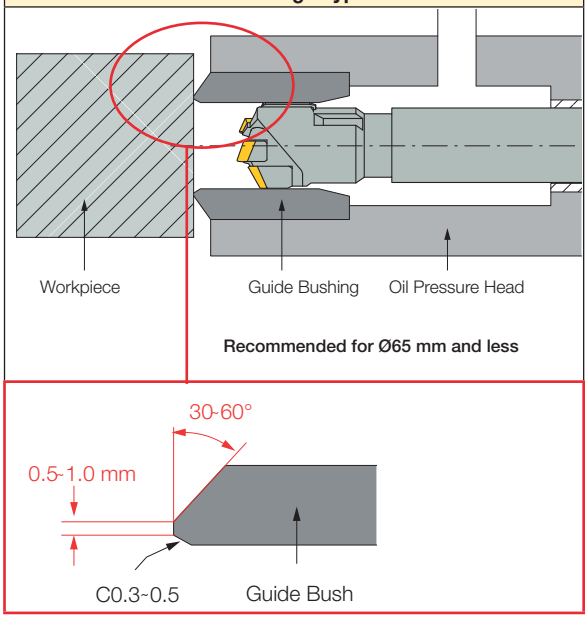
Resin Seal Type



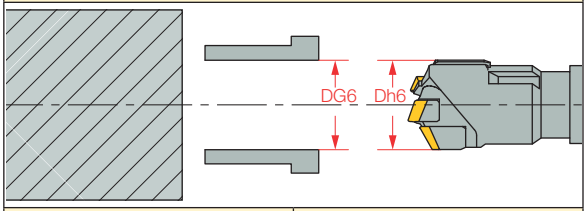
Taper Cone Type



Flat Edge Type



Guide Bushing Tolerance



Tool Diameter D (mm)	G6 Tolerance (mm)
8.00 - 10.00	+0.005 ~ +0.014
10.01 - 18.00	+0.006 ~ +0.017
18.01 - 30.00	+0.007 ~ +0.020
30.01 - 50.00	+0.009 ~ +0.025
50.01 - 80.00	+0.010~ +0.029
80.01 - 120.00	+0.012 ~ +0.034
120.01 - 180.00	+0.014 ~ +0.039
180.01 - 245.99	+0.015 ~ +0.044

Deep Hole Drilling Systems

Problem	Possible Cause	Solution
The drill breaks or insert chips	• Chip evacuation problems • Center misalignment of drill to workpiece	• Check that the coolant passages are clear and that the Venturi slots are not damaged • Check center alignment of drill to workpiece • Check workpiece and drill clamping rigidity
Poor surface finish	• Workpiece or drill clamping rigidity problem • Inadequate coolant oil • Cutting speed too low	• Improve workpiece or drill clamping • Check the coolant oil and replace if necessary • Increase the cutting speed
Excessive leakage of the coolant	• Chips block the fluid passages • The drill was incorrectly assembled, or the Venturi slots of the internal tube are located in the wrong direction	• Clear the chips • Check all connections and the direction of the internal tube
Insufficient coolant flow at the cutting zone, despite correct fluid supply	• Chips block the fluid passages • Worn bushing or sealing device • Venturi slots are too wide (worn) • Internal tube shorter than the external tube	• Clear the chips • Check the bushing and seal and replace if necessary • Replace the internal tube • Replace the internal tube to one with a correct length
Chips jam in the front end of the drill	• Insufficient coolant flow	• Adjust the fluid flow by raising the pressure; check the filter and fluid quality

Connection Adapters

Various kinds of rotating and non-rotating drill connectors are available upon request.

Oil Pressure Heads

Oil pressure heads are available on request.

Special Heads

Special form heads for trepanning or any other special contours can be produced on request.

Coolant

Successful deep hole drilling is achieved by an optimal combination of the tool, the machine and the coolant. Coolant plays an essential role in achieving secure and cost-efficient deep hole drilling operations. Therefore, it is very important to choose the correct type of coolant and use it appropriately.

Coolant

Coolant plays an essential role in lubricating tools, cooling cutting edges, chips and guide pads, as well as evacuating chips when drilling. It also improves tool life, surface finish and cutting accuracy when continuously supplied during the machining process.

1 Lubrication

Lubrication of cutting edges and guide pads is necessary in deep hole drilling. For efficient lubrication, it is recommended to use EP (Extreme Pressure) additives which contain sulfur or chlorine.

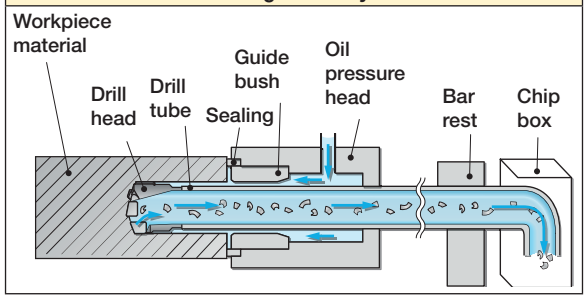
2 Temperature reduction

The ability to cool down the cutting edge and chips depends on such characteristics as thermal conductivity and relative heat. Coolant with good cooling ability increases tool life, but water-soluble coolant is not preferred in deep hole drilling because it reduces effectiveness. If water-soluble coolant is used, the recommended concentration is 10% (dilution rate 1/10) or more.

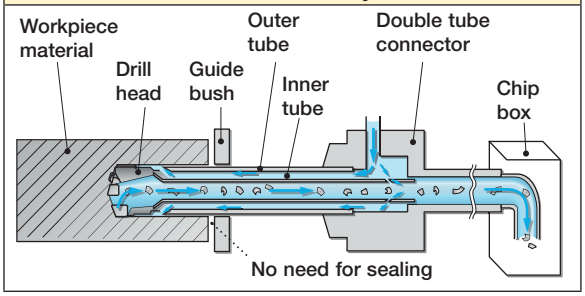
3 Chip evacuation

Coolant helps push chips through the back end of the boring bar (for STS) or inner tube (for DTS) until the chips are separated from the workpiece in general cutting conditions. The flow and the pressure of coolant are also important in order to control chip evacuation.

STS - Single tube system



STS - Double tube system



Coolant unit

A coolant unit is also important to obtain the best effect from the coolant.

1 Coolant pressure and volume should be fixed and continuous.

An ideal coolant unit should be able to set any valve of coolant pressure and volume and monitor the condition with gauges. A system that can detect trapped chips by a pressure gauge and the screw pumps with an inverter controller are both recommended.

2 Coolant temperature should be maintained.

Coolant is heated by factors, such as:

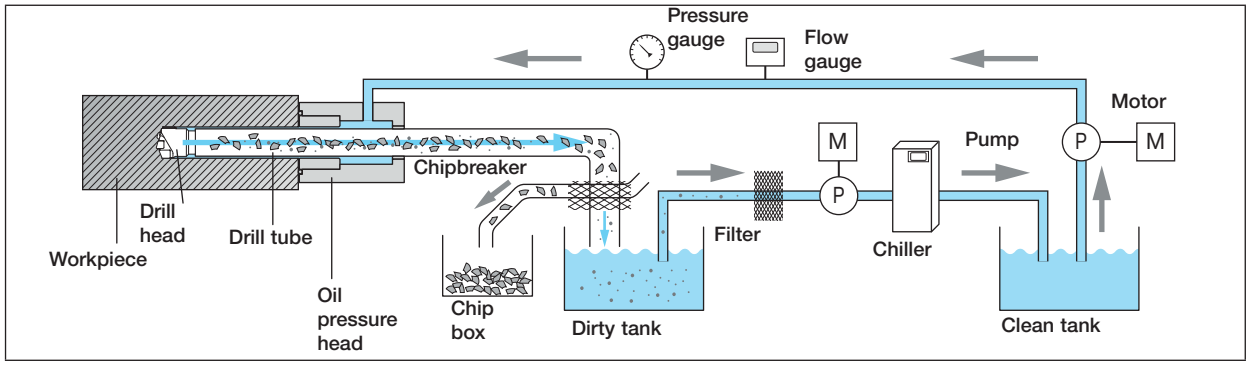
- Cutting edge
- Friction on guide pad
- Contact time of heated chips and coolant
- Pump

Maintaining coolant temperature is important to keeping stable cutting conditions, chip formation and cutting accuracy. The temperature should be lower than 40°C (100°F) for EP additives to provide sufficient lubrication. Therefore, the coolant temperature should be kept between 30 - 40°C (90 - 100°F) throughout the cutting operation.

3 Filtering

Unwanted particles are contained in coolant after the cutting operations, thus filtration is necessary to remove them. The filter size should be selected carefully to catch particles but not EP additives. Filter size depends on the coolant, but around 10 - 20 µm is generally suggested. For iron-based workpieces, a magnetic separator is helpful as it decreases the frequency of filter maintenance.

Flow chart of coolant in deep hole drilling



Requested Information Form for Deep Hole Drill Design

Company name _____ **Telephone no.** _____

Address _____ **Date** _____

Contact person _____ **Customer no.** _____

Workpiece

Product name: _____ Hole diameter: _____

Hole depth: _____ No. of holes: _____ Tolerance (of hole): _____

Surface finish (Rz, Ra...): _____ Deviation (mm/100): _____ Straightness (mm/100): _____

Material

Material (DIN, AISI, JIS...): _____

Hardness (HB, HS, HRC...): _____

Condition: o Quenched o Tempered o Cast o Annealed

o Other _____

Machine

Machine supplier name: _____

Machine type/model: o NC lathe o Machining center o Other _____

Rigidity: o Good o Normal o Poor

Spindle power (kW): _____

Tool and/or workpiece rotation (TR/WR):

o Tool and workpiece o Rotating workpiece (WR) o Rotating tool (TR)

Type of Coolant

Water based: o Soluble o Emulsion _____%

Oil based: o Coolant Pressure (bar): _____ Coolant Volume (L/min): _____

Tool Drill Head

Drill diameter: _____ (mm/inch)

Thread: o Inner o Outer o Brazed

Indexable: o Adjustable o Direct mount Coating: o Coated o Uncoated

o Solid drilling o Counterboring

Pre-drilled hole size: _____ (mm/inch)

Bottom finishing: o Full ball R o Flat bottom R o Corner R o Other _____

Trepanning: o Y o N

Tube outer diameter: _____ (mm/inch) Core size diameter: _____ (mm/inch)

Please fill in and return to your **ISCAR** representative.

Requested Information Form for Deep Hole Drill Design (continued)

Tube

Outside diameter: _____ (mm/inch) Total Length: _____ (mm/inch)

Internal Thread: _____

External Thread: 4 o Starts 2 o Starts 1 o Starts

Tube Thread: 1 o End o Both ends

Inner Tube Length: _____ (mm/inch)

Inner Tube Slit: 1 o End o Both ends

Drilling System & Boring Conditions

o Single Tube System: o Blind Hole Drilling o Double Tube System

o Cross Hole Drilling: o Through Hole Drilling

Please Sketch Your Drilling Application

General Production Information

Quantity of parts per year: _____

Grade, tool life, etc.: _____

Perfomance expectation: V_c= _____ m/min N= _____ RPM F= _____ mm/min f= _____ mm/rev

Cutting data: _____

Description of present system in use: _____

Please fill in and return to your **ISCAR** representative.

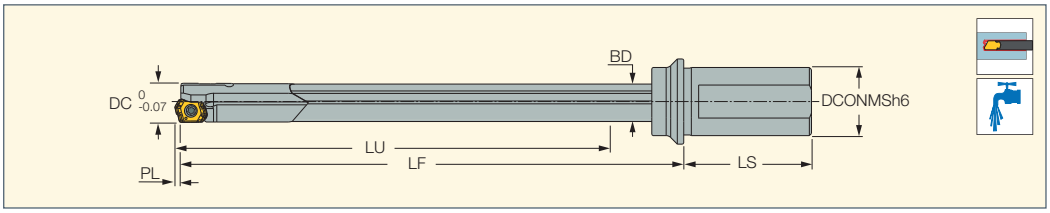
GUNDRILLS

TABLE OF CONTENTS

TRIDEEP DEEP DRILLING

GD-DH (12-13.5)

Gundrills Carrying Indexable Inserts with 2 Chip Splitting Cutting Edges and a Wiper for High Hole Surface Quality



Designation	DC	LF	PL	LU	DCONMS	BD	LS	Insert
GD-DH 12.00-M20-15D-06	12.00	225.00	1.800	196.80	20.00	11.50	50.0	LOGT 06..
GD-DH 12.00-M20-20D-06	12.00	280.00	1.800	251.80	20.00	11.50	50.0	LOGT 06..
GD-DH 12.00-M20-25D-06	12.00	343.00	1.800	314.80	20.00	11.50	50.0	LOGT 06..
GD-DH 12.50-M20-15D-06	12.50	226.00	1.800	196.80	20.00	12.00	50.0	LOGT 06..
GD-DH 12.50-M20-20D-06	12.50	291.00	1.800	261.80	20.00	12.00	50.0	LOGT 06..
GD-DH 12.50-M20-25D-06	12.50	356.00	1.800	326.80	20.00	12.00	50.0	LOGT 06..
GD-DH 13.00-M25-15D-06	13.00	238.00	1.800	204.80	25.00	12.50	56.0	LOGT 06..
GD-DH 13.00-M25-20D-06	13.00	305.00	1.800	271.80	25.00	12.50	56.0	LOGT 06..
GD-DH 13.00-M25-25D-06	13.00	373.00	1.800	339.80	25.00	12.50	56.0	LOGT 06..
GD-DH 13.50-M25-15D-06	13.50	245.00	1.800	211.80	25.00	13.00	56.0	LOGT 06..
GD-DH 13.50-M25-20D-06	13.50	315.00	1.800	281.80	25.00	13.00	56.0	LOGT 06..

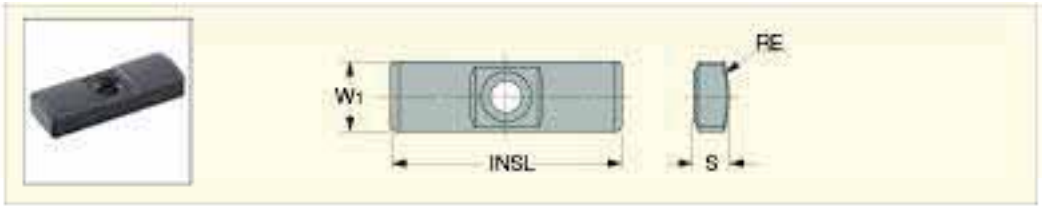
- Note: Gundrills can be supplied with up to 2400 mm length on request. • Inserts and guide pads should be ordered separately (they are not included with the tools).
- For user guide and cutting conditions, see pages 289-292 • Preventative measures: Do NOT operate the deep hole drill at full speed before engaging the guide hole.

Enter the guide hole slowly at a speed of 50 - 100 rpm.

For inserts, see pages: LOGT (288)

GPS

Deep Drilling Solid Carbide Guide Pads

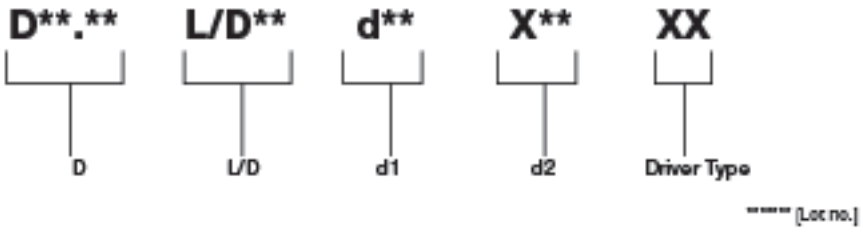


Designation	Dimensions W1	RE	INSL	S	IC908
GPS-04-16-055	4.0	5.50	16.00	2.0	•

Spare Parts

Designation	Guide Pad Screw	Guide Pad Key	N*m
GPS-04-16-055	TB 20043FHG-P M2X0.4	Wrench IP-6/5	0.65

Universal Marking for Deep Drilling Tools

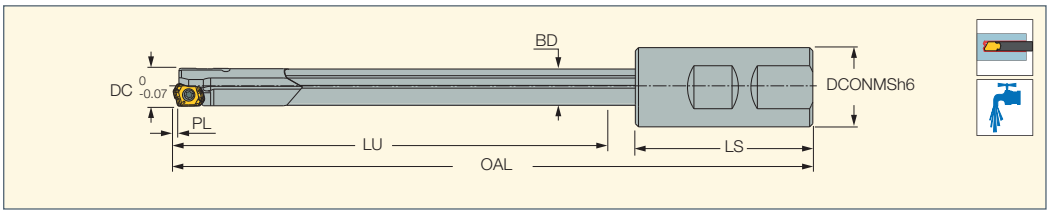


Example:
Metric: D14.00 L/D15 d25X56M
Inch: D0.551 L/D15 d0.984X2.205M
*****

TRIDEEP DEEP DRILLING

GD-DHL

Gundrills Carrying Indexable Inserts with 2 Chip Splitting Cutting Edges and a Wiper for High Hole Surface Quality



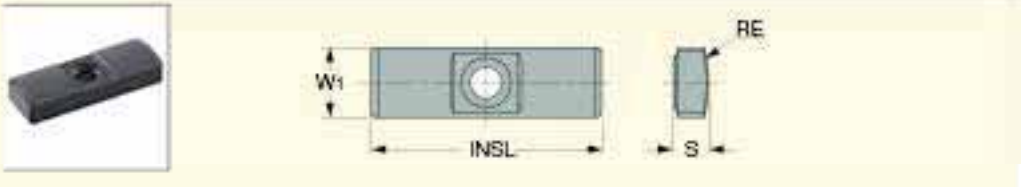
Designation	DC	LU	OAL	DCONMS	BD	PL	LS	Insert
GD-DHL 12.00X800-U03	12.00	713.80	801.80	19.05	11.50	1.80	70.0	LOGT 06..
GD-DHL 12.00X800-22	12.00	733.80	801.80	20.00	11.50	1.80	50.0	LOGT 06..
GD-DHL 12.00X800-34	12.00	733.80	801.80	20.00	11.50	1.80	50.0	LOGT 06..
GD-DHL 12.00X1000-U03	12.00	913.80	1001.80	19.05	11.50	1.80	70.0	LOGT 06..
GD-DHL 12.00X1000-22	12.00	933.80	1001.80	20.00	11.50	1.80	50.0	LOGT 06..
GD-DHL 12.00X1000-34	12.00	933.80	1001.80	20.00	11.50	1.80	50.0	LOGT 06..
GD-DHL 12.00X1650-U03	12.00	1563.80	1651.80	19.05	11.50	1.80	70.0	LOGT 06..
GD-DHL 12.00X1650-22	12.00	1583.80	1651.80	20.00	11.50	1.80	50.0	LOGT 06..
GD-DHL 12.00X1650-34	12.00	1583.80	1651.80	20.00	11.50	1.80	50.0	LOGT 06..
GD-DHL 13.00X800-U04	13.00	711.80	801.80	25.40	12.50	1.80	70.0	LOGT 06..
GD-DHL 13.00X800-23	13.00	725.80	801.80	25.00	12.50	1.80	56.0	LOGT 06..
GD-DHL 13.00X800-35	13.00	725.80	801.80	25.00	12.50	1.80	56.0	LOGT 06..
GD-DHL 13.00X1000-U04	13.00	911.80	1001.80	25.40	12.50	1.80	70.0	LOGT 06..
GD-DHL 13.00X1000-23	13.00	925.80	1001.80	25.00	12.50	1.80	56.0	LOGT 06..
GD-DHL 13.00X1000-35	13.00	925.80	1001.80	25.00	12.50	1.80	56.0	LOGT 06..
GD-DHL 13.00X1650-U04	13.00	1561.80	1651.80	25.40	12.50	1.80	70.0	LOGT 06..
GD-DHL 13.00X1650-23	13.00	1575.80	1651.80	25.00	12.50	1.80	56.0	LOGT 06..
GD-DHL 13.00X1650-35	13.00	1575.80	1651.80	25.00	12.50	1.80	56.0	LOGT 06..

• Note: Gundrills can be supplied with up to 2400 mm length on request. • Inserts and guide pads should be ordered separately (they are not included with the tools).
• For user guide and cutting conditions, see pages 289-292 • Preventative measures: Do NOT operate the deep hole drill at full speed before engaging the guide hole. Enter the guide hole slowly at a speed of 50 - 100 rpm.

For inserts, see pages: LOGT (288)

GPS

Deep Drilling Solid Carbide Guide Pads

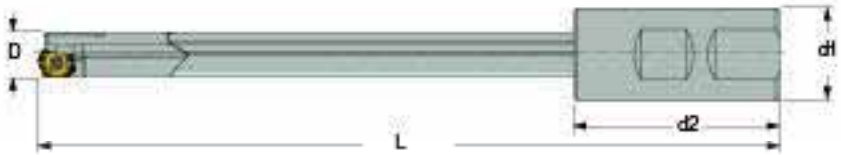


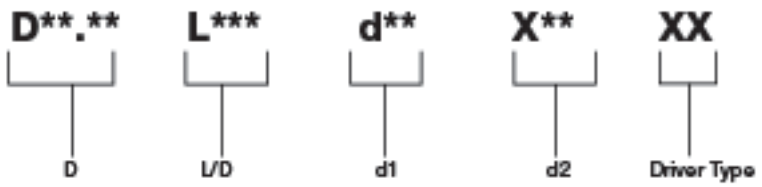
Designation	Dimensions W1	RE	INSL	S	IC908
GPS-04-16-055	4.0	5.50	16.00	2.0	•

Spare Parts

Designation	Guide Pad Screw	Guide Pad Key	N*m
GPS-04-16-055	TS 2004B/H3-P M2X0.4	Wrench IP-6/5	0.55

Universal Marking for Deep Drilling Tools





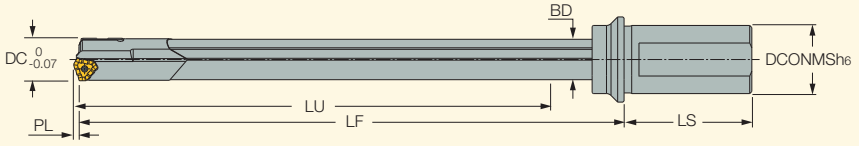
Example:
Metric: D14.00 L1000 d25X56WD
Inch: D0.551 L39.37 d0.984X2.205WD
*****

***** [Loc no.]

TRIDEEP DEEP DRILLING

GD-DH

Gundrills Carrying Triangular Inserts with 3 Chip Splitting Cutting Edges and a Wiper for High Hole Surface Quality



Designation	DC	LU	DCONMS	BD	LF	PL	LS	Insert
GD-DH 14.00-15D-M25-07	14.00	227.00	25.00	13.50	261.0	1.95	56.0	TOGT 07..
GD-DH 14.00-20D-M25-07	14.00	302.00	25.00	13.50	336.0	1.95	56.0	TOGT 07..
GD-DH 14.00-25D-M25-07	14.00	377.00	25.00	13.50	411.0	1.95	56.0	TOGT 07..
GD-DH 14.50-15D-M25-07	14.50	227.00	25.00	14.00	262.0	1.95	56.0	TOGT 07..
GD-DH 14.50-20D-M25-07	14.50	302.00	25.00	14.00	337.0	1.95	56.0	TOGT 07..
GD-DH 14.50-25D-M25-07	14.50	377.00	25.00	14.00	412.0	1.95	56.0	TOGT 07..
GD-DH 15.00-15D-M25-07	15.00	242.00	25.00	14.50	278.0	1.95	56.0	TOGT 07..
GD-DH 15.00-20D-M25-07	15.00	322.00	25.00	14.50	358.0	1.95	56.0	TOGT 07..
GD-DH 15.00-25D-M25-07	15.00	402.00	25.00	14.50	438.0	1.95	56.0	TOGT 07..
GD-DH 16.00-10D-M25-08-N	16.00	172.20	25.00	15.50	209.0	2.20	56.0	TOGT 08..
GD-DH 16.00-15D-M25-08-N	16.00	257.20	25.00	15.50	294.0	2.20	56.0	TOGT 08..
GD-DH 16.00-25D-M25-08-N	16.00	427.20	25.00	15.50	464.0	2.20	56.0	TOGT 08..
GD-DH 16.50-10D-M25-08-N	16.50	172.20	25.00	15.50	209.0	2.20	56.0	TOGT 08..
GD-DH 16.50-15D-M25-08-N	16.50	257.20	25.00	15.50	294.0	2.20	56.0	TOGT 08..
GD-DH 16.50-25D-M25-08-N	16.50	427.20	25.00	15.50	464.0	2.20	56.0	TOGT 08..
GD-DH 17.00-10D-M25-08-N	17.00	182.20	25.00	16.20	220.0	2.20	56.0	TOGT 08..
GD-DH 17.00-15D-M25-08-N	17.00	272.20	25.00	16.20	310.0	2.20	56.0	TOGT 08..
GD-DH 17.00-25D-M25-08-N	17.00	452.20	25.00	16.20	490.0	2.20	56.0	TOGT 08..
GD-DH 17.50-15D-M25-08-N	17.50	272.20	25.00	16.20	310.0	2.20	56.0	TOGT 08..
GD-DH 17.50-25D-M25-08-N	17.50	452.20	25.00	16.20	490.0	2.20	56.0	TOGT 08..
GD-DH 18.00-10D-M25-08-N	18.00	193.00	25.00	16.20	232.0	2.20	56.0	TOGT 08..
GD-DH 18.00-15D-M25-08-N	18.00	288.00	25.00	17.20	327.0	2.20	56.0	TOGT 08..
GD-DH 18.00-25D-M25-08-N	18.00	478.00	25.00	17.20	517.0	2.20	56.0	TOGT 08..
GD-DH 18.50-15D-M25-09	18.50	288.00	25.00	17.20	327.0	3.00	56.0	TOGT 09..
GD-DH 18.50-25D-M25-09	18.50	478.00	25.00	17.20	517.0	3.00	56.0	TOGT 09..
GD-DH 19.00-10D-M25-09	19.00	203.00	25.00	18.20	243.0	3.00	56.0	TOGT 09..
GD-DH 19.00-15D-M25-09	19.00	303.00	25.00	18.20	343.0	3.00	56.0	TOGT 09..
GD-DH 19.00-25D-M25-09	19.00	503.00	25.00	18.20	543.0	3.00	56.0	TOGT 09..
GD-DH 19.50-15D-M25-09	19.50	303.00	25.00	18.20	343.0	3.00	56.0	TOGT 09..
GD-DH 19.50-25D-M25-09	19.50	503.00	25.00	18.20	543.0	3.00	56.0	TOGT 09..
GD-DH 20.00-10D-M32-09	20.00	213.20	32.00	19.00	255.0	3.00	60.0	TOGT 09..
GD-DH 20.00-15D-M32-09	20.00	318.20	32.00	19.00	360.0	3.00	60.0	TOGT 09..
GD-DH 20.00-25D-M32-09	20.00	528.20	32.00	19.00	570.0	3.00	60.0	TOGT 09..
GD-DH 21.00-10D-M32-10	21.00	223.20	32.00	20.00	266.0	3.20	60.0	TOGT 10..
GD-DH 21.00-15D-M32-10	21.00	333.20	32.00	20.00	376.0	3.20	60.0	TOGT 10..
GD-DH 21.00-25D-M32-10	21.00	553.20	32.00	20.00	596.0	3.20	60.0	TOGT 10..
GD-DH 22.00-10D-M32-11	22.00	233.40	32.00	21.00	278.0	3.40	60.0	TOGT 11..
GD-DH 22.00-15D-M32-11	22.00	348.40	32.00	21.00	393.0	3.40	60.0	TOGT 11..
GD-DH 22.00-25D-M32-11	22.00	578.40	32.00	21.00	623.0	3.40	60.0	TOGT 11..
GD-DH 23.00-10D-M32-11	23.00	243.40	32.00	22.00	289.0	3.40	60.0	TOGT 11..
GD-DH 23.00-15D-M32-11	23.00	363.40	32.00	22.00	409.0	3.40	60.0	TOGT 11..
GD-DH 23.00-25D-M32-11	23.00	603.40	32.00	22.00	649.0	3.40	60.0	TOGT 11..
GD-DH 24.00-10D-M32-11	24.00	253.40	32.00	23.00	301.0	3.40	60.0	TOGT 11..
GD-DH 24.00-15D-M32-11	24.00	378.40	32.00	23.00	426.0	3.40	60.0	TOGT 11..
GD-DH 24.00-25D-M32-11	24.00	628.40	32.00	23.00	676.0	3.40	60.0	TOGT 11..
GD-DH 25.00-10D-M32-11	25.00	263.60	32.00	24.00	312.0	3.40	60.0	TOGT 11..
GD-DH 25.00-15D-M32-11	25.00	393.60	32.00	24.00	442.0	3.40	60.0	TOGT 11..
GD-DH 25.00-25D-M32-11	25.00	653.60	32.00	24.00	702.0	3.40	60.0	TOGT 11..
GD-DH 26.00-10D-M40-12	26.00	273.60	40.00	25.00	324.0	3.60	70.0	TOGT 12..
GD-DH 26.00-15D-M40-12	26.00	408.60	40.00	25.00	459.0	3.60	70.0	TOGT 12..
GD-DH 26.00-25D-M40-12	26.00	678.60	40.00	25.00	729.0	3.60	70.0	TOGT 12..
GD-DH 27.00-10D-M40-12	27.00	283.60	40.00	26.00	335.0	3.60	70.0	TOGT 12..
GD-DH 27.00-15D-M40-12	27.00	423.60	40.00	26.00	475.0	3.60	70.0	TOGT 12..
GD-DH 27.00-25D-M40-12	27.00	703.60	40.00	26.00	755.0	3.60	70.0	TOGT 12..
GD-DH 28.00-10D-M40-12	28.00	283.60	40.00	27.00	337.0	3.60	70.0	TOGT 12..
GD-DH 28.00-15D-M40-12	28.00	423.60	40.00	27.00	477.0	3.60	70.0	TOGT 12..
GD-DH 28.00-25D-M40-12	28.00	703.60	40.00	27.00	757.0	3.60	70.0	TOGT 12..
GD-DH 29.00-10D-M40-13	29.00	294.57	40.00	27.00	360.0	4.57	69.0	TOGT 13..
GD-DH 29.00-20D-M40-13	29.00	584.57	40.00	27.00	650.0	4.57	69.0	TOGT 13..
GD-DH 30.00-10D-M40-13	30.00	314.57	40.00	29.00	383.0	4.57	69.0	TOGT 13..

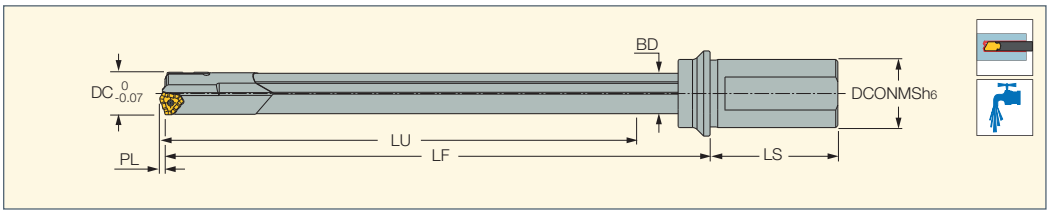
• Note: Gundrills can be supplied with up to 2400 mm length on request. • Inserts and guide pads should be ordered separately (they are not included with the tools).
• For user guide and cutting conditions, see pages 289-292 • Preventative measures: Do NOT operate the deep hole drill at full speed before engaging the guide hole. Enter the guide hole slowly at a speed of 50 - 100 rpm.

For inserts, see pages: TOGT-DT (194) • TOGT-GF (194)

TRIDEEP DEEP DRILLING

GD-DH (continued)

Gundrills Carrying Triangular Inserts with 3 Chip Splitting Cutting Edges and a Wiper for High Hole Surface Quality

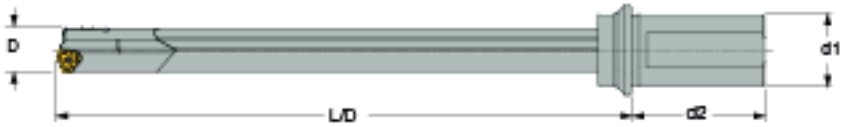


Designation	DC	LU	DCONMS	BD	LF	PL	LS	Insert
GD-DH 30.00-20D-M40-13	30.00	624.57	40.00	29.00	693.0	4.57	69.0	TOGT 13..
GD-DH 31.00-10D-M40-13	31.00	314.57	40.00	29.00	383.0	4.57	69.0	TOGT 13..
GD-DH 31.00-20D-M40-13	31.00	624.57	40.00	29.00	693.0	4.57	69.0	TOGT 13..
GD-DH 32.00-10D-M40-13	32.00	324.57	40.00	30.00	395.0	4.57	69.0	TOGT 13..
GD-DH 32.00-20D-M40-13	32.00	644.57	40.00	30.00	715.0	4.57	69.0	TOGT 13..

• Note: Gundrills can be supplied with up to 2400 mm length on request. • Inserts and guide pads should be ordered separately (they are not included with the tools).
• For user guide and cutting conditions, see pages 289-292 • Preventative measures: Do NOT operate the deep hole drill at full speed before engaging the guide hole. Enter the guide hole slowly at a speed of 50 - 100 rpm.

For inserts, see pages: TOGT-DT (194) • TOGT-GF (194)

Universal Marking for Deep Drilling Tools



D.**** **L/D**** **d**** **X**** **XX**

D L/D d1 d2 Driver Type

***** [Lot no.]

Driver Type

M	Machining	M20,M25,M32,M40 U19.05,U25.4,U31.75 U38.1,FM32,FM40 FU31.75,FU38.1	
WD	Weldon	22,23,24,25,26,99	
WN	Whistle Notch	U03,U04,U05,U06 34,35,36	
F	Flat	FD60C25, FD97C25 C25	
C	Cylindrical	95	

Example:
Metric: D14.00 L/D15 d25X56M
Inch: D0.551 L/D15 d0.984X2.205M
*****

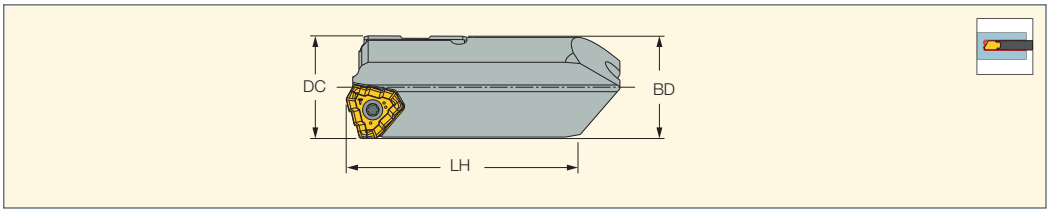
Spare Parts

Diameter Range	Insert	Insert Clamping Screw	Key	N*m	Solid Carbide Guide Pad	Guide Pad Clamping Screw	Key
14.00-15.99	TOGT 070304-DT/GF	SR 14-560/8 M2.5X0.45	T-8	1.2	GPS-06-18-060-DC	SR 34-508 M2.2X0.45	T-7
16.00-18.00	TOGT 080305-DT/GF		T-8	1.2	GPS-06-20-075-DC		
18.01-20.00	TOGT 090305-DT/GF		T-8	1.2	GPS-06-20-085-DC		
20.01-20.99	TOGT 100305-DT/GF	SR 34-506 M3X0.5	T-9	2.0	GPS-06-20-085-DC		
21.00-21.99	TOGT 100305-DT/GF				GPS-06-20-100-DC		
22.00-25.00	TOGT 110405-DT/GF	SR 14-571/8 M3.5X0.6	T-15	4.8	GPS-06-20-100-DC		
26.01-28.00	TOGT 120405-DT/GF	SR 14-506 M4X0.7	T-15	4.8	GPS-06-20-120-DC		
28.01-29.99	TOGT 130405-DT/GF	SR 16-212/L10 M5X0.8	T20/5	10	GPS-06-20-120-DC	SR 34-508 M2.2X0.45	T-7/5
30.00-32.00	TOGT 130405-DT/GF				GPS-07-20-120-DC	CSTB-3L065 M2.2X0.45	T-9/5
32.01-39.01	TOGT 140510-DT/GF				GPS-07-20-120-DC		
39.01-40.00	TOGT 140510-DT/GF				GPS-08-20-133-DC		

TRIDEEP DEEP DRILLING

GDH-MKT

Gundrill Heads Carrying Triangular Inserts with 3 Chip Splitting Cutting Edges and a Wiper for High Hole Surface Quality



Designation	DC	BD	LH
GDH-14.00 MKT	14.00	13.70	51.2
GDH-14.50 MKT	14.50	14.20	51.2
GDH-15.00 MKT	15.00	14.70	51.2
GDH-16.00 MKT	16.00	15.70	51.3
GDH-16.50 MKT	16.50	16.00	51.3
GDH-17.00 MKT	17.00	16.50	51.3
GDH-17.50 MKT	17.50	17.20	51.3
GDH-18.00 MKT	18.00	17.40	51.3
GDH-18.50 MKT	18.50	18.00	52.2
GDH-19.00 MKT	19.00	18.40	52.2
GDH-19.50 MKT	19.50	18.90	52.2
GDH-20.00 MKT	20.00	19.40	52.2
GDH-21.00 MKT	21.00	20.40	52.3
GDH-22.00 MKT	22.00	21.70	52.3
GDH-22.50 MKT	22.50	21.90	52.3
GDH-23.00 MKT	23.00	22.40	52.3
GDH-23.50 MKT	23.50	22.90	52.3
GDH-24.00 MKT	24.00	23.40	52.3
GDH-25.00 MKT	25.00	24.40	52.3
GDH-26.00 MKT	26.00	25.40	52.3
GDH-27.00 MKT	27.00	26.40	52.3
GDH-28.00 MKT	28.00	27.40	52.3

• Inserts and guide pads should be ordered separately (they are not included with the tools). • For user guide and cutting conditions, see pages 289-292

For inserts, see pages: TOGT-DT (194) • TOGT-GF (194)

Spare Parts

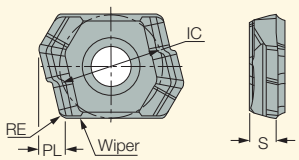


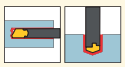

Gundrill Head	Guide Pad Screw		Guide Pad Key	Insert Screw		Insert Key
Description	Description	Qty.	Description	Description	Qty.	Description
GDH-14.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-560/S M2.5X0.45	1	T-8/5
GDH-14.50 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-560/S M2.5X0.45	1	T-8/5
GDH-15.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-560/S M2.5X0.45	1	T-8/5
GDH-16.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-560/S M2.5X0.45	1	T-8/5
GDH-16.50 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-560/S M2.5X0.45	1	T-8/5
GDH-17.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-560/S M2.5X0.45	1	T-8/5
GDH-17.50 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-560/S M2.5X0.45	1	T-8/5
GDH-18.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-560/S M2.5X0.45	1	T-8/5
GDH-18.50 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-560/S M2.5X0.45	1	T-8/5
GDH-19.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-560/S M2.5X0.45	1	T-8/5
GDH-19.50 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-560/S M2.5X0.45	1	T-8/5
GDH-20.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 34-506 M3X0.5	1	T-8/5
GDH-21.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 34-506 M3X0.5	1	T-8/5
GDH-22.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-571/S M3.5X0.6	1	T-10/5
GDH-22.50 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-571/S M3.5X0.6	1	T-10/5
GDH-23.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-571/S M3.5X0.6	1	T-10/5
GDH-23.50 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-571/S M3.5X0.6	1	T-10/5
GDH-24.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-571/S M3.5X0.6	1	T-10/5
GDH-25.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-571/S M3.5X0.6	1	T-10/5
GDH-26.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-506 M4X0.7	1	T-15/5
GDH-27.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-506 M4X0.7	1	T-15/5
GDH-28.00 MKT	SR 34-508 M2.2X0.45	2	T-7/5	SR 14-506 M4X0.7	1	T-15/5

TRIDEEP DEEP DRILLING

LOGT

Deep Drilling Inserts with 2 Chip Splitting Cutting Edges, Positive Rake Chipbreaker and a Wiper





Designation	Dimensions IC	RE	PL	S	IC908
LOGT 060204R-DT	7.00	0.40	1.80	2.00	●

For tools, see pages: GD-DH (12-13.5) (283) • GD-DHL (284)

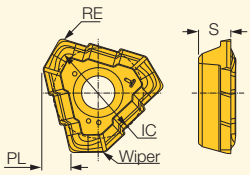
Spare Parts

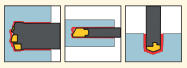
Designation	Insert Screw	Insert key	N*m
LOGT 060204R-DT	SR 10503833L040	T-7F	0.9

TRIDEEP DEEP DRILLING

TOGT-DT

Deep Drilling Inserts with 3 Chip Splitting Cutting Edges, Positive Rake Chipbreaker and a Wiper





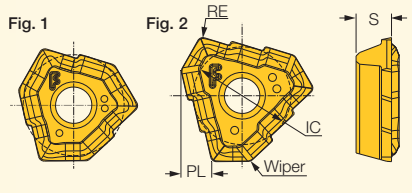
Designation	Dimensions IC	RE	PL	S	Fig.	IC908
TOGT 070304-DT	7.69	0.40	1.95	2.30	1	●
TOGT 080305-DT	8.55	0.50	2.20	2.80	1	●
TOGT 090305-DT	8.32	0.50	3.00	3.00	2	●
TOGT 100305-DT	9.23	0.50	3.20	3.30	2	●
TOGT 110405-DT	10.40	0.50	3.40	3.80	2	●
TOGT 120405-DT	11.59	0.50	3.60	4.30	2	●
TOGT 130408-DT	12.85	0.80	4.57	4.76	2	●
TOGT 140510-DT	16.85	1.00	5.43	5.26	2	●

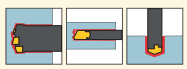
For tools, see pages: DDD-EF-FT (193) • DSD-EF-FT (192) • DSD-IF-FT (192) • GD-DH (285) • GDH-MKT (287)

TRIDEEP DEEP DRILLING

TOGT-GF

Deep Drilling Inserts with 3 Chip Splitting Cutting Edges, Positive Rake Chipbreaker and a Wiper



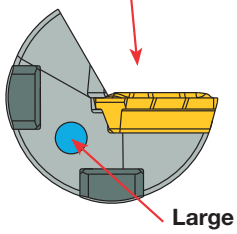


Designation	Dimensions IC	RE	PL	S	Fig.	IC908
TOGT 070304-GF	7.69	0.40	1.95	2.30	1	●
TOGT 080305-GF	8.55	0.50	2.20	2.80	1	●
TOGT 090305-GF	8.32	0.50	3.00	3.00	2	●
TOGT 100305-GF	9.23	0.50	3.20	3.30	2	●
TOGT 110405-GF	10.40	0.50	3.40	3.80	2	●
TOGT 120405-GF	11.59	0.50	3.60	4.30	2	●
TOGT 130408-GF	12.85	0.80	4.57	4.76	2	●

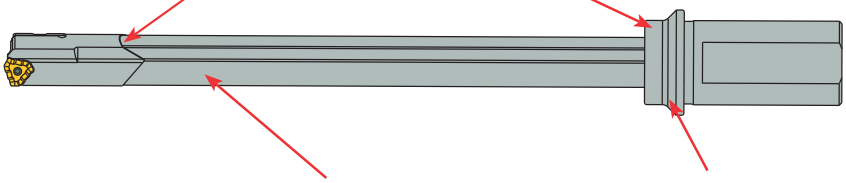
For tools, see pages: DDD-EF-FT (193) • DSD-EF-FT (192) • DSD-IF-FT (192) • GD-DH (285) • GDH-MKT (287)

Wide Flute Angle

- Smooth chip evacuation



Brazed Body



Large Oil Hole

- Efficient lubrication
- Longer life of inserts and guide pads

Steel Body Tool

- Extremely high rigidity
- Simple direct mounting setup

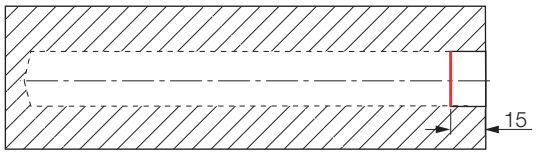
Flange

- Superior rigidity for higher speeds and feeds

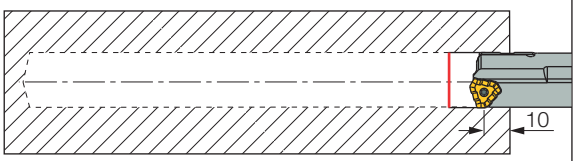
Drilling Process on Machining Centers and Lathe Machines

1 Drill a 15 mm pilot hole D $^{+0.05}_{+0.03}$ flat bottom
2 Set the TRIDEEP drill into the pilot hole (10 mm depth). V_c=5-10 m/min f=0.5-1.0 mm/rev
3 Initial cutting at a 25 mm DOC (80% feed rate), verify activated coolant (V_c=100%).
4 In case of through hole, drill the full hole to a depth of +5 mm.
5 Retract with slow rotation (5-10 m/min).

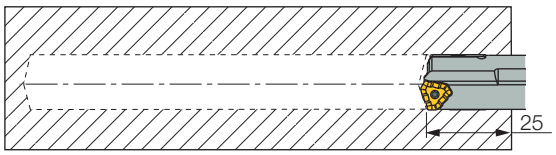
1 Drill a 15 mm pilot hole flat bottom



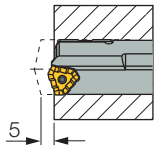
2 Slow rotation and feed while entering to the pre-hole



3 Maintain for 2-3 seconds and activate the cooling system



4 Drill +5mm depth through hole



Inquiry Form

1. Tool

Quantity _____

Nominal diameter and tolerance _____

Please fill in dimensions on the sketch.

Driver

For standard drivers please use codes from page 292 _____

o Code No.

o Special, please attach sketch and specifications.

2. Workpiece

(If possible, attach a drawing)

2.1 Material

Material description
(DIN material number or any other standard):

_____

Hardness and Properties:

_____

2.2 Hole Type

o Blind Hole o Drilling into Pre-hole

o Angled Entry

o Drilling into Solid o Boring o Angled Exit

Drilling Depth _____mm Hole Tolerance _____

2.3 Application:

Workpiece: o Stationary o Rotating

Tool: o Stationary o Rotating

3. Machine

3.1 Technical Data

Machine Type _____

Power _____kW _____

Sketch of drilling application

Note: It may be necessary to change several of the parameters that you indicated, based on our experience with your application.

3.2 Cutting Data:

Cutting Speed V_c _____m/min

Revolutions Nmin _____RPM, Nmax _____RPM

Feed Fmin _____ mm/rev,

Fmax _____ mm/rev

Feed Rate VF _____ mm/min

Coolant:

o Oil o Soluble Oil o Other

Coolant Pressure: _____ Bar

Specially Tailored TRIDEEP Code Key

GD - DH ##.##-#####-##

Dia. | Drilling length | Shank Type

Machining Recommendations for TRIDEEP Drills

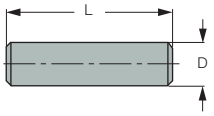
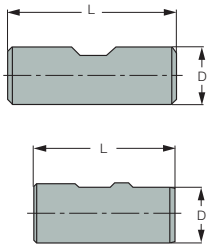
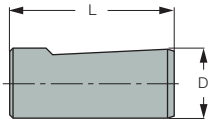
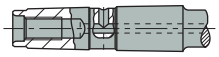
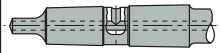
ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material Group No.	TOGT V m/min	TOGT Feed per insert size "GF" & "DT" 06	07	08	09	10	11	12	13
								mm/rev							
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	80-120	0.04-0.08 0.08-0.14			0.04-0.10 0.08-0.16	0.06-0.10 0.08-0.16	0.06-0.10 0.08-0.16	0.06-0.12 0.08-0.18	
		>= 0.25 %C	Annealed	650	190	2									
		< 0.55 %C	Quenched and tempered	850	250	3									
		>= 0.55 %C	Annealed	750	220	4									
			Quenched and tempered	1000	300	5									
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6						0.04-0.12 0.06-0.20			
			Quenched and tempered	930	275	7									
				1000	300	8									
				1200	350	9									
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10		0.04-0.08 0.08-0.14			0.04-0.10 0.08-0.16	0.06-0.10 0.08-0.16	0.06-0.10 0.08-0.16	0.06-0.12 0.08-0.18	
			Quenched and tempered	1100	325	11									
	Stainless steel and cast steel		Ferritic/ martensitic.	680	200	12									
			Martensitic	820	240	13									
M	Stainless steel and cast steel		Austenitic, duplex	600	180	14	50-100	0.02-0.06 0.04-0.12			0.02-0.06 0.04-0.12	0.02-0.06 0.04-0.12	0.02-0.06 0.04-0.12	0.02-0.06 0.04-0.12	
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15	50-100 80-120	0.03-0.15 0.08-0.25			0.03-0.15 0.08-0.25	0.05-0.18 0.08-0.25	0.05-0.18 0.08-0.30	0.05-0.18 0.08-0.30	
			Pearlitic / martensitic		260	16									
	Cast iron nodular (GGG)		Ferritic		160	17									
			Pearlitic		250	18									
	Malleable cast iron		Ferritic		130	19									
			Pearlitic		230	20									
N	Aluminum-wrought alloys		Not hardenable		60	21	80-160	0.03-0.15 0.08-0.20			0.03-0.15 0.08-0.20	0.03-0.18 0.08-0.20	0.05-0.18 0.08-0.20	0.03-0.18 0.08-0.20	
			Hardenable		100	22									
	Aluminum-cast alloys	<=12% Si	Not hardenable		75	23									
			Hardenable		90	24									
		>12% Si	High temperature		130	25									
	Copper alloys	>1% Pb	Free cutting		110	26									
			Brass		90	27									
			Electrolitic copper		100	28									
	Non metallic		Duroplastics, fiber plastics			29									
			Hard rubber			30									
S	High temp. alloys	Fe based	Annealed		200	31	20-50	0.08-0.14			0.08-0.16	0.08-0.16	0.08-0.16	0.08-0.16	
			Hardened		280	32									
		Ni or Co based	Annealed		250	33									
			Hardened		350	34									
			Cast		320	35									

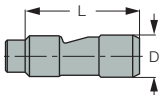
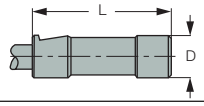
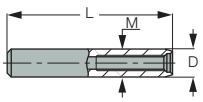
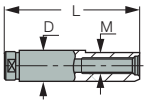
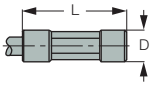
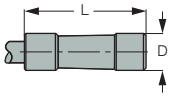
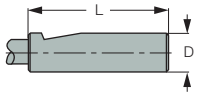
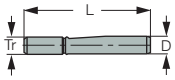
Standard Gundrill Drivers for Machining Centers, Lathes, etc.

Drivers

Drivers are available for dedicated and CNC machines, for any specified diameter and length.
Below are the driver codes and technical data.

Standard Drivers for Gundrill Machines

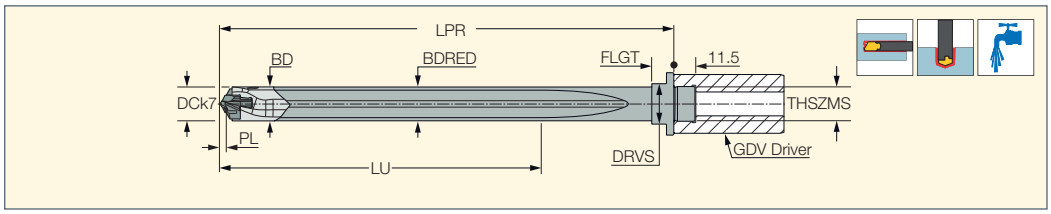
Driver Type	Drawing	øD x L	Driver Code
Cylindrical DIN1835A DIN6535HA		.75x2.03"	95
		20x50	10
		25x56	11
		1.00x2.28"	96
		1.25x2.28"	97
		32x60	12
		40x70	13
Weldon DIN1835B DIN6535HB		.75x2.03"	99
		20x50	22
		25x56	23
		1.00x2.28"	100
		1.25x2.28"	101
		32x60	24
		40x70	25
Whistle Notch DIN1835E		20x50	34
		25x56	35
		32x60	36
		40x70	37
DIN228AK		CM1	45
		CM2	46
		CM3	47
		CM4	48
DIN228BK		CM1	49
		CM2	50
		CM3	51
		CM4	52

Driver Type	Drawing	øD x L	Driver Code
Central Clamping Surface 15°		.750x2.75"	56
		25x70	57
		1.00x2.75"	58
		1.25x2.75"	59
		1.50x2.75"	60
Frontal Clamping Surface 15°		16x50	61
Cylindrical with Thread		25x100 M16x1.5	66
		36x120 M24x1.5	67
VDI Design		25x112 M16x1.5	70
		36x135 M24x1.5	71
Central Clamping Hexagonal		25x70	72
		32x70	73
Central Clamping Tapered		.75x2.75"	76
		20x70	77
Frontal Clamping Surface 2°		1.00x2.75"	80
		1.00x3.94"	81
		1.25x2.75"	82
		1.25x3.94"	83
		1.50x2.75"	84
		1.50x3.94"	85
Trapezoidal Thread		28x126 Tr 28x2	88
		36x162 Tr 36x2	89
Spraymist Driver		25x50	91
		35x60	92

SUMOGUN

MNSNT

Indexable SUMOCHAM Inserts and Modular Shank Gundrills



Designation	DCN[1]	DCX[2]	LU	PL	THSZMS	BD	BDRED	LPR	FLGT	DRVS[3]	SSC[4]	MIID[5]	
MNSNT 100-200-MF16X1	10.00	10.40	200.00	2.720	MF16X1	9.70	9.60	274.00	10.00	16.0	10.0	HCP 100	K DCN 10-13.99
MNSNT 105-200-MF16X1	10.50	10.90	200.00	2.720	MF16X1	10.20	10.10	274.00	10.00	16.0	10.0	HCP 105	K DCN 10-13.99
MNSNT 110-200-MF16X1	11.00	11.40	200.00	2.750	MF16X1	10.70	10.60	275.00	10.00	16.0	11.0	HCP 110	K DCN 10-13.99
MNSNT 115-200-MF16X1	11.50	11.90	200.00	2.750	MF16X1	11.20	11.10	275.00	10.00	16.0	11.0	HCP 115	K DCN 10-13.99
MNSNT 120-200-MF16X1	12.00	12.40	200.00	3.160	MF16X1	11.70	11.60	275.00	10.00	16.0	12.0	HCP 120	K DCN 10-13.99
MNSNT 125-200-MF16X1	12.50	12.90	200.00	3.160	MF16X1	12.20	12.10	275.00	12.00	16.0	12.0	HCP 125	K DCN 10-13.99
MNSNT 130-200-MF16X1	13.00	13.40	200.00	3.510	MF16X1	12.70	12.60	276.00	12.00	16.0	13.0	HCP 130	K DCN 10-13.99
MNSNT 135-200-MF16X1	13.50	13.90	200.00	3.510	MF16X1	13.20	13.10	276.00	12.00	16.0	13.0	HCP 135	K DCN 10-13.99
MNSNT 140-200-MF16X1	14.00	14.40	200.00	3.630	MF16X1	13.70	13.60	276.00	12.00	16.0	14.0	HCP 140	K DCN 14-17.99
MNSNT 145-200-MF16X1	14.50	14.90	200.00	3.630	MF16X1	14.20	14.10	276.00	12.00	16.0	14.0	HCP 145	K DCN 14-17.99
MNSNT 130-250-MF16X1	13.00	13.40	250.00	3.510	MF16X1	12.70	12.60	326.00	12.00	16.0	13.0	HCP 130	K DCN 10-13.99
MNSNT 135-250-MF16X1	13.50	13.90	250.00	3.510	MF16X1	13.20	13.10	326.00	12.00	16.0	13.0	HCP 135	K DCN 10-13.99
MNSNT 140-250-MF16X1	14.00	14.40	250.00	3.630	MF16X1	13.70	13.60	326.00	12.00	16.0	14.0	HCP 140	K DCN 14-17.99
MNSNT 145-250-MF16X1	14.50	14.90	250.00	3.630	MF16X1	14.20	14.10	326.00	12.00	18.0	14.0	HCP 145	K DCN 14-17.99
MNSNT 100-400-MF16X1	10.00	10.40	400.00	2.720	MF16X1	9.70	9.60	474.00	10.00	16.0	10.0	HCP 100	K DCN 10-13.99
MNSNT 105-400-MF16X1	10.50	10.90	400.00	2.720	MF16X1	10.20	10.10	474.00	10.00	16.0	10.0	HCP 105	K DCN 10-13.99
MNSNT 110-400-MF16X1	11.00	11.40	400.00	2.750	MF16X1	10.70	10.60	474.00	10.00	16.0	11.0	HCP 110	K DCN 10-13.99
MNSNT 115-400-MF16X1	11.50	11.90	400.00	2.750	MF16X1	11.20	11.10	474.00	10.00	16.0	11.0	HCP 115	K DCN 10-13.99
MNSNT 120-400-MF16X1	12.00	12.40	400.00	3.160	MF16X1	11.70	11.60	475.00	10.00	16.0	12.0	HCP 120	K DCN 10-13.99
MNSNT 125-400-MF16X1	12.50	12.90	400.00	3.160	MF16X1	12.20	12.10	475.00	12.00	16.0	12.0	HCP 125	K DCN 10-13.99
MNSNT 130-400-MF16X1	13.00	13.40	400.00	3.510	MF16X1	12.70	12.60	476.00	12.00	16.0	13.0	HCP 130	K DCN 10-13.99
MNSNT 135-400-MF16X1	13.50	13.90	400.00	3.510	MF16X1	13.20	13.10	476.00	12.00	16.0	13.0	HCP 135	K DCN 10-13.99
MNSNT 140-400-MF16X1	14.00	14.40	400.00	3.630	MF16X1	13.70	13.60	476.00	12.00	16.0	14.0	HCP 140	K DCN 14-17.99
MNSNT 145-400-MF16X1	14.50	14.90	400.00	3.630	MF16X1	14.20	14.10	476.00	12.00	18.0	14.0	HCP 145	K DCN 14-17.99
MNSNT 150-400-MF16X1	15.00	15.90	400.00	3.880	MF16X1	14.70	14.60	484.00	12.00	18.0	15.0	HCP 150	K DCN 14-17.99
MNSNT 160-400-MF20X1	16.00	16.90	400.00	3.910	MF20X1	15.50	15.40	484.00	12.00	18.0	16.0	HCP 160	K DCN 14-17.99
MNSNT 170-400-MF20X1	17.00	17.90	400.00	4.570	MF20X1	16.50	16.40	485.00	12.00	22.0	17.0	HCP 170	K DCN 14-17.99
MNSNT 180-400-MF20X1	18.00	18.90	400.00	4.660	MF20X1	17.50	17.40	486.00	12.00	22.0	18.0	HCP 180	K DCN 14-17.99
MNSNT 190-400-MF20X1	19.00	19.90	400.00	4.660	MF20X1	18.50	18.40	486.00	12.00	22.0	19.0	HCP 190	K DCN 18-21.99
MNSNT 200-400-MF20X1	20.00	20.90	400.00	4.810	MF20X1	19.50	19.40	487.00	12.00	22.0	20.0	HCP 200	K DCN 18-21.99
MNSNT 210-400-MF20X1	21.00	21.90	400.00	4.940	MF20X1	20.50	20.40	503.00	21.00	28.0	21.0	HCP 210	K DCN 18-21.99
MNSNT 220-400-MF20X1	22.00	22.90	400.00	5.200	MF20X1	21.50	21.40	504.00	21.00	28.0	22.0	HCP 220	K DCN 18-21.99
MNSNT 230-400-MF20X1	23.00	23.90	400.00	5.280	MF20X1	22.50	22.40	504.00	21.00	28.0	23.0	HCP 230	K DCN 22-26.99
MNSNT 240-400-MF20X1	24.00	24.90	400.00	5.630	MF20X1	23.50	23.40	505.00	21.00	28.0	24.0	HCP 240	K DCN 22-26.99
MNSNT 250-400-MF20X1	25.00	25.90	400.00	5.700	MF20X1	24.50	24.40	506.00	21.00	28.0	25.0	HCP 250	K DCN 22-26.99

• For user guide and cutting conditions, see pages 294-297

[1] Do not mount smaller drilling heads than the specified range of the drill body

[2] Cutting diameter maximum

[3] Torque key size

[4] Seat size code

[5] Master insert identification

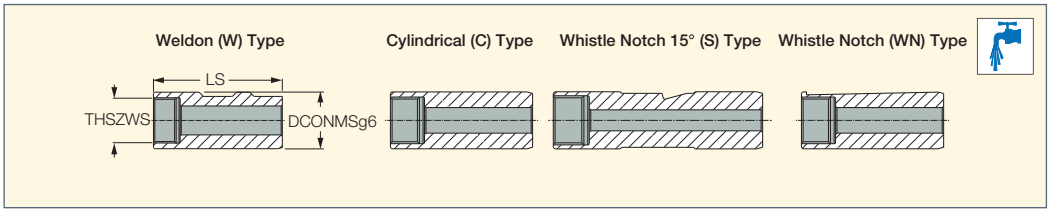
For inserts, see pages: HCP-IQ (47) • ICG (57) • ICK (28) • ICK-2M (32) • ICP (18) • ICP-2M (24) • QCP-2M (43)

For holders, see pages: GDV (294)

SUMOGUN

GDV

Shanks for SUMOGUN Modular Gundrills with Threaded Connection



Designation	THSZWS	DCONMS	Shank[1]	LS
GDV56-MF16X1-I-WN.75"	MF16X1	19.05	S	69.8
GDV99-MF16X1-I-W.75"	MF16X1	19.05	W	69.8
GDV10-MF16X1-M-C20	MF16X1	20.00	C	50.0
GDV22-MF16X1-M-W20	MF16X1	20.00	W	50.0
GDV80-MF16X1-I-WN1.00"	MF16X1	25.40	WN	69.8
GDV11-MF20X1-M-C25	MF20X1	25.00	C	56.0
GDV23-MF20X1-M-W25	MF20X1	25.00	W	56.0
GDV57-MF20X1-M-WN25	MF20X1	25.00	S	70.0
GDV100-MF20X1-I-W1.00"	MF20X1	25.40	W	57.9
GDV58-MF20X1-I-WN1.00"	MF20X1	25.40	S	69.8
GDV101-MF20X1-I-W1.25"	MF20X1	31.75	W	57.9
GDV97-MF20X1-I-C1.25"	MF20X1	31.75	C	57.9
GDV12-MF20X1-M-C32	MF20X1	32.00	C	60.0
GDV24-MF20X1-M-W32	MF20X1	32.00	W	60.0
GDV13-MF20X1-M-C40	MF20X1	40.00	C	70.0
GDV25-MF20X1-M-W40	MF20X1	40.00	W	70.0

[1] W-Weldon, C-Cylindrical, S-Whistle notch 15°, WN-Whistle notch

For tools, see pages: MNSNT (293)

Machining Conditions for MNSNT

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material Group No.	SUMOGUN V (m/min)	SUMOGUN Feed vs. Drill Diameter mm/rev D=10-11.9	D=12-13.9	D=14-15.9	D=16-19.9	D=20-25.9
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	80-110-140	0.15	0.18	0.20	0.25	0.25
		>= 0.25 %C	Annealed	650	190	2	80-105-130	0.18	0.21	0.23	0.30	0.30
		< 0.55 %C	Quenched and tempered	850	250	3	80-100-120	0.21	0.24	0.27	0.35	0.35
		>= 0.55 %C	Annealed	750	220	4	70-90-110					
			Quenched and tempered	1000	300	5	50-70-90					
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	80-100-120	0.14	0.16	0.18	0.23	0.25
			Quenched and tempered	930	275	7	70-90-110	0.17	0.20	0.22	0.27	0.30
				1000	300	8	50-70-90	0.21	0.24	0.26	0.31	0.35
				1200	350	9	40-55-70					
	High alloyed steel, cast steel, and tool steel		Annealed	680	200	10	50-70-90	0.12	0.15	0.18	0.20	0.22
			Quenched and tempered	1100	325	11	40-60-80	0.14	0.17	0.20	0.22	0.24
								0.17	0.20	0.23	0.25	0.27
	Stainless steel and cast steel		Ferritic/ martensitic.	680	200	12	40-55-70	0.12	0.14	0.16	0.16	0.18
								0.13	0.15	0.18	0.19	0.21
			Martensitic	820	240	13		0.15	0.17	0.20	0.21	0.24
K	Cast iron nodular (GG)		Ferritic/pearlitic		180	15	90-125-160	0.20	0.25	0.30	0.35	0.35
			Pearlitic/ martensitic		260	16	80-110-140	0.23	0.28	0.33	0.40	0.42
	Grey cast iron (GGG)		Ferritic		160	17	90-135-180	0.27	0.32	0.37	0.45	0.47
			Pearlitic		250	18	80-110-140					
	Malleable cast iron		Ferritic		130	19	90-125-160					
			Pearlitic		230	20	80-110-140					
N	Aluminum-wrought alloys		Not hardenable		60	21	90-155-220	0.25	0.30	0.35	0.40	0.45
			Hardenable		100	22		0.28	0.33	0.38	0.45	0.50
	Aluminum-cast alloys	<=12% Si	Not hardenable		75	23		0.32	0.37	0.42	0.50	0.57
			Hardenable		90	24						
		>12% Si	High temperature		130	25	80-120-160					

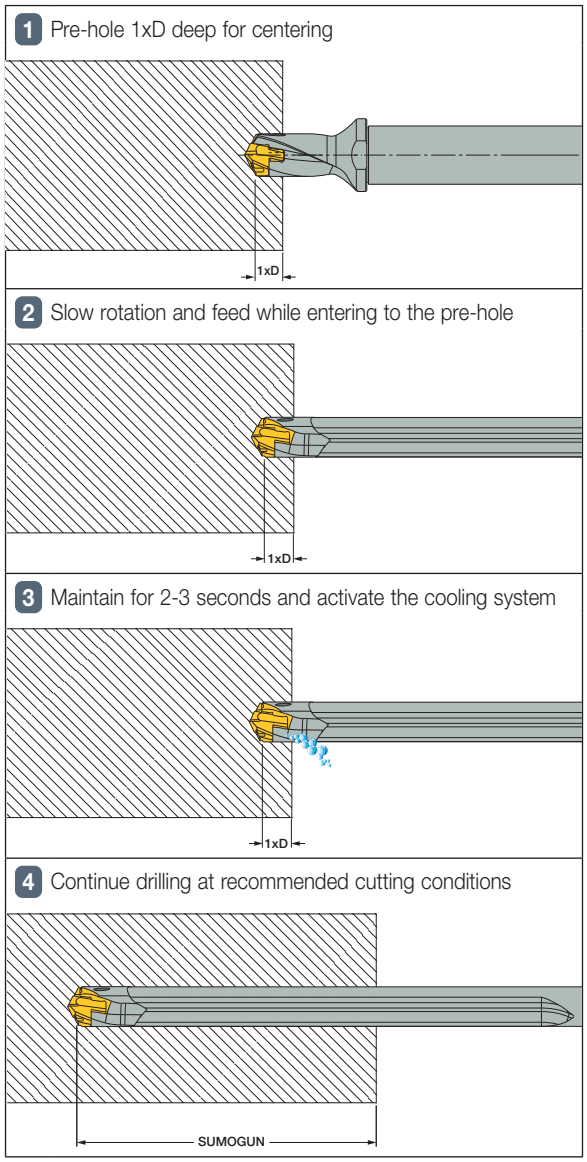
Recommended cutting data

- Mandatory use of emulsion or oil when drilling
- For the 400mm long tools please reduce the cutting speed by 20%.

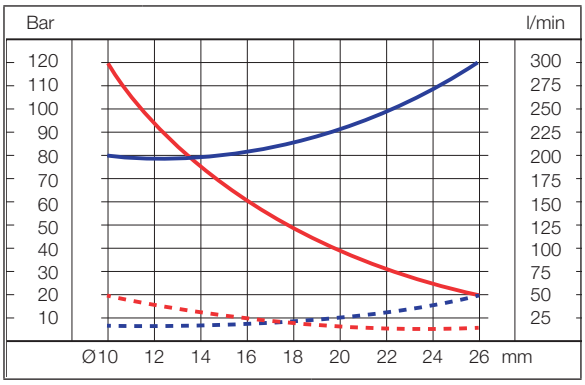
Drill Penetration Instructions on Horizontal Milling and Lathe machines

Note: The following procedure (1-4) is recommended for up to 400 mm hole depths using MNSNT ...-400... drill.

1 Drill a pilot hole 0.5xD deep with a short drill in the same diameter as of the **SUMOGUN** drill.
2 Enter the pre-hole at slow speed, feed and 50 RPM until 1-2 mm before reaching the bottom.
3 Activate the cooling system and increase rotation speed to recommended drilling speed, maintain for 2-3 seconds, then continue at recommended drilling feed. **No pecking is required**. Apply maximum possible coolant flow rate.
4 After having reached the required depth, reduce speed to 50-100 RPM while exiting from the hole.



Pressure and Coolant Flow Rate for SUMOGUN



SUMOGUN Drilling Range — **Drilling Diameter**

Q l/min — P bar

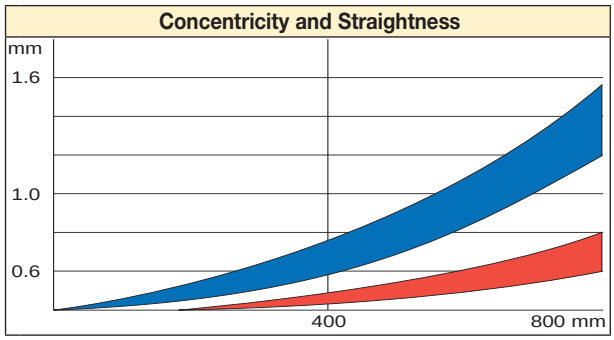
GUNDRILL Machines
Milling and Turning Machines

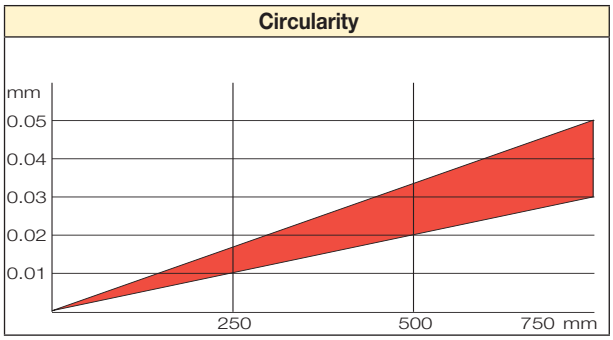
Gundrill Lubrication and Cooling

The best performance is obtained by using oil.
On equipment that uses water-soluble fluids (i.e. machining centers and CNC machines) a concentration between 10% and 15% is recommended.

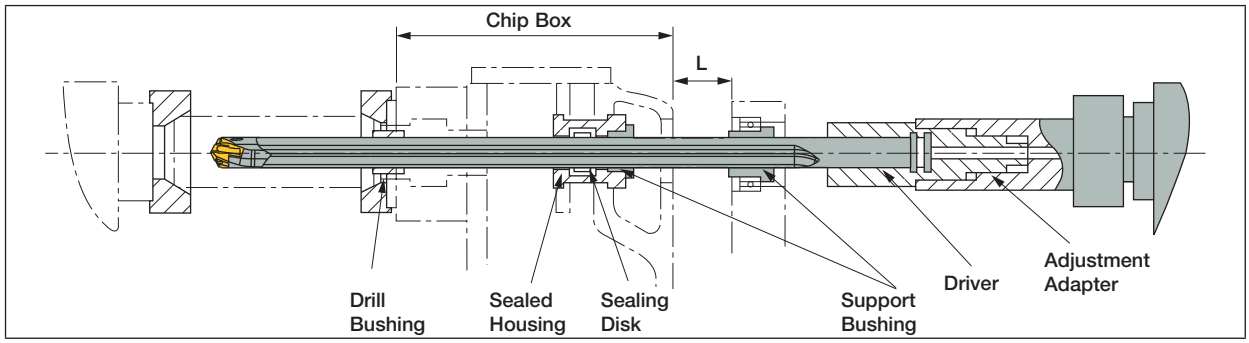
Guidelines for Optimal Gundrill Performance

- Coolant pressure and flow
- It is recommended to use a strong coolant flow for efficient chip flushing and cooling of the cutting edge
- Filtration: It is recommended to use a filter under 20 µm.
- **Note:** Improper filtration may result in interrupted flow of the lubricating oil. This creates a sticky surface on the bearing pads and leads to premature wear of the tool and overloading the coolant pump and spindle seals.
- The coolant temperature should be between 20 and 22º C.
  Note: Above 50º C the viscosity of the coolant is reduced by 50% and becomes ineffective.





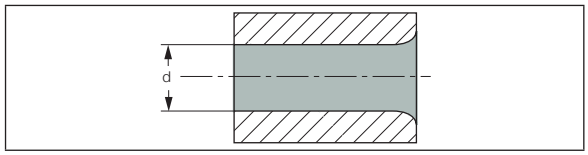
Stationary workpiece – rotating tool
Rotating workpiece – stationary tool



L = 20xD
1- The support bushing should be according to tube diameter (D3) (see below)

Bushing

Based on modified DIN 179 specify the “d” diameter of the drill head. Carbide bushing is delivered only on request.



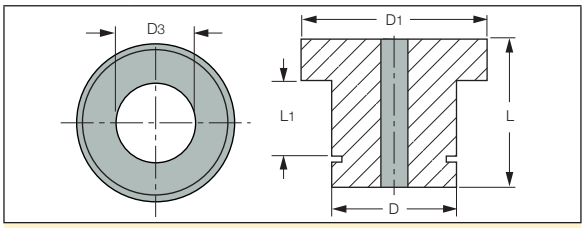
d = Drill diameter +0.02

Guide Bushing

A guide bushing is an essential component for a proper gundrill operation. The function of the guide bushing is to direct the SUMOGUN into the material during penetration. The diameter of the guide bushing should be within 20 microns larger than the diameter of the drill. Dedicated gundrill machines are equipped with a guide bushing system.

Support Bushing

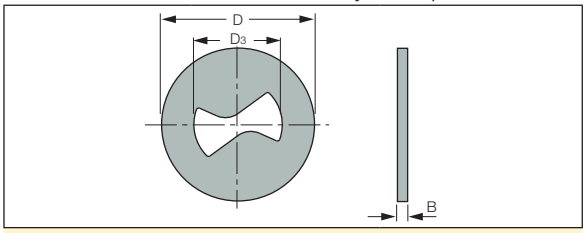
D3 indicate the tube diameter



Support Bushing				
D3	Ext. Ø “D”	Ext. Ø “D1”	Length “L”	Length “L1”
9.6 - 16,399	20	26	20	12
9.6 - 25,999	30	38	26	16
9.6 - 25,999	45	50	26	16

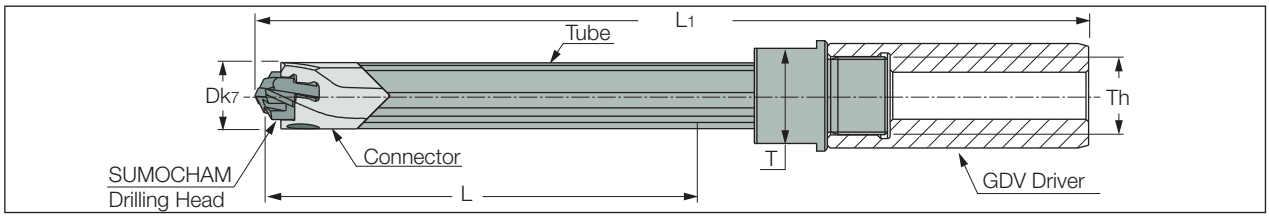
Sealing Disk

Indicate the dimensions needed for your requirements



Sealing Disk		
D3	Ext. Ø “D”	Thick. “ B”
9.6 to 15,559	32	4
15,6 to 25,999	40	4

SUMOGUN Inquiry Form



1. Tool

Quantity _____

Nominal diameter and tolerance _____

Please fill in dimensions on the sketch.

Driver

For standard drivers please use designation from page 294

Special Driver

o Code No. _____

o Special, please attach sketch and specifications.

2. Workpiece

(If possible, please attach a drawing)

2.1 Material

Material description (DIN material number or any other standard):

_____

Hardness and Properties: _____

o Short Chips o Long Chips

2.2 Hole Type

o Blind Hole o Drilling into Pre-hole

o Angled Entry o Drilling into Solid

o Boring o Angled Exit

Drilling Depth _____ mm Hole Tolerance _____

2.3 Application:

Workpiece: o Stationary o Rotating

Tool: o Stationary o Rotating

Sketch of drilling application

Note: It may be necessary to change several of the parameters that you indicated, based on our experience with your application.

3. Machine

3.1 Technical Data

Machine Type _____

Power: _____kW

3.2 Cutting Data:

Cutting Speed V_c _____ m/min

Revolutions Nmin _____ RPM, Nmax _____RPM

Feed Fmin _____ mm/rev,

Fmax _____ mm/rev

Feed Rate VF _____ mm/min

Coolant:

o Oil o Soluble Oil o Other

Coolant Pressure: _____ Bar

Drill Body Type		Hole Diameter	Length
SNT	Steel body	Ø10.00-25.99	Drilling Depth
CNT	For C.N.C		
GDT	For Gundrill		Total length

Metric Fine Pictch	Dwg. Number
1=M16 1=M20	4 last digits

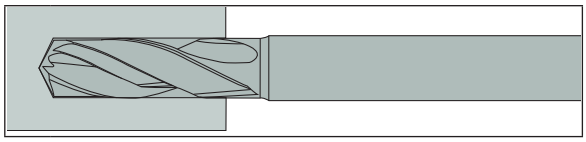
Tool Type	
Code	Type
No code	Standard shape and size
GP	Guide Pads
SC	Special Connector
PT	P-Tube

MN	###	-	XXX	-	XXX	-	MF	1	GP	-	XXXX

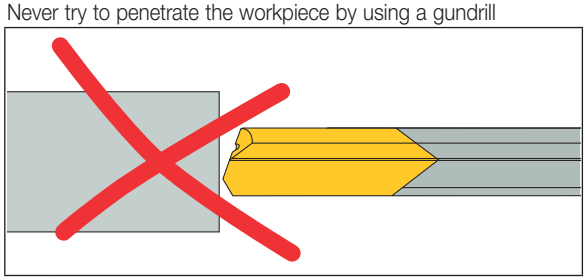
Drilling Head Mounting Procedure

When using a gundrill on a lathe machine, a short solid carbide centering drill should be used prior to the gundrill. Once the gundrill enters the pre-drilled hole, it is self-guided.

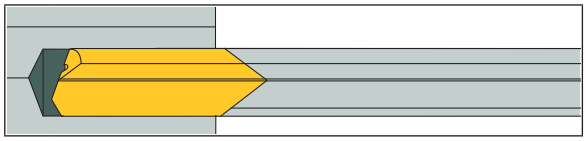
1 Drilling a pre-hole (drill diameter +0.02 mm)



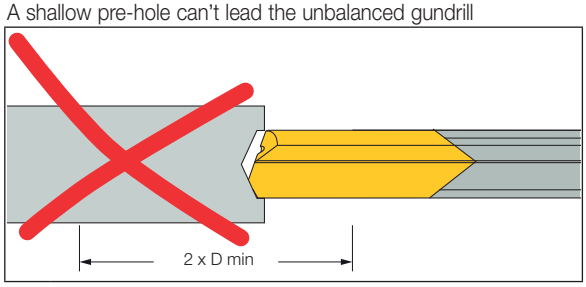
Never try to penetrate the workpiece by using a gundrill



2 Gundrill penetration through the pre-hole

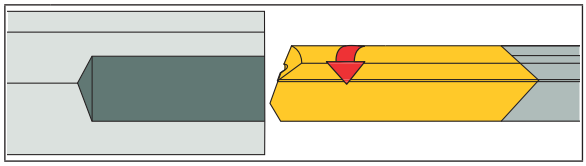


A shallow pre-hole can't lead the unbalanced gundrill

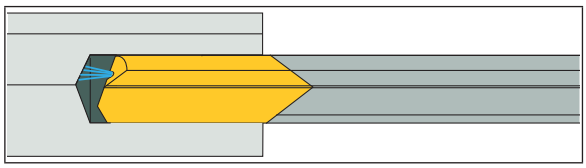


Drill Penetration Instructions

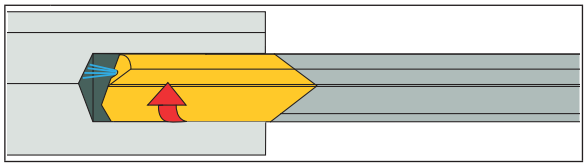
1 Rotate the drill counterclockwise prior to and during hole penetration



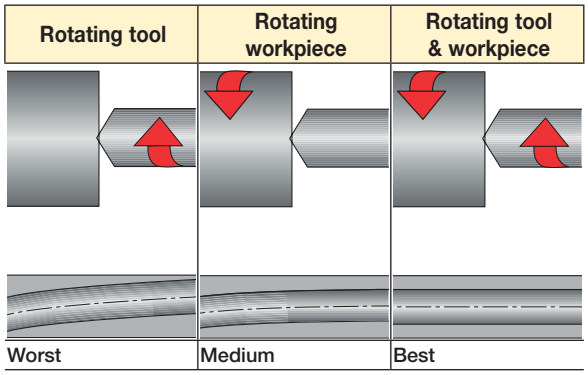
2 Stop the drill rotation and start the coolant



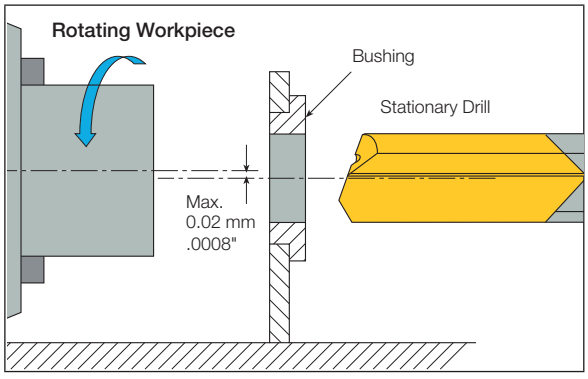
3 Rotate the drill clockwise prior to drilling operation



The influence of a Tool vs. Workpiece rotation



The maximum misalignment between the drill bushing and the workpiece center line should not exceed 0.02 mm (.0008").



Single Flute Gundrill

Iscar's gundrill consists of a single-piece carbide head, a streamlined shank and a driver through which coolant flows to the working end where it is most needed. Chips are evacuated along the V-shaped external flute.

Drilling Head

The carbide head is tapered on its length to reduce friction. The taper angle depends on the type of material to be drilled. For high precision drilling, the taper should be reduced to a minimum.
Note that when the head is resharpened, the diameter of the drill changes, affecting the hole tolerance.

Shank

The cross-section of the shank is V-shaped with coolant holes. It is made of hardened steel that is highly resistant to twisting. This cross-section provides the optimal conditions for twist resistance, coolant flow and chip evacuation.

Driver

The driver ensures the connection between the gundrill and the machine tool, (see page 301 for detailed driver information).

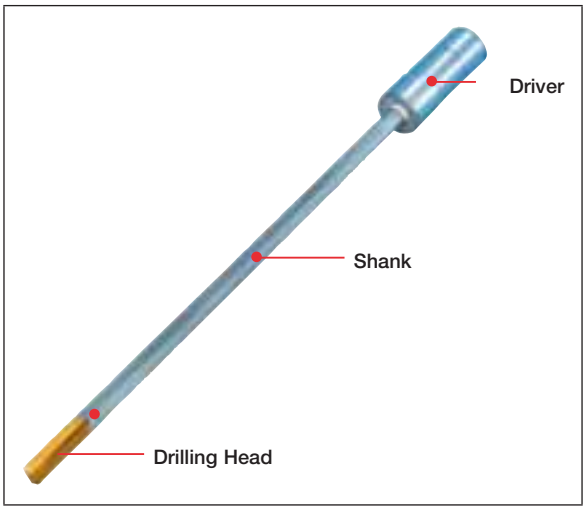
Advantages

- Drilling precision of IT7 to IT9 tolerances can be reached
- Excellent straightness and concentricity
- Maintains high precision hole center alignment
- Surface roughness of R0.4 - R1.6 is easily obtained
- Reboring operations are often unnecessary

Carbide Tipped Gundrill Range

Drill Diameter	Max. Flute Length
2.50 to 3.09	1100
3.10 to 5.99	2500
6.00 to 11.39	3000
11.40 to 40.00	3500

Overall length=flute length+driver length (see page 303)



Iscar's advanced gundrill technology provides superior geometric and dimensional quality for both deep and shallow drilling. The drills are available in the range of 2.5 to 40 mm.

Single Flute Solid Carbide Gundrills

Another type of gundrill is made with an integral tip and shank, made of solid carbide with either a steel or a carbide driver. These drills are designed for conventional machines, machining centers and lathes. This style of gundrill is available from 0.9-16 mm and can be used on various types of materials. It provides superior rigidity and optimal coolant flow rates. As a result of its rigidity, up to 100% higher feed rate can be reached.
When using the small diameter drills, it is crucial to adhere closely to the recommended drilling parameters.

Solid Carbide Gundrill Range

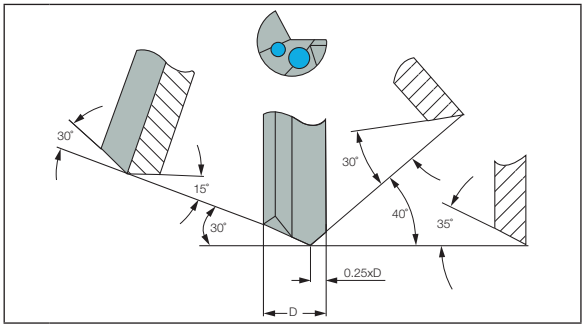
(with or without brazed steel driver)

Drill Diameter	Max. Flute Length
0.9 to 16.00	300 mm

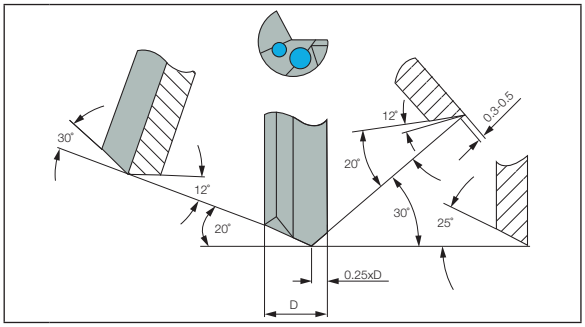
Standard Gundrill Head Sharpening Angles

Subject to the required tolerance, cutting performance and desired chip shape, the following standard sharpening angles are recommended (shown in figures 1 and 2).

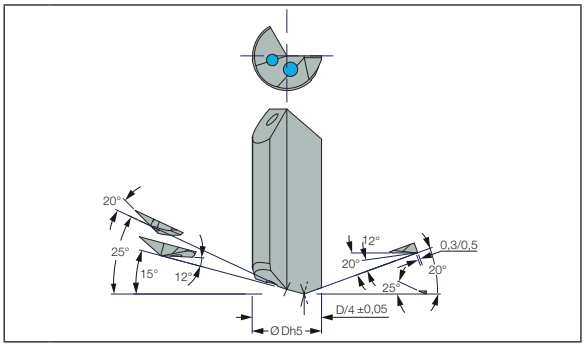
1 Standard sharpening for 0.9 to 4 mm drill diameters



2 Standard sharpening for 4 to 32 mm drill diameters



3 Standard sharpening for 32 to 40 mm drill diameters

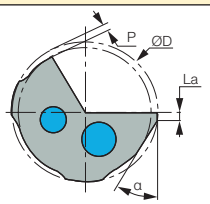


Note: For special or semi-standard gundrills, special geometries will be offered to match the application.

Standard Gundrill Head Profiles

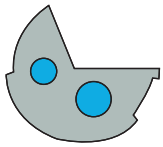
Drilling capacity and finish of the drilled hole are dependent on the geometrical shape of the drill head. Both the profile and the sharpening must be matched to the workpiece material. The profile is defined when the tool is manufactured. Although regrinding may change the cutting geometry, the profile should remain the same.

General Sketch



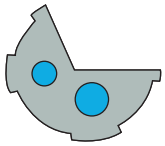
All cross section profile parameters such as: P, La and must be precisely matched to the workpiece material properties.

Profile G (Universal)



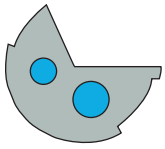
Standard form for most material types, particularly for materials with a tendency to shrink. Recommended for high precision bore tolerance and straightness. Maintains precise exit hole size. Recommended when extra burnishing is required.

Profile A



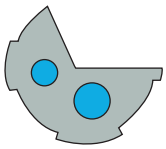
Suitable for cast iron (usually coated) and aluminum alloys. Can be used for cross drilling, angular entry or exit and for interrupted cut. Large coolant gaps between pads.

Profile B



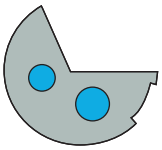
Excellent size control, for high precision hole tolerance. Used for cast iron and aluminum alloys.

Profile C



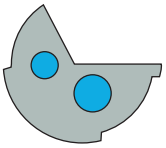
Used for angled entry or exit. Large back taper, for shrinking materials such as types of alloys and stainless steel. Large coolant gaps between pads.

Profile D



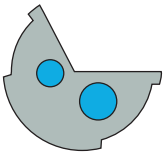
Suitable for cast iron only. Very effective in grey cast iron (usually coated).

Profile E



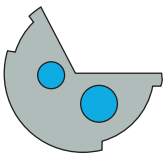
General use, for alloys and stainless steel. This profile eliminates the problem of the tool sticking in the hole after the outer corner dulls. Especially suitable for crankshaft and other forged materials. Recommended for accurate hole straightness.

Profile H



Recommended for all nonferrous and cast iron materials up 5 mm diameter. Sometimes used for wood and plastic with larger back taper.

Profile I

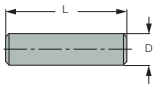
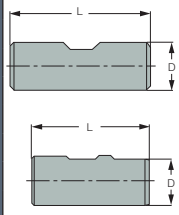
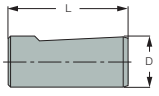
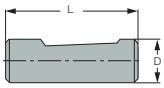


Used for aluminum and brass for best hole finish. For intersecting holes and interrupted cut or when extra outer diameter support and burnishing is required.

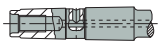
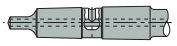
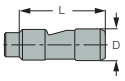
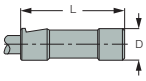
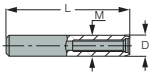
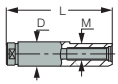
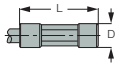
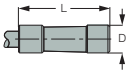
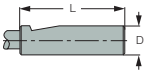
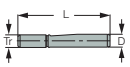
Standard Gundrill Drivers for Machining Centers, Lathes, etc.

Drivers

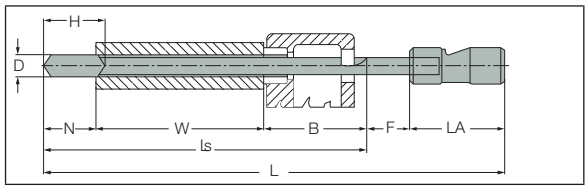
Drivers are available for dedicated and CNC machines for any specified diameter and length.
Below are the driver codes and technical data.

Driver Type	Drawing	DXL	Driver code	BRAZED GUNDRILL F = CYLINDRICAL TUBE: Max. cutting diameter	BRAZED GUNDRILL F = CYLINDRICAL TUBE: Equal or less than max. cutting diameter	BRAZED GUNDRILL F = CYLINDRICAL TUBE: More than max. diameter	SOLID CARBIDE GUNDRILL: F = Straightening extension
Cylindrical DIN1835A DIN6535HA		4x28	N°1	2.749	10	20	18
		5x28	N°2	3.249	10	20	15
		6x36	N°3	4.249	10	20	14
		8x36	N°4	5.749	10	20	14
		10x40	N°5	7.299	10	20	15
		12x45	N°6	8.999	10	20	15
		.50x1.78"	N°94	9.699	10	20	15
		14x45	N°7	10.999	10	20	15
		16x48	N°8	12.399	10	20	15
		18x48	N°9	14.399	10	20	15
		.75x2.03"	N°95	14.899	10	20	15
		20x50	N°10	15.899	10	20	
		25x56	N°11	19.509	10	25	
		1.00x2.28"	N°96	19.509	10	25	
		1.25x2.28"	N°97	25.609	10	25	
		32x60	N°12	25.609	10	25	
		40x70	N°13	32.609	10	25	
		50x80	N°14	40	10	25	
		63x90	N°15	40	10	25	
Weldon DIN1835B DIN6535HB		6x36	N°16	2.749	10	20	15
		8x36	N°17	3.249	10	20	15
		10x40	N°18	7.299	10	20	15
		12x45	N°19	8.999	10	20	15
		.50x1.78"	N°98	9.699	10	20	15
		16x48	N°20	12.399	10	20	15
		18x48	N°21	14.399	10	20	15
		.75x2.03"	N°99	14.899	10	20	15
		20x50	N°22	15.899	10	20	15
		25x56	N°23	19.509	10	25	
		1.00x2.28"	N°100	19.509	10	25	
		1.25x2.28"	N°101	25.609	10	25	
		32x60	N°24	25.609	10	25	
		40x70	N°25	32.609	10	25	
		50x80	N°26	40	10	25	
		63x90	N°27	40	10	25	
Whistle Notch DIN1835E		6x36	N°28	2.749	10	20	
		8x36	N°29	3.249	10	20	
		10x40	N°30	7.299	10	20	15
		12x45	N°31	8.999	10	20	15
		16x48	N°32	12.399	10	20	15
		18x48	N°33	14.399	10	20	15
		20x50	N°34	15.899	10	20	15
		25x56	N°35	19.509	10	25	
		32x60	N°36	25.609	10	25	
		40x70	N°37	32.609	10	25	
Whistle Notch DIN6535HE		6x36	N°38	2.749	10	20	15
		8x36	N°39	3.249	10	20	15
		10x40	N°40	7.299	10	20	15
		12x45	N°41	8.999	10	20	15
		16x48	N°42	12.399	10	20	15
		18x48	N°43	14.399	10	20	15
		20x50	N°44	15.899	10	20	15

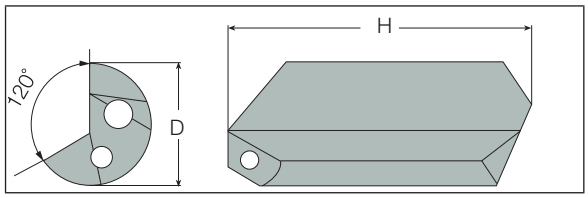
Standard Drivers for Gundrill Machines

Driver Type	Drawing	DXL	Driver code	BRAZED GUNDRILL F = CYLINDRICAL TUBE: Max. cutting diameter	BRAZED GUNDRILL F = CYLINDRICAL TUBE: Equal or less than max. cutting diameter	BRAZED GUNDRILL F = CYLINDRICAL TUBE: More than max. diameter	SOLID CARBIDE GUNDRILL: F = Straightening extension
DIN228AK		CM1	N°45	9.599	10	20	
		CM2	N°46	14.599	10	20	
		CM3	N°47	21.499	10	25	
		CM4	N°48	29.499	10	25	
DIN228BK		CM1	N°49	9.599	10	20	
		CM2	N°50	14.599	10	20	
		CM3	N°51	21.499	10	25	
		CM4	N°52	29.499	10	25	
Central Clamping Surface 15°		6x30	N°53	2.749	10	20	20
		10x40	N°54	7.299	10	20	15
		16x45	N°55	12.399	10	20	
		.750x2.75”	N°56	14.899	10	20	
		25x70	N°57	19.509	10	25	
		1.00x2.75”	N°58	19.509	10	25	
		1.25x2.75”	N°59	25.609	10	25	
		1.50x2.75”	N°60	32.609	10	25	
Frontal Clamping Surface 15°		16x50	N°61	12.399	10	20	
Cylindrical with Thread		10x50 M6X0.5	N°62	7.299	10	20	15
		10x60 M6X0.5	N°63	7.299	10	20	
		.50x1.97” M6x0.5	N°64	8.999	10	20	15
		16x80 M10X1	N°65	12.399	10	20	15
		25x100 M16x1.5	N°66	19.509	10	25	
		36x120 M24x1.5	N°67	30.609	10	25	
VDI Design		10x68 M6x0.5	N°68	6.749	10	20	
		16x90 M10x1	N°69	10.799	10	20	15
		25x112 M16x1.5	N°70	19.509	10	25	
		36x135 M24x1.5	N°71	30.609	10	25	
Central Clamping Hexagonal		25x70	N°72	19.509	10	25	
		32x70	N°73	25.609	10	25	
Central Clamping Tapered		.50x1.50”	N°74	8.599	10	20	15
		16x70	N°75	12.099	10	20	15
		.75x2.75”	N°76	14.099	10	20	
		20x70	N°77	16.099	10	20	15
Frontal Clamping Surface 2°		.50x1.50”	N°78	9.699	10	20	
		.75x2.75”	N°79	14.899	10	20	
		1.00x2.75”	N°80	19.509	10	25	
		1.00x3.94”	N°81	19.509	10	25	
		1.25x2.75”	N°82	25.609	10	25	
		1.25x3.94”	N°83	25.609	10	25	
		1.50x2.75”	N°84	32.609	10	25	
		1.50x3.94”	N°85	32.609	10	25	
Trapezoidal Thread		16x112 Tr 16x1.5	N°86	13.599	10	20	
		20x126 Tr 20x2	N°87	17.099	10	20	
		28x126 Tr 28x2	N°88	25.599	10	25	
		36x162 Tr 36x2	N°89	32.599	10	25	
Spraymist Driver		16x40	N°90	12.399	10	20	
		25x50	N°91	19.509	10	25	
		35x60	N°92	26.599	10	25	

Standard Gundrill Length Calculations



Standard Gundrill Carbide Head Length



D= Cutting diameter
H= Carbide length
N= Regrinding area = H-D
W= Hole depth
B= Chip evacuation area = For typical gundrill machines, 250 mm
= For machining centers, 2xD (minimum 15 mm)
F= 10 mm.
LA = Driver length
LS = Flute length
L= Overall length

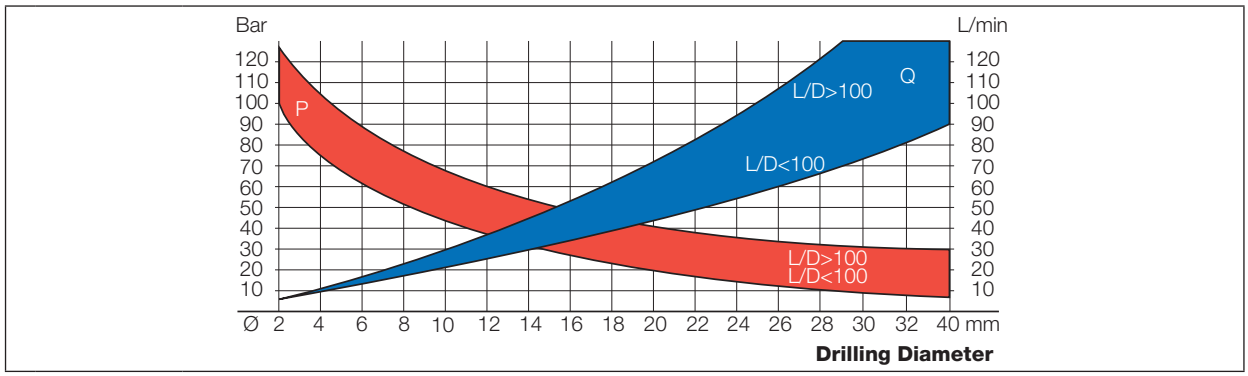
Example
Drilling of a ø10x500 depth hole on a gundrill machine with ø25x70 mm driver code No. 57 (See page 302)
D=10 W=500 LA=70 B=250 (or per experience)
L=N+W+B+F+LA
L=(35-10)+500+250+13+70=858 (OAL)
Ls=N+W+B=770 (flute length)

Ordering Code
For example:
D and Ls are available as standard
STGD-10000-0858-57-IC08

Diameter Range	Head Length
2.50-3.80	20
3.80-4.05	23
4.05-5.05	25
5.05-6.55	30
6.55-11.05	35
11.05-18.35	40
18.35-21.35	45
21.35-23.35	50
23.35-26.35	55
26.35-32.00	65

Note: regrindable length=H-D

Pressure and Coolant Flow Rate for Gundrills



Q l/min P bar

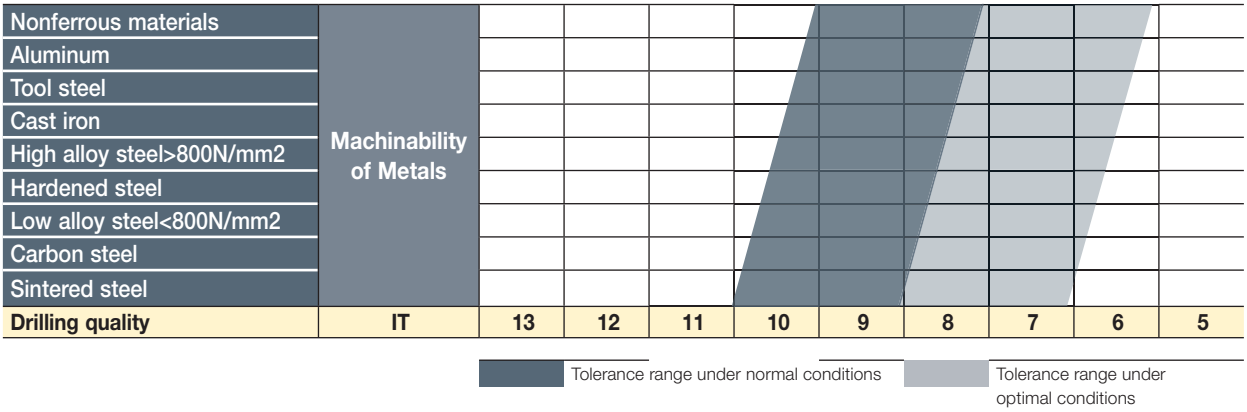
Gundrill Lubrication and Cooling
The best performance is obtained by using oil.
On equipment that uses water-soluble fluids (i.e. machining centers and CNC machines), a concentration between 10% and 15% is recommended.

Guidelines for Optimal Gundrill Performance
- It is recommended to use a strong coolant flow for efficient chip flushing and cooling of the cutting edge
- It is recommended to use a filter under 20 µm
- Note: Improper filtration may result in interrupted flow of lubricating oil. This creates a sticky surface on the bearing pads and leads to premature wear of the tool and overloading the coolant pump and spindle seals
- The coolant temperature should be between 20 and 22º C.
  Note: Above 50º C the viscosity of the coolant is reduced by 50% and becomes ineffective.

Drilling Tolerances Obtainable In Deep Hole Drilling

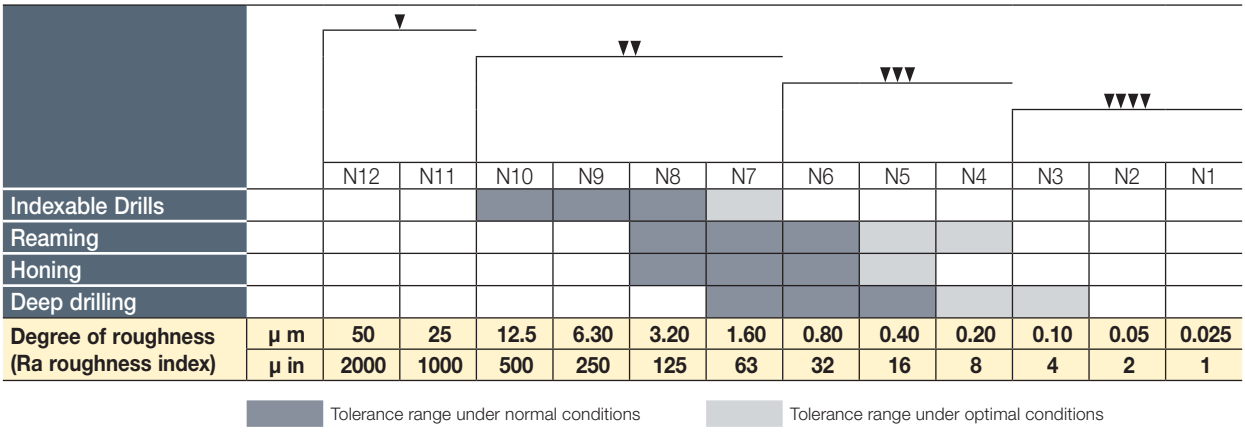
Deep Drilling Tolerances

Gundrill configurations when used under recommended conditions can produce holes with tolerances of IT8-IT9.
When operating under optimal conditions, even better tolerances can be achieved.



Surface Quality

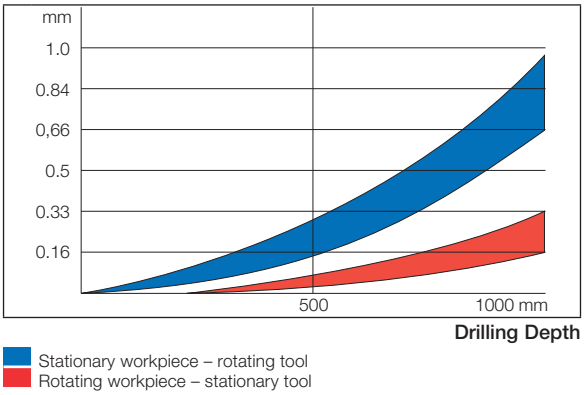
Surface quality of 0.2 Ra can be achieved when using gundrills under recommended conditions.



Concentricity and Straightness

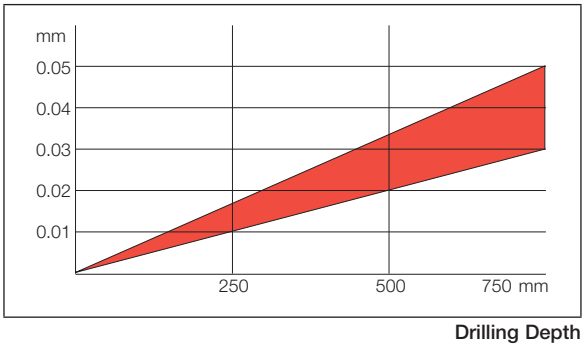
The resulting quality depends on different factors such as:

- Drilling depth and diameter
- Type of machining and cutting parameters
- Quality and uniformity of the workpiece material
- Machine tool conditions
- Gundrill support



Circularity

The geometric quality of bores obtained from deep hole drill bits is clearly higher than that obtained with the use of twist drills. It is possible to obtain precision with deviations of less than 4 µm.



Delivery Schedule Based on Drill Dimensions for Carbide Tipped Gundrills

Single Flute Carbide Tipped Gundrill Designations New Tools

Standard(1) Brazed Drill (Carbide Tipped):

Ordering Example:

STGD	- 05500	- 0500	- 57	- IC08
	Drill Diameter	Overall Length	Offer No. or Drawing No.	Version No. or Drawing

Ø2.5 to Ø20 each 0.1 mm and Ø20 to Ø32 each 1 mm
Standard geometry suitable in any material Standard driver from the table (page 301) 1-2 weeks delivery

Semi-Standard(1) Brazed Drill (Carbide Tipped):

Ordering Example:

GD	- 05520	- 0500	- ER	- IC908(2)
	Drill Diameter	Overall Length	Offer No. or Drawing No.	carbide grade(2)

Diameter out of standard range Standard geometry and/or head profile from page 300 and/or coating Standard driver from the table (page 301) 3-4 weeks delivery

Special(1) Gundrill Carbide Tipped:

Ordering Example:

SPGD	- 05520	- 0500	- 02051	- 01
	Drill Diameter	Overall Length	Offer No. or Drawing No.	Version No.

Any special specification (special geometry, special driver, etc.) 3-4 weeks delivery

Repair (Replacement of the Carbide Tip)

Repair of Standard(1) Drills

Ordering Example:

RSTGD	- 05520	- 0500	- IC08
	Drill Diameter	Overall Length	(The only available carbide grade)

Repair of Semi-Standard(1)

Ordering Example:

RGD	- 05520	- 0500	- GR	- IC508(2)
	Drill Diameter	Overall Length	G=Drill Profile R=Rough (P=Polished)	(carbide grade)(2)

Repair of Special(1) Drills

Ordering Example:

RSPGD	- 05520	- 0500	- 02051	- 01
	Drill Diameter	Overall Length	Offer No. or Drawing No.	Version No. or Drawing

Single Flute Solid Carbide Gundrill Designation New Tools

4-6 weeks delivery for any kind of solid cabide gundrill

Standard(1) Solid Carbide Drills

Ordering Example:

STCGD	- 05500	- 0200	- 05
	Drill Diameter	Overall Length	Driver Type

Semi-Standard(1) Solid Carbide Drills

Ordering Example:

CGD	- 05520	- 0200	- 05	- CPIC08
	Drill Diameter	Overall Length	Driver Type	C=Drill Profile P=Polished (R=Rough) IC08=Carbide Grade(2)

Special(1) Solid Carbide Gundrills

Ordering Example:

SPCGD	- 05520	- 0500	- 02051	- 01
	Drill Diameter	Overall Length	Offer No. or Drawing No.	Version No.

Repair of a solid carbide drill is not possible

Special(1) Two Flute Carbide Tipped Gundrill Designations

Ordering Example:

GD2L	- 05520	- 0500	- 02051	- 01
	Drill Diameter	Overall Length	Offer No. or Drawing No.	Version No.

Standard Geometry Resharpening of Carbide Tipped or Solid Gundrills

(See page 299)

Ordering Example:

STGRIND	- 05520
	Drill Diameter

Special Geometry Resharpening

Ordering Example:

SPGRIND	- 05520	- 0205	- 02051	- 01
	Drill Diameter	Overall Length	Offer No.	Version No.

Standard gundrills: delivery within 1-2 weeks from order (shipment time not included).
Semi-standard gundrills: delivery within 2-4 weeks from order (shipment time not included)
Special gundrills: delivery within 8-10 weeks from order (shipment time not included)
Available carbide grades: IC08 – uncoated grade used as a substrate for the following coated grades: IC908 (TiAlN); IC508 (TiCN+TiN); IC308 (TiCN); IC208 (TiN)

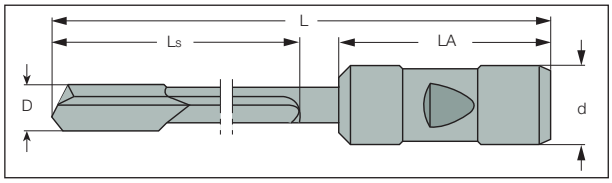
Gundrill Inquiry Form

1. Tool

Quantity _____

Nominal diameter and tolerance _____

Please fill in dimensions on the sketch below.



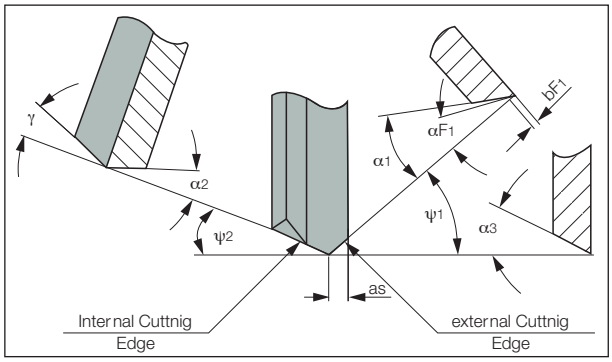
Driver

For standard drivers please use codes from page 301

o Code No.

o Special, please attach sketch and specifications.

Grind: o special (fill in the dimensions and angles below).



α1= _____ αF1= _____ Ψ1= _____

α2= _____ bF1= _____ Ψ2= _____

α3= _____ as= _____ γ= _____

o Standard (see page 299)

Coating:

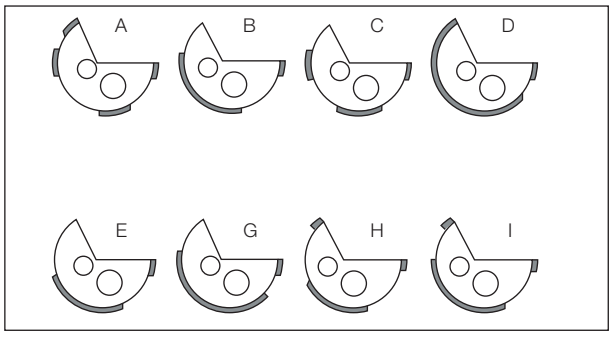
o TiN o TiCN o TiN+TiCN o Other

o IC208 (TiN) o IC308 (TiCN) o IC508 (TiCN+TiN)

o IC908 (TiAlN) o TiAlN

Type:

Please circle the required type. See page 300.



2. Workpiece

(If possible, please attach a drawing)

2.1 Material

Material description (DIN material number or any other standard):

_____

Hardness and Properties:

_____

o Short Chips o Long Chips

2.2 Hole Type

o Blind Hole o Drilling into Pre-hole

o Angled Entry o Drilling into Solid

o Boring o Angled Exit

Drilling Depth _____ mm Hole Tolerance _____

2.3 Application:

Workpiece: o Stationary o Rotating

Tool: o Stationary o Rotating

3. Machine

3.1 Technical Data

Machine Type. _____

Power _____ kW

3.2 Cutting Data:

Cutting Speed V_c _____ m/min

Revolutions Nmin _____ RPM, Nmax _____RPM

Feed Fmin _____ mm/rev,

Fmax _____ mm/rev

Feed Rate VF _____ mm/min

Coolant:

o Oil o Soluble Oil o Other

Coolant Pressure _____ Bar

Sketch of drilling application

Note: It may be necessary to change several of the parameters that you indicated based on our experience with your application.

Typical Gundrill Applications - Main Drilling Methods

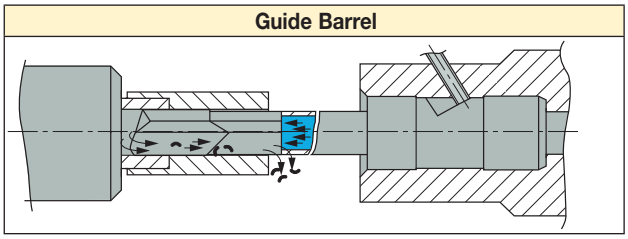


Figure 1

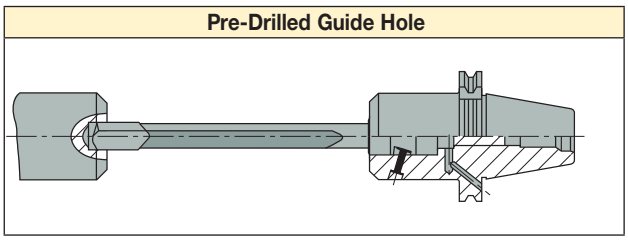


Figure 2

User Guide

The gundrill is not a self-centering tool. Therefore, an external means must be used to guide it to the point of entry into the workpiece. It is recommended that the machine tool be equipped with a means for guiding the gundrill, preferably during the entire drilling process.
An alternative method is a pre-drilled guide hole (figure 2), which is common for machining centers. Once the drill has been fully engaged into this hole, it continues to be self-guided.
The guide pads contribute to the high degree of calibration and provide burnishing of the drilled hole.

Typical Gundrill Applications - Chip Evacuation and Coolant Flow

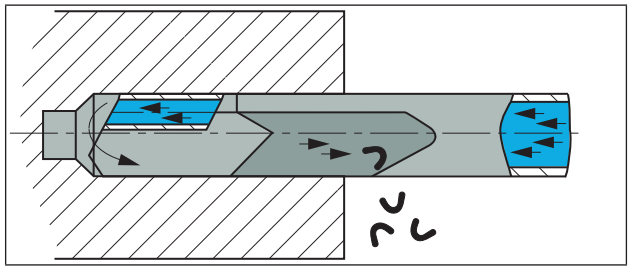


Figure 3

Boring with chip evacuation and coolant flowing opposite the boring direction

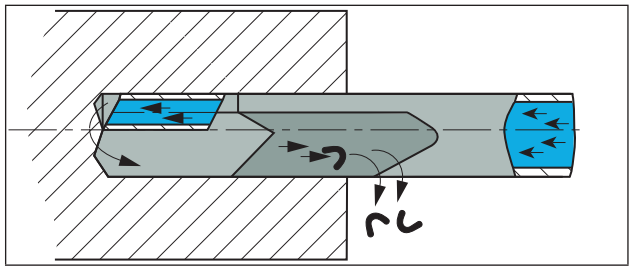


Figure 4

Drilling of solid material with chip evacuation and coolant flow opposite the drilling direction

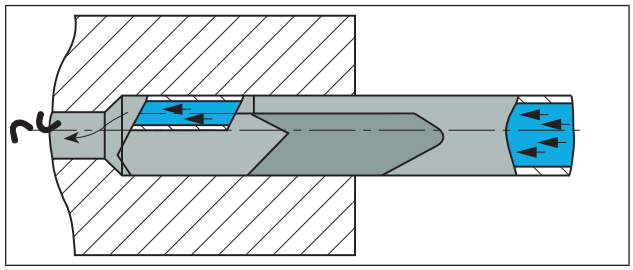


Figure 5

Boring with chip evacuation in the boring direction

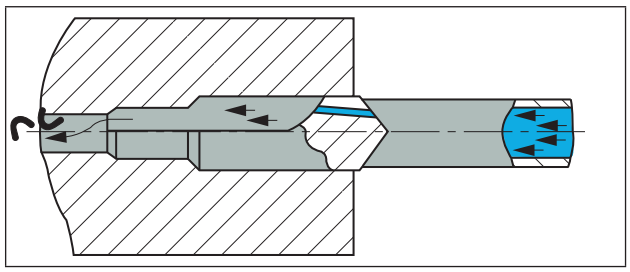
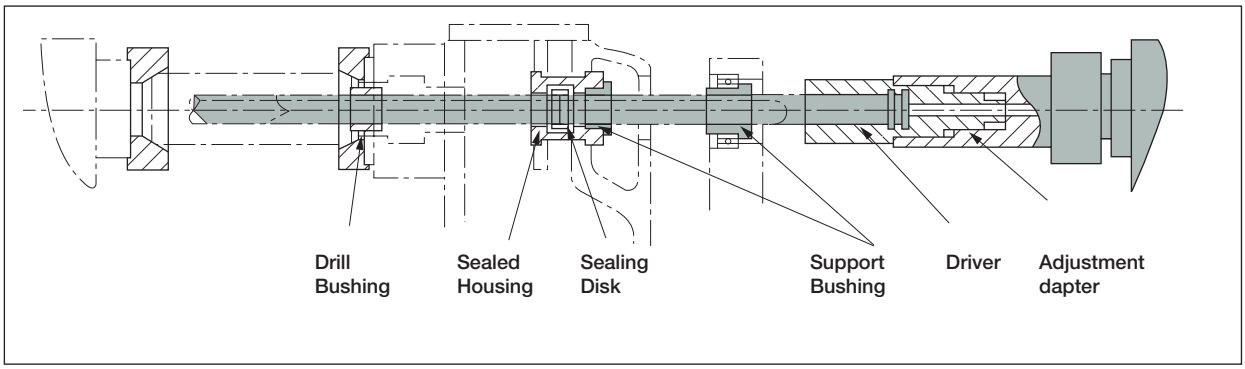


Figure 6

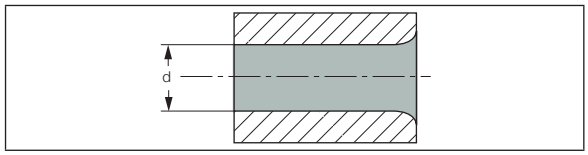
Boring with a staged tool chip evacuation and coolant flow in the boring direction

Deep Hole Machine Accessories



Bushing

Based on modified DIN 179 specify the “d” diameter of the drill. Carbide bushing is delivered only on request.



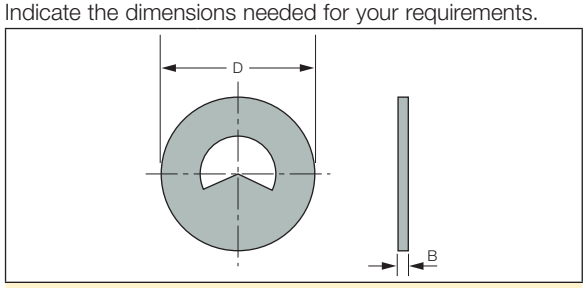
d = Drill diameter +0.02

Guide Bushings

As the gundrill is not a self-centering tool and its radial rigidity is low (due to diameter to length ratio), a guide bushing is an essential component for a proper gundrill operation. The function of the guide bushing is to direct the gundrill into the material during penetration. The diameter of the guide bushing should be within 20 microns larger than the diameter of the drill. Dedicated gundrill machines are equipped with a guide bushing system.

Sealing Disk

Supplied with a single sealing disk or a protection sheet. Indicate the dimensions needed for your requirements.

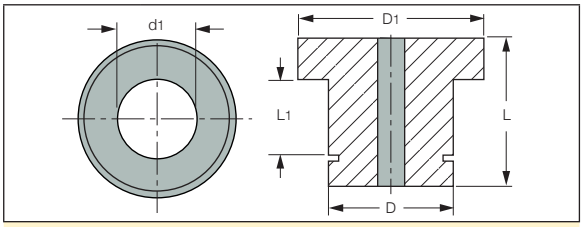


Sealing Disk		
Tool Ø “d”	**Ext. Ø “D”**	**Thick. “ B”**
2 to 6	20	3
3,1 to 15,559	32	4
15,6 to 25,999	40	4
26 to 40	90	4

Sealing Disk with Protection		
Tool Ø “d1”	**Ext. Ø “D”**	**Thick. “ B”**
2,9 - 5,249	20	7
5,25 - 14,449	32	11
14,45 - 25,999	40	12
26 - 41	90	12

Support Bushing

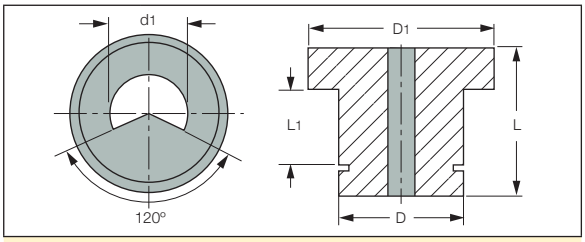
Indicate the “d” diameter of the drill



Support Bushing				
Tool Ø “d1”	**Ext. Ø “D”**	**Ext. Ø “D1”**	**Length “L”**	**Length “L1”**
1,9 - 16,399	20	26	20	12
1,9 - 25,999	30	38	26	16
1,9 - 34	45	50	26	16

Support Bushing with “V” Form

Indicate the “d” diameter of the drill



Support Bushing with “V” Form				
Tool Ø “d1”	**Ext. Ø “D”**	**Ext. Ø “D1”**	**Length “ L”**	**Length “ L1”**
1,9 - 16,399	20	26	20	12
1,9 - 23,799	30	38	26	16

Gundrill Troubleshooting Guide

Hole Problems	Poor clamping	Insufficient coolant flow	Low coolant pressure	Incorrect coolant type	Feed fluctuations	Too high feed	Too low feed	Spindle speed too high	Spindle speed too low	Material structure	Material shrinking due to heat	Workpiece thin wall section	Misalignment	Undersized hole	Rough cutting edge finish	Built up edge	Worn out edge	Interrupted chip flow	Too small flute clearance	Incorrect drill profile	Incorrect head angles	Vibrations	Oversized bushing	A gap between bushing and workpiece	Bushing undersize	Loss of coolant pressure	High coolant pressure	Overheating coolant	Insufficent coolant	Head inside angle excessive wear	Head outside angle excessive wear	Too short carbide head	Tool heal drag	Worn supporting pads
	Possible Causes																																	
Oversize	+	+				+							+			+		+		+	+	+	+	+			+		+	+		+	+	+
Undersize			+								+									+	+			+	+	+					+	+		
Rough surface finish		+	+	+	+	+			+		+			+		+	+	+		+	+	+		+		+		+	+	+	+	+	
Runout	+				+	+			+	+	+	+	+		+		+	+	+	+	+	+	+	+	+				+	+	+	+	+	+
Conical entrance						+															+	+	+	+		+								
Curved hole axis	+				+	+				+		+	+		+		+	+	+	+	+	+	+	+			+		+			+	+	

Drill Problems																																		
Breakage	+	+	+		+	+		+		+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+			+			+	+	+
Chipping					+		+			+					+		+		+		+	+										+		
Poor drill life		+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+
Excessive margin wear	+			+				+					+	+			+	+	+	+					+			+				+	+	
Excessive corner wear				+				+		+	+				+	+	+			+	+	+						+			+			+
Excessive flank wear		+		+		+		+					+	+				+	+		+			+	+			+				+	+	
Drill heat		+				+		+			+			+					+							+		+	+			+	+	+
Flute bending					+	+		+					+					+		+	+	+			+	+			+	+	+	+	+	+
Damaged wear pad				+				+		+	+		+	+				+	+	+		+			+	+		+	+	+		+	+	+
Built-up edge				+	+	+	+		+	+					+		+			+	+	+				+			+		+	+		
Cratering				+		+			+	+					+		+			+	+	+						+	+			+		+

Gundrill Recommended Machining Conditions

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material Group No.(1)	Cutting Speed v_c m/min	Feed (mm/rev) vs. Drill Diameter (mm)				
								2.0-9.79	9.8-11.69	11.7-13.19	13.2-16.19	16.2-40
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1	70-110	0.01-0.03	0.03-0.05	0.035-0.06	0.04-0.07	0.02-0.10
		>= 0.25 %C	Annealed	650	190	2	80-110					
		< 0.55 %C	Quenched and tempered	850	250	3	70-100					
		>= 0.55 %C	Annealed	750	220	4	70-110					
			Quenched and tempered	1000	300	5	70-90					
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	80-110	0.01-0.03	0.03-0.05	0.035-0.06	0.04-0.07	0.02-0.10
			Quenched and tempered	930	275	7	70-110					
				1000	300	8	60-90					
				1200	350	9	50-80					
	High alloyed steel, cast steel and tool steel		Annealed	680	200	10	50-70	0.01-0.03	0.025-0.04	0.03-0.045	0.035-0.05	0.12-0.10
			Quenched and tempered	1100	325	11	40-70	0.01-0.03	0.025-0.04	0.03-0.045	0.035-0.05	0.12-0.10
	Stainless steel and cast steel		Ferritic/ martensitic	680	200	12						
			Martensitic	820	240	13						
M	Stainless steel and cast steel		Austenitic, duplex	600	180	14	40-80	0.01-0.03	0.025-0.04	0.03-0.045	0.035-0.05	0.02-0.10
K	Grey cast iron (GG)		Ferritic/ pearlitic		180	15	70-100	0.01-0.40	0.04-0.1	0.05-0.12	0.06-0.14	0.05-0.20
			Pearlitic/ martensitic		260	16	70-100					
	Nodular cast iron (GGG)		Ferritic		160	17	80-110					
			Pearlitic		250	18	80-110					
	Malleable cast iron		Ferritic		130	19	90-115					
			Pearlitic		230	20	90-115					
N	Aluminum-wrought alloys		Not hardenable		60	21	80-160	0.02-0.04	0.03-0.17	0.03-0.18	0.035-0.19	0.03-0.15
			Hardenable		100	22						
	Aluminum-cast alloys	<=12% Si	Not hardenable		75	23						
			Hardenable		90	24						
		>12% Si	High temperature		130	25	80-120					
	Copper alloys	>1% Pb	Free cutting		110	26	80-180	0.02-0.04	0.02-0.13	0.03-0.16	0.04-0.18	0.03-0.15
			Brass		90	27						
			Electrolitic copper		100	28						
	Non-metallic		Duroplastics, fiber plastics			29						
			Hard rubber			30						
S	High temp. alloys	Fe based	Annealed		200	31	25-60	0.01-0.03	0.025-0.03	0.03-0.035	0.03-0.04	0.02-0.10
			Hardened		280	32						
		Ni or Co based	Annealed		250	33						
			Hardened		350	34						
			Cast		320	35						
	Titanium alloys		Pure	400		36						
			Alpha+beta alloys hardened	1050		37						
H	Hardened steel		Hardened		55 HRC	38	20-50	0.01-0.03	0.025-0.03	0.03-0.035	0.03-0.04	0.02-0.10
			Hardened		60 HRC	39						
	Chilled cast iron		Cast		400	40						
	Cast iron		Hardened		55 HRC	41						

(1) For workpiece materials list, see pages 495-524

HIGH PRECISION REAMING

Holder Designation Code Key

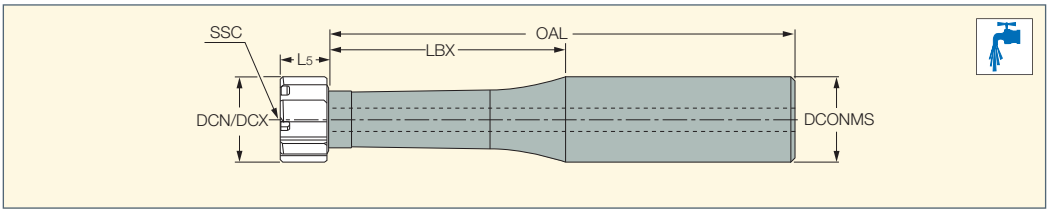
RM	-	BNT6	-	3D	-	16	-	C [1]	-	□ [2]
Reamer		Bayonet Tool Size		Functional Length		Shank Diameter		Shank Type		Shank Material

[1] C- cylindrical, W-Weldon, M-Morse
[2] No letter - Steel (default), C-Carbide, W- Heavy metal

BAYOT-REAM

RM-BNT (Shanks)

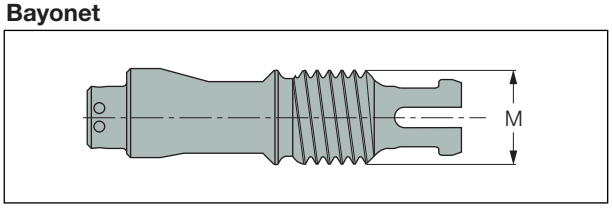
Shanks for BAYO T-REAM
Interchangeable Head Reamers



Designation	ULDR[1]	DCN[2]	DCX[3]	LBX	OAL	L5	DCONMS	SSC[4]		
RM-BNT5-1.5D-16C	1.5	11.501	13.500	20.3	68.25	9.50	16.00	BN5	RM-BN5-SR	RM-BN5-K
RM-BNT6-1.5D-16C	1.5	13.501	16.000	24.0	72.00	9.50	16.00	BN6	RM-BN6-SR	RM-BN6-K
RM-BNT7-1.5D-20C	1.5	16.001	20.000	30.0	80.00	10.70	20.00	BN7	RM-BN7-SR	RM-BN7-K
RM-BNT8-1.5D-20C	1.5	20.001	25.400	38.1	88.10	12.90	20.00	BN8	RM-BN8-SR	RM-BN8-K
RM-BNT9-1.5D-25C	1.5	25.401	32.000	48.0	104.00	12.90	25.00	BN9	RM-BN9-SR	RM-BN9-K
RM-BNT9-1.5D-32C	1.5	25.401	32.000	48.0	108.00	12.90	32.00	BN9	RM-BN9-SR	RM-BN9-K
RM-BNT5-3D-16C	3.0	11.501	13.500	40.5	88.50	9.50	16.00	BN5	RM-BN5-SR	RM-BN5-K
RM-BNT6-3D-16C	3.0	13.501	16.000	48.0	96.00	9.50	16.00	BN6	RM-BN6-SR	RM-BN6-K
RM-BNT7-3D-20C	3.0	16.001	20.000	60.0	110.00	10.70	20.00	BN7	RM-BN7-SR	RM-BN7-K
RM-BNT8-3D-20C	3.0	20.001	25.400	75.0	125.00	12.90	20.00	BN8	RM-BN8-SR	RM-BN8-K
RM-BNT9-3D-25C	3.0	25.401	32.000	94.2	150.20	12.90	25.00	BN9	RM-BN9-SR	RM-BN9-K
RM-BNT9-3D-32C	3.0	25.401	32.000	94.2	154.20	12.90	32.00	BN9	RM-BN9-SR	RM-BN9-K
RM-BNT5-5D-16C	5.0	11.501	13.500	67.7	115.70	9.50	16.00	BN5	RM-BN5-SR	RM-BN5-K
RM-BNT6-5D-16C	5.0	13.501	16.000	80.0	128.00	9.50	16.00	BN6	RM-BN6-SR	RM-BN6-K
RM-BNT7-5D-20C	5.0	16.001	20.000	100.0	150.00	10.70	20.00	BN7	RM-BN7-SR	RM-BN7-K
RM-BNT8-5D-20C	5.0	20.001	25.400	125.0	175.00	12.90	20.00	BN8	RM-BN8-SR	RM-BN8-K
RM-BNT9-5D-32C	5.0	25.401	32.000	158.2	218.20	12.90	32.00	BN9	RM-BN9-SR	RM-BN9-K
RM-BNT5-8D-16C	8.0	11.501	13.500	108.2	156.20	9.50	16.00	BN5	RM-BN5-SR	RM-BN5-K
RM-BNT6-8D-16C	8.0	13.501	16.000	128.0	176.00	9.50	16.00	BN6	RM-BN6-SR	RM-BN6-K
RM-BNT7-8D-20C	8.0	16.001	20.000	160.0	210.00	10.70	20.00	BN7	RM-BN7-SR	RM-BN7-K
RM-BNT8-8D-20C	8.0	20.001	25.400	200.0	250.00	12.90	20.00	BN8	RM-BN8-SR	RM-BN8-K
RM-BNT9-8D-32C	8.0	25.401	32.000	254.2	314.20	12.90	32.00	BN9	RM-BN9-SR	RM-BN9-K

[1] Usable length diameter ratio
[2] Reamer min. diameter
[3] Reamer max. diameter
[4] Connection size

Bayonet



Designation	Head Diameter	Bayonet Size	M
RM-BN5-SR	11.501-13.500	BN5	M5
RM-BN6-SR	13.501-16.000	BN6	M6
RM-BN7-SR	16.001-20.000	BN7	M7
RM-BN8-SR	20.001-25.400	BN8	M8
RM-BN9-SR	25.401-32.000	BN9	M9

Clamping

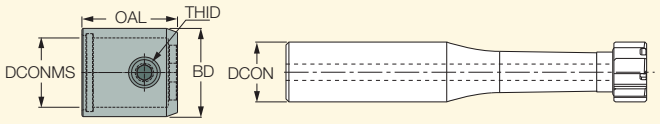
Designation	Head Diameter	Bayonet Size
RM-BN5-K	11.501-13.500	BN5
RM-BN6-K	13.501-16.000	BN6
RM-BN7-K	16.001-20.000	BN7
RM-BN8-K	20.001-25.400	BN8
RM-BN9-K	25.401-32.000	BN9

Accessories

BAYOT-REAM

RM-BN-RC-RING

Runout Adjustment Rings for
RM-BNT Reamer Holders



Designation	BD	OAL	DCONMS	THID	SS[1]	DCON[2]	
RM-BN5-RC-RING	20.00	20.00	16.20	M5x0.5	RM-BNT5	16.00	RM-BN5-RC-SR
RM-BN6-RC-RING	20.00	22.00	16.20	M6x0.5	RM-BNT6	16.00	RM-BN6-RC-SR
RM-BN7-RC-RING	24.00	26.00	20.20	M8x0.5	RM-BNT7	20.00	RM-BN7/8/9-RC-SR
RM-BN8-RC-RING	27.00	33.00	20.20	M8x0.5	RM-BNT8	20.00	RM-BN7/8/9-RC-SR
RM-BN9-RC-RING	39.00	35.00	32.20	M8x0.5	RM-BNT9	32.00	RM-BN7/8/9-RC-SR

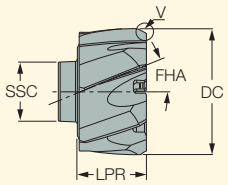
(1) Reamer bayonet size

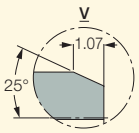
(2) RM-BNT reamer holder shank size

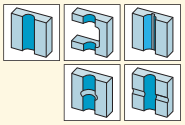
BAYOT-REAM

RM-BN-H7LB

Quick Change Left-Hand Flute Interchangeable Solid Carbide Reaming Heads for High Speed Reaming of Through Holes







Designation	Dimensions					Tough ↔ Hard	
	SSC[2]	DC	LPR	NOF[3]	FHA	IC08	IC908
RM-BN5-11.501-H7LB	BN5	11.501	9.50	6	20.0	•	•
RM-BN5-12.000-H7LB	BN5	12.000	9.50	6	20.0	•	•
RM-BN5-13.000-H7LB	BN5	13.000	9.50	6	20.0	•	•
RM-BN5-13.500-H7LB	BN5	13.500	9.50	6	20.0	•	•
RM-BN6-13.501-H7LB	BN6	13.501	9.50	6	20.0	•	•
RM-BN6-14.000-H7LB	BN6	14.000	9.50	6	20.0	•	•
RM-BN6-15.000-H7LB	BN6	15.000	9.50	6	20.0	•	•
RM-BN6-16.000-H7LB	BN6	16.000	9.50	6	20.0	•	•
RM-BN7-16.001-H7LB	BN7	16.001	10.70	6	20.0	•	•
RM-BN7-17.000-H7LB	BN7	17.000	10.70	6	20.0	•	•
RM-BN7-18.000-H7LB	BN7	18.000	10.70	6	20.0	•	•
RM-BN7-19.000-H7LB	BN7	19.000	10.70	6	20.0	•	•
RM-BN7-20.000-H7LB	BN7	20.000	10.70	6	20.0	•	•
RM-BN8-20.001-H7LB	BN8	20.001	12.90	8	20.0	•	•
RM-BN8-21.000-H7LB	BN8	21.000	12.90	8	20.0	•	•
RM-BN8-22.000-H7LB	BN8	22.000	10.90	8	20.0	•	•
RM-BN8-23.000-H7LB	BN8	23.000	12.90	8	20.0	•	•
RM-BN8-24.000-H7LB	BN8	24.000	12.90	8	20.0	•	•
RM-BN8-25.000-H7LB	BN8	25.000	12.90	8	20.0	•	•
RM-BN9-26.000-H7LB [1]	BN9	26.000	12.90	8	20.0		•
RM-BN9-27.000-H7LB [1]	BN9	27.000	12.90	8	20.0		•
RM-BN9-28.000-H7LB [1]	BN9	28.000	12.90	8	20.0		•
RM-BN9-29.000-H7LB [1]	BN9	29.000	12.90	8	20.0		•
RM-BN9-30.000-H7LB [1]	BN9	30.000	12.90	8	20.0		•
RM-BN9-31.000-H7LB [1]	BN9	31.000	12.90	8	20.0		•
RM-BN9-32.000-H7LB [1]	BN9	32.000	12.90	8	20.0		•

• For user guide, see pages 316-321

[1] The uncoated fine grain IC08 is available on request

[2] Seat size code

[3] Number of flutes

Complementary Grades (on request):

IC30N cermet tipped, recommended for reaming the following materials: non-alloyed (mild) steel,low alloyed steel (<5% of alloying elements), free cutting steel, tempered steel (tensile strength <1100 N/mm^2) and nodular iron (GGG40, GGG60, etc.)

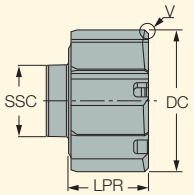
ID5 (PCD) recommended for high speed reaming of aluminum (special cases).

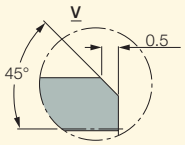
RN01 (DLC coating) recommended for reaming the following materials: aluminum alloys (cast, wrought, etc.), brass, bronze and other nonferrous materials.

BAYOT-REAM

RM-BN-H7SA

Quick Change Straight Flute Interchangeable Solid Carbide Reaming Heads for High Speed Reaming of Blind Holes





Designation	Dimensions				Tough ↔ Hard	
	SSC(2)	DC	LPR	NOF(3)	IC08	IC908
RM-BN5-11.501-H7SA	BN5	11.501	9.50	6	●	●
RM-BN5-12.000-H7SA	BN5	12.000	9.50	6	●	●
RM-BN5-13.000-H7SA	BN5	13.000	9.50	6	●	●
RM-BN5-13.500-H7SA	BN5	13.500	9.50	6	●	●
RM-BN6-13.501-H7SA	BN6	13.501	9.50	6	●	●
RM-BN6-14.000-H7SA	BN6	14.000	9.50	6	●	●
RM-BN6-15.000-H7SA	BN6	15.000	9.50	6	●	●
RM-BN6-16.000-H7SA	BN6	16.000	9.50	6	●	●
RM-BN7-16.001-H7SA	BN7	16.001	10.70	6	●	●
RM-BN7-17.000-H7SA	BN7	17.000	10.70	6	●	●
RM-BN7-18.000-H7SA	BN7	18.000	10.70	6	●	●
RM-BN7-19.000-H7SA	BN7	19.000	10.70	6	●	●
RM-BN7-20.000-H7SA	BN7	20.000	10.70	6	●	●
RM-BN8-20.001-H7SA	BN8	20.001	12.90	8	●	●
RM-BN8-21.000-H7SA	BN8	21.000	12.90	8	●	●
RM-BN8-22.000-H7SA	BN8	22.000	12.90	8	●	●
RM-BN8-23.000-H7SA	BN8	23.000	12.90	8		●
RM-BN8-24.000-H7SA	BN8	24.000	12.90	8	●	●
RM-BN8-25.000-H7SA	BN8	25.000	12.90	8	●	●
RM-BN9-26.000-H7SA	BN9	26.000	12.90	8	●	●
RM-BN9-27.000-H7SA (1)	BN9	27.000	12.90	8		●
RM-BN9-28.000-H7SA (1)	BN9	28.000	12.90	8		●
RM-BN9-29.000-H7SA (1)	BN9	29.000	12.90	8		●
RM-BN9-30.000-H7SA (1)	BN9	30.000	12.90	8		●
RM-BN9-31.000-H7SA (1)	BN9	31.000	12.90	8		●
RM-BN9-32.000-H7SA (1)	BN9	32.000	12.90	8		●

• For user guide, see pages 316-321

(1) The uncoated fine grain IC08 is available on request

(2) Seat size code

(3) Number of flutes

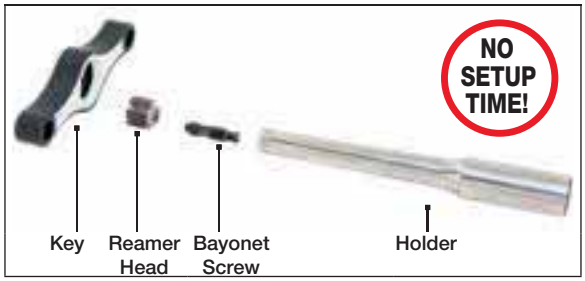
Complementary Grades (on request):

IC30N cermet tipped, recommended for reaming the following materials: non-alloyed (mild) steel,low alloyed steel (<5% of alloying elements), free cutting steel, tempered steel (tensile strength <1100 N/mm^2) and nodular iron (GGG40, GGG60, etc.)

ID5 (PCD) recommended for high speed reaming of aluminum (special cases).
RN01 (DLC coating) recommended for reaming the following materials: aluminum alloys (cast, wrought, etc.), brass, bronze and other nonferrous materials.

The BAYO T-REAM Line is Available in 5 Sizes

Each size has its own diameter range and holder.
For example:
The same RM-BN7 holder can hold any head between Ø16.001–20.000 mm



RM-BN9	RM-BN8	RM-BN7	RM-BN6	RM-BN5
				
Ø25.401-32.000 mm	Ø20.001-25.400 mm	Ø16.001-20.000 mm	Ø13.501-16.000 mm	Ø11.500-13.500 mm

Through Hole	Blind Hole
	
	
Left-Hand Flute The left-hand spiral is designed especially for through hole reaming. Due to this design, the chips are being pushed forward immediately after formation.	**Straight Flute** The coolant flow assists the chip evacuation process. It directs the just-formed chips backwards. The chips pass through the straight flutes and are thrown out of the hole, without causing any damage to the reamer or hole surface.

ATTENTION: Cutting tools can break during use.
To avoid injury always use safety precautions
such as gloves, shields and eye protection.

Assembly Instructions (BN5-BN9)

First Assembly

- Clean the toolholder pocket (Fig. 1)
- Clean the reamer head clamping cone
- Insert the clamping screw into the holder and rotate it 2-3 turns in a clockwise direction (Fig. 2)
- Clamp the reaming head on the screw; note, BN8 and BN9 can be assembled only in a specific position relative to the screw (rotate the head until locating the correct position) (Fig. 3)
- Manually rotate the reaming head until it sits firmly in the pocket
- Tighten with the special key (Fig. 4)
- Make sure there is no face gap between the toolholder and the reaming head (Fig. 5)

Indexing

- Release the reaming head with the key, turning in a counterclockwise direction until it rotates freely
- Rotate another one turn by hand
- Remove the reamer head from the tool; the clamping screw should remain inside!!!
- Clean the pocket of the toolholder (Fig. 1)
- Clean the cone on the new reamer head
- Clamp the reaming head on the screw; note, BN8 and BN9 can be assembled only in a specific position relative to the screw (rotate the head until locating the correct position) (Fig. 3)
- Manually rotate the reaming head. In the beginning it should rotate without the screw and then (after 1/6 of a turn) it should engage with the screw. Rotate until it sits firmly in the pocket. If the screw rotates together with the reaming head from the beginning, remove the reaming head and open the screw another one turn.
- Tighten with the special key (Fig. 4)
- Make sure that there is no face gap between the toolholder and the reaming head (Fig. 5)

1

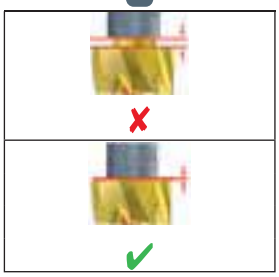
2

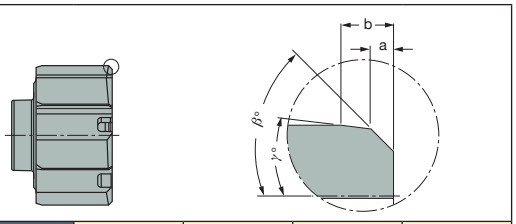
3

4

BN9: 21-23 N*m
BN8: 17-20 N*m
BN7: 13-15 N*m
BN6: 8-10 N*m
BN5: 7-8 N*m

5





Lead Code / Parameter	β°	a [mm]	g°	b [mm]
A	45°	0.5	-	-
B	25°	1.07	-	-
C	45°	0.5	8°	0.75
D	30°	0.5	4°	1.85
E	45°	0.2	-	-
F	90°	-	-	-
G	75°	0.15	-	-
X	Specially Tailored (undesignated)			

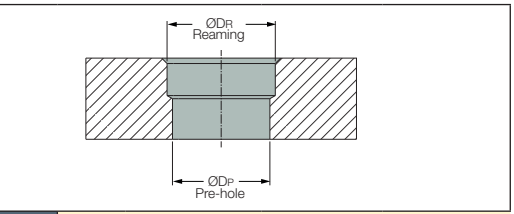
When choosing a reamer, it is important to select a lead geometry that covers the reaming allowance.

Reaming Allowance

Reaming allowance is the stock material which should be removed by reaming. It is recommended to leave different reaming allowances depending on the workpiece material and the pre-hole quality. Pre-hole should be smooth and straight, without deep scratches on it.

Complementary Grades (on request):

IC30N cermet tipped, recommended for reaming the following materials: non-alloyed (mild) steel, low alloyed steel (<5% of alloying elements), free cutting steel, tempered steel (tensile strength <1100 N/mm^2) and nodular iron (GGG40, GGG60, etc.) ID5 (PCD) recommended for high speed reaming of aluminum (special cases). RN01 (DLC coating) recommended for reaming the following materials: aluminum alloys (cast, wrought, etc.), brass, bronze and other nonferrous materials.



Material	Hole Ø mm						
	< 9.5	9.5 - 11.5	11.5 - 13.5	13.5 - 16	16 - 32	>32	
Steel and Cast Iron	0.07-0.10	0.07-0.15	0.10-0.20	0.10-0.30	0.10-0.30	0.20-0.40	mm/Ø
Aluminum and Brass	0.07-0.10	0.10-0.15	0.15-0.25	0.20-0.30	0.20-0.40	0.20-0.50	mm/Ø

Δ - Reaming allowance — Δ = ØDR - ØDP

Recommeded Cutting Conditions for BAYO T-REAM High Speed Reaming Heads

ISO	Material	Condition	Material No.(1)	Through Hole				Interrupted Through Hole			
				First Choice		Second Choice		First Choice		Second Choice	
P	Non-alloy steel and cast steel, free cutting steel	Annealed	1	IC908	LB	IC30N	LA	IC908	LB	IC908	SA
		Annealed	2	V_c = 80 - 200		V_c = 90 - 240		V_c = 60 - 120		V_c = 60 - 120	
		Quenched & tempered	3	BN4 - BN6	f_z = 0.08 - 0.21	BN4 - BN6	f_z = 0.08 - 0.21	BN4 - BN6	f_z = 0.06 - 0.18	BN4 - BN6	f_z = 0.05 - 0.15
		Annealed	4								
		Quenched & tempered	5	BN7 - BN9	f_z = 0.12 - 0.27	BN7 - BN9	f_z = 0.12 - 0.27	BN7 - BN9	f_z = 0.09 - 0.21	BN7 - BN9	f_z = 0.07 - 0.16
	Low alloy and cast steel (less than 5% of alloying elements)	Annealed	6	IC908	LB	IC30N	LA	IC908	LB	IC908	SA
			7	V_c = 80 - 200		V_c = 90 - 240		V_c = 60 - 120		V_c = 60 - 120	
		Quenched & tempered	8	BN4 - BN6	f_z = 0.08 - 0.21	BN4 - BN6	f_z = 0.08 - 0.21	BN4 - BN6	f_z = 0.06 - 0.18	BN4 - BN6	f_z = 0.05 - 0.15
			9	BN7 - BN9	f_z = 0.12 - 0.27	BN7 - BN9	f_z = 0.12 - 0.27	BN7 - BN9	f_z = 0.09 - 0.21	BN7 - BN9	f_z = 0.07 - 0.16
	High alloyed steel, cast steel and tool steel	Annealed	10	IC908	LB	IC908	SA	IC908	LB	IC908	SA
				V_c = 20 - 60		V_c = 20 - 60		V_c = 20 - 60		V_c = 20 - 60	
		Quenched & tempered	11	BN4 - BN6	f_z = 0.05 - 0.13	BN4 - BN6	f_z = 0.04 - 0.11	BN4 - BN6	f_z = 0.04 - 0.11	BN4 - BN6	f_z = 0.03 - 0.09
				BN7 - BN9	f_z = 0.07 - 0.17	BN7 - BN9	f_z = 0.06 - 0.14	BN7 - BN9	f_z = 0.05 - 0.14	BN7 - BN9	f_z = 0.04 - 0.11
	Stainless steel	Ferritic / martensitic	12	IC908	LB	IC908	SA	IC908	LB	IC908	SA
				V_c = 20 - 40		V_c = 20 - 40		V_c = 20 - 40		V_c = 20 - 40	
		Martensitic	13	BN4 - BN6	f_z = 0.05 - 0.13	BN4 - BN6	f_z = 0.04 - 0.11	BN4 - BN6	f_z = 0.04 - 0.11	BN4 - BN6	f_z = 0.03 - 0.09
M	Stainless steel	Austentic	14	BN7 - BN9	f_z = 0.07 - 0.17	BN7 - BN9	f_z = 0.06 - 0.14	BN7 - BN9	f_z = 0.05 - 0.14	BN7 - BN9	f_z = 0.04 - 0.11
K	Grey iron (GG)	Ferritic	15	IC908	LB	IC908	SA	IC908	LB	IC908	SA
				V_c = 120 - 220		V_c = 120 - 220		V_c = 80 - 200		V_c = 80 - 200	
		Pearlitic	16	BN4 - BN6	f_z = 0.08 - 0.18	BN4 - BN6	f_z = 0.08 - 0.16	BN4 - BN6	f_z = 0.05 - 0.13	BN4 - BN6	f_z = 0.05 - 0.13
				BN7 - BN9	f_z = 0.10 - 0.24	BN7 - BN9	f_z = 0.10 - 0.22	BN7 - BN9	f_z = 0.07 - 0.17	BN7 - BN9	f_z = 0.07 - 0.17
	Nodular iron (GGG)	Pearlitic / ferritic	17	IC908	SA or LB	IC30N	LA	IC908	LB	IC908	SA
				V_c = 160 - 280		V_c = 160 - 300		V_c = 150 - 250		V_c = 150 - 250	
		Pearlitic / martensitic	18	BN4 - BN6	f_z = 0.11 - 0.20	BN4 - BN6	f_z = 0.11 - 0.20	BN4 - BN6	f_z = 0.06 - 0.15	BN4 - BN6	f_z = 0.06 - 0.15
				BN7 - BN9	f_z = 0.11 - 0.24	BN7 - BN9	f_z = 0.11 - 0.24	BN7 - BN9	f_z = 0.08 - 0.19	BN7 - BN9	f_z = 0.08 - 0.19
	Malleable iron, Nodular iron ferritic / pearlitic	Ferritic	19	IC908	SA or LB	IC30N	LA or SA	IC908	LB	IC908	SA
				V_c = 100 - 220		V_c = 100 - 240		V_c = 100 - 220		V_c = 100 - 220	
		Pearlitic	20	BN4 - BN6	f_z = 0.11 - 0.20	BN4 - BN6	f_z = 0.11 - 0.20	BN4 - BN6	f_z = 0.06 - 0.15	BN4 - BN6	f_z = 0.06 - 0.15
				BN7 - BN9	f_z = 0.11 - 0.24	BN7 - BN9	f_z = 0.11 - 0.24	BN7 - BN9	f_z = 0.08 - 0.20	BN7 - BN9	f_z = 0.08 - 0.19
N	Aluminum wrought alloy	Not cureable	21	RN01	LG or SG	ID5	SG	RN01	LG	ID5	SG
		Cured	22	V_c = 150 - 400		V_c = 200 - 500		V_c = 150 - 350		V_c = 200 - 500	
	Aluminum - cast, alloyed	Not cureable	23								
		Cured	24	BN4 - BN6	f_z = 0.08 - 0.16	BN4 - BN6	f_z = 0.08 - 0.2	BN4 - BN6	f_z = 0.08 - 0.16	BN4 - BN6	f_z = 0.08 - 0.2
		High temperature	25	BN7 - BN9	f_z = 0.10 - 0.20	BN7 - BN9	f_z = 0.11 - 0.24	BN7 - BN9	f_z = 0.10 - 0.20	BN7 - BN9	f_z = 0.11 - 0.24
	Copper alloys Brass, bronze	Free cutting	26	IC30N	SA or SG	IC08	SG or SA	IC08	SG or SA		
				V_c = 180 - 240		V_c = 30 - 100		V_c = 30 - 100			
		Brass	27	BN4 - BN6	f_z = 0.05 - 0.16	BN4 - BN6	f_z = 0.04 - 0.13	BN4 - BN6	f_z = 0.04 - 0.13		
		Electrolitic copper	28	BN7 - BN9	f_z = 0.04 - 0.20	BN7 - BN9	f_z = 0.05 - 0.16	BN7 - BN9	f_z = 0.05 - 0.16		
	Non-metallic	Duroplastics, fiber plastics	29	IC908	SA	IC908	LB	IC908	SA	IC908	LB
				V_c = 25 - 80		V_c = 25 - 80		V_c = 25 - 80		V_c = 25 - 80	
		Hard rubber	30	BN4 - BN6	f_z = 0.05 - 0.10	BN4 - BN6	f_z = 0.05 - 0.12	BN4 - BN6	f_z = 0.05 - 0.10	BN4 - BN6	f_z = 0.05 - 0.12
				BN7 - BN9	f_z = 0.10 - 0.20	BN7 - BN9	f_z = 0.10 - 0.23	BN7 - BN9	f_z = 0.10 - 0.20	BN7 - BN9	f_z = 0.10 - 0.23
S	* High temp. alloys	Annealed	31	IC908	L *	IC908	S*	IC908	L*	IC908	S*
		Cured	32	V_c = 15 - 50		V_c = 15 - 50		V_c = 15 - 50		V_c = 15 - 50	
		Annealed	33								
		Cured	34	BN4 - BN6	f_z = 0.04 - 0.10	BN4 - BN6	f_z = 0.04 - 0.10	BN4 - BN6	f_z = 0.03 - 0.08	BN4 - BN6	f_z = 0.03 - 0.08
		Cast	35								
				BN7 - BN9	f_z = 0.05 - 0.13	BN7 - BN9	f_z = 0.05 - 0.13	BN7 - BN9	f_z = 0.04 - 0.11	BN7 - BN9	f_z = 0.04 - 0.11
H	Hardened steel	Hardened	38	IC908	LB	IC908	SA	IC908	LB	IC908	SA
		Hardened	39	V_c = 25 - 50		V_c = 25 - 50		V_c = 25 - 50		V_c = 25 - 50	
		Cast	40	BN4 - BN6	f_z = 0.06 - 0.15	BN4 - BN6	f_z = 0.05 - 0.13	BN4 - BN6	f_z = 0.06 - 0.15	BN4 - BN6	f_z = 0.05 - 0.13
		Hardened	41	BN7 - BN9	f_z = 0.10 - 0.20	BN7 - BN9	f_z = 0.10 - 0.20	BN7 - BN9	f_z = 0.10 - 0.20	BN7 - BN9	f_z = 0.10 - 0.20

* Standard edge geometries are not suitable for reaming titanium and high temperature alloys. In order to choose a proper geometry, please ask for our recommendations.

- The given cutting data recommendations refer to the short holders (3xD effective reaming overhang). For longer holders, the cutting speed should be reduced proportionally.
- For relatively large leading angles (spot-facing geometries), the feed should be reduced up to 30%.
- All the given cutting data recommendations refer to the machines with spindle through coolant supply.

(1) For workpiece materials list, see pages 495-524

Material No.	Blind Hole				Interrupted Blind Hole				IC08	
	First Choice		Second Choice		First Choice		Second Choice		Through Hole - LB Blind Hole - SA	
1	IC908	SA	IC30N	SA	IC908	SA			V_c = 6 - 10	
2	V_c = 60-160		V_c = 90 - 200		V_c = 60 - 120					
3	BN_4 - BN6	f_z = 0.06 - 0.18	BN_4 - BN6	f_z = 0.06 - 0.18	BN_4 - BN6	f_z = 0.05 - 0.15			BN_4 - BN6	f_z = 0.05 - 0.17
4										
5	BN7 - BN9	f_z = 0.08 - 0.20	BN7 - BN9	f_z = 0.08 - 0.21	BN7 - BN9	f_z = 0.07 - 0.16			BN7 - BN9	f_z = 0.07 - 0.20
6	IC908	SA	IC30N	SA	IC908	SA			V_c = 6 - 10	
7	V_c = 60-160		V_c = 90 - 200		V_c = 60 - 120					
8	BN_4 - BN6	f_z = 0.06 - 0.18	BN_4 - BN6	f_z = 0.06 - 0.18	BN_4 - BN6	f_z = 0.05 - 0.15			BN_4 - BN6	f_z = 0.05 - 0.17
9	BN7 - BN9	f_z = 0.08 - 0.20	BN7 - BN9	f_z = 0.08 - 0.21	BN7 - BN9	f_z = 0.07 - 0.16			BN7 - BN9	f_z = 0.07 - 0.20
10	IC908	SA			IC908	SA			V_c = 6 - 10	
	V_c = 20 - 60				V_c = 20 - 60					
11	BN_4 - BN6	f_z = 0.04 - 0.10			BN_4 - BN6	f_z = 0.03 - 0.08			BN_4 - BN6	f_z = 0.03 - 0.08
	BN7 - BN9	f_z = 0.05 - 0.13			BN7 - BN9	f_z = 0.04 - 0.10			BN7 - BN9	f_z = 0.05 - 0.10
12	IC908	SA			IC908	SA			V_c = 4 - 8	
	V_c = 20 - 40				V_c = 20 - 40					
13	BN_4 - BN6	f_z = 0.04 - 0.10			BN_4 - BN6	f_z = 0.03 - 0.08			BN_4 - BN6	f_z = 0.03 - 0.08
14	BN7 - BN9	f_z = 0.05 - 0.13			BN7 - BN9	f_z = 0.05 - 0.10			BN7 - BN9	f_z = 0.05 - 0.10
15	IC908	SA			IC908	SA			V_c = 8 - 20	
	V_c = 80 - 200				V_c = 60 - 120					
16	BN_4 - BN6	f_z = 0.06 - 0.18			BN_4 - BN6	f_z = 0.05 - 0.13			BN_4 - BN6	f_z = 0.08 - 0.16
	BN7 - BN9	f_z = 0.08 - 0.23			BN7 - BN9	f_z = 0.08 - 0.18			BN7 - BN9	f_z = 0.10 - 0.20
17	IC908	SA	IC30N	SA	IC908	SA			V_c = 9 - 20	
	V_c = 160 - 280		V_c = 160 - 280		V_c = 160 - 240					
18	BN_4 - BN6	f_z = 0.06 - 0.18	BN_4 - BN6	f_z = 0.06 - 0.18	BN_4 - BN6	f_z = 0.06 - 0.16			BN_4 - BN6	f_z = 0.06 - 0.16
	BN7 - BN9	f_z = 0.08 - 0.23	BN7 - BN9	f_z = 0.08 - 0.24	BN7 - BN9	f_z = 0.08 - 0.18			BN7 - BN9	f_z = 0.08 - 0.20
19	IC908	SA	IC30N	SA	IC908	SA			V_c = 10 - 20	
	V_c = 100 - 220		V_c = 100 - 240		V_c = 100 - 220					
20	BN_4 - BN6	f_z = 0.06 - 0.18	BN_4 - BN6	f_z = 0.06 - 0.18	BN_4 - BN6	f_z = 0.05 - 0.15			BN_4 - BN6	f_z = 0.05 - 0.15
	BN7 - BN9	f_z = 0.08 - 0.23	BN7 - BN9	f_z = 0.08 - 0.23	BN7 - BN9	f_z = 0.08 - 0.20			BN7 - BN9	f_z = 0.08 - 0.15
21	RN01	SG or SA	ID5	SG or SA	RN01	SG or SA	ID5	SG or SA	V_c = 10 - 30	
22	V_c = 150 - 400		V_c = 200 - 400		V_c = 150 - 300		V_c = 200 - 400			
23										
24	BN_4 - BN6	f_z = 0.08 - 0.16	BN_4 - BN6	f_z = 0.08 - 0.16	BN_4 - BN6	f_z = 0.07 - 0.15	BN_4 - BN6	f_z = 0.08 - 0.16	BN_4 - BN6	f_z = 0.05 - 0.12
25	BN7 - BN9	f_z = 0.11 - 0.20	BN7 - BN9	f_z = 0.11 - 0.24	BN7 - BN9	f_z = 0.11 - 0.20	BN7 - BN9	f_z = 0.11- 0.24	BN7 - BN9	f_z = 0.08 - 0.15
26	IC30N	SG or SA	IC08	SG or SA	IC08	SG or SA			V_c = 30 - 100	
	V_c = 180 - 240		V_c = 30 - 100		V_c = 30 - 100					
27	BN_4 - BN6	f_z = 0.05 - 0.16	BN_4 - BN6	f_z = 0.04 - 0.13	BN_4 - BN6	f_z = 0.04 - 0.13			BN_4 - BN6	f_z = 0.04 - 0.13
28	BN7 - BN9	f_z = 0.05 - 0.21	BN7 - BN9	f_z = 0.05 - 0.16	BN7 - BN9	f_z = 0.05 - 0.16			BN7 - BN9	f_z = 0.05 - 0.16
29	IC908	SA			IC908	SA			V_c = 10 - 20	
	V_c = 25 - 80				V_c = 25 - 80					
30	BN_4 - BN6	f_z = 0.05 - 0.10			BN_4 - BN6	f_z = 0.05 - 0.10			BN_4 - BN6	f_z = 0.05 - 0.12
	BN7 - BN9	f_z = 0.10 - 0.20			BN7 - BN9	f_z = 0.10 - 0.20			BN7 - BN9	f_z = 0.08 - 0.16
31	IC908	S*			IC908	S*				
32	V_c = 15 - 50				V_c = 15 - 50					
33										
34	BN_4 - BN6	f_z = 0.03 - 0.08			BN_4 - BN6	f_z = 0.03 - 0.08				
35										
—	BN7 - BN9	f_z = 0.04 - 0.11			BN7 - BN9	f_z = 0.04 - 0.11				
38	IC908	SA			IC908	SA				
39	V_c = 25 - 50				V_c = 25 - 50					
40	BN_4 - BN6	f_z = 0.05 - 0.13			BN_4 - BN6	f_z = 0.05 - 0.13				
41	BN7 - BN9	f_z = 0.10 - 0.20			BN7 - BN9	f_z = 0.10 - 0.20				

Legend:

Grade	→	**LB**	**IC908**
Cutting speed [m/min]	→	**V_c = 10 - 20**	
BAYO T-REAM head size	→	**f_z = 0.04 - 0.15**	**BN4-BN6**
		f_z = 0.05 - 0.20	**BN7-BN9**

Cutting geometry ←
Feed [mm/tooth] ←

Problem			Solutions	Cutting Data/ Allowance			Tool; Toolholder						Workpiece	Machine			Machining Process			
				Feed fZ	Spindle speed min^{-1}	Diameter allowance	Geometry angle	Runout maximum 5µm	Wear check / Change insert	Optimize tool length and diameter	Floating chuck GFIS	ADJ chuck FineFit/RC RING	Workpiece fixture / Pressure	Coolant mixture	Coolant pressure	Angle error / Centic error / Axis deviation	Spindle speed on entry	Entry geomerty / Chamfer / Oblique surface at entry	Feed in and out same	Chip evacuation
Hole too large		Vibration		●			●						●	●	●		●	●		
		Runout error						●			●	●								
		Built up edge		●	●	●			●								●			
		Diameter allowance				●														●
Hole too small		Tool wear							●				● ●	● ●	● ●			●		
		Compression of material					●		●				● ●					●	●	
		Compression of clamping				●	●													
		Diameter allowance				●														
Tapered hole		Deformation by clamping				●							● ●							
		Unequal wall thickness				●	●													
		Machine						●		●	●	●				●				
		Chip flow												●	●					●
Hole shows chatter marks		Vibration		●	●	●	●		●	●			●	●	●		●	●		
		Rumout error						●		●	●	●				●				
Insufficient surface		Vibration		●	●		●		●	●			●	●			●	●		
		Built up edge		●	●				●					●	●					
		Runout error						●			●	●								
		Cutting geometry							●	●										●
		Machine											●	●		●				

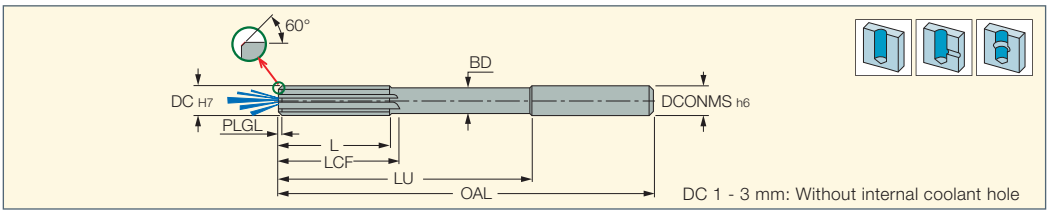
Problem			Solutions	Cutting Data/ Allowance			Tool; Toolholder						Workpiece	Machine			Machining Process			
				Feed fZ	Spindle speed min^{-1}	Diameter allowance	Geometry angle	Runout maximum 5µm	Wear check / Change insert	Optimize tool length and diameter	Floating chuck GFIS	ADJ chuck FineFit/RC RING	Workpiece fixture / Pressure	Coolant mixture	Coolant pressure	Angle error / Centic error / Axis deviation	Spindle speed on entry	Entry geomerty / Chamfer / Oblique surface at entry	Feed in and out same	Chip evacuation
Retraction marks		Built up edge		●	●			●	●	●	●	●		●		●		●		
		Compression of material				●	●		●	●	●	●	●					●	●	
		Compression of clamping																		
Slight defect in shape / noncircular hole		Tool wear				●			●											●
		Chip flow				●								●	●					●
		Machine					●	●	●	●	●	●				●		● ●		●
		Compression of clamping				●							●							

- ● check / optimize
- ● increase / improve
- ● reduce / decrease
- ● apply / use

SOLIDH-REAM

RM-MTR-H7S-CS-C

UOP Solid Carbide Reamers with Straight Flutes, Unequal Pitch and Coolant Holes for High Speed Reaming of Blind Holes



Designation	Dimensions										EVO
	DC	L	PLGL	LCF	BD	LU	OAL	NOF(1)	DCONMS	CSP(2)	
RM-MTR-0100-H7S-CS-C	1.000	6.00	0.100	11.0	0.90	21.0	50.00	3	4.00	0	●
RM-MTR-0150-H7S-CS-C	1.500	9.00	0.150	15.0	1.10	21.0	50.00	3	4.00	0	●
RM-MTR-0200-H7S-CS-C	2.000	12.00	0.150	16.0	1.60	21.0	50.00	4	4.00	0	●
RM-MTR-0250-H7S-CS-C	2.500	12.00	0.200	19.0	2.10	31.0	60.00	4	4.00	0	●
RM-MTR-0300-H7S-CS-C	3.000	12.00	0.250	21.0	2.40	31.0	60.00	4	4.00	0	●
RM-MTR-0350-H7S-CS-C	3.500	12.00	0.250	21.0	2.90	40.0	68.00	4	4.00	1	●
RM-MTR-0400-H7S-CS-C	4.000	12.00	0.400	17.0	3.40	40.0	68.00	4	6.00	1	●
RM-MTR-0450-H7S-CS-C	4.500	12.00	0.400	17.0	3.40	40.0	76.00	4	6.00	1	●
RM-MTR-0500-H7S-CS-C	5.000	12.00	0.400	17.0	3.80	40.0	76.00	4	6.00	1	●
RM-MTR-0550-H7S-CS-C	5.500	12.00	0.400	17.0	4.10	40.0	76.00	4	6.00	1	●
RM-MTR-0600-H7S-CS-C	6.000	12.00	0.400	17.0	4.50	40.0	76.00	4	6.00	1	●
RM-MTR-0650-H7S-CS-C	6.500	15.00	0.400	20.0	5.20	65.0	101.00	6	8.00	1	●
RM-MTR-0700-H7S-CS-C	7.000	15.00	0.400	20.0	5.60	65.0	101.00	6	8.00	1	●
RM-MTR-0750-H7S-CS-C	7.500	15.00	0.400	20.0	6.00	65.0	101.00	6	8.00	1	●
RM-MTR-0800-H7S-CS-C	8.000	15.00	0.400	20.0	6.40	65.0	101.00	6	8.00	1	●
RM-MTR-0850-H7S-CS-C	8.500	18.00	0.400	23.0	6.80	61.0	101.00	6	10.00	1	●
RM-MTR-0900-H7S-CS-C	9.000	18.00	0.400	23.0	7.20	61.0	101.00	6	10.00	1	●
RM-MTR-0950-H7S-CS-C	9.500	18.00	0.400	23.0	7.60	61.0	101.00	6	10.00	1	●
RM-MTR-1000-H7S-CS-C	10.000	18.00	0.500	23.0	8.00	61.0	101.00	6	10.00	1	●
RM-MTR-1050-H7S-CS-C	10.500	18.00	0.500	23.0	8.40	85.0	130.00	6	12.00	1	●
RM-MTR-1100-H7S-CS-C	11.000	18.00	0.500	23.0	8.80	85.0	130.00	6	12.00	1	●
RM-MTR-1150-H7S-CS-C	11.500	18.00	0.500	23.0	9.20	85.0	130.00	6	12.00	1	●
RM-MTR-1200-H7S-CS-C	12.000	18.00	0.500	23.0	9.60	85.0	130.00	6	12.00	1	●

• EVO is a hard submicron IC07 carbide substrate with an ultra-thin silicon based PVD coating, obtained by High Density Plasma (HDP) technology • Hole tolerance: H7 manufacturing tolerance according to DIN 1420

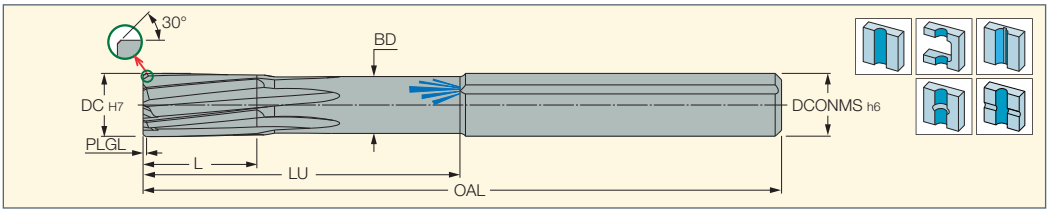
(1) Number of flutes

(2) 0 - Without coolant supply, 1 - With coolant supply

SOLIDH-REAM

RM-MTR-H7N-CS-C

Solid Carbide Reamers with Helical Flutes, Unequal Pitch and Coolant Grooves for High Speed Reaming of Through Holes



Designation	Dimensions									EVO
	DC	L	PLGL	BD	LU	OAL	NOF(1)	DCONMS	CSP(2)	
RM-MTR-0100-H7N-CS-C	1.000	6.00	0.200	0.80	21.0	50.00	3	4.00	0	●
RM-MTR-0150-H7N-CS-C	1.500	7.00	0.350	1.10	21.0	50.00	3	4.00	0	●
RM-MTR-0200-H7N-CS-C	2.000	9.00	0.450	1.50	21.0	50.00	4	4.00	0	●
RM-MTR-0250-H7N-CS-C	2.500	12.00	0.550	1.90	31.0	60.00	4	4.00	0	●
RM-MTR-0300-H7N-CS-C	3.000	12.00	0.700	2.20	31.0	60.00	4	4.00	0	●
RM-MTR-0350-H7N-CS-C	3.500	12.00	0.700	2.60	40.0	68.00	4	4.00	0	●
RM-MTR-0400-H7N-CS-C	4.000	12.00	0.700	3.00	40.0	68.00	4	6.00	1	●
RM-MTR-0450-H7N-CS-C	4.500	12.00	0.900	3.40	40.0	76.00	4	6.00	1	●
RM-MTR-0500-H7N-CS-C	5.000	12.00	0.900	3.80	40.0	76.00	4	6.00	1	●
RM-MTR-0550-H7N-CS-C	5.500	12.00	0.900	4.10	40.0	76.00	4	6.00	1	●
RM-MTR-0600-H7N-CS-C	6.000	12.00	0.900	4.50	40.0	76.00	4	6.00	1	●
RM-MTR-0650-H7N-CS-C	6.500	15.00	0.900	5.20	65.0	101.00	6	8.00	1	●
RM-MTR-0700-H7N-CS-C	7.000	15.00	0.900	5.60	65.0	101.00	6	8.00	1	●
RM-MTR-0750-H7N-CS-C	7.500	15.00	0.900	6.00	65.0	101.00	6	8.00	1	●
RM-MTR-0800-H7N-CS-C	8.000	15.00	0.900	6.40	65.0	101.00	6	8.00	1	●
RM-MTR-0850-H7N-CS-C	8.500	18.00	0.950	6.80	61.0	101.00	6	10.00	1	●
RM-MTR-0900-H7N-CS-C	9.000	18.00	0.950	7.20	61.0	101.00	6	10.00	1	●
RM-MTR-0950-H7N-CS-C	9.500	18.00	0.950	7.60	61.0	101.00	6	10.00	1	●
RM-MTR-1000-H7N-CS-C	10.000	18.00	0.950	8.00	61.0	101.00	6	10.00	1	●
RM-MTR-1050-H7N-CS-C	10.500	18.00	1.050	8.40	85.0	130.00	6	12.00	1	●
RM-MTR-1100-H7N-CS-C	11.000	18.00	1.050	8.80	85.0	130.00	6	12.00	1	●
RM-MTR-1150-H7N-CS-C	11.500	18.00	1.050	9.20	85.0	130.00	6	12.00	1	●
RM-MTR-1200-H7N-CS-C	12.000	18.00	1.050	9.60	85.0	130.00	6	12.00	1	●

• EVO is a hard submicron IC07 carbide substrate with an ultra-thin silicon based PVD coating, obtained by High Density Plasma (HDP) technology • Hole tolerance: H7 manufacturing tolerance according to DIN 1420

(1) Number of flutes

(2) 0 - Without coolant supply, 1 - With coolant supply

RM-MTR Cutting Speed Recommendations

ISO	Main Material Group	Material Type	ISCAR Material Group	V_c (m/min)
P	Steel	Non-alloy and alloy steel	1-10	120-250
		High alloy and tool steel	11	70-120
		Ferritic and martensitic stainless steel	12,13	60-120
M	Stainless steel	Austenitic stainless steel	14	60-120
		Duplex and super duplex stainless steel		25-60
K	Cast iron	Grey cast iron	15-16	70-120
		Nodular cast iron	17-18	60-110
		Malleable cast iron	19-20	60-110
N	Non-ferrous metals	Aluminium alloys	21-24	150-300
S	Superalloys and titanium	Fe- based HRSA	31-32	40-80
		Ni- or Co- based HRSA	33-35	25-50
		Titanium or titanium alloys	36-37	30-80
H	Hard materials	Hardened steel and cast iron, chilled cast iron	38,40-41	25-60

Feed Recommendations

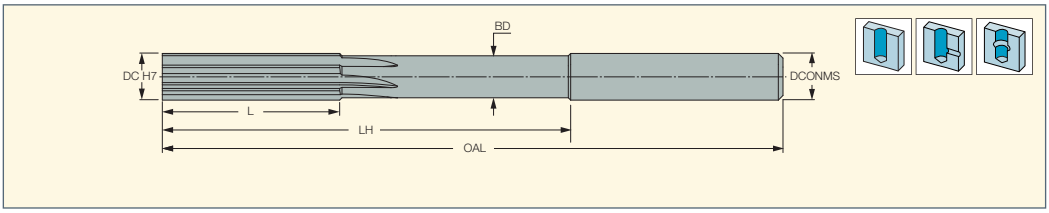
Reamer Diameter mm	Feed mm/rev
1.00-1.50	0.05-0.10
2.00-3.50	0.10-0.20
4.00-5.00	0.10-0.40
5.50-7.50	0.15-0.70
8.00-10.0	0.50-1.40
10.5-12.0	0.80-1.60

Runout max 0.005 mm

SOLIDH-REAM

RM-FCR-H7S-CS-C

DIN 212C Solid Carbide Reamers with Straight Flutes and a Cylindrical Shank for Blind Holes



Designation	Dimensions							IC07
	DC	L	LH	BD	OAL	NOF(1)	DCONMS	
RM-FCR-0300-H7S-CS-C	3.00	15.00	30.0	-	61.00	6	3.00	●
RM-FCR-0320-H7S-CS-C	3.20	18.00	33.0	-	70.00	6	3.20	●
RM-FCR-0350-H7S-CS-C	3.50	18.00	33.0	-	70.00	6	3.50	●
RM-FCR-0400-H7S-CS-C	4.00	19.00	44.0	3.50	75.00	6	4.00	●
RM-FCR-0450-H7S-CS-C	4.50	21.00	46.0	4.00	80.00	6	4.50	●
RM-FCR-0500-H7S-CS-C	5.00	23.00	53.0	4.30	86.00	6	5.00	●
RM-FCR-0550-H7S-CS-C	5.50	26.00	56.0	4.50	93.00	6	5.60	●
RM-FCR-0600-H7S-CS-C	6.00	26.00	56.0	5.00	93.00	6	5.60	●
RM-FCR-0650-H7S-CS-C	6.50	28.00	63.0	5.50	101.00	6	6.30	●
RM-FCR-0700-H7S-CS-C	7.00	31.00	69.0	6.50	109.00	6	7.10	●
RM-FCR-0750-H7S-CS-C	7.50	31.00	69.0	6.50	109.00	6	7.10	●
RM-FCR-0800-H7S-CS-C	8.00	33.00	75.0	7.00	117.00	6	8.00	●
RM-FCR-0850-H7S-CS-C	8.50	33.00	75.0	7.00	117.00	6	8.00	●
RM-FCR-0900-H7S-CS-C	9.00	36.00	81.0	8.00	125.00	6	9.00	●
RM-FCR-0950-H7S-CS-C	9.50	36.00	81.0	8.00	125.00	6	9.00	●
RM-FCR-1000-H7S-CS-C	10.00	38.00	87.0	9.00	133.00	6	10.00	●
RM-FCR-1050-H7S-CS-C	10.50	38.00	87.0	9.00	133.00	6	10.00	●
RM-FCR-1100-H7S-CS-C	11.00	41.00	96.0	9.00	142.00	6	10.00	●
RM-FCR-1200-H7S-CS-C	12.00	44.00	105.0	9.00	151.00	6	10.00	●
RM-FCR-1300-H7S-CS-C	13.00	44.00	105.0	9.00	151.00	6	10.00	●
RM-FCR-1400-H7S-CS-C	14.00	47.00	110.0	11.50	160.00	8	12.50	●
RM-FCR-1500-H7S-CS-C	15.00	50.00	112.0	11.50	162.00	8	12.50	●
RM-FCR-1600-H7S-CS-C	16.00	52.00	120.0	11.50	170.00	8	12.50	●

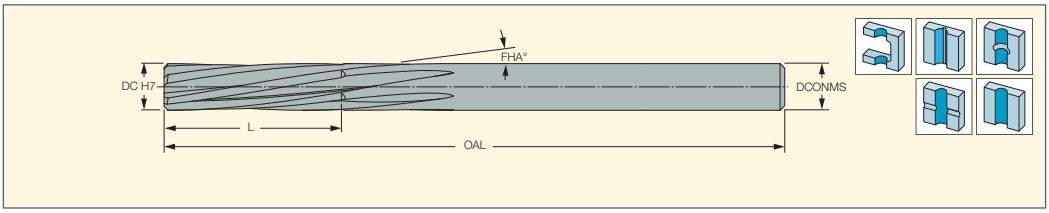
• Hole tolerance: H7 manufacturing tolerance according to DIN1420 • Available grades: IC07 - uncoated, optional: IC907 - TiAlN PVD coated • Special diameters are available on request • For user guide and cutting conditions, see pages 329-332

(1) Number of flutes

SOLIDH-REAM

RM-FCR-H7N-CS-C

DIN 212B Solid Carbide Reamers with Helical Flutes and a Cylindrical Shank for Through Holes



Designation	Dimensions						IC07
	DC	L	OAL	NOF(1)	FHA	DCONMS	
RM-FCR-0300-H7N-CS-C	3.00	15.00	61.00	5	10.0	3.00	●
RM-FCR-0350-H7N-CS-C	3.50	18.00	70.00	5	10.0	3.50	●
RM-FCR-0400-H7N-CS-C	4.00	19.00	75.00	5	10.0	4.00	●
RM-FCR-0450-H7N-CS-C	4.50	21.00	80.00	5	10.0	4.50	●
RM-FCR-0500-H7N-CS-C	5.00	23.00	86.00	5	10.0	5.00	●
RM-FCR-0550-H7N-CS-C	5.50	26.00	93.00	6	10.0	5.50	●
RM-FCR-0600-H7N-CS-C	6.00	26.00	93.00	6	10.0	6.00	●
RM-FCR-0650-H7N-CS-C	6.50	28.00	101.00	6	10.0	6.50	●
RM-FCR-0700-H7N-CS-C	7.00	31.00	109.00	6	10.0	7.00	●
RM-FCR-0750-H7N-CS-C	7.50	33.00	117.00	6	10.0	7.50	●
RM-FCR-0800-H7N-CS-C	8.00	33.00	117.00	6	10.0	8.00	●
RM-FCR-0850-H7N-CS-C	8.50	36.00	125.00	6	10.0	8.50	●
RM-FCR-0900-H7N-CS-C	9.00	36.00	125.00	6	10.0	9.00	●
RM-FCR-0950-H7N-CS-C	9.50	38.00	133.00	6	10.0	9.50	●
RM-FCR-1000-H7N-CS-C	10.00	38.00	133.00	6	10.0	10.00	●
RM-FCR-1050-H7N-CS-C	10.50	41.00	142.00	7	10.0	10.50	●
RM-FCR-1100-H7N-CS-C	11.00	41.00	142.00	7	10.0	11.00	●
RM-FCR-1200-H7N-CS-C	12.00	44.00	151.00	7	10.0	12.00	●
RM-FCR-1300-H7N-CS-C	13.00	44.00	151.00	7	10.0	13.00	●
RM-FCR-1400-H7N-CS-C	14.00	47.00	160.00	7	10.0	14.00	●
RM-FCR-1500-H7N-CS-C	15.00	50.00	162.00	7	10.0	15.00	●
RM-FCR-1600-H7N-CS-C	16.00	52.00	170.00	7	10.0	16.00	●

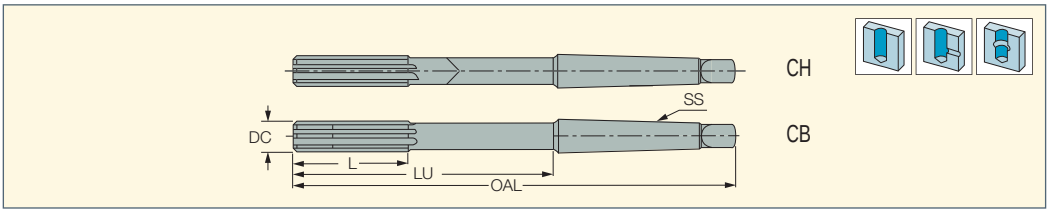
• Hole tolerance: H7 manufacturing tolerance according to DIN1420 • Available grades: IC07 - uncoated, optional: IC907 - TiAlN PVD coated • Special diameters are available on request • For user guide and cutting conditions, see pages 329-332

(1) Number of flutes

SOLIDH-REAM

RM-SHR-H7S-MT

DIN 8094 Solid Carbide Reamers with Straight Flutes and a Morse Taper Shank for Blind Holes



Designation	Dimensions						IC07
	DC	OAL	LU	L	NOF(1)	SS	
RM-SHR-0500-H7S-MT1-CH	5.000	133.00	67.5	23.00	4	MT1	●
RM-SHR-0600-H7S-MT1-CH	6.000	138.00	72.5	26.00	4	MT1	●
RM-SHR-0700-H7S-MT1-CH	7.000	150.00	84.5	31.00	4	MT1	●
RM-SHR-0800-H7S-MT1-CH	8.000	156.00	90.5	33.00	4	MT1	●
RM-SHR-0900-H7S-MT1-CH	9.000	162.00	96.5	36.00	4	MT1	●
RM-SHR-1000-H7S-MT1-CH	10.000	168.00	102.5	38.00	6	MT1	●
RM-SHR-1100-H7S-MT1-CH	11.000	175.00	109.5	41.00	6	MT1	●
RM-SHR-1300-H7S-MT1-CH	13.000	182.00	116.5	44.00	6	MT1	●
RM-SHR-1400-H7S-MT1-CH	14.000	189.00	123.5	47.00	6	MT1	●
RM-SHR-1500-H7S-MT2-CH	15.000	204.00	124.0	50.00	6	MT2	●
RM-SHR-1600-H7S-MT2-CH	16.000	210.00	130.0	52.00	6	MT2	●
RM-SHR-1700-H7S-MT2-CB	17.000	214.00	134.0	54.00	6	MT2	●
RM-SHR-1800-H7S-MT2-CB	18.000	219.00	139.0	56.00	6	MT2	●
RM-SHR-1900-H7S-MT2-CB	19.000	223.00	143.0	58.00	6	MT2	●
RM-SHR-2000-H7S-MT2-CB	20.000	228.00	148.0	60.00	6	MT2	●
RM-SHR-2200-H7S-MT2-CB	22.000	237.00	157.0	64.00	8	MT2	●
RM-SHR-2400-H7S-MT3-CB	24.000	268.00	169.0	68.00	8	MT3	●
RM-SHR-2500-H7S-MT3-CB	25.000	268.00	169.0	68.00	8	MT3	●
RM-SHR-2600-H7S-MT3-CB	26.000	273.00	174.0	70.00	8	MT3	●
RM-SHR-2800-H7S-MT3-CB	28.000	277.00	178.0	71.00	8	MT3	●
RM-SHR-3000-H7S-MT3-CB	30.000	281.00	182.0	73.00	8	MT3	●
RM-SHR-3200-H7S-MT4-CB	32.000	317.00	193.0	77.00	8	MT4	●
RM-SHR-3400-H7S-MT4-CB	34.000	321.00	197.0	78.00	8	MT4	●
RM-SHR-3600-H7S-MT4-CB	36.000	325.00	201.0	79.00	8	MT4	●
RM-SHR-4000-H7S-MT4-CB	40.000	329.00	205.0	81.00	8	MT4	●

• Requires a price and delivery time quotation • Available only upon request • -CH: Brazed solid carbide head • -CB: Brazed solid carbide tips • Hole tolerance: H7 manufacturing tolerance according to DIN 1420 • Available grades: IC07 (uncoated), optional: IC907 (TiAlN PVD coated)

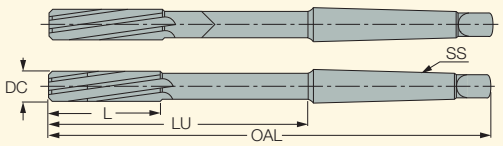
• For user guide and cutting conditions, see pages 329-332

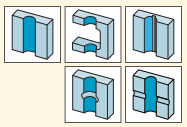
(1) Number of flutes

SOLIDH-REAM

RM-SHR-H7N-MT

DIN 8093 Solid Carbide Reamers with Spiral Flutes and a **Morse Taper** Shank for Through Holes





Designation	Dimensions						IC07
	DC	OAL	LU	L	NOF(1)	SS	
RM-SHR-0500-H7N-MT1-CH	5.000	133.00	67.5	23.00	4	MT1	●
RM-SHR-0600-H7N-MT1-CH	6.000	138.00	72.5	26.00	4	TM1	●
RM-SHR-0700-H7N-MT1-CH	7.000	150.00	84.5	31.00	4	MT1	●
RM-SHR-0800-H7N-MT1-CH	8.000	156.00	90.5	33.00	4	MT1	●
RM-SHR-0900-H7N-MT1-CH	9.000	162.00	96.5	36.00	4	MT1	●
RM-SHR-1000-H7N-MT1-CH	10.000	168.00	102.5	38.00	6	MT1	●
RM-SHR-1100-H7N-MT1-CH	11.000	175.00	109.5	41.00	6	MT1	●
RM-SHR-1200-H7N-MT1-CH	12.000	182.00	116.5	44.00	6	MT1	●
RM-SHR-1300-H7N-MT1-CH	13.000	182.00	116.5	44.00	6	MT1	●
RM-SHR-1400-H7N-MT1-CH	14.000	189.00	123.5	47.00	6	MT1	●
RM-SHR-1500-H7N-MT2-CH	15.000	204.00	124.0	50.00	6	MT2	●
RM-SHR-1600-H7N-MT2-CH	16.000	210.00	130.0	52.00	6	MT2	●
RM-SHR-1800-H7N-MT2-CB	18.000	219.00	139.0	56.00	6	MT2	●
RM-SHR-1900-H7N-MT2-CB	19.000	223.00	143.0	58.00	6	MT2	●
RM-SHR-2000-H7N-MT2-CB	20.000	228.00	148.0	60.00	6	MT2	●
RM-SHR-2200-H7N-MT2-CB	22.000	237.00	157.0	64.00	8	MT2	●
RM-SHR-2500-H7N-MT3-CB	25.000	268.00	169.0	68.00	8	MT3	●
RM-SHR-2600-H7N-MT3-CB	26.000	273.00	174.0	70.00	8	MT3	●
RM-SHR-2800-H7N-MT3-CB	28.000	277.00	178.0	71.00	8	MT3	●
RM-SHR-3000-H7N-MT3-CB	30.000	281.00	182.0	73.00	8	MT3	●
RM-SHR-3200-H7N-MT4-CB	32.000	317.00	193.0	77.00	8	MT4	●
RM-SHR-3400-H7N-MT4-CB	34.000	321.00	197.0	78.00	8	MT4	●
RM-SHR-3500-H7N-MT4-CB	35.000	321.00	197.0	78.00	8	MT4	●
RM-SHR-3600-H7N-MT4-CB	36.000	325.00	201.0	79.00	8	MT4	●
RM-SHR-3800-H7N-MT4-CB	38.000	329.00	205.0	81.00	8	MT4	●

• Requires a price and delivery time quotation • Available only upon request • -CH: Brazed solid carbide head • -CB: Brazed solid carbide tips • Hole tolerance: H7 manufacturing tolerance according to DIN 1420 • Available grades: IC07 (uncoated), optional: IC907 (TiAlN PVD coated)

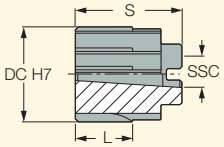
• For user guide and cutting conditions, see pages 329-332

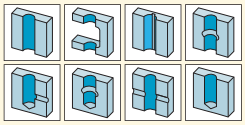
(1) Number of flutes

SOLIDH-REAM

RM-SR-H7S

DIN 8054 Brazed Carbide Tip Shell Reamers with Straight Flutes





1:30 conical connection with brazed tips

Designation	Dimensions DC	S	L	SSC(1)	NOF(2)	IC07
RM-SR25.000H7S-13	25.000	45.00	30.00	13.00	6	●
RM-SR30.000H7S-13	30.000	45.00	30.00	13.00	6	●
RM-SR34.000H7S-13	34.000	45.00	30.00	13.00	8	●
RM-SR35.000H7S-13	35.000	45.00	30.00	13.00	8	●
RM-SR36.000H7S-16	36.000	50.00	30.00	16.00	8	●
RM-SR37.000H7S-16	37.000	50.00	30.00	16.00	8	●
RM-SR38.000H7S-16	38.000	50.00	30.00	16.00	8	●
RM-SR40.000H7S-16	40.000	50.00	30.00	16.00	8	●
RM-SR42.000H7S-16	42.000	50.00	30.00	16.00	8	●
RM-SR44.000H7S-16	44.000	50.00	30.00	16.00	8	●
RM-SR45.000H7S-16	45.000	50.00	30.00	16.00	8	●
RM-SR48.000H7S-19	48.000	56.00	30.00	19.00	10	●
RM-SR50.000H7S-19	50.000	56.00	30.00	19.00	10	●
RM-SR55.000H7S-22	55.000	63.00	30.00	22.00	10	●
RM-SR58.000H7S-22	58.000	63.00	30.00	22.00	10	●
RM-SR60.000H7S-22	60.000	63.00	30.00	22.00	10	●
RM-SR70.000H7S-27	70.000	71.00	30.00	27.00	12	●

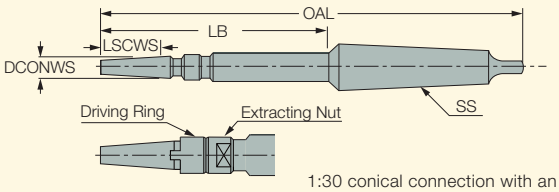
• Available only upon request • Right-hand, H7 manufacturing tolerance according to DIN 1420 • For user guide and cutting conditions, see pages 329-332

(1) Seat size code

SOLIDH-REAM

RM-SRH-Q-MT

DIN 217 Shell Reamer Shanks with a **Morse Taper** Connection



1:30 conical connection with an extraction nut, driving ring and a key.

Designation	DCONWS	DCN(1)	DCX(2)	OAL	LB	LSCWS	SS
RM-SRH Q13-MT3	13.00	25.00	35.00	250.00	149.46	45.00	MT3
RM-SRH Q16-MT3	16.00	36.00	45.00	261.00	160.45	50.00	MT3
RM-SRH Q19-MT3	19.00	48.00	52.00	298.00	173.54	56.00	MT3
RM-SRH Q19-MT4	19.00	48.00	52.00	273.00	174.00	56.00	MT4
RM-SRH Q22-MT3	22.00	55.00	62.00	312.00	187.54	63.00	MT3
RM-SRH Q22-MT4	22.00	55.00	62.00	312.00	188.00	63.00	MT4
RM-SRH Q27-MT4	27.00	65.00	75.00	359.00	198.80	71.00	MT4
RM-SRH Q27-MT5	27.00	65.00	75.00	327.00	200.63	71.00	MT5

• Available only upon request

(1) Minimum insert diameter

(2) Maximum insert diameter

Machining Conditions for Solid Carbide Reamers

Material	Tensile Strength or Brinell Hardness N/mm² bzw. HB	Reamer Diameter mm	Reaming Allowance Relative to Diameter	Feed mm/rev	Cutting Speed m/min
Steel		up to 10	0.04-0.10	0.15-0.25	
	up to 1000	10-25	0.10-0.25	0.20-0.35	6-20
		25-40	0.25-0.40	0.30-0.50	
		up to 10	0.04-0.10	0.12-0.20	
	1000-1400	10-25	0.10-0.25	0.15-0.30	6-15
		25-40	0.25-0.40	0.20-0.40	
Cast steel		up to 10	0.05-0.10	0.15-0.25	
	400-500	10-25	0.10-0.25	0.20-0.40	10-20
		25-40	0.25-0.40	0.30-0.50	
		up to 10	0.04-0.10	0.12-0.20	
	500-700	10-25	0.10-0.25	0.15-0.30	6-15
		25-40	0.25-0.40	0.20-0.40	
Titanium Titanium Alloy		up to 10	0.06-0.12	0.12-0.20	
	500-1300	10-25	0.10-0.25	0.15-0.30	6-15
		25-40	0.25-0.40	0.20-0.40	
Grey cast iron		up to 10	0.06-0.12	0.20-0.30	
	up to 220 HB	10-25	0.10-0.30	0.30-0.45	10-25
		25-40	0.30-0.50	0.40-0.70	
		up to 10	0.06-0.12	0.15-0.25	
	over 220 HB	10-25	0.10-0.30	0.20-0.35	10-20
		25-40	0.30-0.50	0.30-0.50	
Spheroidal graphite Cast iron Malleable cast iron		up to 10	0.06-0.12	0.15-0.25	
		10-25	0.10-0.25	0.20-0.40	8-15
		25-40	0.25-0.40	0.30-0.60	
Aluminum alloy		up to 10	0.06-0.12	0.20-0.30	Si<7% 10-30
	over 80 HB	10-25	0.10-0.30	0.30-0.50	
		25-40	0.30-0.50	0.40-0.70	Si<7% 30-60
Copper		up to 10	0.10-0.20	0.30-0.60	
		10-25	0.20-0.40	0.40-0.80	20-60
		25-40	0.40-0.60	0.50-1.00	
Brass Red bronze Cast bronze		up to 10	0.06-0.12	0.20-0.30	
		10-25	0.10-0.30	0.30-0.50	15-50
		25-40	0.30-0.50	0.40-0.70	
Thermoset polymers		up to 10	0.10-0.25	0.30-0.60	
		10-25	0.20-0.40	0.40-0.80	15-30
		25-40	0.40-0.60	0.50-1.00	

Reamer Manufacturing Tolerances

Nominal Diameter of Reamer D_1 in mm		Reamer Manufacturing Tolerances DIN 1420									
		Admissible maximum and minimum reamer dimensions of nominal diameter d1 in µm for drilling tolerance range									
Over	Up to	A9	A11	B8	B9	B10	B11	C8	C9	C10	C11
1	3	+291	+321	+151	+161	+174	+191	+ 71	+ 81	+ 94	+111
		+282	+300	+146	+152	+160	+170	+ 66	+ 72	+ 80	+ 90
3	6	+295	+333	+155	+165	+180	+203	+ 85	+ 95	+110	+133
		+284	+306	+148	+154	+163	+176	+ 78	+ 84	+ 93	+106
6	10	+310	+356	+168	+180	+199	+226	+ 98	+110	+129	+156
		+297	+324	+160	+167	+178	+194	+ 90	+ 97	+108	+124
10	18	+326	+383	+172	+186	+209	+243	+117	+131	+154	+188
		+310	+344	+162	+170	+184	+204	+107	+115	+129	+149
18	30	+344	+410	+188	+204	+231	+270	+138	+154	+181	+220
		+325	+364	+176	+185	+201	+224	+126	+135	+151	+174
30	40	+362	+446	+203	+222	+255	+206	+153	+172	+205	+256
		+340	+390	+189	+200	+220	+250	+139	+150	+170	+200
40	50	+372	+456	+213	+232	+265	+316	+163	+182	+215	+266
		+350	+400	+199	+210	+230	+260	+149	+160	+180	+210
50	65	+402	+501	+229	+252	+292	+351	+179	+202	+242	+301
		+376	+434	+212	+226	+250	+284	+162	+176	+200	+234
65	80	+422	+521	+239	+262	+302	+361	+189	+212	+252	+311
		+396	+454	+222	+236	+260	+294	+172	+186	+210	+244
80	100	+453	+567	+265	+293	+339	+407	+215	+243	+289	+357
		+422	+490	+246	+262	+290	+330	+196	+212	+240	+280
100	120	+483	+597	+285	+313	+359	+427	+225	+253	+299	+367
		+452	+520	+266	+282	+310	+350	+206	+222	+250	+290
120	140	+545	+672	+313	+345	+396	+472	+253	+285	+336	+412
		+510	+584	+290	+310	+340	+384	+230	+250	+280	+324
140	160	+605	+732	+333	+365	+416	+492	+263	+295	+346	+422
		+570	+644	+310	+330	+360	+404	+240	+260	+290	+334
160	180	+665	+792	+363	+395	+446	+522	+283	+315	+366	+442
		+630	+704	+340	+360	+390	+434	+260	+280	+310	+354

Over	Up to	D8	D9	D10	D11	E7	E8	E9	F6	F7	F8	F9	G6	G7
1	3	+ 31	+ 41	+ 54	+ 71	+ 22	+ 25	+ 35	+ 11	+ 14	+ 17	+ 27	+ 7	+ 10
		+ 26	+ 32	+ 40	+ 50	+ 18	+ 20	+ 26	+ 8	+ 10	+ 12	+ 18	+ 4	+ 6
3	6	+ 45	+ 55	+ 70	+ 93	+ 30	+ 35	+ 45	+ 16	+ 20	+ 25	+ 35	+ 10	+ 14
		+ 38	+ 44	+ 53	+ 66	+ 25	+ 28	+ 34	+ 13	+ 15	+ 18	+ 24	+ 7	+ 9
6	10	+ 58	+ 70	+ 89	+116	+ 37	+ 43	+ 55	+ 20	+ 25	+ 31	+ 43	+ 12	+ 17
		+ 50	+ 57	+ 68	+ 84	+ 31	+ 35	+ 42	+ 16	+ 19	+ 23	+ 30	+ 8	+ 11
10	18	+ 72	+ 86	+109	+143	+ 47	+ 54	+ 68	+ 25	+ 31	+ 38	+ 52	+ 15	+ 21
		+ 62	+ 70	+ 84	+104	+ 40	+ 44	+ 52	+ 21	+ 24	+ 28	+ 36	+ 11	+ 14
18	30	+ 93	+109	+136	+175	+ 57	+ 68	+ 84	+ 31	+ 37	+ 48	+ 64	+ 18	+ 24
		+ 81	+ 90	+106	+129	+ 49	+ 56	+ 65	+ 26	+ 29	+ 36	+ 45	+ 13	+ 16
30	50	+113	+132	+165	+216	+ 71	+ 83	+ 102	+ 38	+ 46	+ 58	+ 77	+ 22	+ 30
		+ 99	+110	+130	+160	+ 62	+ 69	+ 80	+ 32	+ 37	+ 44	+ 55	+ 16	+ 21
50	80	+139	+162	+202	+261	+ 5	+ 99	+122	+ 46	+ 55	+ 69	+ 92	+ 26	+ 35
		+122	+136	+160	+194	+ 74	+ 82	+ 96	+ 39	+ 44	+ 52	+ 66	+ 19	+ 24
80	120	+165	+193	+239	+307	+101	+117	+145	+ 54	+ 65	+ 81	+109	+ 30	+ 41
		+146	+162	+190	+230	+ 88	+ 98	+114	+ 46	+ 52	+ 62	+ 78	+ 22	+ 28
120	180	+198	+230	+281	+357	+119	+138	+170	+ 64	+ 77	+ 96	+ 128	+ 35	+ 48
		+175	+195	+225	+269	+105	+115	+135	+ 55	+ 63	+ 73	+ 93	+ 26	+ 34

Reamer Manufacturing Tolerances (continued)

Nominal Diameter of Reamer D_1 in mm		Reamer Manufacturing Tolerances DIN 1420											
		Admissible maximum and minimum reamer dimensions of nominal diameter d1 in µm for drilling tolerance range											
Over	Up to	R6	R7	S6	S7	T6	U6	U7	U10	X10	X11	Z10	Z11
1	3	-11	-12	-15	-16	-19	-19	-20	-24	-26	-29	-32	-35
		-14	-16	-18	-20	-22	-22	-24	-38	-40	-50	-46	-56
3	6	-14	-13	-18	-17	-22	-22	-21	-31	-36	-40	-43	-47
		-17	-18	-21	-22	-25	-25	-26	-48	-53	-67	-60	-56
6	10	-18	-16	-22	-20	-27	-27	-25	-37	-43	-48	-51	-47
		-22	-22	-26	-26	-31	-31	-31	-58	-64	-80	-72	-74
10	14	-22	-19	-27	-24	-32	-32	-29	-44	-51	-57	-61	-56
		-26	-26	-31	-31	-36	-36	-36	-69	-76	-96	-86	-88
14	18	-22	-19	-27	-24	-32	-32	-29	-44	- 56	-62	-71	-67
		-26	-26	-31	-31	-36	-36	-36	-69	- 81	-101	-96	-106
18	24	-26	-24	-33	-31	-39	-39	-37	-54	- 67	-74	-86	-77
		-31	-32	-38	-39	-44	-44	-45	-84	- 97	-120	-116	-116
24	30	-26	-24	-33	-31	-39	-46	-44	-61	- 77	-84	-101	-108
		-31	-32	-38	-39	-44	-51	-52	-69	-107	-130	-131	-154
30	40	-32	-29	-41	-38	-46	-58	-55	-75	- 95	-104	-127	-136
		-38	-38	-47	-47	-52	-64	-64	-110	-130	-160	-162	-192
40	50	-32	-29	-41	-38	-52	-68	-65	-85	-112	-121	-151	-160
		-38	-38	-47	-47	-58	-74	-74	-120	-147	-177	-186	-216
50	65	-38	-35	-50	-47	-63	-84	-81	-105	-140	-151	-190	-201
		-45	-46	-57	-58	-70	-91	-92	-147	-182	-218	-232	-268
65	80	-40	-37	-56	-53	-72	-99	-96	-120	-164	-175	-228	-239
		-47	-48	-63	-64	-79	-106	-107	-162	-206	-242	-170	-306
80	100	-48	-44	-68	-64	-88	-121	-117	-145	-199	-211	-179	-291
		-56	-57	-76	-77	-96	-129	-130	-194	-248	-288	-328	-368
100	120	-51	-47	-76	-72	-101	-141	-139	-165	-231	-243	-331	-343
		-59	-60	-84	-85	-109	-149	-150	-214	-280	-320	-380	-420
120	140	-60	-54	-89	-83	-119	-167	-161	-194	-272	-286	-389	-403
		-69	-68	-98	-97	-128	-176	-175	-250	-328	-374	-445	-491
140	160	-62	-56	-97	-91	-131	-187	-181	-214	-304	-318	-439	-453
		-71	-70	-106	-105	-140	-196	-195	-270	-360	-406	-495	-541

Over	Up to	H6	H7	H8	H9	H10	H11	H12	J6	J7	J8	JS6	JS7	JS8	JS9
1	3	+5	+8	+11	+21	+34	+51	+85	+1	+2	+3	+2	+3	+4	+8
		+2	+4	+6	+12	+20	+30	+50	-2	-2	-2	-1	-1	-1	-1
3	6	+6	+10	+15	+25	+40	+63	+102	+3	+4	+7	+2	+4	+6	+10
		+3	+5	+8	+14	+23	+30	+60	0	-1	0	-1	-1	-1	-1
6	10	+7	+12	+18	+30	+49	+76	+127	+3	+5	+8	+3	+5	+7	+12
		+3	+6	+10	+17	+28	+44	+74	-1	-1	0	-1	-1	-1	-1
10	16	+9	+15	+22	+36	+59	+93	+153	+4	+7	+10	+3	+6	+9	+15
		+5	+8	+12	+20	+34	+54	+90	0	0	0	-1	-1	-1	-1
18	30	+11	+17	+28	+44	+71	+110	+178	+6	+8	+15	+4	+7	+11	+18
		+6	+9	+16	+25	+41	+64	+104	+1	0	+3	-1	-1	-1	-1
30	50	+13	+21	+33	+52	+85	+136	+212	+7	+10	+18	+5	+8	+13	+21
		+7	+12	+19	+30	+50	+80	+124	+1	+1	+4	-1	-1	-1	-1
50	80	+16	+25	+39	+62	+102	+161	+255	+10	+13	+21	+6	+10	+16	+25
		+9	+14	+22	+36	+60	+94	+150	+3	+2	+4	-1	-1	-1	-1
90	120	+18	+29	+45	+73	+119	+187	+297	+12	+16	+25	+7	+12	+18	+30
		+10	+16	+26	+42	+70	+110	+174	+4	+3	+6	-1	-1	-1	-1
120	180	+21	+34	+53	+85	+136	+212	+360	+14	+20	+31	+8	+16	+72	+35
		+12	+20	+30	+50	+80	+124	+200	+5	+6	+8	-1	0	-1	0

Over	Up to	K6	K7	K8	M6	M7	M8	N6	N7	N8	N9	N10	N11	P6	P7
1	3	-1	-2	-3	-3	-4	-5	-5	-6	-7	-8	-10	-13	-7	-8
		-4	-6	-8	-6	-8	-10	-8	-10	-12	-17	-24	-34	-10	-12
3	6	0	+1	+2	-3	-2	-1	-7	-6	-5	-5	-8	-12	-11	-10
		-3	-4	-5	-6	-7	-8	-10	-11	-12	-16	-25	-39	-14	-15
6	10	0	+2	+2	-5	-3	-3	-9	-7	-7	-6	-9	-14	-14	-12
		-4	-4	-6	-9	-9	-11	-13	-13	-15	-19	-30	-46	-18	-18
10	18	0	+3	+3	-6	-3	-3	-11	-8	-8	-7	-11	-17	-17	-14
		-4	-4	-7	-10	-10	-13	-15	-15	-18	-23	-36	-56	-21	-21
18	30	0	+2	+5	-6	-4	-1	-13	-11	-8	-8	-13	-20	-20	-18
		-5	-6	-7	-11	-12	-13	-18	-19	-20	-27	-43	-66	-25	-26
30	50	0	+3	+6	-7	-4	-1	-15	-12	-9	-10	-15	-24	-24	-21
		-6	-6	-8	-13	-13	-15	-21	-21	-23	-32	-50	-80	-30	-30
50	80	+1	+4	+7	-8	-5	-2	-17	-14	-11	-12	-18	-29	-29	-26
		-6	-7	-10	-15	-16	-19	-24	-25	-28	-38	-60	-96	-36	-37
80	120	0	+4	+7	-10	-6	-3	-20	-16	-13	-14	-21	-33	-34	-30
		-8	-9	-12	-18	-19	-22	-28	-29	-32	-45	-70	-110	-42	-43
120	180	0	+6	+10	-12	-6	-2	-24	-18	-14	-15	-24	-38	-40	-34
		-9	-8	-13	-21	-20	-25	-33	-32	-37	-50	-80	-126	-49	+48

Cutting Speed

The cutting speed has the highest influence on the surface quality of the reamed hole and on the life of the tool. Increasing the cutting speed beyond the optimum speed will cause increased tool wear due to the increased cutting temperature. The increased speed also causes an increase in the built-up edge (material that is welded to the cutting edge). The built-up edge damages the surface finish and shortens the life of the tool. In order to achieve high surface quality and longer tool life, the cutting speed for reaming should be kept relatively low.

Feed Rate

The feed rate directly influences the wear on the cutting edge. As the feed rate is increased, the cutting forces increase almost proportionally. The feed, however, has less influence on the machined surface quality and tool wear than the cutting speed (i.e. the feed can be varied in a relatively wide range without having material influence the quality of the machined hole and the respective tool life). It is therefore recommended to select the highest possible feed in order to shorten reaming times without significantly reducing the tool life.

Reaming Allowance

The reaming allowance (the amount of material to be reamed) also influences the tool life. In order to achieve high tool life, the reaming allowance should be kept at a reasonable minimum considering the process to be performed. If the reaming allowance is too small, it may result in a high dimensional variation (inability to maintain the required tolerances) and a decrease in the machined surface quality. When reaming materials that have surface defects or have been welded or flame cut, the reaming allowance should be increased so these factors do not appear on the reamed surface.

Coolant/Lubrication

The high degree of friction between the tool and the wall being reamed demands the use of a fluid for lubrication and cooling. Using lubrication is more critical for maintaining tolerances than using a coolant. General cutting oils and emulsions may be used. It should be noted that in some cases emulsions will yield a better surface finish than cutting oils. Emulsions are thinner fluids that are able to reach and more uniformly lubricate the cutting edges better than viscous cutting oils (especially when performing deep applications). In order to determine the most suitable lubricant for a particular application, tests should be run on the material to be cut, on a case-to-case basis.

Reaming Prerequisites

In order to achieve high tolerances for reaming applications, there are certain requirements that must be considered.

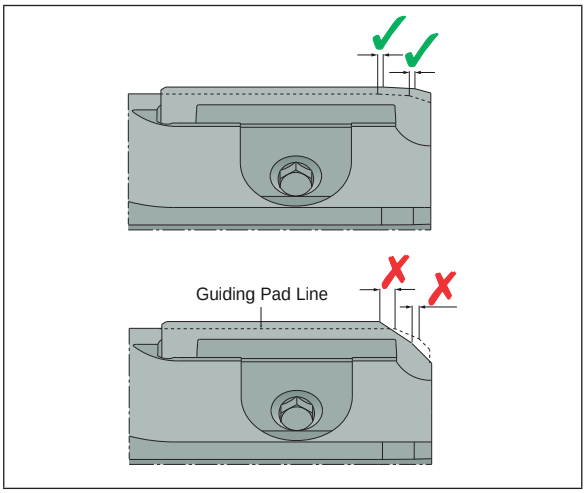
1. Condition of the tool - If the tool is reground, both an exact concentricity and high quality grinding are indispensable.
2. Workpiece material - Axis shifting and warping (i.e. incorrect hole positioning) can only be corrected to a certain degree when reaming. A critical factor is the initial opening in the workpiece. This opening must be even, or if the prepared hole is countersunk, a cone countersink must be used. Failure to properly prepare the initial opening can result in irregular countersinking that leads to the reamer being pushed out of its proper alignment. Ideally, pre-machining should be performed in a chuck to avoid alignment defects.
3. Through holes - For best results, the holes to be reamed should extend completely through the workpiece material. This allows for easy exit of both the cutting fluid and the reamed material. Negative flute reamers are advantageous in through hole reaming.
4. Blind holes - Use straight flute reamers for blind holes.

High Speed Reaming System with Internal Coolant Holes

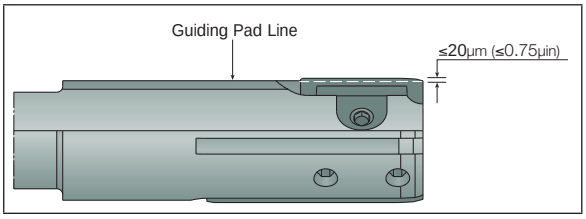
The INDEXH-REAM standard line covers reaming applications of 8-32 mm hole diameters. The indexable cutting insert has two cutting corners with 4 lead angle options and 3 rake angle variations, covering most workpiece material types. The INDEXH-REAM single indexable insert with carbide pads provides a combination of economical and high precision results on a very wide range of materials.

Important

Lead type of the tool (pads) should be compatible with the lead type of the insert. Using an improper insert will damage the tool and the reamed part.



The guiding pads are precisely ground for a specific diameter, and therefore, can only be used for reaming on appropriate hole sizes. The adjustment mechanism is designed for a specific diameter setting and for wear compensation (a few microns only). The same tool can not be used for reaming different diameters.



Tool Designation Code Key

RM	SET	12.000[1]	H6	T	B	C16	s
Reamer	Single-Edged Tool	Hole Diameter	Hole Tolerance				

Hole Type

B	Blind
T	Through

Lead Type[2]

A, B, C, D
(see page 338)
Note: A, C,
D - optional

Shank Type

C	Cylindrical
W	Weldon
F	Flat

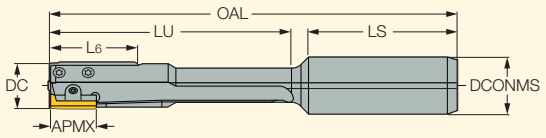
Reamer Length S-Short

(1) To be ordered for each specific diameter and tolerance
(2) Tool lead type - according to insert's lead type

INDEXH-REAM

RM-SET-T-B

Single-Edged Indexable
Reamers for Through Holes



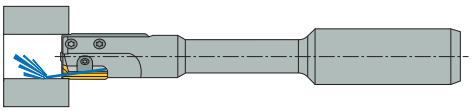
Designation	DC	APMX	L6[1]	LU	LS	OAL	DCONMS	SSC[2]
RM-SET8.000H6T-B-C16S	8.000	15.50	30.00	75.0	45.0	123.50	16.00	1.0
RM-SET9.000H6T-B-C16S	9.000	15.50	30.00	75.0	45.0	123.50	16.00	1.0
RM-SET10.000H6T-B-C16S	10.000	15.50	30.00	75.0	45.0	123.50	16.00	2.0
RM-SET11.000H6T-B-C16S	11.000	15.50	30.00	75.0	45.0	123.50	16.00	2.0
RM-SET12.000H6T-B-C16S	12.000	17.00	30.00	85.0	45.0	135.00	16.00	3.0
RM-SET13.000H6T-B-C16S	13.000	17.00	30.00	85.0	45.0	135.00	16.00	3.0
RM-SET14.000H6T-B-C16S	14.000	17.00	30.00	85.0	45.0	135.00	16.00	3.0
RM-SET15.000H6T-B-C16S	15.000	17.00	30.00	85.0	45.0	135.00	16.00	3.0
RM-SET16.000H6T-B-C20S	16.000	17.00	30.00	110.0	50.0	165.00	20.00	3.0
RM-SET17.000H6T-B-C20S	17.000	17.00	30.00	110.0	50.0	165.00	20.00	3.0
RM-SET18.000H6T-B-C20S	18.000	17.00	30.00	110.0	50.0	165.00	20.00	3.0
RM-SET19.000H6T-B-C20S	19.000	17.00	30.00	110.0	50.0	165.00	20.00	3.0
RM-SET20.000H6T-B-C25S	20.000	17.00	30.00	110.0	56.0	171.00	25.00	3.0
RM-SET21.000H6T-B-C25S	21.000	17.00	30.00	110.0	56.0	171.00	25.00	3.0
RM-SET22.000H6T-B-C25S	22.000	17.00	30.00	130.0	56.0	191.00	25.00	3.0
RM-SET23.000H6T-B-C25S	23.000	17.00	30.00	130.0	56.0	191.00	25.00	3.0
RM-SET24.000H6T-B-C25S	24.000	17.00	30.00	130.0	56.0	191.00	25.00	3.0
RM-SET25.000H6T-B-C25S	25.000	17.00	30.00	130.0	56.0	191.00	25.00	3.0
RM-SET26.000H6T-B-C25S	26.000	22.50	30.00	160.0	56.0	221.00	25.00	4.0
RM-SET27.000H6T-B-C25S	27.000	22.50	30.00	160.0	56.0	221.00	25.00	4.0
RM-SET28.000H6T-B-C25S	28.000	22.50	30.00	160.0	56.0	221.00	25.00	4.0
RM-SET29.000H6T-B-C25S	29.000	22.50	30.00	160.0	56.0	221.00	25.00	4.0
RM-SET30.000H6T-B-C25S	30.000	22.50	30.00	160.0	56.0	221.00	25.00	4.0
RM-SET31.000H6T-B-C25S	31.000	22.50	30.00	160.0	56.0	221.00	25.00	4.0
RM-SET32.000H6T-B-C25S	32.000	22.50	30.00	160.0	56.0	221.00	25.00	4.0

• For spare parts, see page 335 • For user guide and cutting conditions, see pages 338-343

(1) Pad length

(2) Insert size

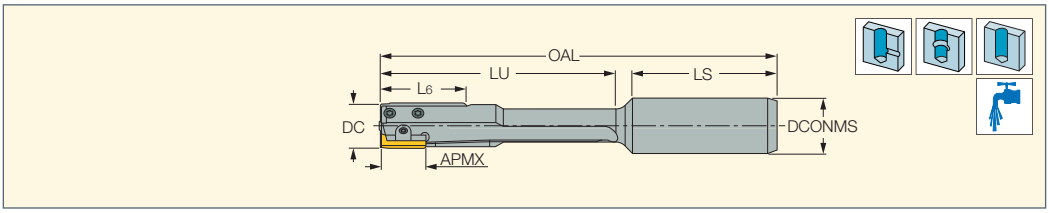
For inserts, see pages: RM-SEI-B (336)



INDEXH-REAM

RM-SET-B-B

Single-Edged Indexable
Reamers for Blind Holes



Designation	DC	APMX	OAL	LS	LU	L6(1)	DCONMS	SSC(2)
RM-SET8.000H6B-B-C16S	8.000	15.50	123.50	45.0	75.0	30.00	16.00	1.0
RM-SET9.000H6B-B-C16S	9.000	15.50	123.50	45.0	75.0	30.00	16.00	1.0
RM-SET10.000H6B-B-C16S	10.000	15.50	123.50	45.0	75.0	30.00	16.00	2.0
RM-SET11.000H6B-B-C16S	11.000	15.50	123.50	45.0	75.0	30.00	16.00	2.0
RM-SET12.000H6B-B-C16S	12.000	17.00	135.00	45.0	85.0	30.00	16.00	3.0
RM-SET13.000H6B-B-C16S	13.000	17.00	135.00	45.0	85.0	30.00	16.00	3.0
RM-SET14.000H6B-B-C16S	14.000	17.00	135.00	45.0	85.0	30.00	16.00	3.0
RM-SET15.000H6B-B-C16S	15.000	17.00	135.00	45.0	85.0	30.00	16.00	3.0
RM-SET16.000H6B-B-C20S	16.000	17.00	165.00	50.0	110.0	30.00	20.00	3.0
RM-SET17.000H6B-B-C20S	17.000	17.00	165.00	50.0	110.0	30.00	20.00	3.0
RM-SET18.000H6B-B-C20S	18.000	17.00	165.00	50.0	110.0	30.00	20.00	3.0
RM-SET19.000H6B-B-C20S	19.000	17.00	165.00	50.0	110.0	30.00	20.00	3.0
RM-SET20.000H6B-B-C25S	20.000	17.00	171.00	56.0	110.0	30.00	25.00	3.0
RM-SET21.000H6B-B-C25S	21.000	17.00	171.00	56.0	110.0	30.00	25.00	3.0
RM-SET22.000H6B-B-C25S	22.000	17.00	191.00	56.0	130.0	30.00	25.00	3.0
RM-SET23.000H6B-B-C25S	23.000	17.00	191.00	56.0	130.0	30.00	25.00	3.0
RM-SET24.000H6B-B-C25S	24.000	17.00	191.00	56.0	130.0	30.00	25.00	3.0
RM-SET25.000H6B-B-C25S	25.000	17.00	191.00	56.0	130.0	30.00	25.00	3.0
RM-SET26.000H6B-B-C25S	26.000	22.50	221.00	56.0	160.0	30.00	25.00	4.0
RM-SET27.000H6B-B-C25S	27.000	22.50	221.00	56.0	160.0	30.00	25.00	4.0
RM-SET28.000H6B-B-C25S	28.000	22.50	221.00	56.0	160.0	30.00	25.00	4.0
RM-SET29.000H6B-B-C25S	29.000	22.50	221.00	56.0	160.0	30.00	25.00	4.0
RM-SET30.000H6B-B-C25S	30.000	22.50	221.00	56.0	160.0	30.00	25.00	4.0
RM-SET31.000H6B-B-C25S	31.000	22.50	221.00	56.0	160.0	30.00	25.00	4.0
RM-SET32.000H6B-B-C25S	32.000	22.50	221.00	56.0	160.0	30.00	25.00	4.0

- For user guide and cutting conditions, see pages 338-343

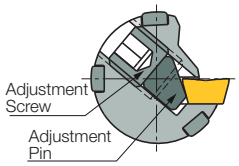
(1) Pad length

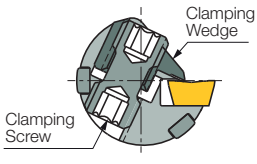
(2) Insert size

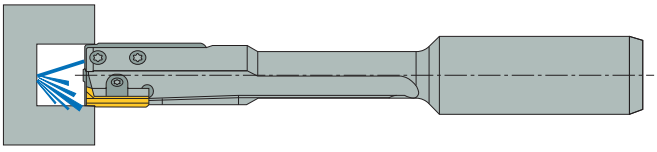
For inserts, see pages: RM-SEI-B (336)

Spare Parts

D [mm]	Clamping Wedge	Clamping Screw	Adjustment Screw	Adjustment Pin	Insert Size
8	WDG-RM-SE-1	SR-CL-RM-SE-1	SR-ADJ-M3x2.5	PIN-ADJ-RM-SE-1	1
9	WDG-RM-SE-1	SR-CL-RM-SE-1	SR-ADJ-M3x3	PIN-ADJ-RM-SE-1	1
10	WDG-RM-SE-2	SR-CL-RM-SE-1	SR-ADJ-M3x3	PIN-ADJ-RM-SE-2	2
11	WDG-RM-SE-2	SR-CL-RM-SE-1	SR-ADJ-M3x4	PIN-ADJ-RM-SE-2	2
12	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x4	PIN-ADJ-RM-SE-3	3
13	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x4	PIN-ADJ-RM-SE-3	3
14	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x4	PIN-ADJ-RM-SE-3	3
15	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x6	PIN-ADJ-RM-SE-3	3
16	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x6	PIN-ADJ-RM-SE-3	3
17	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x8	PIN-ADJ-RM-SE-3	3
18	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x8	PIN-ADJ-RM-SE-3	3
19	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x8	PIN-ADJ-RM-SE-3	3
20	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x10	PIN-ADJ-RM-SE-3	3
21	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x10	PIN-ADJ-RM-SE-3	3
22	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x10	PIN-ADJ-RM-SE-3	3
23	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x10	PIN-ADJ-RM-SE-3	3
24	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x10	PIN-ADJ-RM-SE-3	3
25	WDG-RM-SE-3	SR-CL-RM-SE-3	SR-ADJ-M4x10	PIN-ADJ-RM-SE-3	3
26	WDG-RM-SE-4	SR-CL-RM-SE-4	SR-ADJ-M4x10	PIN-ADJ-RM-SE-4	4
27	WDG-RM-SE-4	SR-CL-RM-SE-4	SR-ADJ-M4x10	PIN-ADJ-RM-SE-4	4
28	WDG-RM-SE-4	SR-CL-RM-SE-4	SR-ADJ-M4x10	PIN-ADJ-RM-SE-4	4
29	WDG-RM-SE-4	SR-CL-RM-SE-4	SR-ADJ-M4x10	PIN-ADJ-RM-SE-4	4
30	WDG-RM-SE-4	SR-CL-RM-SE-4	SR-ADJ-M4x10	PIN-ADJ-RM-SE-4	4
31	WDG-RM-SE-4	SR-CL-RM-SE-4	SR-ADJ-M4x10	PIN-ADJ-RM-SE-4	4
32	WDG-RM-SE-4	SR-CL-RM-SE-4	SR-ADJ-M4x10	PIN-ADJ-RM-SE-4	4







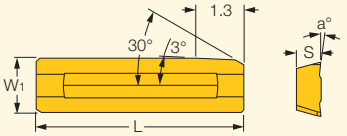
Insert Designation Code Key

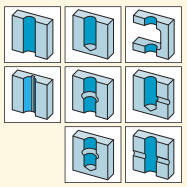
RM	SEI	4	B	12	IC907
Reamer	Single Edge Insert	Insert Size	Lead Type A, B, C	Rake Angle	Carbide Grade

INDEXH-REAM

RM-SEI-B

Single-Edged Reaming Inserts for General Applications at High Cutting Speeds





Designation	Dimensions SSC(1)	a°	L	W1	S	Tough ↔ Hard IC30N	IC07	IC507	IC907
RM-SEI-1B-00	1.0	0	15.50	2.80	1.50				•
RM-SEI-1B-06	1.0	6	15.50	2.80	1.50			•	•
RM-SEI-1B-12	1.0	12	15.50	2.80	1.50		•		•
RM-SEI-2B-00	2.0	0	15.50	3.60	1.50				•
RM-SEI-2B-06	2.0	6	15.50	3.60	1.50			•	•
RM-SEI-2B-12	2.0	12	15.50	3.60	1.50		•		•
RM-SEI-3B-00	3.0	0	17.00	4.40	2.00				•
RM-SEI-3B-06	3.0	6	17.00	4.40	2.00			•	•
RM-SEI-3B-12	3.0	12	17.00	4.40	2.00		•		•
RM-SEI-4B-06	4.0	6	22.50	6.60	3.00	•		•	•
RM-SEI-4B-12	4.0	12	22.50	6.60	3.00		•		•

• Lead type of insert should be compatible with lead type of the tool

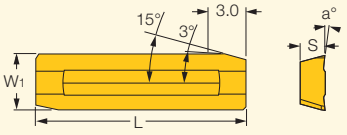
(1) Insert size

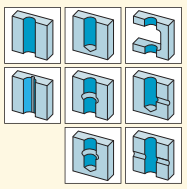
For tools, see pages: RM-SET-B-B (335) • RM-SET-T-B (334)

INDEXH-REAM

RM-SEI-A

Single-Edged Reaming Inserts for High Surface Quality at Low Cutting Conditions





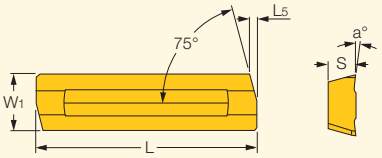
Designation	Dimensions SSC(1)	a°	L	W1	S	Tough ↔ Hard IC507	IC907
RM-SEI-1A-06	1.0	6	15.50	2.80	1.50	•	
RM-SEI-2A-06	2.0	6	15.50	3.60	1.50	•	
RM-SEI-3A-06	3.0	6	15.50	4.40	2.00	•	
RM-SEI-3A-12	3.0	12	17.00	4.40	2.00		•
RM-SEI-4A-06	4.0	6	22.50	6.60	3.00	•	

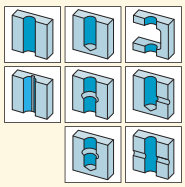
• Lead type of insert should be compatible with lead type of the tool • Available on request

(1) Insert size

INDEXH-REAM

RM-SEI-C
Single-Edged Reaming Inserts
for Aluminum and Brass



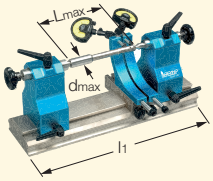


Designation	Dimensions						IC07
	SSC(1)	a°	L	W1	S	PLGL	
RM-SEI-1C-12	1.0	12	15.50	2.80	1.50	0.550	•
RM-SEI-2C-12	2.0	12	15.50	3.60	1.50	0.550	•
RM-SEI-3C-12	3.0	12	17.00	4.40	2.00	0.550	•
RM-SEI-4C-12	4.0	12	22.50	6.60	3.00	0.550	•

• Lead type of insert should be compatible with lead type of the tool • Available on request
(1) Insert size

Accessories

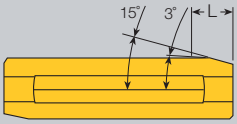
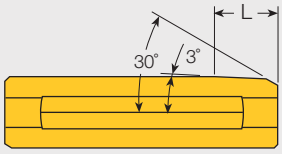
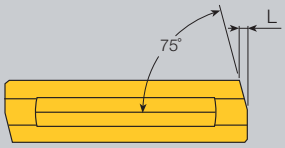
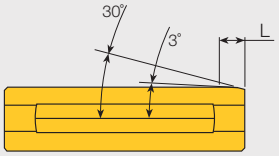
RM SETTING DEVICE
Reamer Setting Device



Designation	L max	l1	d max	kg
RM SETTING DEVICE	265.0	450.00	170.0	25.00

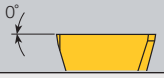
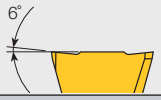
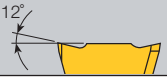
Front Angles and Cutting Geometries

4 standard lead angles are available:

Lead	L [mm]	Use
A	3	Higher surface quality, lower cutting conditions (not recommended for nonferrous materials) 
B	1.3	Universal use, high speed cutting conditions. Can be used on a wide range of materials 
C	0.55	Suitable for aluminum and brass at high cutting speed 
D(1)	0.6	When needed for blind hole - lower feed 

(1) On request

3 standard cutting angles are available:

	Angle [deg.]	Use
00		For cast iron applications
06		General use
12		For stainless steel and aluminum

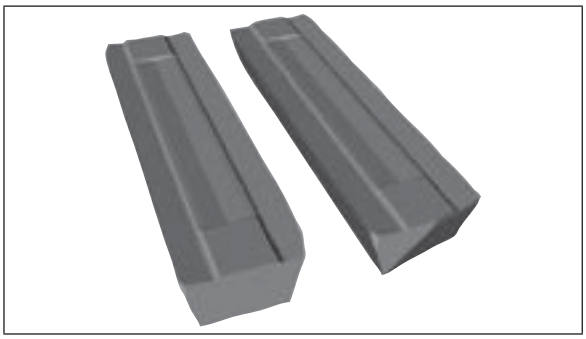
Carbide Grades

IC07 grade is the basic substrate for reaming inserts. It is a very versatile submicron grade. **IC07** features very high fracture toughness and wear resistance, which is required for efficient high speed reaming. An uncoated **IC07** can be used for machining nonferrous (N type material group) applications. Two types of standard coatings are available:

- **IC907** – a TiAlN PVD coating for steel (P) and stainless steel (M) workpiece material groups
- **IC507** - a TiCN+TiN PVD coating for cast iron (K) workpiece material group.

The following grades can be provided on request:

- **PCD** grade for machining aluminum
- **PCBN** grade for machining cast iron
- **IC30N** (cermet) for machining steel

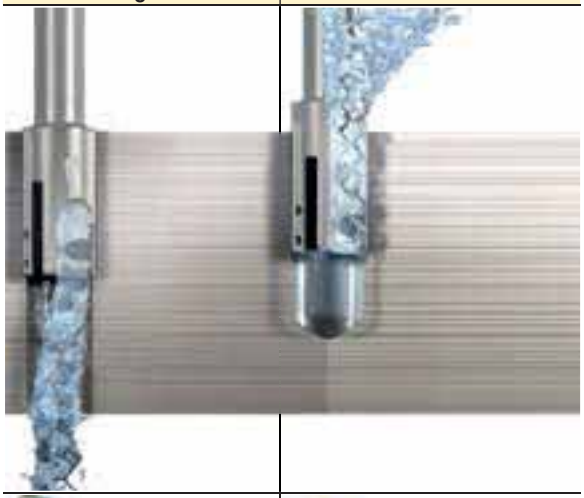
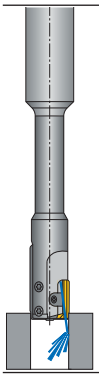
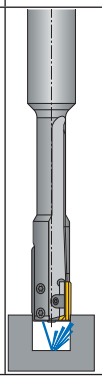


Concept

The INDEXH-REAM Line is available in 4 sizes and features two different holder geometries (short flute and long flute). The holder selection depends on the hole type (through or blind).

RM-SEI-1	RM-SEI-2	RM-SEI-3	RM-SEI-4
			
Ø8.00-9.99 mm (Ø.315-.393")	Ø10.00-11.99 mm (Ø.393-.472")	Ø12.00-25.99 mm (Ø.472-1.024")	Ø26.00-32.00 mm (Ø1.024-1.260")

Applications

Through Hole	Blind Hole
	
	
Through Hole Short Flute Holder. This holder has a lateral coolant outlet located right above the insert. The coolant is pointed directly to the cutting edge to lubricate it and divert the chips forward. Additional coolant outlets are located behind the guiding pads. Their purpose is to reduce high friction that is created between the pads and the reamed surface during machining.	**Blind Hole** Long Flute Holder. This holder has a frontal coolant outlet. The liquid reaches the bottom of the blind hole and evacuates the formed chips. These chips are conveyed backwards through the long chip gullet (flute) of the holder.
	

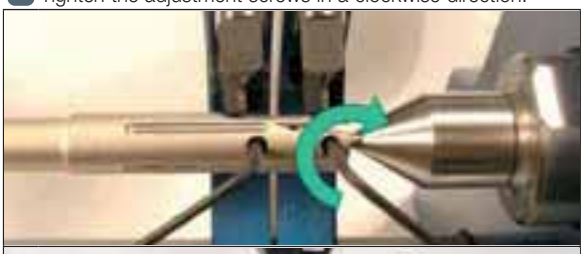
Setting Procedure

1 Place the reamer between the centering pins of the device.

2 Use the pad as a reference for setting the indicator to zero.

3 Rotate and place the inserts against indicators.

4 Tighten the adjustment screws in a clockwise direction.



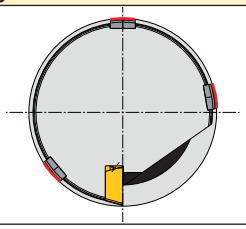
5 Adjust the frontal side of the insert to:
+15 µm (+0.6 µin) on D≤9.99,
+20 µm (+0.8 µin) on D≤10.00

6 Adjust the rear side of insert to:
+5 µm (+0.2 µin) on D≤9.99,
+10 µm (+0.4 µin) on D≤10.00

Back Taper

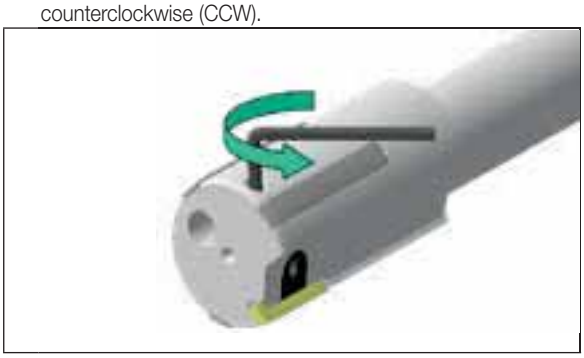
The back taper prevents the reamer from jamming, as well as lowering reaming forces and improving surface quality. Incorrect back taper may cause unstable reaming, accelerated wear and rough surface finish.

High Friction Lubricated Zones

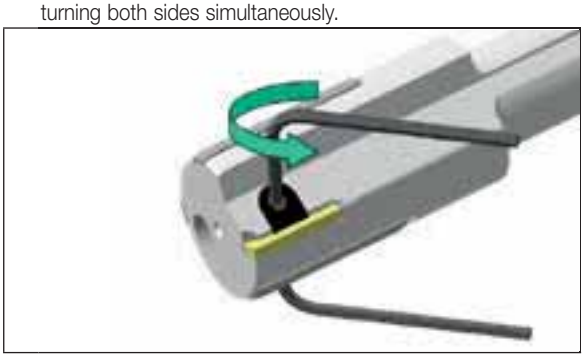


Insert Indexing

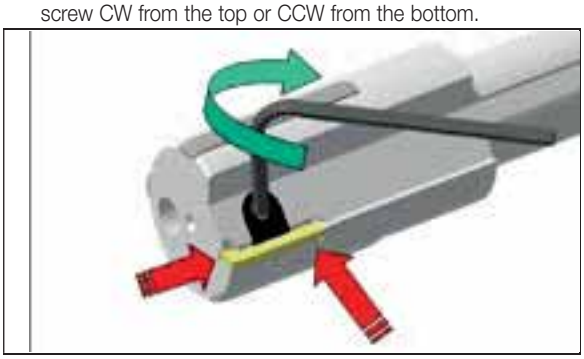
1 Rotate the adjustment screws one turn counterclockwise (CCW).



2 Rotate the clamping screw CCW from the top and/or clockwise (CW) from the bottom, turning both sides simultaneously.



3 Remove the insert. Clean the insert and the pocket. Place the sharp edge on the outer position. Press the insert against the back stopper and the two adjustment pins. Tighten the clamping wedge by rotating the clamping screw CW from the top or CCW from the bottom.



Setting Methods

There are two optional setting methods - comparison micrometer and setting device. Comparison micrometer with dial gauge, although a low cost solution and readily available for small workshops, is prone to damaging the cutting edge and therefore not recommended.

Using a Comparison Micrometer
Set the micrometer to the correct diameter using the precision blocks. Adjust the frontal diameter and back taper by turning the adjustment screw clockwise. The frontal diameter should be larger than the rear diameter by approximately 0.015 mm.(0.6 µin).

Using a Setting Device
ISCAR's mechanical setting device enables easy, quick and accurate adjustment. Due to its modular construction, it can be used for standard, special and more complicated reamer adjustments.

Setting Device Located Between Centers

- Shorter setting time
- Modular system
- Higher accuracy
- No risk of damaging the cutting edge

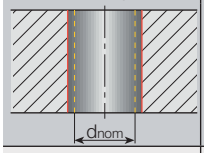
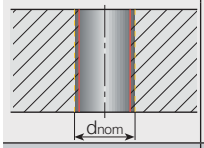
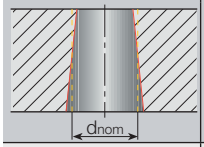
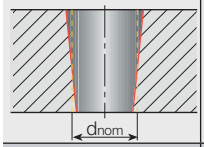
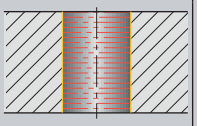
H-REAM Cutting Conditions

The cutting conditions in the table below should be used to start a new application.
Optimal conditions for a specific application should be evaluated by examining the results and changing the machining conditions accordingly.

Material No.	Material	Lead A=15°/3° L3 (reaming allowance = 0.1-0.3)							Lead B=30°/3° L1.3 (reaming allowance = 0.1-0.3)						
		Feed [mm/rev]	Rake [°]	Cutting Speed V_c [m/min]					Feed [mm/rev]	Rake [°]	Cutting Speed V_c [m/min]				
				Carbide	Coated Carbide	Cermet	PCD	CBN			Carbide	Coated Carbide	Cermet	PCD	CBN
1-5	Non-alloy steel and cast steel, free cutting steel	0.1-0.4	6	40-60	60-80	110-160			0.1-0.3	6	60-80	80-120	110-160		
6-9	Low alloy and cast steel (less than 5% of alloying elements)	0.1-0.4	6	20-40	40-60	110-160			0.1-0.3	6	60-80	80-120	110-160		
10-11	High alloyed steel, cast steel and tool steel	0.1-0.4	6	20-40	20-60	20-60			0.1-0.3	6	40-60	40-80	40-80		
12-13	Stainless steel and cast steel	0.1-0.3	12	20-40	40-60	40-60			0.1-0.2	12	40-60	60-80	60-80		
15-16	Grey cast iron (GG)	0.1-0.3	0/6	40-60	60-100			Please ask	0.1-0.3	0/6	60-80	80-120			Please ask
17-18	Nodular cast iron (GGG)	0.1-0.3	0/6	40-60	60-100				0.1-0.3	0/6	60-80	80-120			
19-20	Malleable cast iron	0.1-0.3	0/6	40-60	60-100				0.1-0.3	0/6	60-80	80-120			
21-22	Aluminum wrought alloy						Please ask		0.1-0.3	12	160-200			Please ask	
23-25	Aluminum -cast, alloyed								0.1-0.3	12	160-200				
26-28	Copper alloys								0.1-0.2	0	80-100				
29-30	Non-metallic								0.1-0.3	0	10-70				

Material No.	Material	Lead D=30°/3° L0.6 (reaming allowance = 0.1-0.2)							Lead C=75°/3° L0.55 (reaming allowance = 0.2-0.4)						
		Feed [mm/rev]	Rake [°]	Cutting Speed V_c [m/min]					Feed [mm/rev]	Rake [°]	Cutting Speed V_c [m/min]				
				Carbide	Coated Carbide	Cermet	PCD	CBN			Carbide	Coated Carbide	Cermet	PCD	CBN
1-5	Non-alloy steel and cast steel, free cutting steel	0.05-0.2	6	60-80	80-120	110-160									
6-9	Low alloy and cast steel (less than 5% of alloying elements)	0.05-0.2	6	60-80	80-120	110-160									
10-11	High alloyed steel, cast steel and tool steel and tool steel	0.05-0.2	6	40-60	40-80	40-80									
12-13	Stainless steel and cast steel	0.05-0.2	12	40-60	60-80	60-80									
15-16	Grey cast iron (GG)	0.05-0.2	0/6	60-80	80-120			Please ask							Please ask
17-18	Nodular cast iron (GGG)	0.05-0.2	0/6	60-80	80-120										
19-20	Malleable cast iron	0.05-0.2	0/6	60-80	80-120										
21-22	Aluminum wrought alloy	0.05-0.2	12	110-200			Please ask		0.15-0.3	12	150-250			Please ask	
23-25	Aluminum -cast, alloyed	0.05-0.2	12	180-200					0.15-0.3	12	150-250				
26-28	Copper alloys	0.05-0.2	0	80-100											
29-30	Non-metallic														

Troubleshooting

Problem	Cause	Solution
Hole too large 	• Reamer or pilot hole not centered • Reamer too large • Cooling / lubrication problems	• Use a floating reamer chuck or correct pilot hole • Check size of reamer and correct if necessary • Change lubricant and increase coolant pressure
Hole too small 	• Worn reamer • Reaming allowance too small • Cooling / lubrication problems	• Replace the reamer • Increase reaming allowance • Change lubricant and increase coolant pressure
Conical hole (larger bottom) 	• Misalignment between pre hole and reamer centers	• Re-align or use a floating reamer chuck
Conical hole (larger entrance) 	• Misalignment between pre-hole and reamer centers • Material jammed between reamer and hole in the upper hole section	• Re-align or use a floating reamer chuck • Secure the tool axially
Poor surface finish 	• Worn reamer • Misalignment between pre-hole and reamer centers • Problems with chip evacuation • Incorrect cutting parameters • Built-up edge	• Replace the tool • Re-align or use a floating reamer chuck • Increase coolant pressure • Change cutting parameters • Change cutting parameters or coolant conditions

Complete Machining Solutions
TAPS

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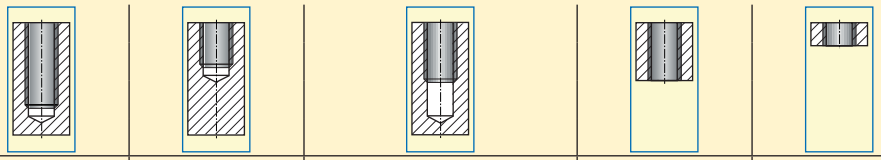
Tap Selection Guide and Cutting Speed Recommendations

Material No.	Hole Type[4] 					Tap Color Code[1]	
						Tool Material[1]	
						Surface Treatment/Coating[2]	
						Flute Hand and Angle	
						Lead According to DIN 2197[3]	
	1	2	3	4	5	Hole Type[4]	
	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Chip	Coolant
1	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	Ext. Long	T
2		>= 0.25 %C	Annealed	650	190	Medium	T
3		< 0.55 %C	Quench and tempered	850	250	Long	T
4		>= 0.55 %C	Annealed	750	220	Long	T
7				930	275	Long	X
8			Quench and tempered	1000	300	Long	X
9				1200	350	Long	A
10	Non-alloy steel and cast steel, free cutting steel		Annealed	680	200	Long	X
11			Quench and tempered	1100	325	Long	X
12	Stainless steel		Ferritic/Martensitis	680	200	Medium	A
13			Martensitic	820	240	Long	A
14	Stainless steel		Austenitic	600	180	Long	A
15	Grey cast iron (GG)		Ferritic/pearlitic		180	Ext. Short	X
16			Pearlitic		260	Ext. Short	X
17	Cast iron nodular (GGG)		Ferritic		160	Short	X
18			Pearlitic		250	Ext. Short	X
19	Malleable cast iron		Ferritic		130	Short	X
20			Pearlitic		230	Short	X
21	Aluminum-wrought alloy		Not cureable		60	Medium	T
22			Cured		100	Medium	T
23	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	Short	T
24			Cured		90	Short	T
25		>12% Si	High temp.		130	Short	T
26	Copper alloys	>1% Pb	Free cutting		110	Med/Short	T
27			Brass		90	Long	T
28			Electrolitic copper		100	Long	T
29	Non-metalic		Duroplastics, fiber plastics			Short	Z
31	High temp. alloys	Fe based	Annealed		200	Long	A
32			Cured		280	Long	A
33	Super alloys	Ni or Co based	Annealed		250	Long	A
34			Cured		350	Long	A
35			Cast		250	Long	A
36	Titanium and Ti alloys		Alpha+beta alloys cured	400		Med/Short	A
37				1050		Med/Short	A

[1] See page 348
[2] See page 362
[3] See page 363
[4] See page 363

Coolant
A - Cutting oil
T - Oil emulsion
X - Oil or emulsion
Z - Dry or emulsion

W(1)		M		M		M		M		M		M		S		H		N		H		G		F
HSS		HSS-E		HSS-E		HSS-E		HSS-E		HSS-E		HSS-E		HSS-E		HSS-E		HSS-E		HSS-E		HSS-E		HSS-E
-		-		TI		ST		-		TI		ST		ST		-		ST		ST		NI		TI
-		-		-		-		R40°		R40°		R40°		-		-		R40°		R40°		-		-
1\2\3		B		B		B		C		C		C		B		B		C		C		C		C
1-2-3-4-5		4-5		4-5		4-5		1-2-3		1-2-3		1-2-3		4-5		4-5		1-2-3		1-2-3		1-2-3-4-5		1-2-3-4-5
m/min		m/min		m/min		m/min		m/min		m/min		m/min		m/min		m/min		m/min		m/min		m/min		m/min
	•	10-25	••	15-45	•	8-25	••	20-25	••	15-45	•	8-25	••			20-25	••	8-25	•	20-25	••			20-60
	•	10-20	••	12-40	•	10-35	••	15-20	••	12-40	•	10-35	••			15-20	••	10-35	••	15-20	••			20-60
	•	12-18	••	15-25	•	6-12	••	12-18	••	15-25	•	6-12	••			12-18	••			12-18	••			17-55
	•	12-18	••	15-40	•	6-20	••	12-18	••	15-40	•	6-20	••			12-18	••			12-18	••			17-55
	•	10-15	••	5-25	•	4-10	••	10-15	••	5-25	•	4-10	••			10-15	••			10-15	••			
	•	6-10	••	5-25	•	4-10	••	6-10	••	5-25	•	4-10	••			6-10	••			6-10	••			
	•	3-5	••	5-20	•	3-5	••	3-5	••	5-20	•	3-5	••			3-5	••			3-5	••			
	•	10-15	••	20-30	•	7-12	••	10-15	••	20-30	•	7-12	••			10-15	••			10-15	••			10-30
	•	7-13	••	12-25	•	5-10	••	7-13	••	12-25	•	5-10	••			7-13	••			7-13	••			
	•	5-9	••	8-18	•	1-5	•	5-9	••	2-10	•	1-5	•	2-10	•					5-9	••			7-15
	•	4-6	••	8-15	•	1-5	•	4-6	••	2-10	•	1-5	•	2-10	•					4-6	••			
	•	5-9	••	8-15	•	1-4	•	5-9	••	2-10	•	1-4	•	2-10	•					5-9	••			
	•	10-15	••	15-45	••	13-20	•	10-15	••	15-45	••	13-20	•							10-15	••	10-30	•	
	•	8-12	••	10-40	••	21-31	•	8-12	••	10-40	••	21-31	•							8-12	••	10-30	•	
	•	8-12	•	10-25	••	21-31	•	8-12	•	10-25	•	21-31	•							8-12	••	10-40	•	
	•	8-12	••	10-20	••	21-31	•	8-12	••	10-20	••	21-31	•							8-12	••	10-35	•	
	•	10-15	•	15-45	••	13-20	•	10-15	••	15-45	••	13-20	•							10-15	••	10-45	•	
	•	10-15	•	10-40	••	13-20	•	10-15	••	10-40	••	13-20	•							10-15	••	10-40	•	
	•	25-35	•	50-70	•	12-25	••	25-35	•	30-60	•	12-25	••					12-25	••	25-35	••			
	•	25-35	•	50-70	•	12-25	••	25-35	•	30-60	•	12-25	••					12-25	••	25-35	••			
	•	10-15	•	10-40	•	10-25	••	10-15	•	15-40	•	10-25	••					10-25	••	10-15	••			
	•	10-15	•	10-40	•	10-25	••	10-15	•	15-40	•	10-25	••					10-25	••	10-15	••			
	•	10-15	•	10-30	•	10-20	••	10-15	•	15-30	•	10-20	••					10-20	••	10-15	••			
	•	25-35	•	50-70	•	20-40	••	25-35	•	30-65	•	20-40	••					20-40	••	25-35	••			17-40
	•	15-20	•	5-60	•	13-30	••	15-20	•	20-45	•	13-30	••					13-30	••	15-20	••			20-60
	•	15-20	•	5-25	•	10-17	••	15-20	•	15-30	•	10-17	••					10-17	••	15-20	••			20-60
	•	6-10	•	5-25	•	6-13	••	6-10	•	10-20	•	6-13	••					6-13	••	6-10	••			
	•	2-4	••	4-8	•			2-4	•	3-7	••					2-4				2-4	•			
	•	2-4	••	4-8	•			2-4		3-7	••					2-4				2-4	•			
	•	2-4	••	4-8	•			2-4		3-7	••					2-4				2-4	•			
	•	2-4	••	4-8	•			2-4		3-7	••					2-4				2-4	•			
	•	2-4	••	4-8	•			2-4		3-7	••					2-4				2-4	•			
	•	6-10	••					6-10	••							6-10				6-10	•			
	•	6-10	•					6-10	••							6-10				6-10	•			

• Recommended
•• Suitable
(1) Hand Tap

Tap Designation Code Key

TPG	UNC	1/4-20	M	□	HE	Ti

Tap Style

- TPH - Hand Tap
- TPF - Forming Tap
- TPG - Gun Point
- TPS - Spiral Flute
- TPST - Straight Flute

D- TPI
D- Pitch

B - Bore for Coolant
(on request)

Coating Types*

- Ni - Nitriding
- Ti - TiN
- TC - TiCN
- TA - TiAlN
- St - Black Oxide

* On request

Thread Standard

- M - ISO Metric Coars Thread DIN-13
- MF - ISO Metric Fine Thread DIN-13
- UNF - Unfied Fine Thread
- UNC - Unfied Coarse Thread

Tap Color Codes(1)

- M - Multi-Material Application
- W - Steel with Good Machinability Rm<750 N/mm^2
- S - Stainless Steel
- H - Hardened Steel and High Temp./ Super Alloys Rm>750 N/mm^2
- G - Grey Cast Iron
- N - Low Alloy Steel Rm<600 N/mm^2
- A - Aluminum and Aluminum Alloys
- F - Any Material with at least 8~10% Elongation

(1) The tools have a matching colored ring around the shank

Tap Materials

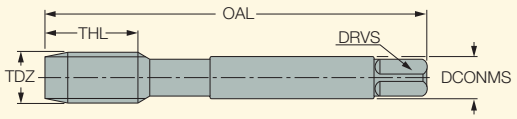
- HS - H.S.S. (M2)
- HE - H.S.S- E 5% Co. HSS (M35)
- PM - Compacted Powder
- HM - Solid Carbide

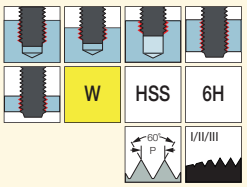
Chamfer Lead According to DIN2197 (specified for each tool family)

- **A** Form A (Chamfer Lead 5-6 Threads)
- **B** Form B (with Gun-Nose and Chamfer Lead 4-5 Threads)
- **C** Form C (Chamfer Lead 2-3 Threads)
- **D** Form D (Chamfer Lead 4-5 Threads)
- **E** Form E (Chamfer Lead 1.5-2 Threads)

TPH M-W (HSS)

DIN 13 HSS Hand Tap Set for
ISO Metric Coarse Threads





Designation	Dimensions									HS
	TDZ	TP[2]	OAL	THL	DCONMS	NOF[3]	DRVS[4]	Pre-hole	Standard	
TPH M-2X0.4-W	M2	0.400	36.00	8.0	2.80	3	2.10	1.60	DIN 352	●
TPH M-2.2X0.45-W	M2.2	0.450	36.00	9.0	2.80	3	2.10	1.75	DIN 352	●
TPH M-2.5X0.45-W	M2.5	0.450	40.00	9.0	2.80	3	2.10	2.05	DIN 352	●
TPH M-2.6X0.45-W [1]	M2.6	0.450	40.00	9.0	2.80	3	2.10	2.10	DIN 352	●
TPH M-3X0.5-W	M3	0.500	40.00	11.0	3.50	3	2.70	2.50	DIN 352	●
TPH M-3.5X0.6-W	M3.5	0.600	45.00	13.0	4.00	3	3.00	2.90	DIN 352	●
TPH M-4X0.7-W	M4	0.700	45.00	13.0	4.50	3	3.40	3.30	DIN 352	●
TPH M-4.5X0.75-W	M4.5	0.750	50.00	16.0	6.00	3	4.90	3.70	DIN 352	●
TPH M-5X0.8-W	M5	0.800	52.00	16.0	6.00	3	4.90	4.20	DIN 352	●
TPH M-5.5X0.9-W	M5.5	0.900	56.00	18.0	6.00	3	4.90	4.60	DIN 352	●
TPH M-6X1.0-W	M6	1.000	56.00	18.0	6.00	3	4.90	5.00	DIN 352	●
TPH M-7X1.0-W	M7	1.000	56.00	18.0	6.00	3	4.90	6.00	DIN 352	●
TPH M-8X1.25-W	M8	1.250	63.00	20.0	6.00	3	4.90	6.80	DIN 352	●
TPH M-9X1.25-W	M9	1.250	63.00	20.0	7.00	4	5.50	7.80	DIN 352	●
TPH M-10X1.5-W	M10	1.500	70.00	22.0	7.00	4	5.50	8.50	DIN 352	●
TPH M-11X1.5-W	M11	1.500	70.00	22.0	8.00	4	6.20	9.50	DIN 352	●
TPH M-12X1.75-W	M12	1.750	80.00	24.0	9.00	4	7.00	10.20	DIN 352	●
TPH M-14X2.0-W	M14	2.000	80.00	26.0	11.00	4	9.00	12.00	DIN 352	●
TPH M-16X2.0-W	M16	2.000	80.00	27.0	12.00	4	9.00	14.00	DIN 352	●
TPH M-18X2.5-W	M18	2.500	95.00	30.0	14.00	4	11.00	15.50	DIN 352	●
TPH M-20X2.5-W	M20	2.500	95.00	32.0	16.00	4	12.00	17.50	DIN 352	●

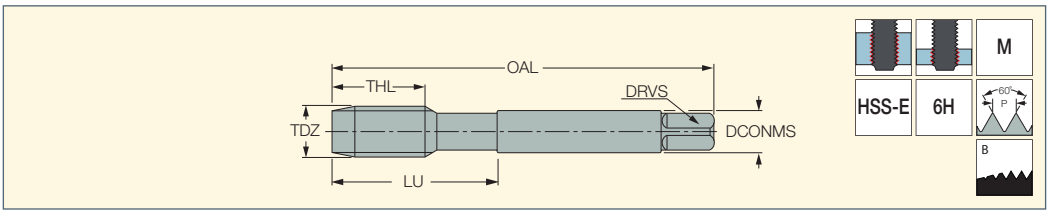
• NOTE: Each set contains 2 or 3 taps • For user guide and cutting conditions, see pages 346-348, 361-382

[1] DIN profile
[2] Thread pitch
[3] Number of flutes
[4] Torque key size

ONETAP

TPG M (HSS)

DIN 13 HSS Gun Point Machine Taps for ISO Metric Coarse Threads for a Wide Range of Materials



Designation	Dimensions										Tough ↔ Hard		
	TDZ	TP[1]	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	Pre-hole	Standard	HE	HEST	HETI
TPG M-2X0.4-M	M2	0.400	45.00	8.0	13.0	2.80	3	2.10	1.60	DIN 371	●	●	●
TPG M-2.2X0.45-M	M2.2	0.450	45.00	8.0	13.0	2.80	3	2.10	1.75	DIN 371	●	●	●
TPG M-2.3X0.4-M	M2.3	0.400	45.00	8.0	13.0	2.80	3	2.10	1.90	DIN 371	●	●	●
TPG M-2.5X0.45-M	M2.5	0.450	50.00	9.0	15.0	2.80	3	2.10	2.05	DIN 371	●	●	●
TPG M-2.6X0.45-M	M2.6	0.450	50.00	9.0	15.0	2.80	3	2.10	2.10	DIN 371	●	●	●
TPG M-3X0.5-M	M3	0.500	56.00	11.0	18.0	3.50	3	2.70	2.50	DIN 371	●	●	●
TPG M-3.5X0.6-M	M3.5	0.600	56.00	12.0	20.0	4.00	3	3.00	2.90	DIN 371	●	●	●
TPG M-4X0.7-M	M4	0.700	63.00	13.0	21.0	4.50	3	3.40	3.30	DIN 371	●	●	●
TPG M-4.5X0.75-M	M4.5	0.750	70.00	14.0	25.0	6.00	3	4.90	3.70	DIN 371	●	●	●
TPG M-5X0.8-M	M5	0.800	70.00	15.0	25.0	6.00	3	4.90	4.20	DIN 371	●	●	●
TPG M-6X1.0-M	M6	1.000	80.00	17.0	30.0	6.00	3	4.90	5.00	DIN 371	●	●	●
TPG M-7X1.0-M	M7	1.000	80.00	17.0	30.0	7.00	3	5.50	6.00	DIN 371	●	●	●
TPG M-8X1.25-M	M8	1.250	90.00	20.0	35.0	8.00	3	6.20	6.80	DIN 371	●	●	●
TPG M-9X1.25-M	M9	1.250	90.00	20.0	35.0	9.00	3	7.00	7.80	DIN 371	●	●	●
TPG M-10X1.5-M	M10	1.500	100.00	22.0	39.0	10.00	3	8.00	8.50	DIN 371	●	●	●
TPG M-11X1.5-M	M11	1.500	100.00	22.0	-	8.00	3	6.20	9.50	DIN 376	●	●	●
TPG M-12X1.75-M	M12	1.750	110.00	24.0	-	9.00	3	7.00	10.20	DIN 376	●	●	●
TPG M-14X2.0-M	M14	2.000	110.00	26.0	-	11.00	3	9.00	12.00	DIN 376	●	●	●
TPG M-16X2.0-M	M16	2.000	110.00	27.0	-	12.00	3	9.00	14.00	DIN 376	●	●	●
TPG M-18X2.5-M	M18	2.500	125.00	30.0	-	14.00	4	11.00	15.50	DIN 376	●	●	●
TPG M-20X2.5-M	M20	2.500	140.00	32.0	-	16.00	4	12.00	17.50	DIN 376	●	●	●
TPG M-22X2.5-M	M22	2.500	140.00	32.0	-	18.00	4	14.50	19.50	DIN 376	●	●	●
TPG M-24X3.0-M	M24	3.000	160.00	34.0	-	18.00	4	14.50	21.00	DIN 376	●	●	●
TPG M-27X3.0-M	M27	3.000	160.00	36.0	-	20.00	4	16.00	24.00	DIN 376	●	●	●
TPG M-30X3.5-M	M30	3.500	180.00	40.0	-	22.00	4	18.00	26.50	DIN 376	●	●	●

• For user guide and cutting conditions, see pages 346-348, 361-382

(1) Thread pitch

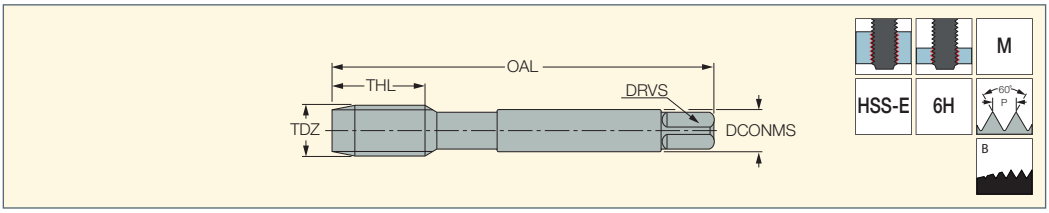
(2) Number of flutes

(3) Torque key size

ONETAP

TPG MF (HSS)

DIN 13 HSS Gun Point Machine Taps for ISO Metric Fine Threads for a Wide Range of Materials



Designation	Dimensions									Tough ↔ Hard		
	TDZ	TP(1)	OAL	THL	DCONMS	NOF(2)	DRVS(3)	Pre-hole	Standard	HE	HEST	HETI
TPG MF-4X0.5-M	M4	0.500	63.00	10.0	2.80	3	2.10	3.50	DIN 374	●	●	●
TPG MF-5X0.5-M	M5	0.500	70.00	11.0	3.50	3	2.70	4.50	DIN 374	●	●	●
TPG MF-6X0.75-M	M6	0.750	80.00	13.0	4.50	3	3.40	5.20	DIN 374	●	●	●
TPG MF-6X0.5-M	M6	0.500	80.00	13.0	4.50	3	3.40	5.50	DIN 374	●	●	●
TPG MF-7X0.75-M	M7	0.750	80.00	14.0	5.50	3	4.30	6.20	DIN 374	●	●	●
TPG MF-8X1.0-M	M8	1.000	90.00	17.0	6.00	3	4.90	7.00	DIN 374	●	●	●
TPG MF-8X0.75-M	M8	0.750	80.00	14.0	6.00	3	4.90	7.20	DIN 374	●	●	●
TPG MF-10X1.25-M	M10	1.250	100.00	22.0	7.00	3	5.50	8.80	DIN 374	●	●	●
TPG MF-10X1.0-M	M10	1.000	90.00	18.0	7.00	3	5.50	9.00	DIN 374	●	●	●
TPG MF-10X0.75-M	M10	0.750	90.00	18.0	7.00	3	5.50	9.20	DIN 374	●	●	●
TPG MF-12X1.5-M	M12	1.500	100.00	22.0	9.00	3	7.00	10.50	DIN 374	●	●	●
TPG MF-12X1.25-M	M12	1.250	100.00	22.0	9.00	3	7.00	10.80	DIN 374	●	●	●
TPG MF-12X1.0-M	M12	1.000	100.00	18.0	9.00	3	7.00	11.00	DIN 374	●	●	●
TPG MF-14X1.5-M	M14	1.500	100.00	22.0	11.00	3	9.00	12.50	DIN 374	●	●	●
TPG MF-14X1.25-M	M14	1.250	100.00	22.0	11.00	3	9.00	12.80	DIN 374	●	●	●
TPG MF-14X1.0-M	M14	1.000	100.00	18.0	11.00	3	9.00	13.00	DIN 374	●	●	●
TPG MF-16X1.5-M	M16	1.500	100.00	22.0	12.00	3	9.00	14.50	DIN 374	●		●
TPG MF-16X1.0-M	M16	1.000	100.00	18.0	12.00	3	9.00	15.00	DIN 374	●	●	●
TPG MF-18X1.5-M	M18	1.500	110.00	25.0	14.00	4	11.00	16.50	DIN 374	●	●	●
TPG MF-18X1.0-M	M18	1.000	110.00	20.0	14.00	4	11.00	17.00	DIN 374	●	●	●
TPG MF-20X1.5-M	M20	1.500	125.00	25.0	16.00	4	12.00	18.50	DIN 374	●	●	
TPG MF-20X1.0-M	M20	1.000	125.00	20.0	16.00	4	12.00	19.00	DIN 374	●	●	●
TPG MF-22X1.5-M	M22	1.500	125.00	25.0	18.00	4	14.50	20.50	DIN 374	●	●	●
TPG MF-22X1.0-M	M22	1.000	125.00	20.0	18.00	4	14.50	21.00	DIN 374	●	●	●
TPG MF-24X2.0-M	M24	2.000	140.00	27.0	18.00	4	14.50	22.00	DIN 374	●	●	●
TPG MF-24X1.5-M	M24	1.500	140.00	27.0	18.00	4	14.50	22.50	DIN 374	●	●	●
TPG MF-26X1.5-M	M26	1.500	140.00	28.0	18.00	4	14.50	24.50	DIN 374	●	●	●
TPG MF-27X2.0-M	M27	2.000	140.00	28.0	20.00	4	16.00	25.00	DIN 374	●	●	●
TPG MF-27X1.5-M	M27	1.500	140.00	28.0	20.00	4	16.00	25.50	DIN 374	●	●	●
TPG MF-28X1.5-M	M28	1.500	140.00	28.0	20.00	4	16.00	26.50	DIN 374	●	●	●
TPG MF-30X2.0-M	M30	2.000	150.00	30.0	22.00	4	18.00	28.00	DIN 374	●	●	●
TPG MF-30X1.5-M	M30	1.500	150.00	30.0	22.00	4	18.00	28.50	DIN 374	●	●	●

• For user guide and cutting conditions, see pages 346-348, 361-382

(1) Thread pitch

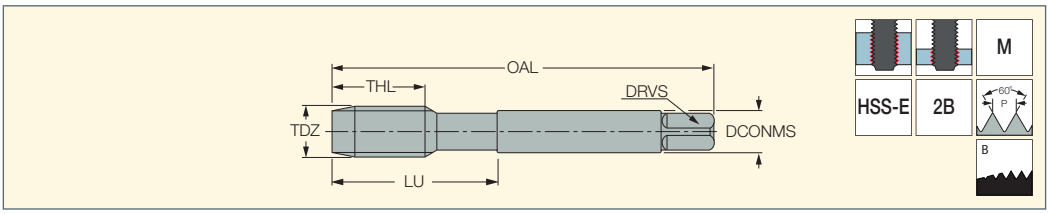
(2) Number of flutes

(3) Torque key size

ONETAP

TPG UNC (HSS)

HSS Gun Point Machine Taps for Unified Coarse Threads for a Wide Range of Materials



Designation	Dimensions										Tough ↔ Hard		
	TDZ	TPI[1]	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	Pre-hole	Standard	HE	HEST	HETI
TPG UNC-#4-40-M	#4	40.0	56.00	11.0	18.0	3.50	3	2.70	2.30	DIN 371	•	•	•
TPG UNC-#5-40-M	#5	40.0	56.00	11.0	18.0	3.50	3	2.70	2.60	DIN 371	•	•	•
TPG UNC-#6-32-M	#6	32.0	56.00	12.0	20.0	4.00	3	3.00	2.85	DIN 371	•	•	•
TPG UNC-#8-32-M	#8	32.0	63.00	13.0	21.0	4.50	3	3.40	3.50	DIN 371	•		•
TPG UNC-#10-24-M	#10	24.0	70.00	15.0	25.0	6.00	3	4.90	3.90	DIN 371	•	•	•
TPG UNC-#12-24-M	#12	24.0	80.00	16.0	30.0	6.00	3	4.90	4.50	DIN 371	•	•	•
TPG UNC-1/4-20-M	1/4"	20.0	80.00	17.0	30.0	7.00	3	5.50	5.20	DIN 371	•	•	•
TPG UNC-5/16-18-M	5/16"	18.0	90.00	20.0	35.0	8.00	3	6.20	6.60	DIN 371	•	•	•
TPG UNC-3/8-16-M	3/8"	16.0	100.00	22.0	39.0	9.00	3	7.00	8.00	DIN 371	•	•	•
TPG UNC-7/16-14-M	7/16"	14.0	100.00	22.0	-	8.00	3	6.20	9.40	DIN 376	•	•	•
TPG UNC-1/2-13-M	1/2"	13.0	110.00	25.0	-	9.00	3	7.00	10.75	DIN 376	•	•	•
TPG UNC-9/16-12-M	9/16"	12.0	110.00	26.0	-	11.00	3	9.00	12.25	DIN 376	•	•	•
TPG UNC-5/8-11-M	5/8"	11.0	110.00	27.0	-	12.00	3	9.00	13.50	DIN 376	•	•	•
TPG UNC-3/4-10-M	3/4"	10.0	125.00	30.0	-	14.00	4	11.00	16.50	DIN 376	•	•	•
TPG UNC-7/8-9-M	7/8"	9.0	140.00	32.0	-	18.00	4	14.50	19.50	DIN 376	•	•	•
TPG UNC-1-8-M	1"	8.0	160.00	36.0	-	20.00	4	16.00	22.25	DIN 376	•	•	•

• For user guide and cutting conditions, see pages 346-348, 361-382

(1) Threads per inch

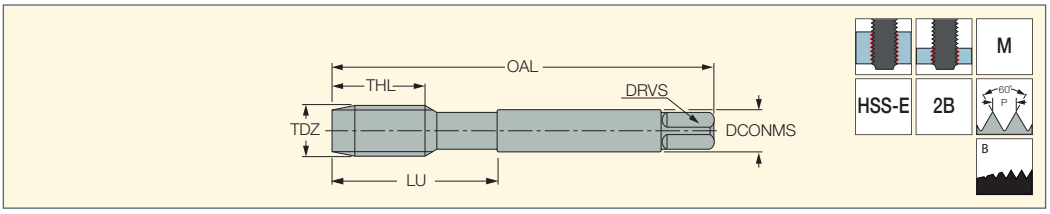
(2) Number of flutes

(3) Torque key size

ONETAP

TPG UNF (HSS)

HSS Gun Point Machine Taps for Unified Fine Threads for a Wide Range of Materials



Designation	Dimensions										Tough ↔ Hard		
	TDZ	TPI[1]	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	Pre-hole	Standard	HE	HEST	HETI
TPG UNF-#4-48-M	#4	48.0	56.00	11.0	18.0	3.50	3	2.70	2.40	DIN 371	•	•	•
TPG UNF-#5-44-M	#5	44.0	56.00	11.0	18.0	3.50	3	2.70	2.70	DIN 371	•	•	•
TPG UNF-#6-40-M	#6	40.0	56.00	12.0	20.0	4.00	3	3.00	3.00	DIN 371	•	•	•
TPG UNF-#8-36-M	#8	36.0	63.00	13.0	21.0	4.50	3	3.40	3.50	DIN 371	•	•	•
TPG UNF-#10-32-M	#10	32.0	70.00	15.0	25.0	6.00	3	4.90	4.10	DIN 371	•	•	•
TPG UNF-#12-28-M	#12	28.0	80.00	16.0	30.0	6.00	3	4.90	4.70	DIN 371	•	•	•
TPG UNF-1/4-28-M	1/4"	28.0	80.00	17.0	30.0	7.00	3	5.50	5.50	DIN 371	•	•	•
TPG UNF-5/16-24-M	5/16"	24.0	90.00	17.0	35.0	8.00	3	6.20	6.90	DIN 371	•	•	•
TPG UNF-3/8-24-M	3/8"	24.0	100.00	18.0	39.0	9.00	3	7.00	8.50	DIN 371	•	•	•
TPG UNF-7/16-20-M	7/16"	20.0	100.00	22.0	-	8.00	3	6.20	9.90	DIN 374	•	•	•
TPG UNF-1/2-20-M	1/2"	20.0	100.00	22.0	-	9.00	3	7.00	11.50	DIN 374	•	•	•
TPG UNF-9/16-18-M	9/16"	18.0	100.00	22.0	-	11.00	3	9.00	12.90	DIN 374	•	•	•
TPG UNF-5/8-18-M	5/8"	18.0	100.00	22.0	-	12.00	3	9.00	14.50	DIN 374	•	•	•
TPG UNF-3/4-16-M	3/4"	16.0	110.00	25.0	-	14.00	4	11.00	17.50	DIN 374	•	•	•
TPG UNF-7/8-14-M	7/8"	14.0	125.00	26.0	-	18.00	4	14.50	20.50	DIN 374	•	•	•
TPG UNF-1-12-M	1"	12.0	140.00	28.0	-	20.00	4	16.00	23.25	DIN 374	•	•	•

• For user guide and cutting conditions, see pages 346-348, 361-382

(1) Threads per inch

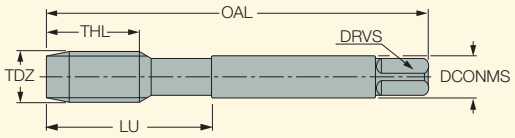
(2) Number of flutes

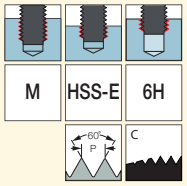
(3) Torque key size

ONETAP

TPS M (HSS)

DIN 13 HSS Spiral Flute Machine Taps for Metric Coarse Threads for a Wide Range of Materials





Designation	Dimensions											Tough ↔ Hard		
	TDZ	TP[1]	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	Pre-hole	Standard	CSP[4]	HE	HEST	HETI
TPS M-2X0.4-M	M2	0.400	45.00	8.0	13.0	2.80	3	2.10	1.60	DIN 371	0	●	●	●
TPS M-2.2X0.45-M	M2.2	0.450	45.00	8.0	13.0	2.80	3	2.10	1.75	DIN 371	0	●	●	●
TPS M-2.3X0.4-M	M2.3	0.400	45.00	8.0	13.0	2.80	3	2.10	1.90	DIN 371	0	●	●	●
TPS M-2.5X0.45-M	M2.5	0.450	50.00	9.0	15.0	2.80	3	2.10	2.05	DIN 371	0	●	●	●
TPS M-2.6X0.45-M	M2.6	0.450	50.00	9.0	15.0	2.80	3	2.10	2.10	DIN 371	0	●	●	●
TPS M-3X0.5-M	M3	0.500	56.00	6.0	18.0	3.50	3	2.70	2.50	DIN 371	0	●	●	●
TPS M-3.5X0.6-M	M3.5	0.600	56.00	7.0	20.0	4.00	3	3.00	2.90	DIN 371	0	●	●	●
TPS M-4X0.7-M	M4	0.700	63.00	7.0	21.0	4.50	3	3.40	3.30	DIN 371	0	●	●	●
TPS M-4.5X0.75-M	M4.5	0.750	70.00	8.0	25.0	6.00	3	4.90	3.70	DIN 371	0	●	●	●
TPS M-5X0.8-M	M5	0.800	70.00	8.0	25.0	6.00	3	4.90	4.20	DIN 371	0	●	●	●
TPS M-6X1.0-M	M6	1.000	80.00	10.0	30.0	6.00	3	4.90	5.00	DIN 371	0	●	●	●
TPS M-7X1.0-M	M7	1.000	80.00	10.0	30.0	7.00	3	5.50	6.00	DIN 371	0	●	●	●
TPS M-8X1.25-M	M8	1.250	90.00	13.0	35.0	8.00	3	6.20	6.80	DIN 371	0	●	●	●
TPS M-9X1.25-M	M9	1.250	90.00	13.0	35.0	9.00	3	7.00	7.80	DIN 371	0	●	●	●
TPS M-10X1.5-M	M10	1.500	100.00	15.0	39.0	10.00	3	8.00	8.50	DIN 371	0	●	●	●
TPS M-11X1.5-M	M11	1.500	100.00	17.0	-	8.00	3	6.20	9.50	DIN 376	0	●	●	●
TPS M-12X1.75-M	M12	1.750	110.00	18.0	-	9.00	3	7.00	10.20	DIN 376	0	●	●	●
TPS M-14X2.0-M	M14	2.000	110.00	20.0	-	11.00	3	9.00	12.00	DIN 376	0	●	●	●
TPS M-16X2.0-M	M16	2.000	110.00	20.0	-	12.00	3	9.00	14.00	DIN 376	0	●	●	●
TPS M-16X2.0-M-B	M16	2.000	110.00	20.0	-	12.00	3	9.00	14.00	DIN 376	1	●		
TPS M-18X2.5-M	M18	2.500	125.00	25.0	-	14.00	4	11.00	15.50	DIN 376	0	●	●	●
TPS M-18X2.5-M-B	M18	2.500	125.00	25.0	-	14.00	4	11.00	15.50	DIN 376	1	●		
TPS M-20X2.5-M	M20	2.500	140.00	25.0	-	16.00	4	12.00	17.50	DIN 376	0	●	●	●
TPS M-20X2.5-M-B	M20	2.500	140.00	25.0	-	16.00	4	12.00	17.50	DIN 376	1	●		
TPS M-22X2.5-M	M22	2.500	140.00	25.0	-	18.00	4	14.50	19.50	DIN 376	0	●	●	●
TPS M-22X2.5-M-B	M22	2.500	140.00	25.0	-	18.00	4	14.50	19.50	DIN 376	1	●		
TPS M-24X3.0-M	M24	3.000	160.00	30.0	-	18.00	4	14.50	21.00	DIN 376	0	●	●	●
TPS M-24X3.0-M-B	M24	3.000	160.00	30.0	-	18.00	4	14.50	21.00	DIN 376	1	●		
TPS M-27X3.0-M	M27	3.000	160.00	30.0	-	20.00	4	16.00	24.00	DIN 376	0	●	●	●
TPS M-30X3.5-M	M30	3.500	180.00	35.0	-	22.00	4	18.00	26.50	DIN 376	0	●	●	●
TPS M-30X3.5-M-B	M30	3.500	180.00	35.0	-	22.00	4	18.00	26.50	DIN 376	1	●		

• For user guide and cutting conditions, see pages 346-348, 361-382

[1] Thread pitch

[2] Number of flutes

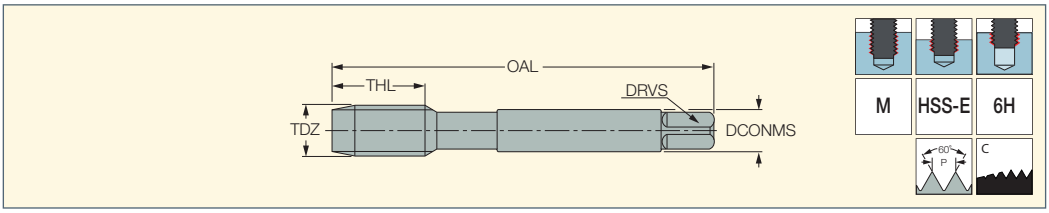
[3] Torque key size

[4] 0 - Without coolant supply, 1 - With coolant supply

ONETAP

TPS MF (HSS)

DIN 13 HSS Spiral Flute Machine Taps for Metric Fine Threads for a Wide Range of Materials



Designation	Dimensions									Tough ↔ Hard		
	TDZ	TP(1)	OAL	THL	DCONMS	NOF(2)	DRVS(3)	Pre-hole	Standard	HE	HEST	HETI
TPS MF-4X0.5-M	M4	0.500	63.00	5.0	2.80	3	2.10	3.50	DIN 374	●	●	●
TPS MF-5X0.5-M	M5	0.500	70.00	5.0	3.50	3	2.70	4.50	DIN 374	●	●	●
TPS MF-6X0.75-M	M6	0.750	80.00	8.0	4.50	3	3.40	5.20	DIN 374	●	●	●
TPS MF-6X0.5-M	M6	0.500	80.00	5.0	4.50	3	3.40	5.50	DIN 374	●	●	●
TPS MF-7X0.75-M	M7	0.750	80.00	10.0	5.50	3	4.30	6.20	DIN 374	●	●	●
TPS MF-8X1.0-M	M8	1.000	90.00	10.0	6.00	3	4.90	7.00	DIN 374	●	●	●
TPS MF-8X0.75-M	M8	0.750	80.00	8.0	6.00	3	4.90	7.20	DIN 374	●	●	●
TPS MF-10X1.25-M	M10	1.250	100.00	16.0	7.00	3	5.50	8.80	DIN 374	●	●	●
TPS MF-10X1.0-M	M10	1.000	90.00	10.0	7.00	3	5.50	9.00	DIN 374	●	●	●
TPS MF-10X0.75-M	M10	0.750	90.00	10.0	7.00	3	5.50	9.20	DIN 374	●	●	●
TPS MF-12X1.5-M	M12	1.500	100.00	15.0	9.00	3	7.00	10.50	DIN 374	●	●	●
TPS MF-12X1.25-M	M12	1.250	100.00	15.0	9.00	3	7.00	10.80	DIN 374	●	●	●
TPS MF-12X1.0-M	M12	1.000	100.00	11.0	9.00	3	7.00	11.00	DIN 374	●	●	●
TPS MF-14X1.5-M	M14	1.500	100.00	15.0	11.00	3	9.00	12.50	DIN 374	●	●	●
TPS MF-14X1.25-M	M14	1.250	100.00	15.0	11.00	3	9.00	12.80	DIN 374	●	●	●
TPS MF-14X1.0-M	M14	1.000	100.00	11.0	11.00	3	9.00	13.00	DIN 374	●	●	●
TPS MF-16X1.5-M	M16	1.500	100.00	15.0	12.00	3	9.00	14.50	DIN 374	●	●	●
TPS MF-16X1.0-M	M16	1.000	100.00	12.0	12.00	3	9.00	15.00	DIN 374	●	●	●
TPS MF-18X1.5-M	M18	1.500	110.00	17.0	14.00	4	11.00	16.50	DIN 374	●	●	●
TPS MF-18X1.0-M	M18	1.000	110.00	13.0	14.00	4	11.00	17.00	DIN 374	●	●	●
TPS MF-20X1.5-M	M20	1.500	125.00	17.0	16.00	4	12.00	18.50	DIN 374	●	●	●
TPS MF-20X1.0-M	M20	1.000	125.00	14.0	16.00	4	12.00	19.00	DIN 374	●	●	●
TPS MF-22X1.5-M	M22	1.500	125.00	17.0	18.00	4	14.50	20.50	DIN 374	●	●	●
TPS MF-22X1.0-M	M22	1.000	125.00	14.0	18.00	4	14.50	21.00	DIN 374	●	●	●
TPS MF-24X2.0-M	M24	2.000	140.00	20.0	18.00	4	14.50	22.00	DIN 374	●	●	●
TPS MF-24X1.5-M	M24	1.500	140.00	20.0	18.00	4	14.50	22.50	DIN 374	●	●	●
TPS MF-26X1.5-M	M26	1.500	140.00	20.0	18.00	4	14.50	24.50	DIN 374	●	●	●
TPS MF-27X2.0-M	M27	2.000	140.00	20.0	20.00	4	16.00	25.00	DIN 374	●	●	●
TPS MF-27X1.5-M	M27	1.500	140.00	20.0	20.00	4	16.00	25.50	DIN 374	●	●	●
TPS MF-28X1.5-M	M28	1.500	140.00	20.0	20.00	4	16.00	26.50	DIN 374	●	●	●
TPS MF-30X2.0-M	M30	2.000	150.00	22.0	22.00	4	18.00	28.00	DIN 374	●	●	●
TPS MF-30X1.5-M	M30	1.500	150.00	22.0	22.00	4	18.00	28.50	DIN 374	●	●	●

• For user guide and cutting conditions, see pages 346-348, 361-382

(1) Thread pitch

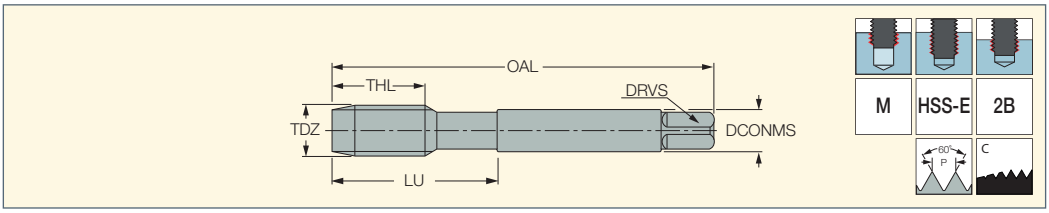
(2) Number of flutes

(3) Torque key size

ONETAP

TPS UNC (HSS)

HSS Spiral Flute Machine Taps for Unified Coarse Threads for a Wide Range of Materials



Designation	Dimensions										Tough ↔ Hard		
	TDZ	TPI[1]	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	Pre-hole	Standard	HE	HEST	HETI
TPS UNC-#4-40-M	#4	40.0	56.00	6.0	18.0	3.50	3	2.70	2.30	DIN 371	•	•	•
TPS UNC-#5-40-M	#5	40.0	56.00	7.0	18.0	3.50	3	2.70	2.60	DIN 371	•	•	•
TPS UNC-#6-32-M	#6	32.0	56.00	7.0	20.0	4.00	3	3.00	2.85	DIN 371	•	•	•
TPS UNC-#8-32-M	#8	32.0	63.00	8.0	21.0	4.50	3	3.40	3.50	DIN 371	•	•	•
TPS UNC-#10-24-M	#10	24.0	70.00	10.0	25.0	6.00	3	4.90	3.90	DIN 371	•	•	•
TPS UNC-#12-24-M	#12	24.0	80.00	10.0	30.0	6.00	3	4.90	4.50	DIN 371	•	•	•
TPS UNC-1/4-20-M	1/4"	20.0	80.00	13.0	30.0	7.00	3	5.50	5.20	DIN 371	•	•	•
TPS UNC-5/16-18-M	5/16"	18.0	90.00	14.0	35.0	8.00	3	6.20	6.60	DIN 371	•	•	•
TPS UNC-3/8-16-M	3/8"	16.0	100.00	16.0	39.0	9.00	3	7.00	8.00	DIN 371	•	•	•
TPS UNC-7/16-14-M	7/16"	14.0	100.00	17.0	-	8.00	3	6.20	9.40	DIN 376	•	•	•
TPS UNC-1/2-13-M	1/2"	13.0	110.00	20.0	-	9.00	3	7.00	10.75	DIN 376	•	•	•
TPS UNC-9/16-12-M	9/16"	12.0	110.00	20.0	-	11.00	3	9.00	12.25	DIN 376	•	•	•
TPS UNC-5/8-11-M	5/8"	11.0	110.00	22.0	-	12.00	3	9.00	13.50	DIN 376	•	•	•
TPS UNC-3/4-10-M	3/4"	10.0	125.00	25.0	-	14.00	4	11.00	16.50	DIN 376		•	•
TPS UNC-7/8-9-M	7/8"	9.0	140.00	27.0	-	18.00	4	14.50	19.50	DIN 376	•	•	•
TPS UNC-1-8-M	1"	8.0	160.00	30.0	-	20.00	4	16.00	22.25	DIN 376	•	•	•

• For user guide and cutting conditions, see pages 346-348, 361-382

(1) Threads per inch

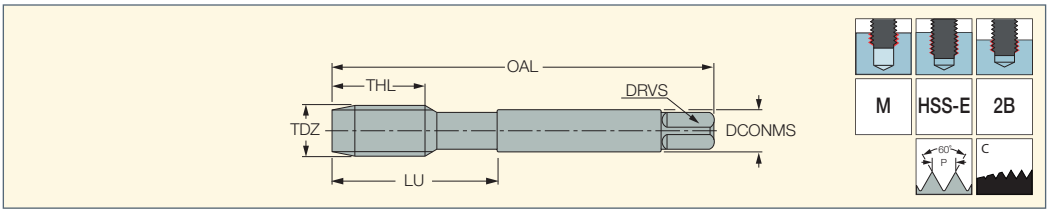
(2) Number of flutes

(3) Torque key size

ONETAP

TPS UNF (HSS)

HSS Spiral Flute Machine Taps for Unified Fine Threads for a Wide Range of Materials



Designation	Dimensions										Tough ↔ Hard		
	TDZ	TPI[1]	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	Pre-hole	Standard	HE	HEST	HETI
TPS UNF-#4-48-M	#4	48.0	56.00	6.0	18.0	3.50	3	2.70	2.40	DIN 371	•	•	•
TPS UNF-#5-44-M	#5	44.0	56.00	7.0	18.0	3.50	3	2.70	2.70	DIN 371	•	•	•
TPS UNF-#6-40-M	#6	40.0	56.00	7.0	20.0	4.00	3	3.00	3.00	DIN 371	•	•	•
TPS UNF-#8-36-M	#8	36.0	63.00	8.0	21.0	4.50	3	3.40	3.50	DIN 371	•	•	•
TPS UNF-#10-32-M	#10	32.0	70.00	10.0	25.0	6.00	3	4.90	4.10	DIN 371	•	•	•
TPS UNF-#12-28-M	#12	28.0	80.00	10.0	30.0	6.00	3	4.90	4.70	DIN 371	•	•	•
TPS UNF-1/4-28-M	1/4"	28.0	80.00	10.0	30.0	7.00	3	5.50	5.50	DIN 371	•	•	•
TPS UNF-5/16-24-M	5/16"	24.0	90.00	10.0	35.0	8.00	3	6.20	6.90	DIN 371	•	•	•
TPS UNF-3/8-24-M	3/8"	24.0	100.00	10.0	39.0	9.00	3	7.00	8.50	DIN 371	•	•	•
TPS UNF-7/16-20-M	7/16"	20.0	100.00	13.0	-	8.00	3	6.20	9.90	DIN 374	•	•	•
TPS UNF-1/2-20-M	1/2"	20.0	100.00	13.0	-	9.00	3	7.00	11.50	DIN 374		•	•
TPS UNF-9/16-18-M	9/16"	18.0	100.00	15.0	-	11.00	3	9.00	12.90	DIN 374	•	•	•
TPS UNF-5/8-18-M	5/8"	18.0	100.00	15.0	-	12.00	3	9.00	14.50	DIN 374	•	•	•
TPS UNF-3/4-16-M	3/4"	16.0	110.00	17.0	-	14.00	4	11.00	17.50	DIN 374	•	•	•
TPS UNF-7/8-14-M	7/8"	14.0	125.00	17.0	-	18.00	4	14.50	20.50	DIN 374	•	•	•
TPS UNF-1-12-M	1"	12.0	140.00	20.0	-	20.00	4	16.00	23.25	DIN 374	•	•	•

• For user guide and cutting conditions, see pages 346-348, 361-382

(1) Threads per inch

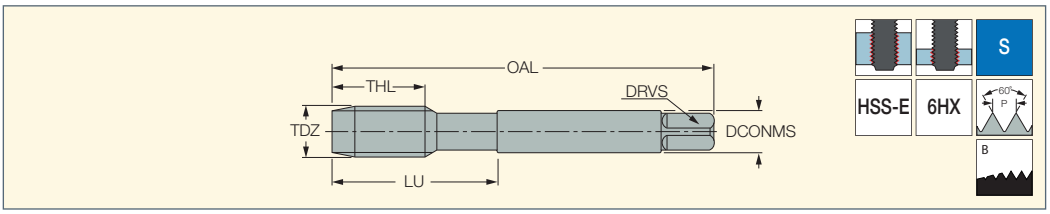
(2) Number of flutes

(3) Torque key size

HSS TAPS

TPG M-S (HSS)

HSS Gun Point Machine Taps According to DIN 13 for ISO Metric Coarse Threads on Steel with Good Machinability



Designation	Dimensions									HEST
	TDZ	TP[1]	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	Pre-hole	
TPG M-2.2X0.45-S	M2.2	0.450	45.00	8.0	-	2.80	3	2.10	1.75	●
TPG M-2.3X0.4-S	M2.3	0.400	45.00	8.0	-	2.80	3	2.10	1.90	●
TPG M-2.5X0.45-S	M2.5	0.450	50.00	9.0	-	2.80	3	2.10	2.05	●
TPG M-2.6X0.45-S	M2.6	0.450	50.00	9.0	-	2.80	3	2.10	2.10	●
TPG M-3X0.5-S	M3	0.500	56.00	11.0	18.0	3.50	3	2.70	2.50	●
TPG M-3.5X0.6-S	M3.5	0.600	56.00	12.0	20.0	4.00	3	3.00	2.90	●
TPG M-4X0.7-S	M4	0.700	63.00	13.0	21.0	4.50	3	3.40	3.30	●
TPG M-4.5X0.75-S	M4.5	0.750	70.00	14.0	25.0	6.00	3	4.90	3.70	●
TPG M-5X0.8-S	M5	0.800	70.00	15.0	25.0	6.00	3	4.90	4.20	●
TPG M-6X1.0-S	M6	1.000	80.00	17.0	30.0	6.00	3	4.90	5.00	●
TPG M-8X1.25-S	M8	1.250	90.00	20.0	35.0	8.00	3	6.20	6.80	●
TPG M-10X1.5-S	M10	1.500	100.00	22.0	39.0	10.00	3	8.00	8.50	●
TPG M-11X1.5-S	M11	1.500	100.00	22.0	-	8.00	3	6.20	9.50	●
TPG M-12X1.75-S	M12	1.750	110.00	24.0	-	9.00	4	7.00	10.20	●
TPG M-16X2.0-S	M16	2.000	110.00	27.0	-	12.00	4	9.00	14.00	●
TPG M-18X2.5-S	M18	2.500	125.00	30.0	-	14.00	4	11.00	15.50	●
TPG M-20X2.5-S	M20	2.500	140.00	32.0	-	16.00	4	12.00	17.50	●

• For user guide and cutting conditions, see pages 346-348, 361-382

[1] Thread pitch

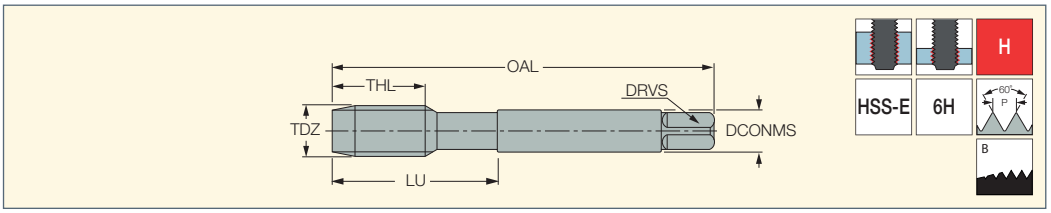
[2] Number of flutes

[3] Torque key size

HSS TAPS

TPG M-H (HSS)

DIN 13 HSS Gun Point Machine Taps for ISO Metric Coarse Threads for Hardened Steel and H.T.A.



Designation	Dimensions									HE
	TDZ	TP[1]	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	Pre-hole	
TPG M-2X0.4-H	M2	0.400	45.00	8.0	-	2.80	3	2.10	1.60	●
TPG M-2.3X0.4-H	M2.3	0.400	45.00	8.0	-	2.80	3	2.10	1.90	●
TPG M-2.5X0.45-H	M2.5	0.450	50.00	9.0	-	2.80	3	2.10	2.05	●
TPG M-2.6X0.45-H	M2.6	0.450	50.00	9.0	-	2.80	3	2.10	2.10	●
TPG M-3X0.5-H	M3	0.500	56.00	11.0	18.0	3.50	3	2.70	2.50	●
TPG M-3.5X0.6-H	M3.5	0.600	56.00	12.0	20.0	4.00	3	3.00	2.90	●
TPG M-4X0.7-H	M4	0.700	63.00	13.0	21.0	4.50	3	3.40	3.30	●
TPG M-4.5X0.75-H	M4.5	0.750	70.00	14.0	25.0	6.00	3	4.90	3.70	●
TPG M-5X0.8-H	M5	0.800	70.00	15.0	25.0	6.00	3	4.90	4.20	●
TPG M-6X1.0-H	M6	1.000	80.00	17.0	30.0	6.00	3	4.90	5.00	●
TPG M-7X1.0-H	M7	1.000	80.00	17.0	30.0	7.00	3	5.50	6.00	●
TPG M-8X1.25-H	M8	1.250	90.00	20.0	35.0	8.00	3	6.20	6.80	●
TPG M-10X1.5-H	M10	1.500	100.00	22.0	39.0	10.00	3	8.00	8.50	●
TPG M-11X1.5-H	M11	1.500	100.00	22.0	-	8.00	3	6.20	9.50	●
TPG M-12X1.75-H	M12	1.750	110.00	24.0	-	9.00	3	7.00	10.20	●
TPG M-14X2.0-H	M14	2.000	110.00	26.0	-	11.00	3	9.00	12.00	●
TPG M-16X2.0-H	M16	2.000	110.00	27.0	-	12.00	3	9.00	14.00	●
TPG M-18X2.5-H	M18	2.500	125.00	30.0	-	14.00	4	11.00	15.50	●
TPG M-20X2.5-H	M20	2.500	140.00	32.0	-	16.00	4	12.00	17.50	●

• For user guide and cutting conditions, see pages 346-348, 361-382

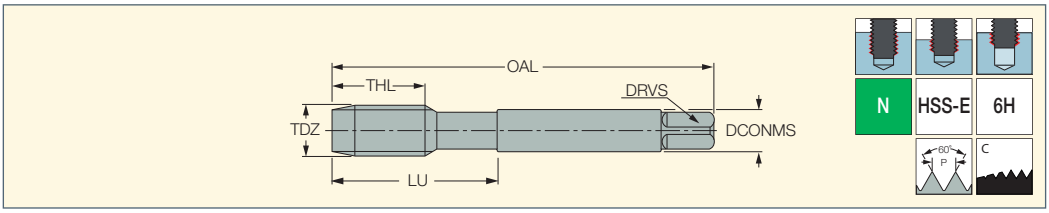
[1] Thread pitch

[2] Number of flutes

[3] Torque key size

TPS M-N (HSS)

DIN 13 HSS R.H. 40° Spiral Flute Machine Taps for ISO Metric Coarse Threads for Low Alloyed Steel



Designation	Dimensions											HEST
	TDZ	TP[2]	OAL	THL	LU	DCONMS	NOF[3]	DRVS[4]	Pre-hole	FHA	Standard	
TPS M-2X0.4-N	M2	0.400	45.00	8.0	-	2.80	3	2.10	1.60	40.0	DIN 371	●
TPS M-2.2X0.45-N	M2.2	0.450	45.00	8.0	-	2.80	3	2.10	1.75	40.0	DIN 371	●
TPS M-2.3X0.4-N [1]	M2.3	0.400	45.00	8.0	-	2.80	3	2.10	1.90	40.0	DIN 371	●
TPS M-2.5X0.45-N	M2.5	0.450	50.00	9.0	-	2.80	3	2.10	2.05	40.0	DIN 371	●
TPS M-3X0.5-N	M3	0.500	56.00	6.0	18.0	3.50	3	2.70	2.50	40.0	DIN 371	●
TPS M-3.5X0.6-N	M3.5	0.600	56.00	7.0	20.0	4.00	3	3.00	2.90	40.0	DIN 371	●
TPS M-4X0.7-N	M4	0.700	63.00	7.0	21.0	4.50	3	3.40	3.30	40.0	DIN 371	●
TPS M-4.5X0.75-N	M4.5	0.750	70.00	8.0	25.0	6.00	3	4.90	3.70	40.0	DIN 371	●
TPS M-5X0.8-N	M5	0.800	70.00	8.0	25.0	6.00	3	4.90	4.20	40.0	DIN 371	●
TPS M-6X1.0-N	M6	1.000	80.00	10.0	30.0	6.00	3	4.90	5.00	40.0	DIN 371	●
TPS M-7X1.0-N	M7	1.000	80.00	10.0	30.0	7.00	3	5.50	6.00	40.0	DIN 371	●
TPS M-8X1.25-N	M8	1.250	90.00	13.0	35.0	8.00	3	6.20	6.80	40.0	DIN 371	●
TPS M-9X1.25-N	M9	1.250	90.00	13.0	35.0	9.00	3	7.00	7.80	40.0	DIN 371	●
TPS M-10X1.5-N	M10	1.500	100.00	15.0	39.0	10.00	3	8.00	8.50	40.0	DIN 371	●
TPS M-11X1.5-N	M11	1.500	100.00	17.0	-	8.00	3	6.20	9.50	40.0	DIN 376	●
TPS M-12X1.75-N	M12	1.750	110.00	18.0	-	9.00	3	7.00	10.20	40.0	DIN 376	●
TPS M-14X2.0-N	M14	2.000	110.00	20.0	-	11.00	3	9.00	12.00	40.0	DIN 376	●
TPS M-16X2.0-N	M16	2.000	110.00	20.0	-	12.00	3	9.00	14.00	40.0	DIN 376	●
TPS M-18X2.5-N	M18	2.500	125.00	25.0	-	14.00	4	11.00	15.50	40.0	DIN 376	●
TPS M-20X2.5-N	M20	2.500	140.00	25.0	-	16.00	4	12.00	17.50	40.0	DIN 376	●

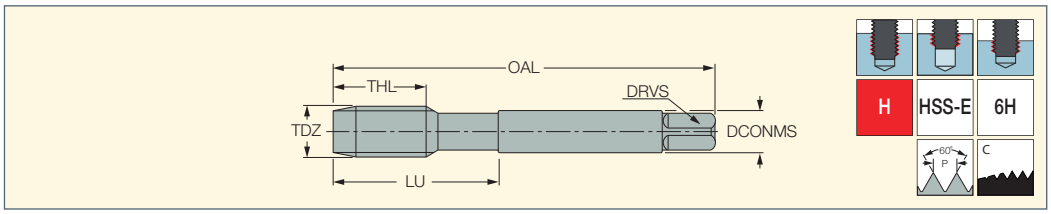
• For user guide and cutting conditions, see pages 346-348, 361-382

[1] DIN profile
[2] Thread pitch
[3] Number of flutes
[4] Torque key size

HSS TAPS

TPS M-H (HSS)

DIN 13 HSS Right-Hand 40° Spiral Flute Machine Taps for ISO Metric Coarse Threads for H.T.A.



Designation	Dimensions										HEST
	TDZ	TP[2]	OAL	THL	LU	DCONMS	NOF[3]	DRVS[4]	Pre-hole	FHA	
TPS M-2X0.4-H	M2	0.400	45.00	8.0	-	2.80	3	2.10	1.60	40.0	●
TPS M-2.2X0.45-H	M2.2	0.450	45.00	8.0	-	2.80	3	2.10	1.75	40.0	●
TPS M-2.5X0.45-H	M2.5	0.450	50.00	9.0	-	2.80	3	2.10	2.05	40.0	●
TPS M-2.6X0.45-H [1]	M2.6	0.450	50.00	9.0	-	2.80	3	2.10	2.10	40.0	●
TPS M-3X0.5-H	M3	0.500	56.00	6.0	18.0	3.50	3	2.70	2.50	40.0	●
TPS M-3.5X0.6-H	M3.5	0.600	56.00	7.0	20.0	4.00	3	3.00	2.90	40.0	●
TPS M-4X0.7-H	M4	0.700	63.00	7.0	21.0	4.50	3	3.40	3.30	40.0	●
TPS M-4.5X0.75-H	M4.5	0.750	70.00	8.0	25.0	6.00	3	4.90	3.70	40.0	●
TPS M-5X0.8-H	M5	0.800	70.00	8.0	25.0	6.00	3	4.90	4.20	40.0	●
TPS M-6X1.0-H	M6	1.000	80.00	10.0	30.0	6.00	3	4.90	5.00	40.0	●
TPS M-7X1.0-H	M7	1.000	80.00	10.0	30.0	7.00	3	5.50	6.00	40.0	●
TPS M-8X1.25-H	M8	1.250	90.00	13.0	35.0	8.00	3	6.20	6.80	40.0	●
TPS M-9X1.25-H	M9	1.250	90.00	13.0	35.0	9.00	3	7.00	7.80	40.0	●
TPS M-10X1.5-H	M10	1.500	100.00	15.0	39.0	10.00	3	8.00	8.50	40.0	●
TPS M-11X1.5-H	M11	1.500	100.00	17.0	-	8.00	3	6.20	9.50	40.0	●
TPS M-12X1.75-H	M12	1.750	110.00	18.0	-	9.00	3	7.00	10.20	40.0	●
TPS M-14X2.0-H	M14	2.000	110.00	20.0	-	11.00	3	9.00	12.00	40.0	●
TPS M-16X2.0-H	M16	2.000	110.00	20.0	-	12.00	3	9.00	14.00	40.0	●
TPS M-18X2.5-H	M18	2.500	125.00	25.0	-	14.00	4	11.00	15.50	40.0	●
TPS M-20X2.5-H	M20	2.500	140.00	25.0	-	16.00	4	12.00	17.50	40.0	●

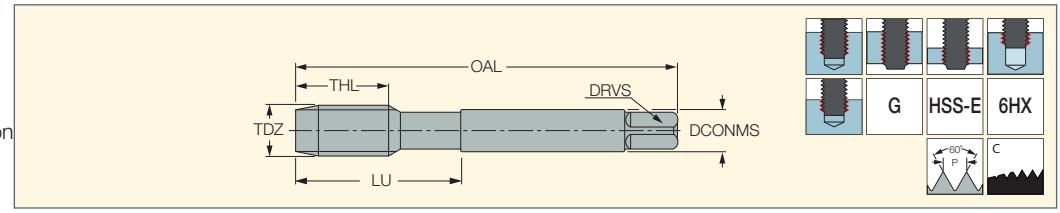
• For user guide and cutting conditions, see pages 346-348, 361-382

[1] DIN profile
[2] Thread pitch
[3] Number of flutes
[4] Torque key size

HSS TAPS

TPST M-G (HSS)

DIN 13 HSS Straight Flute
Machine Taps for ISO Metric
Coarse Threads for Grey Cast Iron



Designation	Dimensions									HENI
	TDZ	TP[2]	OAL	THL	LU	DCONMS	NOF[3]	DRVS[4]	Pre-hole	
TPST M-2.2X0.45-G	M2.2	0.450	45.00	8.0	-	2.80	3	2.10	1.75	●
TPST M-2.3X0.4-G [1]	M2.3	0.400	45.00	8.0	-	2.80	3	2.10	1.90	●
TPST M-2.5X0.45-G	M2.5	0.450	50.00	9.0	-	2.80	3	2.10	2.05	●
TPST M-2.6X0.45-G [1]	M2.6	0.450	50.00	9.0	-	2.80	3	2.10	2.10	●
TPST M-3.5X0.6-G	M3.5	0.600	56.00	12.0	20.0	4.00	3	3.00	2.90	●
TPST M-4X0.7-G	M4	0.700	63.00	13.0	21.0	4.50	3	3.40	3.30	●
TPST M-4.5X0.75-G	M4.5	0.750	70.00	14.0	25.0	6.00	3	4.90	3.70	●
TPST M-5X0.8-G	M5	0.800	70.00	15.0	25.0	6.00	4	4.90	4.20	●
TPST M-6X1.0-G	M6	1.000	80.00	17.0	30.0	6.00	4	4.90	5.00	●
TPST M-8X1.25-G	M8	1.250	90.00	20.0	35.0	8.00	4	6.20	6.80	●
TPST M-9X1.25-G	M9	1.250	90.00	20.0	35.0	9.00	4	7.00	7.80	●
TPST M-10X1.5-G	M10	1.500	100.00	22.0	39.0	10.00	4	8.00	8.50	●
TPST M-11X1.5-G	M11	1.500	100.00	22.0	-	8.00	4	6.20	9.50	●
TPST M-12X1.75-G	M12	1.750	110.00	24.0	-	9.00	4	7.00	10.20	●
TPST M-14X2.0-G	M14	2.000	110.00	26.0	-	11.00	4	9.00	12.00	●
TPST M-16X2.0-G	M16	2.000	110.00	27.0	-	12.00	4	9.00	14.00	●
TPST M-18X2.5-G	M18	2.500	125.00	30.0	-	14.00	4	11.00	15.50	●
TPST M-20X2.5-G	M20	2.500	140.00	32.0	-	16.00	4	12.00	17.50	●

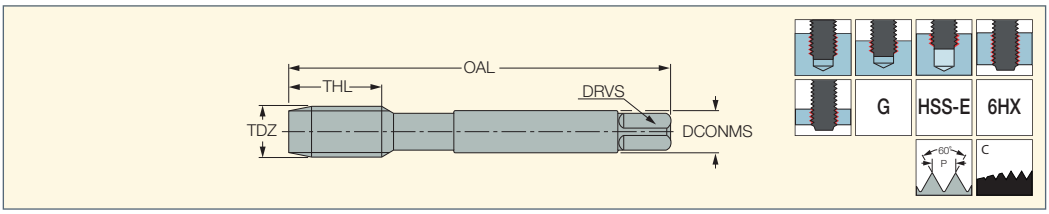
• For user guide and cutting conditions, see pages 346-348, 361-382

[1] DIN profile
[2] Thread pitch
[3] Number of flutes
[4] Torque key size

HSS TAPS

TPST MF-G (HSS)

DIN 13 HSS Straight Flute
Machine Taps for ISO Metric
Fine Threads for Grey Cast Iron



Designation	Dimensions								HENI
	TDZ	TP[1]	OAL	THL	DCONMS	NOF[2]	DRVS[3]	Pre-hole	
TPST MF-10X1.0-G	M10	1.000	90.00	18.0	7.00	3	5.50	9.00	●
TPST MF-10X1.25-G	M10	1.250	100.00	22.0	7.00	3	5.50	8.80	●
TPST MF-12X1.25-G	M12	1.250	100.00	22.0	9.00	3	7.00	10.80	●
TPST MF-14X1.5-G	M14	1.500	100.00	22.0	11.00	3	9.00	12.50	●
TPST MF-16X1.5-G	M16	1.500	100.00	22.0	12.00	4	9.00	14.50	●
TPST MF-22X1.5-G	M22	1.500	125.00	25.0	18.00	4	14.50	20.50	●

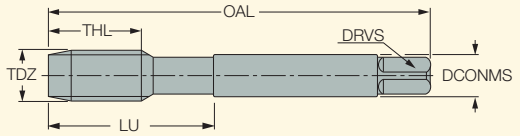
• For user guide and cutting conditions, see pages 346-348, 361-382

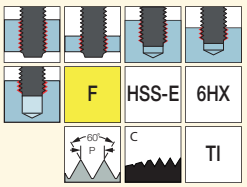
[1] Thread pitch
[2] Number of flutes
[3] Torque key size

HSS TAPS

TPF M-F (HSS)

DIN 13 HSS Cold Forming Machine Taps for ISO Metric Coarse Threads





Designation	Dimensions										HETI
	TDZ	TP[2]	OAL	THL	LU	DCONMS	NOF[3]	DRVS[4]	Pre-hole	Standard	
TPF M-2X0.4-F	M2	0.400	45.00	8.0	-	2.80	5	2.10	1.83	DIN 371	●
TPF M-2.2X0.45-F	M2.2	0.450	45.00	8.0	-	2.80	5	2.10	2.00	DIN 371	●
TPF M-2.3X0.4-F [1]	M2.3	0.400	45.00	8.0	-	2.80	5	2.10	2.10	DIN 371	●
TPF M-2.5X0.45-F	M2.5	0.450	50.00	9.0	-	2.80	5	2.10	2.30	DIN 371	●
TPF M-3X0.5-F	M3	0.500	56.00	11.0	18.0	3.50	5	2.70	2.80	DIN 371	●
TPF M-3.5X0.6-F	M3.5	0.600	56.00	12.0	20.0	4.00	5	3.00	3.25	DIN 371	●
TPF M-4X0.7-F	M4	0.700	63.00	13.0	21.0	4.50	5	3.40	3.70	DIN 371	●
TPF M-4.5X0.75-F	M4.5	0.750	70.00	14.0	25.0	6.00	5	4.90	4.15	DIN 371	●
TPF M-5X0.8-F	M5	0.800	70.00	15.0	25.0	6.00	5	4.90	4.65	DIN 371	●
TPF M-6X1.0-F	M6	1.000	80.00	17.0	30.0	6.00	5	4.90	5.55	DIN 371	●
TPF M-7X1.0-F	M7	1.000	80.00	17.0	30.0	7.00	5	5.50	6.55	DIN 371	●
TPF M-8X1.25-F	M8	1.250	90.00	20.0	35.0	8.00	5	6.20	7.40	DIN 371	●
TPF M-9X1.25-F	M9	1.250	90.00	20.0	35.0	9.00	5	7.00	8.40	DIN 371	●
TPF M-10X1.5-F	M10	1.500	100.00	22.0	39.0	10.00	5	8.00	9.30	DIN 371	●
TPF M-11X1.5-F	M11	1.500	100.00	22.0	-	8.00	5	6.20	10.30	DIN 376	●
TPF M-12X1.75-F	M12	1.750	110.00	24.0	-	9.00	5	7.00	11.20	DIN 376	●
TPF M-14X2.0-F	M14	2.000	110.00	26.0	-	11.00	5	9.00	13.00	DIN 376	●
TPF M-16X2.0-F	M16	2.000	110.00	27.0	-	12.00	6	9.00	15.00	DIN 376	●
TPF M-18X2.5-F	M18	2.500	125.00	30.0	-	14.00	6	11.00	16.80	DIN 376	●
TPF M-20X2.5-F	M20	2.500	140.00	32.0	-	16.00	6	12.00	18.80	DIN 376	●

• For user guide and cutting conditions, see pages 346-348,361-382

[1] DIN profile
[2] Thread pitch
[3] Number of flutes
[4] Torque key size

USER GUIDE CONTENTS

Tap Surface Treatments and Coating Types

The high speed steels we use grant high wear resistance and toughness. For machining certain materials, various surface treatments are an advantage.

Steam Tempered (ST)
The steam tempered is a Fe3O4 oxide coating which reduces the friction between the tool and workpiece and prevents cold welding.

Nitriding (NI)
Recommended surface treatment for machining hard wear/abrasive materials such as grey cast iron, aluminum alloys with high silicon percentage (more than 10%).

TiN Coating (TI)
The TiN coating has a hardness of approximately 2,300 HV and is temperature resistant up to approximately 600°C. This is an excellent golden colored coating for general applications.

TiCN-COATING – TiCN
TiCN takes place of TiN when the conditions require the coating to have a different hardness and toughness. The TiCN brings an advantage to machining very difficult steels or cutting interrupted bores. The TiCN-coating has a hardness of approx. 3,000 HV, but is temperature resistant up to approx. 400° only. That means TiCN needs excellent cooling for long service life. Color: Blue-grey coefficient of friction against steel : 0.4

TiAlN-COATING – TiAlN
This is a special coating for machining abrasive materials such as: grey cast iron, alu-alloys with silicon, fiber reinforced plastics, etc., or machining under high temperatures, which means with insufficient cooling, or high speeds ≥ 600m/min. TiAlN has a hardness of approx. 3,000 HV and is temperature resistant up to approx. 800°. Color: Violet-grey coefficient of friction against steel : 0.4

Hardslick-COATING – Hardslick
Hardslick combines in a novel way the advantages of an extremely hard, thermally stable TiAlN-coating with the sliding and lubricating properties of an outer WC/C (Tungsten carbide/carbon) coating. The hardslick coating has a hardness of approx. 3,000 HV and is temperature-resistant up to approx. 800°. Color: Violet-grey coefficient of friction against steel : 0.2

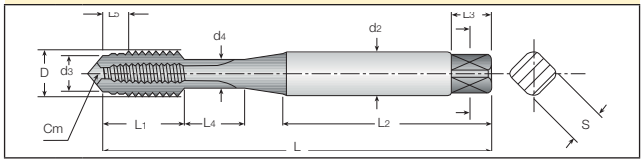
Tolerances According to DIN EN 22857
For taps with ISO metric threads.
The following chart gives a comparison between the new standard DIN EN 22857 and the withdrawn standard DIN 802 part 1. An important change is the re-classification from tap tolerance to tap application class.

Application class for taps to DIN EN 22857		Tolerance class to withdrawn standard DIN 802 part 1	Allotment of the tolerance zones of the nut thread to be cut				
Class 1	ISO 1	4H	4H	5H	-	-	-
Class 2	ISO 2	6H	5G	5G	6H	-	-
Class 3	ISO 3	6G	-	-	6G	7H	8H
-	-	7G	-	-	-	7G	8G

A suitable transition period is to be expected.
Codes for tolerance classes 7G/8G and <X> tolerance zones have yet to be standardized within DIN EN 22857, and the values from DIN 802 part will remain valid.

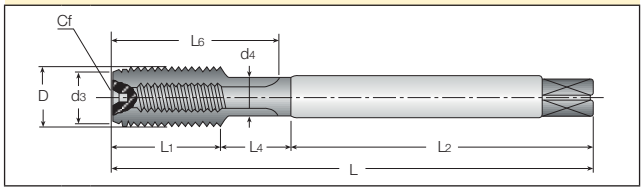
Tap Nomenclature and Standards

DIN 371



D - Major diameter
d2 - Shank diameter
d3 - Chamfer diameter
d4 - Neck diameter

DIN 376

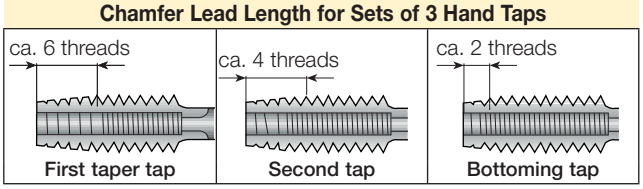


L - Total length
L - Total length
L1 - Thread length
L2 - Shank length
L3 - Square length
L4 - Neck length
L5 - Chamfer length
L6 - Flute length
S - Square size
Cm - Center male
Cf - Center female

Chamfer Lead Forms According to DIN 2197

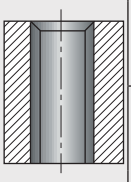
A	6-8 threads	**Form A** Long, 6-8 threads for short through holes.
B	3.5-5 threads	**Form B** Medium, 3.5-5 threads, with spiral point for all through holes and deep tapping holes.
C	2-3 threads	**Form C** Long, 2-3 threads for blind holes and generally for aluminum grey cast iron and brass.
D	3.5-5 threads	**Form D** Medium, 3.5-5 threads for through and blind holes with sufficient runout.
E	1.5-2 threads	**Form E** Extremely short, 1.5-2 threads for blind holes with little runout depth. Avoid use if possible.
F	1-1.5 threads	**Form F** Extremely short, 1-1.5 threads for blind holes with little runout depth. Avoid use if possible.

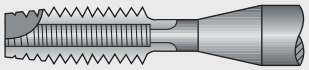
Chamfer Lead Length for Sets of 3 Hand Taps



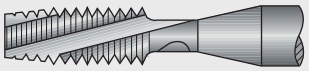
Tap Styles for Hole Types

Throughole

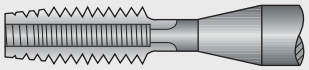




1 Straight fluted tap with spiral point

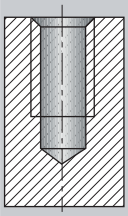


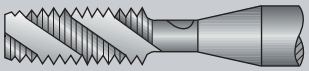
2 Left-hand spiral fluted tap



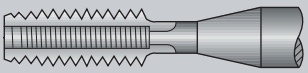
3 Straight fluted tap with long chamfer lead

Blind hole



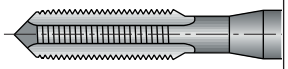
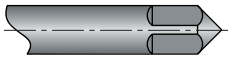
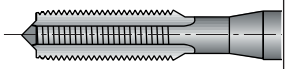
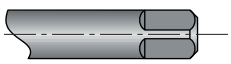
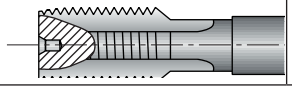
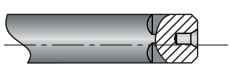


1 Right-hand spiral fluted tap



2 Straight fluted tap with short chamfer lead

Front and End Configurations According to DIN2197

Front End	Shank End
1 External Center 	4 External Center 
2 Stepped External Center 	5 Chamfer 
3 Internal Center 	6 Internal Center 

Thread Dia. Range (mm)	Front End	Shank End	Tap Standard
≤Ø6	1	4 5	DIN352
Ø7	1 2	4 5 6	DIN371
≥Ø8	1 2 3	5 6	DIN376

Pre-Tapping Hole Sizes

ISO Metric Threads Coarse Pitch			
M	Pitch mm	Max Core Dia.mm	Drill Size mm
1	0.25	0.785	0.75
1.1	0.25	0.885	0.85
1.2	0.25	0.985	0.95
1.4	0.30	1.160	1.10
1.6	0.35	1.321	1.25
1.7	0.35	1.346	1.30
1.8	0.35	1.521	1.45
2	0.40	1.679	1.60
2.2	0.45	1.838	1.75
2.3	0.40	1.920	1.90
2.5	0.45	2.138	2.05
2.6	0.45	2.176	2.10
3	0.50	2.599	2.50
3.5	0.60	3.010	2.90
4	0.70	3.422	3.30
4,5	0.75	3.878	3.70
5	0.80	4.334	4.20
6	1.00	5.153	5.00
7	1.00	6.153	6.00
8	1.25	6.912	6.80
9	1,25	7.912	7.80
10	1.50	8.676	8.50
11	1.50	9.676	9.50
12	1.75	10.441	10.20
14	2.00	12.210	12.00
16	2.00	14.210	14.00
18	2.50	15.744	15.50
20	2.50	17.744	17.50
22	2.50	19.744	19.50
24	3.00	21.252	21.00
27	3.00	24.252	24.00
30	3.50	26.771	26.50
33	3.50	29.771	29.50
36	4.00	32.270	32.00
39	4.00	35.270	35.00
42	4.50	37.799	37.50
45	4.50	40.799	40.50
48	5.00	43.297	43.00
52	5.00	47.297	47.00
56	5.50	50.796	50.50
60	5.50	54.796	54.50
64	6.00	58.305	58.00
68	6.00	62.305	62.00

ISO Metric Threads Fine Pitch			
MF	Pitch mm	Max Core Dia.mm	Drill Size mm
2.5	0.35	2.221	2.15
3	0.35	2.271	2.65
3.5	0.35	3.221	3.15
4	0.50	3.599	3.50
4.5	0.50	4.099	4.00
5	0.50	4.599	4.50
5.5	0.50	5.099	5.00
6	0.75	5.378	5.20
7	0.75	6.378	6.20
8	0.75	7.378	7.20
8	1.00	7.153	7.00
9	0.75	8.378	8.20
9	1.00	8.153	8.00
10	0.75	9.378	9.20
10	1.00	9.153	9.00
10	1.25	8.912	8.80
11	0.75	10.378	10.20
11	1.00	10.153	10.00
12	1.00	11.153	11.00
12	1,25	10.912	10.80
12	1,50	10.676	10.50
14	1,00	13.153	13.00
14	1,25	12.912	12.80
14	1.50	12.676	12.50
15	1.00	14.153	14.00
15	1.50	13.676	13.50
16	1.00	15.153	15.00
16	1.50	14.676	14.50
17	1.00	16.153	16.00
17	1.50	15.676	15.50
18	1.00	17.153	17.00
18	1.50	16.676	16.50
18	2.00	16.210	16.00
20	1.00	19.153	19.00
20	1.50	18.676	18.50
20	2.00	18.210	18.00
22	1,00	21.153	21.00
22	1.50	20.676	20.50
22	2.00	20.210	20.00
24	1.00	23.153	23.00
24	1,50	22.676	22.50
24	2,00	22.210	22.00
25	1.00	24.153	24.00
25	1.50	23.676	23.50

ISO Metric Threads Fine Pitch			
MF	Pitch mm	Max Core Dia.mm	Drill Size mm
25	2.00	23.210	23.00
26	1.50	24.676	24.50
27	1.00	26.153	26.00
27	1.50	25.676	25.50
27	2.00	25.210	25.00
28	1.00	27.153	27.00
28	1.50	26.676	26.50
28	2.00	26.210	26.00
30	1.00	29.153	29.00
30	1.50	28.676	28.50
30	2.00	28.210	28.00
30	3.00	27.252	27.00
32	1.50	30.675	30.50
32	2.00	30.210	30.00
33	1.50	31.676	31.50
33	2.00	31.210	31.00
33	3.00	30.252	30.00
35	1.50	33.676	33.50
36	1.50	34.676	34.50
36	2.00	34.210	34.00
36	3.00	33.252	33.00
38	1.50	36.676	36.50
39	1.50	37.676	37.50
39	2.00	37.210	37.00
39	3.00	36.252	36.00
40	1,50	38.676	38.50
40	2.00	38.210	38.00
40	3,00	37.252	37.00
42	1,50	40.676	40.50
42	2,00	40.210	40.00
42	3,00	39.252	39.00
45	1.50	43.676	43.50
45	2.00	43.210	43.00
45	3.00	42.252	42.00
48	1.50	46.676	46.50
48	2.00	46.210	46.00
48	3.00	45.252	45.00
50	1.50	48.676	48.50
50	2.00	48.210	48.00
50	3.00	47.252	47.00
52	1.50	50.676	50.50
52	2.00	50.210	50.00
52	3.00	49.252	49.00

Pre-Tapping Hole Sizes - Forming Taps

Recommended Tap Drill Size		
M	Pitch mm	Drill Size mm
1	0.25	0.9
1.1	0.25	1
1.2	0.25	1.1
1.4	0.3	1.28
1.6	0.35	1.47
1.7	0.35	1.57
1.8	0.35	1.67
2	0.4	1.85
2.2	0.45	2.03
2.3	0.4	2.15
2.5	0.45	2.33
2.6	0.45	2.43
3	0.5	2.8
3.5	0.6	3.25
4	0.7	3.7
4.5	0.75	4.2
5	0.8	4.65
6	1	5.55
7	1	6.55
8	1.25	6.6
9	1.25	7.45
10	1.5	8.45
11	1.5	9.35
12	1.75	11.25
14	2	13.1
16	2	15.1
18	2.5	16.85
20	2.5	18.85
22	2.5	20.85
24	3	22.65
27	3	25.65
30	3.5	28.4
33	3.5	31.4
36	4	34.15
39	4	37.15
42	4.5	39.9
45	4.5	42.9
48	5	45.65

Recommended Tap Drill Size		
MF	Pitch mm	Drill Size mm
2.5	0.35	2.37
2.6	0.35	2.47
3	0.35	2.88
3.5	0.35	3.38
4	0.5	3.8
5	0.5	4.8
6	0.5	5.8
6	0.75	5.7
7	0.75	6.7
8	0.75	7.7
8	1	7.6
9	0.75	8.7
9	1	8.6
10	0.75	9.7
10	1	9.6
10	1.25	9.45
11	1	10.6
12	1	11.6
12	1.25	11.45
12	1.5	11.35
14	1	13.6
14	1.25	13.45
14	1.5	13.35
15	1	14.6
15	1.5	14.35
16	1	15.6
16	1.5	15.35
18	4	17.6
18	1.5	17.35
18	2	17.1
20	1	19.6
20	1.5	19.35
20	2	19.1
24	2	23.1
30	2	29.1
36	3	34.65
42	4	40.15
48	3	46.65

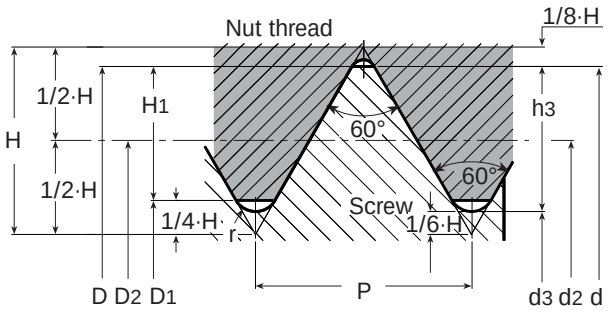
Pre-Tapping Hole Sizes - General Taps

American Unified Coarse Threads			
UNC	T.P.I	Max. Core Dia. inch	Drill Size mm
#1	64	1.585	1.5
#2	56	1.872	1.8
#3	48	2.146	2.1
#4	40	2.385	2.3
#5	40	2.697	2.6
#6	32	2.896	2.85
#8	32	3.528	3.5
#10	24	3.95	3.9
#12	24	4.59	4.5
1/4"	20	5.25	5.2
5/16"	18	6.68	6.6
3/8"	16	8.082	8
7/16"	14	9.441	9.4
1/2"	13	10.881	10.75
9/16"	12	12.301	12.25
5/8"	11	13.693	13.5
3/4"	10	16.624	16.5
7/8"	9	19.52	19.5
1"	8	22.344	22.25
1*1/8"	7	25.082	25
1*1/4"	7	28.258	28.25
1*3/8"	6	30.851	30.75
1*1/2"	6	34.026	34
1*3/4"	5	39.56	39.5
2"	4.5	45.367	45.25

American Unified Fine Threads			
UNF	T.P.I	Max. Core Dia. inch	Drill Size mm
#0	80	1.306	1.3
#1	72	1.613	1.6
#2	64	1.913	1.9
#3	56	2.197	2.1
#4	48	2.459	2.4
#5	44	2.741	2.7
#6	40	3.012	3
#8	36	3.597	3.5
#10	32	4.168	4.1
#12	28	4.717	4.7
1/4"	28	5.563	5.5
5/16"	24	6.995	6.9
3/8"	24	8.565	8.5
7/16"	20	9.947	9.9
1/2"	20	11.524	11.5
9/16"	18	12.969	12.9
5/8"	18	14.554	14.5
3/4"	16	17.546	17.5
7/8"	14	20.493	20.5
1"	12	23.363	23.25
1*1/8"	12	26.538	26.5
1*1/4"	12	29.713	29.5
1*3/8"	12	32.888	32.7
1*1/2"	12	36.063	36

ISO Metric Thread
Nominal Dimensions According to UNI 4535-64

Tap flank diameter production tolerances for ISO 6H Nut threads limit dimensions - nut threads ISO 6H



Coarse Pitch Threads Dimensions in mm

$H = 0.86603P$

$H_1 = \frac{5}{8} H = 0.54127P$

$h_3 = \frac{17}{24} H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4} H = d-0.64952P$

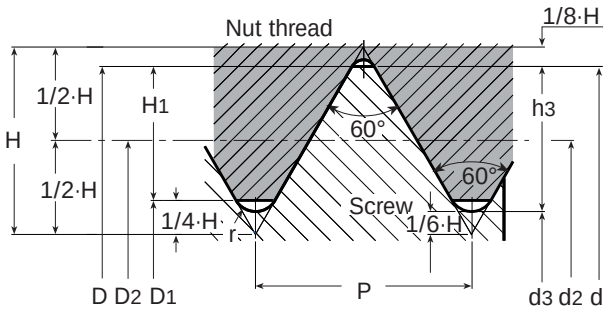
$d_3 = d-2h_3 = d-1.22687P$

$r = \frac{H}{6} = 0.14434P$

Nominal Dia. d=D	Pitch P	Flank Dia. d2=D2	Minor Diameter		Thread Depth		Radius r	Flank Dia. Tap Tolerance 6H d2		Flank Dia. Tap Tolerance 6H	
			Screw d3	Nut D1	Screw h3	Nut H1		Min.	Max.	Min.	Max.
M1.6	0.35	1.373	1.171	1.221	0.215	0.189	0.051	1.393	1.407	1.373	1.458
M1.8	0.35	1.573	1.371	1.421	0.215	0.189	0.051	1.593	1.607	1.573	1.658
M2	0.4	1.740	1.509	1.567	0.245	0.217	0.058	1.761	1.776	1.740	1.830
M2.2	0.45	1.908	1.648	1.713	0.276	0.244	0.065	1.931	1.946	1.908	2.003
M2.5	0.45	2.208	1.948	2.013	0.276	0.244	0.065	2.231	2.246	2.208	2.303
M3	0.5	2.675	2.387	2.459	0.307	0.271	0.072	2.699	2.715	2.675	2.775
M3.5	0.6	3.110	2.764	2.850	0.368	0.325	0.087	3.137	3.155	3.110	3.222
M4	0.7	3.545	3.141	3.242	0.429	0.379	0.101	3.574	3.593	3.545	3.663
M4.5	0.75	4.013	3.580	3.688	0.460	0.406	0.108	4.042	4.061	4.013	4.131
M5	0.8	4.480	4.019	4.134	0.491	0.433	0.115	4.510	4.530	4.480	4.605
M6	1	5.350	4.773	4.917	0.613	0.541	0.144	5.385	5.409	5.350	5.500
M7	1	6.350	5.773	5.917	0.613	0.541	0.144	6.385	6.409	6.350	6.500
M8	1.25	7.188	6.466	6.647	0.767	0.677	0.180	7.226	7.251	7.188	7.348
M9	1.25	8.188	7.466	7.647	0.767	0.677	0.180	8.226	8.251	8.188	8.348
M10	1.5	9.026	8.160	8.376	0.920	0.812	0.217	9.068	9.096	9.026	9.206
M11	1.5	10.026	9.160	9.376	0.920	0.812	0.217	10.068	10.096	10.026	10.206
M12	1.75	10.863	9.853	10.106	1.074	0.947	0.253	10.911	10.943	10.863	11.063
M14	2	12.701	11.546	11.835	1.227	1.083	0.289	12.752	12.786	12.701	12.913
M16	2	14.701	13.546	13.835	1.227	1.083	0.289	14.752	14.786	14.701	14.913
M18	2.5	16.376	14.933	15.294	1.534	1.353	0.361	16.430	16.466	16.376	16.600
M20	2.5	18.376	16.933	17.294	1.534	1.353	0.361	18.430	18.466	18.376	18.600
M22	2.5	20.376	18.933	19.294	1.534	1.353	0.361	20.430	20.466	20.376	20.600
M24	3	22.051	20.319	20.752	1.840	1.624	0.433	22.115	22.157	22.051	22.316
M27	3	25.051	23.319	23.752	1.840	1.624	0.433	25.115	25.157	25.051	25.316
M30	3.5	27.727	25.706	26.211	2.147	1.894	0.505	27.794	27.839	27.727	28.007
M33	3.5	30.727	28.706	29.211	2.147	1.894	0.505	30.794	30.839	30.727	31.007
M36	4	33.402	31.093	31.670	2.454	2.165	0.577	33.473	33.520	33.402	33.702
M39	4	36.402	34.093	34.670	2.454	2.165	0.577	36.473	36.520	36.402	36.702
M42	4.5	39.077	36.479	37.129	2.760	2.436	0.650	39.152	39.202	39.077	39.392
M45	4.5	42.077	39.479	40.129	2.760	2.436	0.650	42.152	42.202	42.077	42.392
M48	5	44.752	41.866	42.587	3.067	2.706	0.722	44.832	44.885	44.752	45.087
M52	5	48.752	45.866	46.587	3.067	2.706	0.722	48.832	48.885	48.752	49.087
M56	5.5	52.428	49.252	50.046	3.374	2.977	0.794	52.512	52.568	52.428	52.783
M60	5.5	56.428	53.252	54.046	3.374	2.977	0.794	56.512	56.568	56.428	56.783
M64	6	60.103	56.639	57.505	3.681	3.248	0.866	60.193	60.253	60.103	60.478
M68	6	64.103	60.639	61.505	3.681	3.248	0.866	64.193	64.253	64.103	64.478
Metric Thread MA (old UNI 159 profile)								**Nut Tolerance SH8**			
M1.7	0.35	1.473	1.246	1.246	0.227	0.227	0.040	1.493	1,507	1.473	1.529
M2.3	0.4	2.040	1.780	1.780	0.260	0.260	0.040	2.061	2.076	2.040	2.120
M2.6	0.45	2.308	2.016	2.016	0.292	0.292	0.050	2.331	2.346	2.308	2.388

ISO Metric Fine Thread
Nominal Dimensions According to UNI 4535-64

Tap flank diameter production tolerances for ISO 6H Nut threads limit dimensions - nut threads ISO 6H



Coarse Pitch Threads Dimensions in mm

$H = 0.86603P$

$H_1 = \frac{5}{8} H = 0.54127P$

$h_3 = \frac{17}{24} H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4} H = d-0.64952P$

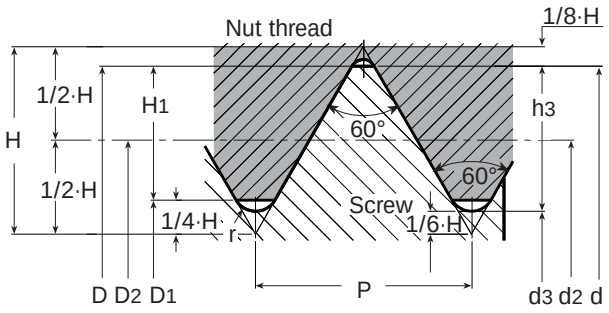
$d_3 = d-2h_3 = d-1.22687P$

$r = \frac{H}{6} = 0.14434P$

Nominal Dia. d=D	Pitch P	Flank Dia. d2=D2	Minor Diameter		Thread Depth		Radius r	Flank Dia. Tap Tolerance 6H d2		Flank Dia. Tap Tolerance 6H	
			Screw d3	Nut D1	Screw h3	Nut H1		Min.	Max.	Min.	Max.
M 2	0.25	1.838	1.693	1.729	0.153	0.135	0.036	1.844	1.856	1.838	1.886
M 2.5	0.35	2.273	2.701	2.121	0.215	0.189	0.051	2.293	2.307	2.273	2.358
M 3	0.35	2.773	2.571	2.621	0.215	0.189	0.051	2.794	2.809	2.773	2.863
M 3.5	0.35	3.273	3.071	3.121	0.215	0.189	0.051	3.294	3.309	3.273	3.363
M 4	0.5	3.675	3.387	3.459	0.307	0.271	0.072	3.699	3.715	3.675	3.775
M 4.5	0.5	4.175	3.887	3.959	0.307	0.271	0.072	4.199	4.215	4.175	4.275
M 5	0.5	4.675	4.387	4.459	0.307	0.271	0.072	4.699	4.715	4.675	4.775
M 5.5	0.5	5.175	4.887	4.959	0.307	0.271	0.072	5.199	5.215	5.175	5.275
M 6	0.5	5.675	5.387	5.459	0.307	0.271	0.072	5.702	5.72	5.675	5.787
M 6	0.75	5.513	5.08	5.188	0.46	0.406	0.108	5.545	5.566	5.513	5.645
M 7	0.75	6.513	6.08	6.188	0.46	0.406	0.108	6.545	6.566	6.513	6.645
M 8	0.5	7.675	7.387	7.459	0.307	0.271	0.072	7.702	7.72	7.675	7.787
M 8	0.75	7.513	7.08	7.188	0.46	0.406	0.108	7.545	7.566	7.513	7.645
M 8	1	7.35	6.773	6.917	0.613	0.541	0.144	7.835	7.409	7.35	7.5
M 9	0.75	8.513	8.08	8.188	0.46	0.406	0.108	8.545	8.566	8.513	8.645
M 9	1	8.35	7.773	7.917	0.613	0.541	0.144	8.385	8.409	8.35	8.5
M 10	0.5	9.675	9.387	9.459	0.307	0.271	0.072	9.702	9.72	9.675	9.787
M 10	0.75	9.513	9.08	9.188	0.46	0.406	0.108	9.545	9.566	9.513	9.645
M 10	1	9.35	8.773	8.917	0.613	0.541	0.144	9.385	9.409	9.35	9.5
M 10	1.25	9.188	8.466	8.647	0.767	0.677	0.18	9.226	9.251	9.188	9.348
M 11	0.75	10.513	10.08	10.188	0.46	0.406	0.108	10.545	10.566	10.513	10.645
M 11	1	10.35	9.773	9.917	0.613	0.541	0.144	10.385	10.409	10.35	10.5
M 12	0.75	11.513	11.08	11.188	0.46	0.406	0.108	11.547	11.569	11.513	11.653
M 12	1	11.35	10.773	10.917	0.613	0.541	0.144	11.388	11.413	11.35	11.51
M 12	1.25	11.188	10.466	10.647	0.767	0.677	0.18	11.23	11.258	11.188	11.368
M 12	1.5	11.026	10.16	10.376	0.92	0.812	0.217	11.071	11.101	11.026	11.216
M 13	1	12.35	11.773	11.917	0.613	0.541	0.144	12.388	12.413	12.35	12.51
M 14	1	13.35	12.773	12.917	0.613	0.541	0.144	13.388	13.413	13.35	13.51
M 14	1.25	13.188	12.466	12.647	0.767	0.677	0.18	13.23	13.258	13.188	13.368
M 14	1.5	13.026	12.16	12.376	0.92	0.812	0.217	13.071	13.101	13.026	13.216
M 15	1	14.35	13.773	13.917	0.613	0.541	0.144	14.388	14.413	14.35	14.51
M 15	1.5	14.026	13.16	13.376	0.92	0.812	0.217	14.071	14.101	14.026	14.216
M 16	1	15.35	14.773	14.917	0.613	0.541	0.144	15.388	15.413	15.35	15.51
M 16	1.25	15.188	14.466	14.647	0.767	0.677	0.18	15.23	15.258	15.188	15.368
M 16	1.5	15.026	14.16	14.376	0.92	0.812	0.217	15.071	15.101	15.026	15.216
M 17	1	16.35	15.773	15.917	0.613	0.541	0.144	16.388	16.413	16.35	16.51
M 17	1.5	16.026	15.16	15.376	0.92	0.812	0.217	16.071	16.101	16.026	16.216
M 18	1	17.350	16.773	16.917	0.613	0.541	0.144	17.388	17.413	17.35	17.51
M 18	1.5	17.026	16.16	16.376	0.92	0.812	0.217	17.071	17.101	17.026	17.216
M 18	2	16.701	15.546	15.835	1.227	1.083	0.289	16.752	16.786	16.701	16.913

ISO Metric Fine Thread
Nominal Dimensions According to UNI 4535-64

Tap flank diameter production tolerances for ISO 6H Nut threads limit dimensions - nut threads ISO 6H



Coarse Pitch Threads Dimensions in mm

$H = 0.86603P$

$H_1 = \frac{5}{8} H = 0.54127P$

$h_3 = \frac{17}{24} H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$

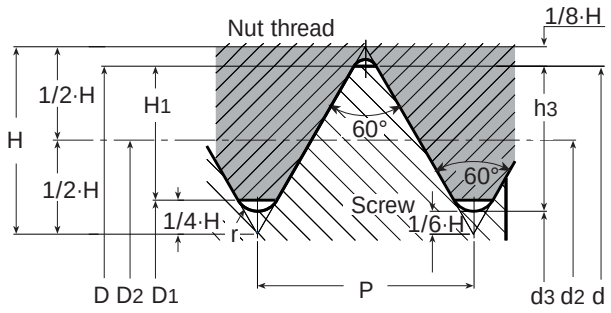
$d_3 = d - 2h_3 = d - 1.22687P$

$r = \frac{H}{6} = 0.14434P$

Nominal Dia. d=D	Pitch P	Flank Dia. d2=D2	Minor Diameter		Thread Depth		Radius r	Flank Dia. Tap Tolerance 6H d2		Flank Dia. Tap Tolerance 6H	
			Screw d3	Nut D1	Screw h3	Nut H1		Min.	Max.	Min.	Max.
M 20	1	19.35	18.773	18.917	0.613	0.541	0.144	19.388	19.413	19.35	19.51
M 20	1.5	19.026	18.16	18.376	0.92	0.812	0.217	19.071	19.101	19.026	19.216
M 20	2	18.701	17.546	17.835	1.227	1.083	0.289	18.752	18.786	18.701	18.913
M 22	1	21.35	20.773	20.917	0.613	0.541	0.144	21.388	21.413	21.35	21.51
M 22	1.5	21.026	20.16	20.376	0.92	0.812	0.217	21.071	21.101	21.026	21.216
M 22	2	20.701	19.546	19.835	1.227	1.083	0.289	20.752	20.786	20.701	20.913
M 24	1	23.350	22.773	22.917	0.613	0.541	0.144	23.390	23.416	23.350	23.520
M 24	1.5	23.026	22.160	22.376	0.920	0.812	0.217	23.074	23.106	23.026	23.226
M 24	2	22.701	21.546	21.835	1.227	1.083	0.289	22.754	22.791	22.701	22.925
M 25	1	24.350	23.773	23.917	0.613	0.541	0.144	24.390	24.416	24.350	24.520
M 25	1.5	24.026	23.160	23.376	0.920	0.812	0.217	24.074	24.106	24.026	24.226
M 25	2	23.701	22.546	22.835	1.227	1.083	0.289	23.754	23.791	23.701	23.925
M 26	1	25.350	24.773	24.917	0.613	0.541	0.144	25.390	25.416	25.350	25.520
M 26	1.5	25.026	24.160	24.376	0.920	0.812	0.217	25.074	25.106	25.026	25.226
M 26	2	24.701	23.546	23.835	1.227	1.083	0.289	24.754	24.791	24.701	24.925
M 27	1	26.350	25.773	25.917	0.613	0.541	0.144	26.390	26.416	26.350	26.520
M 27	1.5	26.026	25.160	25.376	0.920	0.812	0.217	26.074	26.106	26.026	26.226
M 27	2	25.701	24.546	24.835	1.227	1.083	0.289	25.754	25.791	25.701	25.925
M 28	1	27.350	26.773	26.917	0.613	0.541	0.144	27.390	27.416	27.350	27.520
M 28	1.5	27.026	26.160	26.376	0.920	0.812	0.217	27.074	27.106	27.026	27.226
M 28	2	26.701	25.546	25.835	1.227	1.083	0.289	26.754	26.791	26.701	26.925
M 30	1	29.350	28.773	28.917	0.613	0.541	0.144	29.390	29.416	29.350	29.520
M 30	1.5	29.026	28.160	28.376	0.920	0.812	0.217	29.074	29.106	29.026	29.226
M 30	2	28.701	27.546	27.835	1.227	1.083	0.289	28.754	28.791	28.701	28.925
M 30	3	28.051	26.319	26.752	1.840	1.624	0.433	28.115	28.157	28.051	28.316
M 32	1.5	31.026	30.160	30.376	0.920	0.812	0.217	31.074	31.106	31.026	31.226
M 32	2	30.701	29.546	29.835	1.227	1.083	0.289	30.754	30.791	30.701	30.925
M 33	1.5	32.026	31.160	31.376	0.920	0.812	0.217	32.074	32.106	32.026	32.226
M 33	2	31.701	30.546	30.835	1.227	1.083	0.289	31.754	31.791	31.701	31.925
M 33	3	31.051	29.319	29.752	1.840	1.624	0.433	31.115	31.157	31.051	31.316
M 35	1.5	34.026	33.160	33.376	0.920	0.812	0.217	34.074	34.106	34.026	34.226
M 35	2	33.701	32.546	32.835	1.227	1.083	0.289	33.754	33.791	33.701	33.925
M 36	1.5	35.026	34.160	34.376	0.920	0.812	0.217	35.074	35.106	35.026	35.226
M 36	2	34.701	33.546	33.835	1.227	1.083	0.289	34.754	34.791	34.701	34.925
M 36	3	34.051	32.319	32.752	1.840	1.624	0.433	34.115	34.157	34.051	34.316
M 38	1.5	37.026	36.160	36.376	0.920	0.812	0.217	37.074	37.106	37.026	37.226
M 39	1.5	38.026	37.160	37.376	0.920	0.812	0.217	38.074	38.106	38.026	38.226
M 39	2	37.701	36.546	36.835	1.227	1.083	0.289	37.754	37.791	37.701	37.925
M 39	3	37.051	35.319	35.752	1.840	1.624	0.433	37.115	37.157	37.051	37.316
M 40	1.5	39.026	38.160	38.376	0.920	0.812	0.217	39.074	39.106	39.026	39.226

ISO Metric Fine Thread
Nominal Dimensions According to UNI 4535-64

Tap flank diameter production tolerances for ISO 6H Nut threads limit dimensions - nut threads ISO 6H



Coarse Pitch Threads Dimensions in mm

$H = 0.86603P$

$H_1 = \frac{5}{8} H = 0.54127P$

$h_3 = \frac{17}{24} H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$

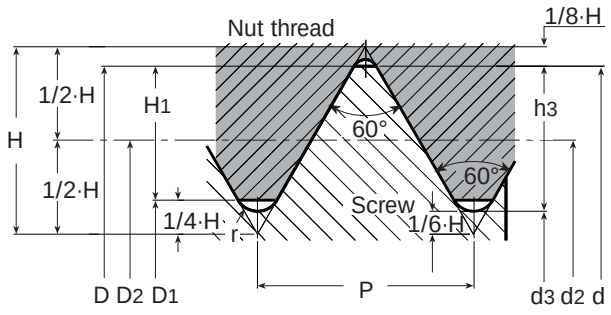
$d_3 = d - 2h_3 = d - 1.22687P$

$r = \frac{H}{6} = 0.14434P$

Nominal Dia. d=D	Pitch P	Flank Dia. d2=D2	Minor Diameter		Thread Depth		Radius r	Flank Dia. Tap Tolerance 6H d2		Flank Dia. Tap Tolerance 6H	
			Screw d3	Nut D1	Screw h3	Nut H1		Min.	Max.	Min.	Max.
M 40	2	38.701	37.546	37.835	1.227	1.083	0.289	38.754	38.791	38.701	38.925
M 40	3	38.051	36.319	36.752	1.840	1.624	0.433	38.115	38.157	38.051	38.316
M 42	1.5	41.026	40.160	40.376	0.920	0.812	0.217	41.074	41.106	41.026	41.226
M 42	2	40.701	39.546	39.835	1.227	1.083	0.289	40.754	40.791	40.701	40.925
M 42	3	40.051	38.319	38.752	1.840	1.624	0.433	40.115	40.157	40.051	40.316
M 45	1.5	44.026	43.160	43.376	0.920	0.812	0.217	44.074	44.106	44.026	44.226
M 45	2	43.701	42.546	42.835	1.227	1.083	0.289	43.754	43.791	43.701	43.925
M 45	3	43.051	41.319	41.752	1.840	1.624	0.433	43.115	43.157	43.051	43.316
M 48	1.5	47.026	46.160	46.376	0.920	0.812	0.217	47.077	47.111	47.026	47.238
M 48	2	46.701	45.546	45.835	1.227	1.083	0.289	46.758	46.796	46.701	46.937
M 48	3	46.051	44.319	44.752	1.840	1.624	0.433	46.118	46.163	46.051	46.331
M 50	1.5	49.026	48.160	48.376	0.920	0.812	0.217	49.077	49.111	49.026	49.238
M 50	2	48.701	47.546	47.835	1.227	1.083	0.289	48.758	48.796	48.701	48.937
M 50	3	48.051	46.319	46.752	1.840	1.624	0.433	48.118	48.163	48.051	48.331
M 52	1.5	51.026	50.160	50.376	0.920	0.812	0.217	51.077	51.111	51.026	51.238
M 52	2	50.701	49.546	49.835	1.227	1.083	0.289	50.758	50.796	50.701	50.937
M 52	3	50.051	48.319	48.752	1.840	1.624	0.433	50.118	50.163	50.051	50.331
M 55	1.5	54.026	53.160	53.376	0.920	0.812	0.217	54.077	54.111	54.026	54.238
M 55	2	53.701	52.546	52.835	1.227	1.083	0.289	53.758	53.796	53.701	53.937
M 55	3	53.051	51.319	51.752	1.840	1.624	0.433	53.118	53.163	53.051	53.331
M 56	1.5	55.026	54.160	54.376	0.920	0.812	0.217	55.077	55.111	55.026	55.238
M 56	2	54.701	53.546	53.835	1.227	1.083	0.289	54.758	54.796	54.701	54.937
M 56	3	54.051	52.319	52.752	1.840	1.624	0.433	54.118	54.163	54.051	54.331
M 58	1.5	57.026	56.160	56.376	0.920	0.812	0.217	57.077	57.111	57.026	57.238
M 58	2	56.701	55.546	55.835	1.227	1.083	0.289	56.758	56.796	56.701	56.937
M 58	3	56.051	54.319	54.752	1.840	1.624	0.433	56.118	56.163	56.051	56.331
M 60	1.5	59.026	58.160	58.376	0.920	0.812	0.217	59.077	59.111	59.026	59.238
M 60	2	58.701	57.546	57.835	1.227	1.083	0.289	58.758	58.796	58.701	58.937
M 60	3	58.051	56.319	56.752	1.840	1.624	0.433	58.118	58.163	58.051	58.331
Metric thread MA (old UNI 160 Profile)								**Nut Tolerance SH8**			
M 2,3	0.25	2.138	1.976	1.976	0.162	0.162	0.03	2.144	2.156	2.138	2.194
M 2,6	0.35	2.373	2.146	2.146	0.227	0.227	0.04	2.393	2.407	2.373	2.429

UNIFIED Coarse Thread
Nominal Dimensions According to ANSI B1.1

Tap flank diameter production tolerances for ISO 2B
Nut threads limit dimensions - nut threads ANSI B1.1, 2B-3B



Coarse Pitch Threads Dimensions in mm

$H = 0.86603P$

$H_1 = \frac{5}{8} H = 0.54127P$

$h_3 = \frac{17}{24} H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$

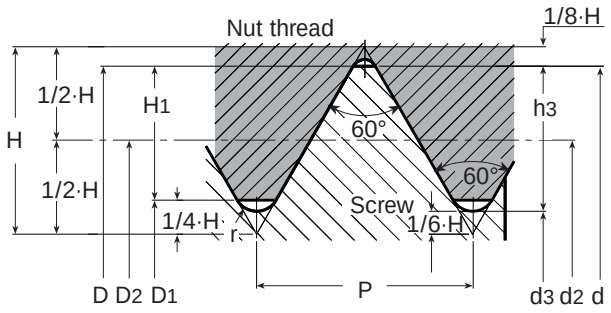
$d_3 = d - 2h_3 = d - 1.22687P$

$r = \frac{H}{6} = 0.14434P$

Nominal T.P.I Dia.		Pitch P	External Dia. d=D	Flank Dia. d2=D2	Minor diameter		Pitch diameter Tap tolerance 2B		Pitch diameter Nut tolerance		
					Nut D1	Screw h3	Min.	Max.	max. 2B/3B	max. 2B	max. 3B
UNC#1	64	0.397	1.854	1.598	1.425	1.367	1.610	1.623	1.598	1.664	1.646
UNC# 2	64	0.454	2.184	1.890	1.694	1.628	1.902	1.915	1.890	1.961	1.943
UNC#3	48	0.529	2.515	2.172	1.941	1.864	2.184	2.197	2.172	2.248	2.228
UNC# 4	40	0.635	2.845	2.433	2.156	2.065	2.446	2.459	2.433	2.517	2.494
UNC# 5	40	0.635	3.175	2.764	2.487	2.395	2.776	2.789	2.764	2.847	2.827
UNC# 6	32	0.794	3.505	2.990	2.647	2.532	3.105	3.028	2.990	3.084	3.058
UNC# 8	32	0.794	4.166	3.650	3.307	3.193	3.675	3.688	3.650	3.746	3.721
UNC# 10	24	1.058	4.826	4.138	3.680	3.528	4.163	4.176	4.138	4.247	4.219
UNC# 12	24	1.058	5.486	4.798	4.341	4.188	4.823	4.836	4.798	4.910	4.882
UNC 1/4"	20	1.270	6.350	5.524	4.976	4.793	5.575	5.588	5.524	5.646	5.616
UNC 5/16"	18	1.411	7.938	7.021	6.411	6.205	7.071	7.084	7.021	7.155	7.120
UNC 3/8"	16	1.588	9.525	8.494	7.805	7.577	8.545	8.557	8.494	8.639	8.603
UNC 7/16"	14	1.814	11.112	9.934	9.149	8.887	9.985	9.997	9.934	10.089	10.051
UNC 1/2"	13	1.954	12.700	11.430	10.584	10.302	11.481	11.494	11.430	11.595	11.552
UNC 9/16"	12	2.117	14.288	12.913	11.996	11.692	12.964	12.977	12.913	13.086	13.043
UNC 5/8"	11	2.309	15.875	14.376	13.376	13.043	14.427	14.440	14.376	14.559	14.514
UNC 3/4"	10	2.540	19.050	17.399	16.229	15.933	17.450	17.463	17.399	17.595	17.544
UNC 7/8"	9	2.822	22.225	20.391	19.169	18.763	20.455	20.467	20.391	20.599	20.546
UNC 1"	8	3.175	25.400	23.338	21.963	21.504	23.401	23.414	23.338	23.561	23.505
UNC 1 1/8"	7	3.629	28.575	26.218	24.648	24.122	26.294	26.319	26.218	26.457	26.398
UNC 1 1/4"	7	3.629	31.750	29.393	27.823	27.297	29.469	29.494	29.393	29.637	29.576
UNC 1 3/8"	6	4.233	34.925	32.174	30.343	29.731	32.250	32.276	32.174	32.438	32.372
UNC 1 1/2"	6	4.233	38.100	35.349	33.518	32.906	35.425	35.451	35.349	35.616	35.550
UNC 1 3/4"	5	5.080	44.450	41.151	38.951	38.217	41.241	41.266	41.151	41.445	41.372
UNC 2"	4 1/2	5.644	50.800	47.135	44.689	43.876	47.235	47.260	47.135	47.450	47.371
UNC 2 1/4"	4 1/2	5.644	57.150	53.485	51.039	50.226			53.485	53.805	53.726
UNC 2 1/2"	4	6.350	63.500	59.375	56.627	55.710			59.375	59.718	59.632
UNC 2 3/4"	4	6.350	69.850	65.725	62.977	62.060			65.725	66.073	65.987
UNC 3"	4	6.350	76.200	72.075	69.327	68.410			72.075	72.428	72.339
UNC 3 1/4"	4	6.350	82.550	78.425	75.677	74.760			78.425	78.783	78.694
UNC 3 1/2"	4	6.350	88.900	84.775	82.027	81.110			84.775	85.183	85.049
UNC 3 3/4"	4	6.350	95.250	91.125	88.377	87.460			91.125	91.493	91.402
UNC 4"	4	6.350	101.600	97.475	94.727	93.810			97.475	97.848	97.757

UNIFIED Fine Thread
Nominal Dimensions According to ANSI B1.1

Tap flank diameter production tolerances for ISO 2B
Nut threads limit dimensions - nut threads ANSI B1.1, 2B-3B



Coarse Pitch Threads Dimensions in mm

$H = 0.86603P$

$H_1 = \frac{5}{8} H = 0.54127P$

$h_3 = \frac{17}{24} H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$

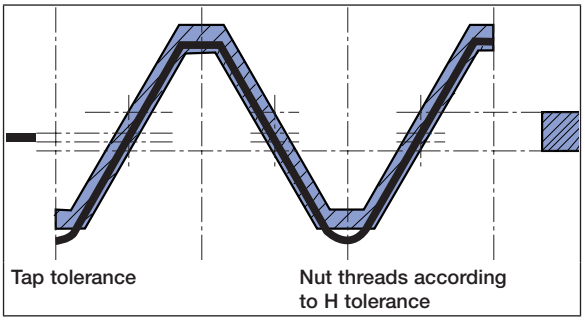
$d_3 = d - 2h_3 = d - 1.22687P$

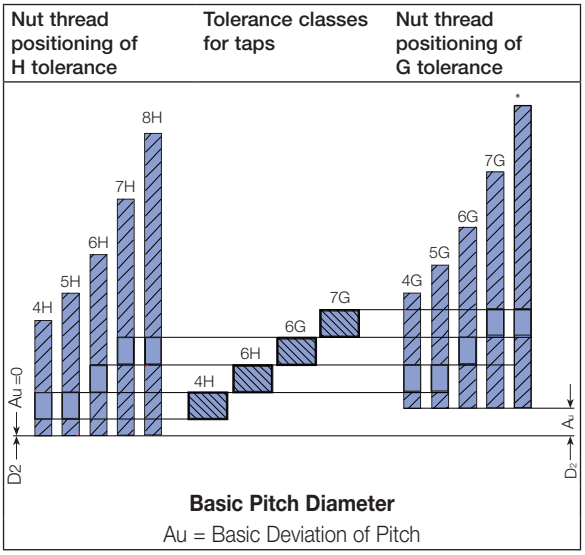
$r = \frac{H}{6} = 0.14434P$

Nominal T.P.I Dia.		Pitch P	External Dia. d=D	Flank Dia. d2=D2	Minor diameter		Pitch diameter Tap tolerance 2B		Pitch diameter Nut tolerance		
					Nut D1	Screw h3	Min.	Max.	max. 2B/3B	max. 2B	max. 3B
UNF#0	80	0.318	1.524	1.318	1.181	1.135	1.331	1.344	1.318	1.377	1.361
UNF#1	72	0.353	1.854	1.626	1.473	1.422	1.638	1.651	1.626	1.689	1.674
UNF#2	64	0.397	2.184	1.928	1.755	1.697	1.941	1.953	1.928	1.996	1.979
UNF#3	56	0.454	2.515	2.220	2.024	1.958	2.233	2.245	2.220	2.291	2.273
UNF#4	48	0.529	2.845	2.502	2.271	2.195	2.515	2.527	2.502	2.581	2.560
UNF#5	44	0.577	3.175	2.799	2.550	2.466	2.812	2.824	2.799	2.880	2.860
UNF#6	40	0.635	3.505	3.094	2.817	2.725	3.108	3.119	3.094	3.180	3.157
UNF#8	36	0.706	4.166	3.708	3.401	3.299	3.721	3.734	3.708	3.800	3.777
UNF#10	32	0.794	4.826	4.310	3.967	3.853	4.336	4.348	4.310	4.409	4.384
UNF#12	28	0.907	5.486	4.897	4.503	4.374	4.923	4.935	4.897	5.004	4.976
UNF 1/4"	28	0.907	6.350	5.761	5.367	5.237	5.799	5.812	5.761	5.870	5.842
UNF 5/16"	24	1.058	7.938	7.249	6.792	6.640	7.287	7.300	7.249	7.371	7.341
UNF 3/8"	24	1.058	9.525	8.837	8.379	8.227	8.875	8.887	8.837	8.961	8.931
UNF 7/16"	20	1.270	11.112	10.287	9.738	9.555	10.338	10.351	10.287	10.424	10.391
UNF 1/2"	20	1.270	12.700	11.874	11.326	11.143	11.925	11.938	11.874	12.017	11.981
UNF 9/16"	18	1.411	14.288	13.371	12.761	12.555	13.421	13.434	13.371	13.520	13.482
UNF 5/8"	18	1.411	15.875	14.958	14.348	14.143	15.009	15.022	14.958	15.110	15.072
UNF 3/4"	16	1.588	19.050	18.019	17.330	17.102	18.070	18.082	18.019	18.184	18.143
UNF 7/8"	14	1.814	22.225	21.046	20.262	20.000	21.110	21.123	21.046	21.224	21.181
UNF 1"	12	2.117	25.400	24.026	23.109	22.804	24.089	24.102	24.026	24.219	24.171
UNF 1*1/8"	12	2.117	28.575	27.201	26.284	25.979	27.252	27.277	27.201	27.339	27.351
UNF 1*1/4"	12	2.117	31.750	30.376	29.459	29.154	30.427	30.452	30.376	30.579	30.528
UNF 1*3/8"	12	2.117	34.925	33.551	32.634	32.329	33.602	33.627	33.551	33.759	33.706
UNF 1*1/2"	12	2.117	38.100	36.726	35.809	35.504	36.777	36.802	36.726	36.937	36.886

Tap Tolerances

Tolerance classes of taps and tolerance positions for screw threads as per ISO metric standard.





Basic Pitch Diameter

Au = Basic Deviation of Pitch

For Optimum Tapping Conditions, Reduced Machining Times and Increased Tap Life

Selection of the Most Suitable Tap

As a general rule, materials with deformation capability of at least 10% can be cold-formed. To decide on the most suitable tap, please refer to the tap recommendation table on page 346.

Pre-Tapping Holes

Check that the holes are within the prescribed size range depending on the application (see table on page 364) The holes should be clean and swarf-free.

Lubrication

Frequently the lubricant content of the coolant used for general machining is too low for tapping.

- If it is not possible to increase the lubricant content, following are some possible solutions:
- A separate lubricating unit can be connected to the machine control to deliver the required quantity of concentrated emulsion into the core hole or onto the tap.Tapping in separate operations allows the use of the ideal tapping lubricant.

Tapping Speeds

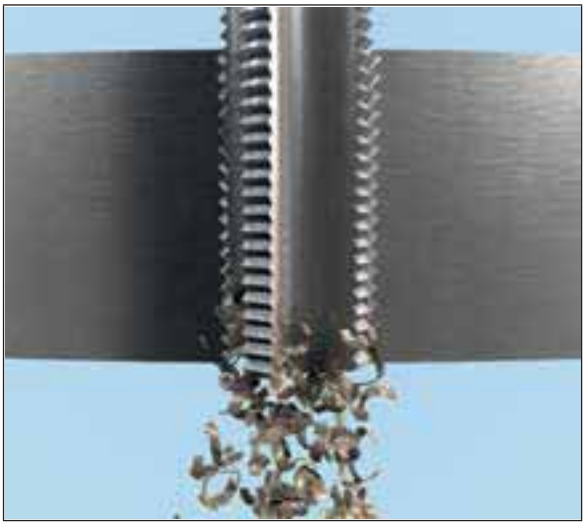
The tapping speed has a great influence on chip flow and the life of the tap. It is worthwhile to establish the ideal speed by tapping trials. For recommended initial values, see table on page 346. In addition, the following should be taken into consideration: characteristics of the material, machine and clamping method.

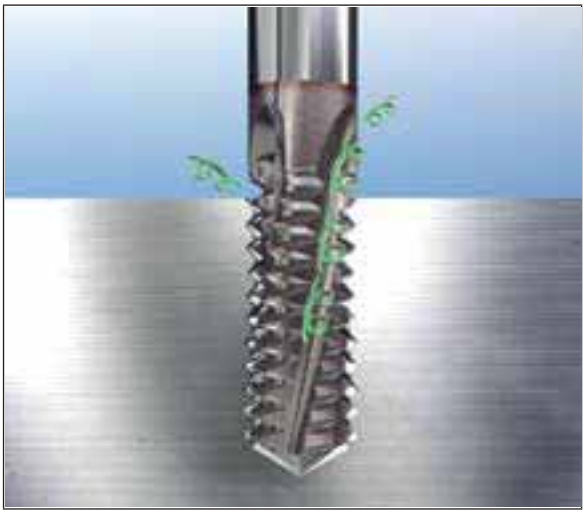
Effects of Unsuitable Tapping Speed

- forced tapping
- tap lead chipping caused by overloaded cutting tooth
- torn threads
- unsatisfactory tap life
- rejected threads

Chip Explusion

Tap selection is also influenced by the type of hole being threaded. Through hole tapping usually requires a tap that pushes the chips out in front of the cutting edge and through the other end of the hole. A bottom hole tap must pull chips up and out of the hole.





Tap Jamming

Some possible causes of tap jamming are:

- unsuitable tap
- tap with incorrect cutting geometry
- unsuitable coolant for material
- insufficient coolant
- axial pressure (pull or push) on the tap
- core hole too small
- breaks in walls of core hole
- speed too high or too low
- swarf trapped in the hole
- incorrect alignment of tap and core hole
- tap eccentricity

Results of Tap Jamming

- torn threads
- short tap life
- rejected threads
- tap breakage
- scrap workpieces

Tap Mounting

The tap must be mounted on the axis of the core hole. On non-synchronized machines (feed/speed) we recommend using a tapping spindle. (**ISCAR GTI**, **GTIN** collets, see pages 381-382)

Tapping Heads

As a rule, with non-synchronized machine spindles (feed/ speed), the feed rate should be programmed approximately 5-10% lower than the thread pitch. In these cases, a tapping chuck must be used which will compensate the difference between the feed rate and the thread pitch. It is important that the tension spring in the axial compensation is set to a minimum pressure to avoid axially loading the tap. The compression spring should be tensioned so the tap starts to cut by compressing the spring up to one-half pitch.

Important

Verify that the correct speed has been selected. Ensure that ample lubricating coolant is being used. Machine and equipment stability are essential for optimal performance and results.

Forming Taps

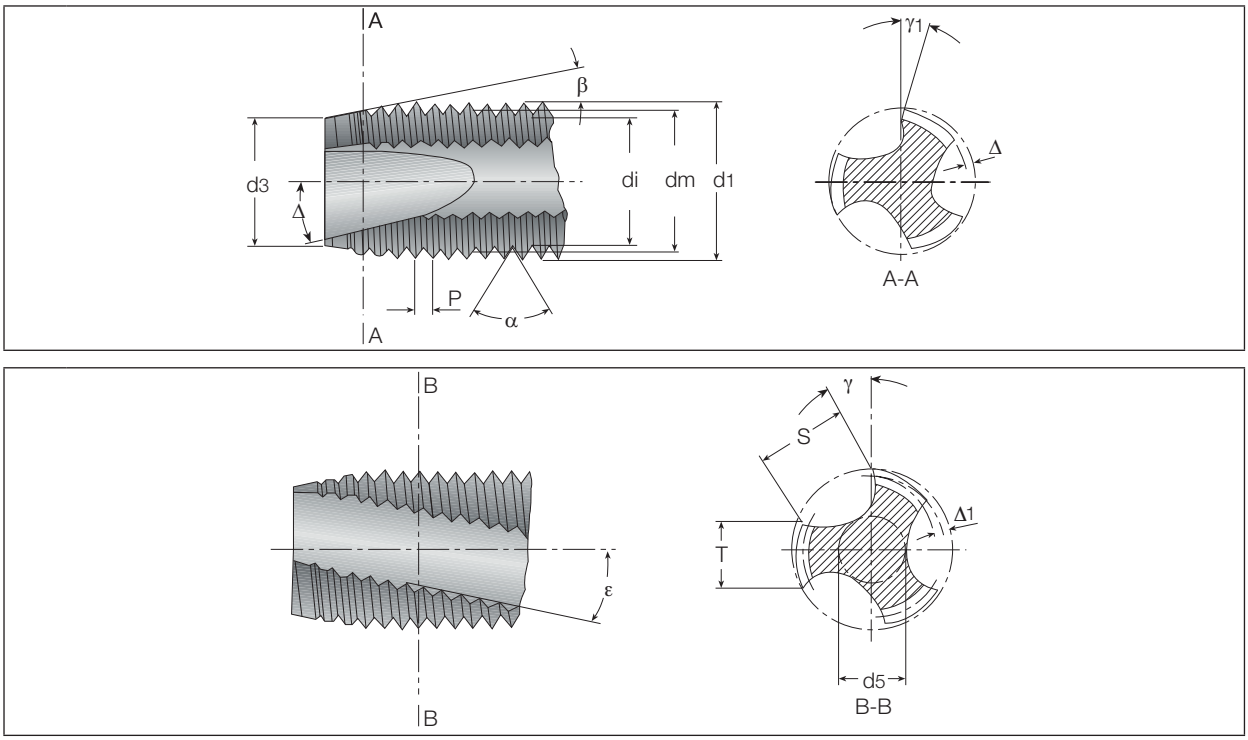
Forming taps (roll forming or cold forming) produce threads by deforming the material near the hole walls rather than by cutting the material. This method often works well in ductile materials. However, in brittle materials it often results in unsatisfactory threads.

Torque requirements for forming taps are considerably higher than for cutting taps. When forming taps are used, chuck capacity must be decreased by 25%. Forming taps do not produce chips.

Troubleshooting

Problem	Cause	Solution
Tapped hole oversized	Incorrect tap (cutting geometry unsuitable for application)	Use tap selected from the relevant material group
	Faulty alignment	Ensure that the tap is correctly aligned with the core hole axis
	Tap jamming	Improve lubrication and direction of coolant Adjust cutting speed
	Incorrectly reground tap (lead tip is not concentric)	Regrind tap
Stripped threads	Incorrect tap (cutting geometry incorrect for application)	Use a tap from the relevant material group
	Spindle speed and feed rate are not synchronized	Check feed rate programming and/or pitch of leading spindle. Use a tapping spindle with axial float (**GTI**/**GTIN**)
	Insufficient starting pressure exerted on tap (causes peeling)	Increase starting pressure
Bell mouthed tapped hole	Incorrect starting pressure	Use a tapping spindle with axial float (**GTI**/**GTIN**)
Unsatisfactory thread surface finish	Incorrect tap (cutting geometry unsuitable for application)	Select tap for the relevant material group
	The tap is blunt	Replace or regrind tap
	Tap badly re-ground	Regrind tap. Check that cutting geometry is suitable for material
	Incorrect lubricant, concentration or quantity	Ensure the use of a suitable coolant and an ample supply
Partial tap chipping	Swarf jamming	Check cutting speed. Use alternative tap
	Tap has jammed against bottom of pre-hole	Check hole and thread depths. Drill a deeper pre-hole
	Tap incorrectly reground (lead-in diameter too short, therefore too few cutting teeth)	Ensure that correct dimensions are maintained when regrinding
	Irregular workpiece material structure	Adjust cutting speed. Improve lubricant quality of coolant
Partial tap chipping	Swarf jamming	Check cutting speed. Use alternative tap
	Tap has jammed against bottom of pre-hole	Check hole and thread depths. Drill a deeper pre-hole
	Tap incorrectly reground (lead-in diameter too short, therefore too few cutting teeth)	Ensure that correct dimensions are maintained when regrinding
	Irregular workpiece material structure	Adjust cutting speed. Improve lubricant quality of coolant
Excessive tap wear	Incorrect cutting speed	Adjust cutting speed to suit workpiece material
	Coolant lacking in lubricating qualities and/or quantity	Ensure the use of a suitable coolant and an ample supply. Check that the coolant is reaching the cutting zone
	Surface of the pre-hole is compacted	Check pre-hole drilling conditions (drill carefully to reduce risk of surface compacting). Check drill cutting edges
Tap breakage	Incorrect tap in use (cutting geometry unsuitable for application)	Use tap from the relevant material group
	Centering error	Ensure that axes of tap and pre-hole are aligned
	Blunt tap	regrind tap
	Tap has reached bottom of pre-hole	Use tapping spindle with axial float and slipping clutch (**GTI**/**GTIN**)
	Pre-hole too small	Check for correct pre-hole size, see pages 364-365

Tap Nomenclature (Regrinding)



d1	Major diameter
dm	Flank diameter
di	Minor diameter
d3	Chamfer diameter
P	Pitch
a	Flank angle
ß	Chamfer angle
j	Gun nose angle
ϒ	Gun nose front rake angle
Δ	Chamfer relief
Δ 1	Pitch diameter relief on the land
ϒ1	Rake angle
T	Width of land
S	Flute width
d5	Web thickness
ε	Angle of spiral flute

Regrinding

Regrinding

Tap regrinding takes place in two steps:

1 regrinding of relieved chamfer
2 regrinding of flutes (see picture 1)

Regrinding of Relieved Chamfer

It is recommended that the resharpening be executed either on specific tap regrinding machines or on conventional resharpening machines equipped with an auxiliary device to generate the circular back relief. Picture 2 shows regrinding done with the cylindrical surface of a grinding wheel. Before regrinding, verify that the tap, fixed between points or on the pincer, runs concentrical. Also ensure that angle B is in the correct order to keep the same number of threads on chamfer.

Resharpening of Flutes

The rake angle g is obtained by moving the tap axis, in relation to the regrinding surface, of an amount X to be calculated with the formula: X = 1/2 d1 sin (ϒ)
(see picture 3).
(d1 =tap major diameter)

Example:

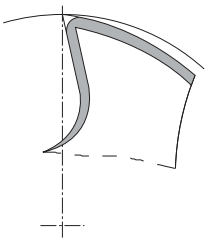
Tap 10 X 1,5 to cut on steel strength = 600 N/mm²

d1 = 10 mm ; ϒ = 15° ;
sin (ϒ) = 0,25882;

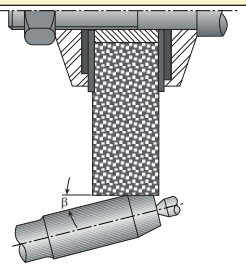
$$X = \frac{0.25885}{2} \text{ x10 ; X=1.29 mm}$$

On all taps with spiral flutes, it is possible to find the pitch of the spiral in reference to the lead screw necessary for resharpening. In case of using taps equipped with a deburring tool, it is necessary to extend the flutes according to the supplier's recommendation. As the wear on a tap is mainly on the chamfer area, for taps with a gun nose, regrinding the flutes can be done on the front area only (see picture 4).
In cases where the thread flanks are worn (in addition to the active edges), regrinding as described above is impractical. In this case restoration is done, by cutting the chamfer away (thus creating a shorter tap) and then reproducing the chamfer with same angle and relief.
(see picture 5)
In the absence of special regrinding machines, such restoration is advisable for regrinding taps with spiral flutes. This is because regrinding the flutes becomes unnecessary.

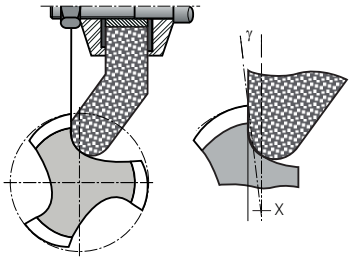
Picture 1



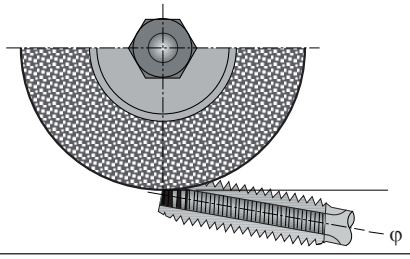
Picture 2



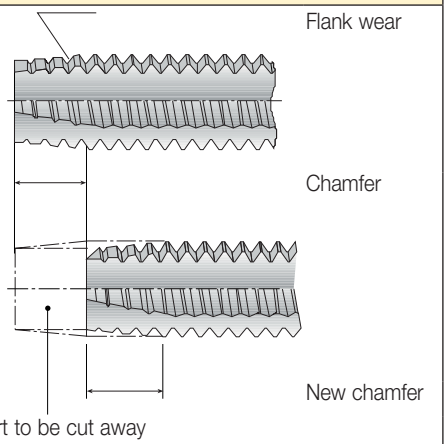
Picture 3



Picture 4



Picture 5



General Recommendations (Regrinding)

Maintenance
It is important to periodically regrind the worn tap. This is to avoid permanent damage or even tool breakage.

The Grinding Wheels
The structure and grain of grinding wheels must be appropriate for the tap to be resharpened.

Taps for Cast Iron
Taps used on cast iron can rarely be resharpened, as it is very abrasive and tends to wear the flank in such a way that it becomes grossly out of tolerance.

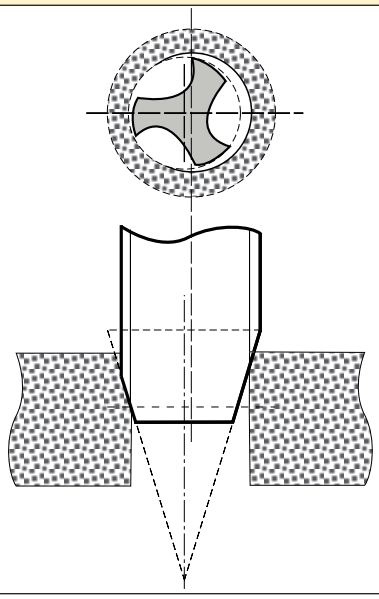
Taps for Aluminun
After regrinding it is advisable to remove the steel burrs with a wire brush.

Tap Inspection
It is important to inspect the tap after regrinding to ensure that all of the dimensions and angles have remained according to its specifications.

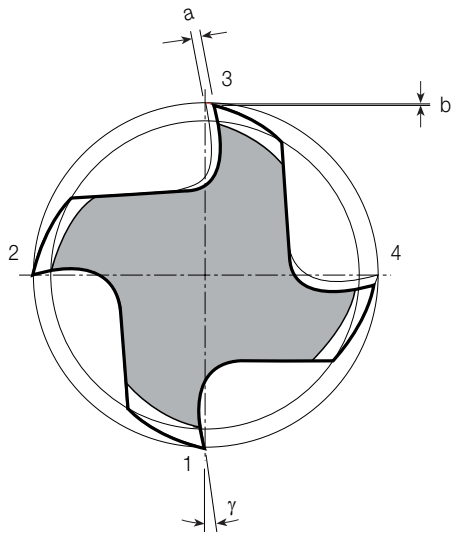
Controls (tests)
Once the tap is resharpened, it is always best to test it to correctly obtain the same threads as when the tap was new.

- The chamfer must be perfectly on axis in order to avoid the effects of picture 6. The cutters must have correct divisions.
- The results of resharpening with an incorrect division is shown in picture 7.
- The length and number of threads in chamfer must be precisely identical to those of the new tap.

Picture 6



Picture 7



Incorrect division-cutters not concentric

Test Report Form

Company _____ **Department** _____

Address _____ **Phone** _____

_____

Tool

Description of the tap being used at present Thread diameter and pitch _____

Make _____ Type _____

Class of tolerance _____

o Right-hand cutting

o Left-hand cutting _____

o Fluteless

o Right-hand spiral flutes _____ degrees _____

o Straight flutes

o Left-hand spiral flutes _____ degrees _____

o Spiral point

o Length of chamfer _____ mm _____

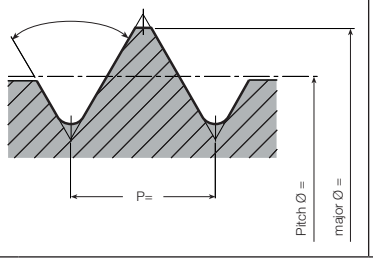
Additional information for special pitches or thread forms

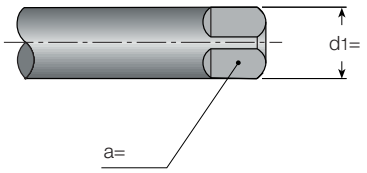
Major diameter _____

Pitch diameter _____

Flank angle _____ degrees _____

Minor diameter _____





Hole

Tap drill diameter _____

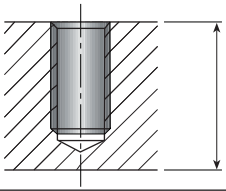
Length of hole _____

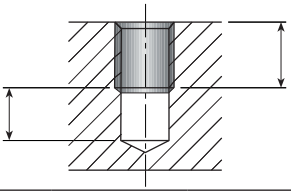
o Through hold

Depth of full thread _____

o Blind hole

Special requirements or unusual characteristics of the threaded product _____





Unusual characteristics of the threaded product or of the tapping method. _____

ie. counterbore, tapping on an angle, etc. _____

Test Report Form

Tapping speed	_____ m/min _____ RPM
Lubricant	o none o Emulsion _____ % o Cutting oil o Other _____ o Under pressure o Vaporization _____
Machine	Type _____ o Horizontal Tapping o Vertical Tapping
Driving	o Tap revolvers Number of spindles _____ o Workpiece revolvers
Feed	o Without o Power o CNC _____ %
Toolholder	o Rigid o Floating o Safety clutch Make _____ Type _____
Material to be tapped	Material no. or designation _____ Composition, if known _____ Tensile strength or hardness _____ N/mm^2 _____ HB _____ HRc Chip form o Short o Long o Annealed steel o Hardened steel o Heat treated steel

More details: _____

Contact person _____

Date _____ Signature _____

Thread Standards

Cylindrical Threads	
UNC	Unified coarse thread series
UNF	Unified fine thread series
UNEF	Unified extra-fine thread series
UN	Constant pitch series - threads with constant pitch of T.P.I. 4, 6, 8, 12, 16, 20, 28, 32
UNS	Selected combinations - threads with special dia. - pitch combinations
UNJ	Unified threads with constant pitch with radius on minor diameter from 0.15011 pitch to 0.18042 pitch
UNJC	Unified coarse thread with radius on minor diameter from 0.15011 pitch to 0.18042 pitch
UNJEF	Unified extra-fine thread with radius on minor diameter from 0.15011 pitch to 0.18042 pitch
UNJF	Unified fine threads with radius on minor diameter from 0.15011 pitch to 0.18042 pitch

Pipe Cylindrical Threads	
NPS	Cylindrical threads for pipe
NPSC	American Standard for pipe coupling
NPSF	American Standard for internal threads on pipe, dryseal
NPSH	American Standard for cylindrical threads for pipes, joints and nipples
NPSI	American Standard for internal cylindrical threads on pipe (dryseal)
NPSL	American Standard for cylindrical threads on pipes for nuts
NPSM	American Standard for cylindrical threads on pipes for mechanical joints
NGO	American National pipe threads for gas exhaust
NGS	American National pipe threads for gas

Taper Pipe Threads	
ANPT	Taper pipe threads for Army, Navy and Airforce
F-PTE	Taper pipe fine threads (dryseal)

Taper Pipe Threads	
NPT	Taper pipe threads
NPTF	Taper pipe threads (dryseal)
NPTR	Taper pipe threads for railway equipment
PTF-SAE SHORT	Taper pipe short threads (dryseal)-SAE
PTF-SPL SHORT	Taper pipe special threads (dryseal)-SAE
PTF-SPL EXTRA SHORT	Extra short special threads (dryseal)-SAE
SPL-PTF	Special taper pipe dryseal threads
NGT	National American taper pipe threads
SGT	Special taper pipe threads
API	American Petroleum Institute taper pipe threads

Trapezoidal and Saw Tooth Threads	
ACME-C ACME	Self-centering threads
ACME-G ACME	Generical application
STUB-ACME	ACME Flat threads with reduced thread depth
60° STUB-ACME	ACME Flat threads with 60° flank angle
N BUTT	American National Saw tooth threads

British Standard	
BSW	Whitworth British Standard coarse pitch
BSF	Whitworth British Standard fine pitch
WHIT	Whitworth Standard special pitch
R	British Standard external threading for taper pipe (dryseal) (already BSP-Tr)
Rc	British Standard internal threading taper thread for pipe (BSP-Tr)
Rp	British Standard cylindrical thread for pipe (already BSP.PI)
BA	British Standard Association threads
BSC	British Standard threads for bicycles
CEI	British Standard for bicycles

GTI / GTIN - Tapping Attachment

Compact tapping collet with tension and compression floating mechanism for ER32 collet chucks.
A tapping collet for standard and rigid tapping operations.
The **GTIN** ER32 collet makes tap removal and replacement easy, quick and reliable.
Designed for stationary and rotating applications, the **GTIN** ER32 collets are economical and efficient due to the ability to use existing ER32 collet chucks (with various shank sizes and types).

Applications:

The **GTIN** ER32 tapping collet is designed especially for CNC mill/turn centers, for regular and rigid tapping.

Advantages:

Quick tap change with a front clamping nut

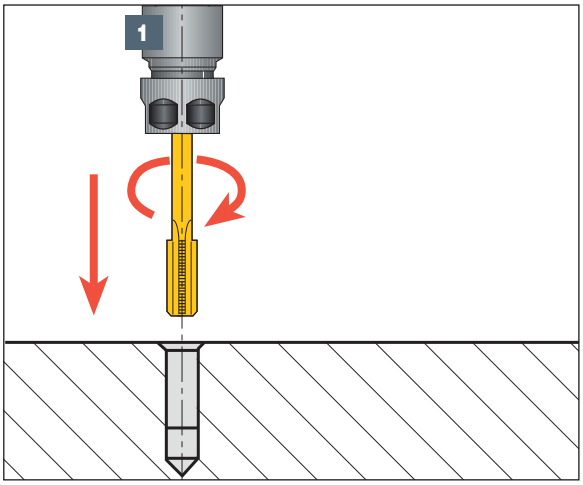
- Compact design for minimal clearance between the turret and chuck
- Fits every type of stationary and rotating ER32 collet chuck
- Positive tap drive with internal square driver
- Compensates for machine feed and tap pitch variance, resulting in greater thread accuracy
- Floating mechanism compensates for misalignment between tap and workpiece
- High accuracy due to tension and compression mechanism
- Available for all tap shank standards (DIN, ISO, ANSI, JIS)
- Tapping range M1-M16 (#0 to 5/8")
- Saves setup time by quick tap changing without removing **GTIN** from the machine
- Optimal for machines which have limited space between the turret and workpiece

GTI / GTIN - Tapping Attachment

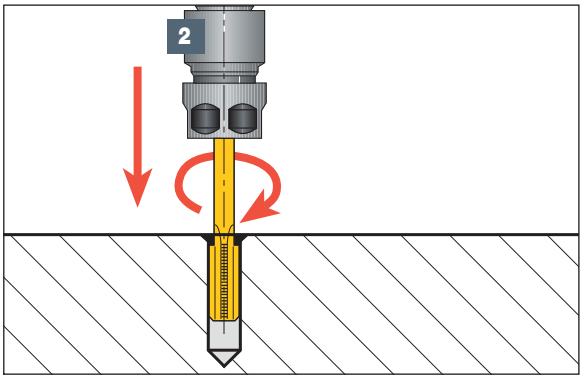
Operation

For through- and blind-hole tapping:

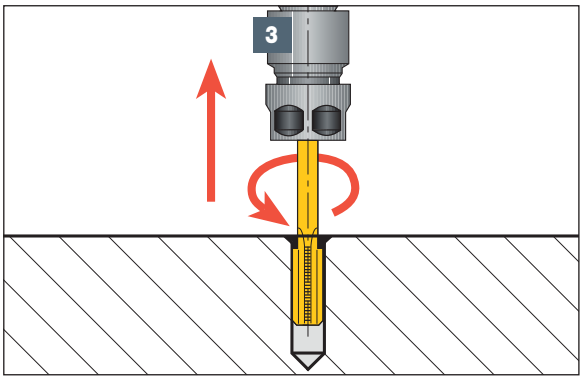
1 Enter feed rate according to thread pitch (or 1-2 % lower). Set spindle to starting point with 0.08 mm clearance.



2 Start spindle forward with right hand rotation until reaching desired depth.



3 Stop feed and rotation and reverse to starting point.



Description:

Short tap chucks for ER collets.

Application:

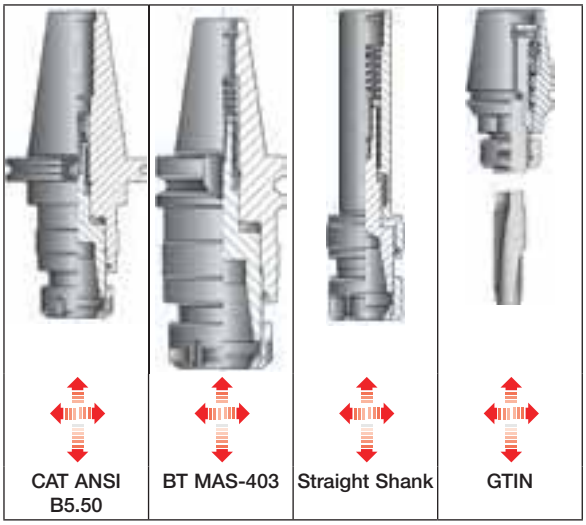
Axial float/tension/compression type for CNC milling machines and lathes with reversing motors and rigid tapping.

Features:

- Compensates for machine feed and tap pitch variance
- Floating mechanism compensates for misalignment between tap and workpiece
- Right- and left-hand tapping

Advantages:

- Practical and efficient tap holding by the ER spring collet without using jaw drive
- Compact design for minimal clearance applications
- Heavy duty design for high torque drive ensures the same accuracy as the tap itself



ITS BORE


ITS-BORE
BHE MB50-50
Ø2.5-110
0.5
0.01
Non. 0.002
LOCK
BHDH 24x75
CW 32

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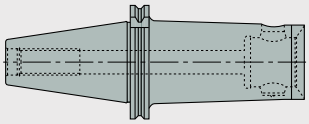

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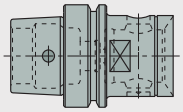

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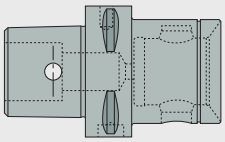

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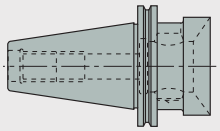

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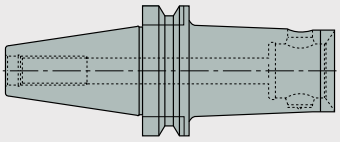

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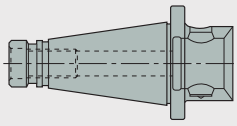

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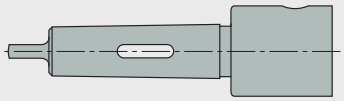

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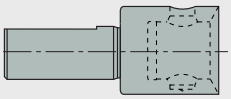

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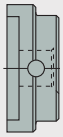

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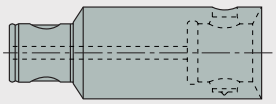

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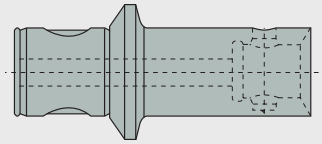

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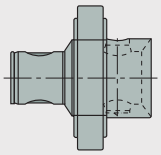

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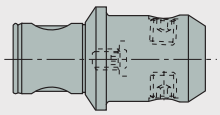

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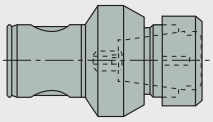

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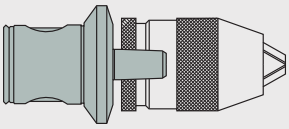

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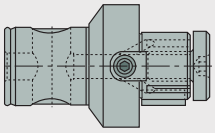
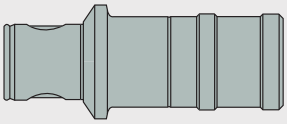


TP Page 400



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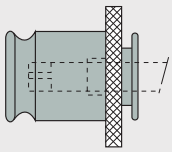
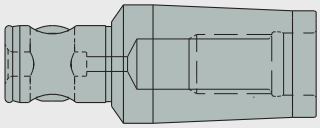


ODP see ISCAR MILLING LINES catalog pages 582,610,624, 650,668



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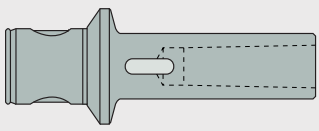

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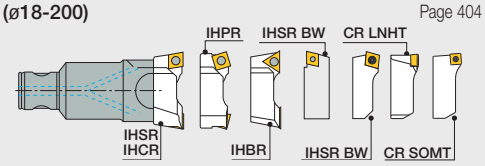
The ITS BORE System

Rough Boring Heads

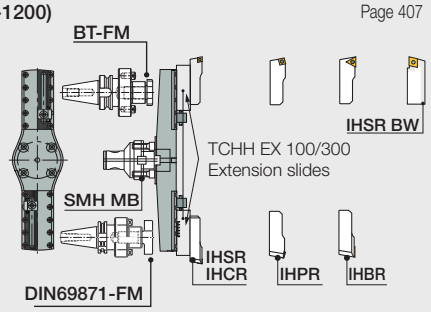
BHR MB 16, 20, 25, 32, 40, 50, 63, 80

(ø18-200) Page 404



TCH AL 200, 300, 400, 500, 600, 700, 800

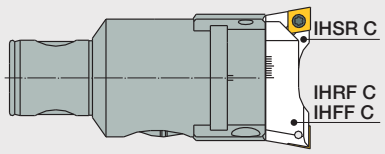
(ø200-1200) Page 407



Rough & Fine Boring Heads

BHC MB 25, 32, 40, 50, 63, 80

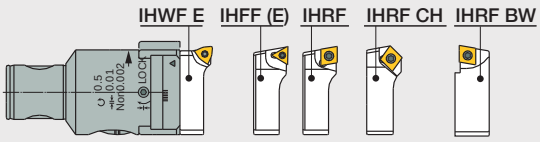
(ø28-120) Page 411



Fine Boring Heads (10 µm)

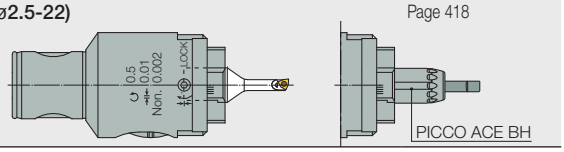
BHE MB 14, 16, 20, 25, 32, 40

(ø14.5-66) Page 418



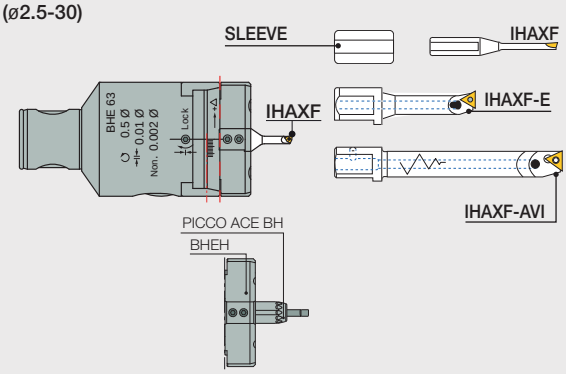
BHE MB-H 32, 50

(ø2.5-22) Page 418



BHE MB 50, 63, 80

(ø2.5-30)



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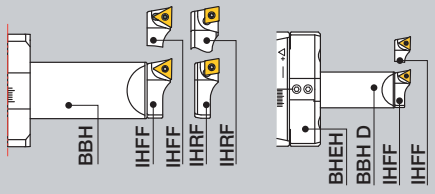
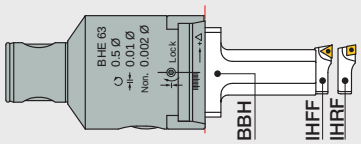
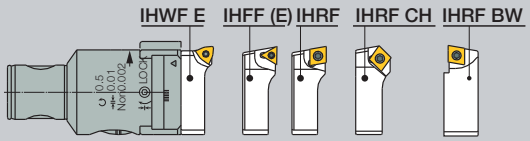


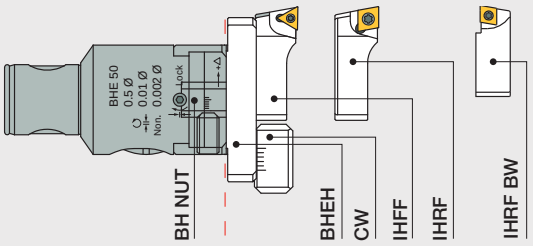
(ø40-90)



(ø54-132)



(ø72-200)



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The ITS BORE System

Fine Boring Heads (2 µm)

BHF MB 16, 20, 25, 32, 40

(ø18-63)

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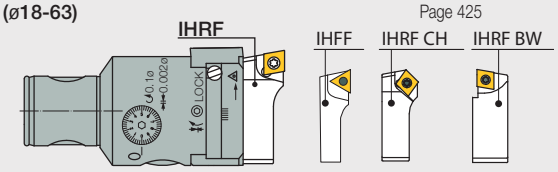

BHF MB 50-BL

(ø2.5-22)

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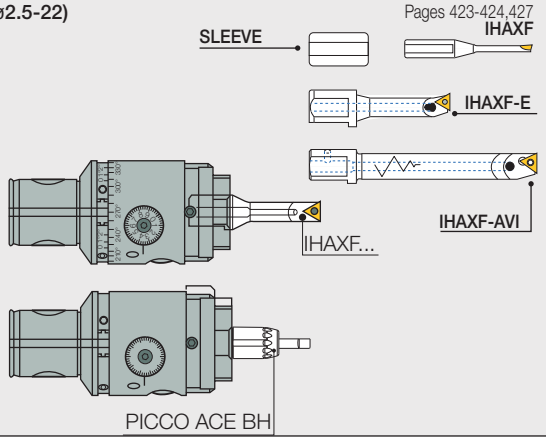
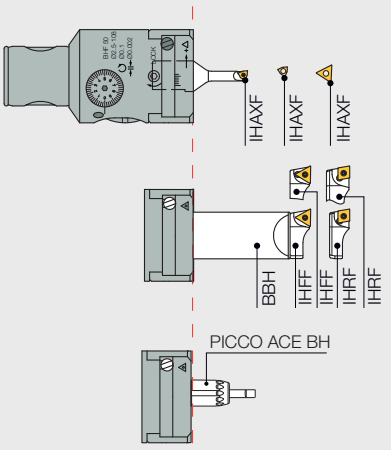


BHF MB 50-50X60

(ø2.5-30)



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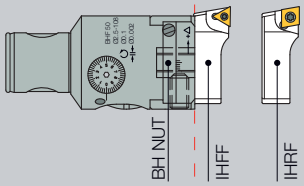

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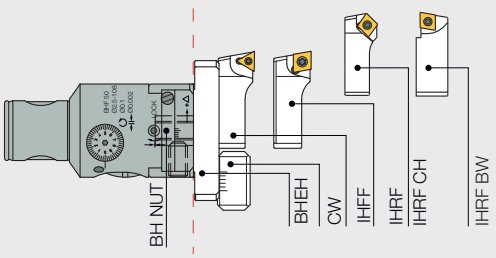

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BHF MB 50, 63, 80

(ø77-500)

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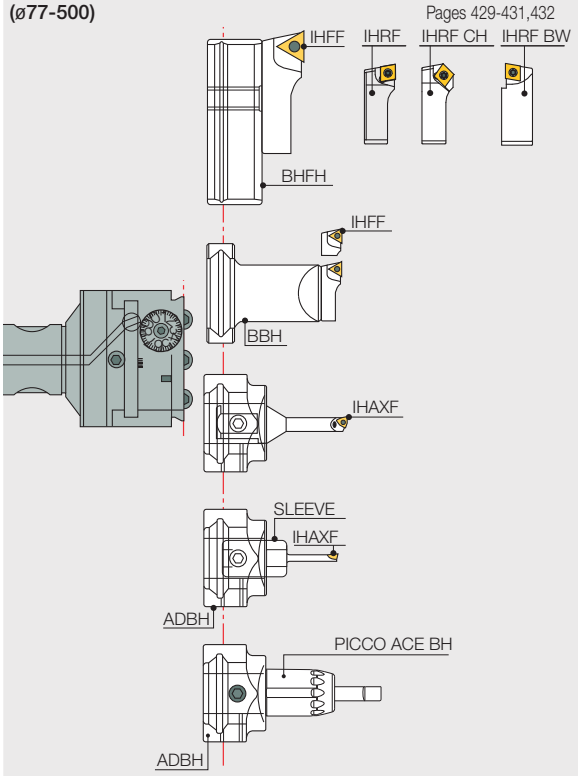

TCH AL 200, 300, 400, 500, 600, 700, 800

(ø200-1200)

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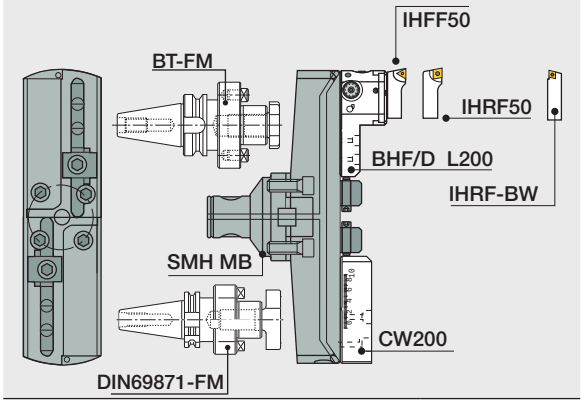

BHD 32, 40, 50, 63, 80

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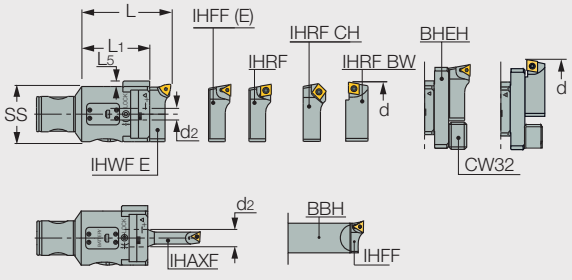
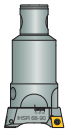
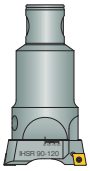
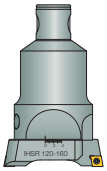
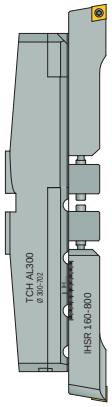
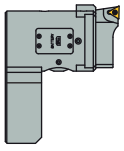
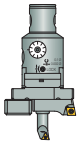
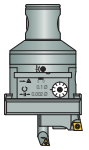
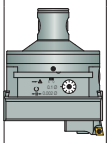
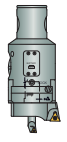
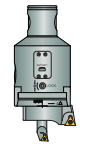
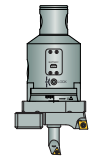
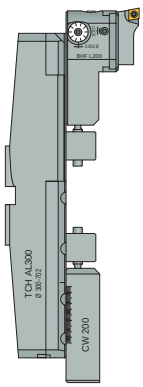
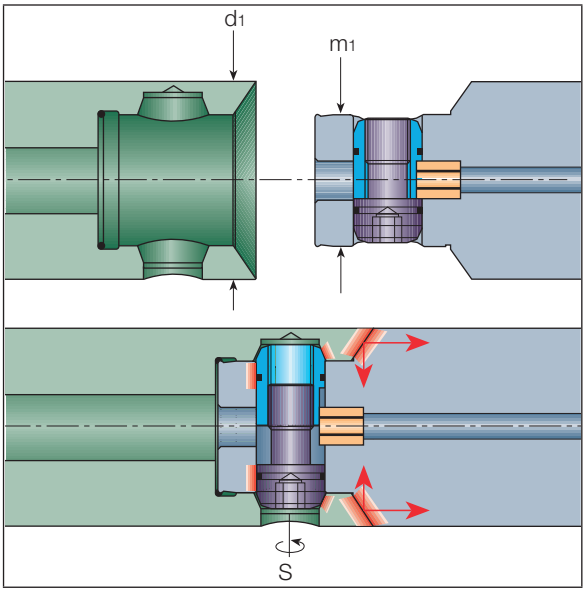


ITS BORE Boring Heads Selection Guide

MB Size		14	16	20	25	32	40	50	63	80	
Rough	BHR-TCH Ø18-1202		BHR MB16-16 Ø18-22  Page 404	BHR MB20-20 Ø22-28  Page 404	BHR MB25-25 Ø28-38  Page 404	BHR MB32-32 Ø35.5-50  Page 404	BHR MB40-40 Ø50-68  Page 404	BHR MB50-50 Ø68-90 MB50-63 Ø90-120  Page 404	BHR MB63-63 Ø90-120  Page 404	BHR MB80-80 Ø120-200  Page 404	Roughing  Page 407
Rough + Finish	BHC Ø28-120 10 µm				BHC MB25-25 Ø28-36  Page 411	BHC MB32-32 Ø36-46  Page 411	BHC MB40-40 Ø46-60  Page 411	BHC MB50-50 Ø60-75  Page 411	BHC MB63-63 Ø75-95  Page 411	BHC MB80-80 Ø95-120  Page 411	
Finish	BHE Ø6-200 10 µm	BHE MB14-14 Ø14.5-18  Page 418	BHE MB16-16 Ø18-24  Page 418	BHE MB20-20 Ø22-30  Page 418	BHE MB25-25 Ø28-40  Page 418	BHE MB32-32 Ø35-53  Page 418	BHE MB40-40 Ø48-66  Page 418	BHE MB50-50 Ø2.5-110  Page 418	BHE MB63-63 Ø6-125  Page 418	BHE MB80-80 Ø6-200  Page 418	TCH AL200 Ø200-602 TCH AL300 Ø300-702 TCH AL400 Ø400-802 TCH AL500 Ø500-902 TCH AL600 Ø600-1002 TCH AL700 Ø700-1102 TCH AL800 Ø800-1202
	BHE H Ø2.5-22 10 µm					BHE MB32-32...H Ø2.5-18  Page 418		BHE MB50-50...H Ø2.5-22  Page 418			Finishing BHD50 L200 Ø200-1202  Page 437
	BHF Ø2.5-1202 2 µm		BHF MB16-16 Ø18-23  Page 425	BHF MB20-20 Ø22-29  Page 425	BHF MB25-25 Ø28-38  Page 425	BHF MB32-32 Ø35.5-50  Page 425	BHF MB40-40 Ø48-63  Page 425	BHF MB50-50 Ø2.5-108 BHF MB50-80 Ø2.5-160 BHF MB50-63  Page 425	BHF MB63-63 Ø2.5-125  Page 432	BHF MB80-80 Ø2.5-160  Page 432	BHF MB80-125 Ø135-500  Page 432	BHF L200 Ø200 -1202 Page 437
	BHF BL Ø2.5-22 2 µm					BHF MB50-32... BL Ø2.5-12  Page 423		BHF MB50-50... BL Ø6-22  Page 423		Page	
	BHD MB Ø2-1202 2 µm					BHD MB32-32-83 Ø35-51  Page 414	BHD MB40-40-90 Ø48-64  Page 414	BHD MB50-50X60 Ø2.5-110  Page 414	BHD MB63-63X89 Ø6-125  Page 414	BHD MB80-80X104 Ø6-200  Page 414	 Page 438

MB Connection

ITSBORE is a modular toolholder system for boring, milling, drilling and tapping. This rigid, high-precision system is manufactured in one of the world's most advanced production facilities. The system is designed with extreme flexibility and simplicity, making it suitable for machine tools, machining centers and flexible manufacturing systems. It is recommended for machining strict tolerances with a high degree of surface finish. Its cylindrical-conical coupling and radial-expanding pin ensure maximum rigidity and concentricity in boring and milling. The system has an internal coolant supply in all components.

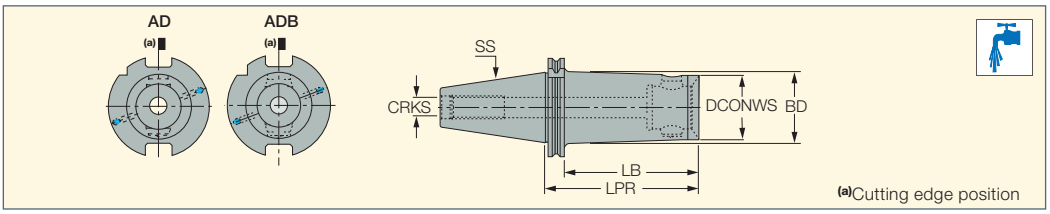


Designation	d_1	øm_1	Size Allen Key (mm)	Tightening Torque (Nm) ⚠	Maximum Driving Torque (Nm)
MB14	14	10	2.5	2-2.5	40
MB16	16	10	2.5	2-2.5	40
MB20	20	13	3	4-4.5	70
MB25	25	16	3	6.5-7.5	120
MB32	32	20	4	7-8	200
MB40	40	25	5	16-18	400
MB50	50	32	6	30-35	700
MB63	63	42	8	70-80	1600
MB80	80	42	8	70-80	1600
MB110	110	76	14	200-220	6300

ITSBORE

SKA-MB

MB Modular Connection System with DIN69871 Form AD/ADB / ISO7388/1 Taper Shanks



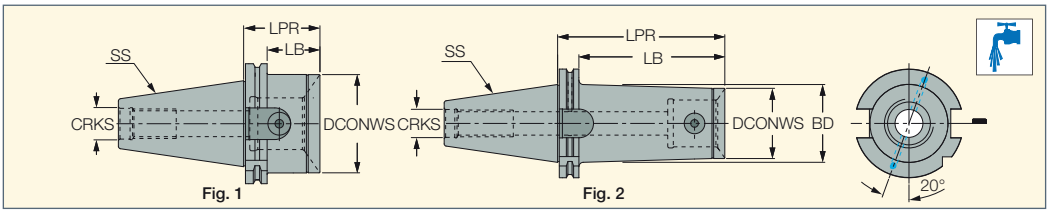
Designation	SS	DCONWS	LPR	LB	BD	CRKS	kg	
SKA 30-MB32	30	32.00	30.00	10.5	-	M12	0.40	HW 4.0
SKA 30-MB50	30	50.00	60.00	41.0	-	M12	0.67	HW 6.0
SKA 40-MB40	40	40.00	45.00	26.0	-	M16	0.94	HW 5.0
SKA 40-MB40X120 ADB	40	40.00	120.00	101.0	44.50	M16	1.70	HW 5.0
SKA 40-MB50	40	50.00	48.00	29.0	-	M16	0.99	HW 6.0
SKA 40-MB50X120 ADB	40	50.00	120.00	101.0	-	M16	2.04	HW 6.0
SKA 40-MB63	40	63.00	80.00	61.0	-	M16	1.52	HW 8.0
SKA 45-MB50	45	50.00	48.00	29.0	-	M20	1.77	HW 6.0
SKA 50-MB110X150	50	110.00	150.00	131.0	-	M24	8.47	HW 10.0
SKA 50-MB50	50	50.00	48.00	29.0	-	M24	2.82	HW 6.0
SKA 50-MB50X120 ADB	50	50.00	120.00	101.0	60.00	M24	4.03	HW 6.0
SKA 50-MB63	50	63.00	56.00	37.0	-	M24	2.95	HW 8.0
SKA 50-MB63X150 ADB	50	63.00	150.00	131.0	70.00	M24	2.81	HW 8.0
SKA 50-MB80	50	80.00	62.00	43.0	-	M24	3.51	HW 8.0
SKA 50-MB80X180 ADB	50	80.00	180.00	161.0	-	M24	7.90	HW 8.0
SKA 60-MB110X100	60	110.00	100.00	81.0	-	M30	10.50	HW 10.0
SKA 60-MB110X200	60	110.00	200.00	181.0	-	M30	18.00	HW 10.0
SKA 60 MB63X60	60	63.00	60.00	41.0	71.00	M30	9.47	HW 8.0
SKA 60-MB80X65	60	80.00	65.00	46.0	-	M30	10.38	HW 8.0

• Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability • The coolant passages of holders with A/B suffix are plugged with screws so they can be used either as SKA or SKB (through coolant).

ITSBORE

SKA-FC-MB

MB Modular Boring Connection System with DIN 69871 Face Contact ADB Tapered Shanks

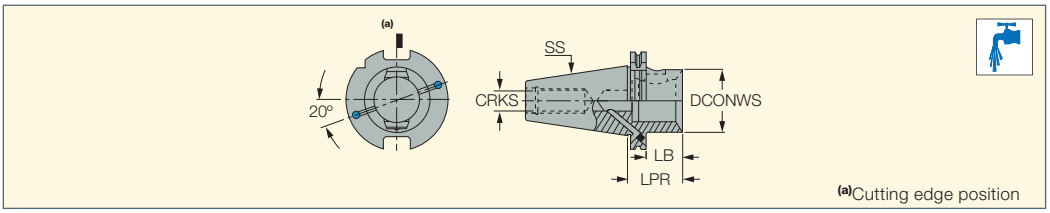


Designation	SS	DCONWS	LPR	BD	LB	CRKS	Fig.	kg	
SKA 40 FC MB50 ADB	40	50.00	48.00	-	29.0	M16	1.	0.90	HW 6.0
SKA 40 FC MB50X120 ADB	40	50.00	120.00	-	101.0	M16	2.	1.70	HW 6.0
SKA 40 FC MB63 ADB	40	63.00	80.00	-	-	M16	1.	1.50	HW 8.0
SKA 50 FC MB50 ADB	50	50.00	48.00	-	29.0	M24	1.	2.70	HW 6.0
SKA 50 FC MB50X120 ADB	50	50.00	120.00	60.00	101.0	M24	2.	3.50	HW 6.0
SKA 50 FC MB63 ADB	50	63.00	56.00	-	37.0	M24	1.	2.80	HW 8.0
SKA 50 FC MB63X150 ADB	50	63.00	150.00	75.50	131.0	M24	2.	5.00	HW 8.0
SKA 50 FC MB80 ADB	50	80.00	62.00	-	43.0	M24	1.	3.40	HW 8.0
SKA 50 FC MB80X180 ADB	50	80.00	180.00	-	161.0	M24	2.	6.90	HW 8.0

ITSBORE

SKB-MB

MB Modular Connection System with DIN69871 Form B (coolant through flange) Taper Shanks



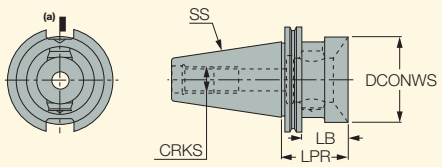
Designation	SS	DCONWS	LB	LPR	CRKS	kg	
SKB 40-MB50	40	50.00	29.0	48.00	M16	1.04	HW 6.0
SKB 40-MB63	40	63.00	61.0	80.00	M16	1.56	HW 8.0
SKB 50-MB50	50	50.00	29.0	48.00	M24	2.91	HW 6.0
SKB 50-MB63	50	63.00	37.0	56.00	M24	3.07	HW 8.0
SKB 50-MB80	50	80.00	43.0	62.00	M24	3.60	HW 8.0

• Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

CATM-MB

MB Modular Boring Connection System with CATM FORM AD ANSIB5.5 Caterpillar Tapered Shanks and Metric Pull Stud Threads



(a)Cutting edge position

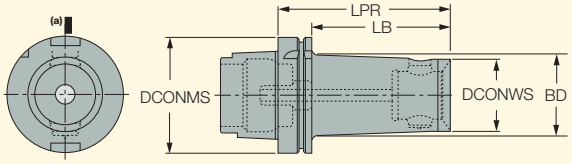
Designation	SS	DCONWS	LB	LPR	CRKS	kg	
CATM 40 MB50	40	50.00	47.0	66.00	M16	1.21	HW 6.0
CATM 40 MB63	40	63.00	-	100.00	M16	1.91	HW 8.0
CATM 45 MB50	45	50.00	29.0	48.00	M20	1.83	HW 6.0
CATM 50 MB50	50	50.00	29.0	48.00	M24	3.06	HW 6.0
CATM 50 MB63	50	63.00	37.0	56.00	M24	3.08	HW 8.0
CATM 50 MB80	50	80.00	43.0	62.00	M24	3.38	HW 8.0

• Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

HSK A-MB

MB Modular Connection System with DIN 69893 HSK A Taper Shanks



(a)Cutting edge position

Designation	DCONMS	DCONWS	LB	LPR	BD	kg			
HSK A40 MB32	40.00	32.00	28.0	48.00	-	0.32	COOLING TUBE HSK A40	WRENCH COOL TUBE HSK40*	HW 4.0
HSK A50 MB50	50.00	50.00	-	66.00	-	0.69	COOLING TUBE HSK A50	WRENCH COOL TUBE HSK50*	HW 6.0
HSK A63 MB40	63.00	40.00	34.0	60.00	-	0.92	COOLING TUBE HSK A63	WRENCH COOL TUBE HSK63*	HW 5.0
HSK A63 MB40X120	63.00	40.00	94.0	120.00	46.00	1.60	COOLING TUBE HSK A63	WRENCH COOL TUBE HSK63*	HW 5.0
HSK A63 MB50	63.00	50.00	40.0	66.00	-	1.04	COOLING TUBE HSK A63	WRENCH COOL TUBE HSK63*	HW 6.0
HSK A63 MB50X120	63.00	50.00	94.0	120.00	-	1.05	COOLING TUBE HSK A63	WRENCH COOL TUBE HSK63*	HW 6.0
HSK A63 MB63	63.00	63.00	-	75.00	-	1.15	COOLING TUBE HSK A63	WRENCH COOL TUBE HSK63*	HW 8.0
HSK A80 MB50	80.00	50.00	44.0	70.00	-	1.61	COOLING TUBE HSK A 80	WRENCH COOL TUBE HSK80*	HW 6.0
HSK A80 MB63	80.00	63.00	54.0	80.00	-	1.50	COOLING TUBE HSK A 80	WRENCH COOL TUBE HSK80*	HW 8.0
HSK A80 MB80	80.00	80.00	-	86.00	-	2.54	COOLING TUBE HSK A 80	WRENCH COOL TUBE HSK80*	HW 8.0
HSK A100 MB50	100.00	50.00	43.0	72.00	-	2.58	COOLING TUBE HSK A100	WRENCH COOL TUBE HSK100*	HW 6.0
HSK A100 MB50X120	100.00	50.00	91.0	120.00	60.00	1.05	COOLING TUBE HSK A100	WRENCH COOL TUBE HSK100*	HW 6.0
HSK A100 MB63	100.00	63.00	53.0	82.00	-	2.86	COOLING TUBE HSK A100	WRENCH COOL TUBE HSK100*	HW 8.0
HSK A100 MB63X150	100.00	63.00	121.0	150.00	70.00	4.71	COOLING TUBE HSK A100	WRENCH COOL TUBE HSK100*	HW 8.0
HSK A100 MB80	100.00	80.00	59.0	88.00	-	3.60	COOLING TUBE HSK A100	WRENCH COOL TUBE HSK100*	HW 8.0
HSK A100 MB80X180	100.00	80.00	151.0	180.00	-	6.50	COOLING TUBE HSK A100	WRENCH COOL TUBE HSK100*	HW 8.0

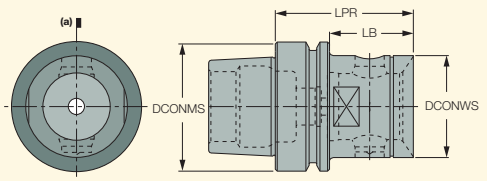
• A cooling tube must be used with all coolant through HSK spindles • Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

* Optional, should be ordered separately

ITSBORE

HSK E-MB

MB Modular Connection System with DIN 69893 E Taper Shanks



(a)Cutting edge position

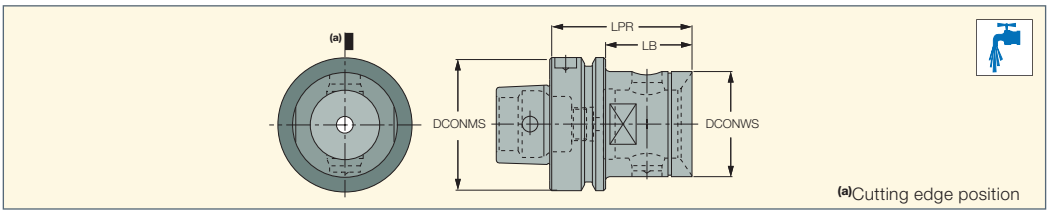
Designation	DCONMS	DCONWS	LB	LPR	kg	
HSK E40 MB32	40.00	32.00	22.0	42.00	0.30	HW 4.0
HSK E50 MB50	50.00	50.00	-	66.00	0.71	HW 6.0
HSK E63 MB50	63.00	50.00	40.0	66.00	1.87	HW 6.0

• A cooling tube must be used with all coolant through HSK spindles • Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

HSK F-MB

MB Modular Connection System with DIN 69893 F Taper Shanks



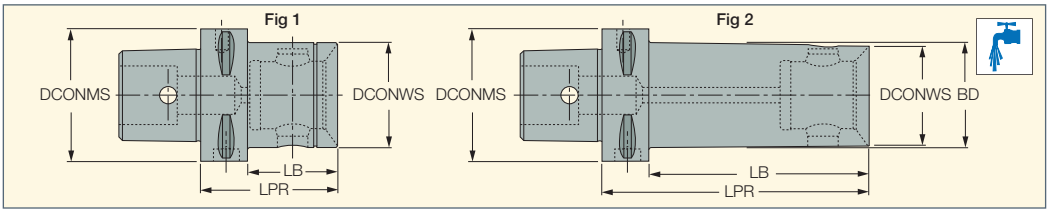
Designation	DCONMS	DCONWS	LB	LPR	kg	
HSK F 63 MB50	63.00	50.00	39.0	65.00	1.00	HW 6.0

• A cooling tube must be used with all coolant through HSK spindles • Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE CAMFIX

C#-MB

MB Modular Boring Connection System with CAMFIX Exchangeable Shanks



Designation	DCONMS	DCONWS	LPR	LB	BD	Fig.	kg			
C4 MB32X42	40.00	32.00	42.00	22.0	-	1.	0.30	HW 4.0	COOLING TUBE C4*	WRENCH COOL TUBE C4*
C4 MB40X45	40.00	40.00	45.00	-	-	1.	0.40	HW 5.0	COOLING TUBE C4*	WRENCH COOL TUBE C4*
C5 MB50X55	50.00	50.00	55.00	-	-	1.	0.72	HW 6.0	COOLING TUBE C5*	WRENCH COOL TUBE C5*
C6 MB40X50	63.00	40.00	50.00	28.0	-	1.	0.90	HW 5.0	COOLING TUBE C6*	WRENCH COOL TUBE C6*
C6 MB40X120	63.00	40.00	120.00	98.0	44.00	2.	1.50	HW 5.0	COOLING TUBE C6*	WRENCH COOL TUBE C6*
C6 MB50X55	63.00	50.00	55.00	33.0	50.00	2.	0.80	HW 6.0	COOLING TUBE C6*	WRENCH COOL TUBE C6*
C6 MB50X67	63.00	50.00	67.00	45.0	-	1.	1.10	HW 6.0	COOLING TUBE C6*	WRENCH COOL TUBE C6*
C6 MB50X120	63.00	50.00	120.00	98.0	54.00	2.	1.90	HW 6.0	COOLING TUBE C6*	WRENCH COOL TUBE C6*
C6 MB63X77	63.00	63.00	77.00	-	-	1.	1.54	HW 8.0	COOLING TUBE C6*	WRENCH COOL TUBE C6*
C8 MB50X60	80.00	50.00	60.00	30.0	-	1.	1.99	HW 6.0	COOLING TUBE C8*	WRENCH COOL TUBE C8*
C8 MB50X120	80.00	50.00	120.00	90.0	54.00	2.	2.80	HW 6.0	COOLING TUBE C8*	WRENCH COOL TUBE C8*
C8 MB63X70	80.00	63.00	70.00	40.0	-	1.	2.16	HW 8.0	COOLING TUBE C8*	WRENCH COOL TUBE C8*
C8 MB63X150	80.00	63.00	150.00	120.0	67.00	2.	4.00	HW 8.0	COOLING TUBE C8*	WRENCH COOL TUBE C8*
C8 MB80X75	80.00	80.00	75.00	-	-	1.	2.60	HW 8.0	COOLING TUBE C8*	WRENCH COOL TUBE C8*
C8 MB80X120	80.00	80.00	120.00	-	-	1.	4.30	HW 8.0	COOLING TUBE C8*	WRENCH COOL TUBE C8*

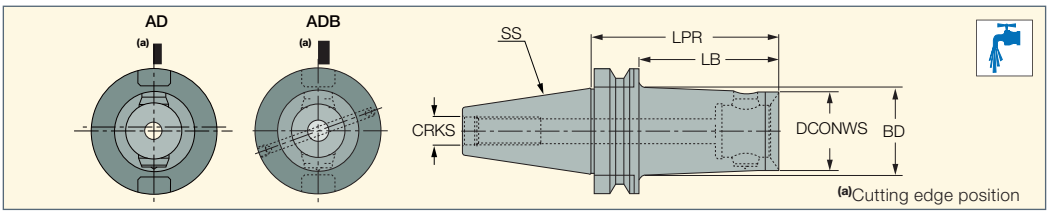
• Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

* Optional, should be ordered separately

ITSBORE

BT-MB

MB Modular Connection System with BT MAS-403 FORM AD/ADB Taper Shanks



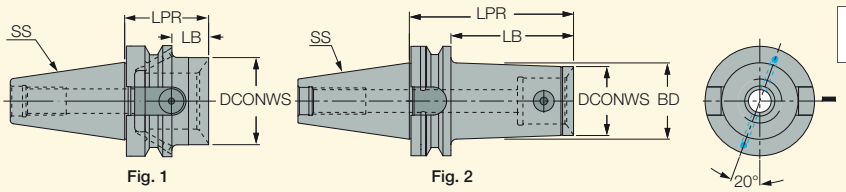
Designation	SS	DCONWS	LB	LPR	BD	CRKS	kg	
BT30 MB32	30	32.00	10.6	32.00	-	M12	0.38	HW 4.0
BT30 MB50	30	50.00	38.6	60.00	-	M12	0.70	HW 6.0
BT40 MB40	40	40.00	18.0	45.00	-	M16	0.99	HW 5.0
BT40 MB40X120 ADB	40	40.00	93.0	120.00	44.50	M16	1.78	HW 5.0
BT40 MB50	40	50.00	21.0	48.00	-	M16	1.00	HW 6.0
BT40 MB50X120 ADB	40	50.00	93.0	120.00	-	M16	2.08	HW 6.0
BT40 MB63	40	63.00	39.0	66.00	-	M16	1.35	HW 8.0
BT45 MB50	45	50.00	29.0	62.00	-	M20	2.32	HW 6.0
BT50 MB50	50	50.00	28.0	66.00	-	M24	3.78	HW 6.0
BT50 MB50X120 ADB	50	50.00	82.0	120.00	60.00	M24	4.64	HW 6.0
BT50 MB63	50	63.00	37.0	75.00	-	M24	3.98	HW 8.0
BT50 MB63X150 ADB	50	63.00	112.0	150.00	70.00	M24	5.85	HW 8.0
BT50 MB80	50	80.00	37.0	75.00	-	M24	4.30	
BT50 MB80X180 ADB	50	80.00	142.0	180.00	-	M24	8.19	HW 8.0
BT50 MB110X140	50	110.00	102.0	140.00	-	M24	6.80	HW 10.0
BT60 MB110X110	60	110.00	63.0	110.00	-	M30	11.50	HW 10.0
BT60 MB110X200	60	110.00	152.0	200.00	-	M30	18.10	HW 10.0

• Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

BT-FC-MB

MB Modular Boring System
with BT MAS-403 Face Contact
ADB Tapered Shanks

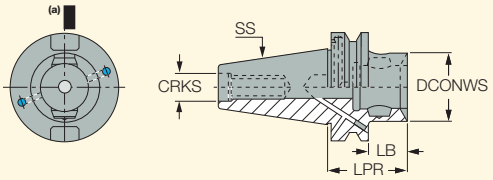


Designation	SS	DCONWS	LPR	BD	LB	Fig.	kg	
BT30 FC MB50	30	50.00	60.00	-	32.0	1.	0.70	
BT40 FC MB50	40	50.00	48.00	-	21.0	1.	0.90	HW 6.0
BT40 FC MB50X120 ADB	40	50.00	120.00	-	93.0	2.	1.90	HW 5.0
BT40 FC MB63	40	63.00	66.00	-	-	1.	1.20	HW 8.0
BT50 FC MB50	50	50.00	66.00	-	28.0	1.	3.30	HW 6.0
BT50 FC MB50X120 ADB	50	50.00	120.00	60.00	82.0	2.	4.20	HW 6.0
BT50 FC MB63	50	63.00	75.00	-	37.0	1.	3.70	HW 8.0
BT50 FC MB63X150 ADB	50	63.00	150.00	70.00	112.0	2.	5.80	HW 8.0
BT50 FC MB80	50	80.00	75.00	-	37.0	1.	4.00	HW 8.0
BT50 FC MB80X180 ADB	50	80.00	180.00	-	142.0	2.	7.50	HW 8.0

ITSBORE

BTB-MB

MB Modular Connection
System with BT MAS-403
Type B Taper Shanks



(a)Cutting edge position

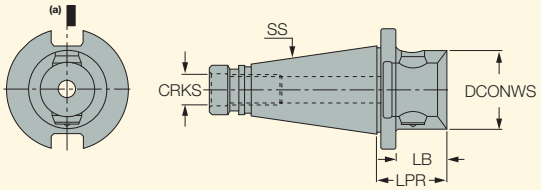
Designation	SS	DCONWS	LB	LPR	CRKS	kg	
BTB40 MB50	40	50.00	21.0	48.00	M16	0.96	HW 6.0
BTB40 MB63	40	63.00	-	66.00	M16	1.34	HW 8.0
BTB50 MB50X66	50	50.00	28.0	66.00	M24	3.89	HW 6.0
BTB50 MB63X75	50	63.00	37.0	75.00	M24	4.00	HW 8.0
BTB50 MB80	50	80.00	37.0	75.00	M24	4.30	HW 8.0

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

ISOM-MB

MB Modular Connection System
with DIN 2080-A Taper Shanks



(a)Cutting edge position

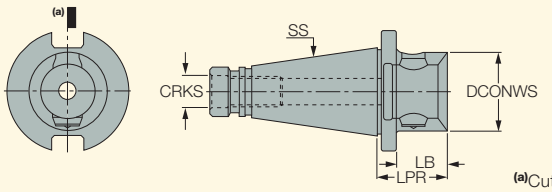
Designation	SS	DCONWS	LB	LPR	CRKS	kg	
ISOM 30-MB50	30	50.00	-	58.00	M12	0.78	HW 6.0
ISOM 40-MB50	40	50.00	36.0	48.00	M16	0.95	HW 6.0
ISOM 40-MB63	40	63.00	-	60.00	M16	1.34	HW 8.0
ISOM 45-MB50	45	50.00	33.0	48.00	M20	1.81	HW 6.0
ISOM 50-MB50	50	50.00	33.0	48.00	M24	2.82	HW 6.0
ISOM 50-MB63	50	63.00	41.0	56.00	M24	3.04	HW 8.0
ISOM 50-MB80	50	80.00	45.0	60.00	M24	3.60	HW 8.0

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

ISO-MB

MB Modular Connection System
with ISO 297 Taper Shanks



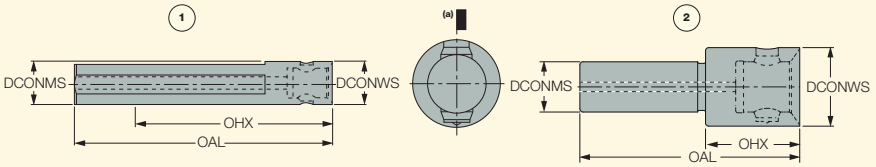
(a)Cutting edge position

Designation	SS	DCONWS	LB	LPR	CRKS	kg	
ISO 40-MB50	40	50.00	36.0	48.00	UNC 5/8"-11	1.03	HW 6.0
ISO 40-MB63	40	63.00	-	60.00	UNC 5/8"-11	1.36	HW 8.0
ISO 50-MB50	50	50.00	33.0	48.00	UNC 1.0"-8	2.83	HW 6.0
ISO 50-MB63	50	63.00	41.0	56.00	UNC 1.0"-8	2.94	HW 8.0
ISO 50-MB80	50	80.00	45.0	60.00	UNC 1.0"-8	3.56	HW 8.0

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

ST-MB
MB Modular Connection System
with Straight Cylindrical Shanks



(a)Cutting edge position

Designation	DCONMS	DCONWS	OAL	OHX(1)	CSP(2)	Fig.	kg	
ST 16-MB16	16.00	16.00	100.00	66.0	1	1.	0.15	HW 2.5
ST 20-MB20	20.00	20.00	125.00	85.0	1	1.	0.27	HW 3.0
ST 25-MB32	25.00	32.00	100.00	35.0	0	2.	0.41	HW 4.0
ST 32-MB50	32.00	50.00	140.00	60.0	0	2.	0.42	HW 6.0

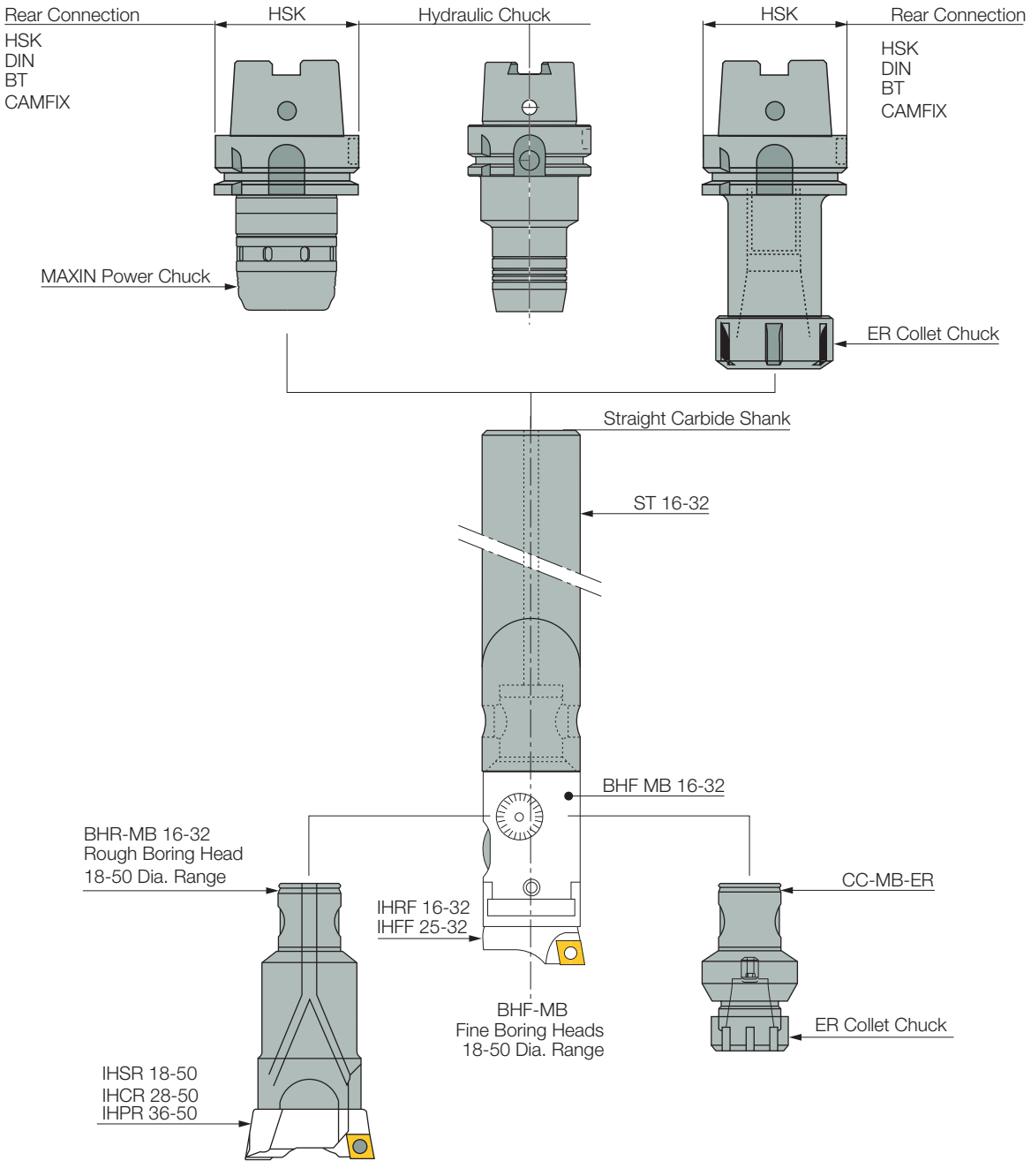
- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

(1) Maximum overhang

(2) 0 - Without coolant supply, 1 - With coolant supply

ST-MB Straight Carbide Shank with MB Connection Assembly Options

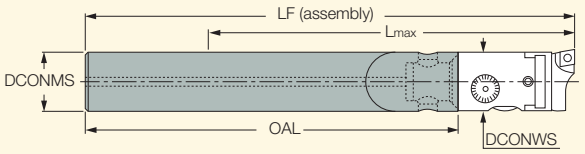
ST16-32 MB16-MB32 Diameter Range: 18-50 mm



ITSBORE

ST-MB-E

MB Modular Connection System with Cylindrical Carbide Shanks



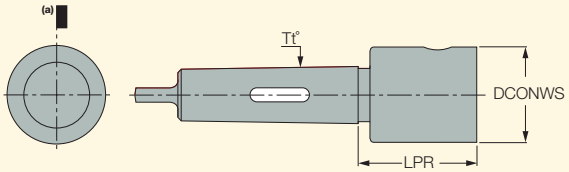
Designation	DCONMS	DCONWS	OAL	LF	L max	kg	
ST 16-MB16X110E	16.00	16.00	110.00	144.00	100.0	0.28	HW 2.5
ST 16-MB16X140E	16.00	16.00	140.00	174.00	125.0	0.17	HW 2.5
ST 16-MB16X170E	16.00	16.00	170.00	204.00	160.0	0.42	HW 2.5
ST 20-MB20X135E	20.00	20.00	135.00	175.00	125.0	0.40	HW 3.0
ST 20-MB20X170E	20.00	20.00	170.00	210.00	160.0	0.69	HW 3.0
ST 20-MB20X210E	20.00	20.00	210.00	250.00	200.0	0.40	HW 3.0
ST 25-MB25X160E	25.00	25.00	160.00	210.00	160.0	0.40	HW 3.0
ST 25-MB25X205E	25.00	25.00	205.00	255.00	200.0	1.28	HW 3.0
ST 25-MB25X255E	25.00	25.00	255.00	305.00	250.0	1.55	HW 3.0
ST 32-MB32X195E	32.00	32.00	195.00	258.00	200.0	1.96	HW 4.0
ST 32-MB32X250E	32.00	32.00	250.00	313.00	250.0	2.50	HW 4.0
ST 32-MB32X315E	32.00	32.00	315.00	378.00	320.0	3.30	HW 4.0

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

MTT-MB

MB Modular Connection System with DIN 228/B 1806 Morse Taper Shanks



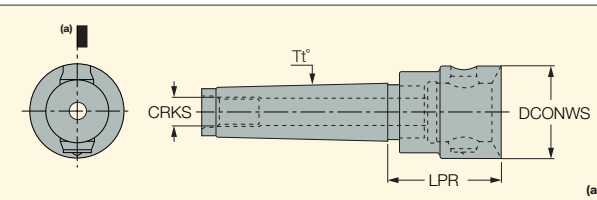
Designation	Tt°	DCONWS	LPR	kg	
MTT 5-MB63	MT5	63.00	65.00	2.16	HW 8.0

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

MTD-MB

MB Modular Connection System with DIN 228/A 220 Morse Taper Shanks



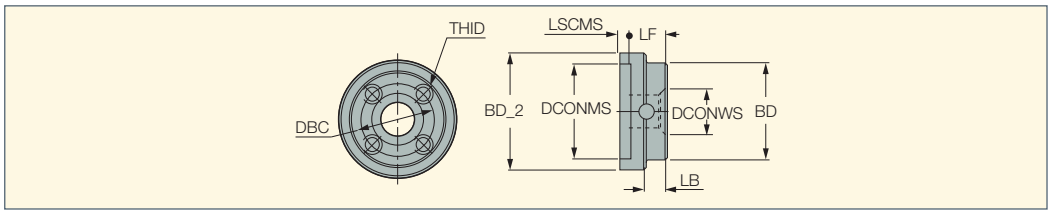
Designation	Tt°	DCONWS	LPR	CRKS	kg	
MTD 4-MB50	MT4	50.00	63.00	M16	0.93	HW 6.0
MTD 4-MB50 SIP	MT4	50.00	63.00	M14	0.98	HW 6.0

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

DIN2079-MB

MB Modular Connection System with DIN 2079 Spindle Connecting Interface



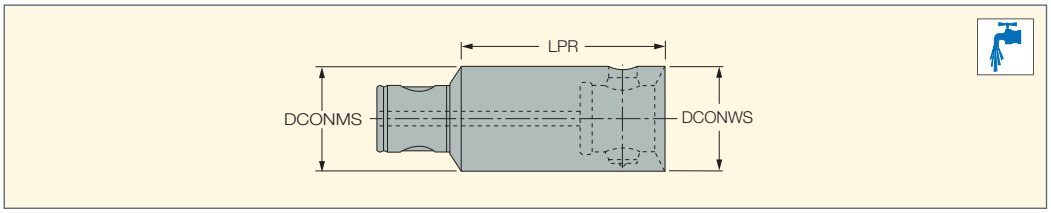
Designation	LF	DCONWS	LSCMS	LB	BD	BD_2	DCONMS	DBC	THID	kg	
DIN2079 MB50 40	35.00	50.00	10.00	21.0	90.00	110.00	88.89	66.70	M12	1.96	HW 6.0
DIN2079 MB63 40	47.00	63.00	10.00	31.0	90.00	110.00	88.89	66.70	M12	2.06	HW 8.0
DIN2079 MB63 50	45.00	63.00	12.00	31.0	135.00	150.00	128.57	101.60	M16	4.60	HW 8.0
DIN2079 MB80 50	50.00	80.00	12.00	36.0	135.00	150.00	128.57	101.60	M16	5.00	HW 8.0

- Standard connection plate that can be assembled easily on most CNC spindle machines with a DIN2079 interface. This connection plate enables the use of ITS BORE components with the MB connection by using any standard adapter with four screws. It is affixed directly on the machine spindle.

ITSBORE

EX-MB

Extensions for the MB Modular Connection System



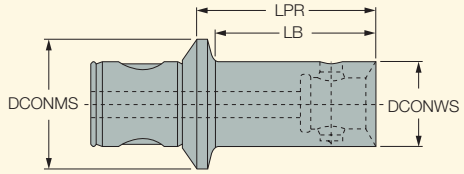
Designation	DCONMS	LPR	DCONWS	kg
EX 14X25-MB14	14.00	25.00	14.00	0.04
EX 16X25-MB16	16.00	25.00	16.00	0.06
EX 20X32-MB20	20.00	32.00	20.00	0.09
EX 25X25-MB25	25.00	25.00	25.00	0.10
EX 25X40-MB25	25.00	40.00	25.00	0.16
EX 32X32-MB32	32.00	32.00	32.00	0.20
EX 32X50-MB32	32.00	50.00	32.00	0.31
EX 40X40-MB40	40.00	40.00	40.00	0.39
EX 40X63-MB40	40.00	63.00	40.00	0.61
EX 50X50-MB50	50.00	50.00	50.00	0.70
EX 50X80-MB50	50.00	80.00	50.00	1.20
EX 50X100-MB50	50.00	100.00	50.00	1.53
EX 63X63-MB63	63.00	63.00	63.00	1.49
EX 63X100-MB63	63.00	100.00	63.00	2.39
EX 63X125-MB63	63.00	125.00	63.00	2.99
EX 80X80-MB80	80.00	80.00	80.00	3.10
EX 80X125-MB80	80.00	125.00	80.00	4.90
EX 80X160-MB80	80.00	160.00	80.00	6.25
EX 110X140-MB110	110.00	140.00	110.00	10.45
EX 110X200-MB110	110.00	200.00	110.00	14.30

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

RE MB-MB

Reducers for the MB Modular Connection System



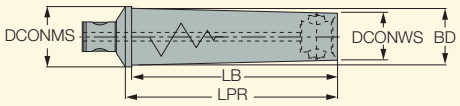
Designation	DCONMS	DCONWS	LPR	LB	kg
RE MB16-MB14X24	16.00	14.00	25.00	19.5	0.04
RE MB20-MB14X19	20.00	14.00	20.00	14.5	0.03
RE MB20-MB16X20	20.00	16.00	20.00	16.0	0.06
RE MB25-MB14X19	25.00	14.00	20.00	13.5	0.06
RE MB25-MB16X20	25.00	16.00	20.00	15.0	0.08
RE MB25-MB20X25	25.00	20.00	25.00	20.0	0.09
RE MB32-MB14X25	32.00	14.00	25.00	17.5	0.08
RE MB32-MB16X24	32.00	16.00	24.00	18.0	0.13
RE MB32-MB20X25	32.00	20.00	25.00	20.0	0.14
RE MB32-MB25X28	32.00	25.00	28.00	23.0	0.16
RE MB40-MB14X25	40.00	14.00	25.00	16.5	0.23
RE MB40-MB16X24	40.00	16.00	24.00	17.0	0.22
RE MB40-MB20X26	40.00	20.00	26.00	20.0	0.23
RE MB40-MB25X28	40.00	25.00	28.00	22.0	0.26
RE MB40-MB32X32	40.00	32.00	32.00	27.0	0.29
RE MB50-MB14X25	50.00	14.00	25.00	14.5	0.40
RE MB50-MB14X39	50.00	14.00	39.00	30.5	0.42
RE MB50-MB16X24	50.00	16.00	24.00	15.0	0.39
RE MB50-MB16X40	50.00	16.00	40.00	31.0	0.41
RE MB50-MB16X74	50.00	16.00	74.00	65.0	0.47
RE MB50-MB20X26	50.00	20.00	26.00	18.0	0.40
RE MB50-MB20X70	50.00	20.00	70.00	62.0	0.50
RE MB50-MB20X93	50.00	20.00	93.00	85.0	0.56
RE MB50-MB25X117	50.00	25.00	117.00	110.0	0.68
RE MB50-MB25X28	50.00	25.00	28.00	21.0	0.42
RE MB50-MB25X87	50.00	25.00	87.00	80.0	0.64
RE MB50-MB32X144	50.00	32.00	144.00	137.0	1.09
RE MB50-MB32X32	50.00	32.00	32.00	25.0	0.46
RE MB50-MB32X87	50.00	32.00	87.00	80.0	0.71
RE MB50-MB40X176	50.00	40.00	176.00	170.0	1.87
RE MB50-MB40X36	50.00	40.00	36.00	30.0	0.51
RE MB50-MB40X87	50.00	40.00	87.00	80.0	0.97
RE MB63-MB50X40	63.00	50.00	40.00	34.0	0.97
RE MB80-MB50X45	80.00	50.00	45.00	36.0	1.35
RE MB80-MB63X60	80.00	63.00	60.00	52.0	1.77
RE MB110-MB80X70	110.00	80.00	70.00	52.0	6.00

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

RE MB-AVI

MB Modular System Vibration Damping Reducers



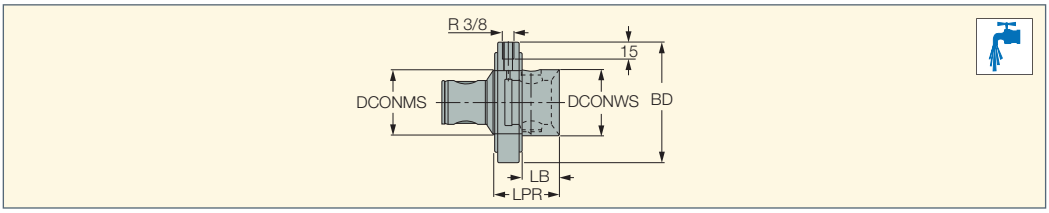
Designation	DCONMS	DCONWS	LPR	BD	LB	kg
RE MB50-MB16X74-AVI	50.00	16.00	74.00	17.50	65.0	0.51
RE MB50-MB20X93-AVI	50.00	20.00	93.00	21.50	85.0	0.65
RE MB50-MB25X117-AVI	50.00	25.00	117.00	27.00	110.0	0.92
RE MB50-MB32X144-AVI	50.00	32.00	144.00	35.00	138.0	1.47
RE MB50-MB40X176-AVI	50.00	40.00	176.00	47.00	170.0	2.66
RE MB63-MB50X220-AVI	63.00	50.00	220.00	60.00	214.0	5.00
RE MB80-MB63X280-AVI	80.00	63.00	280.00	77.00	272.0	10.40

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

CHR MB

Coolant Supply Collar for the MB Modular Boring System



Designation	DCONMS	DCONWS	BD	LB	LPR	RPMX(1)	CP(2)	kg
CHR MB63	63.00	63.00	115.00	35.0	63.00	3500	10	3.30

- Important: coolant flow must be started prior to rotating the spindle to avoid damage of the O-rings
- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

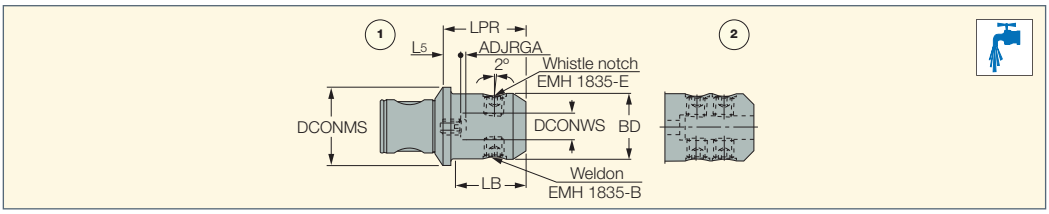
(1) Maximum RPM

(2) Coolant pressure (Bar)

ITSBORE

EMH MB

Weldon and Whistle Notch Side-Lock Holders with the MB Modular Boring Connection System



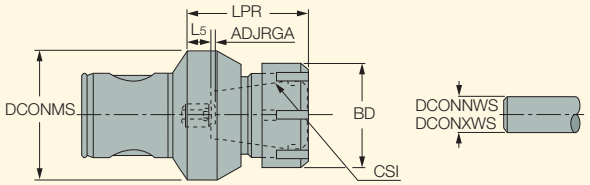
Designation	DCONMS	DCONWS	BD	LB	LPR	L5	ADJRGA	Fig.	kg
EMH MB50-6	50.00	6.00	25.00	32.5	44.00	7.00	2.0	1.	0.51
EMH MB50-8	50.00	8.00	28.00	33.0	44.00	7.00	2.0	1.	0.54
EMH MB50-10	50.00	10.00	35.00	42.0	52.00	11.00	3.0	1.	0.68
EMH MB50-12	50.00	12.00	42.00	48.0	57.00	11.00	3.0	1.	0.85
EMH MB50-14	50.00	14.00	42.00	48.0	57.00	11.00	3.0	1.	0.84
EMH MB50-16	50.00	16.00	48.00	61.0	67.00	17.00	4.0	1.	1.12
EMH MB50-20	50.00	20.00	51.00	-	67.00	16.00	4.0	1.	1.08
EMH MB50-25	50.00	25.00	63.00	-	80.00	22.00	4.0	2.	1.21
EMH MB63-16	63.00	16.00	48.00	53.0	64.00	14.00	4.0	1.	1.45
EMH MB63-20	63.00	20.00	52.00	56.0	66.00	14.00	4.0	1.	1.55
EMH MB63-25	63.00	25.00	64.00	-	74.00	16.00	4.0	2.	2.11
EMH MB63-32	63.00	32.00	72.00	-	76.00	14.00	4.0	2.	2.42
EMH MB80-40	80.00	40.00	80.00	-	83.00	12.00	4.0	2.	3.21

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

CC MB-ER

DIN 6499 ER Collet Chuck with the MB Modular Boring Connection System



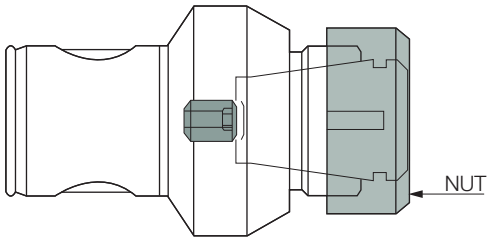
Designation	DCONMS	CSI	DCONNWS(1)	DCONXWS(2)	BD	LPR	L5	ADJRGA	kg		
CC MB16 ER11M	16.00	ER11	0.5	7.0	16.00	25.00	2.50	2.0	0.05	NUT ER11 MINI	WRENCH ER11 MINI*
CC MB20 ER16M	20.00	ER16	0.5	10.0	22.00	32.00	1.00	2.0	0.05	NUT ER16 MINI	WRENCH ER16 MINI*
CC MB25 ER20M	25.00	ER20	1.0	13.0	28.00	40.00	2.50	2.0	0.14	NUT ER20 MINI	WRENCH ER20 MINI*
CC MB32 ER25M	32.00	ER25	1.0	16.0	35.00	42.00	1.50	2.0	0.23	NUT ER25 MINI	WRENCH ER25 MINI*
CC MB40 ER25	40.00	ER25	1.0	16.0	42.00	45.00	5.00	2.0	0.45	NUT ER25 TOP	WRENCH ER25*
CC MB50 ER25	50.00	ER25	1.0	16.0	42.00	48.00	7.00	2.0	0.67	NUT ER25 TOP	WRENCH ER25*
CC MB50 ER32	50.00	ER32	2.0	20.0	50.00	55.00	7.00	2.0	0.79	NUT ER32 TOP	WRENCH ER32*
CC MB63 ER32	63.00	ER32	2.0	20.0	50.00	59.00	12.00	2.0	1.35	NUT ER32 TOP	WRENCH ER32*
CC MB63 ER40	63.00	ER40	3.0	26.0	63.00	64.00	12.00	2.0	1.55	NUT ER40 TOP	WRENCH ER40*

- For ER collets, see ISCAR Tooling Systems Catalog.

(1) Minimum diameter

(2) Maximum diameter

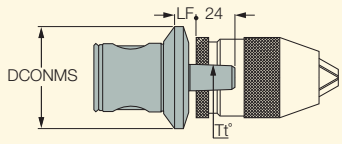
* Optional, should be ordered separately



ITSBORE

DC MB

DIN238 DC Drill Chuck Arbor with the MB Modular Connection System



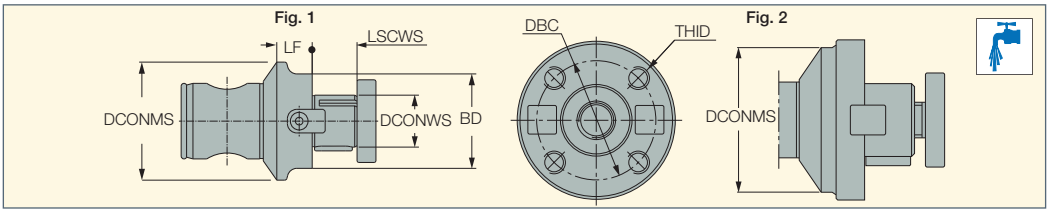
Designation	DCONMS	Tt°	LF	kg
DC MB50 B16	50.00	B16	10.00	0.40
DC MB63 B16	63.00	B16	13.50	0.41

- Without drill chuck.

ITSBORE

SMH MB

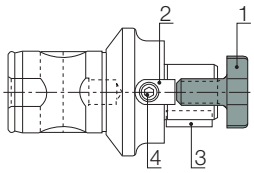
Shell Mill Holders with the MB Modular Boring Connection System



Designation	DCONMS	DCONWS	BD	DBC	THID	LF	LSCWS	Fig.	kg
SMH MB40-16	40.00	16.00	32.00	-	-	15.00	17.00	1.	0.32
SMH MB40-22	40.00	22.00	40.00	-	-	13.00	19.00	1.	0.38
SMH MB50-16	50.00	16.00	32.00	-	-	15.00	17.00	1.	0.48
SMH MB50-22	50.00	22.00	40.00	-	-	15.00	19.00	1.	0.55
SMH MB50-27	50.00	27.00	50.00	-	-	15.00	21.00	1.	0.66
SMH MB50-32	50.00	32.00	60.00	-	-	15.00	24.00	1.	0.79
SMH MB63-22	63.00	22.00	60.00	-	-	15.00	19.00	1.	1.01
SMH MB63-27	63.00	27.00	60.00	-	-	15.00	21.00	1.	1.09
SMH MB63-32	63.00	32.00	70.00	-	-	15.00	24.00	1.	1.24
SMH MB80-32	80.00	32.00	88.00	-	-	24.00	24.00	1.	2.09
SMH MB80-40	80.00	40.00	88.00	66.70	M12	24.00	27.00	2.	2.25
SMH MB80-50	80.00	50.00	90.00	-	-	24.00	30.00	2.	2.58
SMH MB80-60 (1)	80.00	60.00	128.50	101.60	M16	31.50	40.00	2.	4.19
SMH MB110-60 (1)	110.00	60.00	128.50	101.60	M16	36.00	40.00	2.	7.56

- When mounting slitting cutters, remove the drive dogs and use spacer rings.
- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

(1) Shell locking screw not supplied



Spare Parts

Designation	(1)	(2)	(3)	(4)
SMH MB40-16	M 8 CLAMP SCREW SEM 16	BH DOG DRIVE SMH 16	KEY SMH 16	M3X8 SMH KEY SCREW
SMH MB40-22	M 10 CLAMP SCREW SEM 22	BH DOG DRIVE SMH 22	KEY SMH 22	M4X10SMH KEY SCREW
SMH MB50-16	M 8 CLAMP SCREW SEM 16	BH DOG DRIVE SMH 16	KEY SMH 16	M3X8 SMH KEY SCREW
SMH MB50-22	M 10 CLAMP SCREW SEM 22	BH DOG DRIVE SMH 22	KEY SMH 22	M4X10SMH KEY SCREW
SMH MB50-27	M 12 CLAMP SCREW SEM 27	BH DOG DRIVE SMH 27	KEY SMH 27	M5X12SMH KEY SCREW
SMH MB50-32	M 16 CLAMP SCREW SEM 32	BH DOG DRIVE SMH 32	KEY SMH 32	M6X16SMH KEY SCREW
SMH MB63-27	M 12 CLAMP SCREW SEM 27	BH DOG DRIVE SMH 27	KEY SMH 27	M5X12SMH KEY SCREW
SMH MB63-32	M 16 CLAMP SCREW SEM 32	BH DOG DRIVE SMH 32	KEY SMH 32	M6X16SMH KEY SCREW
SMH MB80-32	M 16 CLAMP SCREW SEM 32	BH DOG DRIVE SMH 32	KEY SMH 32	M6X16SMH KEY SCREW
SMH MB80-40	M 20 CLAMP SCREW SEM 40	BH DOG DRIVE SMH 40	KEY SMH 40	M6X18SMH KEY SCREW

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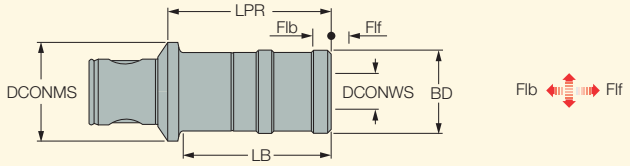
TP MB-M

Tapping Chucks with the MB Modular Connection System



Designation	DCONMS	Tap min	Tap max	LB	LPR	BD	DCONWS	Flf	Flb	kg
TP MB50-M 3-12	50.00	M1	M14	65.0	76.00	36.00	19.00	7.5	7.5	0.78
TP MB50-M 8-20	50.00	M4.5	M20	-	106.00	53.00	31.00	12.5	12.5	1.60
TP MB63-M 3-12	63.00	M1	M14	57.2	70.00	36.00	19.00	7.5	7.5	1.14
TP MB63-M 8-20	63.00	M4.5	M20	93.0	104.00	53.00	31.00	12.5	12.5	1.88

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

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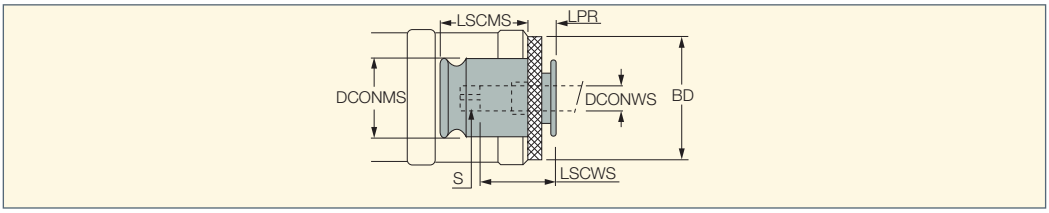
TCS-DIN

Quick Change Tap
Collets for Solid Taps



Designation	DCONWS[1]	S[2]	S1[3]	S2[4]	BD	DCONMS	LPR	LSCMS	LSCWS	kg
TCS #1 DIN 4-3	4.00	3.00	M4	-	30.00	19.00	7.0	21.50	17.0	0.48
TCS #1 DIN 3.5-2.7	3.50	2.70	M3	M4.5, M5	30.00	19.00	7.0	21.50	17.0	0.01
TCS #1 DIN 4.5-3.4	4.50	3.40	M3.5	M6	30.00	19.00	7.0	21.50	17.0	0.08
TCS #1 DIN 6-4.9	6.00	4.90	M4.5, M6	M8	30.00	19.00	7.0	21.50	17.0	0.08
TCS #1 DIN 8-6.2	8.00	6.20	M8	-	30.00	19.00	7.0	21.50	17.0	0.10
TCS #1 DIN 9-7	9.00	7.00	-	M12	30.00	19.00	7.0	21.50	17.0	0.08
TCS #1 DIN 10-8	10.00	8.00	M10	-	30.00	19.00	7.0	21.50	17.0	0.10
TCS #1 DIN 11-9	11.00	9.00	M14	M14	30.00	19.00	7.0	21.50	17.0	0.48
TCS #2 DIN 8X6.2	8.00	6.20	M8	-	48.00	31.00	11.0	35.00	30.0	0.28
TCS #2 DIN 9X 7	9.00	7.00	-	M12	48.00	31.00	17.0	35.00	30.0	0.28
TCS #2 DIN 10X 8	10.00	8.00	M10	-	48.00	31.00	17.0	35.00	30.0	0.28
TCS #2 DIN 11X 9	11.00	9.00	-	M14	48.00	31.00	17.0	35.00	30.0	0.48
TCS #2 DIN 12X 9	12.00	9.00	-	M16	48.00	31.00	17.0	35.00	30.0	0.27
TCS #2 DIN 14X11	14.00	11.00	-	M18	48.00	31.00	17.0	35.00	30.0	0.25
TCS #2 DIN 16X12	16.00	12.00	-	M20	48.00	31.00	17.0	35.00	30.0	0.24

[1] According to tap shank size.
[2] Square size.
[3] Tap size according to DIN371
[4] Tap size according to DIN376/374

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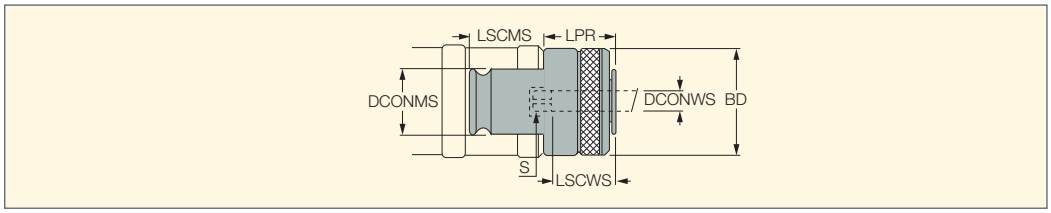
TCC-DIN

Quick Change Tap Collets
with a Safety Clutch



Designation	DCONWS[1]	S[2]	S1[3]	S2[4]	BD	DCONMS	LPR	LSCMS	LSCWS	kg
TCC #1 DIN 2.8-2.1	2.80	2.10	M2, M2.5	M4	32.00	19.00	25.0	21.50	17.0	0.17
TCC #1 DIN 4-3	4.00	3.00	M3.5	-	32.00	19.00	25.0	21.50	17.0	0.34
TCC #1 DIN 4.5-3.4	4.50	3.40	M4	M6	32.00	19.00	25.0	21.50	17.0	0.17
TCC #1 DIN 6-4.9	6.00	4.90	M4.5, M6	M8	32.00	19.00	25.0	21.50	17.0	0.17
TCC #1 DIN 7-5.5	7.00	5.50	M7	M10	32.00	19.00	25.0	21.50	17.0	0.17
TCC #1 DIN 8-6.2	8.00	6.20	M8	-	32.00	19.00	25.0	21.50	17.0	0.16
TCC #1 DIN 9-7	9.00	7.00	-	M12	32.00	19.00	25.0	21.50	17.0	0.17
TCC #1 DIN 10-8	10.00	8.00	M10	-	32.00	19.00	25.0	21.50	17.0	0.16
TCC #1 DIN 11-9	11.00	9.00	M10	M14	32.00	19.00	25.0	21.50	17.0	0.15
TCC #2 DIN 6X4.9	6.00	4.90	M4.5, M6	M8	50.00	31.00	34.0	35.00	30.0	0.53
TCC #2 DIN 7X5.5	7.00	5.50	M7	M10	50.00	31.00	34.0	35.00	30.0	0.54
TCC #2 DIN 8X6.2	8.00	6.20	M8	-	50.00	31.00	34.0	35.00	30.0	0.53
TCC #2 DIN 9X7	9.00	7.00	M7	M12	50.00	31.00	34.0	35.00	30.0	0.53
TCC #2 DIN 10X8	10.00	8.00	M10	-	50.00	31.00	34.0	35.00	30.0	0.53
TCC #2 DIN 11X9	11.00	9.00	-	M14	50.00	31.00	34.0	35.00	30.0	0.53
TCC #2 DIN 12X9	12.00	9.00	-	M16	50.00	31.00	34.0	35.00	30.0	0.52
TCC #2 DIN 14X11	14.00	11.00	-	M18	50.00	31.00	34.0	35.00	30.0	0.51
TCC #2 DIN 16X12	16.00	12.00	-	M20	50.00	31.00	34.0	35.00	30.0	0.50

[1] According to tap shank size.
[2] Square size.
[3] Tap size according to DIN371
[4] Tap size according to DIN376/374

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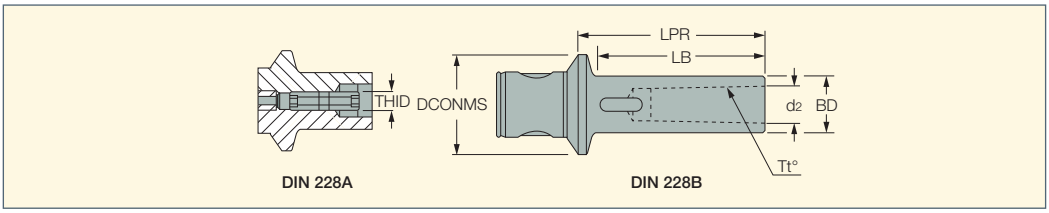
AMT MB-MT

MB Modular Connection System with Morse Taper Tang DIN 228 A/B

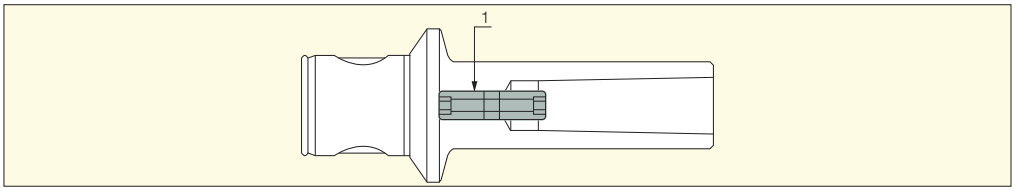


Designation	Tt°	DCONMS	d2	BD	THID	LB	LPR	kg
AMT MB50-MT1	MT1	50.00	12.07	20.00	M6	68.0	80.00	0.52
AMT MB50-MT2	MT2	50.00	17.78	30.00	M10	86.0	100.00	0.78
AMT MB50-MT3	MT3	50.00	23.82	36.00	M12	110.0	120.00	1.02
AMT MB63-MT3	MT3	63.00	23.82	36.00	M12	108.0	120.00	1.40
AMT MB63-MT4	MT4	63.00	31.26	48.00	M16	133.0	150.00	2.20

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

AMT

Screw for Shanks – Morse Taper Tang AMT



Spare Parts

Designation	1
AMT MB50-MT2	AMT MT2-SCREW
AMT MB50-MT3	AMT MT3-SCREW
AMT MB63-MT3	AMT MT3-SCREW
AMT MB63-MT4	AMT MT4-SCREW

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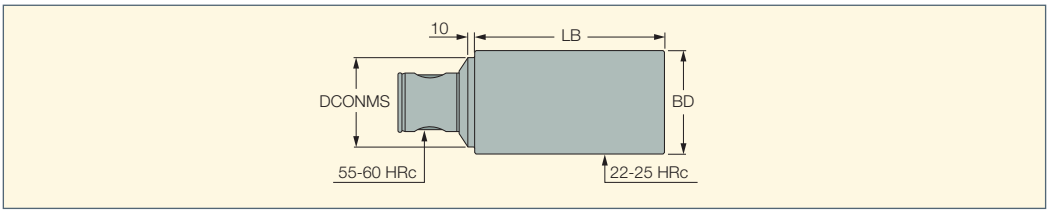
BLANK MB

Blanks with MB Modular Connection System



Designation	DCONMS	BD	LB	kg
BLANK MB50-63X160	50.00	63.00	160.00	4.44
BLANK MB63-80X200	63.00	80.00	200.00	8.77
BLANK MB80-100X250	80.00	100.00	250.00	16.62
BLANK MB110-130X250	110.00	130.00	250.00	18.00

- Material: 39NiCrMo3

Rough Boring Options

Roughing with High Feed			Roughing with High Cutting Depth	Light Roughing or Semi-Finishing Applications

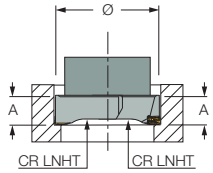
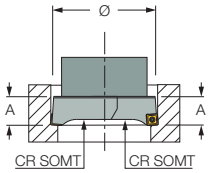
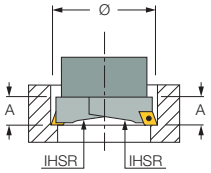
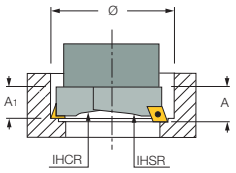
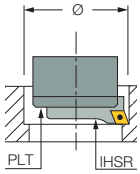

				

Fig. a			Fig. b	Fig. c

1 Radial setting of the cutting edges should be carried out with tool presetting equipment.
2 Boring bars fitted with two insert pockets are for roughing operations involving heavy chip removal.
The double-insert boring bars include:
- Two IHSR/CR SOMT/CR LNHT insert holders on the same plane with the two cutting edges set at an identical radial distance for high feed rate roughing operations (Fig. a).
- An IHCR insert holder and an IHSR insert holder not on the same plane with the two cutting edges set at different radial distances for high-depth roughing operations (Fig. b).
3 Boring bars fitted with a single insert holder are for roughing and finishing operations involving normal chip removal. The serrated surface protection plate PLT should always be used (Fig. c).

Rough Boring Head Diameter Range

	10 20 30 40 50 60 70 80 90 100 110 120 130 200 300 400 500 600 700 800 900 1000 1100 1200	Assembly Reference Page
BHR MB16-16x34	18-22	843
BHR MB20-20x40	22-28	
BHR MB25-25x50	28-38	
BHR MB32-32x63	35.5-50	
BHR MB40-40x80	50-68	
BHR MB50-50x100	68-90	
BHR MB50-63x80	90-120	
BHR MB63-63x125	90-120	
BHR MB80-80x140	120-200	
TCH AL200	200-602	847
TCH AL300	300-702	
TCH AL400	400-802	
TCH AL 500	500-902	
TCH AL 600	600-1002	
TCH AL 700	700-1102	
TCH AL 800	800-1202	

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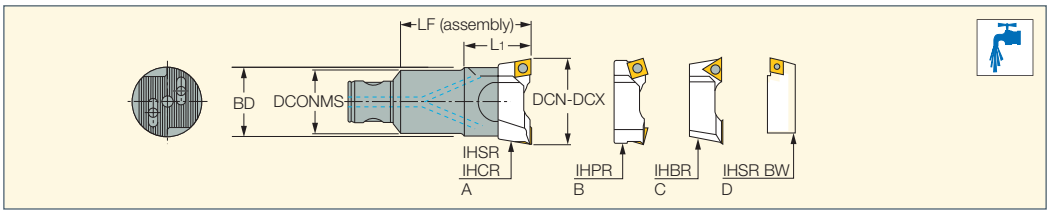
BHR MB

Rough Boring Heads for
Diameter Range 18-200 mm



Designation	BD	DCONMS	LF	DCN(1)	DCX(2)	L1	IH(3)	RPMX(4)	kg
BHR MB16-16X34	16.00	16.00	34.00	18.0	22.0	-	IH...18-22	12000	0.06
BHR MB20-20X40	20.00	20.00	40.50	22.0	28.0	-	IH...22-28	12000	0.11
BHR MB25-25X50	25.00	25.00	50.00	28.0	38.0	-	IH...28-38	10000	0.18
BHR MB32-32X63	32.00	32.00	63.00	35.5	50.0	-	IH...36-50	10000	0.36
BHR MB40-40X80	40.00	40.00	80.00	50.0	68.0	-	IH...50-68	8000	0.70
BHR MB50-50X100	55.00	50.00	100.00	68.0	90.0	50.0	IH...68-90	8000	1.49
BHR MB50-63X80	72.00	50.00	80.00	90.0	120.0	60.0	IH...90-120	8000	1.50
BHR MB63-63X125	72.00	63.00	125.00	90.0	120.0	63.0	IH...90-120	6000	3.09
BHR MB80-80X140	95.00	80.00	140.00	120.0	200.0	75.0	IH...120-800	5000	5.38

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

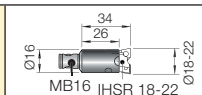
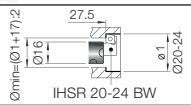
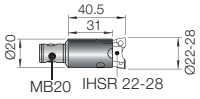
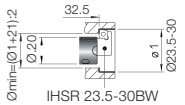
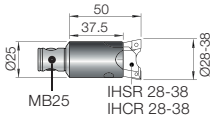
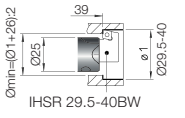
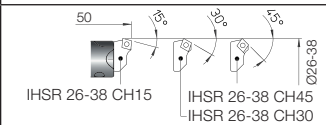
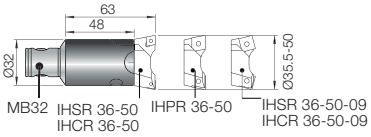
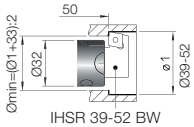
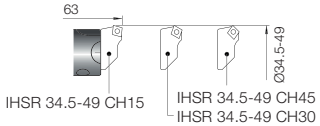
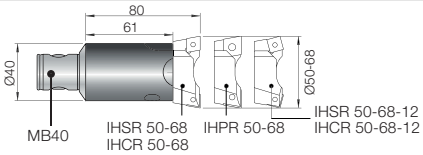
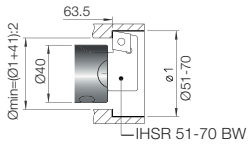
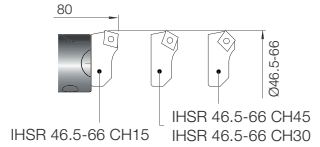
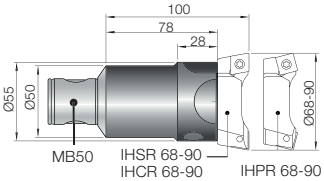
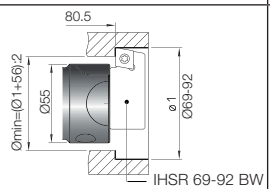
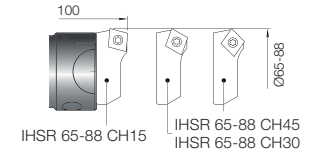
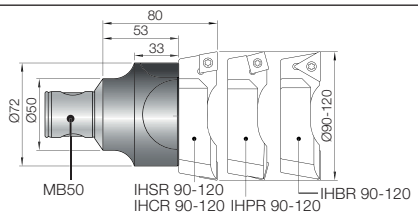
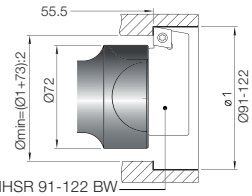
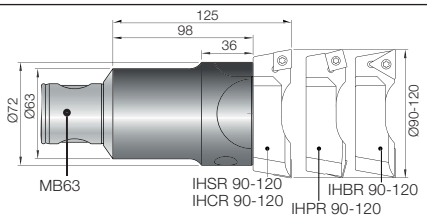
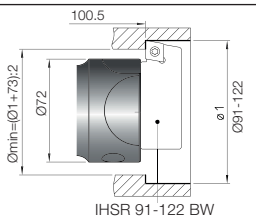
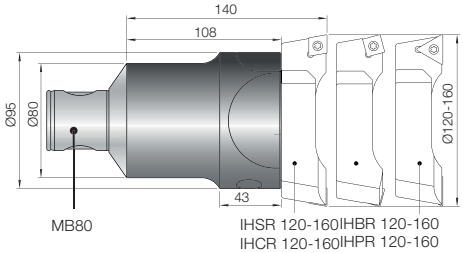
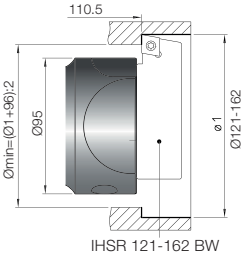
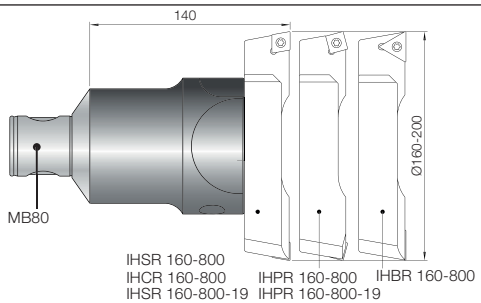
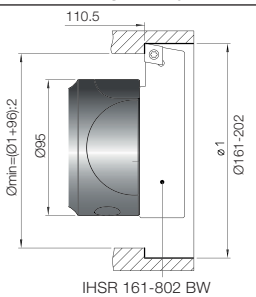
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Insert holders
(4) Maximum RPM

Spare Parts

Designation				
BHR MB16-16X34	BH NUT BHR MB16	PLT 16*	SR M3X14 DIN912	SR M3X8 DIN913
BHR MB20-20X40	BH NUT BHR MB20	PLT 20*	SR M4X15DIN912	BH M3X5UNI5923
BHR MB25-25X50	BH NUT BHR MB25	PLT 25*	SR M4X20 DIN912	SR M3X8 DIN913
BHR MB32-32X63	BH NUT BHR MB32	PLT 32*	SR M5X25DIN912	SR M4X12 DIN913
BHR MB40-40X80	BH NUT BHR MB40	PLT 40*	SR M6X30 DIN912	SR M5X14 DIN913
BHR MB50-63X80	BH NUT BHR MB50	PLT 50*	SR M10X40DIN912	SR M5X12 DIN913
BHR MB63-63X125	BH NUT BHR MB63	PLT 63*	SR M10X40DIN912	SR M6X16 DIN913
BHR MB80-80X140	BH NUT BHR MB80	PLT 80*	SR M12X45DIN912	SR M8X25 DIN913

* Optional, should be ordered separately

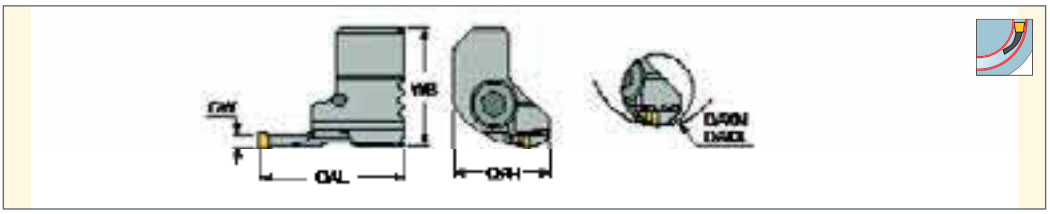
BHR MB - Additional Information

BHR MB16- 16X34 Ø18 ~ .22			
BHR MB20- 20X40 Ø22 ~ 28			
BHR MB25- 25X50 Ø28 ~ 38			
BHR MB32- 32X63 Ø35.5 ~ 50			
BHR MB40- 40X80 Ø50 ~ 68			
BHR MB50- 50X100 Ø68 ~ 90			
BHR MB50- 63X80 Ø90 ~ 120			
BHR MB63- 63X125 Ø90 ~ 120			
BHR MB80- 80X140 Ø120 ~ 200			
			

MIN CUT MINI FACE LINE

IHSR-MIFR

Trepanning Cartridges Carrying MINCUT Inserts Mounted on the BHR MB32-32X63 Boring Head



Designation	DAXN[1]	DAXX[2]	CWN[3]	CWX[4]	OAL	WB	OAH	Insert		
IHSR 8-21 MIFR8	8.0	21.0	1.50	2.20	32.00	23.00	17.50	MI.R 8	SR 14-297	T-8/5
IHSR 19-34 MIFR10	19.0	34.0	2.00	3.00	27.00	22.00	17.80	MI.R 10	SR 34-506	T-9/5

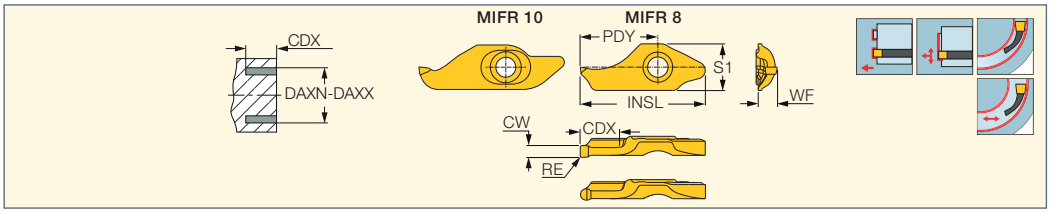
[1] Minimum axial grooving diameter
[2] Maximum axial grooving diameter
[3] Minimum cutting width
[4] Maximum cutting width

For inserts, see pages: MIFR (406)
For holders, see pages: BHR MB (404)

MIN CUT MINI FACE LINE

MIFR

Screw-Clamped Inserts for Internal Face Grooving and Turning



Designation	Dimensions											IC908	Recommended Machining Data	
	INSL	CW	CWTOL[1]	RE	RETOL[2]	WF	S1	DAXN[3]	DAXX[4]	CDX	PDY		f face-groove (mm/rev)	f face-turn (mm/rev)
MIFR 8-1.50-0.20	17.70	1.50	0.02	0.20	0.020	2.60	6.5	8.0	11.5	5.50	11.00	•	0.02-0.10	0.02-0.06
MIFR 8-1.60-0.80	17.70	1.60	0.02	0.80	0.020	2.60	6.5	8.0	12.1	5.50	11.00	•	0.02-0.10	0.02-0.06
MIFR 8-2.00-0.20	17.70	2.00	0.02	0.20	0.020	2.80	6.5	8.0	16.0	5.50	11.00	•	0.02-0.10	0.02-0.06
MIFR 8-2.20-0.20	17.70	2.20	0.02	0.20	0.020	2.90	6.5	8.0	21.0	5.50	11.00	•	0.02-0.10	0.02-0.06
MIFR 10-2.00-0.20	25.10	2.00	0.02	0.20	0.020	3.00	7.6	10.0	-	9.00	14.80	•	0.02-0.10	0.02-0.06
MIFR 10-2.00-1.00	25.10	2.00	0.02	1.00	0.020	3.00	7.6	10.0	-	9.00	14.80	•	0.02-0.10	0.02-0.06
MIFR 10-2.50-0.20	25.10	2.50	0.02	0.20	0.020	3.10	7.6	10.0	30.0	9.00	14.80	•	0.02-0.10	0.02-0.06
MIFR 10-2.50-1.25	25.10	2.50	0.02	1.25	0.020	3.30	7.6	10.0	-	9.00	14.80	•	0.02-0.10	0.02-0.06
MIFR 10-3.00-0.20	25.10	3.00	0.02	0.20	0.020	3.40	7.6	10.0	30.0	9.00	14.80	•	0.02-0.10	0.02-0.06
MIFR 10-3.00-1.50	25.10	3.00	0.02	1.50	0.020	3.30	7.6	10.0	34.0	9.00	14.80	•	0.02-0.10	0.02-0.06

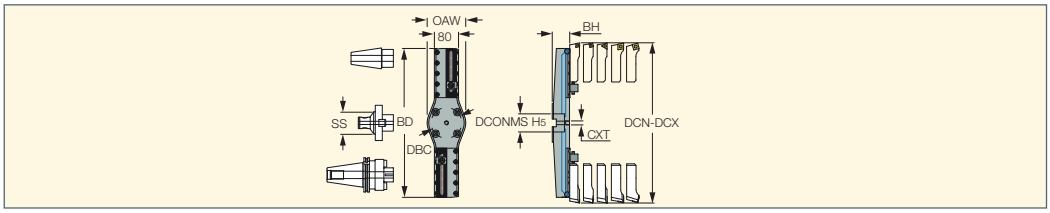
• Recommended cutting speeds and feeds can increased by 20-30% for aluminum, and reduced by 20-30% for titanium and Inconel
[1] Cutting width tolerance (+/-)
[2] Corner radius tolerance (+/-)
[3] Minimum axial grooving diameter
[4] Maximum axial grooving diameter

For tools, see pages: IHSR-MIFR (406)

ITSBORE

TCH AL

Aluminum Twin Cutter Heads for Rough and Fine Boring Operations, Diameter Range 200-1200 mm



Designation	DCN(1)	DCX(2)	BD	DCONMS	DBC	SS	OAW	CXT	BH	CSP(3)	RPMX(4)	kg
TCH AL200	200.0	602.0	194.00	40.00	66.70	80	-	-	54.00	1	700	3.20
TCH AL300	300.0	702.0	288.00	40.00	66.70	80	-	-	54.00	1	400	3.90
TCH AL400	400.0	802.0	394.00	40.00	66.70	80	-	1/4GAS	61.00	0	300	6.90
TCH AL500	500.0	902.0	494.00	60.00	101.60	80,110	128.0	1/4GAS	69.00	0	200	8.70
TCH AL600	600.0	1002.0	594.00	60.00	101.60	80,110	128.0	1/4GAS	71.00	0	200	8.34
TCH AL700	700.0	1102.0	694.00	60.00	101.60	80,110	128.0	1/4GAS	74.00	0	200	8.34
TCH AL800	800.0	1202.0	794.00	60.00	101.60	80,110	128.0	1/4GAS	80.00	0	150	15.20

• Aluminum body, with steel serrated seats • The "O" position on the counterweight balances the BHF boring head for 200 mm boring diameter position. For every 10 mm change in boring diameter, move the counterweight by 1 measurement mark • Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability • For spare parts, see pages 436-437, 468

(1) Cutting diameter minimum

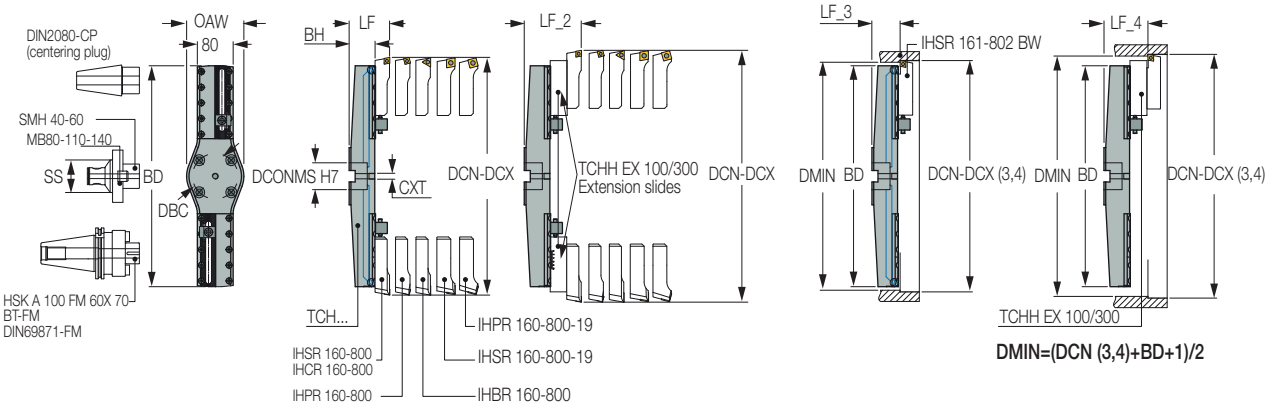
(2) Cutting diameter maximum

(3) 0 - Without coolant supply, 1 - With coolant supply

(4) Maximum RPM

For tools, see pages: IHBR (409) • IHCR (408) • IHPR (408) • IHSR (408) • IHSR-BW (410)

Large Diameter Double Edge Rough Boring Options



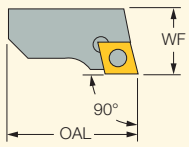
DMIN=(DCN (3,4)+BD+1)/2

Boring Tools	Extension Slides	Dimensions	Aluminum Twin Cutter Heads						
			TCH 200	TCH 300	TCH 400	TCH 500	TCH 600	TCH 700	TCH 800
IH.R 160-800/-19		DCN-DCX	200-300	300-400	400-500	500-600	600-700	700-800	800-900
IH.R 160-800/-19	TCHH EX 100	DCN-DCX	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
IH.R 160-800/-19	TCHH EX 300	DCN-DCX	400-600	500-700	600-800	700-900	800-1000	900-1100	1000-1200
IHSR 161-802 BW		DCN-DCX (3,4)	202-302	302-402	402-502	502-602	602-702	702-802	802-902
IHSR 161-802 BW	TCHH EX 100	DCN-DCX (3,4)	302-402	402-502	502-602	602-702	702-802	802-902	902-1002
IHSR 161-802 BW	TCHH EX 300	DCN-DCX (3,4)	402-602	502-702	602-802	702-902	802-1002	902-1102	1002-1202
IH.R 160-800		LF	86	86	93	101	103	106	112
IH.R 160-800-19		LF	94	94	101	109	111	114	120
IH.R 160-800	TCHH EX 100	LF_2	116	116	123	131	133	136	142
IH.R 160-800	TCHH EX 300	LF_2	126	126	133	141	143	146	152
IH.R 160-800-19	TCHH EX 100	LF_2	124	124	131	139	141	144	150
IH.R 160-800-19	TCHH EX 300	LF_2	134	134	141	149	151	154	160
IHSR 161-802 BW		LF_3	56.5	56.5	63.5	71.5	73.5	76.5	82.5
IHSR 161-802 BW	TCHH EX 100	LF_4	86.5	86.5	93.5	101.5	103.5	106.5	112.5
IHSR 161-802 BW	TCHH EX 300	LF_4	96.5	96.5	103.5	111.5	113.5	116.5	122.5

ITSBORE

IHSR

Rough Boring Tools for Twin Cutters with a Radial and Axial Edge Positioned Inner to the Opposite Finishing Tool



Designation	DCN(1)	DCX(2)	WF	OAL	Insert			
IHSR 18-22	18.0	22.0	8.00	15.00	CCMT 0602...	SR 14-548	T-7/5	
IHSR 22-28	22.0	28.0	9.50	19.00	CCMT 0602...	SR 14-548	T-7/5	
IHSR 28-38	28.0	38.0	12.50	23.00	CCMT 0602...	SR 14-548	T-7/5	
IHSR 36-50	35.5	50.0	15.00	32.00	CCMT 0602...	SR 14-548	T-7/5	
IHSR 36-50-09	35.5	50.0	15.00	32.00	CCMT 09T3...	SR 16-236	T-15/5	
IHSR 50-68	50.0	68.0	19.00	40.00	CCMT 09T3...	SR 16-236	T-15/5	
IHSR 50-68-12	50.0	68.0	19.00	40.00	CCMT 1204...	SR 16-212	T-20/5	
IHSR 68-90	68.0	90.0	22.00	54.00	CCMT 1204...	SR 16-212	T-20/5	
IHSR 90-120	90.0	120.0	27.00	70.50	CCMT 1204...	SR 16-212	T-20/5	
IHSR 120-160	120.0	160.0	32.00	94.50	CCMT 1204...	SR 16-212	T-20/5	
IHSR 160-800	160.0	800.0	32.00	130.00	CCMT 1204...	SR 16-212	T-20/5	
IHSR 160-800-19	160.0	800.0	40.00	130.00	CNMG 1906...	SR 10402352		HW 4.0

- For user guide, see pages 403, 471-477

(1) Cutting diameter minimum

(2) Cutting diameter maximum

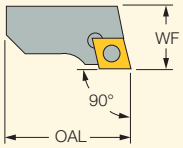
For inserts, see pages: CCET-WF (453) • CCGT-AF (455) • CCGT-AS (455) • CCGW/CCMT (CBN) (454) • CCMT (PCD) (454) • CCMT-14 (453) • CCMT-PF (452) • CCMT-WG (454) • CCMT/CCGT (453) • CCMT/CCGT-SM (452)

For holders, see pages: BHR MB (404) • TCH AL (407) • TCHH EX (438)

ITSBORE

IHCR

Boring Toolholders for the MB Modular Boring System



Designation	DCN(1)	DCX(2)	WF	OAL	Insert		
IHCR 28-38	28.0	38.0	12.30	23.00	CCMT 0602...	SR 14-548	T-7/5
IHCR 36-50	35.5	50.0	14.80	32.00	CCMT 0602...	SR 14-548	T-7/5
IHCR 36-50-09	36.0	50.0	14.80	32.00	CCMT 09T3...	SR 16-236	T-15/5
IHCR 50-68	50.0	68.0	18.70	40.00	CCMT 09T3...	SR 16-236	T-15/5
IHCR 50-68-12	50.0	68.0	18.70	40.00	CCMT 1204...	SR 16-212	T-20/5
IHCR 68-90	68.0	90.0	21.70	54.00	CCMT 1204...	SR 16-212	T-20/5
IHCR 90-120	90.0	120.0	26.70	70.50	CCMT 1204...	SR 16-212	T-20/5
IHCR 120-160	120.0	160.0	31.70	94.50	CCMT 1204...	SR 16-212	T-20/5
IHCR 160-800	160.0	800.0	31.70	130.00	CCMT 1204...	SR 16-212	T-20/5

- For user guide, see pages 403, 471-477

(1) Cutting diameter minimum

(2) Cutting diameter maximum

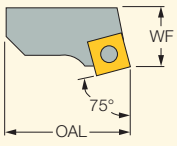
For inserts, see pages: CCET-WF (453) • CCGT-AF (455) • CCGT-AS (455) • CCGW/CCMT (CBN) (454) • CCMT (PCD) (454) • CCMT-14 (453) • CCMT-PF (452) • CCMT-WG (454) • CCMT/CCGT (453) • CCMT/CCGT-SM (452)

For holders, see pages: BHR MB (404) • TCH AL (407) • TCHH EX (438)

ITSBORE

IHPR

75° Rough Boring Toolholders



Designation	DCN(1)	DCX(2)	WF	OAL	Insert			
IHPR 36-50	35.5	50.0	15.00	32.00	SCMT 09T3...	SR 16-236	T-15/5	
IHPR 50-68	50.0	68.0	19.00	40.00	SCMT 09T3...	SR 16-236	T-15/5	
IHPR 68-90	68.0	90.0	22.00	53.90	SCMT 1204...	SR 16-212	T-20/5	
IHPR 90-120	90.0	120.0	27.00	70.50	SCMT 1204...	SR 16-212	T-20/5	
IHPR 120-160	120.0	160.0	32.00	94.50	SCMT 1204...	SR 16-212	T-20/5	
IHPR 160-800	160.0	800.0	32.00	130.00	SCMT 1204...	SR 16-212	T-20/5	
IHPR 160-800-19	160.0	800.0	40.00	129.00	SNMG 1906...	SR10402352		HW 4.0

- For user guide, see pages 403, 471-477

(1) Cutting diameter minimum

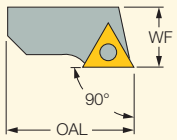
(2) Cutting diameter maximum

For inserts, see pages: SCGT-AS (458) • SCMT-14 (457) • SCMT-19 (458) • SCMT-SM (457)

For holders, see pages: BHR MB (404) • TCH AL (407) • TCHH EX (438)

ITSBORE

IHBR
Rough Boring Toolholders



Designation	DCN(1)	DCX(2)	WF	OAL	Insert		
IHBR 90-120	90.0	120.0	27.00	70.50	TCMT 2205...	SR 16-212	T-20/5
IHBR 120-160	120.0	160.0	32.00	94.50	TCMT 2205...	SR 16-212	T-20/5
IHBR 160-800	160.0	800.0	32.00	130.00	TCMT 2205...	SR 16-212	T-20/5

- For user guide, see pages 403, 471-477

(1) Cutting diameter minimum

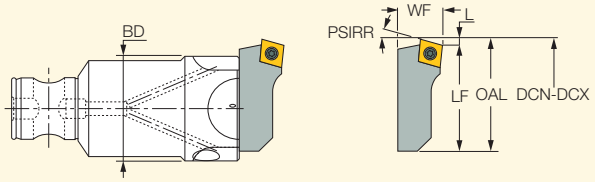
(2) Cutting diameter maximum

For inserts, see pages: TCMT-19 (458) • TCMT-SM (459)

For holders, see pages: BHR MB (404) • TCH AL (407) • TCHH EX (438)

ITSBORE

IHSR-CH
Chamfering Tools for
BHR Boring Heads



Designation	DCN(1)	PSIRR	LF	OAL	WF	L	BD	DCX(2)	Insert		
IHSR 26-38 CH15	26.0	15.0	21.40	23.00	12.50	1.60	25.00	38.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 26-38 CH30	26.0	30.0	20.00	23.00	12.50	3.00	25.00	38.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 26-38 CH45	26.0	45.0	18.70	23.00	12.50	4.30	25.00	38.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 34.5-49 CH15	34.5	15.0	29.40	31.00	15.00	1.60	32.00	49.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 34.5-49 CH30	34.5	30.0	28.00	31.00	15.00	3.00	32.00	49.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 34.5-49 CH45	34.5	45.0	26.70	31.00	15.00	4.30	32.00	49.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 46.5-66 CH15	46.5	15.0	36.60	39.00	19.00	2.40	40.00	66.00	CCMT 09T3...	SR 16-236	T-15/5
IHSR 46.5-66 CH30	46.5	30.0	34.40	39.00	19.00	4.60	40.00	66.00	CCMT 09T3...	SR 16-236	T-15/5
IHSR 46.5-66 CH45	46.5	45.0	32.50	39.00	19.00	6.50	40.00	66.00	CCMT 09T3...	SR 16-236	T-15/5
IHSR 65-88 CH15	65.0	15.0	49.80	53.00	22.00	3.20	50.00	88.00	CCMT 1204...	SR 16-212	T-20/5
IHSR 65-88 CH30	65.0	30.0	46.80	53.00	22.00	6.20	50.00	88.00	CCMT 1204...	SR 16-212	T-20/5
IHSR 65-88 CH45	65.0	45.0	44.20	53.00	22.00	8.80	50.00	88.00	CCMT 1204...	SR 16-212	T-20/5

- For user guide, see pages 403,471-477

(1) Cutting diameter minimum

(2) Cutting diameter maximum

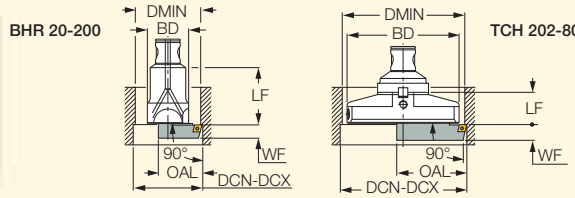
For inserts, see pages: CCET-WF (453) • CCGT-AF (455) • CCGT-AS (455) • CCMT-14 (453) • CCMT-PF (452) • CCMT-WG (454) • CCMT/CCGT (453)
• CCMT/CCGT-SM (452)

For holders, see pages: BHR MB (404)

ITSBORE

IHSR-BW

Back Face Turning Tools for BHR and TCH AL Rough Boring Heads



Designation	SS(1)	BD	DCN(2)	LF	DCX(3)	WF	OAL	Insert
IHSR 20-24 BW	BHR MB16-16	16.0	20	27.5	24	10	16.00	CCMT 0602...
IHSR 23.5-30BW	BHR MB20-20	20.0	23.5	32.5	30	11	19.50	CCMT 0602...
IHSR 29.5-40BW	BHR MB25-25	25.0	29.5	39.0	40	14.5	24.00	CCMT 0602...
IHSR 39-52 BW	BHR MB32-32	32.0	39	50.0	52	17	32.00	CCMT 09T3...
IHSR 51-70 BW	BHR MB40-40	40.0	51	63.5	70	21	42.00	CCMT 1204...
IHSR 69-92 BW	BHR MB50-50	55.0	69	80.5	92	24.5	57.00	CCMT 1204...
IHSR 91-122 BW	BHR MB63-63	72.0	91	100.5	122	28.5	76.00	CCMT 1204...
IHSR 121-162 BW	BHR MB80-80	95.0	121	110.5	162	31.5	101.00	CCMT 1204...
IHSR 161-802 BW	BHR MB80-80	95.0	161	110.5	202	31.5	122	CCMT 1204...
	TCH AL200	194	202	56.5	302	28	122	CCMT 1204...
	TCH AL300	288	302	56.5	402	28	122	CCMT 1204...
	TCH AL400	394	402	63.5	502	28	122	CCMT 1204...
	TCH AL500	494	502	71.5	602	28	122	CCMT 1204...
	TCH AL600	594	602	73.5	702	28	122	CCMT 1204...
	TCH AL700	694	702	76.5	802	28	122	CCMT 1204...
	TCH AL800	794	802	82.5	902	28	122	CCMT 1204...

• DMIN=(min bore diameter)=(DCN+BD+1)/2 • BD=Size of the boring head being used • For user guide, see pages 403, 471-477

(1) Suitable boring heads

(2) Cutting diameter minimum

(3) Cutting diameter maximum

For inserts, see pages: CCET-WF (453) • CCGT-AF (455) • CCGT-AS (455) • CCGW/CCMT (CBN) (454) • CCMT (PCD) (454) • CCMT-14 (453) • CCMT-PF (452) • CCMT-WG (454) • CCMT/CCGT (453) • CCMT/CCGT-SM (452)

For holders, see pages: BHR MB (404) • TCH AL (407, 438) • TCHH EX (438)

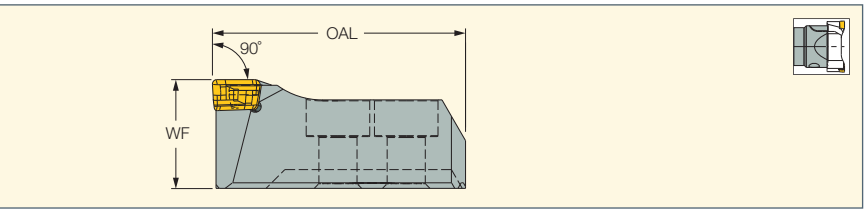
Spare Parts

Designation		
IHSR 20-24 BW	SR 14-548	T-7/5
IHSR 23.5-30BW	SR 14-548	T-7/5
IHSR 29.5-40BW	SR 14-548	T-7/5
IHSR 39-52 BW	SR 16-236	T-15/5
IHSR 51-70 BW	SR 16-212	T-20/5
IHSR 69-92 BW	SR 16-212	T-20/5
IHSR 91-122 BW	SR 16-212	T-20/5
IHSR 121-162 BW	SR 16-212	T-20/5
IHSR 161-802 BW	SR 16-212	T-20/5

ITSBORE

CR LNHT

Boring Cartridge with a Tangential Insert for BHR MB50-50X100 Boring Head



Designation	DCN(1)	DCX(2)	WF	OAL	MIID(3)
CR LNHT10 68-90-CP	68.00	90.00	23.10	53.76	HTP LN.. 1006

• For user guide, see pages 403, 471-477

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Master insert identification

For inserts, see pages: HTP LN.. 1006 (450)

For holders, see pages: BHR MB (404)

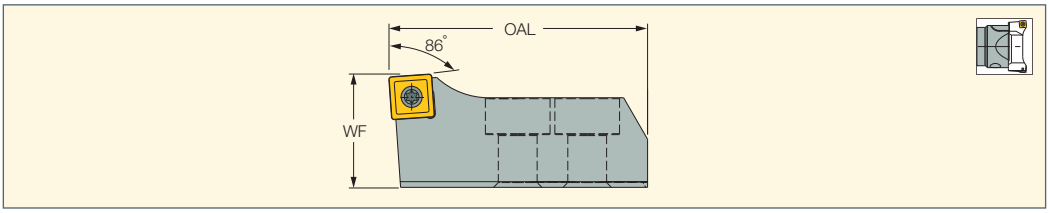
Spare Parts

Designation			
CR LNHT	SR 34-550	BLD T10/S7	SW6-SD

ITSBORE

CR SOMT

Boring Cartridge with a Square Insert for BHR MB50-50X100 Boring Head



Designation	DCN(1)	DCX(2)	WF	OAL	MIID(3)
CR SOMT09 68-90-CP	68.00	90.00	23.60	54.00	SO.T 09...

• For user guide, see pages 403, 471-477

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Master insert identification

For inserts, see pages: SOGX/T-AL (115) • SOMT-DT (116) • SOMT-GF (115) • SOMT-HD (116)

For holders, see pages: BHR MB (404)

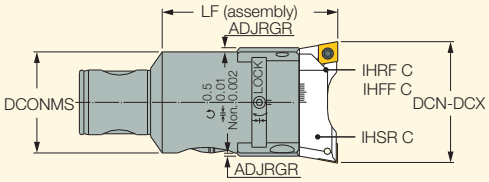
Spare Parts

Designation			
CR SOMT	SR 34-506	SW4-SD	BLD T09/M7-SW4

ITSBORE

BHC MB

Combi Rough and Fine Boring Heads with 10 µm Direct Diameter Adjustment and 2 µm by a Vernier Scale



Designation	DCONMS	LF	DCN(1)	DCX(2)	ADJRGR	IH	RPMX(3)	kg
BHC MB25-25-57	25.00	56.50	28.0	36.0	0.50	IH...-C	10000	0.23
BHC MB32-32-71	32.00	71.00	36.0	46.0	0.50	IH...-C	10000	0.45
BHC MB40-40-90	40.00	90.00	46.0	60.0	1.00	IH...-C	8000	0.70
BHC MB50-50-87	50.00	87.00	60.0	75.0	1.00	IH...-C	8000	1.21
BHC MB63-63-109	63.00	109.00	75.0	95.0	2.00	IH...-C	6000	2.70
BHC MB80-80-130	80.00	130.00	95.0	120.0	2.00	IH...-C	5000	4.41

• The roughing head precedes the finishing head by 0.2 mm. Each head can be adjusted independently • Important: insert radius for combi rough and fine boring must be the same size. • For spare parts, see page 468

(1) Cutting diameter minimum

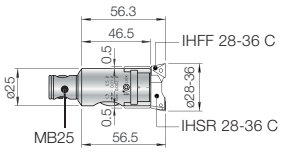
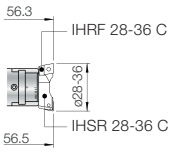
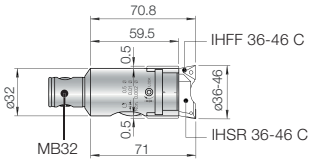
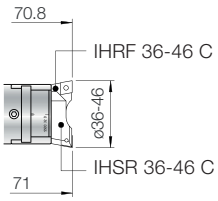
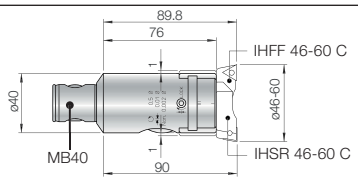
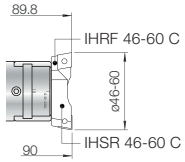
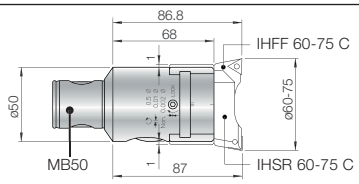
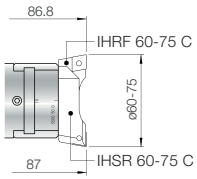
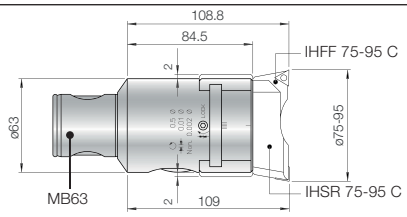
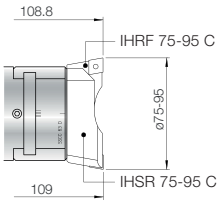
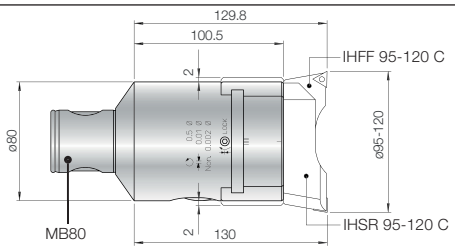
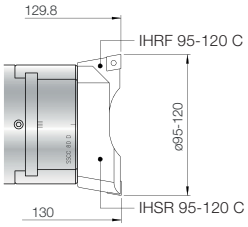
(2) Cutting diameter maximum

(3) Maximum RPM

For tools, see pages: IHFF-C (413) • IHRF-C (413) • IHSR-C (413)

Graduated dial of 0.01 mm with circular vernier of 0.002 mm

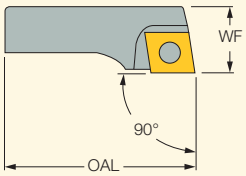
BHC MB - Additional Information

BHC MB25-25-57 Ø28 ~ 36		
BHC MB32-32-71 Ø36 ~ 46		
BHC MB40-40-90 Ø46 ~ 60		
BHC MB50-50-87 Ø60 ~ 75		
BHC MB63-63-109 Ø75 ~ 95		
BHC MB80-80-130 Ø95 ~ 120		

ITSBORE

IHRF-C

Boring Tools for Twin Cutters Positioned Inner to the Opposite Finishing Tool on MB BHC Combi Boring Heads



Designation	DCN(1)	DCX(2)	WF	OAL	Insert		
IHRF 28-36 C	28.0	36.0	9.80	24.00	CCGT 0602...	SR 14-548	T-7/5
IHRF 36-46 C	36.0	46.0	11.30	30.00	CCGT 0602...	SR 14-548	T-7/5
IHRF 46-60 C	46.0	60.0	13.80	40.00	CCGT 09T3...	SR 16-236	T-15/5
IHRF 60-75 C	60.0	75.0	18.80	54.00	CCGT 09T3...	SR 16-236	T-15/5
IHRF 75-95 C	75.0	95.0	24.30	68.00	CCGT 09T3...	SR 16-236	T-15/5
IHRF 95-120 C	95.0	120.0	29.30	87.00	CCGT 09T3...	SR 16-236	T-15/5

- For user guide, see page 477

(1) Cutting diameter minimum

(2) Cutting diameter maximum

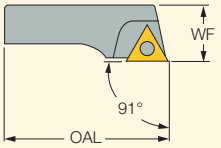
For inserts, see pages: CCGT-AS (455) • CCGW/CCMT (CBN) (454) • CCMT (PCD) (454) • CCMT-14 (453) • CCMT-PF (452) • CCMT-WG (454) • CCMT/CCGT (453) • CCMT/CCGT-SM (452)

For holders, see pages: BHC MB (411)

ITSBORE

IHFF-C

Triangular Finishing Insert Holders for BHC Combi Boring Heads



Designation	WF	OAL	DCN(1)	DCX(2)	Insert		
IHFF 28-36 C	9.80	24.00	28.00	36.00	TPGX 0902...	SR 14-298	T-8/5
IHFF 36-46 C	11.30	30.00	36.00	46.00	TPGX 0902...	SR 14-298	T-8/5
IHFF 46-60 C	13.80	40.00	46.00	60.00	TPGX 1103...	SR-17979 M3X8	T-8/5
IHFF 60-75 C	18.80	54.00	60.00	75.00	TPGX 1103...	SR-17979 M3X8	T-8/5
IHFF 75-95 C	25.30	68.00	75.00	95.00	TPGX 1103...	SR-17979 M3X8	T-8/5
IHFF 95-120 C	29.30	87.00	95.00	120.00	TPGX 1103...	SR-17979 M3X8	T-8/5

- For user guide, see page 477

(1) Cutting diameter minimum

(2) Cutting diameter maximum

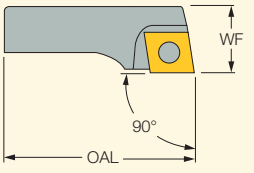
For inserts, see pages: TPGX (459) • TPGX (CBN) (460)

For holders, see pages: BHC MB (411)

ITSBORE

IHSR-C

Rhombic Roughing Insert Holders for BHC Combi Boring Heads



Designation	DCN(1)	DCX(2)	WF	OAL	Insert		
IHSR 28-36 C	28.0	36.0	10.00	24.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 36-46 C	36.0	46.0	11.50	30.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 46-60 C	46.0	60.0	14.00	40.00	CCMT 09T3...	SR 16-236	T-15/5
IHSR 60-75 C	60.0	75.0	19.00	54.00	CCMT 09T3...	SR 16-236	T-15/5
IHSR 75-95 C	75.0	95.0	24.50	68.00	CCMT 09T3...	SR 16-236	T-15/5
IHSR 95-120 C	95.0	120.0	29.50	87.00	CCMT 09T3...	SR 16-236	T-15/5

- For user guide, see page 477

(1) Cutting diameter minimum

(2) Cutting diameter maximum

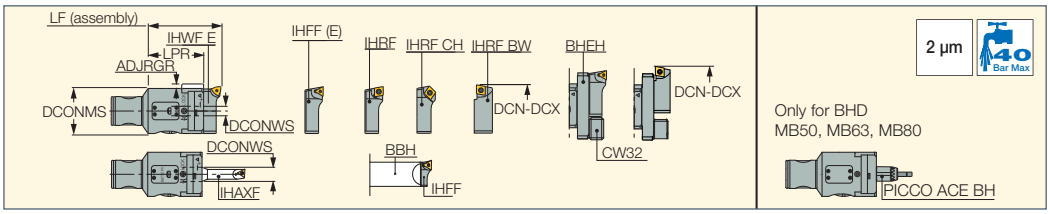
For inserts, see pages: CCET-WF (453) • CCGT-AF (455) • CCGT-AS (455) • CCGW/CCMT (CBN) (454) • CCMT (PCD) (454) • CCMT-14 (453) • CCMT-PF (452) • CCMT-WG (454) • CCMT/CCGT (453) • CCMT/CCGT-SM (452)

For holders, see pages: BHC MB (411)

ITSBORE

BHD MB

Fine Boring Heads with Digital 2 µm Direct Adjustment Diametric Display



Designation	LF	DCONMS	DCN(1)	DCX(2)	LPR	ADJRGR	DCONWS	RPMX(3)	kg
BHD MB32-32-83	83.00	32.00	35.0	51.0	71.5	3.00	-	20000	0.41
BHD MB40-40-90	90.00	40.00	48.0	64.0	76.0	4.00	-	20000	0.73
BHD MB50-50-60	80.00	50.00	2.5	110.0	61.0	5.00	16.00	20000	1.10
BHD MB63-63-89	88.50	63.00	6.0	125.0	69.5	5.00	16.00	20000	2.20
BHD MB80-80-104	104.00	80.00	6.0	200.0	84.5	5.00	16.00	20000	3.90

• For spare parts, see pages 435-436 • Note that a protruding reset button dictates the enlargement of the actual DCONMS by 2 mm in each size respectively. This is important when the tool is being used for back-boring applications where you must clear any obstacles inside the machine/workpiece.

(1) Cutting diameter minimum

(2) Cutting diameter maximum

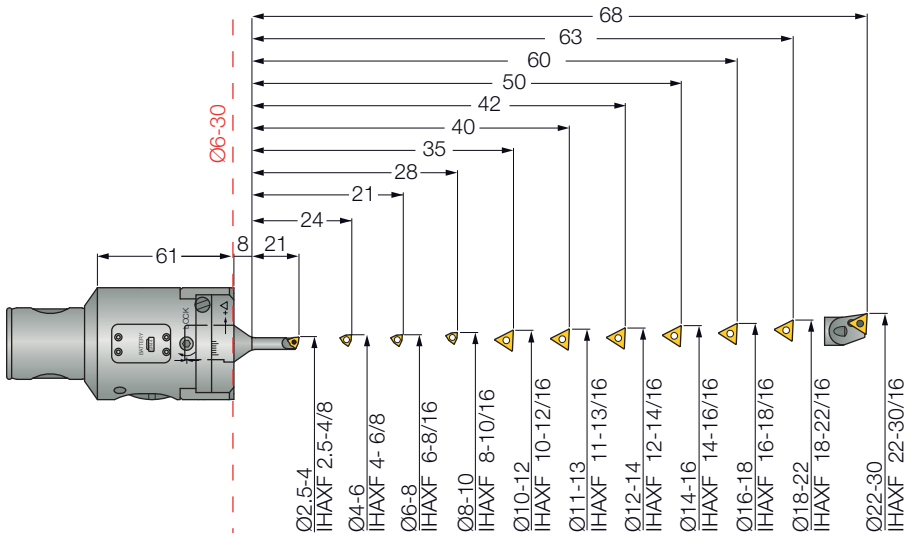
(3) Maximum RPM

For tools, see pages: IHAXF (432) • IHAXF-AVI (434) • IHAXF-E (434) • IHFF (436) • IHRF (436) • IHRF-BW (439) • IHRF-CH (439) • IHWF (436)

Fine Boring Head Range 2 µm Direct Diametric Adjustment

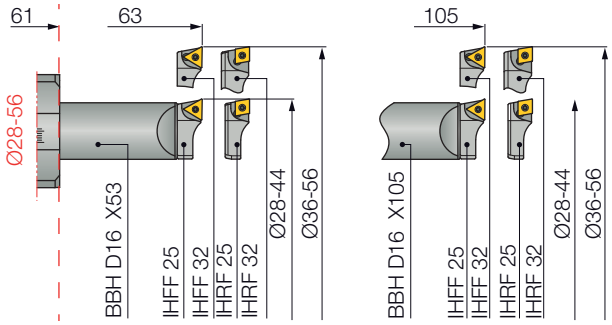
BHD MB50-50X60 ø2.5-110

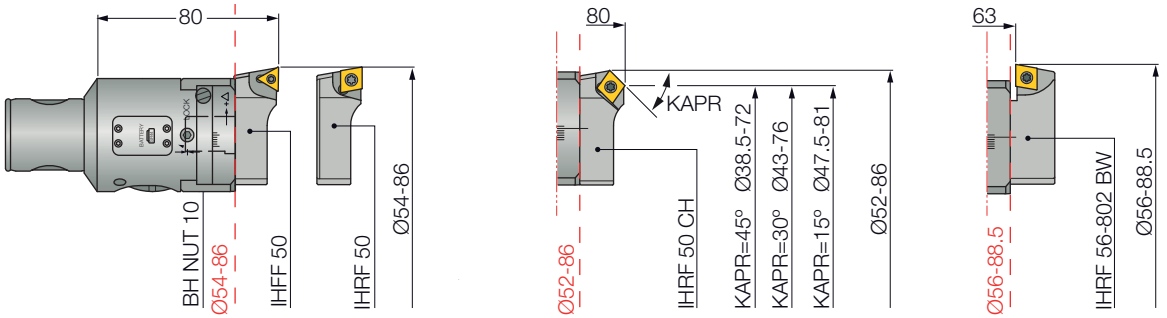
2 µm

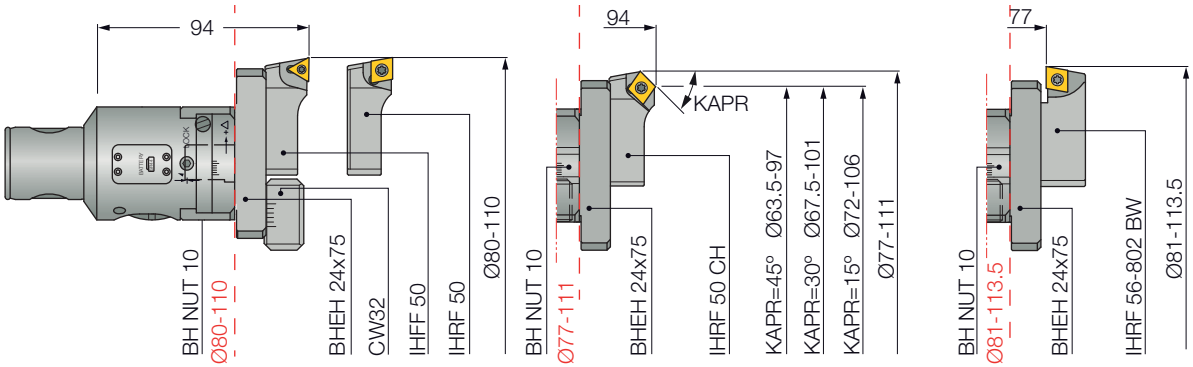


SLEEVE D8-D16

REQUIRED FOR IHAXF.../8



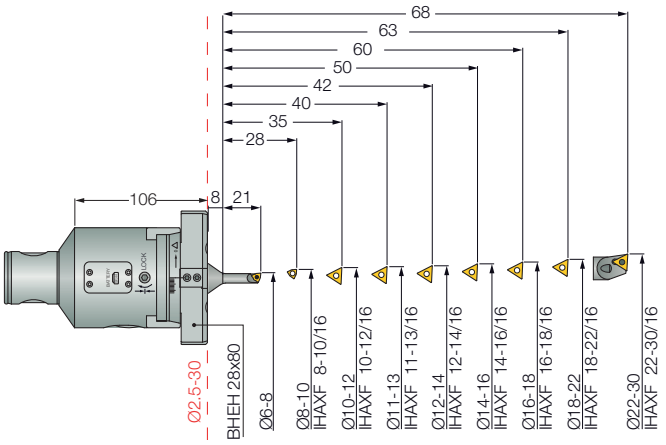


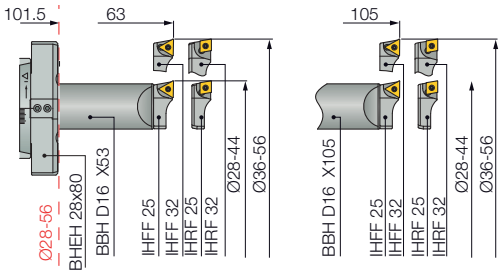


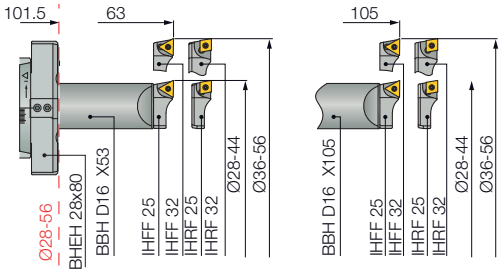
Fine Boring Head Range 2 µm Direct Diametric Adjustment

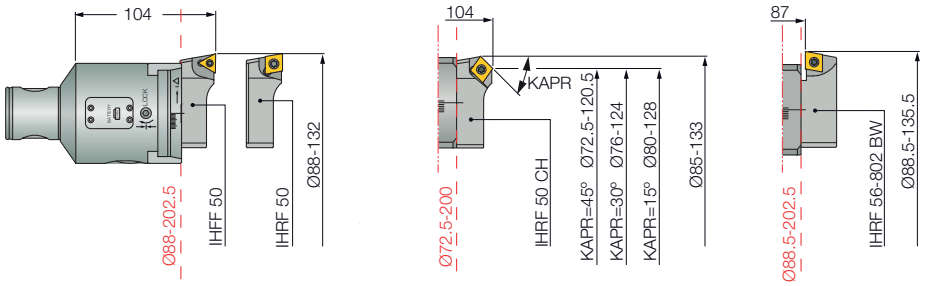
BHD MB63-63X89 ø6-125

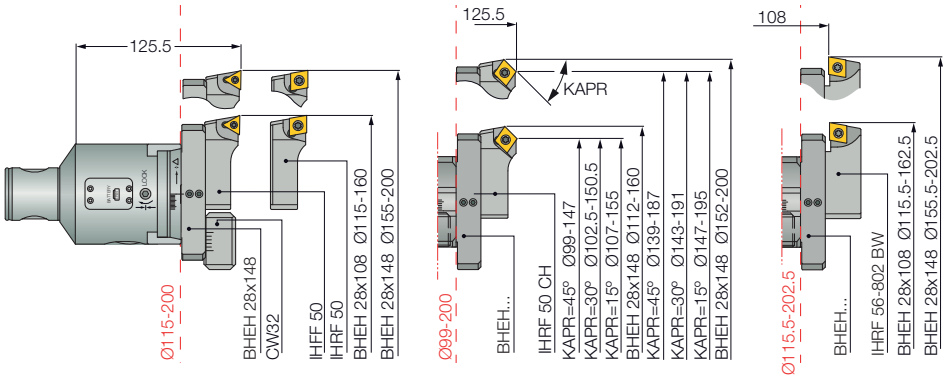
2 µm







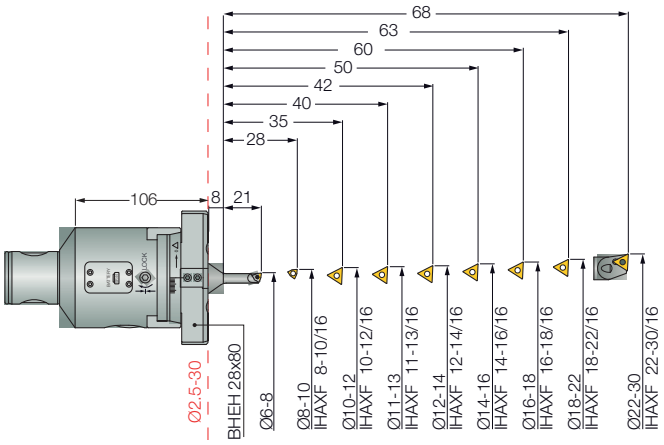


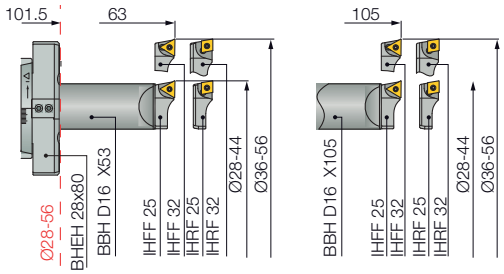


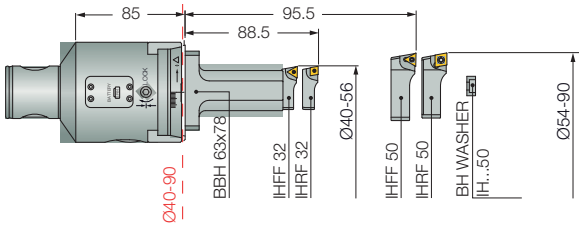
Fine Boring Head Range 2 µm Direct Diametric Adjustment

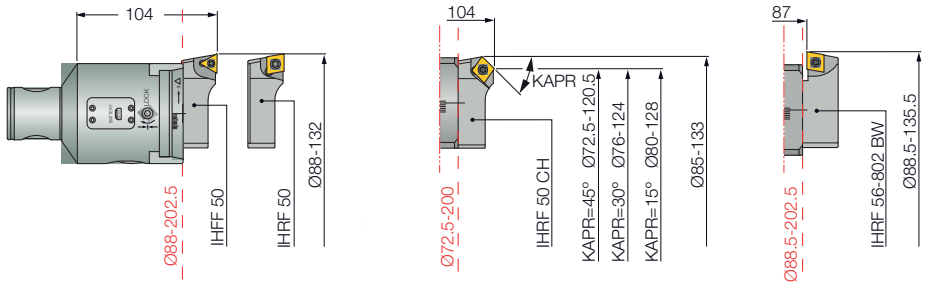
BHD MB80-80X104 ø6-200

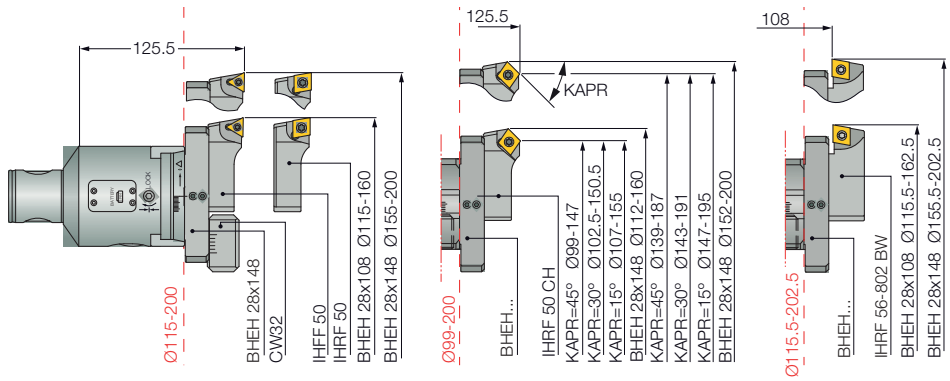
2 µm







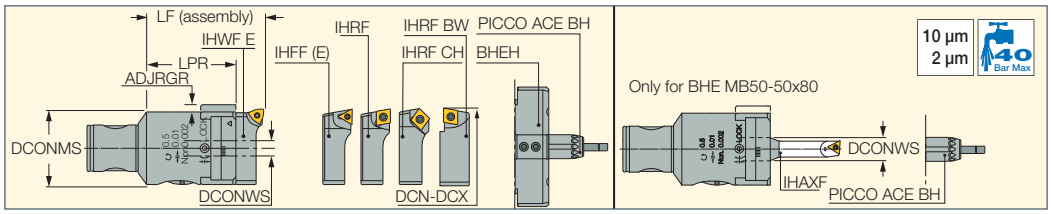




ITSBORE

BHE MB

Fine Boring Heads with the MB Connection, 10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale



Designation	DCONMS	LF	DCN(1)	DCX(2)	LPR	ADJRGR	DCONWS	kg
BHE MB14-14-30	14.00	30.00	14.5	18.0	22.0	1.00	-	0.05
BHE MB16-16-34	16.00	34.00	18.0	24.0	26.0	2.00	-	0.08
BHE MB20-20-40	20.00	40.00	22.0	30.0	31.5	3.00	-	0.05
BHE MB25-25-50	25.00	50.00	28.0	40.0	40.0	3.00	-	0.20
BHE MB32-32-63	32.00	63.00	35.0	53.0	51.5	4.00	-	0.41
BHE MB40-40-80	40.00	80.00	48.0	66.0	66.0	5.00	-	0.79
BHE MB50-50-80	50.00	80.00	2.5	110.0	61.0	5.00	16.00	1.04
BHE MB63-63-89	63.00	89.00	6.0	125.0	69.5	10.00	-	1.00
BHE MB80-80-104	80.00	104.00	6.0	200.0	84.5	12.00	-	3.84

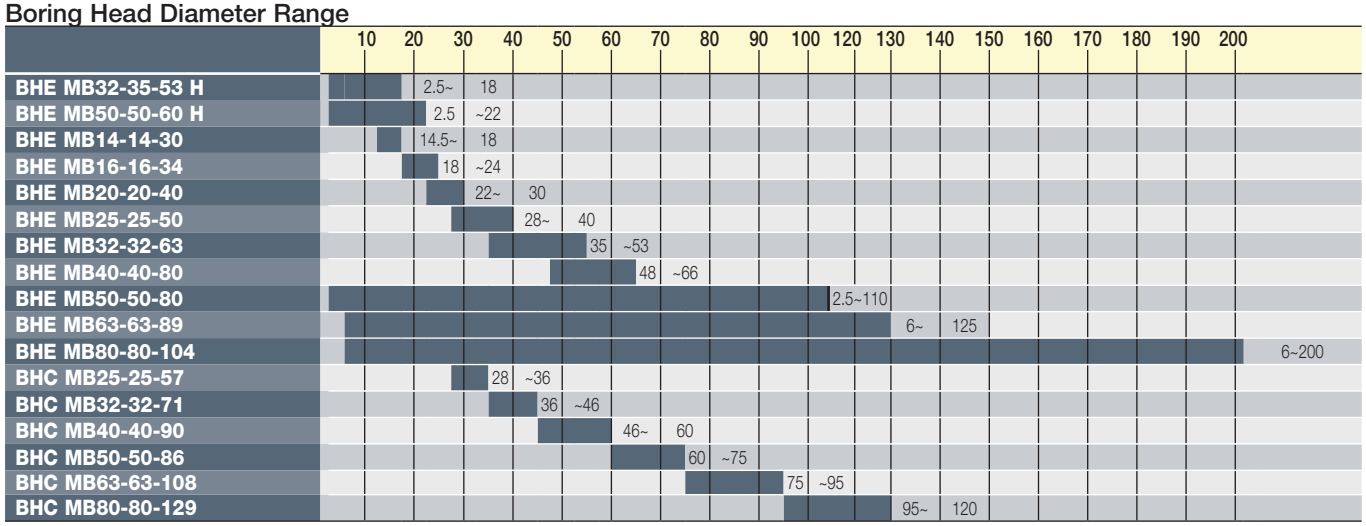
• For boring options, see pages 388, 419-422 • For spare parts, see pages 435-436, 467

(1) Cutting diameter minimum

(2) Cutting diameter maximum

For tools, see pages: IHAXF (432) • IHAXF-AVI (434) • IHAXF-E (434) • IHFF (436) • IHRF (436) • IHRF-BW (439) • IHRF-CH (439) • IHWF (436)

Boring Head Diameter Range



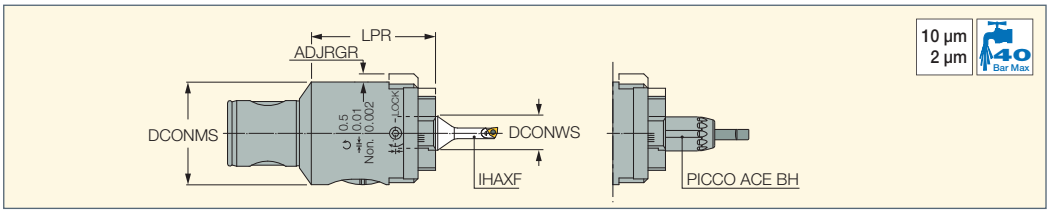
BHE MB50-50-80

Graduated dial of 0.01 mm with circular vernier of 0.002 mm

ITSBORE

BHE MB-H

Fine Boring Heads for High Rotation Speed with a 10 Micrometer Direct Dia. Adjustment and 2 Micrometer by a Vernier Scale



Designation	DCONMS	LPR	DCN(1)	DCX(2)	DCONWS	ADJRGR	RPMX(3)	kg
BHE MB32-32-53 H	32.00	53.00	2.5	18.0	8.00	0.50	10000	0.35
BHE MB50-50-60 H	50.00	60.00	2.5	22.0	16.00	1.00	8000	1.00

• For spare parts, see pages 435-436, 467

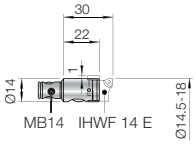
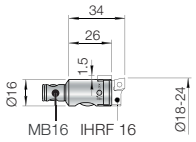
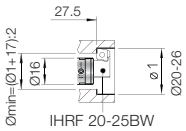
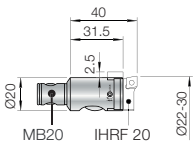
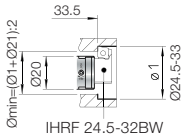
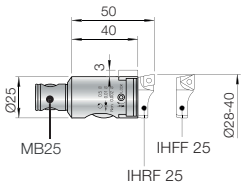
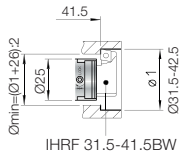
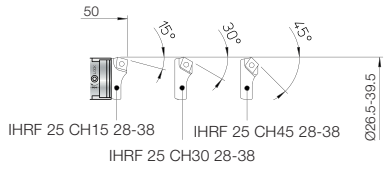
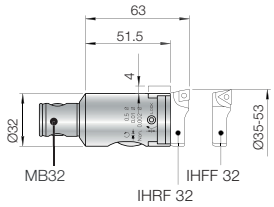
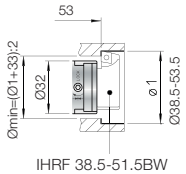
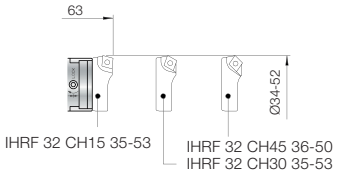
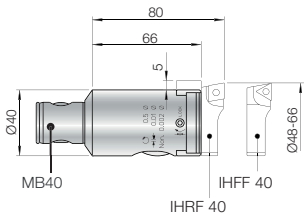
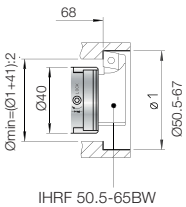
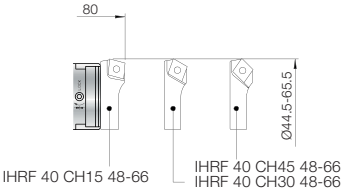
(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Maximum RPM

For tools, see pages: IHAXF (432) • IHAXF-AVI (434) • IHAXF-E (434)

BHE MB - Additional Information

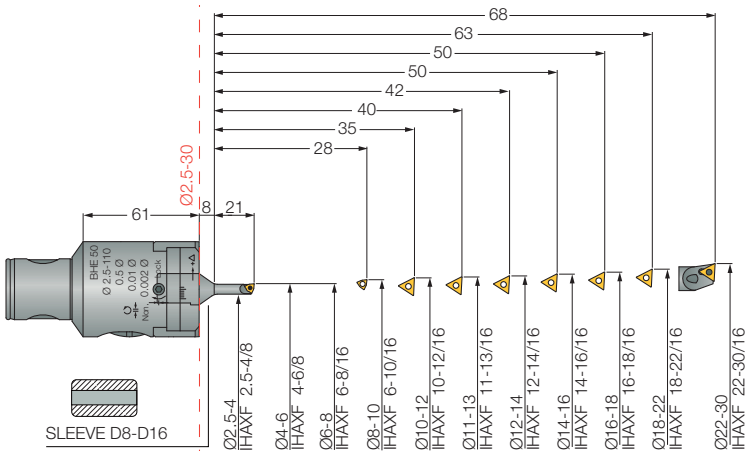
BHE MB14-14-30 Ø14.5 ~ 18			
BHE MB16-16-34 Ø18 ~ 24			
BHE MB20-20-40 Ø22 ~ 30			
BHE MB25-25-50 Ø28 ~ 40			
BHE MB32-32-63 Ø35 ~ 53			
BHE MB40-40-80 Ø48 ~ 66			

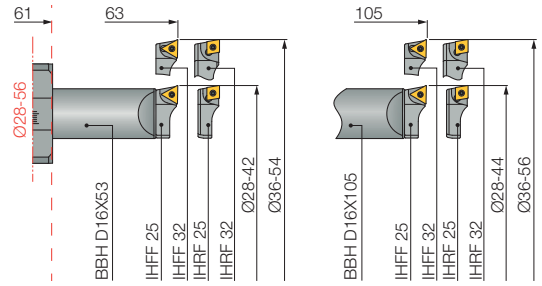
Fine Boring Head Range

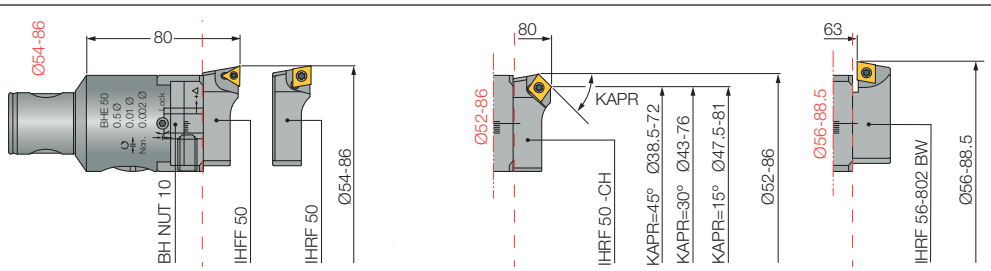
10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale

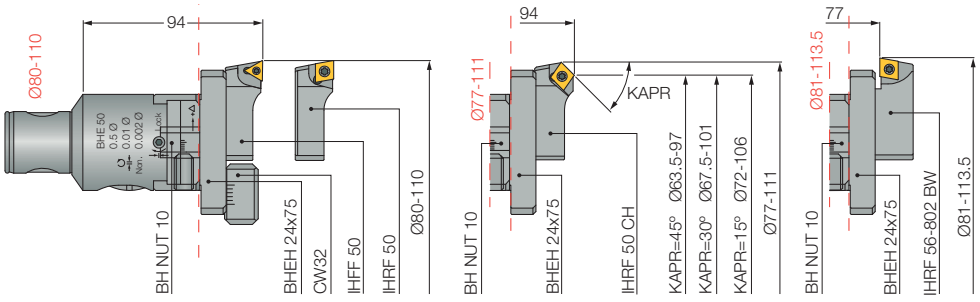
BHE MB50-50x80 ø2.5-113.5

2 µm
10 µm









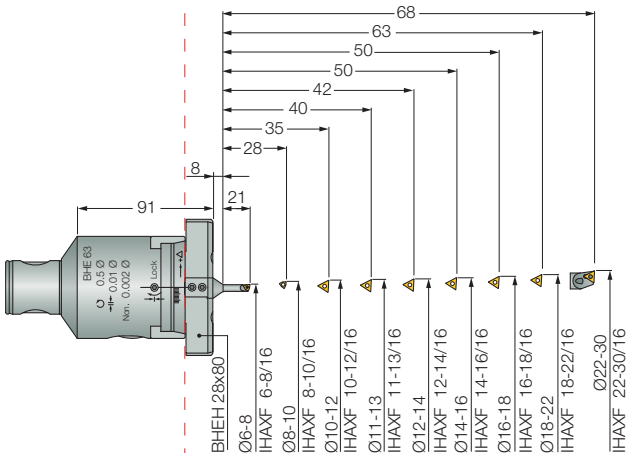
See page 481

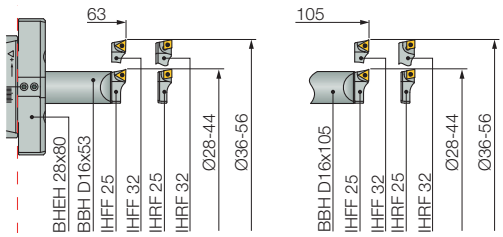
Fine Boring Head Range

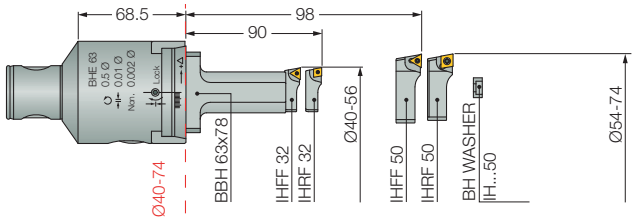
10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale

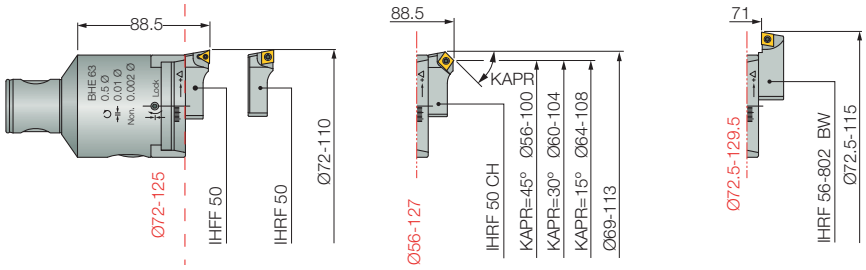
BHE MB63-63x89 ø6-129.5

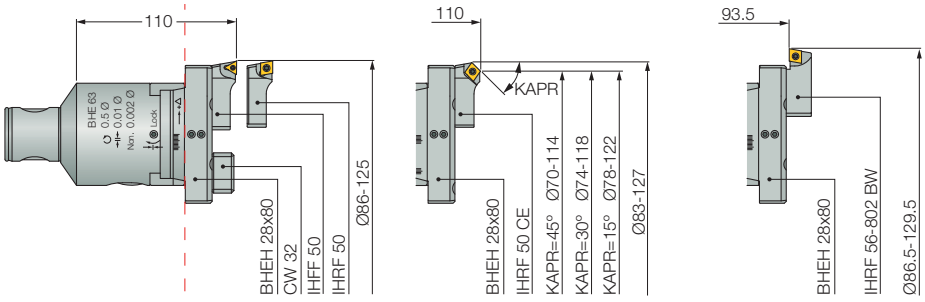
2 µm
10 µm











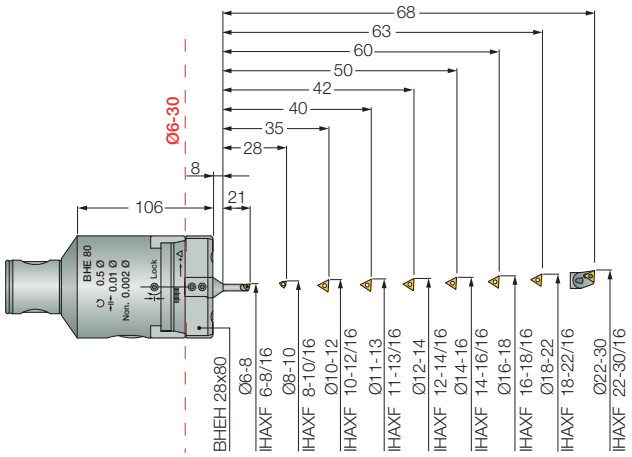
See page 482

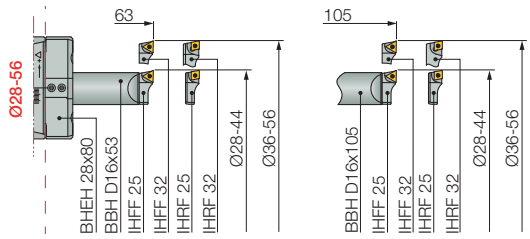
Fine Boring Head Range

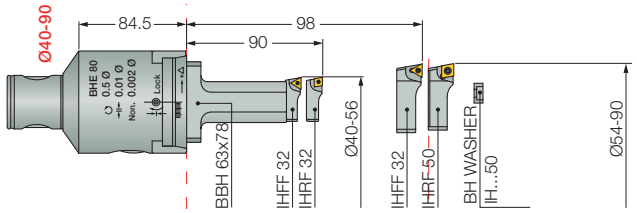
10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale

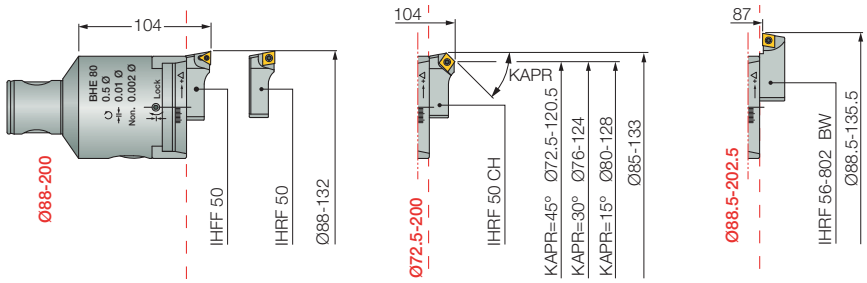
BHE MB80-80x104 ø6-202.5

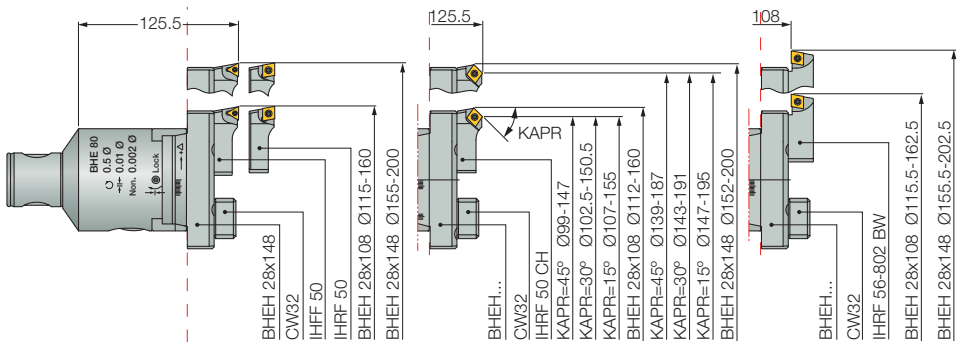
2 µm
10 µm









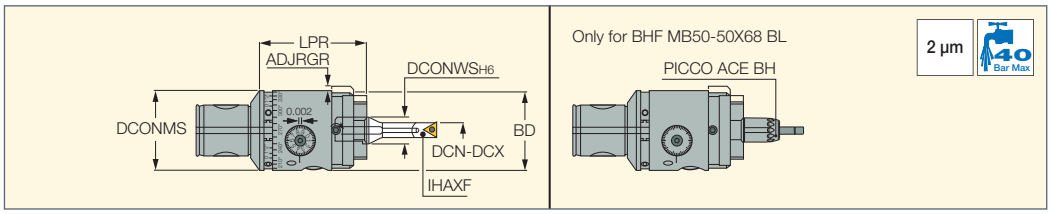


See page 482

ITSBORE

BHF MB-BL

Fine Boring Heads with a Balancing Mechanism and a 2 Micrometer Direct Diametric Adjustment



Designation	DCONMS	BD	LPR	DCN(1)	DCX(2)	DCONWS	ADJRGR	RPMX(3)	kg
BHF MB50-32X60 BL	50.00	32.00	60.00	2.5	12.0	8.00	3.00	20000	0.80
BHF MB50-50X68 BL	50.00	50.00	68.50	6.0	22.0	16.00	4.00	20000	1.12

• For boring options, see page 427 • For spare parts, see page 466 • For cutting conditions, see page 477

(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Maximum RPM

For tools, see pages: IHAXF (432)

BHF MB50-32X60 BL and BHF MB50-50X68 BL with the simple positioning of the two counterweights into the graduated groove. The table below displays all tools available for the working range of 2.5-22 mm diameters.

Balance Correction for BHF MB50-32x60BL

TOOLS	Ø BORE	SKB 40-MB50		BTB 40 MB50		HSK 63 MB50	
		W1	W2	W1	W2	W1	W2
IHAXF 2.5-4/8	2.5	66°	283°	54°	292°	60°	257°
	3	76°	283°	56°	284°	8°	196°
	3.5	83°	360°	44°	246°	107°	261°
	4	116°	285°	30°	224°	128°	264°
IHAXF 4-6/8	4	71°	293°	50°	294°	63°	262°
	4.5	75°	287°	55°	287°	6°	194°
	5.5	4°	238°	44°	248°	129°	287°
	5.5	126°	298°	32°	229°	129°	268°
	6	123°	264°	145°	301°	136°	254°
IHAXF 6-8/8	6.6	2°	302°	45°	307°	68°	280°
	6.5	75°	288°	56°	288°	78°	274°
	7.7	5°	280°	55°	280°	179°	351°
	7.5	16°	199°	78°	295°	129°	284°
	8	121°	292°	18°	214°	128°	275°
IHAXF 8-10/8	8	70°	295°	49°	297°	88°	300°
	8.5	75°	280°	55°	281°	51°	245°
	9	67°	255°	49°	258°	160°	330°
	9.5	131°	302°	19°	216°	112°	273°
	10	119°	272°	167°	320°	129°	266°
IHAXF 10-12/8	10	65°	293°	46°	293°	56°	257°
	10.5	66°	273°	29°	262°	182°	351°
	11	44°	234°	45°	255°	163°	317°
	11.5	130°	295°	16°	214°	131°	270°
	12	127°	275°	156°	312°	138°	259°

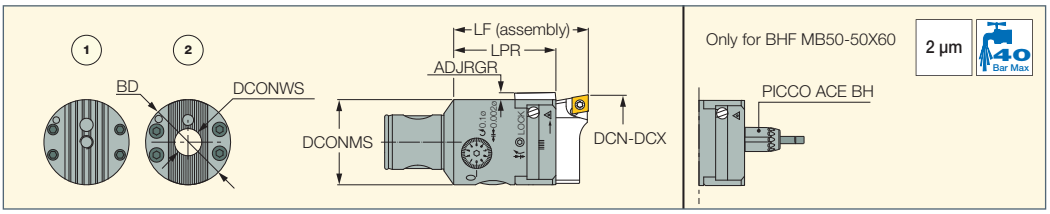
Balancing Data for Various BHF...MB...BL Boring Combinations (continued)

Balance Correction for BHF MB50-50x68 BL							
TOOLS	Ø BORE	SKB 40-MB50		BTB 40 MB50		HSK 63 MB50	
		W_1	W_2	W_1	W_2	W_1	W_2
IHAXF 6- 8/16	6.0	43°	315°	46°	346°	46°	346°
	6.5	63°	326°	44°	326°	59°	336°
	7	82°	305°	67°	304°	93°	323°
	7.5	30°	205°	62°	255°	5.5°	163°
	8	124°	242°	126°	258°	92°	219°
IHAXF 8-10/16	8	42°	312°	36°	336°	48°	348°
	8.5	52°	328°	39°	339°	75°	330°
	9	68°	318°	51°	317°	112°	331°
	9.5	104°	283°	73°	268°	56°	212°
	10	110°	270°	15°	200°	113°	222°
IHAXF 10-12/16	10	35°	336°	30°	330°	44°	344°
	10.5	44°	321°	32°	332°	45°	345°
	11	56°	307°	35°	312°	71°	325°
	11.5	153°	328°	21°	223°	327°	121°
	12	139°	297°	171°	333°	84°	234°
IHAXF 12-14/16	12	30°	330°	26°	326°	40°	340°
	12.5	32°	332°	28°	328°	48°	334°
	13	64°	281°	40°	280°	80°	304°
	13.5	38°	236°	42°	261°	38°	208°
	14	138°	253°	177°	300°	114°	236°
IHAXF 14-16/16	14	22°	324°	18°	318°	39°	339°
	14.5	30°	330°	16°	316°	57°	357°
	15	37°	257°	22°	266°	54°	302°
	15.5	184°	340°	35°	270°	130°	297°
	16	160°	253°	172°	277°	138°	251°
IHAXF 16-18/16	16	26°	326°	24°	324°	58°	358°
	16.5	36°	303°	14°	313°	37°	319°
	17	37°	276°	27°	292°	56°	272°
	17.5	151°	287°	187°	324°	128°	288°
	18	160°	279°	189°	304°	140°	243°
IHAXF 18-22/16	18	10°	310°	6°	305°	28°	328°
	18.5	29°	328°	0°	300°	17°	313°
	19	200°	317°	230°	332°	26°	259°
	19.5	190°	295°	208°	307°	169°	303°
	20	180°	242°	188°	249°	174°	234°
	20.5	179°	240°	186°	247°	168°	228°
	21	176°	236°	174°	236°	169°	229°
	21.5	190°	252°	141°	202°	170°	230°
	22	180°	240°	170°	230°	176°	236°

ITSBORE

BHF MB16-MB50
Dia. 2.5-108

Fine Boring Heads with a 2 µm Direct Diametric Adjustment for a Diameter Range of 2.5 up to 108 mm



Designation	DCONMS	BD	LF	LPR	ADJRGR	DCN(1)	DCX(2)	DCONWS	Fig.	IH	RPMX(3)	kg		
BHF MB16-16X34 RV	16.00	16.00	34.0	26.00	1.00	18.0	23.0	-	1.	IH.. 16..	12000	0.11	BH LOCK NUT 14/16	BH LOCK SR 14/16
BHF MB20-20X40 RV	20.00	20.00	40.0	32.60	2.00	22.0	29.0	-	1.	IH.. 20..	12000	0.14	BH LOCK NUT 20	BH LOCK SR 20
BHF MB25-25X50	25.00	25.00	50.0	40.00	2.00	28.0	38.0	-	1.	IH.. 25..	10000	0.21	BH LOCK NUT 25	BH LOCK SR 25
BHF MB32-32X63	32.00	32.00	63.0	51.50	3.00	35.5	50.0	-	1.	IH.. 32..	10000	0.43	BH LOCK NUT 32	BH LOCK SR 32
BHF MB40-40X80	40.00	40.00	80.0	66.00	4.00	48.0	63.0	-	1.	IH.. 40..	8000	0.79	BH LOCK NUT 40	BH LOCK SR 40
BHF MB50-50X60	50.00	50.00	79.0	60.00	4.00	2.5	108.0	16.00	2.	IH.. 50..	8000	1.09	BH NUT 10	BH LOCK SR 50

• For user guide, see pages 428, 481 • For spare parts, see page 466

(1) Cutting diameter minimum

(2) Cutting diameter maximum

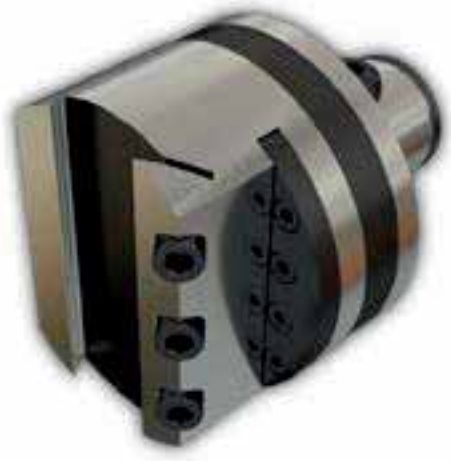
(3) Maximum RPM

For tools, see pages: IHAXF (432) • IHAXF-AVI (434) • IHAXF-E (434) • IHFF (436) • IHRF (436) • IHRF-BW (439) • IHRF-CH (439)

Fine Boring Head Diameter Range

Assembly Reference

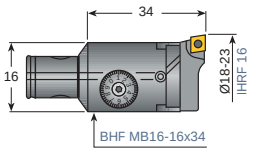
	0 10 20 30 40 50 60 70 80 90 100 110 120 130 150 180 280 400 600 700 800 1200	Page
BHF MB16-16x34	18-23	864
BHF MB20-20x40	22-29	
BHF MB25-25x50	28-38	
BHF MB32-32x63	35.5-50	
BHF MB40-40x80	48-63	
BHF MB50-32x60 BL	2.5-12	862
BHF MB50-50x68 BL	6-22	
BHF MB50-50x60	2.5-108	864
BHF MB50-63x87	2.5-160	871
BHF MB50-80x94	2.5-220	
BHF MB80-80x94	2.5-220	
BHF MB80-125x114	36-500	
TCH AL 200	200-602	
TCH AL 300	300-702	
TCH AL 400	400-802	
TCH AL 500	500-902	876
TCH AL 600	600-1002	
TCH AL 700	700-1102	
TCH AL 800	800-1202	



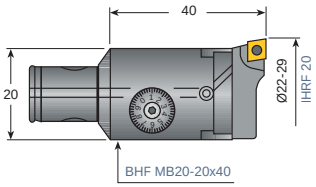
BHF Fine Boring Heads high precision machining to a close tolerance with high surface quality.
These heads enable a fine diametric adjustment as small as 2 µm with a direct reading.

BHF MB16-MB40 Diameter Range: 18-63

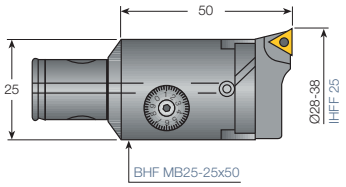
ø18-23
BHF MB16-16X34 RV

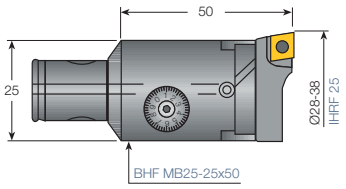


ø22-29
BHF MB20-20X40 RV



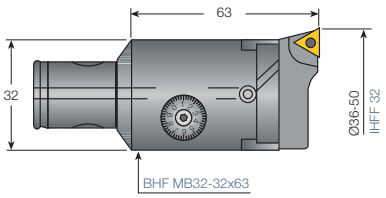
ø28-38
BHF MB25-25x50

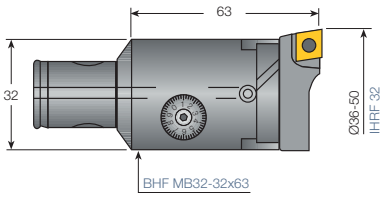




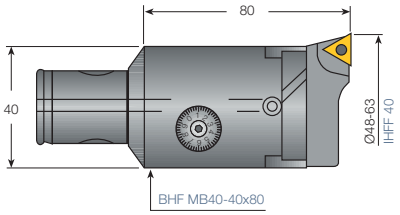
BHF MB16-MB40 Diameter Range: 18-63

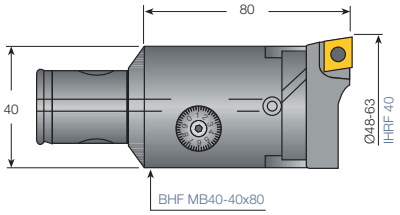
ø36-50
BHF MB32-32x63





ø48-63
BHF MB40-40x80



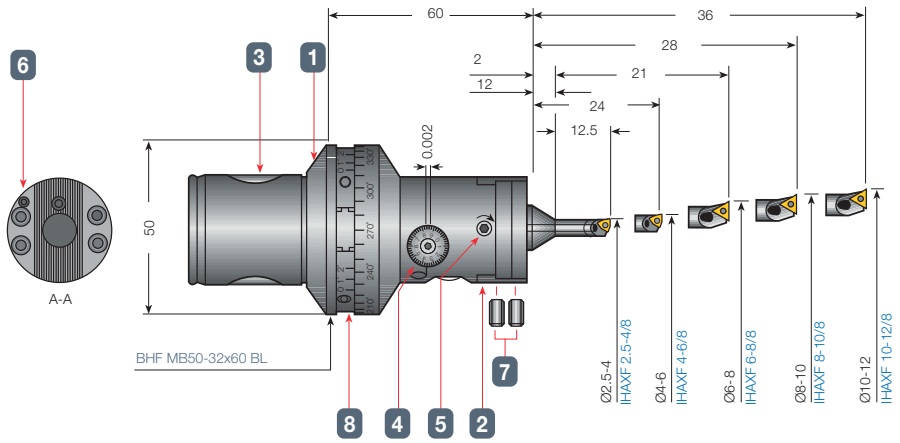


Fine Boring Heads with Balancing Rings

2 µm Direct Diametric Adjustment

BHF MB50-32x60 BL ø2.5-12

2 µm

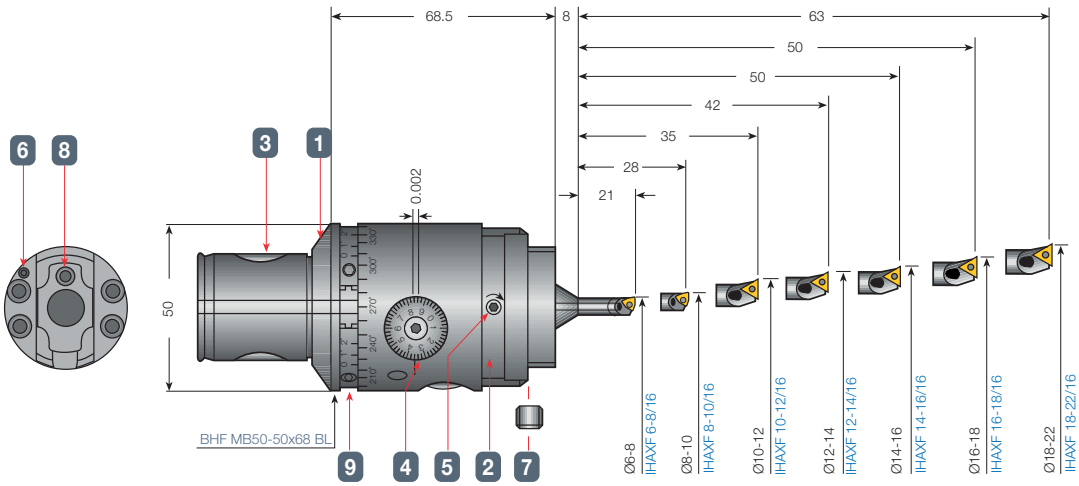


1. Body
2. Tool Slide
3. Expanding Pin
4. Graduated Dial
5. Slide Locking Screw
6. Coolant Nozzle
7. Boring Bar Locking Screws
8. Balancing Rings

See page 481

BHF MB50-50x68 BL ø6-22

2 µm



1. Body
2. Tool Slide
3. Expanding Pin
4. Graduated Dial
5. Slide Locking Screw
6. Coolant Nozzle
7. Boring Bar Locking Screws
8. Oiling Nipple
9. Balancing Rings

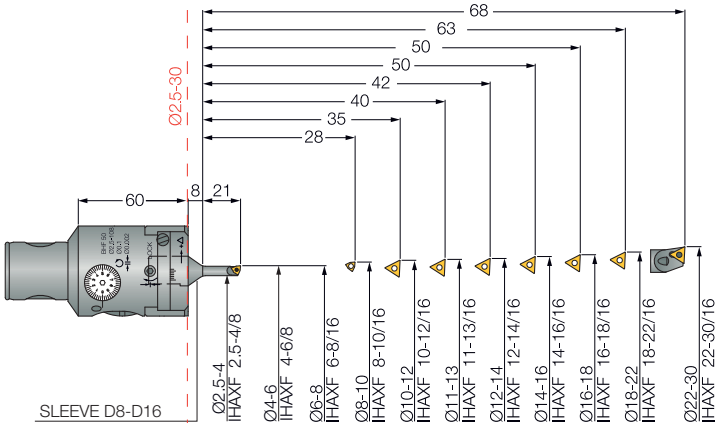
See page 481

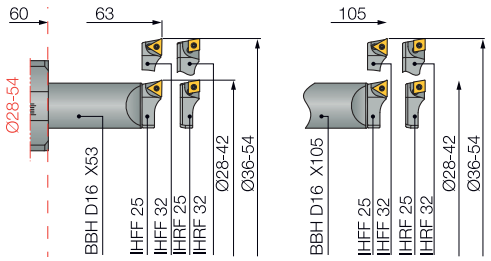
Fine Boring Head Range

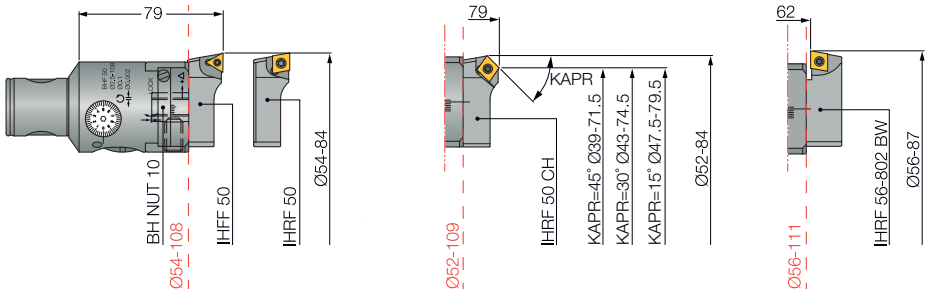
2 µm Direct Diametric Adjustment

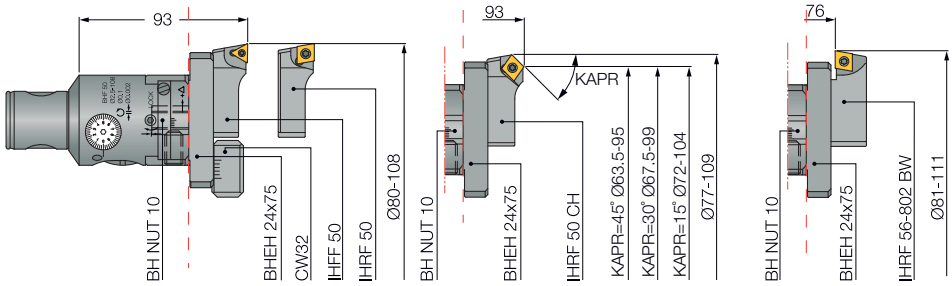
BHF MB50-50x60 ø2.5-108

2 µm









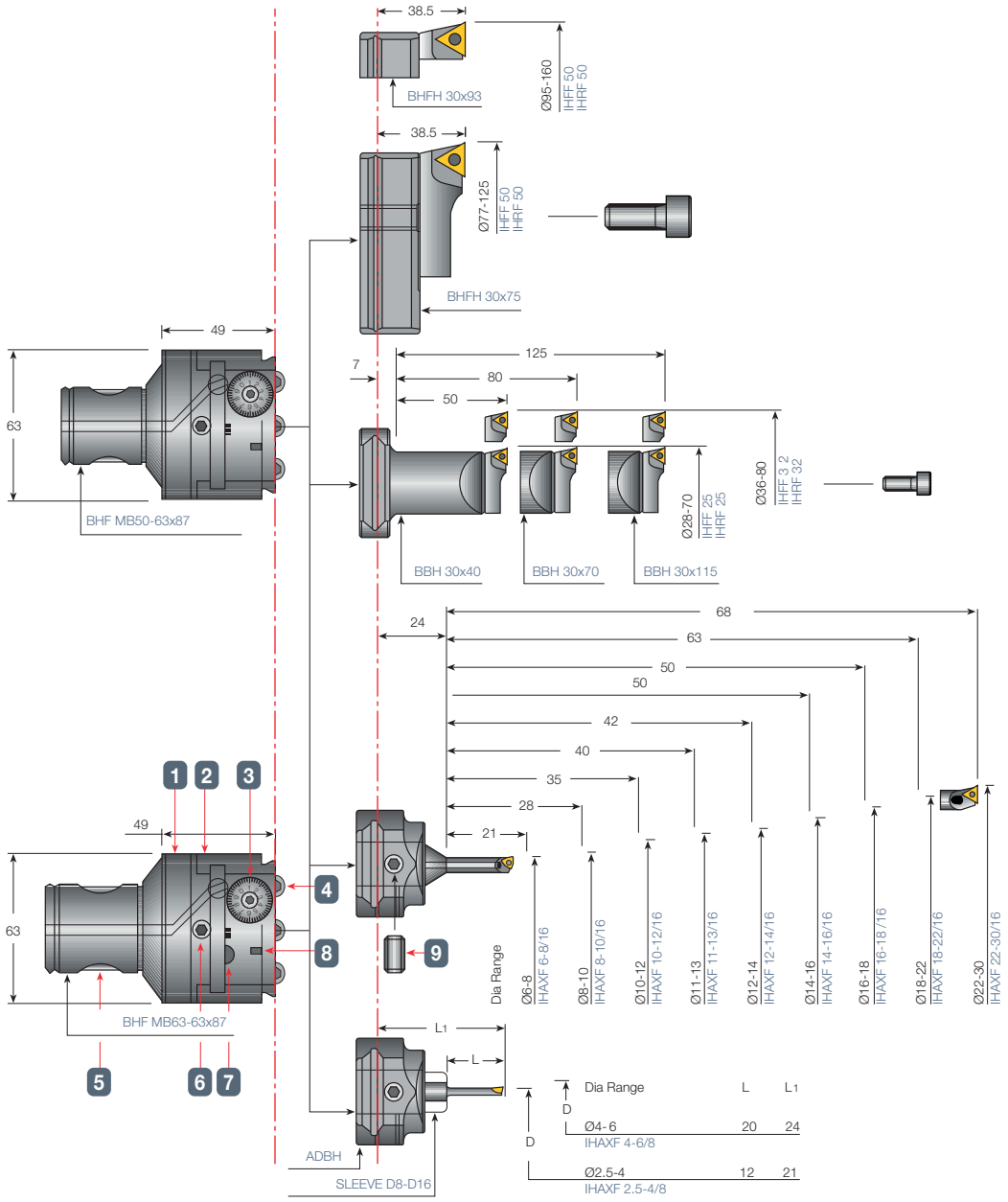
See page 481

Fine Boring Head Range

2 µm Direct Diametric Adjustment

BHF MB50-63x87 ø2.5-160
BHF MB63-63x87 ø2.5-160

2 µm



1. Body
2. Tool Slide
3. Graduated Dial
4. Toolholder Locking Screw
5. Expanding Pin
6. Slide Locking Screw
7. Coolant Nozzle
8. Oiling Nipple
9. Toolholder Locking Screw

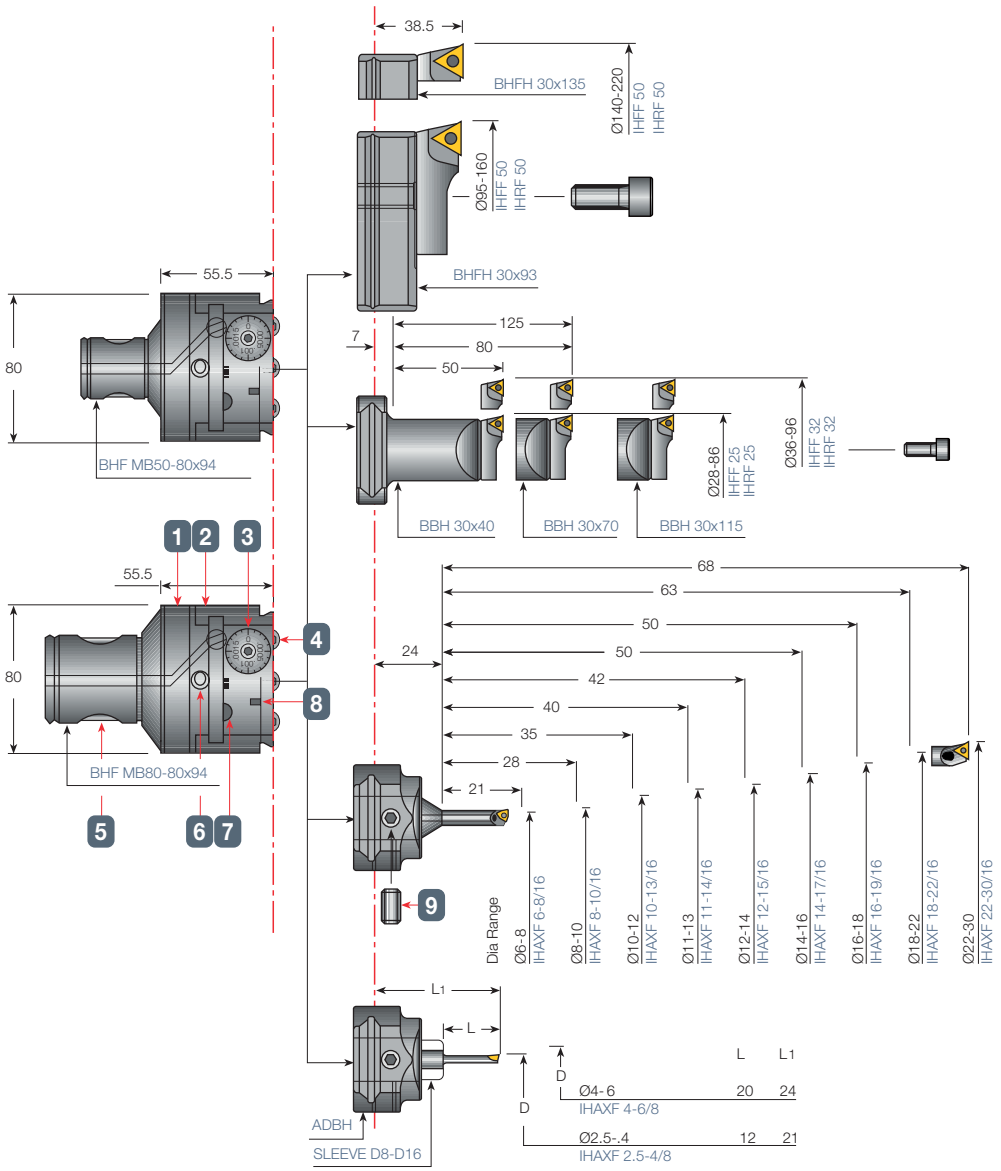
See pages 481-482

Fine Boring Head Range

2 µm Direct Diametric Adjustment

BHF MB50-80x94 ø2.5-220
BHF MB80-80x94 ø2.5-220

2 µm



1. Body
2. Tool Slide
3. Graduated Dial
4. Toolholder Locking Screw
5. Expanding Pin
6. Slide Locking Screw
7. Coolant Nozzle
8. Oiling Nipple
9. Toolholder Locking Screw

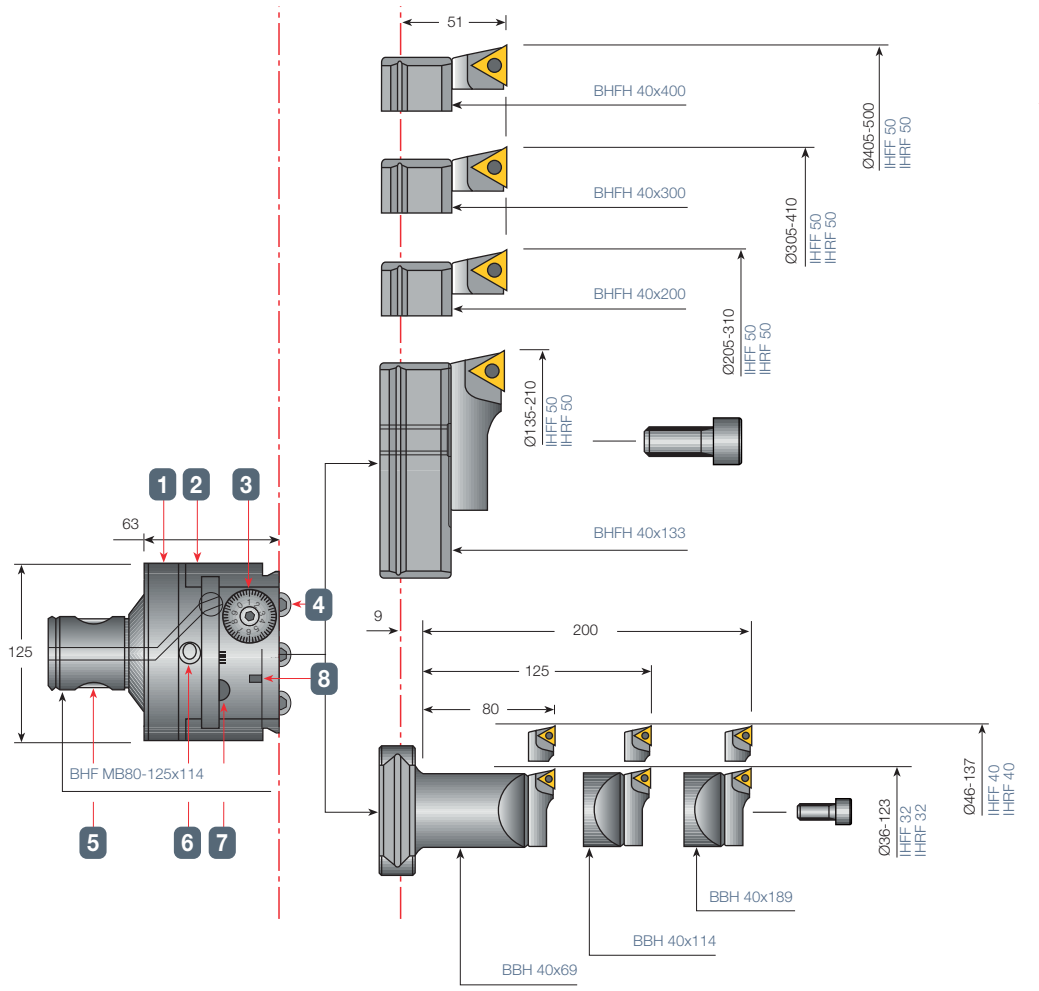
See pages 481-482

Fine Boring Head Range

2 µm Direct Diametric Adjustment

BHF MB80-125x114 ø36-500

2 µm



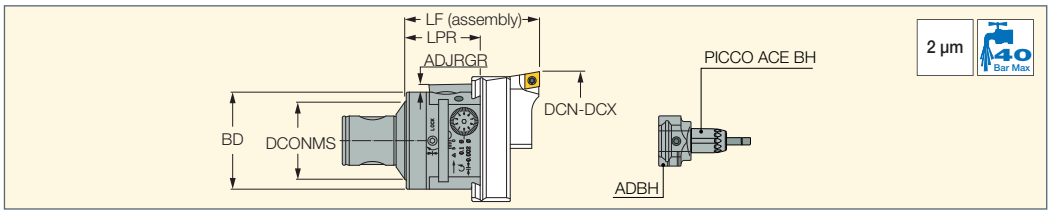
1 Body
2 Tool Slide
3 Graduated Dial
4 Toolholder Locking Screw
5 Expanding Pin
6 Slide Locking Screw
7 Coolant Nozzle
8 Oiling Nipple

See page 482

ITSBORE

BHF MB50-MB80
Dia. 2.5-500

Fine Boring Heads with a 2 µm Direct Diametric Adjustment for a Diameter Range of 2.5 up to 500 mm



Designation	DCONMS	BD	LF	DCN[4]	DCX[5]	LPR	ADJRGR	RPMX[6]	kg
BHF MB50-63X87 [1]	50.00	63.00	87.0	2.5	125.0	49.00	5.00	8000	1.28
BHF MB50-80X94 [2]	50.00	80.00	94.0	2.5	160.0	58.00	5.00	8000	2.22
BHF MB63-63X87 [1]	63.00	63.00	87.0	2.5	125.0	49.00	5.00	6000	1.57
BHF MB80-80X94 [2]	80.00	80.00	94.0	2.5	160.0	58.00	5.00	5000	2.63
BHF MB80-125X114 [3]	80.00	125.00	114.0	135.0	500.0	63.00	5.00	4000	5.72

• For user guide, see pages 429-431, 478-483 • For spare parts, see page 466

[1] Use with slide BHFH 30X75 or BHFH 30X93.

[2] Use with slide BHFH 30X93 or BHFH 30X135.

[3] Use with slide BHFH 40X133, BHFH 40X200, BHFH 40X300 and BHFH 40X400.

[4] Cutting diameter minimum

[5] Cutting diameter maximum

[6] Maximum RPM

ITSBORE

IHAXF

Brazed and Indexable Boring Bars for the MB Modular Boring System

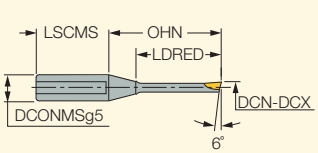


Fig. 1

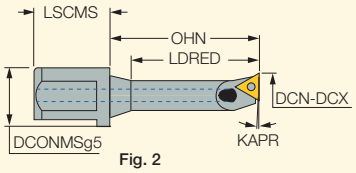


Fig. 2

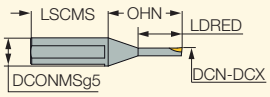


Fig. 3

Designation	DCN[2]	DCX[3]	LDRED	OHN[4]	LSCMS	DCONMS[5]	Fig.	KAPR[6]	Insert	CSP[7]		
IHAXF 2.5-4/8 [1]	2.50	4.00	12.5	21.00	22.00	8.00	1.	3.0	SOLID	0		
IHAXF 4- 6/8 [1]	4.00	6.00	20.0	24.00	24.00	8.00	1.	3.0	SOLID	0		
IHAXF 6- 8/16	6.00	8.00	21.0	29.00	22.00	16.00	2.	3.0	WCGT 0201...	1	SR 14-299	T-6/5
IHAXF 6- 8/8	6.00	8.00	21.0	23.00	16.00	8.00	3.	5.0	WCGT 0201...	1	SR 14-299	T-6/5
IHAXF 8-10/16	8.00	10.00	28.0	36.00	22.00	16.00	2.	3.0	WCGT 0201...	1	SR 14-299	T-6/5
IHAXF 8-10/8	8.00	10.00	-	28.00	16.00	8.00	3.	5.0	WCGT 0201...	1	SR 14-299	T-6/5
IHAXF 10-12/16	10.00	12.00	35.0	43.00	22.00	16.00	2.	3.0	TPGX 0902...	1	SR 14-298	T-8/5
IHAXF 10-12/8	10.00	12.00	-	36.00	16.00	8.00	3.	5.0	TPGX 0902...	1	SR 14-298	T-8/5
IHAXF 11-13/16	11.00	13.00	40.0	48.00	22.00	16.00	2.	3.0	TPGX 0902...	1	SR 14-298	T-8/5
IHAXF 12-14/16	12.00	14.00	42.0	48.00	22.00	16.00	2.	3.0	TPGX 0902...	1	SR 14-298	T-8/5
IHAXF 12-14/8	12.00	14.00	-	42.00	14.00	8.00	3.	3.0	TPGX 0902...	1	SR 14-298	T-8/5
IHAXF 14-16/16	14.00	16.00	50.0	52.00	22.00	16.00	2.	3.0	TPGX 0902...	1	SR 14-298	T-8/5
IHAXF 14-16/8	14.00	16.00	-	48.00	14.00	8.00	3.	3.0	TPGX 0902...	1	SR 14-298	T-8/5
IHAXF 16-18/16	16.00	18.00	50.0	58.00	22.00	16.00	2.	3.0	TPGX 0902...	1	SR 14-298	T-8/5
IHAXF 16-18/8	16.00	18.00	-	54.00	14.00	8.00	3.	3.0	TPGX 0902...	1	SR 14-298	T-8/5
IHAXF 18-22/16	18.00	22.00	-	63.00	22.00	16.00	2.	3.0	TPGX 0902...	1	SR 14-298	T-8/5
IHAXF 22-30/16	22.00	30.00	-	68.00	22.00	16.00	2.	3.0	TPGX 0902...	1	SR 14-298	T-8/5

[1] Brazed tool

[2] Cutting diameter minimum

[3] Cutting diameter maximum

[4] Minimum overhang

[5] For DCONMS=8 mm, 16 mm O.D. sleeves should be used

[6] Tool cutting edge angle

[7] 0 - Without coolant supply, 1 - With coolant supply

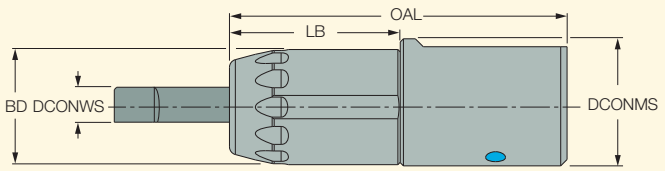
For inserts, see pages: TPGX (459) • TPGX (CBN) (460) • TPGX (PCD) (460) • WCGT (459)

For holders, see pages: ADBH (435) • BHD MB (414) • BHE MB (418) • BHE MB-H (418) • BHF MB-BL (423) • BHF MB16-MB50 Dia. 2.5-108 (425) • SLEEVE (433)

PICCOACE ITSBORE

PICCO ACE-BH

Holders with Short Shanks for ITS BORE System Carrying PICCOCUT Inserts



Designation	DCONMS	DCONWS	BD	OAL	LB	
PICCO ACE-BH 16-4	16.00	4.00	14.50	42.50	21.50	WRENCH ACE 4-5
PICCO ACE-BH 16-5	16.00	5.00	14.50	42.50	21.50	WRENCH ACE 4-5
PICCO ACE-BH 16-6	16.00	6.00	19.90	43.50	21.50	WRENCH ACE 6-7
PICCO ACE-BH 16-7	16.00	7.00	19.90	43.50	21.50	WRENCH ACE 6-7

- Holders are suitable for right- and left-hand PICCO inserts

The PICCO-ACE-BH Holders Can Carry a Wide Range of PICCOCUT Insert Geometries


PICCO 050


PICCO 050C


PICCO 051


PICCO 050 IB50 (CBN)


PICCO 520


PICCO 060


PICCO MF

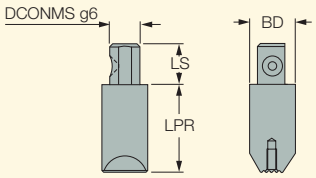

PICCO 010


PICCO 020

ITSBORE

BBH D16

Extension Slides for MB Modular Fine Boring Holders



Designation	DCONMS	LPR	BD	LS	kg
BBH D16-53	16.00	53.00	25.00	21.50	0.50
BBH D16-105	16.00	95.00	25.00	21.50	0.80

For tools, see pages: IHFF (436) • IHRF (436)

ITSBORE

SLEEVE

Reduction Sleeves for Boring Bars on the MB Modular Boring System

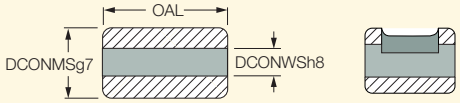


Fig.1

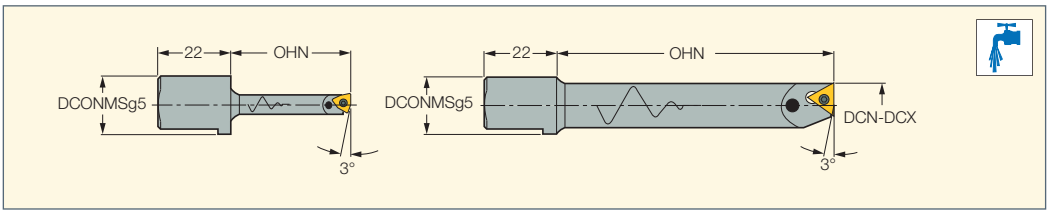
Fig.2

Designation	DCONMS	DCONWS	OAL	Fig.
SLEEVE D 8-D16	16.00	8.00	23.00	2.

For tools, see pages: IHAXF (432)

ITSBORE

IHAXF-AVI
Heavy Metal Vibration
Damping Boring Bars

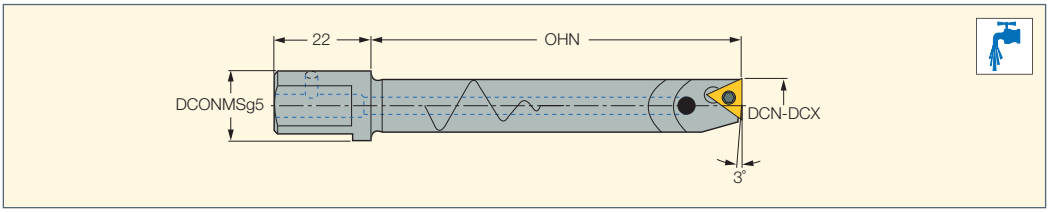


Designation	DCN(1)	DCX(2)	OHN(3)	DCONMS	Insert		
IHAXF 6- 8-AVI	6.00	8.00	36.0	16.00	WCGT 0201...	SR 14-299	T-6/5
IHAXF 8-10-AVI	8.00	10.00	48.0	16.00	WCGT 0201...	SR 14-299	T-6/5
IHAXF 10-12-AVI	10.00	12.00	60.0	16.00	TPGX 0902...	SR 14-298	T-8/5
IHAXF 12-14-AVI	12.00	14.00	72.0	16.00	TPGX 0902...	SR 14-298	T-8/5
IHAXF 14-16-AVI	14.00	16.00	84.0	16.00	TPGX 0902...	SR 14-298	T-8/5
IHAXF 16-18-AVI	16.00	18.00	96.0	16.00	TPGX 0902...	SR 14-298	T-8/5

• Note: Not recommended to be used on balanceable BHF-BL fine boring heads.
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Minimum overhang
For inserts, see pages: TPGX (459) • TPGX (CBN) (460) • WCGT (459)
For holders, see pages: ADBH (435) • BHD MB (414) • BHE MB (418) • BHE MB-H (418) • BHF MB16-MB50 Dia. 2.5-108 (425)

ITSBORE

IHAXF-E
Carbide Vibration
Dampening Boring Bars

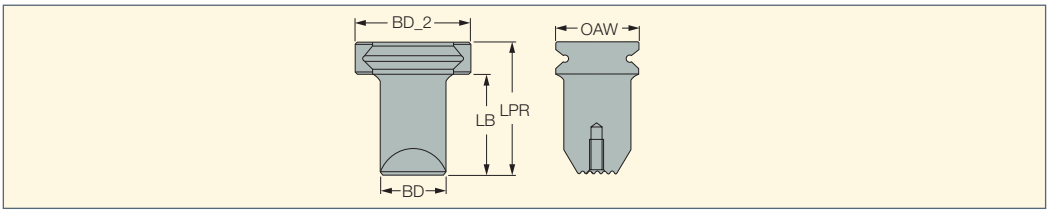


Designation	DCN(1)	DCX(2)	OHN(3)	DCONMS	Insert		
IHAXF 6- 8-E	6.00	8.00	45.0	16.00	WCGT 0201...	SR 14-299	T-6/5
IHAXF 8-10-E	8.00	10.00	60.0	16.00	WCGT 0201...	SR 14-299	T-6/5
IHAXF 10-12-E	10.00	12.00	75.0	16.00	TPGX 0902...	SR 14-298	T-8/5
IHAXF 12-14-E	12.00	14.00	90.0	16.00	TPGX 0902...	SR 14-298	T-8/5
IHAXF 14-16-E	14.00	16.00	105.0	16.00	TPGX 0902...	SR 14-298	T-8/5
IHAXF 16-18-E	16.00	18.00	120.0	16.00	TPGX 0902...	SR 14-298	T-8/5

• Note: Not recommended to be used on balanceable BHF-BL fine boring heads.
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Minimum overhang
For inserts, see pages: TPGX (459) • TPGX (CBN) (460) • WCGT (459)
For holders, see pages: ADBH (435) • BHD MB (414) • BHE MB (418) • BHE MB-H (418) • BHF MB16-MB50 Dia. 2.5-108 (425)

ITSBORE

BBH 30/40
Extension Slides for MB
Modular Fine Boring Holders

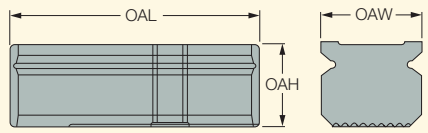


Designation	OAW	LB	BD	LPR	BD_2	kg
BBH 30X40	30.5	40.0	25.00	52.50	43.00	0.27
BBH 30X70	30.5	70.0	25.00	82.50	43.00	0.38
BBH 30X115	30.5	115.0	27.00	127.50	43.00	0.64
BBH 40X69	40.0	69.0	32.00	86.00	56.00	0.69
BBH 40X114	40.0	114.0	32.00	131.00	56.00	0.98
BBH 40X189	40.0	189.0	38.00	206.00	56.00	1.94

For tools, see pages: IHFF (436) • IHRF (436)

ITSBORE

BHFH
Counter Weight Slides for MB Modular Fine Boring Holders

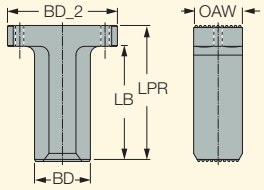


Designation	OAW	OAL	OAH	kg	
BHFH 30X75	30.5	75.00	25.00	0.44	SR M10X25 DIN912
BHFH 30X93	30.5	93.00	25.00	0.54	SR M10X25 DIN912
BHFH 30X135	30.5	135.00	25.00	0.76	SR M10X25 DIN912
BHFH 40X133	40.0	133.00	40.00	1.52	SR M10X25 DIN912
BHFH 40X200	40.0	200.00	40.00	2.30	SR M10X25 DIN912
BHFH 40X300	40.0	300.00	40.00	3.47	SR M10X25 DIN912
BHFH 40X400	40.0	400.00	40.00	4.56	SR M10X25 DIN912

For tools, see pages: IHFF (436) • IHRF (436) • IHRF-BW (439) • IHRF-CH (439)

ITSBORE

BBH 63
Extension Slides for MB Modular BHE Fine Boring Holders

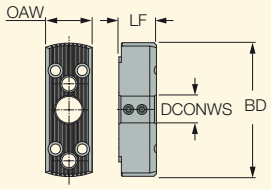


Designation	BD_2	LPR	BD	LB	OAW	kg
BBH 63X78	63.00	78.00	32.00	66.0	28.0	0.52

For tools, see pages: IHFF (436) • IHRF (436)

ITSBORE

BHEH
Slides for MB Modular BHE Fine Boring Holders



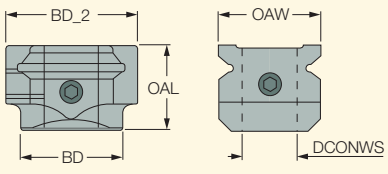
Designation	OAW	BD	LF	DCONWS	kg				
BHEH 24X75	24.0	75.00	14.50	-	0.20				
BHEH 28X80	28.0	80.00	22.50	16.00	0.33	SR M6X6 DIN913*	SR M5X25DIN912*	HW 4.0*	HW 3.0*
BHEH 28X108	28.0	108.00	22.50	-	0.53				
BHEH 28X148	28.0	148.00	22.50	-	0.69				

* Optional, should be ordered separately

For tools, see pages: IHFF (436) • IHRF (436) • IHRF-BW (439) • IHRF-CH (439)

ITSBORE

ADBH
Sleeve for MB Modular Fine Boring Holders

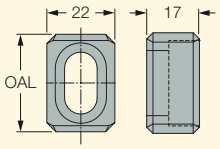


Designation	BD	DCONWS	OAL	BD_2	OAW	kg
ADBH 30XD16	30.00	16.00	25.00	39.00	30.5	0.15

For tools, see pages: IHAXF (432) • IHAXF-AVI (434) • IHAXF-E (434)

ITSBORE

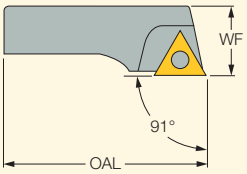
CW32
Counter Balancing Weight
Used on BHEH Slide for
Fine Boring Holders



Designation	OAL	kg
CW32	31.50	0.05

ITSBORE

IHFF
Triangular Insert Holders
for Mounting on MB
Fine Boring Heads

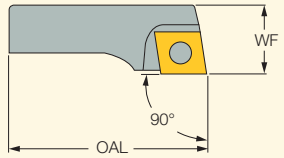


Designation	WF	OAL	DCN(1)	DCX(2)	Insert		
IHFF 25	10.00	26.50	28.0	40.0	TPGX 0902...	SR 14-298	T-8/5
IHFF 32	11.50	34.50	35.0	53.0	TPGX 0902...	SR 14-298	T-8/5
IHFF 40	14.00	44.60	48.0	66.0	TPGX 1103...	SR-17979 M3X8	T-8/5
IHFF 50	19.00	52.00	54.0	86.0	TPGX 1103...	SR-17979 M3X8	T-8/5

(1) Cutting diameter minimum
(2) Cutting diameter maximum
For inserts, see pages: TPGX (459) • TPGX (CBN) (460)
For holders, see pages: BBH 30/40 (434) • BBH 63 (435) • BBH D16 (433) • BHD 50 L200 (437) • BHD MB (414) • BHE MB (418) • BHEH (435) • BHF L200 (437) • BHF MB16-MB50 Dia. 2.5-108 (425) • BHFH (435)

ITSBORE

IHRF
80° Rhombic Insert
Holders for Mounting on
MB Fine Boring Heads

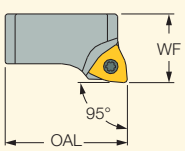


Designation	WF	OAL	DCN(1)	DCX(2)	Insert		
IHRF 16	8.00	17.00	18.0	24.0	CCGT 0602...	SR 14-548	T-7/5
IHRF 20	8.50	21.00	22.0	30.0	CCGT 0602...	SR 14-548	T-7/5
IHRF 25	10.00	26.50	28.0	40.0	CCGT 0602...	SR 14-548	T-7/5
IHRF 32	11.50	34.50	35.0	53.0	CCGT 0602...	SR 14-548	T-7/5
IHRF 40	14.00	44.00	48.0	66.0	CCGT 09T3...	SR 16-236	T-15/5
IHRF 50	19.00	52.00	54.0	86.0	CCGT 09T3...	SR 16-236	T-15/5

(1) Cutting diameter minimum
(2) Cutting diameter maximum
For inserts, see pages: CCET-WF (453) • CCGT-AF (455) • CCGT-AS (455) • CCGW/CCMT (CBN) (454) • CCMT (PCD) (454) • CCMT-14 (453) • CCMT-PF (452) • CCMT-WG (454) • CCMT/CCGT (453) • CCMT/CCGT-SM (452)
For holders, see pages: BBH 30/40 (434) • BBH 63 (435) • BBH D16 (433) • BHD 50 L200 (437) • BHD MB (414) • BHE MB (418) • BHEH (435) • BHF L200 (437) • BHF MB16-MB50 Dia. 2.5-108 (425) • BHFH (435)

ITSBORE

IHWF
Trigon Insert Holders for Mounting
on MB Fine Boring Heads



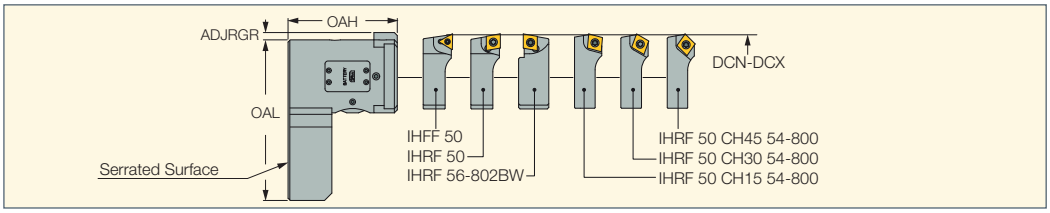
Designation	WF	OAL	DCN(1)	DCX(2)	Insert
IHWF 14 E	8.00	14.00	14.5	18.0	WCGT 0201...

(1) Cutting diameter minimum
(2) Cutting diameter maximum
For inserts, see pages: WCGT (459)
For holders, see pages: BHD MB (414) • BHE MB (418)

ITSBORE

BHD 50 L200

Digital Fine Boring Slide Head for TCH AL Large Diameter Holders



Designation	DCN(1)	DCX(2)	OAL	OAH	ADJRGR	RPMX(3)	kg
BHD 50 L200	200.0	1202.0	110.00	74.0	5.00	20000	1.70

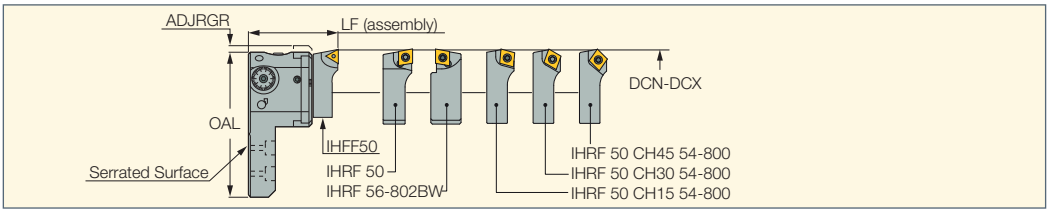
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Maximum RPM

For tools, see pages: IHFF (436) • IHRF (436) • IHRF-BW (439) • IHRF-CH (439)

ITSBORE

BHF L200

Fine Boring Slide Head for TCH AL Large Diameter Holders



Designation	DCN(1)	DCX(2)	OAL	LF	ADJRGR	kg
BHF L200	200.0	1202.0	110.00	67.0	5.00	1.27

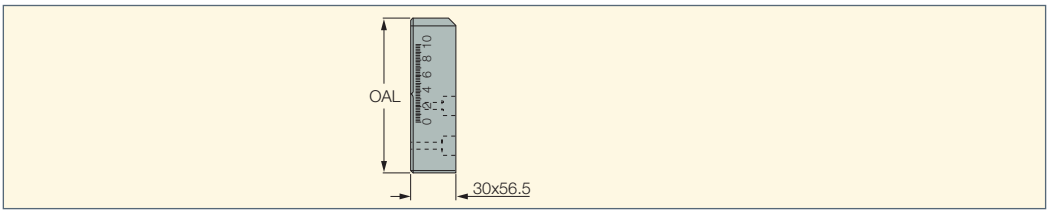
(1) Cutting diameter minimum
(2) Cutting diameter maximum

For tools, see pages: IHFF (436) • IHRF (436) • IHRF-BW (439) • IHRF-CH (439)

ITSBORE

CW200

Counter Balancing Weight for TCH AL Rough and Fine Boring Holders

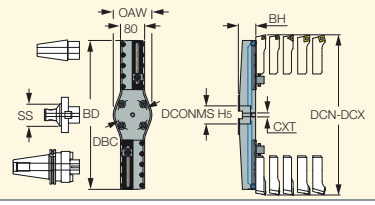


Designation	OAL	kg
CW200	105.00	1.12

ITSBORE

TCH AL

Aluminum Twin Cutter Heads for Rough and Fine Boring Operations, Diameter Range 200-1200 mm



Designation	DCN(1)	DCX(2)	BD	DCONMS	DBC	SS	OAW	CXT	BH	CSP(3)	RPMX(4)	kg
TCH AL200	200.0	602.0	194.00	40.00	66.70	80	-	-	54.00	1	700	3.20
TCH AL300	300.0	702.0	288.00	40.00	66.70	80	-	-	54.00	1	400	3.90
TCH AL400	400.0	802.0	394.00	40.00	66.70	80	-	1/4GAS	61.00	0	300	6.90
TCH AL500	500.0	902.0	494.00	60.00	101.60	80,110	128.0	1/4GAS	69.00	0	200	8.70
TCH AL600	600.0	1002.0	594.00	60.00	101.60	80,110	128.0	1/4GAS	71.00	0	200	8.34
TCH AL700	700.0	1102.0	694.00	60.00	101.60	80,110	128.0	1/4GAS	74.00	0	200	8.34
TCH AL800	800.0	1202.0	794.00	60.00	101.60	80,110	128.0	1/4GAS	80.00	0	150	15.20

• Aluminum body, with steel serrated seats • The "O" position on the counterweight balances the BHF boring head for 200 mm boring diameter position. For every 10 mm change in boring diameter, move the counterweight by 1 measurement mark • Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability • For spare parts, see pages 436-437, 469

(1) Cutting diameter minimum

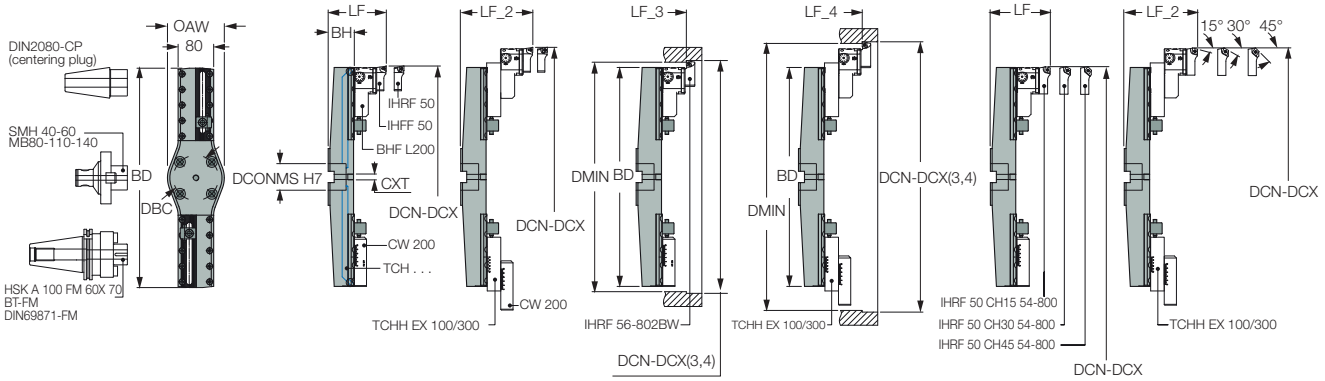
(2) Cutting diameter maximum

(3) 0 - Without coolant supply, 1 - With coolant supply

(4) Maximum RPM

For tools, see pages: IHBR (409) • IHCR (408) • IHPR (408) • IHSR (408) • IHSR-BW (410)

Large Diameter Double Edge Fine Boring Options

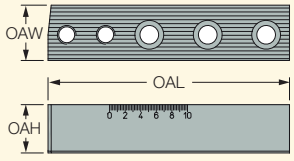


Boring Tools	Fine Boring Slide Head	Extension Slides	Dimensions	Aluminum Twin Cutter Heads: TCH 200	TCH 300	TCH 400	TCH 500	TCH 600	TCH 700	TCH 800
IH.F 50	BHF L200 / BHD50 L200		DCN-DCX	200-300	300-400	400-500	500-600	600-700	700-800	800-900
IH.F 50	BHF L200 / BHD50 L200	TCHH EX 100	DCN-DCX	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
IH.F 50	BHF L200 / BHD50 L200	TCHH EX 300	DCN-DCX	400-600	500-700	600-800	700-900	800-1000	900-1100	1000-1200
IHRF 56-802BW	BHF L200 / BHD50 L200		DCN-DCX(3,4)	202-302	302-402	402-502	502-602	602-702	702-802	802-902
IHRF 56-802BW	BHF L200 / BHD50 L200	TCHH EX 100	DCN-DCX(3,4)	302-402	402-502	502-602	602-702	702-802	802-902	902-1002
IHRF 56-802BW	BHF L200 / BHD50 L200	TCHH EX 300	DCN-DCX(3,4)	402-602	502-702	602-802	702-902	802-1002	902-1102	1002-1202
IH.F 50	BHF L200		LF	120	120	127	135	137	140	146
IH.F 50	BHF L200	TCHH EX 100	LF_2	150	150	157	165	167	170	176
IH.F 50	BHF L200	TCHH EX 300	LF_2	160	160	167	175	177	180	186
IHRF 56-802BW	BHF L200		LF_3	103	103	110	118	120	123	129
IHRF 56-802BW	BHF L200	TCHH EX 100	LF_4	133	133	140	148	150	153	159
IHRF 56-802BW	BHF L200	TCHH EX 300	LF_4	143	143	150	158	160	163	169
IH.F 50	BHD50 L200		LF	147	147	154	162	164	167	173
IH.F 50	BHD50 L200	TCHH EX 100	LF_2	177	177	184	192	194	197	203
IH.F 50	BHD50 L200	TCHH EX 300	LF_2	187	187	194	202	204	207	213
IHRF 56-802BW	BHD50 L200		LF_3	130	130	137	145	147	150	156
IHRF 56-802BW	BHD50 L200	TCHH EX 100	LF_4	160	160	167	175	177	180	186
IHRF 56-802BW	BHD50 L200	TCHH EX 300	LF_4	170	170	177	185	187	190	196

ITSBORE

TCHH EX

Boring Tools Extension Slides for TCH AL Boring Heads



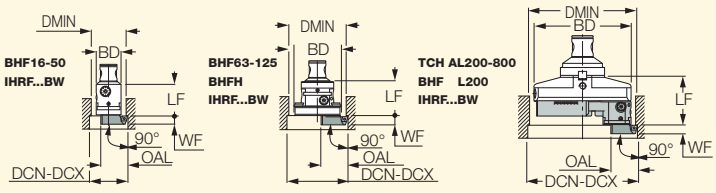
Designation	OAH	OAW	OAL	kg
TCHH EX100	31.00	35.5	155.00	1.50
TCHH EX300	41.00	35.5	255.00	2.80

For tools, see pages: IHBR (409) • IHCR (408) • IHPR (408) • IHSR (408) • IHSR-BW (410)

ITSBORE

IHRF-BW

Back Face Turning Toolholders
for BHF and TCH AL
Fine Boring Heads



Designation	SS (1)	BD	DCN(2)	LF	DCX(3)	WF	OAL	Insert
IHRF 20-25BW	BHF MB16-16x34	16	20	27.5	25	8	18	CCMT 0602...
IHRF 24.5-32BW	BHF MB20-20x40	20	24.5	33.5	32	8.5	22.5	CCMT 0602...
IHRF 31.5-41.5BW	BHF MB25-25x50	25	31.5	41.5	40.5	9.5	28.5	CCMT 0602...
IHRF 38.5-51.5BW	BHF MB32-32x63	32	38.5	53	51.5	11	35.5	CCMT 0602...
IHRF 50.5-65BW	BHF MB40-40X80	40	50.5	68	65	13.5	46	CCMT 09T3...
IHRF 56-802BW	BHF MB50-50X60	50	56	62	87	17.5	53	CCMT 09T3...
	BHF MB63-63X87+BHFH...	75-93	82	70.5	127	17.5	53	CCMT 09T3...
	BHF MB80-80X94+BHFH...	93-135	100	79.5	162	17.5	53	CCMT 09T3...
	BHF MB80-125X114+BHFH...	133-400	140	98	502	17.5	53	CCMT 09T3...
	TCH AL200+BHF L200/BHD 50 L200	194	202	103	302	17.5	53	CCMT 09T3...
	TCH AL300+BHF L200/BHD 50 L200	288	302	103	402	17.5	53	CCMT 09T3...
	TCH AL400+BHF L200/BHD 50 L200	394	402	110	502	17.5	53	CCMT 09T3...
	TCH AL500+BHF L200/BHD 50 L200	494	502	118	602	17.5	53	CCMT 09T3...
	TCH AL600+BHF L200/BHD 50 L200	594	602	120	702	17.5	53	CCMT 09T3...
	TCH AL700+BHF L200/BHD 50 L200	694	702	123	802	17.5	53	CCMT 09T3...
	TCH AL800+BHF L200/BHD 50 L200	794	802	129	902	17.5	53	CCMT 09T3...

• DMIM=(min bore diameter)=(DCN+BD+1)/2 • BD=Size of the boring head being used

(1) Cutting diameter minimum

(2) Cutting diameter maximum

For inserts, see pages: CCGT-AS (455) • CCGW/CCMT (CBN) (454) • CCMT (PCD) (454) • CCMT-14 (453) • CCMT-PF (452) • CCMT-WG (454) • CCMT/CCGT (453) • CCMT/CCGT-SM (452)

For holders, see pages: BHD 50 L200 (437) • BHD MB (414) • BHE MB (418) • BHEH (435) • BHF L200 (437) • BHF MB16-MB50 Dia. 2.5-108 (425) • BHFH (435)

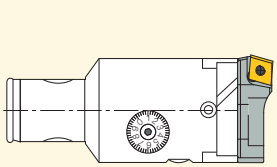
Spare Parts

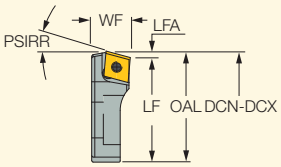
Designation		
IHRF-BW	SR 16-236	T-15/5

ITSBORE

IHRF-CH

Chamfering Tools for
BHF Boring Heads





Designation	DCN(1)	DCX(2)	LF	OAL	WF	LFA	PSIRR	Insert
IHRF 16 CH20 18-23	18.00	23.00	17.80	20.00	11.00	2.20	20.0	CCGT 0602...
IHRF 16 CH30 18-23	18.00	23.00	16.80	20.00	9.00	3.20	30.0	CCGT 0602...
IHRF 16 CH45 18-23	18.00	23.00	15.54	20.10	9.50	4.60	45.0	CCGT 0602...
IHRF 16 CH60 18-23	18.00	23.00	14.50	20.00	9.50	5.60	60.0	CCGT 0602...
IHRF 20 CH15 22-29	22.00	29.00	22.30	24.00	11.00	1.70	15.0	CCGT 0602...
IHRF 20 CH20 22-29	22.00	29.00	21.70	24.00	11.00	2.20	20.0	CCGT 0602...
IHRF 20 CH30 22-29	22.00	29.00	20.80	24.00	9.00	3.20	30.0	CCGT 0602...
IHRF 20 CH60 22-29	22.00	29.00	18.40	24.00	9.50	5.60	60.0	CCGT 0602...
IHRF 25 CH15 28-38	28.00	38.00	24.00	25.70	10.40	1.70	15.0	CCGT 0602...
IHRF 25 CH30 28-38	28.00	38.00	22.60	25.60	10.40	3.20	30.0	CCGT 0602...
IHRF 25 CH45 28-38	28.00	38.00	21.40	25.90	10.40	4.40	45.0	CCGT 0602...
IHRF 32 CH15 35-53	35.00	53.00	32.00	33.70	12.60	1.70	15.0	CCGT 0602...
IHRF 32 CH30 35-53	35.00	53.00	30.50	33.70	12.10	3.20	30.0	CCGT 0602...
IHRF 32 CH45 36-50	36.00	50.00	29.20	33.70	12.10	4.60	45.0	CCGT 0602...
IHRF 32 CH60 36-50	36.00	50.00	29.30	34.80	12.00	5.60	60.0	CCGT 0602...
IHRF 40 CH60 48-63	48.00	63.00	39.10	47.50	16.50	8.40	60.0	CCGT 09T3...
IHRF 40 CH15 48-66	48.00	66.00	44.90	47.40	17.50	2.50	15.0	CCGT 09T3...
IHRF 40 CH30 48-66	48.00	66.00	38.20	42.90	14.40	4.70	30.0	CCGT 09T3...
IHRF 40 CH45 48-66	48.00	66.00	36.40	43.00	14.40	6.70	45.0	CCGT 09T3...
IHRF 50 CH15 54-800	54.00	800.00	48.10	50.60	19.00	2.50	15.0	CCGT 09T3...
IHRF 50 CH20 54-800	54.00	800.00	52.20	55.50	18.00	3.30	20.0	CCGT 09T3...
IHRF 50 CH30 54-800	54.00	800.00	49.95	50.80	19.00	4.70	30.0	CCGT 09T3...
IHRF 50 CH45 54-800	54.00	800.00	44.00	50.60	19.00	6.70	45.0	CCGT 09T3...
IHRF 50 CH60 54-800	54.00	800.00	47.10	55.50	16.50	8.40	60.0	CCGT 09T3...

(1) Cutting diameter minimum

(2) Cutting diameter maximum

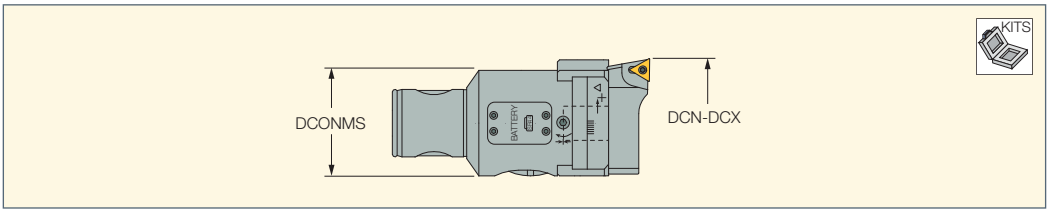
For inserts, see pages: CCGT-AS (455) • CCGW/CCMT (CBN) (454) • CCMT (PCD) (454) • CCMT-14 (453) • CCMT-PF (452) • CCMT-WG (454) • CCMT/CCGT (453) • CCMT/CCGT-SM (452)

For holders, see pages: BHD 50 L200 (437) • BHD MB (414) • BHE MB (418) • BHEH (435) • BHF L200 (437) • BHF MB16-MB50 Dia. 2.5-108 (425) • BHFH (435)

ITSBORE

KIT BHD-MB

Digital Display Fine Boring Head and Various Boring Tools and Inserts



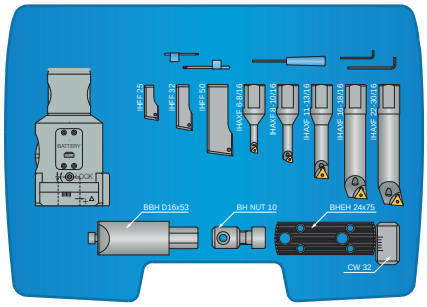
Designation	DCN(1)	DCONMS	DCX(2)
KIT BHD MB50-50 6-110	6.00	50.00	110.00
KIT BHD MB63-63 6-125	6.00	63.00	125.00
KIT BHD MB80-80 6-200	6.00	80.00	200.00

(1) Cutting diameter minimum

(2) Cutting diameter maximum

Boring Kit BHD MB50-50 metric/inch (ø6-110 mm)

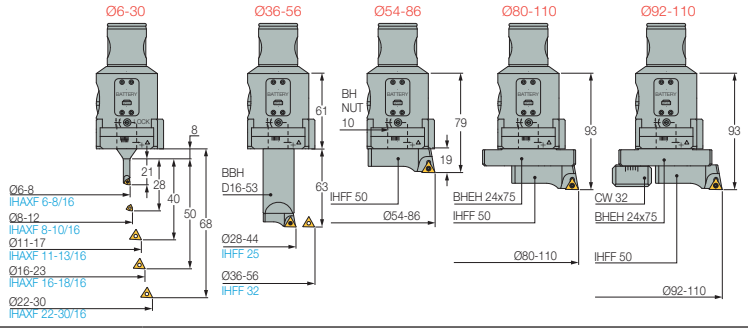
Fine Boring Head with a 2 µm Direct Diametric Adjustment Resolution and a Built-in Digital Display



2 µm

Tools	Inserts
1 BHD MB50-50x60	2 WCGT 020102L
1 IHFF 25	5 TPGX 730-L
1 IHFF 32	1 TPGX 220-L
1 IHFF 50	
1 IHAXF 6-8/16	
1 IHAXF 8-10/16	
1 IHAXF 11-13/16	
1 IHAXF 16-18/16	
1 IHAXF 22-30/16	
1 BBH D16-53	
1 BHEH 24x75	
1 BH NUT 10	
1 CW 32	

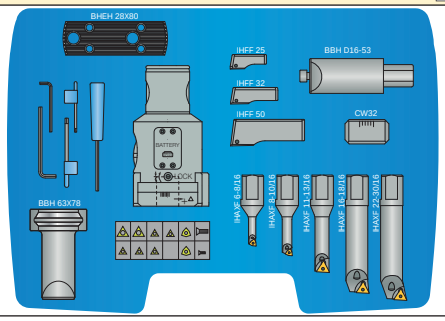
Designation	MB	Boring Range
KIT BHD MB50-50 6-110	50	6-110



ITSBORE

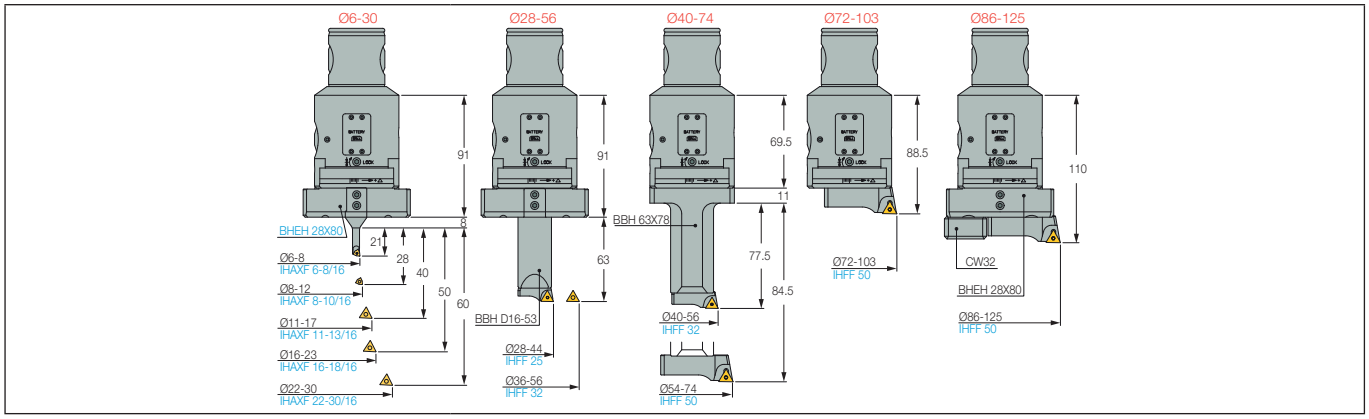
Boring Kit BHD MB63-63 6-125 metric/inch (ø6-125 mm)

Fine Boring Head with a 2 µm Direct Diametric Adjustment Resolution and a Built-in Digital Display



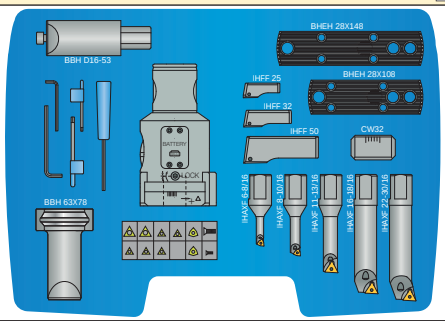
2 µm	Tools	Inserts
	1 BHD MB63-63-89	2 WCGT 020102L
	1 BBH 63X78	5 TPGX 730-L
	1 BHEH 28X80	1 TPGX 220-L
	1 BBH 16-53	
	1 CW32	
	1 IHAXF 6- 8/16	
	1 IHAXF 8-10/16	
	1 IHAXF 11-13/16	
	1 IHAXF 16-18/16	
	1 IHAXF 22-30/16	
	1 IHFF 25	
	1 IHFF 32	
	1 IHFF 50	

Designation	MB d1	Boring Range
KIT BHD MB63-63 6-125	63	2.5-125



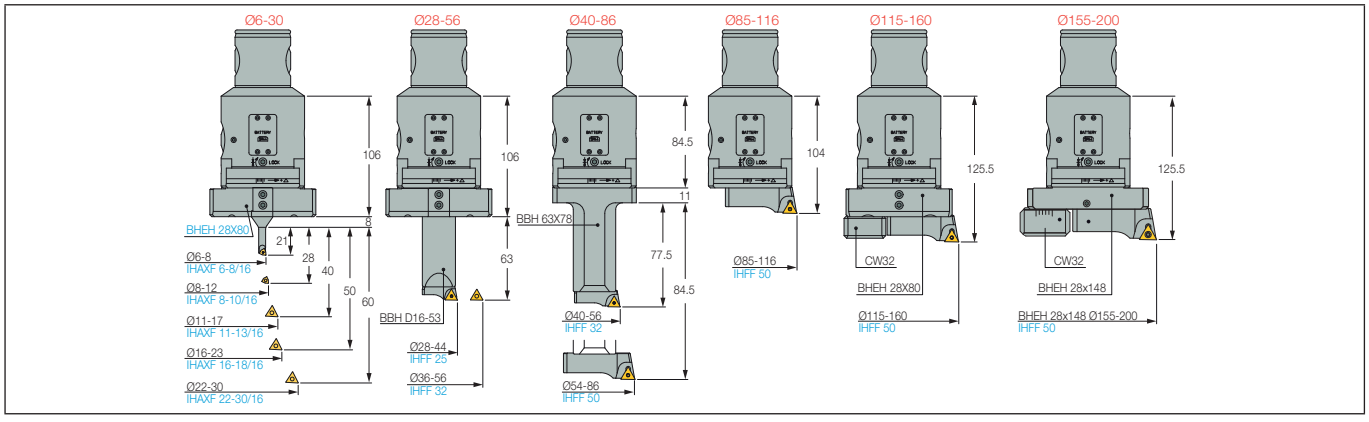
Boring KIT BHD MB80-80 6-200 metric/inch (ø6-200 mm)

Fine Boring Head with a 2 µm Direct Diametric Adjustment Resolution and a Built-in Digital Display



2 µm	Tools	Inserts
	1 BHD MB80-80-104	2 WCGT 020102L
	1 BBH D16-53	5 TPGX 730-L
	1 BBH 63X78	1 TPGX 220-L
	1 BHEH 28X108	
	1 BHEH 28X148	
	1 CW32	
	1 IHAXF 6- 8/16	
	1 IHAXF 8-10/16	
	1 IHAXF 11-13/16	
	1 IHAXF 16-18/16	
	1 IHAXF 22-30/16	
	1 IHFF 25	
	1 IHFF 32	
	1 IHFF 50	

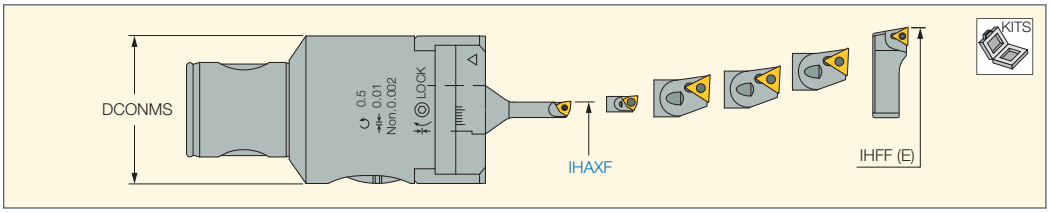
Designation	MB	Boring Range
KIT BHD MB80-80 6-200	80	6-200



ITSBORE

KIT BHE MB

Contains a Fine Boring Head and Various Boring Tools and Inserts



Designation	DCN(2)	DCX(3)	DCONMS	RPMX(4)
KIT BHE MB32-32 2.5-12 H (1)	2.50	12.00	32.00	10000
KIT BHE MB50-50 6-110	6.00	110.00	50.00	8000
KIT BHE MB50-50 6-22 H (1)	6.00	22.00	50.00	8000
KIT BHE MB63-63 6-125	6.00	125.00	63.00	6000
KIT BHE MB80-80 6-200	6.00	200.00	80.00	5000

- For kit contents and boring options, see following page.
- 0.01 mm direct diametric adjustment and 0.002 mm by a vernier scale.

(1) Balanced to G2.5/12,000 RPM
(2) Cutting diameter minimum
(3) Cutting diameter maximum
(4) Maximum RPM

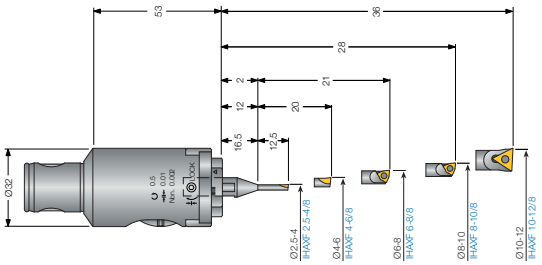
Boring KIT BHE MB32-32 2.5-12 H (ø2.5-12 mm)

Fine Boring Head 10 µm Direct Diametric Adjustment and a 2 µm by a Vernier Scale

10 µm
2 µm

Boring Tools	Inserts
1 BHE MB32-32X53 H	5 TPGX 090202L
1 IHAXF 2.5-4/8	2 WCGT 020102L
1 IHAXF 4-6/8	
1 IHAXF 6-8/8	
1 IHAXF 8-10/8	
1 IHAXF 10-12/8	

Designation	MB	Boring Range
KIT BHE MB32-32 2.5-12 H	32	2.5-12



ITSBORE

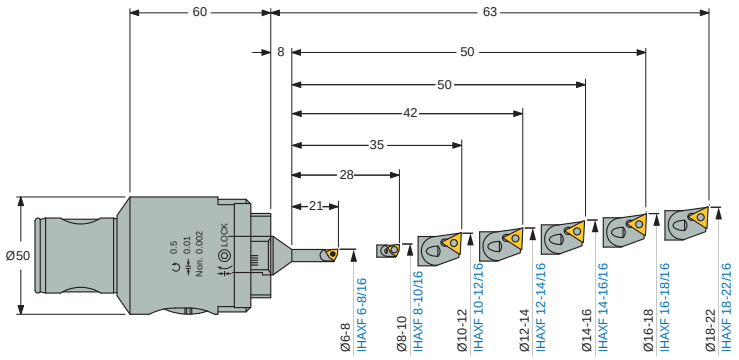
Boring KIT BHE MB50-50 6-22 H (ø6-22 mm)

Fine Boring Head 10 µm Direct Diametric Adjustment and a 2 µm by a Vernier Scale

10 µm 2 µm	Boring Tools	Inserts
	1 BHE MB50-50X60 H	5 TPGX 090202L
	1 IHAXF 6-8/16	2 WCGT 020102L
	1 IHAXF 8-10/16	
	1 IHAXF 10-12/16	
	1 IHAXF 12-14/16	
	1 IHAXF 14-16/16	
	1 IHAXF 16-18/16	
	1 IHAXF 18-22/16	

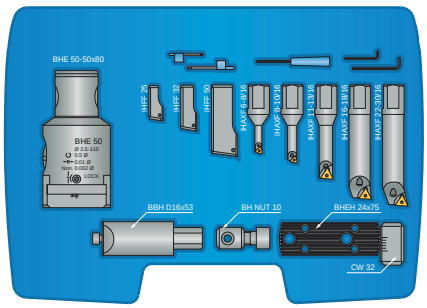
Designation	MB	Boring Range
KIT BHE MB50-50 6-22 H	50	6-22

10 µm direct diametric adjustment and 2 µm by a Vernier scale



Boring KIT BHE MB50-50 6-110 (ø6-110 mm)

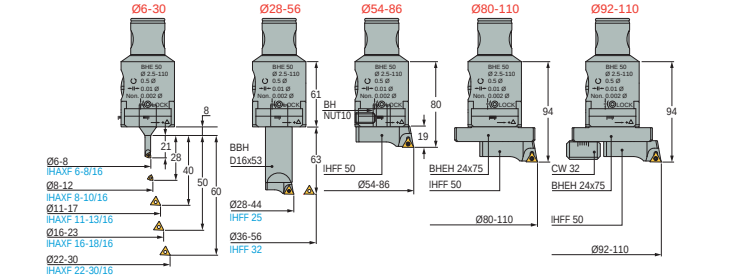
Fine Boring Head 10 µm Direct Diametric Adjustment and a 2 µm by a Vernier Scale



10 µm 2 µm	Boring Tools
	1 BHE MB50-50x80
	1 IHFF 25
	1 IHFF 32
	1 IHFF 50
	1 IHAXF 6-8/16
	1 IHAXF 8-10/16
	1 IHAXF 11-13/16
	1 IHAXF 16-18/16
	1 IHAXF 22-30/16
	1 BBH D16x53
	1 BHEH 24x75
	1 BH NUT 10
	1 CW 32

Designation	MB	Boring Range
KIT BHE MB50-50 6-110	50	6-110

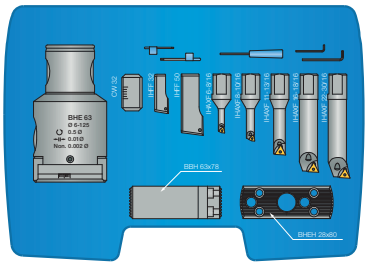
10 µm direct diametric adjustment and 2 µm by a Vernier scale



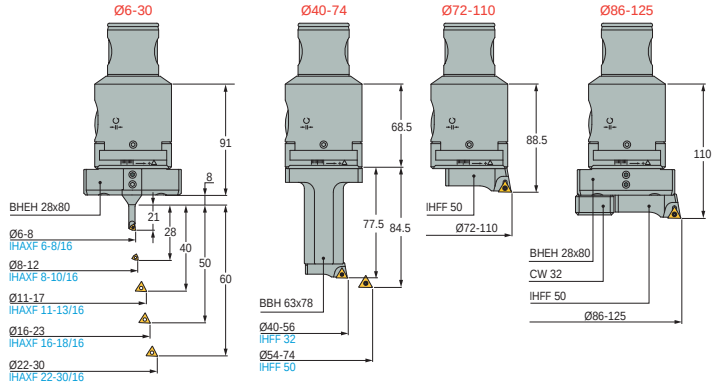
ITSBORE

Boring KIT BHD MB63-63 6-125 (ø6-125 mm)

Fine Boring Head 10 µm Direct Diametric Adjustment and a 2 µm by a Vernier Scale

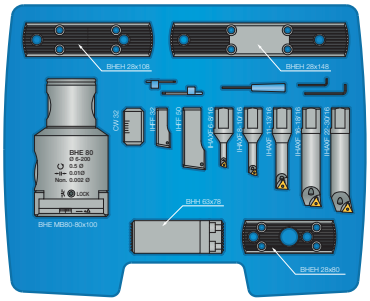
	10 µm 2 µm	Boring Tools
		1 BHD MB63-63x89
		1 IHFF 32
		1 IHFF 50
		1 IHFF 6-8/16
		1 IHAXF 8-10/16
		1 IHAXF 11-13/16
		1 IHAXF 16-18/16
		1 IHAXF 22-30/16
		1 BBH 63x78
		1 BHEH 28x80
		1 BH WASHER IH..50
		1 CW 32

Designation	MB	Boring Range
KIT BHD MB63-63 6-125	63	6-125



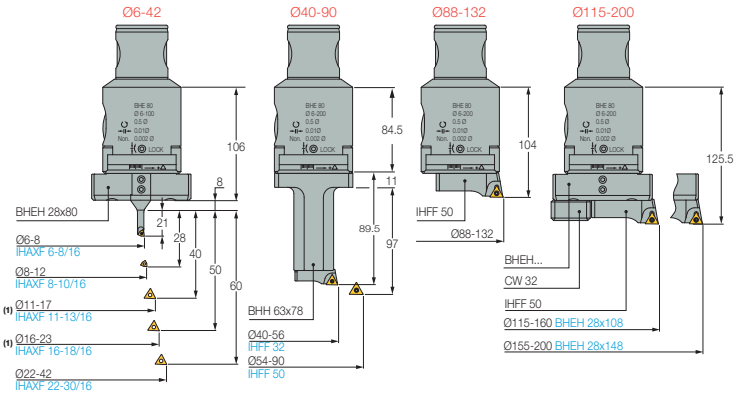
Boring KIT BHE MB80-80 6-200 (ø6-200 mm)

Fine Boring Head 10 µm Direct Diametric Adjustment and a 2 µm by a Vernier Scale

	10 µm 2 µm	Boring Tools
		1 BHE MB80-80x104
		1 IHFF 32
		1 IHFF 50
		1 IHFF 6-8/16
		1 IHAXF 8-10/16
		1 IHAXF 11-13/16
		1 IHAXF 16-18/16
		1 IHAXF 22-30/16
		1 BBH 63x78
		1 BHEH 28x80
		1 BHEH 28x108
		1 BHEH 28x148
		1 BH WASHER IH..50
		1 CW 32

Designation	MB	Boring Range
KIT BHE MB80-80 6-200	80	6-200

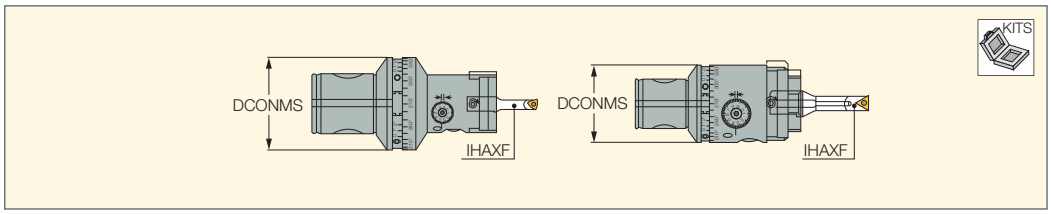
(1) The specified boring range differs from the one specified for the boring bar.
The extra range is not recommended for high rotational speeds.



ITSBORE

KIT BHF MB-BL

Contains a Balanceable Fine Boring Head and Various Boring Tools and Inserts



Designation	DCONMS	DCN(2)	DCX(3)	RPMX(4)
KIT BHF MB50-50 6-22 BL (1)	50.00	6.00	22.00	20000

(1) Balanced to G2.5/20,000 RPM.
(2) Cutting diameter minimum
(3) Cutting diameter maximum
(4) Maximum RPM

Boring KIT BHF MB50-50 6-22 BL (ø6-22 mm)

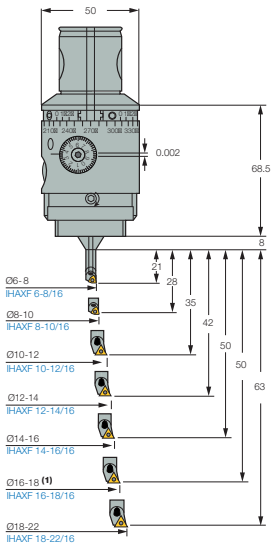
BHF BL Fine Boring Balanceable Head

2 µm

Tools	Inserts
1 BHF MB50-50X68 BL	5 TPGX 090202L
1 IHAXF 6-8/16	2 WCGT 020102L
1 IHAXF 8-10/16	
1 IHAXF 10-12/16	
1 IHAXF 12-14/16	
1 IHAXF 14-16/16	
1 IHAXF 16-18/16	
1 IHAXF 18-22/16	

Designation	MB	Boring Range
KIT BHF MB50-50 6-22 BL	50	6-22

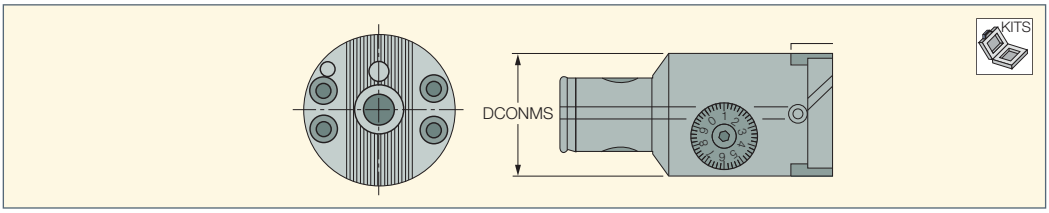
(1) On BHF BL max. balanceable dia. is 20 mm.



ITSBORE

KIT BHF-MB

Contains a Fine Boring Head and Various Boring Tools and Inserts

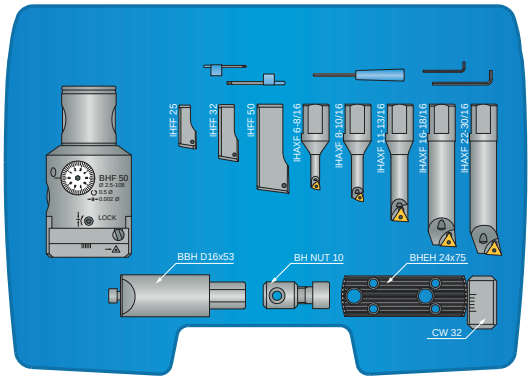


Designation	DCN(1)	DCX(2)	DCONMS	RPMX(3)
KIT BHF MB50-50 6-108	6.00	108.00	50.00	8000
KIT BHF MB50-63 6-125	6.00	125.00	50.00	8000
KIT BHF MB50-80 6-220	6.00	220.00	50.00	8000
KIT BHF MB63-63 6-125	6.00	125.00	63.00	6000
KIT BHF MB80-80 6-220	6.00	220.00	80.00	5000

(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Maximum RPM

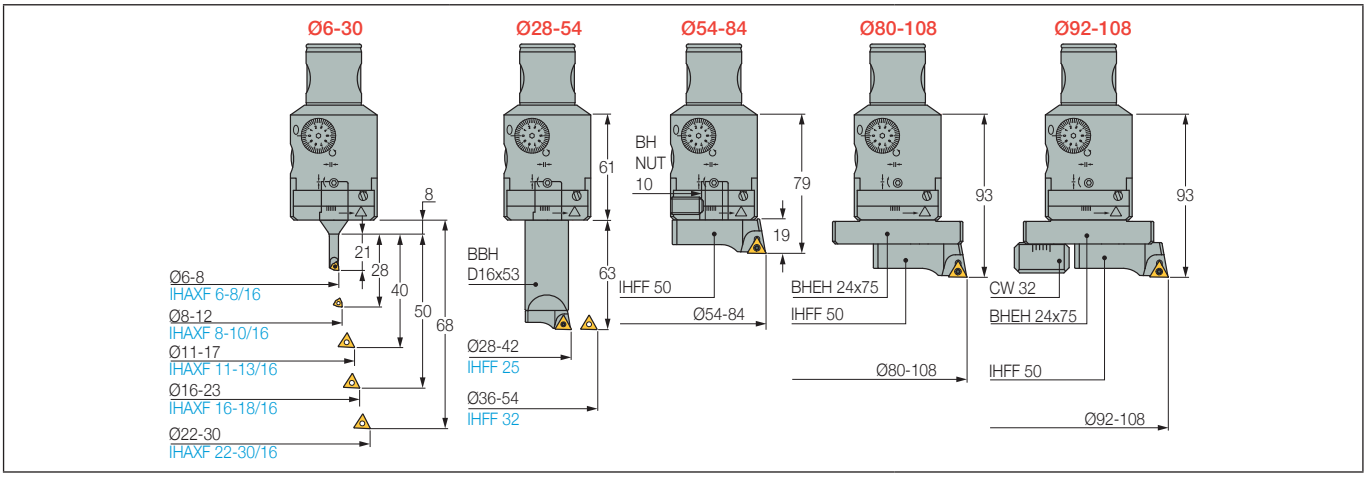
Boring KIT BHF MB50-50 6-108 (ø6-108 mm)

2 µm



Tools	Inserts
1 BHF MB50-50x60	2 WCGT 020102L
1 IHFF 25	5 TPGX 730-L
1 IHFF 32	1 TPGX 220-L
1 IHFF 50	
1 IHAXF 6-8/16	
1 IHAXF 8-10/16	
1 IHAXF 11-13/16	
1 IHAXF 16-18/16	
1 IHAXF 22-30/16	
1 BBH D16x53	
1 BHEH 24x75	
1 BH NUT 10	
1 CW 32	

Designation	MB	Boring Range
KIT BHF MB50-50 6-108	50	6-108

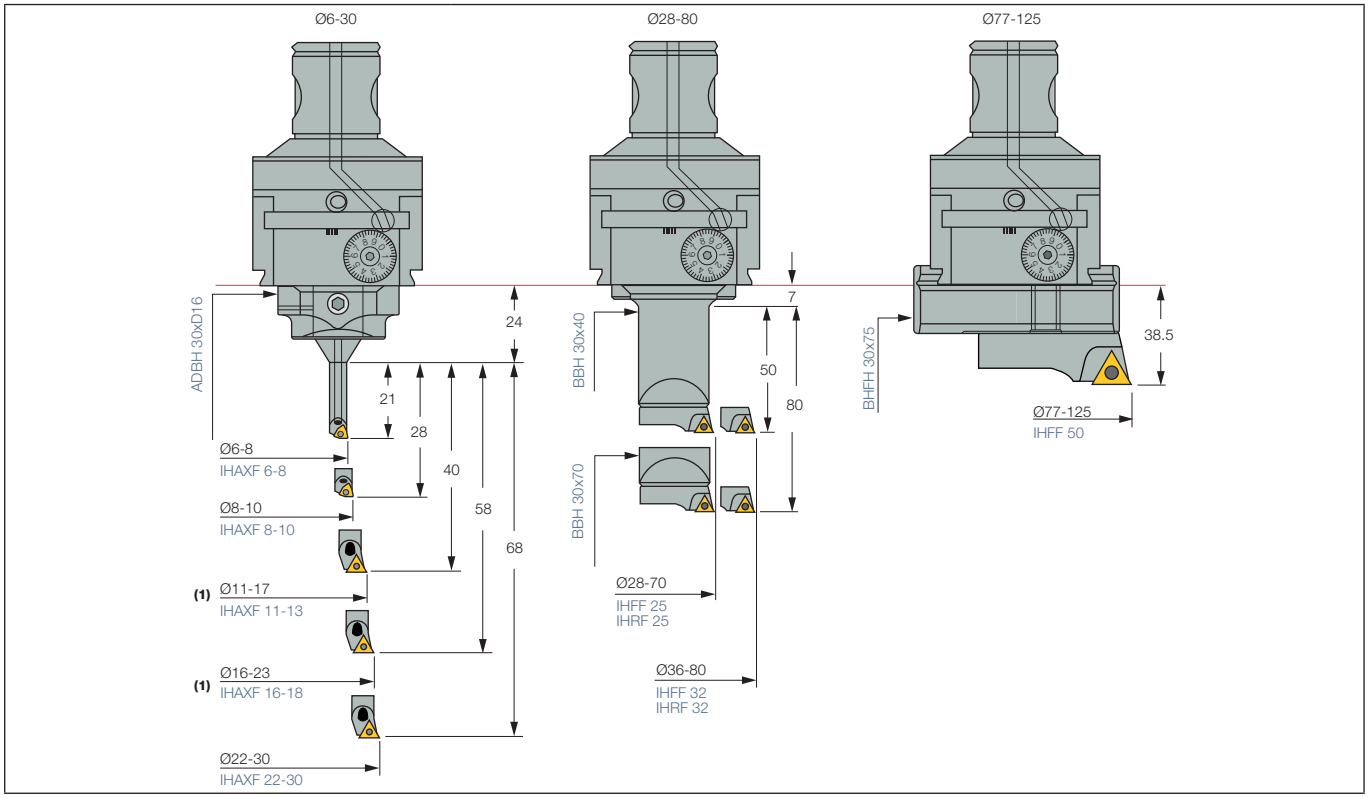


Boring KIT BHF MB50-63 6-125 / Boring KIT BHF MB63-63 6-125 (ø6-125 mm)

2 µm	Tools	Inserts
	1 BHF MB...-63x87	5 TPGX 090202L
	1 IHAXF 6-8/16	1 TPGX 110302L
	1 IHAXF 8-10/16	2 WCGT 020102L
	1 IHAXF 11-13/16	
	1 IHAXF 16-18/16	
	1 IHAXF 22-30/16	
	1 ADBH 30xD16	
	1 BBH 30x40	
	1 BBH 30x70	
	1 BHFH 30x75	
	1 IHFF 25	
	1 IHFF 32	
	1 IHFF 50	

Designation	MB	Boring Range
KIT BHF MB50-63 6-125	50	6-125
KIT BHF MB63-63 6-125	63	6-125

(1) The specified boring range differs from the one specified for the boring bar. The extra range is not recommended for high rotational speeds.



ITSBORE

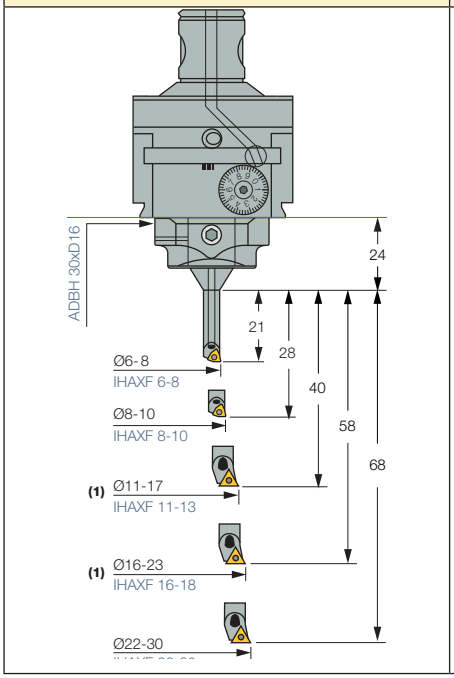
Boring KIT BHF MB50-80 6-220 / KIT BHF MB80-80 6-220 (ø6-220 mm)

2 µm	Tools	Inserts
	1 BHF MB..-80x94	5 TPGX 090202L
	1 IHAXF 6-8/16	1 TPGX 110302L
	1 IHAXF 8-10/16	2 WCGT 020102L
	1 IHAXF 11-13/16	
	1 IHAXF 16-18/16	
	1 IHAXF 22-30/16	
	1 ADBH 30xD16	
	1 BBH 30x40	
	1 BBH 30x70	
	1 BBH 30x115	
	1 BHFH 30x93	
	1 BHFH 30x135	
	1 IHFF 25	
	1 IHFF 32	
	1 IHFF 50	

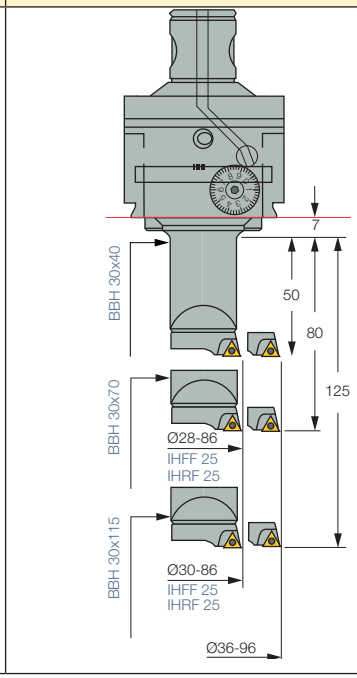
Designation	MB	Boring Range
KIT BHF MB50-80 6-220	50	6-220
KIT BHF MB80-80 6-220	80	6-220

(1) The specified boring range differs from the one specified for the boring bar. The extra range is not recommended for high rotational speeds.

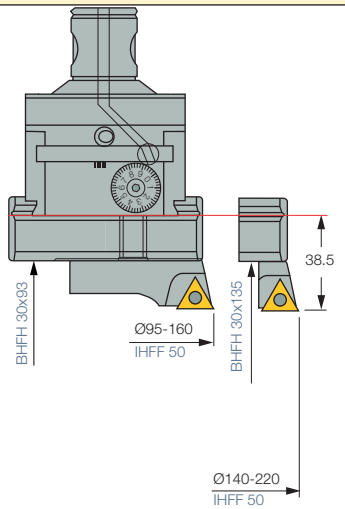
ø6-30



ø28-96



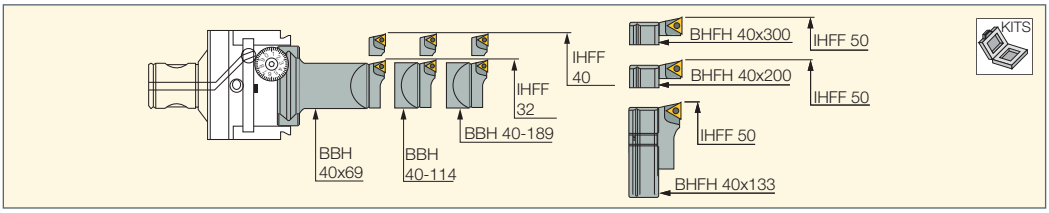
ø95-220



ITSBORE

KIT BHFH-MB

Contains Adapters, Extensions and Boring Bars for 36 to 410 mm Boring Range

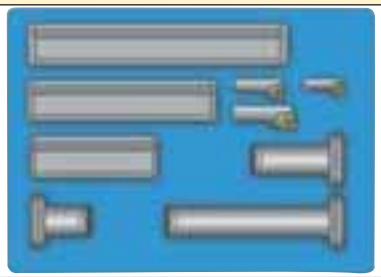


Designation	DCONMS	DCN(1)	DCX(2)
KIT BHFH MB80-125	80.00	36.00	410.00

(1) Cutting diameter minimum
(2) Cutting diameter maximum

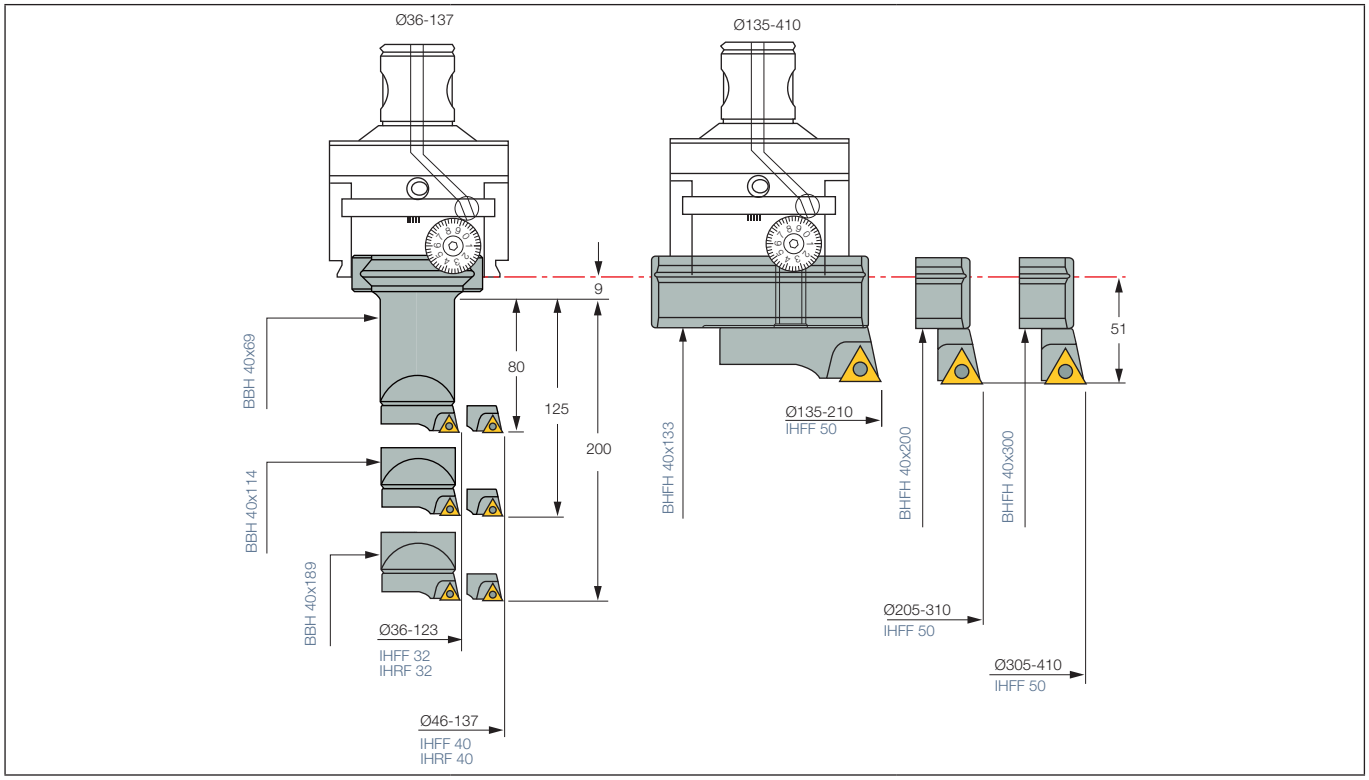
KIT BHFH MB80-125 36-410

Holder for BHF MB80-125x114 ø36-410



ACCESSORIES
1 BBH 40x69
1 BBH 40x114
1 BBH 40x189
1 BHFH 40x133
1 BHFH 40x200
1 BHFH 40x300
1 IHFF 32
1 IHFF 40
1 IHFF 50

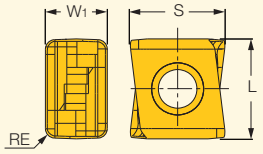
Designation	MB	Boring Range
KIT BHFH MB80-125 36-410	80	36-410

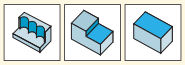


TANGPLUNGE
PLUNGING LINE

HTP LN.. 1006

Tangentially Clamped Inserts with 4 Cutting Edges for Plungers





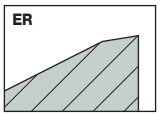
Designation	Dimensions W1	L	S	RE	Tough ↔ Hard IC330	IC830	IC808	IC810	IC07	Recommended Machining Data f_z (mm/t)
HTP LNAR 1006 FR (1)	6.50	10.50	10.13	1.00			●			0.05-0.15
HTP LNAR 1006 FR-P	6.50	10.50	10.13	1.00					●	0.05-0.15
HTP LNHT 1006 ER	6.50	10.50	9.93	1.00	●	●	●	●		0.10-0.15
HTP LNHT 1006 ETR	6.50	10.50	9.93	1.00	●	●	●			0.12-0.20
HTP LNMT 1006 ER (2)	6.50	10.50	9.96	1.00	●	●	●			0.08-0.15

- FR-P - For machining aluminum, ER- For general applications, ETR- First priority for hardened steel

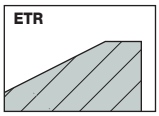
(1) FR - Sharp cutting edge for unstable conditions and for ISO S material

(2) Mounting this insert increases tool diameter by 0.1 mm

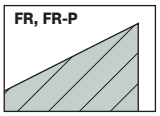
For tools, see page: CR LNHT (410)



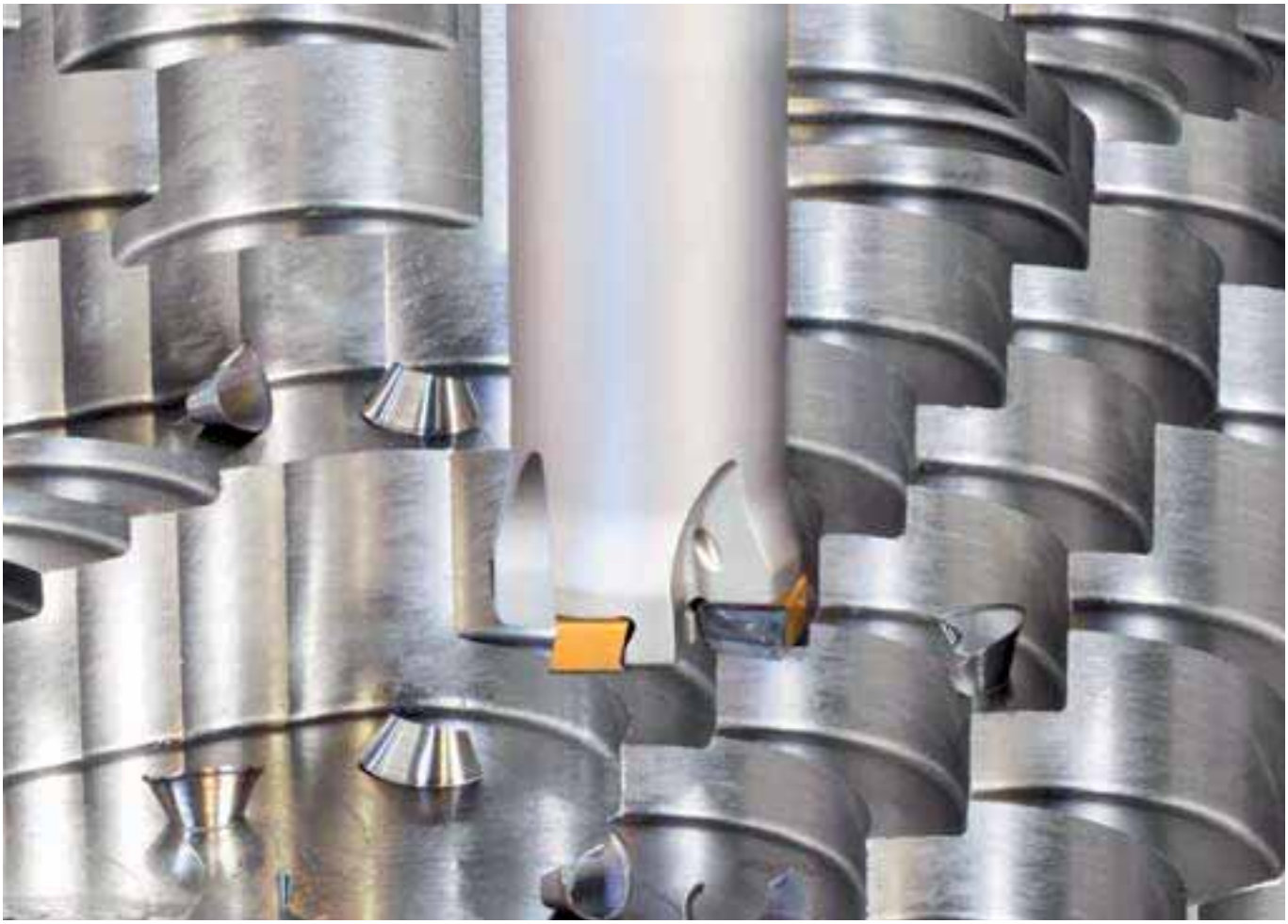
ER- For general applications



ETR- First priority for hardened steel



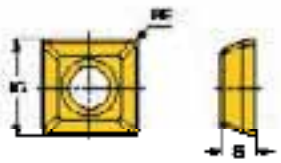
FR-P- For machining aluminum



DR-TWIST INDEXABLE DRILL LINE

SOMT-DT

Inserts for DR Drills for General Applications at Medium-to-High Feeds



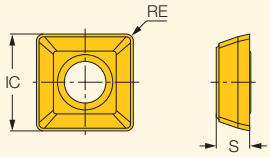
Designation	Dimensions IC	S	RE	Tough ↔ Hard IC328	IC5500	IC808	IC908	IC8080	IC9080
SOMT 09T306-DT	9.00	3.81	0.60		●	●	●	●	●

For tools, see pages: CR SOMT (411) • DR-2D-N (106) • DR-3D-N (108) • DR-4D-N (109) • DR-4D-T (112) • DR-CA (113)

DR-TWIST INDEXABLE DRILL LINE

SOMT-GF

Inserts for DR Drills for Soft Materials at Low-to-Medium Feeds



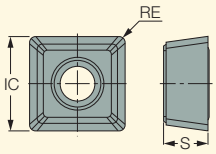
Designation	Dimensions IC	S	RE	Tough ↔ Hard IC328	IC908
SOMT 09T306-GF	9.00	3.81	0.60	●	●

For tools, see pages: CR SOMT (411) • DR-2D-N (106) • DR-3D-N (108) • DR-4D-N (109) • DR-4D-T (112) • DR-CA (113)

DR-TWIST INDEXABLE DRILL LINE

SOGX/T-AL

Inserts for DR Drills for Aluminum



Designation	Dimensions IC	S	RE	IC08
SOGT 09T306-AL	9.00	3.81	0.60	●

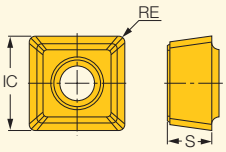
• Sharp cutting edge with polished rake for aluminum

For tools, see pages: CR SOMT (411) • DR-2D-N (106) • DR-3D-N (108) • DR-4D-N (109) • DR-4D-T (112) • DR-5D-N (111)

DR-TWIST INDEXABLE DRILL LINE

SOMT-HD

Inserts for DR Drills for Carbon Steel and Soft Materials



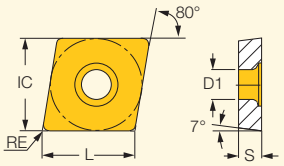
Designation	Dimensions IC	S	RE	IC808
SOMT 09T306-HD	9.00	3.81	0.60	●

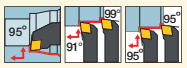
For tools, see pages: CR SOMT (411) • DR-2D-N (106) • DR-3D-N (108) • DR-4D-N (109) • DR-4D-T (112) • DR-CA (113)

ISOTURN

CCMT/CCGT-SM

Single-Sided Turning Inserts for Semi-Finish and Finishing on Soft Materials and Exotic Alloys





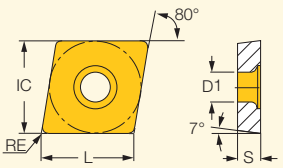
Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC6025	IC8250	IC6015	IC8150	IC20	IC5010	IC428	IC5005	IC806	IC807	IC907	Recommended Machining Data a_p (mm)	f (mm/rev)
CCGT 060201-SM	6.45	6.35	2.38	0.10	2.80											●	0.25-2.00	0.05-0.20
CCGT 060202-SM	6.45	6.35	2.38	0.20	2.80											●	0.25-2.00	0.05-0.25
CCMT 060202-SM	6.45	6.35	2.38	0.20	2.80		●		●					●			0.25-2.00	0.05-0.25
CCMT 060204-SM	6.45	6.35	2.38	0.40	2.80	●	●	●	●					●	●	●	0.50-2.50	0.07-0.25
CCMT 060208-SM	6.45	6.35	2.38	0.80	2.80	●		●							●	●	0.50-2.50	0.07-0.25
CCMT 09T302-SM	9.70	9.52	3.97	0.20	4.40	●	●	●						●	●	●	0.50-2.50	0.06-0.25
CCMT 09T304-SM	9.70	9.52	3.97	0.40	4.40	●	●		●	●	●	●	●	●	●	●	0.50-2.50	0.06-0.25
CCMT 09T308-SM	9.70	9.52	3.97	0.80	4.40	●	●	●	●		●		●	●	●	●	0.50-3.00	0.07-0.25
CCMT 120404-SM	12.90	12.70	4.76	0.40	5.50		●		●					●	●	●	0.70-3.50	0.07-0.25
CCMT 120408-SM	12.90	12.70	4.76	0.80	5.50	●	●	●	●						●	●	0.70-3.50	0.07-0.30

For tools, see pages: IHCR (408) • IHRF (436) • IHRF-BW (439) • IHRF-C (413) • IHRF-CH (439) • IHSR (408) • IHSR-BW (410) • IHSR-C (413) • IHSR-CH (409)

ISOTURN

CCMT-PF

80° Rhombic Inserts with a Positive Flank for Semi-Finish and Finishing on Soft Materials and Exotic Alloys



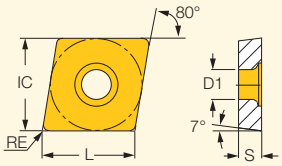
Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC830	IC6025	IC6015	IC806	IC807	IC907	IC804	Recommended Machining Data a_p (mm)	f (mm/rev)
CCMT 060202-PF	6.30	6.35	2.38	0.20	2.80	●	●	●		●	●	●	0.20-2.50	0.04-0.25
CCMT 060204-PF	6.30	6.35	2.38	0.40	2.80	●	●	●	●	●	●		0.40-2.50	0.04-0.30
CCMT 09T302-PF	9.70	9.52	3.97	0.20	4.40	●			●	●	●	●	0.50-3.00	0.05-0.30
CCMT 09T304-PF	9.70	9.52	3.97	0.40	4.40	●	●	●	●	●	●	●	0.50-3.50	0.05-0.35

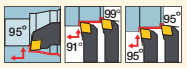
For tools, see pages: IHCR (408) • IHRF (436) • IHRF-BW (439) • IHRF-C (413) • IHRF-CH (439) • IHSR (408) • IHSR-BW (410) • IHSR-C (413) • IHSR-CH (409)

ISOTURN

CCMT-14

80° Rhombic Inserts with a 7° Positive Flank for Semi-Finishing and Finish Turning





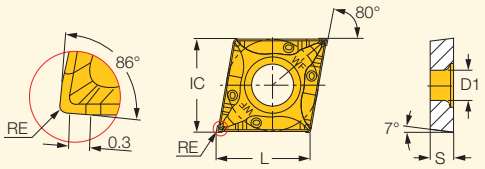
Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC830	IC8250	IC20	IC428	IC5005	IC807	IC907	Recommended Machining Data a_p (mm)	f (mm/rev)
CCMT 060204-14	6.30	6.35	2.38	0.40	2.80	●		●	●	●	●	●	0.50-2.50	0.14-0.25
CCMT 09T304-14	9.70	9.52	3.97	0.40	4.40		●				●	●	0.50-3.00	0.14-0.25
CCMT 09T308-14	9.70	9.52	3.97	0.80	4.40	●	●	●	●	●			0.80-3.00	0.14-0.30
CCMT 120408-14	12.90	12.70	4.76	0.80	5.50	●		●					0.80-3.00	0.14-0.30

For tools, see pages: IHCR (408) • IHRF (436) • IHRF-BW (439) • IHRF-C (413) • IHRF-CH (439) • IHSR (408) • IHSR-BW (410) • IHSR-C (413) • IHSR-CH (409)

ISOTURN

CCET-WF

80° Rhombic Inserts with a 7° Positive Flank and a Wiper Near the Corner for High Feed Finishing



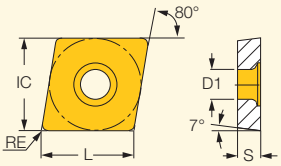
Designation	Dimensions L	IC	S	RE	D1	IC907	Recommended Machining Data a_p (mm)	f (mm/rev)
CCET 0602005-WF	6.30	6.35	2.38	0.05	2.80	●	0.05-2.00	0.01-0.20
CCET 09T3005-WF	9.50	9.52	3.97	0.05	4.40	●	0.05-2.00	0.01-0.20

For tools, see pages: IHCR (408) • IHRF (436) • IHSR (408) • IHSR-BW (410) • IHSR-C (413) • IHSR-CH (409)

ISOTURN

CCMT/CCGT

80° Rhombic Inserts with a 7° Positive Flank for Semi-Finishing and Finish Turning



Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC8250	IC30N	IC20	IC20N	IC520N	Recommended Machining Data a_p (mm)	f (mm/rev)
CCGT 060202	6.45	6.35	2.38	0.20	2.80		●				0.50-2.00	0.10-0.20
CCGT 060202L [1]	6.45	6.35	2.38	0.20	2.80		●	●			0.50-2.00	0.10-0.20
CCGT 060204	6.45	6.35	2.38	0.40	2.80		●				0.50-2.00	0.10-0.20
CCGT 060204L [1]	6.45	6.35	2.38	0.40	2.80		●				0.50-2.00	0.10-0.20
CCMT 060202	6.45	6.35	2.38	0.20	2.80	●			●		0.50-2.00	0.10-0.20
CCMT 060204	6.45	6.35	2.38	0.40	2.80		●		●	●	0.50-2.00	0.12-0.22
CCMT 09T302	9.70	9.52	3.97	0.20	4.40				●	●	0.50-2.50	0.12-0.25
CCMT 09T304	9.70	9.52	3.97	0.40	4.40				●	●	0.50-2.50	0.12-0.25
CCMT 09T308	9.70	9.52	3.97	0.80	4.40				●	●	0.80-3.00	0.14-0.25

• Use left-hand inserts for left-hand external tools and for right-hand internal tools

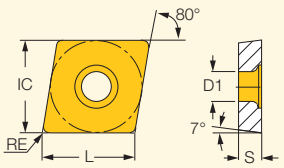
[1] Left-hand insert

For tools, see pages: IHCR (408) • IHRF (436) • IHRF-BW (439) • IHRF-C (413) • IHRF-CH (439) • IHSR (408) • IHSR-BW (410) • IHSR-C (413) • IHSR-CH (409)

ISOTURN

CCMT-WG

80° Rhombic Inserts with a 7° Positive Flank and a Wiper Near the Corner for High Feed Finishing



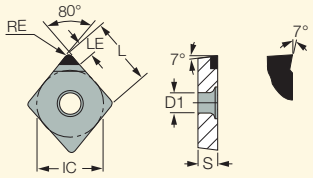
Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC8250	IC807	IC907	Recommended Machining Data a_p (mm)	f (mm/rev)
CCMT 060204-WG	6.30	6.35	2.38	0.40	2.80		●	●	0.40-2.00	0.10-0.35
CCMT 09T304-WG	9.70	9.52	3.97	0.40	4.40	●			0.40-2.00	0.14-0.30
CCMT 09T308-WG	9.70	9.52	3.97	0.80	4.40	●			0.50-2.50	0.20-0.38
CCMT 120408-WG	12.90	12.70	4.76	0.80	5.50	●			0.50-3.00	0.20-0.36

For tools, see pages: • IHCR (408) • IHRF (436) • IHRF-BW (439) • IHRF-C (413) • IHRF-CH (439) • IHSR (408) • IHSR-BW (410) • IHSR-C (413) • IHSR-CH (409)

ISOTURN

CCMT (PCD)

Inserts with a Single PCD Top Corner Tip, 7° Clearance and Positive Rake Angle for Finishing Aluminum



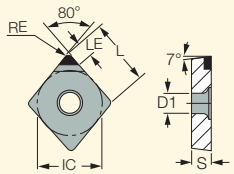
Designation	Dimensions L	IC	S	RE	LE	D1	ID5	Recommended Machining Data a_p (mm)	f (mm/rev)
CCMT 060202D	6.30	6.35	2.38	0.20	3.1	2.80	●	0.08-3.00	0.05-0.30
CCMT 060204D	6.30	6.35	2.38	0.40	3.0	2.80	●	0.10-3.00	0.05-0.30
CCMT 09T304D	9.70	9.52	3.97	0.40	3.9	4.40	●	0.10-3.00	0.05-0.30

For tools, see pages: IHCR (408) • IHRF (436) • IHRF-BW (439) • IHRF-C (413) • IHRF-CH (439) • IHSR (408) • IHSR-BW (410) • IHSR-C (413)

ISOTURN

CCGW/CCMT (CBN)

80° Rhombic Inserts with a Single CBN Top Corner Tip and 7° Clearance for Machining Hardened Steel



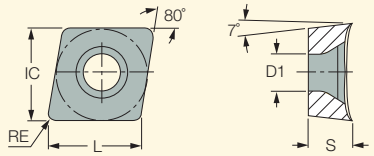
Designation	Dimensions L	IC	S	RE	LE	D1	Tough ↔ Hard IB05H	IB55	IB10H	Recommended Machining Data a_p (mm)	f (mm/rev)
CCGW 03X102T01015-1	3.63	3.57	1.39	0.20	2.0	1.90	●		●	0.05-0.50	0.05-0.20
CCGW 03X104T01015-1	3.63	3.57	1.39	0.40	2.3	1.90	●		●	0.05-0.50	0.05-0.20
CCGW 04T102T01015-1	4.44	4.37	1.79	0.20	2.0	2.30	●		●	0.05-0.50	0.05-0.20
CCGW 04T104T01015-1	4.44	4.37	1.79	0.40	2.3	2.30	●		●	0.05-0.50	0.05-0.20
CCMT 060202T	6.30	6.35	2.38	0.20	2.6	2.80		●		0.05-0.50	0.05-0.20
CCMT 060204T	6.30	6.35	2.38	0.40	2.7	2.80		●		0.05-0.50	0.05-0.20
CCMT 09T304T	9.70	9.52	3.97	0.40	2.9	4.40		●		0.05-0.50	0.05-0.20
CCMT 09T308T	9.70	9.52	3.97	0.80	3.6	4.40		●		0.05-0.50	0.05-0.20

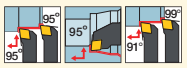
For tools, see pages: IHCR (408) • IHRF (436) • IHRF-BW (439) • IHRF-C (413) • IHRF-CH (439) • IHSR (408) • IHSR-BW (410) • IHSR-C (413)

ISOTURN

CCGT-AS

80° Rhombic Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum





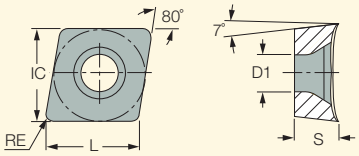
Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CCGT 060201-AS	6.40	6.35	2.38	0.10	2.80	●	0.50-2.00	0.10-0.20
CCGT 060202-AS	6.40	6.35	2.38	0.20	2.80	●	0.50-2.00	0.10-0.20
CCGT 060204-AS	6.40	6.35	2.38	0.40	2.80	●	0.50-2.00	0.10-0.25
CCGT 09T301-AS	9.70	9.52	3.97	0.10	4.40	●	0.50-2.50	0.10-0.25
CCGT 09T302-AS	9.70	9.52	3.97	0.20	4.40	●	0.50-2.50	0.10-0.25
CCGT 09T304-AS	9.70	9.52	3.97	0.40	4.40	●	0.50-2.50	0.10-0.25
CCGT 09T308-AS	9.70	9.52	3.97	0.80	4.40	●	0.80-3.00	0.10-0.30
CCGT 120402-AS	12.90	12.70	4.76	0.20	5.50	●	0.50-2.50	0.10-0.25
CCGT 120404-AS	12.90	12.70	4.76	0.40	5.50	●	0.50-2.50	0.10-0.25
CCGT 120408-AS	12.90	12.70	4.76	0.80	5.50	●	1.00-3.50	0.10-0.30

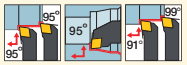
For tools, see pages: IHCR (408) • IHRF (436) • IHRF-BW (439) • IHRF-C (413) • IHRF-CH (439) • IHSR (408) • IHSR-BW (410) • IHSR-C (413) • IHSR-CH (409)

ISOTURN

CCGT-AF

80° Rhombic Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum





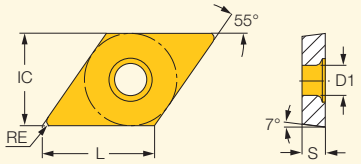
Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CCGT 09T308-AF	9.70	9.52	3.97	0.80	4.40	●	0.80-3.00	0.15-0.25
CCGT 120408-AF	12.90	12.70	4.76	0.80	5.50	●	1.00-3.50	0.15-0.30

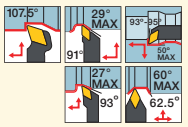
For tools, see pages: IHCR (408) • IHRF (436) • IHSR (408) • IHSR-BW (410) • IHSR-C (413) • IHSR-CH (409)

ISOTURN

DCMT-14

55° Rhombic Inserts with a Positive Flank for Semi-Finishing and Finish Turning on Soft Materials and Exotic Alloys



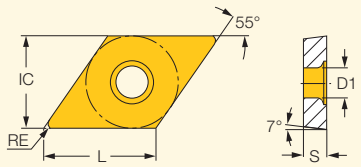


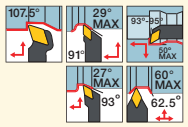
Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC830	IC8150	IC20	IC428	IC5005	Recommended Machining Data a_p (mm)	f (mm/rev)
DCMT 11T304-14	11.60	9.52	3.97	0.40	4.40	●	●	●			1.00-2.50	0.14-0.25
DCMT 11T308-14	11.60	9.52	3.97	0.80	4.40		●	●	●	●	1.50-3.00	0.14-0.29

ISOTURN

DCMT/DCGT

55° Rhombic Inserts with a 7° Positive Clearance for Finishing Applications





Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC830	IC8250	IC908	IC30N	IC530N	IC8150	IC20N	IC520N	Recommended Machining Data a_p (mm)	f (mm/rev)
DCGT 070201R [1]	7.70	6.35	2.38	0.10	2.80			●						0.25-1.50	0.05-0.15
DCGT 070202	7.70	6.35	2.38	0.20	2.80				●					0.50-2.00	0.08-0.20
DCGT 070204	7.70	6.35	2.38	0.40	2.80				●					0.80-2.50	0.10-0.25
DCMT 070202	7.70	6.35	2.38	0.20	2.80	●	●				●	●	●	0.50-2.00	0.08-0.20
DCMT 070204	7.70	6.35	2.38	0.40	2.80	●	●		●		●	●	●	0.50-2.00	0.08-0.22
DCGT 11T302	11.60	9.52	3.97	0.20	4.40				●					0.50-2.00	0.08-0.20
DCGT 11T304	11.60	9.52	3.97	0.40	4.40				●			●		1.00-2.50	0.12-0.25
DCMT 11T302	11.60	9.52	3.97	0.20	4.40				●	●		●	●	0.50-2.00	0.08-0.20
DCMT 11T304	11.60	9.52	3.97	0.40	4.40				●			●	●	0.50-2.00	0.12-0.25
DCMT 11T308	11.60	9.52	3.97	0.80	4.40	●						●	●	1.50-3.00	0.14-0.29

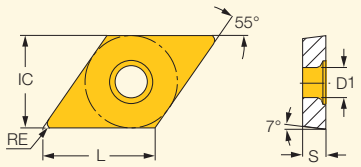
• Right-hand inserts for right-hand external tools and for left-hand internal tools • For user guide and cutting speed recommendations, see pages ..

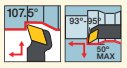
[1] Right-hand insert

ISOTURN

DCMT/DCGT-PF

55° Rhombic Inserts with a Positive Flank for Semi-Finish and Finishing on Soft Materials and Exotic Alloys



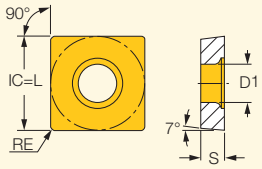


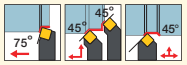
Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC830	IC6025	IC8250	IC908	IC6015	IC806	IC807	IC907	IC804	Recommended Machining Data a_p (mm)	f (mm/rev)
DCGT 070201-PF	7.70	6.35	2.38	0.10	2.80				●						0.30-3.00	0.02-0.25
DCGT 070202-PF	7.70	6.35	2.38	0.20	2.80				●						0.40-3.00	0.03-0.25
DCGT 070204-PF	7.70	6.35	2.38	0.40	2.80				●						0.50-3.00	0.05-0.25
DCMT 070201-PF	7.70	6.35	2.38	0.10	2.80							●	●		0.30-3.00	0.02-0.25
DCMT 070202-PF	7.70	6.35	2.38	0.20	2.80	●									0.40-3.00	0.03-0.25
DCMT 070204-PF	7.70	6.35	2.38	0.40	2.80	●									0.50-3.00	0.05-0.25
DCMT 070208-PF	7.70	6.35	2.38	0.80	2.80							●	●		0.70-3.00	0.08-0.25
DCGT 11T301-PF	11.60	9.52	3.97	0.10	4.40				●						0.30-3.00	0.03-0.25
DCGT 11T302-PF	11.60	9.52	3.97	0.20	4.40				●						0.40-3.00	0.04-0.25
DCGT 11T304-PF	11.60	9.52	3.97	0.40	4.40				●						0.50-3.00	0.05-0.25
DCGT 11T308-PF	11.60	9.52	3.97	0.80	4.40				●						0.70-3.00	0.10-0.25
DCMT 11T302-PF	11.60	9.52	3.97	0.20	4.40	●					●	●	●	●	0.30-3.00	0.04-0.25
DCMT 11T304-PF	11.60	9.52	3.97	0.40	4.40	●	●	●		●	●	●	●	●	0.50-3.00	0.05-0.25
DCMT 11T308-PF	11.60	9.52	3.97	0.80	4.40	●	●	●		●	●	●	●	●	0.70-3.00	0.10-0.25

ISOTURN

SCMT-SM

Square Inserts with a 7° Positive Flank for Semi-Finishing and Finish Turning on Soft Materials and Exotic Alloys





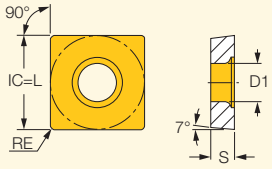
Designation	Dimensions L	S	RE	D1	Tough ↔ Hard IC830	IC6025	IC8250	IC8150	IC5005	IC807	IC907	Recommended Machining Data a_p (mm)	f (mm/rev)
SCMT 09T304-SM	9.52	3.97	0.40	4.40			●	●		●	●	0.50-3.00	0.07-0.25
SCMT 09T308-SM	9.52	3.97	0.80	4.40	●	●	●	●	●	●	●	0.50-3.00	0.10-0.30
SCMT 120404-SM	12.70	4.76	0.40	5.50				●				0.50-3.50	0.10-0.25
SCMT 120408-SM	12.70	4.76	0.80	5.50			●	●		●	●	1.00-4.00	0.10-0.30

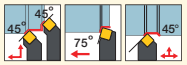
For tools, see page: IHPR (408)

ISOTURN

SCMT-14

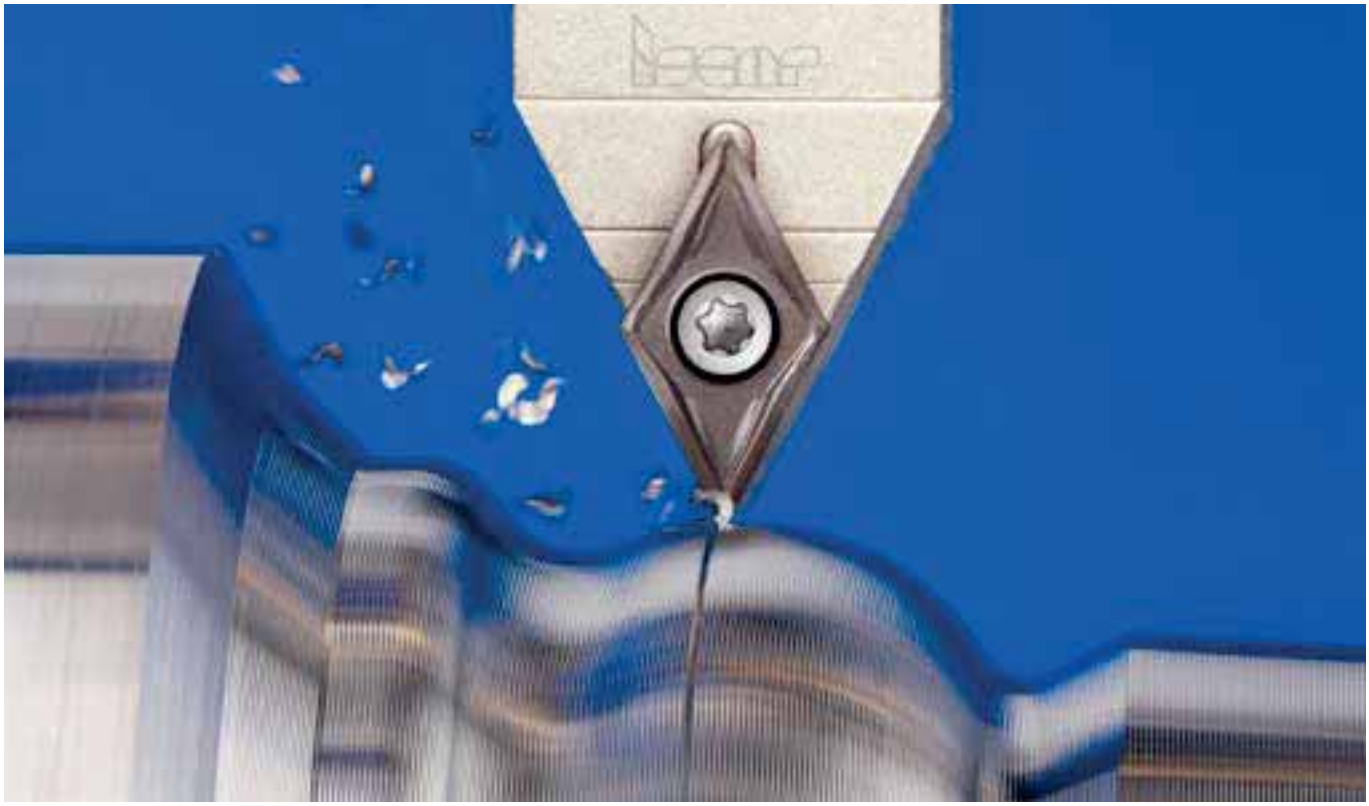
Square Inserts with a 7° Positive Flank for Semi-Finishing and Finish Turning on Soft Materials and Exotic Alloys





Designation	Dimensions L	S	RE	D1	Tough ↔ Hard IC8250	IC807	IC907	Recommended Machining Data a_p (mm)	f (mm/rev)
SCMT 09T304-14	9.52	3.97	0.40	4.40		●	●	1.00-3.50	0.12-0.30
SCMT 120404-14	12.70	4.76	0.40	5.50	●			1.00-4.00	0.12-0.30

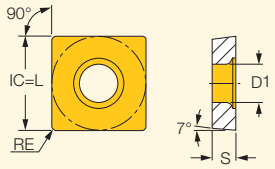
For tools, see page: IHPR (408)

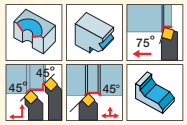


ISOTURN

SCMT-19

Square Inserts with a 7° Positive Flank for Semi-Roughing at Medium to High Feeds





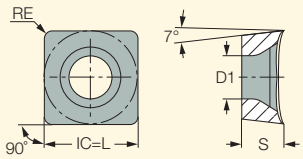
Designation	Dimensions L	S	RE	D1	Tough ↔ Hard IC830	IC20	IC5005	IC807	IC907	Recommended Machining Data a_p (mm)	f_z (mm/rev)
SCMT 120408-19	12.70	4.76	0.80	5.50	●	●	●	●	●	3.00-8.00	0.08-0.15
SCMT 120412-19	12.70	4.76	1.20	5.50		●				3.00-8.00	0.08-0.15

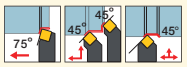
For tools, see page: IHPR (408)

ISOTURN

SCGT-AS

Square Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum





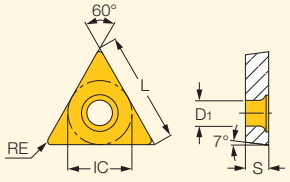
Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
SCGT 09T308-AS	9.52	9.52	3.97	0.80	4.40	●	0.50-3.00	0.10-0.30
SCGT 120404-AS	12.70	12.70	4.76	0.40	5.50	●	1.00-4.00	0.10-0.30
SCGT 120408-AS	12.70	12.70	4.76	0.80	5.50	●	1.00-4.00	0.10-0.30

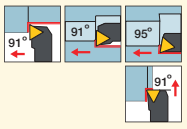
For tools, see page: IHPR (408)

ISOTURN

TCMT-19

Triangular Inserts with a 7° Positive Flat Rake for Semi-Roughing Applications at Medium to High Feeds





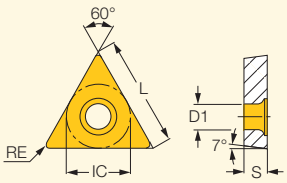
Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC830	IC50M	IC8150	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
TCMT 110204-19	11.00	6.35	2.38	0.40	2.80		●	●	●	0.50-3.00	0.10-0.30
TCMT 16T308-19	16.50	9.52	3.97	0.80	4.40	●	●		●	1.00-4.00	0.20-0.35
TCMT 220508-19	22.00	12.70	5.00	0.80	5.50		●			1.00-4.00	0.20-0.35

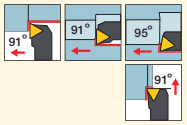
For tools, see page: IHBR (409)

ISOTURN

TCMT-SM

Triangular Inserts with a 7° Positive Flank for Semi-Finishing and Finish Turning on Soft Materials and Exotic Alloys





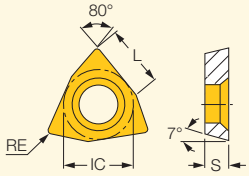
Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC830	IC8350	IC8250	IC908	IC8150	IC5010	IC428	IC5005	IC807	IC907	Recommended Machining Data a_p (mm)	f (mm/rev)
TCMT 110204-SM	11.00	6.35	2.38	0.40	2.80		●	●	●	●	●		●	●	●	0.20-3.00	0.05-0.25
TCMT 110208-SM	11.00	6.35	2.38	0.80	2.80			●						●	●	0.50-2.50	0.07-0.25
TCMT 16T304-SM	16.50	9.52	3.97	0.40	4.40	●		●		●		●	●	●	●	0.50-3.00	0.06-0.25
TCMT 16T308-SM	16.50	9.52	3.97	0.80	4.40	●		●		●			●	●	●	0.50-3.00	0.08-0.28
TCMT 16T308-SM*	16.50	9.52	3.97	0.80	4.40		●									0.50-3.00	0.08-0.28

For tools, see page: IHBR (409)

ISOTURN

WCGT

Trigon Inserts with a 7° Positive Flank and Chipformer for Finish Turning



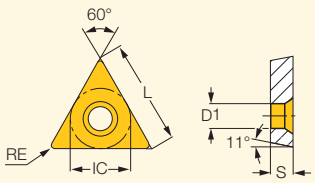
Designation	Dimensions L	IC	S	RE	Tough ↔ Hard IC908	IC30N	Recommended Machining Data a_p (mm)	f (mm/rev)
WCGT 020102L	2.18	3.97	1.59	0.20	●	●	0.40-2.00	0.05-0.10
WCGT 020104L	2.18	3.97	1.59	0.40	●	●	0.40-2.00	0.10-0.15

For tools, see pages: IHAXF (432) • IHAXF-AVI (434) • IHAXF-E (434) • IHWF (436)

ISOTURN

TPGX

Triangular Inserts with an 11° Positive Flank and Ground Chipformer for Finish Turning



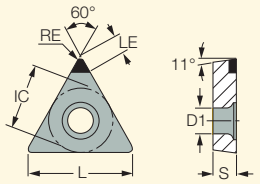
Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC908	IC20	IC20N	IC520N	Recommended Machining Data a_p (mm)	f (mm/rev)
TPGX 090202-L	9.52	5.56	2.38	0.20	3.00	●	●	●	●	1.00-2.00	0.10-0.20
TPGX 090204-L	9.52	5.56	2.38	0.40	3.00	●	●	●	●	1.00-2.50	0.15-0.20
TPGX 110302-L	11.00	6.35	3.18	0.20	3.50	●	●	●	●	1.00-2.50	0.10-0.20
TPGX 110304-L	11.00	6.35	3.18	0.40	3.50	●	●	●	●	1.00-3.00	0.15-0.20
TPGX 110308-L	11.00	6.35	3.18	0.80	3.50		●			1.00-3.50	0.15-0.25

For tools, see pages: IHAXF (432) • IHAXF-AVI (434) • IHAXF-E (434) • IHFF (436) • IHFF-C (413)

ISOTURN

TPGX (CBN)

Triangular Inserts with CBN Single Top Corner Brazed Tip, 11° Clearance for Machining Cast Iron and Hardened Steel



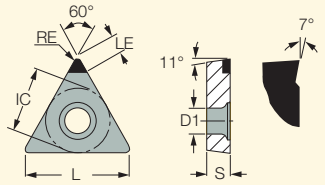
Designation	Dimensions L	IC	S	RE	LE	D1	Tough ↔ Hard IB90	IB50	Recommended Machining Data a_p (mm)	f (mm/rev)
TPGX 090202T	9.52	5.56	2.38	0.20	2.5	2.50	●	●	0.05-0.50	0.03-0.20
TPGX 090204T	9.52	5.56	2.38	0.40	2.6	2.50	●	●	0.05-0.50	0.03-0.20
TPGX 110302T	11.00	6.35	3.18	0.20	3.3	3.50	●	●	0.05-0.50	0.03-0.20
TPGX 110304T	11.00	6.35	3.18	0.40	3.0	3.50	●	●	0.05-0.50	0.03-0.20

For tools, see pages: IHAXF (432) • IHAXF-AVI (434) • IHAXF-E (434) • IHFF (436) • IHFF-C (413)

ISOTURN

TPGX (PCD)

Triangular Inserts with PCD Single Top Corner Brazed Tip, 11° Clearance and Positive Rake Angle for Finishing Aluminum



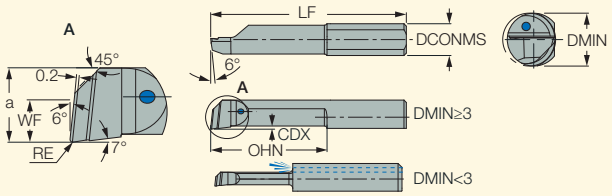
Designation	Dimensions L	IC	S	RE	LE	D1	ID5	Recommended Machining Data a_p (mm)	f (mm/rev)
TPGX 090202	9.52	5.56	2.38	0.20	3.0	2.50	●	0.10-3.00	0.05-0.30
TPGX 090204	9.52	5.56	2.38	0.40	3.0	2.50	●	0.10-3.00	0.05-0.30
TPGX 110302	11.00	6.35	3.18	0.20	3.4	3.50	●	0.10-3.00	0.05-0.30
TPGX 110304	11.00	6.35	3.18	0.40	3.8	3.50	●	0.10-3.00	0.05-0.30

For tools, see page: AIHAXF (432)

PICCOCUT

PICCO R/LX050

Reinforced Boring Inserts with Internal Coolant Holes



Designation	Dimensions DCONMS	WF	a	RE	LF	OHN(1)	CDX(2)	DMIN	IC908
PICCO R/LX050.2-5R15	4.00	-	1.80	0.15	19.00	5.0	0.10	2.00	●
PICCO R/LX050.2-10R05	4.00	-	1.80	0.05	24.00	10.0	0.10	2.00	●
PICCO R/LX050.2-10R15	4.00	-	1.80	0.15	24.00	10.0	0.10	2.00	●
PICCO R/LX050.3-16R10	4.00	0.70	2.70	0.10	30.00	16.0	0.15	3.00	●
PICCO R/LX050.3-16R20	4.00	0.70	2.70	0.20	30.00	16.0	0.15	3.00	●
PICCO R/LX050.4-10R10	4.00	1.60	3.60	0.10	24.00	10.0	0.20	4.00	●
PICCO R/LX050.4-10R20	4.00	1.60	3.60	0.20	24.00	10.0	0.20	4.00	●
PICCO R/LX050.4-16R10	4.00	1.60	3.60	0.10	30.00	16.0	0.20	4.00	●
PICCO R/LX050.4-16R20	4.00	1.60	3.60	0.20	30.00	16.0	0.20	4.00	●
PICCO R/LX050.5-15R10	5.00	2.10	4.60	0.10	30.00	15.0	0.30	5.00	●
PICCO R/LX050.5-15R20	5.00	2.10	4.60	0.20	30.00	15.0	0.30	5.00	●
PICCO R/LX050.5-25R10	5.00	2.10	4.60	0.10	40.00	25.0	0.30	5.00	●
PICCO R/LX050.5-25R20	5.00	2.10	4.60	0.20	40.00	25.0	0.30	5.00	●
PICCO R/LX050.6-15R10	6.00	2.50	5.50	0.10	30.00	15.0	0.40	6.00	●
PICCO R/LX050.6-15R20	6.00	2.50	5.50	0.20	30.00	15.0	0.40	6.00	●
PICCO R/LX050.6-22R20	6.00	2.50	5.50	0.20	37.00	22.0	0.40	6.00	●
PICCO R/LX050.6-35R20	6.00	2.50	5.50	0.20	50.00	35.0	0.40	6.00	●

• Left-hand inserts on request

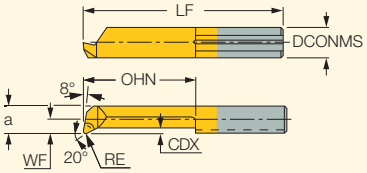
(1) Minimum overhang

(2) Cutting depth maximum

PICCOCUT

PICCO R/L 050, 053, 055

Inserts for Internal Turning and Chamfering



Right-hand shown

Designation	Dimensions								Tough ↔ Hard	
	DCONMS	WF	a	LF	OHN(2)	RE	CDX(3)	DMIN	IC228	IC908
PICCO R 050.06-2 (1)	4.00	-	0.50	20.00	2.0	0.04	0.08	0.60	●	●
PICCO R 050.06-3 (1)	4.00	-	0.50	20.00	3.0	0.04	0.08	0.60	●	●
PICCO R 050.08-4	4.00	-	0.70	20.00	4.0	0.04	0.08	0.80		●
PICCO R/L 050.1-5	4.00	-	0.90	20.00	4.5	0.05	0.10	1.00	●	●
PICCO R/L 050.1-7	4.00	-	0.90	22.00	6.5	0.05	0.10	1.00	●	●
PICCO R 050.15-5	4.00	-	1.30	19.00	5.0	0.05	0.10	1.50		●
PICCO R 050.15-10	4.00	-	1.30	24.00	10.0	0.06	0.10	1.50		●
PICCO R/L 050.2-5	4.00	-	1.70	19.00	4.0	0.05	0.10	2.00	●	●
PICCO R 055.2-5	4.00	-	1.70	19.00	5.0	0.05	0.10	2.00		●
PICCO R/L 050.2-10	4.00	-	1.70	24.00	9.0	0.05	0.10	2.00	●	●
PICCO R 055.2-10	4.00	-	1.70	24.00	10.0	0.05	0.10	2.00		●
PICCO L 050.2-15	4.00	-	1.70	29.00	15.0	0.05	0.10	2.00	●	●
PICCO R 050.2-15	4.00	-	1.70	29.00	14.0	0.05	0.10	2.00	●	●
PICCO R 055.2-15	4.00	-	1.70	29.00	15.0	0.05	0.10	2.00		●
PICCO R 050.25-5	4.00	0.20	2.20	19.00	5.0	0.05	0.15	2.50		●
PICCO R 050.25-10	4.00	0.20	2.20	24.00	10.0	0.07	0.15	2.50		●
PICCO R 050.25-16	4.00	0.20	2.20	30.00	16.0	0.07	0.15	2.50		●
PICCO R 053.3-10	4.00	0.60	2.60	24.00	9.0	0.03	0.20	2.80		●
PICCO R 055.3-10	4.00	0.60	2.60	24.00	10.0	0.05	0.20	2.80		●
PICCO R/L 050.3-10	4.00	0.60	2.60	24.00	9.0	0.10	0.20	2.80	●	●
PICCO R 053.3-16	4.00	0.60	2.60	30.00	15.0	0.03	0.20	2.80		●
PICCO R 055.3-16	4.00	0.60	2.60	30.00	16.0	0.05	0.20	2.80		●
PICCO R/L 050.3-16	4.00	0.60	2.60	30.00	15.0	0.10	0.20	2.80	●	●
PICCO R 053.3-20	4.00	0.60	2.60	34.00	19.0	0.03	0.20	2.80		●
PICCO R/L 050.3-20	4.00	0.60	2.60	34.00	19.0	0.10	0.20	2.80	●	●
PICCO R 050.35-10	4.00	1.10	3.10	24.00	10.0	0.10	0.25	3.50		●
PICCO R 050.35-16	4.00	1.10	3.10	30.00	16.0	0.10	0.25	3.50		●
PICCO R 050.35-20	4.00	1.10	3.10	34.00	20.0	0.10	0.25	3.50		●
PICCO R 050.35-24	4.00	1.10	3.10	38.00	24.0	0.10	0.25	3.50		●
PICCO R 053.4-10	4.00	1.50	3.50	24.00	9.0	0.03	0.30	4.00		●
PICCO R 055.4-10	4.00	1.50	3.50	24.00	10.0	0.05	0.30	4.00		●
PICCO R/L 050.4-10	4.00	1.50	3.50	24.00	9.0	0.10	0.30	4.00	●	●
PICCO R 053.4-16	4.00	1.50	3.50	30.00	15.0	0.03	0.30	4.00		●
PICCO R 055.4-16	4.00	1.50	3.50	30.00	16.0	0.05	0.30	4.00		●
PICCO R/L 050.4-16	4.00	1.50	3.50	30.00	15.0	0.10	0.30	4.00	●	●
PICCO R 053.4-20	4.00	1.50	3.50	34.00	19.0	0.03	0.30	4.00		●
PICCO R 055.4-20	4.00	1.50	3.50	34.00	20.0	0.05	0.30	4.00		●
PICCO R/L 050.4-20	4.00	1.50	3.50	34.00	19.0	0.10	0.30	4.00	●	●
PICCO R/L 050.4-24	4.00	1.50	3.50	38.00	23.0	0.10	0.30	4.00	●	●
PICCO R/L 050.4-28	4.00	1.50	3.50	42.00	27.0	0.10	0.30	4.00	●	●
PICCO R 055.4-28	4.00	1.50	3.50	42.00	28.0	0.05	0.50	4.00		●
PICCO R 055.5-10	5.00	1.90	4.40	25.00	9.0	0.05	0.50	5.00		●
PICCO R/L 050.5-10	5.00	1.90	4.40	25.00	9.0	0.15	0.50	5.00	●	●
PICCO R 055.5-15	5.00	1.90	4.40	30.00	14.0	0.05	0.50	5.00		●
PICCO R/L 050.5-15	5.00	1.90	4.40	30.00	14.0	0.15	0.50	5.00	●	●
PICCO R 055.5-20	5.00	1.90	4.40	35.00	19.0	0.05	0.50	5.00		●
PICCO R/L 050.5-20	5.00	1.90	4.40	35.00	19.0	0.15	0.50	5.00	●	●
PICCO R 055.5-25	5.00	1.90	4.40	40.00	24.0	0.05	0.50	5.00		●
PICCO R/L 050.5-25	5.00	1.90	4.40	40.00	24.0	0.15	0.50	5.00	●	●
PICCO R 055.5-30	5.00	1.90	4.40	45.00	29.0	0.05	0.50	5.00		●
PICCO R/L 050.5-30	5.00	1.90	4.40	45.00	29.0	0.15	0.50	5.00	●	●
PICCO R/L 050.5-35	5.00	1.90	4.40	50.00	34.0	0.15	0.50	5.00	●	●
PICCO R 055.6-15	6.00	2.30	5.30	30.00	14.0	0.05	0.50	6.00		●
PICCO R/L 050.6-15	6.00	2.30	5.30	30.00	14.0	0.15	0.50	6.00	●	●
PICCO R 055.6-22	6.00	2.30	5.30	37.00	21.0	0.05	0.50	6.00		●
PICCO R/L 050.6-22	6.00	2.30	5.30	37.00	21.0	0.15	0.50	6.00	●	●
PICCO R 055.6-25	6.00	2.30	5.30	40.00	24.0	0.05	0.50	6.00		●
PICCO R/L 050.6-25	6.00	2.30	5.30	40.00	24.0	0.15	0.50	6.00	●	●
PICCO R 055.6-30	6.00	2.30	5.30	45.00	29.0	0.05	0.50	6.00		●

- Specify right- or left-hand bars

(1) Maximum D.O.C.=0.01-0.03 mm, maximum feed=0.01 mm/rev.

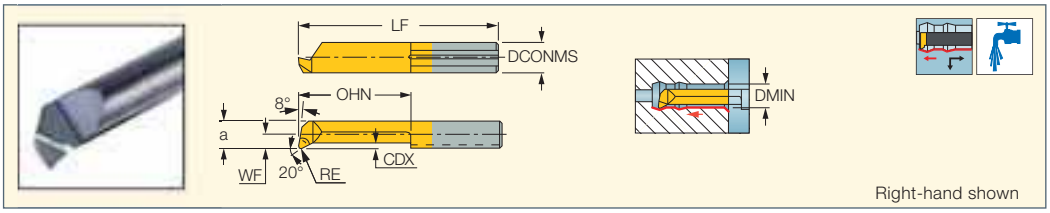
(2) Minimum overhang

(3) Cutting depth maximum

PICCOCUT

PICCO R/L 050, 053, 055 (Continue)

Inserts for Internal Turning and Chamfering



Designation	Dimensions								Tough ↔ Hard	
	DCONMS	WF	a	LF	OHN(2)	RE	CDX(3)	DMIN	IC228	IC908
PICCO R/L 050.6-30	6.00	2.30	5.30	45.00	29.0	0.15	0.50	6.00	•	•
PICCO R/L 050.6-35	6.00	2.30	5.30	50.00	34.0	0.15	0.50	6.00	•	•
PICCO R/L 050.6-42	6.00	2.30	5.30	57.00	41.0	0.15	0.50	6.00	•	•
PICCO R/L 050.7-20	7.00	2.80	6.30	35.00	19.0	0.15	0.60	6.80	•	•
PICCO R/L 050.7-25	7.00	2.80	6.30	40.00	24.0	0.15	0.60	6.80	•	•
PICCO R/L 050.7-30	7.00	2.80	6.30	45.00	29.0	0.15	0.60	6.80	•	•
PICCO R/L 050.7-35	7.00	2.80	6.30	50.00	34.0	0.15	0.60	6.80	•	•
PICCO R/L 050.7-40	7.00	2.80	6.30	55.00	39.0	0.15	0.60	6.80	•	•
PICCO R/L 050.7-45	7.00	2.80	6.30	60.00	44.0	0.15	0.60	6.80	•	•
PICCO R/L 050.7-50	7.00	2.80	6.30	65.00	49.0	0.15	0.60	6.80	•	•

- Specify right- or left-hand bars

(1) Maximum D.O.C.=0.01-0.03 mm, maximum feed=0.01 mm/rev.

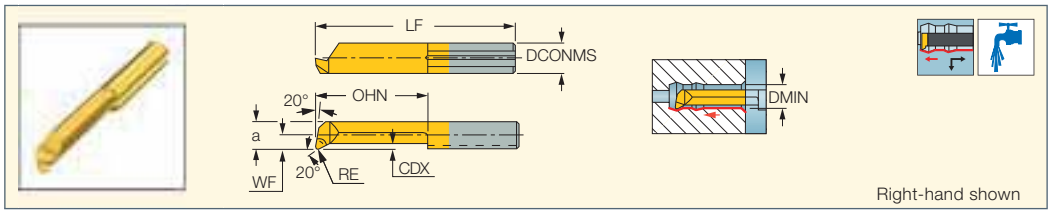
(2) Minimum overhang

(3) Cutting depth maximum

PICCOCUT

PICCO R 050.20

Inserts for Internal Turning and Chamfering Next to the Bottom of Blind Holes



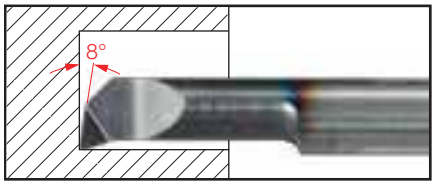
Designation	Dimensions								IC908
	DCONMS	WF	a	LF	OHN(1)	RE	CDX(2)	DMIN	
PICCO R 050.20.2-10	4.00	-	1.70	24.00	10.0	0.05	0.10	2.00	•
PICCO R 050.20.3-10	4.00	0.60	2.60	24.00	10.0	0.10	0.20	2.80	•
PICCO R 050.20.4-16	4.00	1.50	3.50	30.00	16.0	0.10	0.30	4.00	•
PICCO R 050.20.5-20	5.00	1.90	4.40	35.00	19.0	0.15	0.50	5.00	•

- Specify right- or left-hand bars

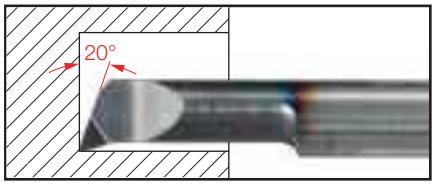
(1) Minimum overhang

(2) Cutting depth maximum

PICCO 050...



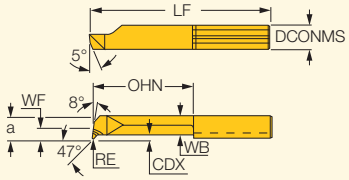
PICCO 050.20...



PICCOCUT

PICCO R/L 047

Inserts for Internal Deep Profiling



Right-hand shown

Designation	Dimensions									IC908
	DCONMS	WF	a	LF	OHN(1)	WB	CDX(2)	DMIN	RE	
PICCO R/L 047.4-20	4.00	1.50	3.50	34.00	20.0	3.00	0.30	4.00	0.15	•
PICCO R/L 047.5-25	5.00	1.90	4.40	40.00	25.0	3.80	0.50	5.00	0.15	•
PICCO R/L 047.6-30	6.00	2.30	5.30	45.00	30.0	4.50	0.50	6.00	0.15	•
PICCO R 047.T6-22	6.00	2.30	5.30	37.00	22.0	3.40	1.80	6.00	0.15	•
PICCO R 047.T6-30	6.00	2.30	5.30	45.00	30.0	3.40	1.80	6.00	0.15	•

• Left hand inserts on request

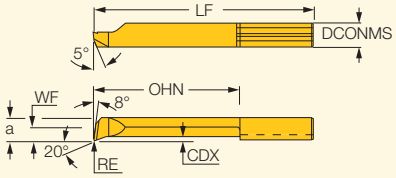
(1) Minimum overhang

(2) Cutting depth maximum

PICCOCUT

PICCO R/L 050-C

Inserts with Chipformers for Internal Boring and Profiling



Right-hand shown

Designation	Dimensions								IC908
	DCONMS	WF	a	LF	OHN(1)	CDX(2)	DMIN	RE	
PICCO R/L 050.4-10C	4.00	1.50	3.50	24.00	10.0	0.30	4.00	0.10	•
PICCO R/L 050.4-20C	4.00	1.50	3.50	34.00	20.0	0.30	4.00	0.10	•
PICCO R/L 050.4-24C	4.00	1.50	3.50	38.00	24.0	0.30	4.00	0.10	•
PICCO R/L 050.4-28C	4.00	1.50	3.50	42.00	28.0	0.30	4.00	0.10	•
PICCO R 050.4-16C	4.00	1.50	3.50	30.00	16.0	0.30	4.00	0.10	•
PICCO R/L 050.5-10C	5.00	1.90	4.40	25.00	10.0	0.50	5.00	0.15	•
PICCO R/L 050.5-15C	5.00	1.90	4.40	30.00	15.0	0.50	5.00	0.15	•
PICCO R/L 050.5-20C	5.00	1.90	4.40	35.00	20.0	0.50	5.00	0.15	•
PICCO R/L 050.5-25C	5.00	1.90	4.40	40.00	25.0	0.50	5.00	0.15	•
PICCO R/L 050.5-30C	5.00	1.90	4.40	45.00	30.0	0.50	5.00	0.15	•
PICCO R/L 050.5-35C	5.00	1.90	4.40	50.00	35.0	0.50	5.00	0.15	•
PICCO R/L 050.6-15C	6.00	2.30	5.30	30.00	15.0	0.50	6.00	0.15	•
PICCO R/L 050.6-22C	6.00	2.30	5.30	37.00	22.0	0.50	6.00	0.15	•
PICCO R/L 050.6-25C	6.00	2.30	5.30	40.00	25.0	0.50	6.00	0.15	•
PICCO R/L 050.6-30C	6.00	2.30	5.30	45.00	30.0	0.50	6.00	0.15	•
PICCO R/L 050.6-35C	6.00	2.30	5.30	50.00	35.0	0.50	6.00	0.15	•
PICCO R/L 050.6-42C	6.00	2.30	5.30	57.00	42.0	0.50	6.00	0.15	•
PICCO R/L 050.7-20C	7.00	2.80	6.30	35.00	20.0	0.60	6.80	0.15	•
PICCO R/L 050.7-25C	7.00	2.80	6.30	40.00	25.0	0.60	6.80	0.15	•
PICCO R/L 050.7-30C	7.00	2.80	6.30	45.00	30.0	0.60	6.80	0.15	•
PICCO R/L 050.7-35C	7.00	2.80	6.30	50.00	35.0	0.60	6.80	0.15	•
PICCO R/L 050.7-40C	7.00	2.80	6.30	55.00	40.0	0.60	6.80	0.15	•
PICCO L 050.7-50C	7.00	2.80	6.30	65.00	50.0	0.60	6.80	0.15	•

• All left-hand inserts on request

(1) Minimum overhang

(2) Cutting depth maximum

Stainless Steel 316L

PICCO R 050.6-35C with Chipbreaker

f= 0.03 mm/rev

f= 0.05 mm/rev

PICCO R 050.6-35 Standard

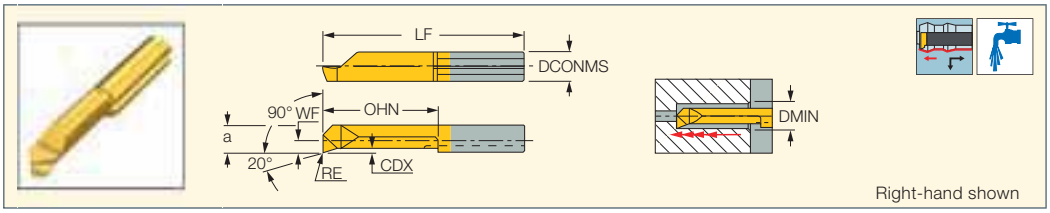
f= 0.03 mm/rev

f= 0.05 mm/rev

PICCOCUT

PICCO R/L 090

Inserts for Internal Turning and Profiling



Designation	Dimensions								IC228
	DCONMS	WF	a	LF	OHN(1)	RE	CDX(2)	DMIN	
PICCO R/L 090.3-10	4.00	0.60	2.60	24.00	9.0	0.10	0.20	2.80	●
PICCO R/L 090.3-16	4.00	0.60	2.60	30.00	15.0	0.10	0.20	2.80	●
PICCO R/L 090.4-10	4.00	1.50	3.50	24.00	9.0	0.10	0.30	4.00	●
PICCO R/L 090.4-16	4.00	1.50	3.50	30.00	15.0	0.10	0.30	4.00	●
PICCO R/L 090.5-10	5.00	1.90	4.40	25.00	9.0	0.15	0.50	5.00	●
PICCO R/L 090.5-15	5.00	1.90	4.40	30.00	14.0	0.15	0.50	5.00	●
PICCO R/L 090.5-20	5.00	1.90	4.40	35.00	19.0	0.15	0.50	5.00	●

• Specify right- or left-hand bars

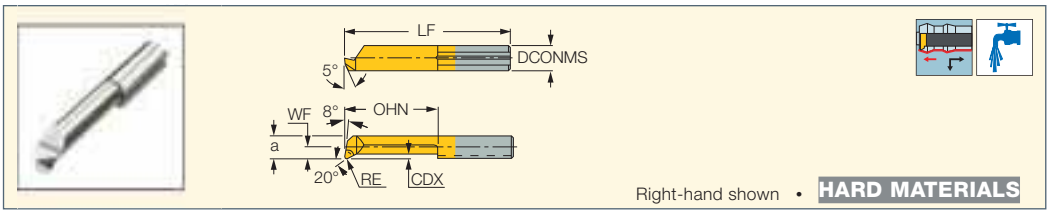
(1) Minimum overhang

(2) Cutting depth maximum

PICCOCUT

PICCO R 050 (CBN)

CBN Tipped Inserts for Internal Turning, Profiling and Chamfering of Hard Steel



Designation	Dimensions								IB55
	DCONMS	WF	a	LF	OHN(1)	CDX(2)	DMIN	RE	
PICCO R 050.3-10B	4.00	0.60	2.60	25.50	10.0	0.20	2.80	0.10	●
PICCO R 050.4-10B	4.00	1.50	3.50	25.50	10.0	0.30	4.00	0.10	●
PICCO R 050.5-15B	5.00	1.90	4.40	31.50	15.0	0.50	5.00	0.15	●
PICCO R 050.6-15B	6.00	2.30	5.30	31.50	15.0	0.50	6.00	0.15	●
PICCO R 050.7-20B	7.00	2.80	6.30	36.50	20.0	0.60	6.80	0.15	●

• It is not recommended to use coolant when machining with CBN tipped tools • Available on request only

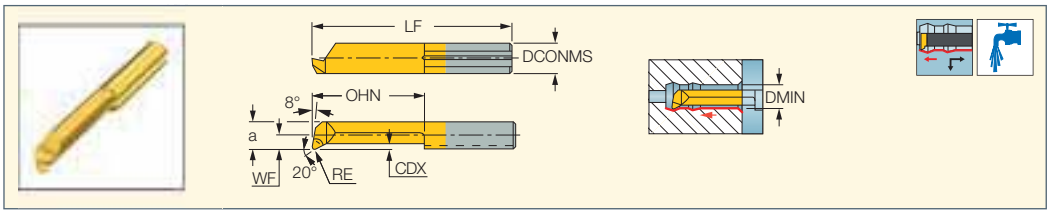
(1) Minimum overhang

(2) Cutting depth maximum

PICCOCUT

PICCO R/LHD 050

Inserts for Internal Turning and Chamfering of Hard Steel - Up to 65 HRC



Designation	Dimensions								IC902
	DCONMS	WF	a	LF	OHN(1)	RE	CDX(2)	DMIN	
PICCO R/LHD 050.2-5	4.00	-	1.70	19.00	4.0	0.05	0.10	2.00	●
PICCO R/LHD 050.3-10	4.00	0.60	2.60	24.00	9.0	0.10	0.20	2.80	●
PICCO R/LHD 050.3-16	4.00	0.60	2.60	30.00	15.0	0.10	0.20	2.80	●
PICCO R/LHD 050.4-10	4.00	1.50	3.50	24.00	9.0	0.10	0.30	4.00	●
PICCO R/LHD 050.4-20	4.00	1.50	3.50	34.00	19.0	0.10	0.30	4.00	●
PICCO R/LHD 050.5-10	5.00	1.90	4.40	25.00	9.0	0.15	0.50	5.00	●
PICCO R/LHD 050.5-15	5.00	1.90	4.40	30.00	14.0	0.15	0.50	5.00	●
PICCO R/LHD 050.6-15	6.00	2.30	5.30	30.00	14.0	0.15	0.50	6.00	●
PICCO R/LHD 050.7-20	7.00	2.80	6.30	35.00	19.0	0.15	0.60	6.80	●
PICCO R/LHD 050.7-25	7.00	2.80	6.30	40.00	24.0	0.15	0.60	6.80	●
PICCO R/LHD 050.7-35	7.00	2.80	6.30	50.00	34.0	0.15	0.60	6.80	●

• Specify right- or left-hand bars

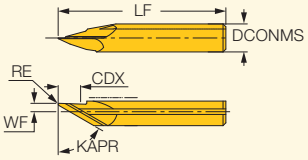
(1) Minimum overhang

(2) Cutting depth maximum

PICCOCUT

PICCO R/L 520

Inserts for Internal Chamfering



Right-hand shown

Designation	Dimensions							IC908
	DCONMS	WF	KAPR(1)	LF	RE	CDX	DMIN	
PICCO R/L 520.0045-15	5.00	1.50	45.0	30.00	0.20	3.50	1.00	●
PICCO R/L 520.0060-15	5.00	1.50	60.0	30.00	0.20	4.00	1.00	●

• Left hand inserts on request

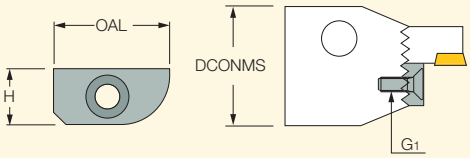
(1) Tool cutting edge angle

ITSBORE

Accessories

PLT

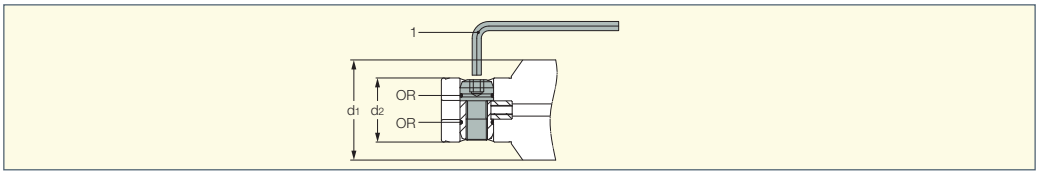
Cover Plate Protects the Serrated Faces When a Single Toolholder is Used



Designation	DCONMS	H	OAL	G1
PLT 16	16.00	7.0	14.00	SR M3x12 DIN912
PLT 20	20.00	8.5	17.00	SR M4x14 DIN912
PLT 25	25.00	10.2	21.00	SR M4x16 DIN7991
PLT 32	32.00	13.9	28.00	SR M5x20 DIN7991
PLT 40	40.00	17.4	35.00	SR M6x25 DIN7991
PLT 50	50.00	21.4	47.50	SR M8x25 DIN7991
PLT 63	63.00	26.4	62.00	SR M10x30 DIN7991
PLT 80	80.00	33.9	82.50	SR M12x35 DIN7991

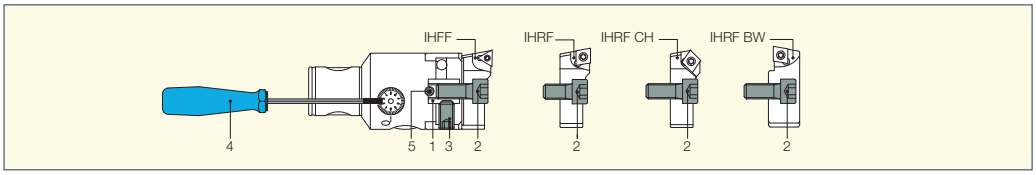
ITSBORE

BH MB COUPLING SET



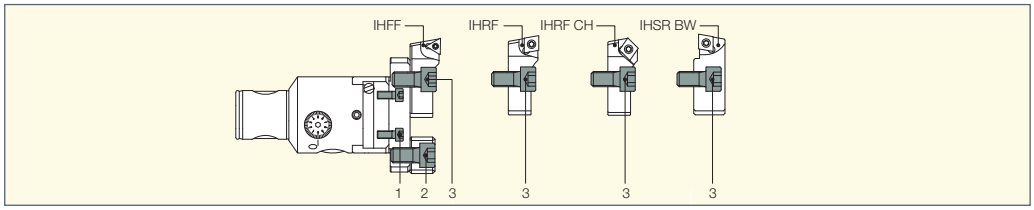
Designation	d1	d2	1	OR
BH MB14 COUPLING SET	14	10	2.5	-
BH MB16 COUPLING SET	16	10	2.5	-
BH MB20 COUPLING SET	20	13	3	-
BH MB25 COUPLING SET	25	16	3	-
BH MB32 COUPLING SET	32	20	4	ORM 0075-10
BH MB40 COUPLING SET	40	25	5	ORM 0100-10
BH MB50 COUPLING SET/M5	50	32	6	ORM 0130-10
BH MB63-80 COUPLING SET	63 - 80	42	8	OR 2075
BH MB110 COUPLING SET	110	76	14	OR 3112

BHF - SPARE PARTS



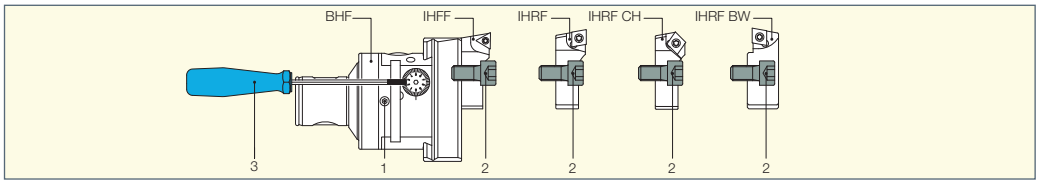
Designation	1	2	3	4	5
BHF...-16...	-	SR M3X6 DIN 912	-	BH HW 1.5 HANDLE	SR M3X4.5 DIN 913
BHF...-20...	-	SR M4X8 DIN 912	-	BH HW 1.5 HANDLE	SR M3X4.5 DIN 913
BHF...-25...	-	SR M5X1O DIN 912	-	BH HW 2.0 HANDLE	SR M4X4 DIN 913
BHF...-32...	-	SR M6X12 DIN 912	-	BH HW 2.0 HANDLE	SR M4X5 DIN 913
BHF...-40...	-	SR M8X14 DIN 912	-	BH HW 2.5 HANDLE	SR M5X6 DIN 913 SR
BHF...-50-60	BH NUT 10	SR M1OX25 DIN 912	SR M10X16 DIN 913	BH HW 2.5 HANDLE	SR M5X8 DIN 913

BHF - SPARE PARTS



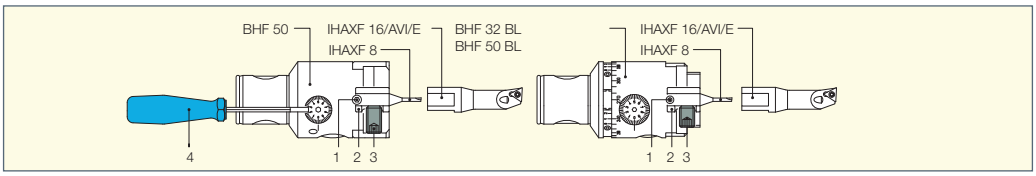
Designation	1	2	3
BHF...-50...	SR M5X12 DIN 912	SR M1OX20 DIN 912	SR M1OX25 DIN 912

BHF - SPARE PARTS



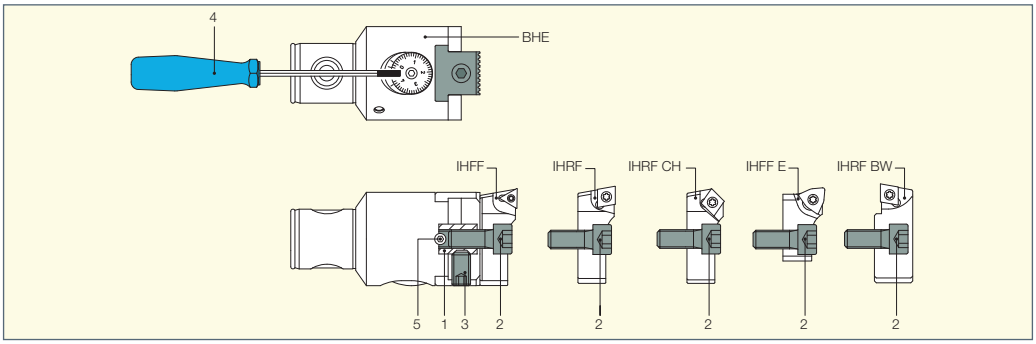
Designation	1	2	3
BHF...-63...	SR M6X10 DIN 915		
BHF...-80...	SR M6X14 DIN 915	SR M1OX25 DIN 912	BH HW 3.0 HANDLE
BHF...-125...	SR M6X22 DIN 915		

BHF - SPARE PARTS



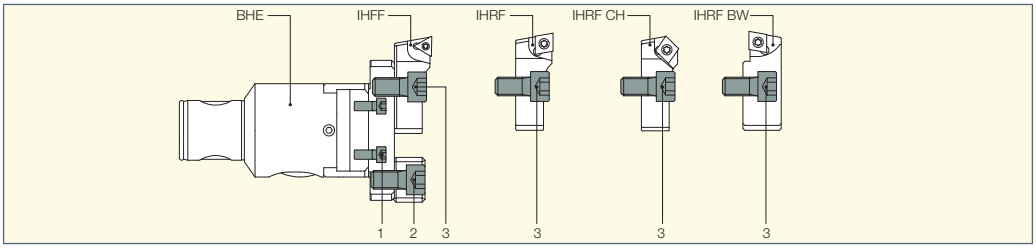
Designation	1	2	3	4
BHF...-50...	SR M5X8 DIN 913	SLEEVE D 8-D16	SR M10X10 DIN 913	BH HW 2.5 HANDLE
BHF...-32... BL	SR M4X5 DIN 913	-	SR M5X8 DIN 913 SR M5X12 DIN 913	BH HW 2.0 HANDLE
BHF...-50... BL	SR M5X8 DIN 913	SLEEVE D 8-D16	SR M10X10 DIN 913	BH HW 2.5 HANDLE

BHE MB - SPARE PARTS



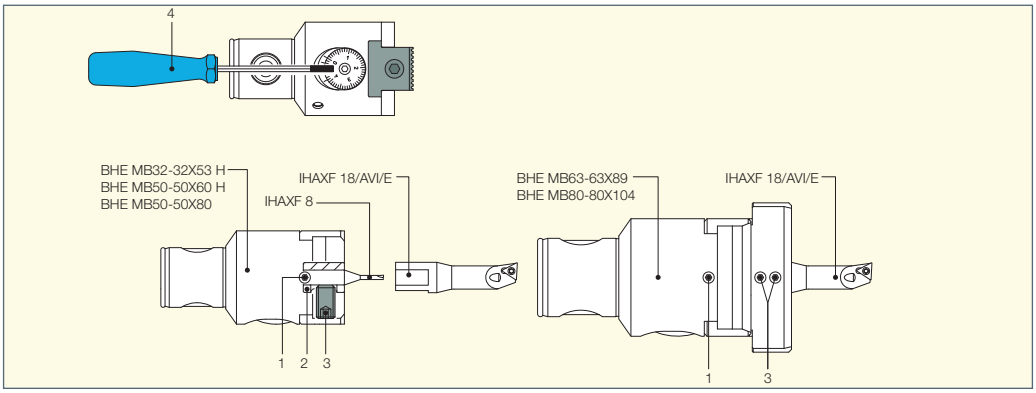
Designation	1	2	3	4	5
BHE MB14-14X30	-	SR M3X6 DIN 912	-	BH HW 1.5 HANDLE	SR M3X3.5 DIN 913
BHE MB16-16X34	-	SR M3X6 DIN 912	-	BH HW 1.5 HANDLE	SR M3X4.5 DIN 913
BHE MB20-20X40	-	SR M4X8 DIN 912	-	BH HW 1.5 HANDLE	SR M3X4.5 DIN 913
BHE MB25-25X50	-	SR M5X1O DIN 912	-	BH HW 1.5 HANDLE	SR M4X4 DIN 913
BHE MB32-32X63	-	SR M6X12 DIN 912	-	BH HW 2.5 HANDLE	SR M5X5 DIN 913
BHE MB40-40X80	-	SR M8X14 DIN 912	-	BH HW 3.0 HANDLE	SR M6X6 DIN 913
BHE MB50-50X80	BH NUT 10	SR M1OX25 DIN 912	SR M10X16 DIN 913	BH HW 3.0 HANDLE	SR M6X8 DIN 913
BHE MB63-63X89	-	SR M1OX20 DIN 912	-	BH HW 3.0 HANDLE	SR M6X8 DIN 913
BHE MB80-80X104	-	SR M1OX25 DIN 912	-	BH HW 3.0 HANDLE	SR M6X12 DIN 913

BHE - SPARE PARTS



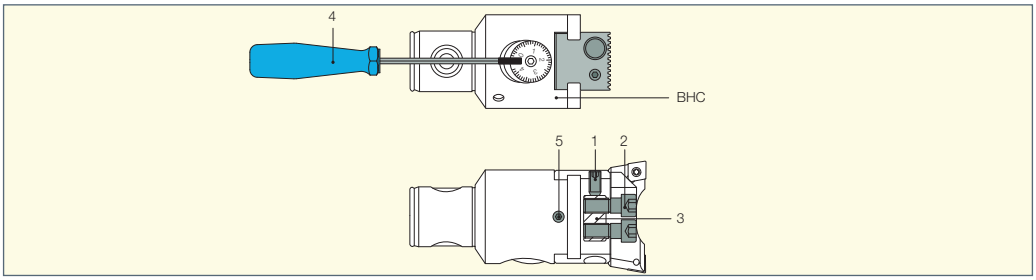
Designation	1	2	3
BHE MB50-50X80	SR M5X12 DIN 912	SR M1OX20 DIN 912	SR M1OX25 DIN 912
BHE MB63-63X89	SR M5X25 DIN 912		
BHE MB80-80X104			

BHE - SPARE PARTS



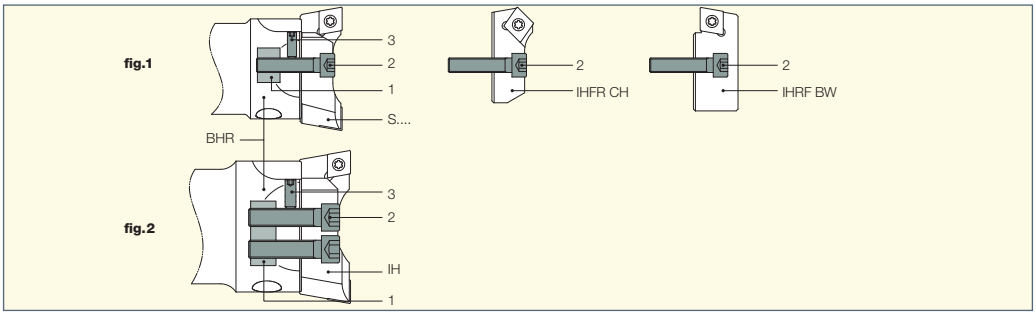
Designation	1	2	3	4
BHE MB32-32X53 H	SR M5X5 DIN 913	-	SR M5X8 DIN 913	BH HW 2.5 HANDLE
	SR M5X5 DIN 913	-	SR M5X12 DIN 913	
BHE MB50-50X60 H	SR M6X8 DIN 913	SLEEVE D 8-D16	SR M10X10 DIN 913	BH HW 3.0 HANDLE
BHE MB50-50X80	SR M6X8 DIN 913	SLEEVE D 8-D16	SR M10X10 DIN 913	
BHE MB63-63X89	SR M6X8 DIN 913	-	SR M6X6 DIN 913	
BHE MB80-80X104	SR M6X12 DIN 913	-	SR M6X6 DIN 913	

BHC - SPARE PARTS



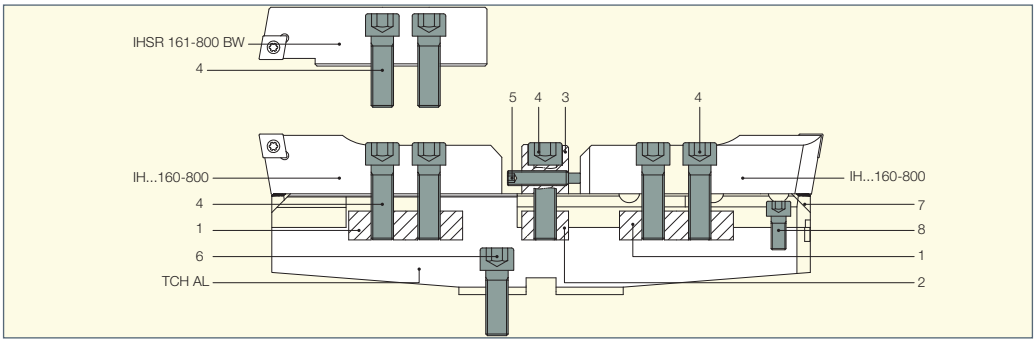
Designation	1	2	3	4	5
BHC MB25-25X57	SR M4X8 DIN 913	BH SR M4X11 DIN 912 PT	BH NUT-BHC MB25	BH HW 2.0 HANDLE	SR M4X5 DIN 913
BHC MB32-32X71	SR M5X10 DIN 913	BH SR M5X12.5 DIN 912 PT	BH NUT-BHC MB32	BH HW 2.5 HANDLE	SR M5X5 DIN 913
BHC MB40-40X90	SR M6X12 DIN 913	BH SR M6X16 DIN 912 PT	BH NUT-BHC MB40	BH HW 3.0 HANDLE	SR M6X6 DIN 913
BHC MB50-50X87	SR M6X14 DIN 913	BH SR M8X20 DIN 912 PT	BH NUT-BHC MB50	BH HW 3.0 HANDLE	SR M6X8 DIN 913
BHC MB63-63X109	SR M6X16 DIN 913	BH SR M10X26 DIN 912 PT	BH NUT-BHC MB63	BH HW 3.0 HANDLE	SR M6X8 DIN 913
BHC MB80-80X130	SR M6X20 DIN 913	BH SR M12X30 DIN 912 PT	BH NUT-BHC MB80	BH HW 3.0 HANDLE	SR M6X12 DIN 913

BHR - SPARE PARTS



Designation	1	2	3
BHR MB16...16	BH NUT BHR MB16	SR M3X14 DIN912	SR M3X4 DIN913
BHR MB20...20	BH NUT BHR MB20	SR M4X15 DIN912	SR M3X5 DIN913
BHR MB25...25	BH NUT BHR MB25	SR M4X20 DIN912	SR M3X8 DIN913
BHR MB32...32	BH NUT BHR MB32	SR M5X25 DIN912	SR M4X12 DIN913
BHR MB40...50	BH NUT BHR MB40	SR M6X30 DIN912	SR M5X14 DIN913
BHR MB50...50	BH NUT BHR MB50	SR M8X35 DIN912	SR M5X12 DIN913
BHR MB50...63	BH NUT BHR MB63	SR M10X40 DIN912	SR M6X16 DIN913
BHR MB63...63	BH NUT BHR MB63	SR M10X40 DIN912	SR M6X16 DIN913
BHR MB80...80	BH NUT BHR MB80	SR M12X45 DIN912	SR M8X25 DIN913

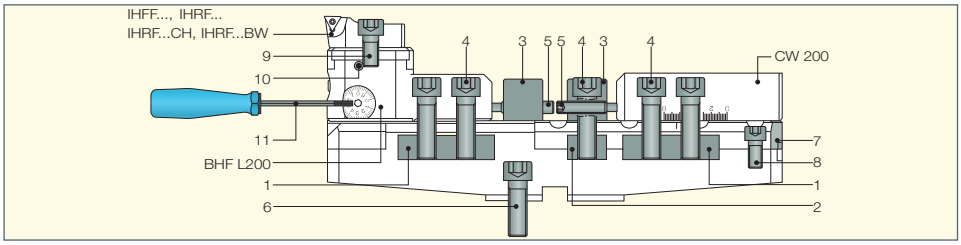
TCH AL - SPARE PARTS (Rough Boring)



Designation	1	2	3	4
TCH AL 200-300-400 TCH AL 500-600-700-800	BH TCH NUT A	BH TCH NUT B	BH TCH NUT C	SR M12X40 DIN 912

Designation	5	6	7	8
TCH AL 200	SR M8X40 DIN 915	SR M12X35 DIN 912	BH SERRATED PLATE 200	SR M8X25 DIN 912
TCH AL 300	SR M8X40 DIN 915	SR M12X35 DIN 912	BH SERRATED PLATE 300	SR M8X25 DIN 912
TCH AL 400	SR M8X40 DIN 915	SR M12X35 DIN 912	BH SERRATED PLATE 400-700	SR M8X20 DIN 912
TCH AL 500-600-700-800	SR M8X40 DIN 915	SR M16X50 DIN 912	BH SERRATED PLATE 400-700	SR M8X25 DIN 912

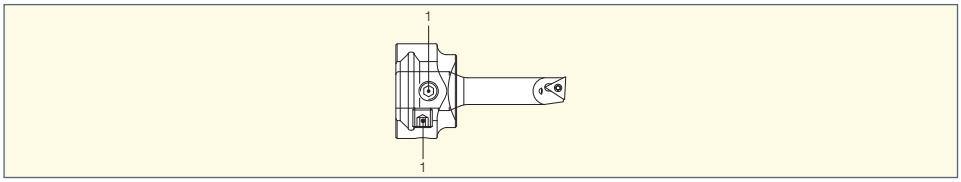
TCH AL - SPARE PARTS (Fine Boring)



Designation	1	2	3	4	5
TCH AL 200-300-400 TCH AL 500-600-700-800	BH TCH NUT A	BH TCH NUT B	BH TCH NUT C	SR M12X40 DIN 912	SR M8X40 DIN 915

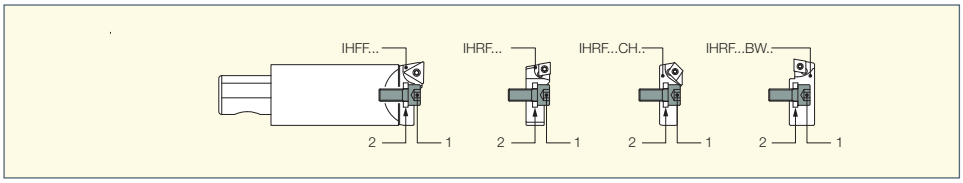
Designation	6	7	8	9	10	11
TCH AL 200	SR M12X35 DIN 912	BH SERRATED PLATE 200	SR M8X25 DIN 912	SR M1OX20 DIN 912	SR M6X8 DIN 915	BH HW 3.0 HANDLE
TCH AL 300	SR M12X35 DIN 912	BH SERRATED PLATE 300	SR M8X25 DIN 912	SR M1OX20 DIN 912	SR M6X8 DIN 915	BH HW 3.0 HANDLE
TCH AL 400	SR M12X35 DIN 912	BH SERRATED PLATE 400-700	SR M8X20 DIN 912	SR M1OX20 DIN 912	SR M6X8 DIN 915	BH HW 3.0 HANDLE
TCH AL 500-600-700-800	SR M16X50 DIN 912	BH SERRATED PLATE 400-700	SR M8X25 DIN 912	SR M1OX20 DIN 912	SR M6X8 DIN 915	BH HW 3.0 HANDLE

ADBH - SPARE PARTS



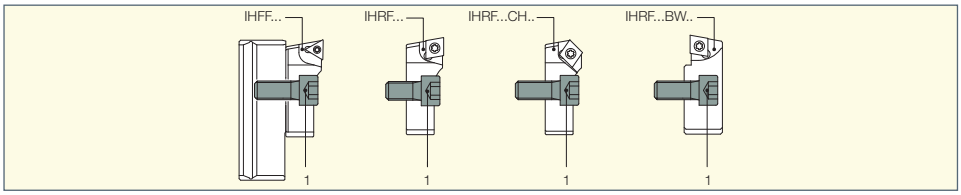
Designation	1
ADBH 30XD16	TSR M8X8 DIN 915

BBH-D - SPARE PARTS



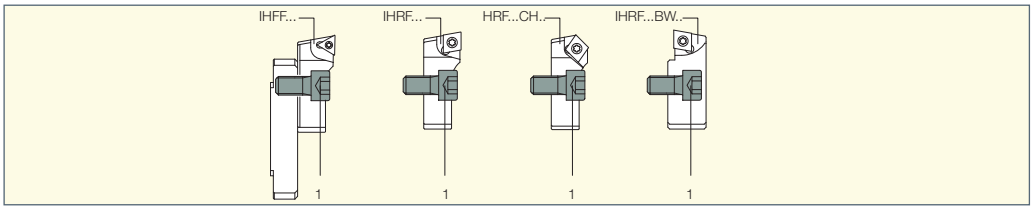
Designation	1	2
BBH D16-53	SR M5X12 DIN 912	WASHER DIN 125A M5
BBH D16-105	SR M5X12 DIN 912	WASHER DIN 125A M5

BHFH - SPARE PARTS



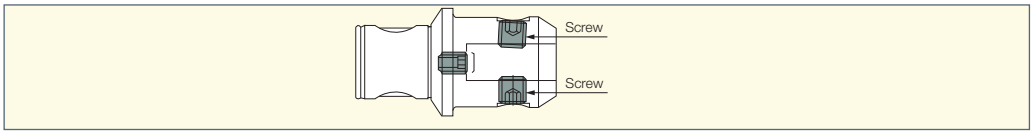
Designation	1
BHFH 30X75	SR M1OX18 DIN 912
BHFH 40X133	
BHFH 30X93	
BHFH 40X200	SR M1OX25 DIN 912
BHFH 30X135	
BHFH 40X300	
BHFH 40X400	

BHEH - SPARE PARTS



Designation	1
BHEH 24x75	SR M1OX20 DIN 912
BHEH 28x80	SR M1OX25 DIN 912
BHEH 28x108	
BHEH 28x148	

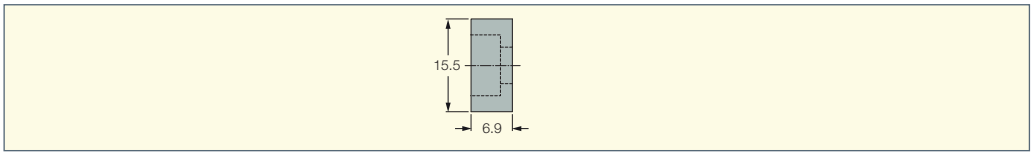
EMH - SPARE PARTS



Designation	Screw #1	Screw # 2
EMH MB 50-6	EMH 50-6 SCREW	M6x10 EM SCREW
EMH MB 50-8	EMH 50-8 SCREW	M8x10 EM SCREW
EMH MB 50-10	EMH 50-10 SCREW	M10x12 EM SCREW
EMH MB 50-12	EMH 50-12 SCREW	M12x16 EM SCREW
EMH MB 50-14	EMH 50-14 SCREW	M14x16 EM SCREW
EMH MB 50-16	EMH 50-16 SCREW	M14x16 EM SCREW
EMH MB 50-20	EMH 50-20 SCREW	M16x16 EM SCREW
EMH MB 63-16	EMH 63-16 SCREW	M14x16 EM SCREW
EMH MB 63-20	EMH 63-20 SCREW	M16x16 EM SCREW
EMH MB 63-25	EMH 63-25 SCREW	M18x20 EM SCREW
EMH MB 63-32	EME 63-32 SCREW	M18x20 EM SCREW
EMH MB 80-40	EMH 80-40 SCREW	M20x20 EM SCREW

BH WASHER - SPARE PARTS

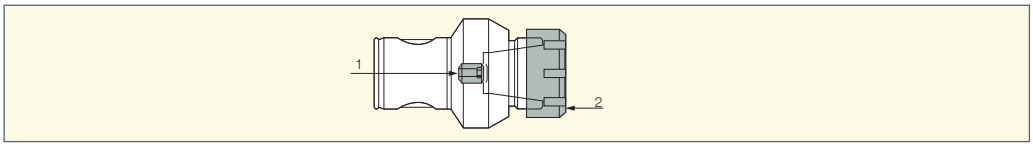
For Kit BHE



Designation	For Kit BHE
BH WASHER IH..50	KIT BHE MB50-50X80
	KIT BHE MB63-63X89
	KIT BHE MB80-80X104
	KIT BHF MB50-50X80 6-108

CC - SPARE PARTS

Components for CC MB



Designation	1	2	Wrench
CC MB16-ER11M	CC MB16 SCREW	NUT ER11 MINI	WRENCH ER11 MINI
CC MB20-ER16M	CC MB20 SCREW	NUT ER16 MINI	WRENCH ER16 MINI
CC MB25-ER20M	CC MB25 SCREW	NUT ER20 MINI	WRENCH ER20 MINI
CC MB32-ER25M	CC MB32 SCREW	NUT ER25 MINI	WRENCH ER25 MINI
CC MB40-ER25	CC MB40 SCREW	NUT ER25 TOP	WRENCH ER25
CC MB50-ER25	CC MB50 SCREW	NUT ER25 TOP	WRENCH ER25
CC MB50-ER32	CC MB50 SCREW	NUT ER32 TOP	WRENCH ER32
CC MB63-ER32	CC MB63 SCREW	NUT ER32 TOP	WRENCH ER32
CC MB63-ER40	CC MB63 SCREW	NUT ER40 TOP	WRENCH ER40

BHR Rough Boring Cutting Data

ISO	Workpiece Material	Hardness HB	Overhang LDRED/BDRED	a_p (mm) RE (Radius)	Boring Range 18-28		Boring Range 28-50		Boring Range 50-68	
					0.5-1.2	1.2-2.5	0.8-1.5	1.5-2.5	0.8-1.5	1.5-3.0
					0.2	0.4	0.2-0.4	0.4	0.2-0.4	0.4-0.8
P	Carbon Steel	HB<200	2.5	V_c (m/min)	150-180	120-150	160-200	140-170	160-200	140-180
			●●●	f (mm/rev)	0.1-0.2	0.08-0.2	0.15-0.2	0.15-0.2	0.15-0.25	0.08-0.2
			4	V_c (m/min)	140-160	100-140	160-180	120-150	160-180	120-150
			●●	f (mm/rev)	0.1-0.18	0.08-0.15	0.1-0.12	0.08-0.1	0.1-0.12	0.08-0.1
			6.3	V_c (m/min)	60-80	40-60	60-90	50-60	70-90	50-70
			●	f (mm/rev)	0.06-0.12	0.06-0.1	0.06-0.12	0.06-0.1	0.06-0.1	0.06-0.1
	Carbon Steel	HB>200	2.5	V_c (m/min)	130-160	100-130	140-180	120-160	140-180	120-160
			●●●	f (mm/rev)	0.08-0.15	0.08-0.12	0.08-0.2	0.06-0.12	0.08-0.25	0.08-0.18
			4	V_c (m/min)	110-140	80-110	100-140	80-120	100-140	80-120
			●●	f (mm/rev)	0.08-0.12	0.08-0.1	0.08-0.15	0.06-0.15	0.08-0.2	0.06-0.15
			6.3	V_c (m/min)	70-90	60-70	80-100	60-80	80-100	60-80
			●	f (mm/rev)	0.08-0.1	0.06-0.08	0.06-0.1	0.06-0.08	0.08-0.15	0.06-0.1

ISO	Workpiece Material	Hardness HB	Overhang LDRED/BDRED	a_p (mm) RE (Radius)	Boring Range 68-120		Boring Range 120-200		Boring Range 200-500	
					0.8-1.5	1.5-3.5	0.8-2.0	2.0-3.5	0.8-2.0	2.0-4.0
					0.2-0.4	0.4-0.8	0.2-0.4	R=0.4-0.8	R=0.2-0.4	R=0.4-0.8
P	Carbon Steel	HB<200	2.5	V_c (m/min)	160-220	150-180	180-250	160-200	220-280	200-220
			●●●	f (mm/rev)	0.15-0.25	0.08-0.2	0.15-0.3	0.1-0.2	0.15-0.3	0.1-0.15
			4	V_c (m/min)	140-180	120-150	160-200	140-180	N.R.	N.R.
			●●	f (mm/rev)	0.08-0.2	0.08-0.15	0.1-0.2	0.08-0.15		
			6.3	V_c (m/min)	70-100	50-70	N.R.	N.R.	N.R.	N.R.
			●	f (mm/rev)	0.06-0.1	0.06-0.1				
	Carbon Steel	HB>200	2.5	V_c (m/min)	140-180	120-160	150-170	100-140	100-140	80-120
			●●●	f (mm/rev)	0.15-0.3	0.12-0.2	0.15-0.25	0.1-0.2	0.15-0.3	0.1-0.2
			4	V_c (m/min)	120-150	100-140	100-130	80-110	N.R.	N.R.
			●●	f (mm/rev)	0.1-0.2	0.1-0.18	0.08-0.2	0.08-0.12		
			6.3	V_c (m/min)	80-100	60-80	N.R.	N.R.	N.R.	N.R.
			●	f (mm/rev)	0.08-0.12	0.08-0.12				

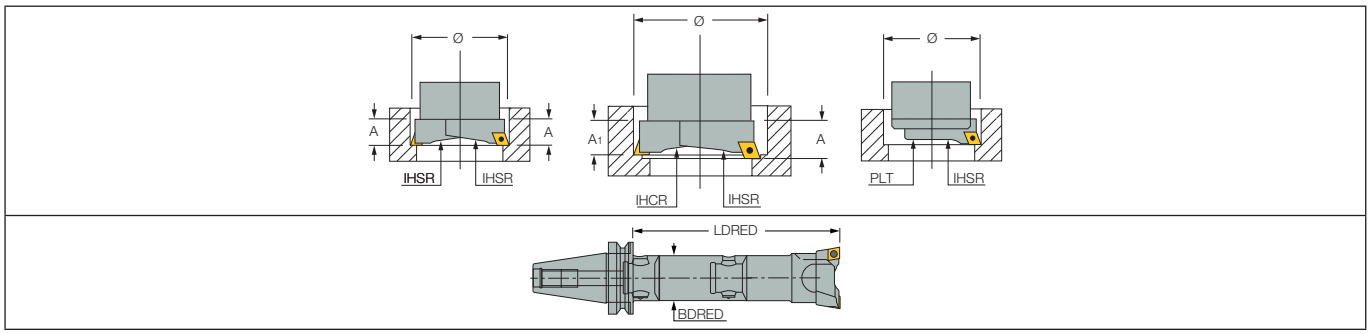
N.R. = Not Recommended

Stability

●●● Good

●● Normal

● Poor



In case of a single or a stepped boring cutter configuration, only half the feed should be applied.

BHR Rough Boring Cutting Data

ISO	Workpiece Material	Hardness HB	Overhang LDRED/BDRED	a_p (mm) RE (Radius)	Boring Range 18-28		Boring Range 28-50		Boring Range 50-68	
					0.5-1.0	1.0-1.8	0.5-1.0	1.0-1.8	0.5-1.2	1.2-2.0
					0.2	0.4	0.2-0.4	0.4	0.2-0.4	0.4-0.8
P	Carbon Steel	HB<200	2.5	V_c (m/min)	140-160	90-120	150-180	100-130	160-200	140-180
			●●●	f (mm/rev)	0.08-0.18	0.08-0.15	0.08-0.2	0.08-0.18	0.1-0.25	0.1-0.15
			4	V_c (m/min)	100-130	70-100	110-150	90-120	140-180	100-130
			●●	f (mm/rev)	0.08-0.15	0.06-0.12	0.08-0.18	0.08-0.15	0.8-0.18	0.08-0.12
			6.3	V_c (m/min)	80-100	60-90	80-100	70-90	100-140	80-120
			●	f (mm/rev)	0.08-0.15	0.06-0.1	0.06-0.12	0.06-0.12	0.6-0.15	0.08-0.1
	Carbon Steel	HB>200	2.5	V_c (m/min)	130-150	120-140	130-150	120-140	140-170	120-150
			●●●	f (mm/rev)	0.08-0.18	0.06-0.15	0.08-0.18	0.06-0.15	0.08-0.2	0.08-0.18
			4	V_c (m/min)	100-130	100-120	100-130	100-120	120-150	100-120
			●●	f (mm/rev)	0.08-0.15	0.06-0.13	0.08-0.15	0.06-0.13	0.08-0.18	0.08-0.15
			6.3	V_c (m/min)	80-100	70-90	80-100	70-90	100-120	70-90
			●	f (mm/rev)	0.08-0.12	0.06-0.11	0.08-0.12	0.06-0.11	0.08-0.12	0.06-0.11

ISO	Workpiece Material	Hardness HB	Overhang LDRED/BDRED	a_p (mm) RE (Radius)	Boring Range 68-120		Boring Range 120-200		Boring Range 200-500	
					1.8	2.5	0.8-2.0	2.0-3.5	0.8-2.0	2.0-4.0
					0.2-0.4	0.4-0.8	0.2-0.4	0.4-0.8	0.2-0.4	0.4-0.8
P	Carbon Steel	HB<200	2.5	V_c (m/min)	160-220	140-180	160-220	140-180	160-220	140-180
			●●●	f (mm/rev)	0.1-0.3	0.1-0.25	0.1-0.3	0.1-0.25	0.1-0.35	0.1-0.3
			4	V_c (m/min)	150-200	120-160	120-160	120-160	N.R	N.R
			●●	f (mm/rev)	0.1-0.2	0.08-0.18	0.1-0.2	0.08-0.18		
			6.3	V_c (m/min)	100-140	100-140	N.R	N.R	N.R	N.R
			●	f (mm/rev)	0.08-0.18	0.08-0.15				
	Carbon Steel	HB>200	2.5	V_c (m/min)	160-200	140-180	140-200	140-180	140-200	140-180
			●●●	f (mm/rev)	0.1-0.3	0.01-0.25	0.01-0.35	0.01-0.3	0.01-0.35	0.01-0.3
			4	V_c (m/min)	140-160	120-140	150-180	120-140	N.R	N.R
			●●	f (mm/rev)	0.08-0.2	0.08-0.15	0.08-0.12	0.08-0.12		
			6.3	V_c (m/min)	100-120	70-90	N.R	N.R	N.R	N.R
			●	f (mm/rev)	0.08-0.16	0.08-0.12				

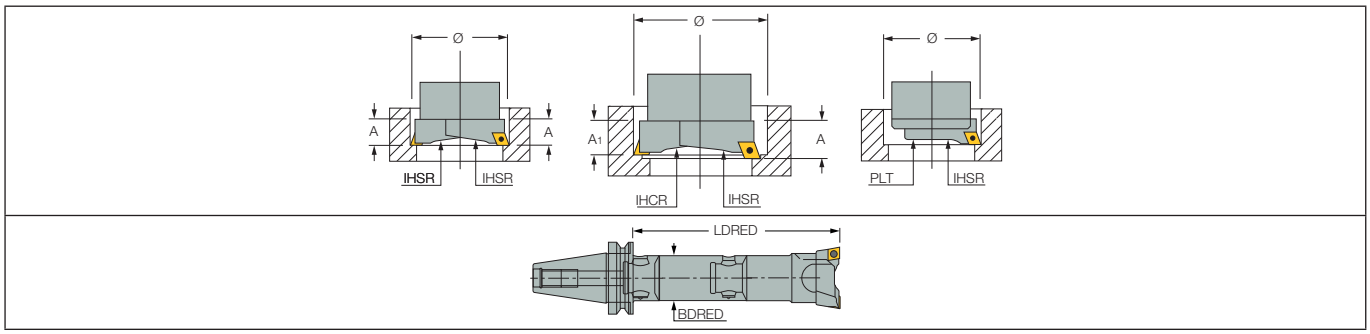
N.R. = Not Recommended

Stability

●●● Good

●● Normal

● Poor



In case of a single or a stepped boring cutter configuration, only half the feed should be applied.

BHR Rough Boring Cutting Data

ISO	Workpiece Material	Hardness HB	Overhang LDRED/BDRED	a_p (mm) RE (Radius)	Boring Range 18-28		Boring Range 28-50		Boring Range 50-68	
					0.5-1.0	1.0-1.8	0.5-1.0	1.0-1.8	0.5-1.2	1.2-2.0
					0.2	0.4	0.2-0.4	0.4	0.2-0.4	0.4-0.8
M	Stainless Steel	Ferritic & Martensitic	2.5	V_c (m/min)	100-150	110-130	120-160	100-150	120-160	110-160
			●●●	f (mm/rev)	0.08-0.15	0.06-0.12	0.08-0.18	0.06-0.12	0.08-0.25	0.08-0.18
			4	V_c (m/min)	90-130	90-120	100-140	90-140	100-150	80-120
			●●	f (mm/rev)	0.08-0.12	0.06-0.1	0.08-0.12	0.06-0.1	0.08-0.18	0.08-0.12
			6.3	V_c (m/min)	60-90	50-70	60-90	50-70	70-100	50-70
			●	f (mm/rev)	0.06-0.1	0.06-0.1	0.06-0.12	0.06-0.1	0.06-0.15	0.08-0.1
	Stainless Steel	Austenitic	2.5	V_c (m/min)	110-130	100-130	120-150	110-140	110-160	100-150
			●●●	f (mm/rev)	0.08-0.15	0.06-0.12	0.08-0.18	0.06-0.12	0.08-0.25	0.06-0.12
			4	V_c (m/min)	80-110	80-110	90-130	90-120	100-150	90-130
			●●	f (mm/rev)	0.08-0.12	0.06-0.1	0.08-0.12	0.06-0.1	0.08-0.18	0.06-0.1
			6.3	V_c (m/min)	60-90	50-70	60-90	50-70	70-100	50-70
			●	f (mm/rev)	0.06-0.1	0.06-0.1	0.06-0.12	0.06-0.1	0.06-0.15	0.06-0.1
	Cast Stainless Steel	Ferritic & Martensitic	2.5	V_c (m/min)	90-130	100-130	120-150	110-140	120-160	100-150
			●●●	f (mm/rev)	0.08-0.15	0.06-0.12	0.08-0.18	0.06-0.12	0.08-0.25	0.06-0.12
			4	V_c (m/min)	70-110	80-110	90-130	90-120	100-150	90-130
			●●	f (mm/rev)	0.08-0.12	0.06-0.1	0.08-0.12	0.06-0.1	0.08-0.18	0.06-0.1
			6.3	V_c (m/min)	60-90	50-70	60-90	50-70	70-100	50-70
			●	f (mm/rev)	0.06-0.1	0.06-0.1	0.06-0.12	0.06-0.1	0.06-0.15	0.06-0.1
	Cast Stainless Steel	Austenitic	2.5	V_c (m/min)	80-120	70-110	100-150	90-140	110-150	100-150
			●●●	f (mm/rev)	0.08-0.15	0.06-0.12	0.08-0.18	0.06-0.1	0.08-0.25	0.06-0.12
			4	V_c (m/min)	70-100	70-100	80-130	70-120	90-140	90-130
			●●	f (mm/rev)	0.08-0.12	0.06-0.1	0.08-0.12	0.06-0.1	0.08-0.18	0.06-0.1
			6.3	V_c (m/min)	60-90	50-70	60-90	50-70	70-100	50-70
			●	f (mm/rev)	0.06-0.1	0.06-0.1	0.06-0.12	0.06-0.1	0.06-0.15	0.06-0.1

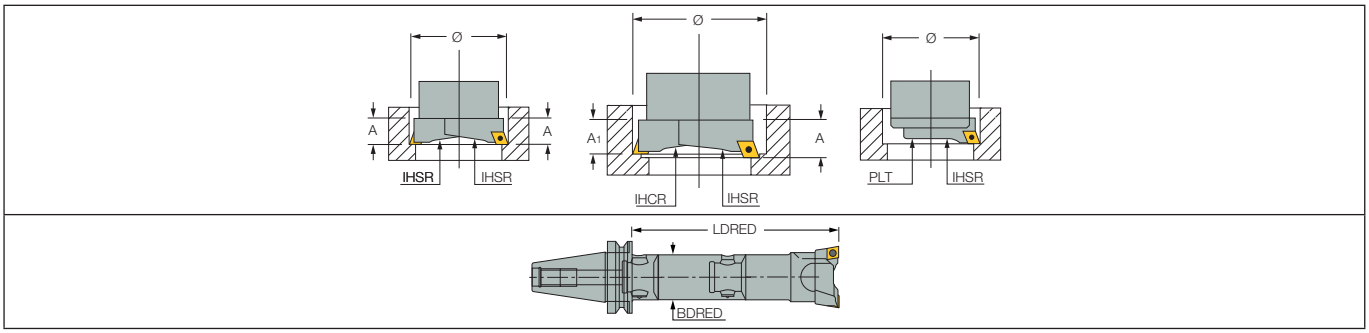
N.R. = Not Recommended

Stability

●●● Good

●● Normal

● Poor



In case of a single or a stepped boring cutter configuration, only half the feed should be applied.

BHR Rough Boring Cutting Data

ISO	Workpiece Material	Hardness HB	Overhang LDRED/BDRED	a_p (mm) RE (Radius)	Boring Range 68-120		Boring Range 120-200		Boring Range 200-500	
					0.8-1.8	1.8-2.5	0.8-2.0	2.0-3.0	0.8-2.0	2.0-3.5
					0.2-0.4	0.4-0.8	0.2-0.4	0.4-0.8	0.2-0.4	0.4-0.8
M	Stainless Steel	Ferritic & Martensitic	2.5	V_c (m/min)	130-220	120-200	140-220	120-180	150-220	120-20
			●●●	f (mm/rev)	0.08-0.3	0.08-0.25	0.08-0.3	0.08-0.25	0.08-0.3	0.08-0.25
			4	V_c (m/min)	100-160	90-140	120-180	90-140	N.R	N.R
			●●	f (mm/rev)	0.08-0.25	0.08-0.18	0.08-0.25	0.08-0.18		
			6.3	V_c (m/min)	70-100	50-70	N.R	N.R	N.R	N.R
			●	f (mm/rev)	0.08-0.2	0.08-0.15				
	Stainless Steel	Austenitic	2.5	V_c (m/min)	120-200	100-160	120-200	100-160	120-200	100-180
			●●●	f (mm/rev)	0.08-0.3	0.08-0.25	0.08-0.3	0.08-0.25	0.08-0.3	0.08-0.25
			4	V_c (m/min)	100-150	90-140	100-160	90-140	N.R	N.R
			●●	f (mm/rev)	0.08-0.25	0.08-0.18	0.08-0.25	0.08-0.18		
			6.3	V_c (m/min)	70-100	50-70	N.R	N.R	N.R	N.R
			●	f (mm/rev)	0.08-0.2	0.08-0.15				
	Cast Stainless Steel	Ferritic & Martensitic	2.5	V_c (m/min)	130-200	120-180	140-200	120-160	140-200	120-180
			●●●	f (mm/rev)	0.08-0.3	0.08-0.25	0.08-0.3	0.08-0.25	0.08-0.3	0.08-0.25
			4	V_c (m/min)	110-150	90-150	100-160	90-140	N.R	N.R
			●●	f (mm/rev)	0.08-0.25	0.08-0.18	0.08-0.25	0.08-0.18		
			6.3	V_c (m/min)	70-100	50-70	N.R	N.R	N.R	N.R
			●	f (mm/rev)	0.08-0.2	0.08-0.15				
	Cast Stainless Steel	Austenitic	2.5	V_c (m/min)	130-180	120-180	120-200	100-160	120-200	100-180
			●●●	f (mm/rev)	0.08-0.3	0.08-0.25	0.08-0.3	0.08-0.25	0.08-0.3	0.08-0.25
			4	V_c (m/min)	100-140	90-140	100-160	90-140	N.R	N.R
			●●	f (mm/rev)	0.08-0.25	0.08-0.18	0.08-0.25	0.08-0.18		
			6.3	V_c (m/min)	70-190	50-70	N.R	N.R	N.R	N.R
			●	f (mm/rev)	0.08-0.2	0.08-0.15				

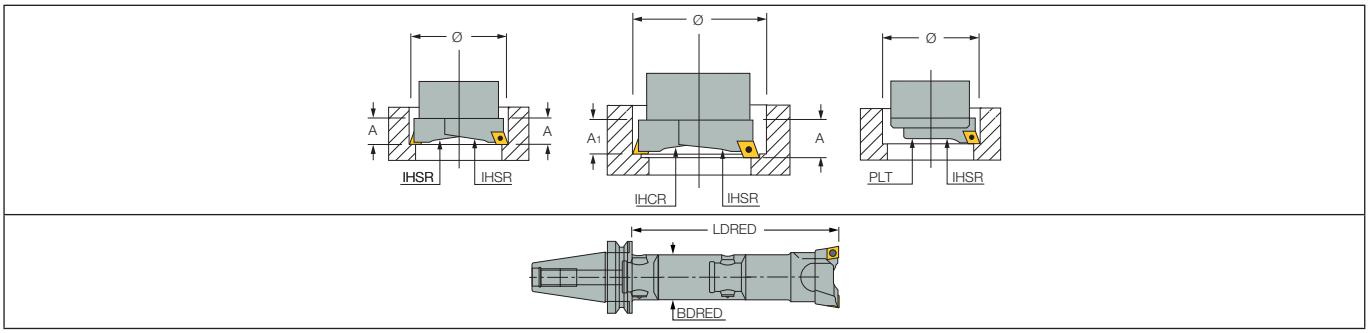
N.R. = Not Recommended

Stability

●●● Good

●● Normal

● Poor



In case of a single or a stepped boring cutter configuration, only half the feed should be applied.

BHR Rough Boring Cutting Data

ISO	Workpiece Material	Hardness HB	Overhang LDRED/BDRED	a_p (mm) RE (Radius)	Boring Range 18-28		Boring Range 28-50		Boring Range 50-68	
					0.5-1.0	1.0-1.8	0.5-1.0	1.0-1.8	0.5-1.2	1.2-2.0
					0.2-0.4	0.4	0.2-0.4	0.4	0.2-0.4	0.4-0.8
K	Gray Cast Iron GG 10-25	HB<200	2.5	V_c (m/min)	120-160	100-140	120-180	110-150	120-180	110-150
			●●●	f (mm/rev)	0.06-0.15	0.06-0.18	0.06-0.15	0.06-0.12	0.08-0.2	0.08-0.12
			4	V_c (m/min)	100-140	80-120	100-150	80-120	100-150	80-120
			●●	f (mm/rev)	0.06-0.12	0.06-0.1	0.06-0.12	0.06-0.1	0.08-0.12	0.08-0.1
			6.3	V_c (m/min)	70-100	60-90	70-100	60-90	70-100	60-90
			●	f (mm/rev)	0.06-0.1	0.06-0.1	0.06-0.1	0.06-0.1	0.08-0.1	0.08-0.1
	Gray Cast Iron GG 25-40		2.5	V_c (m/min)	140-200	140-200	140-220	160-250	180-220	200-280
			●●●	f (mm/rev)	0.06-0.15	0.06-0.18	0.06-0.15	0.06-0.18	0.08-0.2	0.1-0.25
			4	V_c (m/min)	120-160	120-160	120-180	140-200	140-180	180-220
			●●	f (mm/rev)	0.06-0.12	0.06-0.14	0.06-0.12	0.06-0.14	0.08-0.12	0.08-0.2
			6.3	V_c (m/min)	70-100	60-90	70-100	60-90	60-100	60-120
			●	f (mm/rev)	0.06-0.1	0.06-0.1	0.06-0.1	0.06-0.1	0.08-0.1	0.08-0.1
	Cast Iron GGG	Spheroidal & Graphite	2.5	V_c (m/min)	120-180	120-180	120-200	140-220	180-220	180-240
			●●●	f (mm/rev)	0.06-0.15	0.06-0.18	0.06-0.15	0.06-0.18	0.08-0.18	0.1-0.2
			4	V_c (m/min)	120-160	120-160	120-180	140-200	140-200	160-220
			●●	f (mm/rev)	0.06-0.12	0.06-0.14	0.06-0.12	0.06-0.14	0.08-0.12	0.08-0.18
			6.3	V_c (m/min)	60-100	60-90	60-100	60-90	60-90	60-100
			●	f (mm/rev)	0.06-0.1	0.06-0.1	0.06-0.1	0.06-0.1	0.08-0.1	0.08-0.1

ISO	Workpiece Material	Hardness HB	Overhang LDRED/BDRED	a_p (mm) RE (Radius)	Boring Range 68-120		Boring Range 120-200		Boring Range 50-68	
					0.8-1.8	1.8-2.5	0.8-2.0	2.0-3.0	0.8-2.0	2.0-3.5
					0.2-0.4	0.4-0.8	0.2-0.4	0.4-0.8	0.2-0.4	0.4-0.8
K	Gray Cast Iron GG 10-25	HB<200	2.5	V_c (m/min)	120-200	110-150	150-250	180-280	150-250	180-280
			●●●	f (mm/rev)	0.08-0.25	0.08-0.3	0.08-0.25	0.08-0.35	0.08-0.25	0.08-0.35
			4	V_c (m/min)	100-150	80-120	120-170	120-170	N.R	N.R
			●●	f (mm/rev)	0.08-0.18	0.08-0.2	0.08-0.18	0.08-0.25		
			6.3	V_c (m/min)	70-100	60-90	N.R	N.R	N.R	N.R
			●	f (mm/rev)	0.08-0.15	0.08-0.12				
	Gray Cast Iron GG 25-40		2.5	V_c (m/min)	250-300	250-350	250-350	250-350	250-350	250-350
			●●●	f (mm/rev)	0.12-0.35	0.12-0.35	0.15-0.3	0.15-0.4	0.15-0.3	0.15-0.4
			4	V_c (m/min)	200-270	230-300	200-300	200-270	N.R	N.R
			●●	f (mm/rev)	0.1-0.25	0.12-0.3	0.15-0.3	0.15-0.35		
			6.3	V_c (m/min)	70-150	60-120	N.R	N.R	N.R	N.R
			●	f (mm/rev)	0.1-0.15	0.12-0.25				
	Cast Iron GGG	Spheroidal & Graphite	2.5	V_c (m/min)	200-240	200-280	200-280	220-300	220-300	220-300
			●●●	f (mm/rev)	0.12-0.3	0.12-0.3	0.15-0.3	0.15-0.35	0.15-0.3	0.15-0.35
			4	V_c (m/min)	160-220	180-240	180-250	200-270	N.R	N.R
			●●	f (mm/rev)	0.1-0.2	0.12-0.25	0.12-0.2	0.15-0.35		
			6.3	V_c (m/min)	60-100	60-100	N.R	N.R	N.R	N.R
			●	f (mm/rev)	0.1-0.15	0.12-0.2				

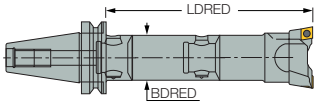
N.R. = Not Recommended

Stability

●●● Good

●● Normal

● Poor



In case of a single or a stepped boring cutter configuration, only half the feed should be applied.

BHR Rough Boring Cutting Data

ISO	Workpiece Material	Hardness HB	Overhang LDRED/BDRED	a_p (mm) RE (Radius)	Boring Range 18-28		Boring Range 28-50		Boring Range 50-68	
					0.5-1.5	1.5-2.5	0.5-1.5	1.5-2.5	0.5-2.0	1.2-3.0
					0.2-0.4	0.4	0.2-0.4	0.4	0.2-0.4	0.4-0.8
N	Aluminum / Cast	>12si	2.5	V_c (m/min)	200-300	240-350	200-300	240-350	200-300	240-35
			●●●	f (mm/rev)	0.06-0.2	0.06-0.25	0.06-0.2	0.06-0.25	0.06-0.25	0.06-0.3
			4	V_c (m/min)	150-220	150-220	150-220	150-220	150-220	150-220
			●●	f (mm/rev)	0.06-0.2	0.06-0.2	0.06-0.2	0.06-0.2	0.06-0.2	0.06-0.2
			6.3	V_c (m/min)	60-100	60-100	60-100	60-100	60-100	60-100
			●	f (mm/rev)	0.06-0.1	0.06-0.1	0.06-0.1	0.06-0.1	0.06-0.1	0.06-0.1
	Aluminum / Cast	<12si	2.5	V_c (m/min)	180-250	220-280	180-250	220-280	180-250	220-280
			●●●	f (mm/rev)	0.06-0.2	0.06-0.25	0.06-0.25	0.06-0.25	0.06-0.25	0.06-0.3
			4	V_c (m/min)	120-220	120-220	120-220	120-220	120-220	120-220
			●●	f (mm/rev)	0.06-0.2	0.06-0.2	0.06-0.2	0.06-0.2	0.06-0.2	0.06-0.25
			6.3	V_c (m/min)	60-100	60-100	60-100	60-100	60-100	60-100
			●	f (mm/rev)	0.06-0.1	0.06-0.1	0.06-0.1	0.06-0.1	0.06-0.1	0.06-0.1

ISO	Workpiece Material	Hardness HB	Overhang LDRED/BDRED	a_p (mm) RE (Radius)	Boring Range 68-120		Boring Range 120-200		Boring Range 200-500	
					0.8-3.0	1.8-4.0	0.8-3.0	2.0-4.0	0.8-3.0	2.0-4.5
					0.2-0.4	0.4-0.8	0.2-0.4	0.4-0.8	0.2-0.4	0.4-0.8
N	Aluminum / Cast	>12si	2.5	V_c (m/min)	200-300	240-350	200-300	240-350	200-300	240-350
			●●●	f (mm/rev)	0.06-0.25	0.06-0.3	0.06-0.25	0.06-0.4	0.06-0.25	0.06-0.4
			4	V_c (m/min)	150-220	150-220	150-220	150-220	N.R	N.R
			●●	f (mm/rev)	0.06-0.2	0.06-0.2	0.06-0.2	0.06-0.2		
			6.3	V_c (m/min)	60-100	60-100	N.R	N.R	N.R	N.R
			●	f (mm/rev)	0.06-0.1	0.06-0.1				
	Aluminum / Cast	<12si	2.5	V_c (m/min)	180-250	220-280	180-250	220-280	180-250	220-280
			●●●	f (mm/rev)	0.06-0.25	0.06-0.3	0.06-0.3	0.06-0.4	0.06-0.3	0.06-0.4
			4	V_c (m/min)	120-220	120-220	120-220	120-220	N.R	N.R
			●●	f (mm/rev)	0.06-0.2	0.06-0.2	0.06-0.2	0.06-0.2		
			6.3	V_c (m/min)	60-100	60-100	N.R	N.R	N.R	N.R
			●	f (mm/rev)	0.06-0.1	0.06-0.1				

N.R. = Not Recommended

Stability

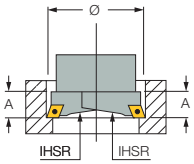
●●● Good

●● Normal

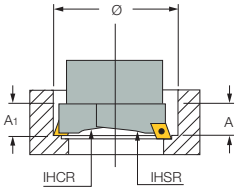
● Poor

Cutting Conditions

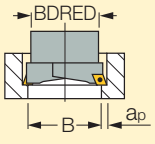
Cutting Conditions for BHR Rough Boring Heads



Twin boring cutters with the same cutting diameter



Twin boring cutters with different cutting diameters and heights (Z=1)



B Working Range	a_p Steel	a_p Cast Iron, Aluminum
18-28	a_p - 1.5-2	a_p - 2-2.5
28-50	a_p - 2-3	a_p - 2.5-3.5
50-68	a_p - 3-4	a_p - 3.5-5
68-200	a_p - 4-5	a_p - 5-7
200-500	a_p - 5-6	a_p - 6-8

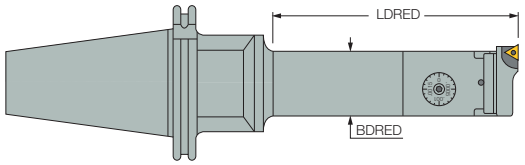
It's advisable to start with B hole≥boring bar diameter d

Cutting Conditions for Boring Operations with BHC Combi Rough and Fine

ISO	Material	Boring Depth to Diameter Ratio	Working Conditions	Cutting Speed V_c=m/min	Feed fn=mm/rev		Carbide Grade	Cutting Depth mm			
					RE=0.2	RE=0.4		Finishing	Roughing		
									Ø28-Ø46	Ø46-Ø75	Ø75-Ø160
P	Carbon Steel HB < 200	LDRED/BDRED = 2.5	good	160-250	0.1-0.2	0.1-0.2	IC807, IC908, IC520N, IC20N, IC30N, IC8150, IC8250, IC3028	0.15-0.3	1.5	2	2.5
		LDRED/BDRED = 4	normal	120-180	0.1-0.2	0.1-0.2					
		LDRED/BDRED = 6.3	difficult	70-100	*0.1-0.15	0.1-0.2					
	Carbon Steel HB > 200	LDRED/BDRED = 2.5	good	140-200	0.1-0.2	0.1-0.2		0.15-0.3	1.5	2	2.5
		LDRED/BDRED = 4	normal	100-160	0.1-0.2	0.1-0.2					
		LDRED/BDRED = 6.3	difficult	70-100	*0.1-0.15	0.1-0.2					
M	Stainless Steel AISI 304-316	LDRED/BDRED = 2.5	good	100-140	0.1-0.2	0.1 -0.2	IC807, IC30N, IC3028	0.15-0.3	1.5	2	2.5
		LDRED/BDRED = 4	normal	80-110	0.1-0.2	0.1 -0.2					
		LDRED/BDRED = 6.3	difficult	60-90	*0.1-0.15	0.1-0.2					
K	Cast Iron	LDRED/BDRED = 2.5	good	120-160	0.1-0.2	0.1 -0.2	IB55, IC908, IC5005, IC428	0.15-0.3	2	2.5	3
		LDRED/BDRED = 4	normal	90-120	0.1-0.2	0.1 -0.2					
		LDRED/BDRED = 6.3	difficult	60-90	*0.1-0.15	0.1-0.2					
N	Aluminum	LDRED/BDRED = 2.5	good	250-350	0.1-0.2	0.1-0.2	ID5, IC20	0.15-0.3	2	2.5	3
		LDRED/BDRED = 4	normal	160-250	0.1-0.2	0.1-0.2					
		LDRED/BDRED = 6.3	difficult	100-150	*0.1-0.15	0.1-0.2					

* Only for finishing Inserts.
** Use inserts with the same corner radii for both roughing and finishing inserts

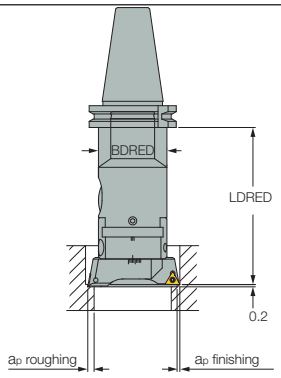
V_c Cutting speed (m/min)
D Diameter of workpiece (mm)
n Number of revolutions / min' (rev./min)
V_f Feed rate (mm/min.)
fn Feed / rev/ (mm/rev)
∏ 3.14



$$Vc = \frac{\prod \cdot D \cdot n}{1000}$$

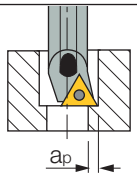
$$n = \frac{Vc\ 1000}{\prod \cdot D}$$

$$Vf = n \cdot fn$$



In case of a single or a stepped boring cutter configuration, only half the feed should be applied.

Cutting Conditions for BHD / BHF / BHE Fine Boring Heads



ISO	Material	LDRED/BDRED	Stability	Cutting Speed V_c=m/min	Feed f=mm/rev Insert Radius		Insert Grade
					RE=0.2	RE=0.4	
P	Carbon Steel HB<200	LDRED/BDRED=2.5	good	200-300	0.05-0.08	0.08-0.10	IC20N
		LDRED/BDRED=4	normal	160-250	0.05-0.08	0.08-0.10	IC30N
		LDRED/BDRED=6.3	difficult	70-100	0.05-0.08	-	IC54
	Carbon Steel HB<200	LDRED/BDRED=2.5	good	160-250	0.05-0.08	0.08-0.10	IC20N
		LDRED/BDRED=4	normal	150-200	0.05-0.08	0.08-0.10	IC30N
		LDRED/BDRED=6.3	difficult	70-100	0.05-0.08	-	
M	Stainless Steel AISI 304-316	LDRED/BDRED=2.5	good	120-160	0.05-0.08	0.08-0.10	IC54
		LDRED/BDRED=4	normal	100-140	0.05-0.08	0.08-0.10	
		LDRED/BDRED=6.3	difficult	70-100	0.05-0.08	-	
K	Cast Iron	LDRED/BDRED=2.5	good	120-160	0.05-0.08	0.08-0.10	IC20
		LDRED/BDRED=4	normal	100-140	0.05-0.08	0.08-0.10	
		LDRED/BDRED=6.3	difficult	70-100	0.05-0.08	-	
N	Aluminum	LDRED/BDRED=2.5	good	300-400	0.05-0.08	0.08-0.10	IC20
		LDRED/BDRED=4	normal	250-350	0.05-0.08	0.08-0.10	
		LDRED/BDRED=6.3	difficult	100-150	0.05-0.08	-	

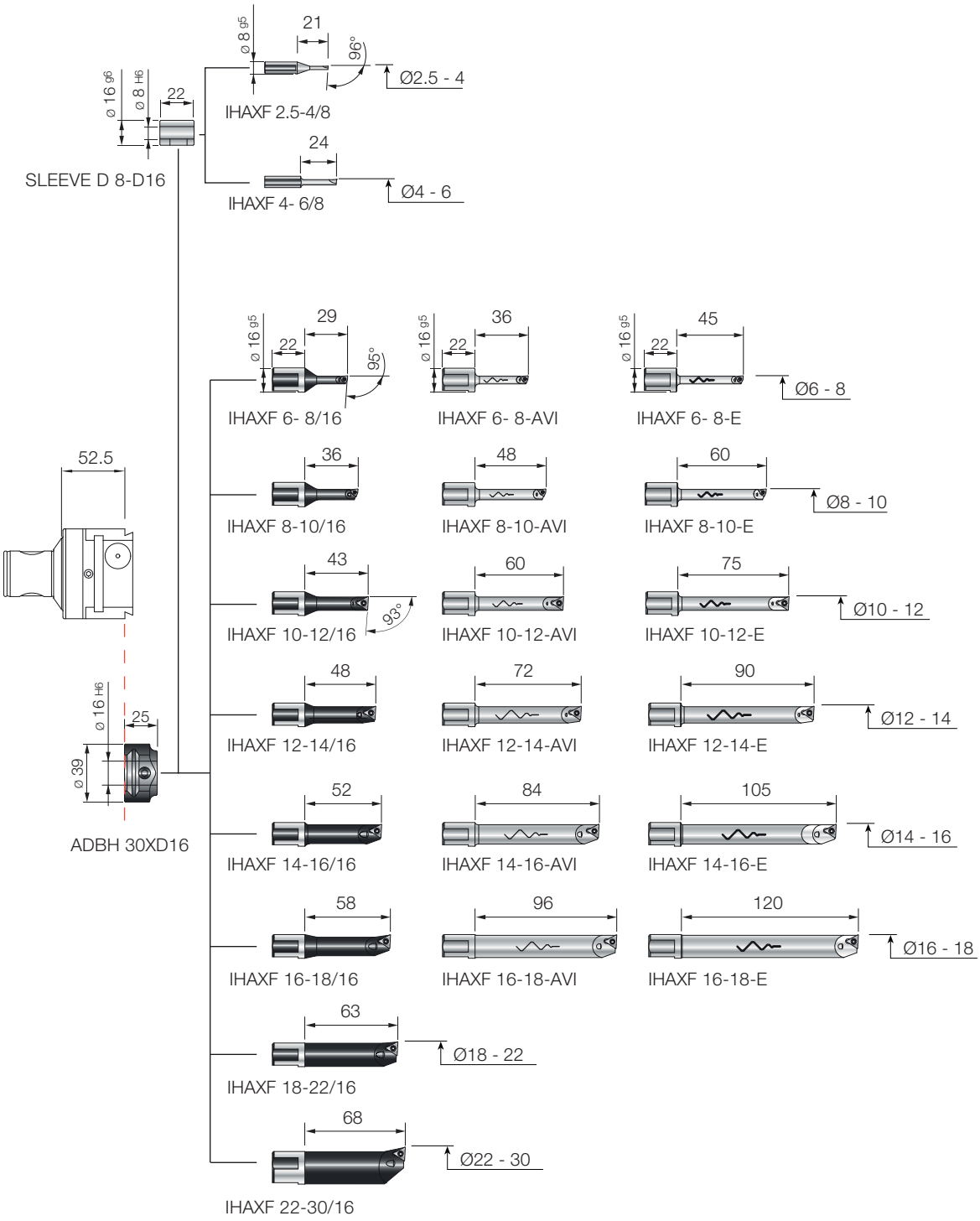
(1) a_p=0.1 min

Fine Boring Head Range

2 µm Direct Diametric Adjustment

BHF MB50-80x94
BHF MB80-80x94
ø2.5-160

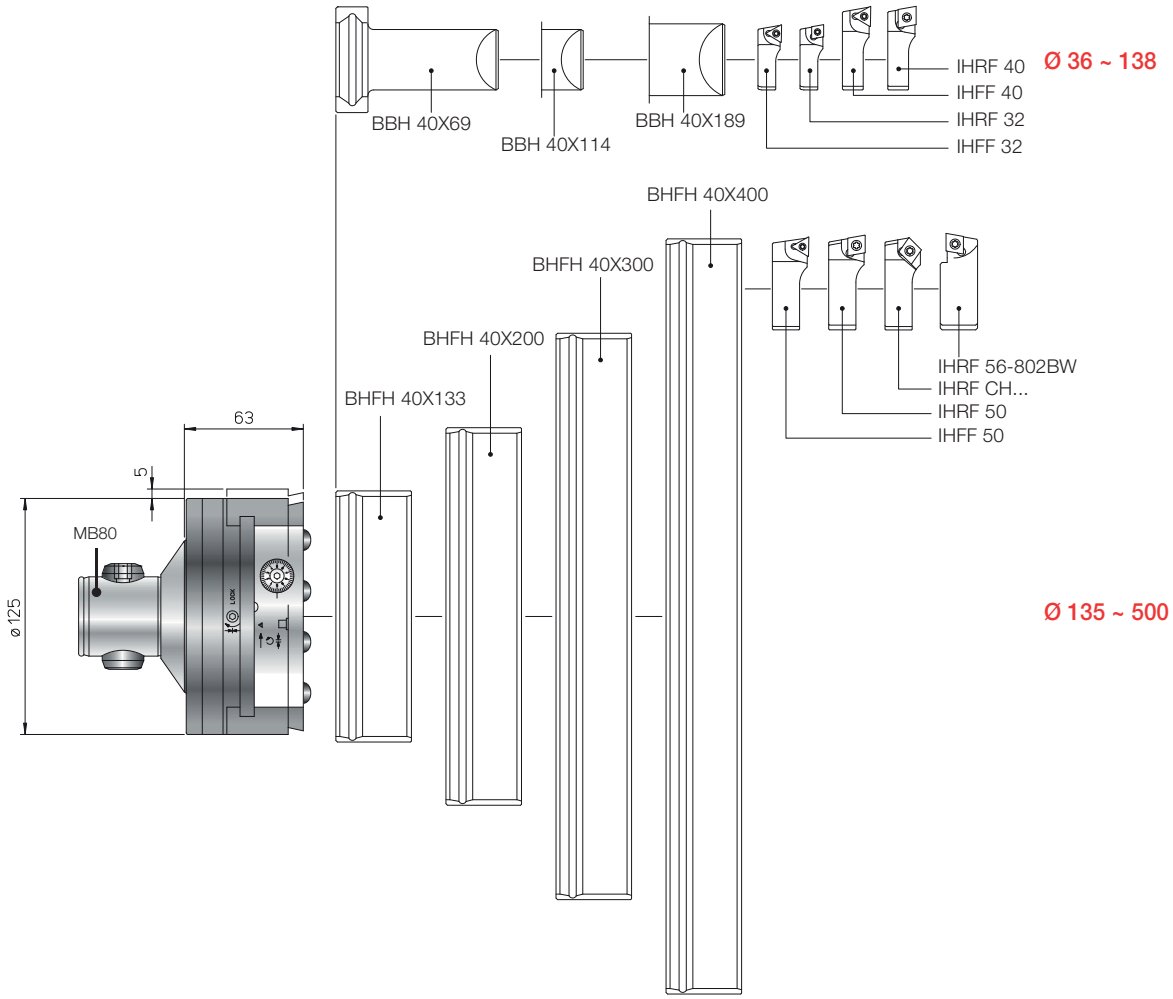
2 µm



Fine Boring Head Range

2 µm Direct Diametric Adjustment

BHF MB80-125x114
ø36-500

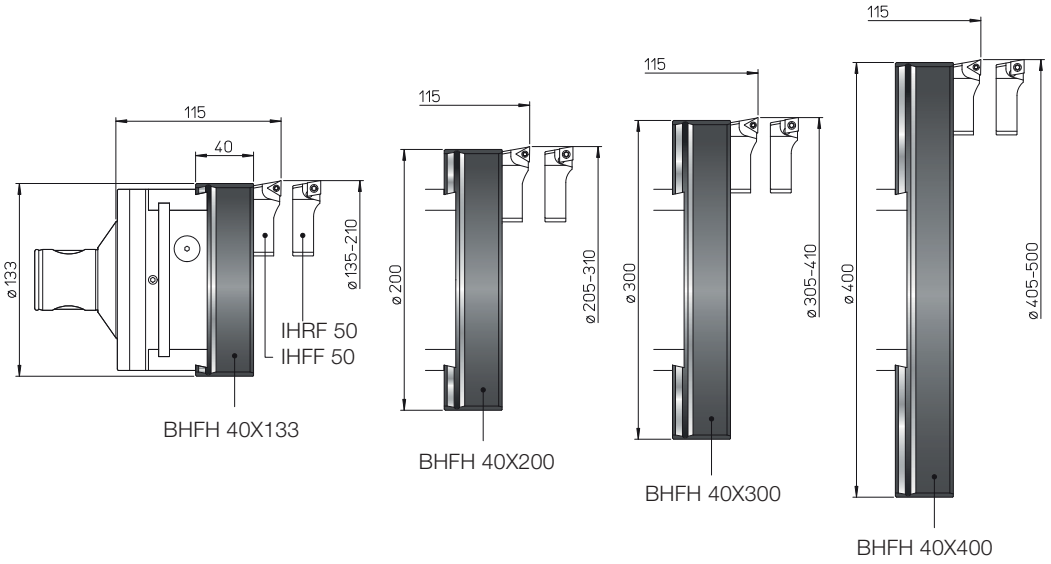


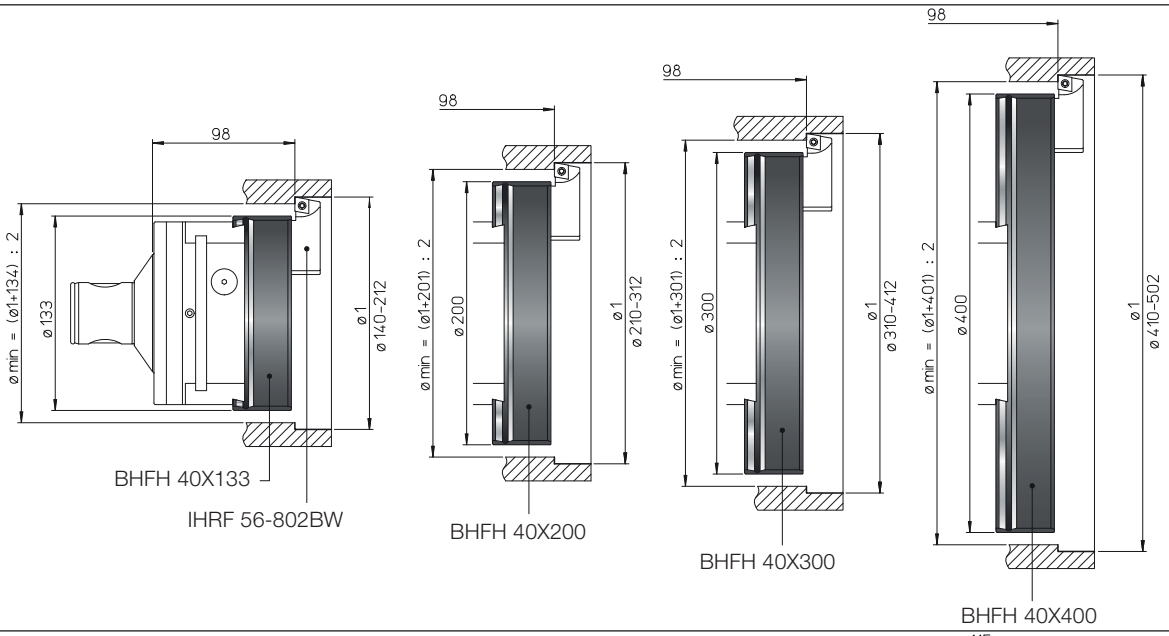
Fine Boring Head Range

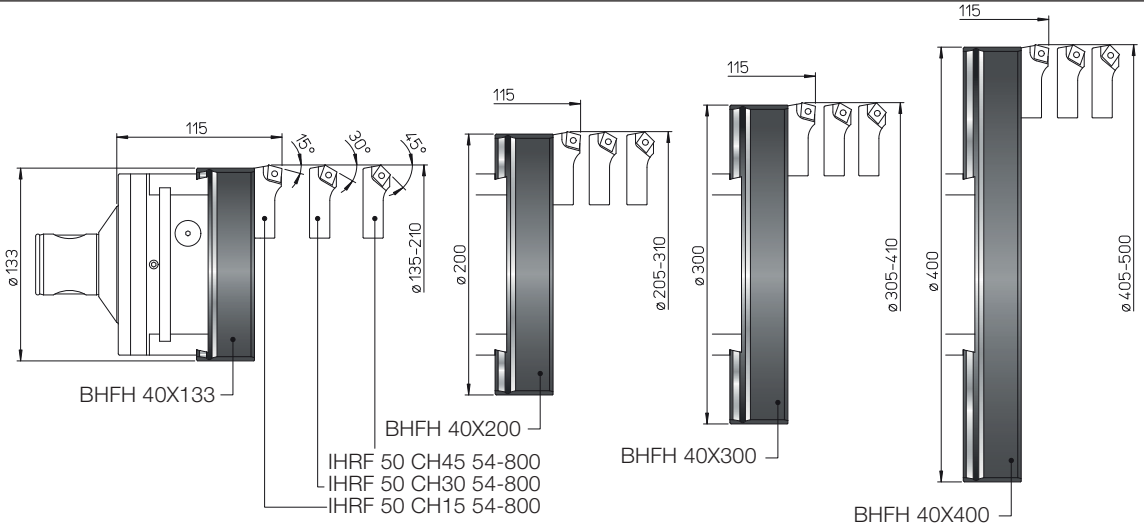
2 µm Direct Diametric Adjustment

BHF MB80-125x114
ø2.5-160

2 µm



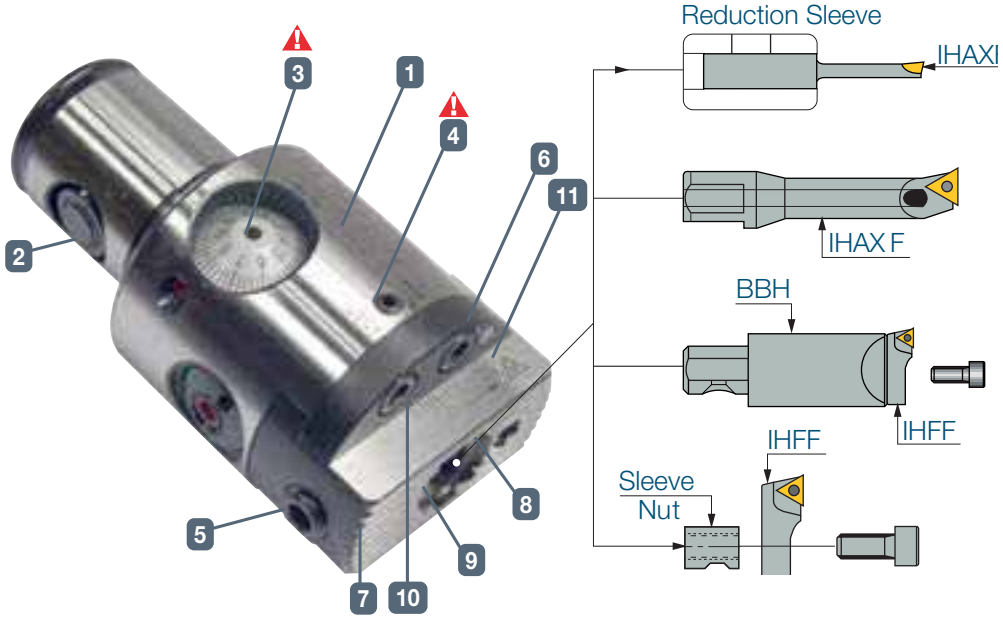




Fine Boring Head BHF 16-50

Operating Instructions

BHF 50 Shown



1. Body
2. Expanding pin
3. Graduated dial
4. Slide locking screw
5. Toolholder locking screw
6. Coolant nozzle
7. Serrated face
8. Oiling nipple
9. Tool bore 16H7
10. Slide adjustment range
    Do not exceed the range marks!!
11. Cutting edge position mark

Assembly

- Before mounting the BHF boring head, make sure the expanding pin **[2]** does not protrude from the cylindrical body part.
- Insert BHF into the shank.
- Tighten pin [2] by turning clockwise following the recommended tightening torque guidelines below:

Recommended torque:	(N.m)
BHF MB16-16x34	2.0 - 2.5
BHF MB20-20x40	4.0 - 4.5
BHF MB25-25x50	6.5 - 7.5
BHF MB32-32x63	7.0 - 8.0
BHF MB40-40x80	16.0 - 18.0
BHF MB50-50x60	30.0 - 35.0

- Insert the screw **[5]**. If it protrudes, the sleeve should be rotated until the screw can enter the recess in the sleeve nut, reduction sleeve or boring bar.

Disassembly

In order to separate the BHF from the shank, loosen the expanding pin **[2]** by turning counterclockwise.

Positioning

- The tool slide **[7]** allows for a 4 mm adjustment by turning graduated dial **[3]** counterclockwise.
- When changing the direction of the dial rotation, backlash must be compensated for.
- After positioning, lock the tool slide by means of the screw **[4]**.
- Loosen screw [4] before making any slide adjustment.

Maintenance

Weekly:

- Lubricate through the nipple **[8]** with ISO UN G220 oil.

Periodically:

- Clean and lubricate the conical and cylindrical matching surfaces.
- Treat expanding pin **[2]** with an anti-friction lubricant.
- Clean and lubricate the tool slide guideway.

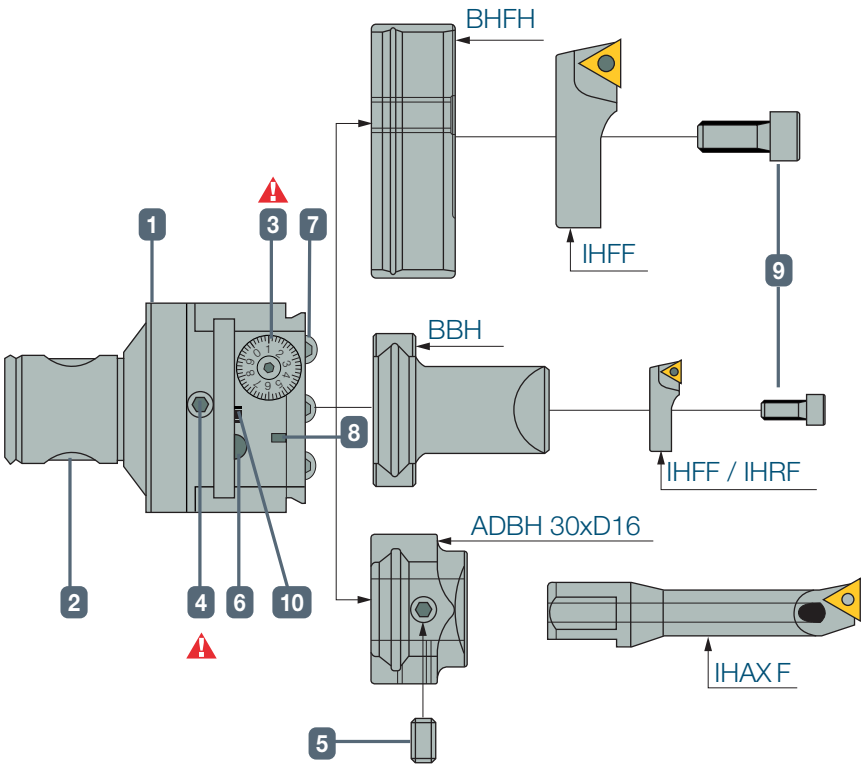
Important Note:

Toolholder should be firmly affixed to the slide.

Fine Boring Head BHF 63-125

Operating Instructions

BHF 50 Shown



1. Body
2. Expanding pin
3. Graduated dial
4. Slide locking screw
5. Toolholder locking screw
6. Coolant nozzle
7. Slide holder
8. Oiling nipple
9. Toolholder locking screws
10. Slide adjustment range
    Do not exceed the range marks

Assembly

- Before mounting the BHF boring head, make sure the expanding pin **[2]** does not protrude from the cylindrical body part.
- Insert BHF into the shank.
- Tighten pin [2] by turning clockwise following the recommended tightening torque guidelines below:

Recommended torque:	(N.m)
BHF MB50- 63x87	30-35
BHF MB50- 80x94	30-35
BHF MB63- 63x87	80-90
BHF MB80- 80x94	80-90
BHF MB80-125x94	80-90

- Insert the screw **[5]**. If it protrudes, the sleeve should be rotated until the screw can enter the recess in the sleeve nut or boring bar.

Disassembly

In order to separate the BHF from the shank, loosen the expanding pin **[2]** by turning counterclockwise.

Positioning

- The tool slide **[7]** allows for a 5 mm adjustment by turning graduated dial **[3]** counterclockwise.
- When changing the direction of the dial rotation, backlash must be compensated for.
- After positioning, lock the tool slide by means of the screw **[4]**.
- Loosen screw [4] before making any slide adjustment.

Maintenance

Weekly:

- Lubricate through the nipple **[8]** with ISO UN G220 oil.

Periodically:

- Clean and lubricate the conical and cylindrical matching surfaces.
- Treat expanding pin **[2]** with an anti-friction lubricant.
- Clean and lubricate the tool slide guideway.

Important Note:

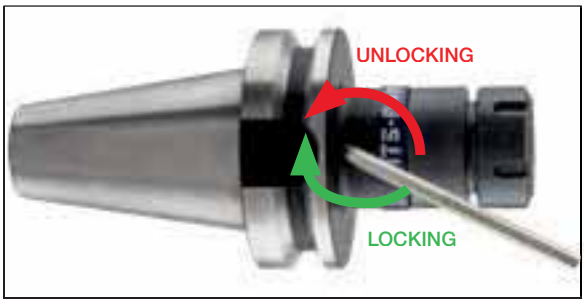
Toolholder should be firmly affixed to the slide.

Operation and Maintenance

MB Connection

To LOCK, rotate the radial pin clockwise

To UNLOCK, rotate the radial pin counter-clockwise
Table shows the recommended tightening torques:

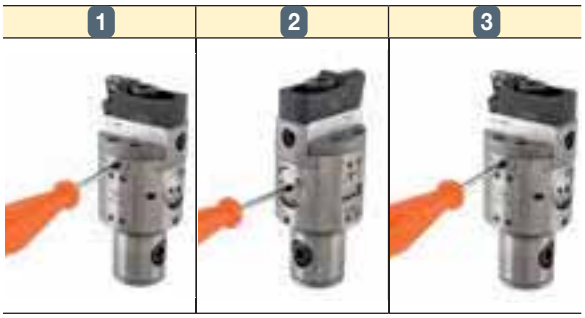


Before assembling the MB connection elements, make sure the radial pin is not projected from the cylindrical parts.

CORRECT 4	WRONG 7
	

Stages for adjusting boring heads with dial:

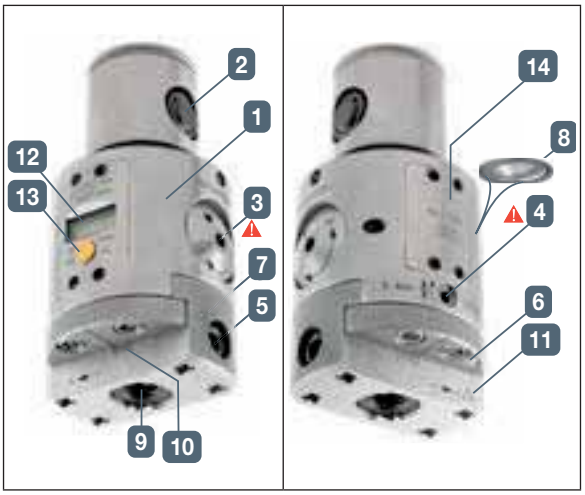
1. Loosen slide adjustment screw
2. Adjust the dial screw
3. Tighten slide adjustment screw



Driving Torque	
MB	**Nm**
MB14	2-2.5
MB16	2-2.5
MB20	4-4.5
MB25	6.5-7.5
MB32	7-8
MB40	16-18
MB50	30-35
MB63	70-80
MB80	70-80
MB110	200-220

BHD Digital Fine Boring Head Metric/Inch Operating Instructions

BHD MB 80-32



Tighten pin [2] by turning clockwise
Following the recommended tightening torque guidelines below:

Designation	(Nm)	(Lbf.ft)	Allen Key (mm)
BHD MB32-32-83	7.0-8.0	5.16-5.90	4
BHD MB40-40-90	16.0-18.0	11.80-13.28	5
BHD MB50-50-60	30.0-35.0	22.13-25.81	6
BHD MB63-63-89	70.0-80.0	51.63-59.0	8
BHD MB80-80-104	70.0-80.0	51.63-59.0	8

1. Body
2. Expanding pin
3. Dial
4. Slide locking screw
5. Toolholder locking screw
6. Coolant nozzle
7. Slide holder
8. Oiling nipple
9. Tool bore 16H7
10. Slide adjustment range
11. Cutting edge position mark
12. Digital display
13. Selection button
14. Battery cover

Assembly

- Before mounting the BHD boring head, make sure the expanding pin **[2]** does not protrude from the cylindrical body part.
- Insert BHD boring head into the shank.

⚠ Tighten pin [2] by turning clockwise.

- Tighten screw **[5]**. If it protrudes, the sleeve should be rotated until the screw can enter the recess in the sleeve nut or boring bar.

Disassembly
To separate the BHD from the shank, loosen the expanding pin **[2]** by turning counterclockwise.

Positioning
The display **[12]** shows the value of the adjustment diameter with a 2µm screen resolution.

- Switch on the BHD boring head by pushing the selection button **[13]**. The display **[12]** will show the value of the previous adjustment. To reset the value displayed, press and hold the button **[13]**. After 2 seconds, the display will show. Release the button. The display will show the value 0.000.

⚠ Loosen screw [4] before making any slide adjustment to the dial [3].

- Adjust the required diameter by turning the dial **[3]** counterclockwise. The tool slide **[7]** allows a 5mm radial adjustment. The display **[12]** will show the new value in diameter. The absolute value CANNOT be viewed, only the relative value.
- After positioning, lock the tool slide by means of the screw **[4]** see torque recommendation. If unused for more than 30 seconds, the display switches off automatically.

WARNINIG
⚠ DO NOT perform any slide movement when the display is switched off.
⚠ DO NOT exceed the range marks [10].

Before carrying out a fine adjustment (described in FIG.3):
1 Loosen screw **[4]** of slide adjustment.
2 Adjust dial **[3]** to required diameter.
3 Tighten screw **[4]**.

Setting metric/inch
To change unit readout from metric to inch:

- Press and hold the button **[13]**. The display shows "----", after 10 sec the new unit readout appears on the left of the display.
- Release the button.

BHD Digital Fine Boring Head Metric/Inch Operating Instructions

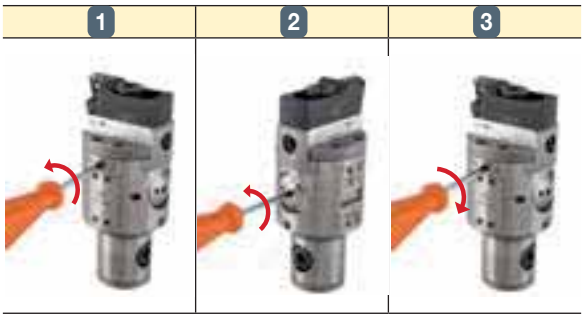


Fig. 3

Locking Screw Tightening Torques (Nm)

Designation:	(Nm)
BHD MB32-32-83	2.0
BHD MB40-40-90	2.5
BHD MB50-50-60	3.0
BHD MB63-63-89	3.5
BHD MB80-80-104	4.0

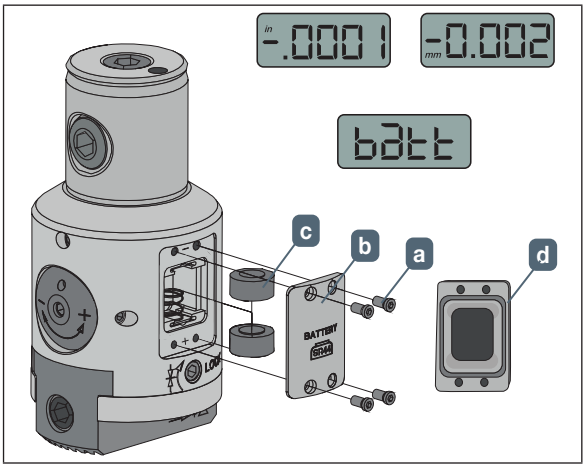


Fig. 4

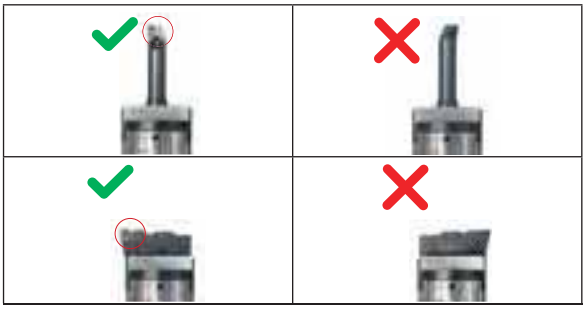


Fig. 5

Battery Replacement

When the batteries are low the display will show a warning sign "batt" for a few seconds (FIG.4). It is recommended to replace the batteries as soon as possible.

To replace the batteries (**FIG.5**):

- Remove the battery compartment cover **[b]** by unscrewing the 4 screws **[a]**.
- Replace the two batteries using type SR44 1.55V and position them in the correct direction.
- Tighten the 4 screws **[a]**.
- The integrated seal **[d]** is now secured on the battery cover.

Maintenance Weekly:

- Lubricate through the nipple **[8]** with ISO UN G220 oil.

Periodically:

Clean and lubricate the conical and cylindrical matching surfaces.

Treat the expanding pin **[2]** with an anti-friction lubricant.

Clean and lubricate the tool slide guide way.

WARNING

- The only maneuvering and adjustment screws to be used are those listed in the components section.
- The screws not listed in the components section should not be touched so as to avoid malfunction of the boring bars and heads.
- Bit holders and boring bars should be assembled with the insert turned in the same direction as the screw **[4]**.
- The use of coolant on the BHD boring head double-bit heads should be 40 BAR max.
- The machine tool must be equipped with all of the active and passive safety devices that will assure safe use of the BHD boring head.
- ISCAR requires that the machine tools where the BHD boring head is mounted comply with the provisions of the 2006/42/CE directive.

Inserts

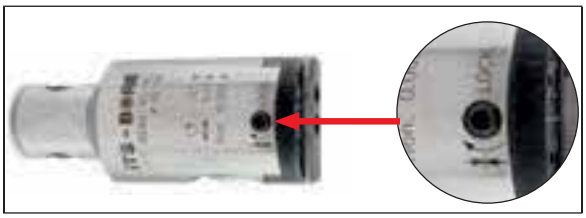
We advise you to use the inserts proposed by ISCAR. The use of different inserts can affect ultimate machining results.

Cartridge should be mounting according to the insert symbol direction

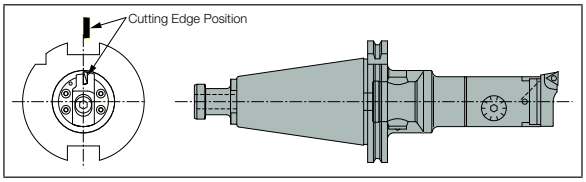
CORRECT 4	WRONG 7
	

CORRECT 4	WRONG 7
	

Warning: slide position must be adjusted within the indicated limits. Excess movements damage internal kinematics



When BHF is assembled, the cutting edge should be positioned in relation to the arbor key slots.



Maintenance

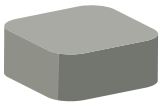
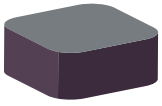
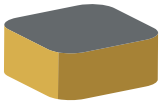
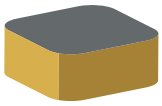
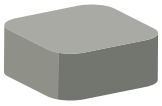
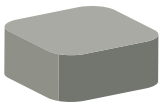
Boring heads should be lubricated with ISO UN G220 oil weekly

ITSBORE

Complete Machining Solutions
MATERIALS AND GRADES

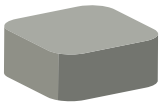
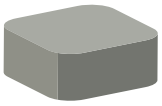
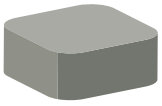
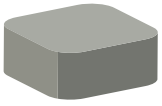
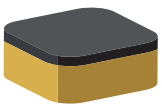
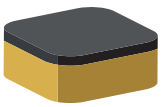
Member IMC Group

ISCAR Hole Making Grades Chart

	Grade	ISO	Grade Description	Coating Layers	*Coating Color
PVD COATED	IC328	P25-P40 M30-M40 S20-S30 	A tough substrate with PVD coating, suitable for wide range of applications on steel and stainless steel at low to medium speeds and medium to high feeds. The grade is recommended for interrupted cuts and machining under unstable conditions.	TiCN Base	
	IC508	P20-P40 M20-M30 K20-K30 N10-N30 S10-S25 H20-H30	A broad-spectrum grade with a tough-submicron fine grain substrate and PVD coating. Designed for machining main types of engineering materials at various cutting speeds. Features excellent notch wear and built-up edge resistance. Suitable for interrupted cutting and machining under unfavorable conditions.	TiN TiCN Base	
	IC520	 M10-M20 N10-N15 S10-S20 	A hard substrate PVD coated grade. Intended mainly for machining austenitic stainless steel, high-temperature alloys and Titanium.	TiN TiCN Base	
	IC806	P10-P20 M10-M20 K10-K25 	A hard submicron fine grain substrate, PVD coated grade followed by a SUMOTEC surface treatment. Applied mainly to machining heat- resistant superalloys at moderate cutting speeds.	TiAlN AlTiN Base	
	IC808	P15-P30 M20-M30 K20-K30 S10-S25 H20-H30	A tough, submicron fine grain size substrate with excellent chipping resistance, combined with a SUMOTEC PVD coating. Provides high wear resistance. Recommended for a very wide range of materials.	TiN TiAlN Base	
	IC808G	P15-P30 M20-M30 K15-K25 S10-S25 H10-H20	A tough, submicron fine grain size substrate with PVD coating. Features high resistance to chipping and abrasive wear. Designed for machining a wide variety of engineering materials.	TiN TiAlN Base	
	IC830	P20-P40 M25-M35 S15-S30 	A tough substrate with PVD coating and a special SUMOTEC surface treatment. Suitable for machining steel and stainless steel at low to medium cutting speeds and moderate to high feeds. The grade features high toughness and recommended for interrupted cuts and machining under unstable conditions. May be used on high temperature alloys at low cutting speeds.	TiN TiAlN Base	
	IC903	P10-P20 M15-M25 K10-K20 S10-S20 H10-H20	Ultra-fine grain size, PVD coated. High wear resistance and toughness. High speed, medium feed. Used for up to 62 HRC hardened steel, Titanium, nickel-based alloys and stainless steel.	AlTiN Base	
	IC907	P10-P20 M05-M15 K15-K30 S10-S20 H05-H15	A hard submicron grain size substrate with a PVD coating, suitable for a wide range of a materials such as steels, alloy steels, hard steels, austenitic stainless steel and heat resistant alloys at moderate to relatively high cutting speeds under stable conditions. Features high wear resistance and plastic deformation durability.	TiAlN Base	

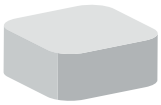
* For coated grades

ISCAR Hole Making Grades Chart

	Grade	ISO	Grade Description	Coating Layers	*Coating Color
PVD COATED	IC908	P15-P30 M20-M30 K20-K30 S10-S25 H20-H30	A tough submicron grain size substrate with PVD coating, recommended for general use in a large variety of operations and materials such as steels, alloy steels, austenitic stainless steel and high temperature alloys at moderate cutting speeds. Features high wear resistance and chipping durability.	TiAlN Base	
	IC920	 K10-K20 N10-N25 	A PVD coated carbide grade that features good fracture toughness and high wear resistance. Used mostly for machining nodular cast iron at medium cutting speed.	TiAlN Base	
	IC928	P20-P40 M25-M35 S15-S30 	A tough substrate with PVD coating, suitable for machining steel and stainless steel at low to medium cutting speeds and moderate to high feeds. The grade is recommended for interrupted cuts and machining under unstable conditions.	TiAlN Base	
	IC950	P15-P35 K15-K35 	A PVD coated grade with excellent wear resistance. Generally used for heavy machining alloy steel and cast iron.	TiAlN Base	
	IC1008	P10-P20 M05-M15 K15-K30 S10-S20 H05-H15	A tough submicron grain size substrate with coating. Recommended for general use on a wide range of applications and materials as steels, alloy steels, austenitic stainless steel and high temperature alloys at moderate cutting speeds.	TiN TiAlN Base	
CVD COATED	IC5500	P20-P35 	A tough substrate with SUMOTEC CVD coating. Recommended for high speed drilling of steel. Provides excellent tool life.	TiN Al_2O_3 TiCN Base	
	IC8080	P10-P20 K10-K20 	A submicron grain size substrate with SUMOTEC MTCVD coating. Features excellent chipping and wear resistance. Recommended for high speed drilling of cast iron and steel, to be used for the peripheral insert on DR drills.	TiN Al_2O_3 TiCN Base	
	IC9025	P20-P30 M15-M30 	A tough substrate with a cobalt enriched layer combined with a multi-layer CVD coating. Recommended for general use machining of steel in a wide range of conditions, featuring high toughness and wear resistance.	TiN Al_2O_3 TiCN Base	
	IC9080	P10-P20 K10-K20 	A submicron grain size substrate with a CVD coating. Features excellent chipping and wear resistance. Recommended for high speed drilling of cast iron and steel, to be used for the peripheral insert on DR drills.	TiN Al_2O_3 TiCN Base	

* For coated grades

ISCAR Hole Making Grades Chart

	Grade	ISO	Grade Description	Uncoated Layers	Uncoated
UNCOATED	IC03	S10-S20 H15-H25	An uncoated, ultra-fine carbide grain size, which is characterized by high wear resistance and toughness. Used mainly for machining high-temperature superalloys and Titanium, may be applied to cutting hardened steel and cast iron.	Base	
	IC07	M10-M20 N05-N20 S10-S30	A hard-uncoated submicron grain size carbide grade, suitable for machining aluminum alloys and other non-ferrous materials at high cutting speeds.	Base	
	IC08	M10-M30 N10-N25 S10-S30	A tough uncoated submicron grain size carbide grade, suitable for steels, stainless steel and high temperature alloys at low cutting speeds. Good choice for non-ferrous materials.	Base	

MATERIAL GROUPS

Based on ISO 513 and VDI 3323 standards

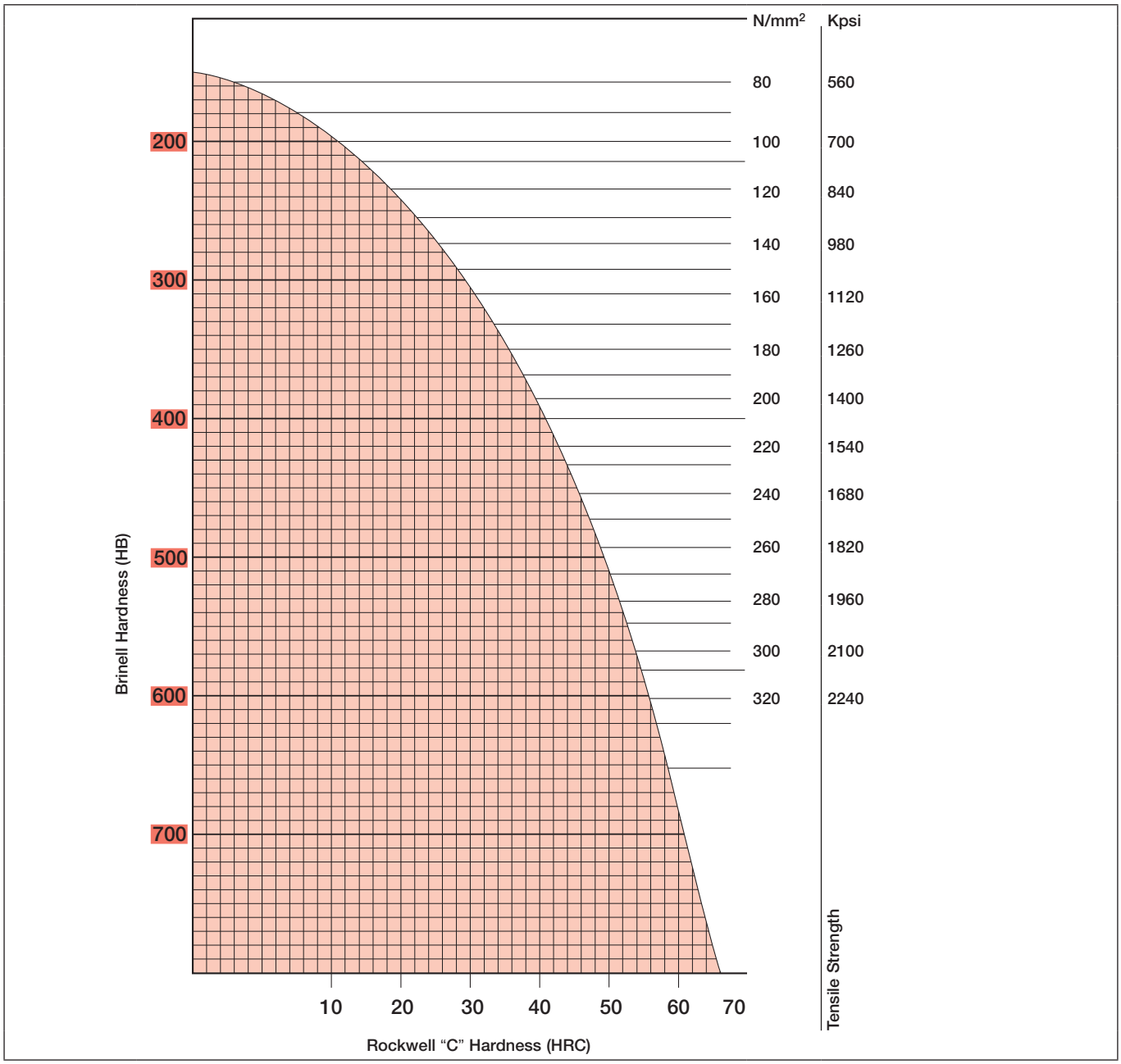
ISO	Material		Condition	Tensile Strength [N/mm²]	Kc1(1) [N/mm²]	mc(2)	Hardness HB	Material Group No.
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	1350	0.21	125	1
		≥ 0.25 %C	Annealed	650	1500	0.22	190	2
		< 0.55 %C	Quenched and tempered	850	1675	0.24	250	3
		≥ 0.55 %C	Annealed	750	1700	0.24	220	4
			Quenched and tempered	1000	1900	0.24	300	5
	Low alloy and cast steel (less than 5% of alloying elements)		Annealed	600	1775	0.24	200	6
			Quenched and tempered	930	1675	0.24	275	7
				1000	1725	0.24	300	8
				1200	1800	0.24	350	9
	High alloyed steel, cast steel and tool steel		Annealed	680	2450	0.23	200	10
			Quenched and tempered	1100	2500	0.23	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	1875	0.21	200	12
			Martensitic	820	1875	0.21	240	13
M	Stainless steel and cast steel		Austenitic, duplex	600	2150	0.20	180	14
K	Gray cast iron (GG)		Ferritic / pearlitic		1150	0.20	180	15
			Pearlitic / martensitic		1350	0.28	260	16
	Nodular cast iron (GGG)		Ferritic		1225	0.25	160	17
			Pearlitic		1350	0.28	250	18
	Malleable cast iron		Ferritic		1225	0.25	130	19
			Pearlitic		1420	0.3	230	20
N	Aluminum-wrought alloys		Not hardenable		700	0.25	60	21
			Hardenable		800	0.25	100	22
	Aluminum-cast alloys	≤12% Si	Not hardenable		700	0.25	75	23
			Hardenable		700	0.25	90	24
		>12% Si	High temperature		750	0.25	130	25
	Copper alloys	>1% Pb	Free cutting		700	0.27	110	26
			Brass		700	0.27	90	27
			Electrolytic copper		700	0.27	100	28
	Non metallic		Duroplastics, fiber plastics					29
			Hard rubber					30
S	High temperature alloys	Fe based	Annealed		2600	0.24	200	31
			Hardened		3100	0.24	280	32
		Ni or Co based	Annealed		3300	0.24	250	33
			Hardened		3300	0.24	350	34
			Cast		3300	0.24	320	35
	Titanium alloys		Pure	400	1160	0.24		36
			Alpha+beta alloys, hardened	1050	1245	0.24		37
H	Hardened steel		Hardened		4600		55 HRC	38
			Hardened		4700		60 HRC	39
	Chilled cast iron		Cast		4600		400	40
	Cast iron		Hardened		4500		55 HRC	41

Steel
Stainless Steel
Cast Iron
Non-ferrous
High Temp. and Titanium Alloys
Hardened Steel and Cast Iron

(1) Specific cutting force for 1 mm² chip section.
(2) Chip thickness factor.

MATERIAL GROUPS

Hardness Conversion Table



According to VDI 3323 Standard

Material Group No.	USA	Germany		U.K.	France	Sweden	Italy	Spain	Japan	Russia	EURONORM
	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
1	1020; G10200; K02301; K02595; K02596; K02597; K02598; K02599; K02702; K0300	1.0044	S275JR; St 44-2; Fe 430 B	EN 43 B; Fe 430 B FN; 43/25 HR; 43/25HS; 43 B; HFW4; HFS4; ERW 3	E 28-2	1411; 1412	Fe 430 B FN; Fe 430 B	AE 275 B; Fe 430 B FN	SN 400 B; SN 400 C; SN 490 B; SN 490 C; SS 400; STK 400; STKM 19 C; STKR 400; 19 C; SS 41; STK 41	St4ps; St4sp	S275JR
1		1.0050	E295; St 50-2; Fe 490-2; ST 50-2 G (E295+CR)	Fe 490-2 FN; 50 B	A 50-2	1550; 2172	Fe 490	A 490-2; Fe 490-2 FN	SS 490; SS 50	St5ps; St5sp	
1	K02404; K02702	1.0045	S355JR; Fe 510 B	50 B; 4360-50 B	E 36-2		Fe 510 B FN	AE 355 B	SN 400 B; SN 400 C; SN 490 B; SN 490 C; SS 490; SS 50		S355JR
1	K02702	1.0143	S275J0; St 44-3 U; Fe 430 C	43C; 4360-43C	E 28-3	1414-01	Fe 430 C FN	AE 275 D			S275J0
1		1.0130	P265S; SPH 265	164-400B LT 20	SPH 265; A 42 AP			SPH 265			P265S
1	A 619	1.0333	DC03G1; USt 3; USt 13	2 CR; 3 CR	E		FeP 02	AP 02	SPCD		DC03G1
1	K02601; K03000; A 573 Gr. 70; A 611 Gr.D	1.0144	S275J2G3 (S275J2); St 44-3 (Fe 430 D 1)	Fe 430 D1 FF; 4360-43 C; 4360-43 D	E 28-3; E 28-4	1411; 1412; 1414	Fe 430 B; Fe 430 C (FN); Fe 430 D (FF)	AE 275 D; Fe 430 D1 FF	SM 400 A; SM 400 B; SM 400 C; SS 400; STK 400; STKR 400; SM 41 A; SM 41 B; SM 41 C	St4kp; St4ps; St4sp	
1	1008; G10080; A 621	1.0330	DC01; DC 01; St 2; St 12	CR 4; CS 4	C; TC	1142	FeP 01; FeP 00	AP 11; FeP 01; AP 00	SPCC; CR 1		DC01 (FeP 05)
1	1015; G10150; K02401	1.0037	S235JR (Fe 360 B); St 37-2	Fe 360 B; 4360-40 B; ERW 3; CEW 3; 37/23 HR; 37/23 HS; 37/23 CR; 37/23 CS	E 24-2	1311	Fe 360 B; 1449 37/23 HR	AE 235 B; Fe 360 B	STKM 12 A; STKM 12 AC		
1		1.0035	S185 (Fe 310-0); St 33	Fe 310-0; 15 HR; 15 HS; 1449 15 HR; 1449 15 HS	A 33	1300	Fe 320	Fe 310-0; A 310-0	SGP; SS 330; SS 34	St0	S185
1	K02502	1.0034	E195; RSt 34-2	CEW 2; 34/20 HR; 34/20 HS; 34/20 CR; 1449 34/20CS	A 34-2 NE		Fe 330 BFN			St2ps; St2sp	E195
1		1.0334	DD12G1; UStW 23		2 C		FeP 12	AP 12	SPHD	10kp	
1	1006; G10060	1.0335	DD13; StW 24	1 CR; 1 CS; 1 HR; 2 HR; 2 HS; 2 CR; 2 CS	3 C		FeP 13	AP13	SPHE	08kp	DD13
1	A 620	1.0338	DC04; St 4; St 14	CR 1; CR 2	ES	1147	FeP 04	AP 04; FeP 04	SPCE; HR 4	08JuA	DC04 (FeP 04)

Material Group No.	USA	Germany		U.K.	France	Sweden	Italy	Spain	Japan	Russia	EURONORM
	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
1	K01700; K02001; K02200; K02201; K02203; K02503; K02601; K02801	1.0345	P235GH; HI; H I	141-360; 151-360; 154-360; 161-360; 164-360	A 37 CP	1330; 1331	FeE 235; Fe 360 1 KW; Fe 360 1 KG; Fe 360 2 KW; Fe 360 2 KG	A 37 Grado RA II; A 37 Grado RC I	SGV 410; SGV 450; SGV 480; SPV 235; SPV 450; SPV 490; SGV 42; SGV 46; SGV 49; SPV 24; SPV 46; SPV 50		P235GH
1	1010; G10100	1.0301	C10; C 10	040 A 10; 045 M 10; En 2 A; En 2 A/1; En 2 B; En 32 A; 10 CS	C10RR; XC 10; C 10; AF 34 C 10		1 C 10; C 10	F.151; F.151.A	S 10C	10	C10
1		1.0149	S275JOH; St 44-3 U; RoSt 44-2	43 C; 4360-43C	E 28-3	1412-04	Fe 430 C	Fe 430 C; AE 275 C			S275JOH
1		1.0226	DX51D; St 02 Z	Z2	GC	1151 10	FeP 02 G	FeP 02 G	SGC C		
1	A 1011 (SS Grade 36 (230) Type 2); A1011 (SS Grade 36 (250) Type 1)	1.0114	S235JO; St 37-3 U; Fe 360 C	40 C; 4360-40C	E 24-3		Fe 360 C FN	AE 235 C	SS 330; SS 34		S235JO
1	A572-60	1.8900	S380N; StE 380	4360 55 E		2145	FeE 390 KG		S 25 C		S380N
1	A 572 Gr. 65	1.0060	E335; St 60-2 (Fe 590-2 B)	En 55 C; Fe 590-2-FN; 55 E; 4360-55 E	A 60-2	1650	Fe 590; Fe 60-2	A 590; Fe 590-2 FN	SM 570; SM 58	St6ps; St6sp	E335
1		1.0028	S250G1T; USt 34-2		A 34-2		Fe 330; Fe 330 B FU		SS 330; SS 34		
1	K01700; K02200; K02801	1.0112	P235S; SPH 235	164-360B LT20; 1501-164-360B LT20	A 37 AP; SPH 235		Fe 360 C	AE 235 C			P235S
1		1.0722	10SPb20; 10 SPb 20		10 PbF 2		CF 10 SPb 20	10 SPb 20; F.2122			10SPb20
1	1108; 1109; 1111; B1111; B 1111; G11080; G11090	1.0721	10S20; 10 S 20		10 F 2		CF 10 S 20	10 S 20; F. 2121			10S20
1	12L13; 12L14; 12 L 13; 12 L 14; G12134; G12144	1.0718	11SMnPb30; 9 SMnPb 28	230 M 07 Pb; En 1A Pb	S 250 Pb	1914	CF 9 SMnPb 28	F.210.C; F.210.M; 11 SMnPb 28; F.2112	SUM 22 L; SUM 23 L; SUM 24 L		11SMnPb30
1	1213; 1215; G12130; G12150	1.0715	11SMn30; 9 SMn 28	230 M 07; En 1 A	S 250	1912	CF 9 S 22	F.210.A; F.210.L; 11 SMn 28; F.2111	SUM 22		11SMn30
1	1020; 1023; G10200; G10230	1.1151	C22E; Ck 22	055 M 15; 070 M 20; En 3 A; En 3 C; En 2	XC 25; XC 18; 2 C 22	1450	C 20; C 25	F.1120; C 25 K	S 20 C; S 20 CK; S 22 C	20	C22E
1	A 1008 (HSLAS-F Grade 80 [550]); A 1011 (HLAS-F Grade 80 [550])	1.0986	S500MC; QStE 500 TM	60F55 HR; 60F55 HS; 60F55 CS	E 560 D; S 560 MC		FeE 560 TM				S500MC

Material Group No.	USA	Germany		U.K.	France	Sweden	Italy	Spain	Japan	Russia	EURONORM
	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
1	A 1008 (HSLAS-F Grade 70 [480]); A 1008 (HSLAS Grade 70 [480] Class 1)	1.0984	S500MC; QStE 500 TM		E 490 D; S 490 MC	2662	FeE 490 TM				S500MC
1	A 1008 (HSLAS Grade 65 [450] Class 1); A 1008 (HSLAS Grade 65 [450] Class 2)	1.0982	S460MC; QStE 460 TM	1501-50F45; 50F45 HR; 50F45 HS; 50F45 CS							S460MC
1	A 1008 (HSLAS Grade 50 [340] Class 1); A 1008 (HSLAS Grade 50 [340] Class 2)	1.0976	S355MC; QStE 360 TM	46F40 HR; 46F40 HS; 46F40 CS	E 355 D	2642	FeE 355 TM				S355MC
1	A 1008 (HSLAS Grade 50 [340]); A 1008 (HSLAS Grade45 [310] Class 2); A 1011 (HSLAS-F Grade 50 [340])	1.0972	S315MC; QStE 300 TM	1501-40F30; 43F35 HR; 43F35 HS; 43F35 CS	E 315 D						
1	K01600; K02007; K02700; K02701; K02803; K02900; K03009; K03300; K11803; K12000; K12001; K12037	1.0562	P355N; StE 355	225-490A	FeE 355 KG N; E 355 R/FP; A 510 AP	2106	FeE 355; FeE 355 KG; FeE 355 KW	AE 355 KG; AE 355 DD	SM 490 A; SM 490 B; SM 490 C; SM 490 YA; SM 490YB STK 490 YB; STK 490; STK 500; SM 50 A; SM 50 B	15GF	P355N
1	1024; K03011; K03014; K12037; K12709	1.0570	S355J2G3 (S355J2); St 52-3 N (Fe 510 D1)			2132; 2134	fE 510	AE 355 D; Fe 510 D1 FF	SM 490 A; SM 490 B; SM 490 C; SM 490 YA; SM 490 YB; SM 520 B; SM 520 C; STK 490; STK 500; STKM 16 C	17GS; 17G1S	S355J2G3
1	K01600; K02302; K02700; K02701; K02803; K03301; K11803; K12037; K12609; A 299 (A); A 299 (B)	1.0566	P355NL1; TStE 355	225-490 A	A 510 FP	2107	Fe E 355 KT		SLA 365; STK 490; STK 500; SLA 37; STK 50; STK 51		P355NL1
1	K01600; K02007; K02701; K02803; K117803; K12001; K12037; K12609	1.0565	P355NH; WStE 355	225/490; 225-490 A; 500 Nb	A 510 AP	2106	FeE 355-2; FeE 355 KW				P355NH
1	K12037	1.0549	S355 NLH; TStE 355	50 EE		2135	Fe 510 D	FeE 355 KTM			S355 NLH
1	K12000	1.0553	S355JO; St 52-3 U; Fe 510 C	50 C; 4360-50C	E 36-3		Fe 510 C FN	AE 355 C	SCC 3		S355JO

Material Group No.	USA	Germany		U.K.	France	Sweden	Italy	Spain	Japan	Russia	EURONORM
	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
1	A 252 (1); A 252 (2); A 252 (3)	1.0547	S355JOH; St 52-3 U	50 C; 4360-50C	TSE 355-3; E 36-3		Fe 510 C	AE 355 C; Fe 510 C			S355JOH
1	K02502	1.0036	S235JRG1; S235JR; Fe 360 B; USt 37-2	Fe 360 B FU; Fe 360 B FN		1311; 1312	Fe 360 B; Fe 360 C; Fe 360 D	AE 235 B; Fe 360 B		16D; St3Kp	
1	1020; 1022; 1023; G10200; G10220; G10230	1.0402	C22	055 M 15; 070 M 20; En 3 A; En 3 B; En 3 C; En 2; 22 HS; 22 CS	AF 42 C 20; XC 25; 1 C 22	1450	C 20; C 21	F.112; 1 C 22	S 20 C; S 22 C	20	C22; 2C/2D
1	K01701; K02505; K02704; K02801	1.0425	P265GH; H II	151-400; 154-400; 161-400; 164-400	A 42 CP; A 42 AP	1431; 1430; 1432	Fe 410 1 KW; Fe 410 1 KG; Fe 410 1 KT; Fe 410 2 KW; Fe 410 2 KG	A 42 Grado RC I; A 42 Grado RC II; F.6306; F.6307	SG 295; SGV 410; SGV 450; SGV 480; SPV 315; SPV 355; SG 30; SGV 42; SGV 46; SGV 49; SPV 32; SPV 36	16K; 20K	P265GH
1	A27 65-35	1.0443	HX300PD; H300PD; H 300 PD		E 23-45 M	1305					HX300PD
1	K12000; K12037	1.0546	S355NL; TStE 355	50 EE; 4360-50EE	E 355 FP	2135; 2135-01	FeE 355 KT	AE 355 Grado KT			
1	K12709	1.0545	S355N; StE 355	50 E; 4360-50E	E 355 R	2134	FeE 355 KG	AE 355 Grado KG	SM 490 A; SM 490 B; SM 490 C; SM 490 YA; SM 490 YB; SM 50 A; SM 50 B; SM 50 C; SM 50 YA; SM 50 YB		S355N
1	K02705; K02305; K12709	1.0539	S355NH; StE 335 N	S355NH	S355NH; TSE 355-4	2134-04	Fe 510 B	Fe 355 KGN			S355NH
1	1213; 1215; G12130; G12150	1.0715	11SMn30; 9 SMn 28	230 M 07; 220 M 07	S 250	1912	CF 9 S 22	F.210.A; F.210.L; 11 SMn 28; F.2111	SUM 22		11SMn30
1		1.0722	10SPb20; 10 SPb 20		10 PbF 2		CF 10 SPb 20	10 SPb 20; F.2122			10SPb20
1	1215; G12150; A 29 (1215); A 108 (1215); A 510 (1215); A 510 (1215); A 519 (1215); A 521 (1215)	1.0736	11SMn37; 9 SMn 36		S 300		CF 9 Mn 36	12 SMn 35; F.2113	SUM 25		11SMn37
1	12L14; 12 L 14; G12144	1.0737	11SMnPb37; 9 SMnPb 36		S 300 Pb	1926	CF 9 SMnPb 36	12 SMnPb 35; F.2114			11SMnPb37
1	1010; G10100	1.1121	C10E; Ck 10	040 A 10; 045 M 10; En 2 A; En 2 A/1; En 2 B; En 32 A	C10RR; XC 10	1265	2 C 10; 2 C 15; 1 C 10; C 10	C 10 k; F.1510	S 09 CK; S 10 C	08; 10	C10E
1	1015; 1017; G10150; G10170	1.1141	C15E; Ck 15	080 A 15; 080 M 15; En 32 C	XC 12; XC 15; XC 18	1370	1 C 15; C 15	C 16 k; F.1511; F.1110; C 15 k	S 15 C; S 15 CK	15	C15E

Material Group No.	USA	Germany		U.K.	France	Sweden	Italy	Spain	Japan	Russia	EURONORM
	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
1	1020; G10200; K02301; K02595; K02596; K02597; K02598; K02599; K02702; K03000	1.0044	S275JR; St 44-2; Fe 430 B	En 43 B; Fe 430 B; 43/25 HR; 43/25 HS; 43 B; HFW 4; HFS 4; ERW 3; CEW 4; SAW 4	E 28 A; NFA 35-501 E 28	1411; 1412	Fe 430 B FN	AE 275 B; Fe 430 B FN	SN 400 B; SN 400 C; SN 490 B; SN 490 C; SS 400; STK 400; STKM 19 C; STKR 400; 19 C; SS 41; STK 41	St4ps; St4sp	S275JR
1		1.0250	S320GD; StE 320-3 Z		S 320 GD				SGC 440; SZAC 440; SZAH 440; SGLH 440		S320GD
1		1.0453	P265NL; P 265 NL								P265NL
1		1.0338	DC04; St 4; St 14	CR 1; CS 2	ES	1147	FeP 04	AP 04; FeP 04	SPCE; HR 4	08JuA	DC04
1											
1	K02001; K02601; K02701	1.0116	S235J2G3 (S235J2); St 37-3 N; Fe 360 D 1	Fe 360 D1 FF; 37/23 CR; 37/23 CS; 37/23 HR; 37/23 HS; 40 D; HFW 4; HFS 4	E 24-3; E 24-4; E 24-U	1312; 1313	Fe 360 C; D; Fe 360 C FN; Fe 360 D FF; Fe 37-2		SS 330; SS 34	16D; St3sp	S235J2G3
1	1015; 1017; G10150; G10170	1.0401	C15; C 15	080 A 15; 080 M 15; En32 C; 17 CS; 17 HS	C18RR; XC 18; C 18; AF 37 C 12	1350	1 C 15; C15; C16	F.111	S 15 C		C15
1		1.0347	DC03; RRSt; RRSt 13	CR2; CR3; CS3; 1449 3 CR; 1449 2 CR	E	1146	FeP 02; FeP 03	AP 02; AP02; FeP03	SPCD; CR 3	08Ju	DC03
1	K01500; K01702; K02401; K02502; K03000; A570.36	1.0038	S235JR; S235JRG2; RSt 37-2; Fe 360 B	Fe 360 B FU; 37/23 CR; 37/23 CS; 37/23 HR; 37/23 HS; HFW 3; HFS 3; 40 B	E 24-2 NE	1312	Fe 360 B FN	AE 235 B FN; AE 235 B FU; Fe 360 B FN; Fe 360 B FU	SS 330; SS 34	St3ps; St3sp	S235JR
1	J03001	1.0446	GE240; GS-45	A 1					230-450; 230-450 W	25L-3	GE240
2	1035; G10350	1.0501	C35G; C 35 G	080 M 30; En 5; 080 M 36	C 35; AF 55; 1 C 35; XC 38	1572; 1550	C 35; 1 C 35	F.113	S 35 C; S 35 CM		C35G
2	1035; G10350	1.1183	C35G; C 35 G; Cf 35	080 A 35	XC 38 TS	1572	C 36; C 38	F.1130; C 35 k	S 35 C; S 35 CM	35	C35G
2	1039; G10390	1.1157	40Mn4; 40 Mn 4		35 M 5					40G	
2	1040; G10400	1.0511	C40; C 40	En 8; 080 M 40	AF 60; C 40; 1 C 40		C 40; 1 C 40	F.114.A			C40
2	1045; 1045 H; 1042; G10450; H10450; G10420	1.1191	C45E; Ck 45	080 H 46; 080 M 46	C45RR; XC 45; XC 48 H-1	1672	C 45	F.1140; F.1142; C 45 k; C48 k	S 45 C; S 45 CM; S 48 C	45	C45E
2	1025; G10250	1.1158	C25E; Ck 25	070 M 26	2 C 25; XC 25		C 25	F.1120; C 25 k	S 25 C; S 28 C	25	C25E

Material Group No.	USA	Germany		U.K.	France	Sweden	Italy	Spain	Japan	Russia	EURONORM
	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
2	1043; 1045; G10430; G10450	1.0503	C45; C 45	080 M 46	C 45; AF 65; C 45; 1 C 45	1650	C 45; 1 C 45	F.114	S 45 C; S 45 CM	45	C45
2	1050; 1055; G10500; G10550	1.1213	C53G; C53E; Cf 53		XC 48 TS		C 53		S 50 C; S 50 CM	50	
2	1140; G11400	1.0726	35S20; 35 S 20	212 M 36	35 MF 4	1957		F.210.G; 35 MnS 6; F.2131			35S20; 8M
2	1139; 1146; G11390; G11460	1.0727	46S20; 45 S 20		45 MF 4						46S20
2	K12000	1.0553	S355J0; St 52-3 U; Fe 510-C	50 C	E 36-3		Fe 510 C FN	AE 355 C	SCC 3		S355J0
2		1.0551	S355JRC								S355JRC
2	K02700; K02803; K03103; K03300; K12437	1.0473	P355GH; 19 Mn 6		A 52 CP	2101; 2102	Fe E 355-2	A 52 RC I, RA II	SGV 410; SGV 450; SGV 480		P355GH
2		1.0416	C18D; GS-38		20-400 M	1306					C18D
2	K12447	1.0577	S355J2; S355J2G4; Fe 510 D2		A 52 FP	2107		A 52 RB II; AE 355 D			
2	1049; 1050; G10490; G10500	1.1206	C50E; Ck 50	080 M 50	XC 50; 2 C 50	1674	C 50			50	C50E
2	1330; 1527; G13300; G15270	1.1170	28Mn6	150 M 19; En 14 A; En 14 B	20 M 5		C 28 Mn		SCMn 1	30G	28Mn6
2	1034; 1035; 1038; G10340; G10350; G10380; C 1034	1.1181	C35E; Ck 35	080 M 30; En 5; 080 M 36	XC35RR; XC32; XC 35; XC 38 H 2; XC 38 H 1; 2 C 35	1572	C 35	F.1130; C 35 k	S 35 C; S 35 CM; S 38 C	35	C35E
2		1.1180	C35R; Cm 35	080 A 35	XC 38 H 1 u; Cm 35		C 35	F.1135; C 35 k-1			C35R
2	1030; G10300	1.1178	C30E; Ck 30	080 M 30; En 5	XC 32		C 30	2 C 30	S 30 C; S 30 CM		C30E
2	1049; 1050; G10490; G10500	1.0540	C50	En 43 A; 080 M 50	C50	1674	C 50	1 C 50	S 50 C		C50
2	1536; G15360	1.1166	34Mn5					TO.B	SMn 433 H; SMn 433 HRCH; SMn 433 RCH; SMn 1 H		
2	1025; G10250	1.0406	C25	070 M 26	1 C 25		C 25; 1 C 25				
2		1.0723	15S22; 15 S 20	210 A 15; 210 M 15		1922		F.210F; F.210.F	SUM 32		
2		1.1730	C45U; C45W; C 45 U; C 45 U								C45U
3	1045; 1049; G10450; G10490	1.1201	C45R; Cm 45	080 M 46	3 C 45; XC 42 H 1; XC 48 H 1 u	1660	C 45	F.1145; F.1147; C 45 k-1; C 48 k-1	S 45 C; S 45 CM	45	C45R
3	1040; G10400	1.1186	C40E; Ck 40	080 M 40; En 8	2 C 40; XC 42 H 1		C 40		S 40 C	40	C40E

Material Group No.	USA	Germany		U.K.	France	Sweden	Italy	Spain	Japan	Russia	EURONORM
	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
3	1074; 1075; G10740; G10750	1.0614	C76D; C 76 D; D 75-2		XC 75		3 CD 75			75	C76D
3	1095; G10950	1.0618	C92D; C 92 D; D 95-2	95 HS; 95 CS	XC 90		3 CD 95				C92D
3	1086; G10860	1.0616	C86D; C 86 D; D 85-2	80 HS; 80 CS	XC 80		C 85; 3 CD 85				C86D
3		1.1165	G28Mn6; GS-30 Mn 5	A 5; A 6				30 Mn 5; AM 30 Mn 5; F.120.D; F.8211; F.8311	SCMn 2	27ChGSNMDTL; 30GSL	G28Mn6
3	K01700; K02001; K02200; K02201; A 516 Gr.70; A 515 Gr. 70; A 414 Gr.F; A 414 Gr.G	1.0481	P295GH; 17Mn4; 17 Mn 4	224-469 B	A 48 CP; A 48 AP	2102	Fe 295	A 47 RC I; RA II	SG 365; SGV 410; SGV 450; SGV 480; SPV 315; SG 37; SGV 42; SGV 46; SGV 49; SPV 32	14G2	P295GH
3	1043; 1045; G10430; G10450	1.0503	C45; C 45	080 M 46	C 45; AF 65; C 45; 1 C 45	1650	C 45; 1 C 45	F.114	S 45 C; S 45 CM		C45
3	1335; 1335 H; 1541; 1541 H; G13350; G15410; H13350; H15410	1.1167	36Mn5; 36 Mn 5	150 M 36	40 M 5; 35 Mn 5	2120		F. 1203-36 Mn 6; F. 8212-36 Mn 5	SMn 438; SMn 438H; SCMn 3	35G2; 35GL	36Mn5
3	1045; 1045 H; 1042; G10450; H10450; G10420	1.1191	C45E; Ck 45	089 H 46; 080 M 46	C45RR; XC 45; XC 48 H 1	1672	C 45	F.1140; F.1142; C 45 k; C 48 k	S 45 C; S 45 CM; S 48 C	45	C45E
3		1.1303	38MnVS6; 38 MnVS 6								38MnVS6
4	1055; G10550	1.0535	C55	070 M 55; En 9	C54; 1 C 55; AF 70; C 55	1655	C 55; 1 C 55	F.115	S 55 C; S 55 C-CSP; S 55 CM	55	C55
4	1055; G10550	1.1203	C55E; Ck 55	070 M 55; En 9	C50RR; XC 54; XC 50; 2 C 55; XC 55 H 1	1655	C 55	F.1150; C 55 K	S 55 C; S 55 C-CSP; S 55 CM	55	C55E
4	1060; G10600	1.0601	C60	060 A 62; En 43 D	C60; 1 C 60		C 60; 1 C 60		S 58 C; S 60-C-CSP; S 60 CM; S 65 C-CSP; S 65 CM	60; 60G	C60; 43D
4	1070; G10700	1.1231	C67S; Ck 67	060 A 67; 080 A 67; En 43 E	C68RR; XC 68	1770	C 67		S 70 C-CSP; S 70 CM	65GA; 68GA	C67S
4	1074; 1075; 1078; G10700; G10750; G10780	1.1248	C75S; Ck 75	060 A 78; 80	C75RR; XC 75	1774	C 75		S 75 CM	75A	C75S
4	1095; G10950	1.1274	C100S; Ck 101	95	C100RR; XC 100	1870	C 100		SK 95 -CSP		C100S
4	W112; W1; T72301	1.1563	C125U; C 125 W		Y2 120; C120E3U		C 120 KU	F.5123; C 120	SK 120; SK 120 M; SK 2; SK 2 M; TC 120	U12-1	C125U

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
4	1086; G10860	1.1269	C80S; Ck 85; C 85 E		C90RR; XC 90		C 85		SK 85-CP	85A	C80S
4	1055; G10550	1.1209	C55R; Cm 55	070 M 55; En 9	3 C 55; XC 55 H 1		C 55	F.1155; C 55 k-1			C55R
4	1074; 1075; G10740; G10750	1.0605	C75	060 A 78	C 75		C 75			75	
4	1070; G10700	1.0603	C67	060 A 67; 080 A 67; En 43 E; 1449 70 HS	C68; XC 65		C 67		S 70 C-CSP; S 70 CM		C67
4		1.1219	C56E2; Cf 54						C56E2; S55C		C56E2
5	1055; G10550	1.1220	C56D2; C 56 D 2		C 56 D 2						C56D2
5		1.1217	C90S; C 90 S	CS95	C90RR; XC 90; XC90; C90E2U				SK 95		C90S
5	1060; 1064; G10600; G10640	1.1221	C60E; Ck 60	060 A 62; 070 M 60; En 43 D	C60RR; XC 60; X 65; 2 C 60	1678	C 60		S 58 C; S 60 C-CSP; S 60 CM; C 65 C-CSP; C 60 CM	60GA	C60E
5	1055; G10550	1.1203	C55E; Ck 55	070 M 55; En 9	C50RR; XC 54; XC 50; XC 55 H 1; 2 C 55	1655	C 55	F.1150; C 55 k	S 55 C; S 55 C-CSP; S 55 CM	55	C55E
6	9260; G92600	1.5028	65Si7; 65 Si 7		60 S 7				50 P 7; SUP 6; SUP 6 M; SUP 7; SWOSM	60S2G	
6	9260 H; H92600; 9260; G92600	1.5027	60Si7	251 A 60; 251 H 60	60 S 7		60 Si 7	F.144.B; F.1441		60S2	
6	9255; G92550	1.5026	56Si7; 56 Si 7; 55Si7; 55 Si 7	251 A 58; En 45 A	55 S 7	2085; 2090	55 Si 7	F.144; F.144.A; 56 Si 7; F.1440		55S2; 60S2	565Si7; 55Si7
6	9255; G22550	1.5025	51Si7; 51 S 7		50S7; 51 Si 7		48 Si 7; 50 Si 7	F.145.B			51Si7
6		1.5024	46Si7		45 S 7; Y 46 S 7; 46 SI 7			F.1451			46Si7
6	G50986; ASTM Grade E50100; ASTM Grade G15116; SAE E50100	1.3501	100Cr2; 100 Cr 2	GCr6; B00040; GCr4	100C2					SchCh4	
6	K21390; K21590; ASTM A 182 F22	1.7380	10CrMo9-10; 10 CrMo 9 10	622; 622-490; 622/515; 622/690	12 CD 9-10; 10 CD 9.10	2218	12 CrMo 9 10	TU.H	SCMQ4E; SCMV 4; SFVA F 22.A; SFVA F 22.B; SFVCM F22B; STBA 24; STFA 24; STPA 24	12Ch8	10CrMo9-10
6	O2; T31502	1.2842	90MnCrV8; 90 MnCrV 8	BO 2; BO2	90 MnV 8; 90 MV 8		90 MnVCr 8 KU	90 MnCrV 8; F.5229			90MnCrV8
6		1.2550	60WCrV7; 60 WCrV 7	BS1; BS 1	55 WC 20	2710	55 WCrV 8 KU; 58 WCr 9 KU	60 WCrSiV 8; F.5242			60WCrV7
6		1.2241	51CrMnV4; 51 CrV 4; 50 CrV 4								
6	L2; T61202	1.2210	115CrV3; 115 CrV 3		100 C 3		107 CrV 3 KU	F.520.L; F.5125			115CrV3

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
6		1.2419	105WCr6; 105 WCr 6	105WC 13	105 WCr 5; 105 WC 13	2140	107 WCr 5 KU	F.5233; 105 WCr 5	SKS 2; SKS 2 M; SKS 3; SKS 31	ChW1G; ChWG	105WCr6
6	4820; 5120; 5120H; G48200; G51200; H51200	1.7147	20MnCr5; 20 MnCr 5	150 M 19	20 MC 5	2172	20 MnCr 5; Fe52	F.150.D	SMnC 420 H; SMnC 420 RCH; SMnC 21 H	18ChG	20MnCr5
6	9255; G92550	1.0904	55Si7; 55 Si 7	250A53	55 S 7	2085	55 Si 8	56 Si 7			
6	9254; G92550	1.0904	55Si7; 55 Si 7	250 A 53	55 S 7	2090					
6	9262; G95620	1.0961	HDT 450 F; S340 MGC		60 SC 6		60 SiCr 8	60 SiCr 8; F.1442		60S2; 55S2; 50ChFA	
6	4135; 4137; 4135H; 4137H; G41350; G41370; H41350; H41370	1.7220	34CrMo4; GS34 CrMo 4; G34 CrMo 4	708 A 30	34 CD 4; 34CrMo4RR; 35 CD 4;	2234	34 CrMo 4 KB; 35 CrMo 4	35 CrMo 4 DF; F.125.A; F.125.B; F.1254; F.1250	SCM 435 H; SCM 435 HRCH; SCM 435 M; SCM 435 RCH; SCM 435TK; SCM 3 H; STKS 3	35ChM; AS38ChGM	34CrMo4
6		1.5120	38MnSi4; 38 MnSi 4								
6	L3; T61203	1.2067	102Cr6; 102 Cr 6; 100Cr6	BL 3; BL3	100Cr6RR; 100 C 6; 100Cr6; Y 100 C 6		102 Cr 6 KU	F.5230; 100 Cr 6	SUJ 2	Ch	102Cr6
6	L1	1.2108	90CrSi5; 90 CrSi 5			2092	105 WCr 5				90CrSi5
6	P20; T51620	1.2330	35CrMo4; 35 CrMo 4	708 A 37	34 CD 4	2234	35 CrMo 4				35CrMo4
6	O1; T31501	1.2510	100MnCrW4; 100 MnCrW 4	BO1; BO0; BO 1; BO 0	90MnWCrV5; 90 MWCV 5; 8 MO 8	2140	95 MnWCr 5 KU; 10 WCr 6	F.522.A; F.5220; 95 MnCrW5; 105 WCr 5	SKS 31		100MnCrW4
6	S1; T41901	1.2542	45WCrV7; 45 WCrV 7	BS1; BS 1	45 WCrV 8; 45 WCrV 20	2710	45 WCrV 8 KU	F.524; F.5241; 45 WCrSi 8		5ChW25F	45WCrV7
6	L6; T61206	1.2713	55NiCrMoV6; 56NiCrMoV6; 55 NiCrMoV 6; 56 NiCrMoV 6	BH 224; BH 225	55 NCDV 7			F.520.S	SKT 4	5ChNM	55NiCrMoV6
6		1.2721	50NiCr13		55 NCV 6	2550		F.528			
6	E52100; G52986	1.3505	100Cr6; 100 Cr 6	2 S.135; 535 A 99	100Cr6RR; 100 C 6; 100Cr6	2258	100 Cr 6	F.131; 100 Cr 6; F.1310	SUJ 2; SUJ 4	SchCh 15	100Cr6
6	K11820; K12020; K12320; A204 Grade A; A182 Grade F1	1.5415	16Mo3; 15 Mo 3	1503-243 B	15 D 3	2912; 16Mo3	16 Mo 3 KG; 16 Mo 3 KW; 16 Mo 5 KG; 16 Mo 5 KW	F. 2601; 16 Mo 3	STBA 12; STFA 12; STPA 12		
6	4422; G44220; J12522	1.5419	G20Mo5; 20Mo4; GS-22 Mo 4	245; B 1; B1					SCPH 11		G20Mo5
6	A 350-LF 5; K13050; K21703; K22103	1.5622	14Ni6; 14 Ni 6		16 N 6		14 Ni 6 KG; 14 Ni 6 KT	F.2641; 15 Ni 6			14Ni6
6	3415	1.5732	14NiCr10; 14 NiCr 10		14 NC 11		16 NiCr 11	15 NiCr 11	SNC 415; SNC 415 H; SNC 415 M	12ChN3A	14NiCr10

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
6	3310; 3310 RH; 3312; 3316; 9315; E 3310; E 3316; E9315; G33106	1.5752	15NiCr13; 14NiCr14; 15 NiCr 13; 14NiCr14	655 M 13; 655 H 13; En 36 A	10 NC 12; 12 NC 15; 14 NC 12; 16 NC 12; 16 NCD 13			15 NiCr 11; F.1540	SNC 815 H; SNC 815 HRCH; SNC 815 RCH; SNC 22 H		15NiCr13
6		1.7262	15CrMo5; 15 CrMo 5		12 CD 4			12 CrMo 4; F.150.J; F155; F.1551	SCM 415 H; SCM 415 HRCH; SCM 415 M; SCM 415 RCH; SCM 415 TK; SCM 21 H		15CrMo5
6		1.6587	17CrNiMo6; 17 CrNiMo 6	820A16	18 NCD 6			14 NiCrMo 13			
6	9310; 9310H; 9310 RH; E 9310 H; G93106; H93100; H93106	1.6657	14NiCrMo13-4; 14 NiCrMo 13 4	832 H 13; 832 M 13; S.157; En 36 C	16 NCD 13		15 NiCrMo 13; 16 NiCrMo 12	14 NiCrMo 13; 14 NiCrMo 13-1; F.1560; F.1569			
6	5015; G50150	1.7015	15Cr3; 15 Cr 3	523 M 15	12 C 3; 15Cr2RR; 15 C 2				SCr 415; SCr 415 H; SCr 415 HRCH; SCr 415 RCH; SCr 21 H	15Ch	15Cr3
6	5132; 5132 H; G51320; H51320	1.7033	34Cr4; 34 Cr 4	530 A 32; 530 H 32; 530 M 32	32 C 4		34 Cr 4; 34 Cr KB	35 Cr 4; F.8221	SCr 430; SCr 430 H; SCr 430 HRCH; SCr 430 RCH; SCr 2 H	35Ch	34Cr4
6	5140; 5140 H; 5140 RH; G51400; H51400	1.7035	41Cr4; 41 Cr 4	530 A 40; 530 M 40; 530 H 40; En 18	42 C 4		41 Cr 4; 41 Cr 4 KB	41 Cr 4 DF; F.1211; F.1202	SCr 440; SCr 440 H	40Ch	41Cr4
6	5140; G51400	1.7045	42Cr4; 42 Cr 4	530 A 40	42 C 4 TS	2245	41 Cr 4	42 Cr 4	SCr 440		
6	5115; 5117; G51150; G51170	1.7131	16MnCr5; 16 MnCr 5	527 M 17; 590 H 17; 590 M 17	16MnCr5RR; 16 MC 5	2173	16 MnCr 5	F.1516		18ChG	16MnCrS5
6		1.7139	16MnCrS5; 16 MnCrS 5		BGH 7139; BOHLER E 411; VW 4221; OPEL QS1916; PROCONS 7139; E411; SES	2127					16MnCrS5
6	5155; 5155 H; 5150; G51550; H51550; G51600	1.7176	55Cr3; 55 Cr 3	525 A 58; 525 A 60; En 48	55 C 3; 55Cr3	2253	55 Cr 3	F.1431	SUP 9; SUP 9 A; SUP 9 M	50ChGA	55Cr3
6	4142; G41420	1.7223	41CrMo4; 41 CrMo 4		MOC 2; V320		41 CrMo 4	42 CrMo 4	SNB 22-1	40ChFA	
6	4140; 4140 H; 4140 RH; 4142; 4142 H; 4145; G41400; H41400; G41420; H41420; K14248; K14047	1.7225; 1.7227	42CrMo4; 42CrMo4V; 42 CrMo 4; 42 CrMo 4 V	708 M 40; 709 M 40; En 19; En 19 A	42 CD 4; 40 CD 4; 42CrMo4RR	2244; 42CrMo4	42 CrMo 4; 38 CrMo 4 KB; 41 CrMo 4	TO.D; TU.L	SCM 440 H; SCM 440 HRCH; SCM 440 M; SCM 440 RCH; SCM 440 TK; SNB 7 Class 2; SCM 4 H; SNB 22-1	40ChFA	42CrMo4

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
6	4147; 4147 H; 4150; 4150 H; 8650; 8650 H; G41470; G41500; G86500; H41470; H41500; H86500	1.7228	50CrMo4; 50 CrMo 4	708 M 40; 708 A 47		2512	653 M 31		SCM 445 H; SCM 445 HRCH; SCM 445 RCH; SCM 5 H		50CrMo4
6	8620; G86200	1.7321	20MoCr4; 20 MoCr 4			2625				BGH 7321; E320; SIQUAL 7321	20MoCr4
6	K11547; K11562; K11564; K11757; K11789; K12052; ASTM A182 F12	1.7335	13CrMo4-5; 13 CrMo4 4	620; 620-440; 620-470; 620-540; 621	15 CD 4-05	2216	14 CrMo 3; 14CrMo4 5	TU.E; TU.F; F.2631; 14 CrMo 4 5	SCMV 2; SFVA 12; STBA 22; STFA 22; STPA 20; STPA 22	12ChM; 15ChM	13CrMo4-5
6	K21390; K21590; ASTM A182 F22	1.7380	10CrMo9-10; 10 CrMo 9 10; GS-12CrMo9-10; GS-12 CrMo 9 10; G 12 CrMo9-12	622; 622-490; 622/515; 622/690; 1502-622	12 CD 9-10; 10 CD 9.10	2218	12 CrMo 9; 12 CrMo 10	TU.H	SCMQ 4 E; SCMV 4; SFVA F 22 A; SFVA F 22 B; SFVCM F 22 B; STBA 24; STFA 24; STPA 24	12Ch8	10CrMo9-10
6		1.7715	14MoV6-3; 14 MoV 6 3	1503-660-440				13 MoCrV 6			
6	E71400; K24065; K24728; A355 Class A	1.8509	41CrAlMo7-10; 41CrAlMo7; 41 CrAlMo 7	905 M 39; En 41 B	40 CAD 6.12	2940	41 CrAlMo 7	F.174; 41 CrAlMo 7; F1740	SACM 645; SACM 1	38Ch2MJuA	41B
6		1.6566	17NiCrMo6-4								17NiCrMo6-4
6	P20+S	1.2312	40CrMnMoS8-6		40 CMD 8 S						
6		1.7149	20MnCrS5; 20 MnCrS 5								20MnCrS5
6	P20+Ni	1.2738	40CrMnNiMo8-6-4; 40 CrMnNiMo 8 6 4		40 CMND 8					40Ch2GNM	40CrMnNiMo8-6-4
6		1.2311	40CrMnMo7; 40 CrMnMo 7		40 CMD 8		35 CrMo 8 KU	F.5302			40CrMnMo7
6		1.7238	49CrMo4; 49 CrMo 4								
6	4150; G41500	1.7701	52CrMoV4; 51CrMoV4; 51 CrMoV 4		51 CDV 4; 51CrMoV4		51 CrMoV 4				51CrMoV4
6		1.7337	16CrMo4-4; 16 CrMo 4 4				A 18 CrMo 45 KW		SCM 415 M; SCM 415; STBA 22; SFVA F12		
6		1.7242	16CrMo4; 16 CrMo 4		15 CD 3.5		18 CrMo 4	F.1550; 18 CrMo 4	SCM 418 H; SCM 418 HRCH; SCM 418 RCH; SCM 418 TK		16CrMo4
6	4419; 4419 H; 4520; G44190; H44190; G45200; K11522; K11820; K12020; K12023; K12320; K12821	1.5423	16Mo5				16 Mo 5 KG; 16 Mo 5 KW	TU.D; F.2602	SB 450 M; SB 480 M; SB 46 M SB 49 M		
6										30ChGSA	

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6	HY-80; HY 80; HY80; K31820; MIL-S-21952										
6				605 M 36; En 16; En 16T							
7	4130; 4130 H; 4130 RH; G41300; H41300	1.7218	25CrMo4; 25 CrMo 4; GS-25 CrMo 4; G 25 CrMo 4	708 A 25	25 CD 4	2225	25 CrMo 4; 25 CrMo KB	F.222; F.1256	SCM 420 TK; SCM 430 M; SCM 430 RCH; SCM 430 TK; STKS 1	20ChM; 30ChM	25CrMo4
7		1.8070	21CrMoV5-11; 21 CrMoV 5 11				35 NiCr 9				
7		1.7755	GS-35 CrMoV 10 4; G35 CrMoV 10-4								
7		1.7733	24CrMoV5-5		20 CDV 6		21 CrMoV 5 11				
7	4340; 4340 H; 9850; G43400; G98500; H43400; K23028	1.6565	40NiCrMo6; 40 NiCrMo 6	817 M 40; En 24				F.1275; 40 NiCrMo 7	SNB 24-1; SNB 24-2; SNB 24-3; SNB 24-4; SNB 24-5; SNCM 439 RCH	40Ch2N2MA	40NiCrMo6
7	8640; 8640 H; 8740; 8740 H; 8742; G86400; G87400; G87420; H86400; H87400; K11640	1.6546	40NiCrMo2-2; 40 NiCrMo 2 2		40 NCD 2; 40 NCD TS		40 NiCrMo 2; 40 NiCrMo 2 KB	40 NiCrMo 2 DF; F.1205; F.1204; TO.E	SNCM 240; SNCM 240 RCH	38ChGNM	
7	8617; 8617 H; 8620; 8620 H; 8620 RH; 8617; G86170; G86200; H86170; H86200; K12147	1.6523	20NiCrMo2-2; 21NiCrMo2; 21 NiCrMo 2	805 H 20; 805 M 20; 806 M 20; En 362	20 NCD 2	2506	20 NiCrMo 2	20 NiCrMo 2; 20 NiCrMo 3-1; F.1522; F.1534	SNCM 220; SNCM 220 H; SNCM 220 HRCH; SNCM 220 M; SNCM 220 RCH; SNCM 21 H	20ChGNM	20NiCrMo2-2
7		1.5755	31NiCr14; 31 NiCr 14	653 M 31	18 NC 13						
7	3135	1.5710	36NiCr6; 36 NiCr 6	640 A 35	35 NC 6				SNC 236		36NiCr6
7	4340; G43400; 4337; G43370	1.6582	34CrNiMo6; 34 CrNiMo 6	816 M 6; 817 M 40	34 CrNiMo 8; 35 NCD 6	2541	35 NiCrMo 6 KB	F.1272		38Ch2N2MA	34CrNiMo6
7		1.8519	31CrMoV9; 31 CrMoV 9							30Ch3MF	31CrMoV9
7	8630	1.6545	30NiCrMo2-2; 30 NiCrMo 2 2		30 NCD 2		30 NiCrMo 2 KB				
7	4340; G43400	1.6580	30CrNiMo8	823 M 30	30 CND 8; 30 NCD 8			30 CrNi Mo 8	SNCM 431		
7	K01907	1.5217	20MnV6; 20 MnV 6 N	55 C; GR 55; Grade 55	20MV6; TS E 455 4; TU E 455 4						20MnV6; S460
7	300M; 4340M; K44220	1.6928	41SiNiCrMoV7-6	S 155							
8		1.8523	40CrMoV13-9; 39CrMoV13-9; 39 CrMoV 13 9	897 M 39			36 CrMoV 12				40CrMoV13-9
8		1.8515	31CrMo12; 31 CrMo 12	722 M 24	30 CD 12	2240	32 CrMo 12	F.1712; F.124.A			31CrMo12; 40B

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8		1.8161	58CrV4; 58 CrV 4								
8		1.7361	32CrMo12; 32 CrMo 12	722 M 24	30 CD 12	2240	30 CrMo 12	F.124.A			32CrMo12
8	9840; G98400	1.6511	36CrNiMo4; 36 CrNiMo 4	817 M 37; 816 M 40	40 NCD 3; 35 NCD 5		39 NiCrMo 4; 39 NiCrMo 4 KB	F.128; F.1280; 35 NiCrMo 4	SUP 10	40ChGNM; 40ChN2MA	36CrNiMo4
8	6145; 6150; 6150 H; G61500; H61500	1.8159	51CrV4; 50CrV4; 50 CrV 4	735 A 50; 735 A 51; 735 H 51; 735 M 50; En 47	50CrV4RR; 50 CV 4; 51 CV 4	2230	50 CrV 4	F.143; F.143.A; 51 CrV 4; F.1430	SUP 10; SUP 10-CSP; SUP 10 M	50ChFA; 50ChGFA	51CrV4
8	3435	1.5736	36NiCr10; 36 NiCr 10		30 NC 11				SNC 631; SNC 631 H; SNC 631 M		
8	A128 Grade A; J91109; J91129; J91139; J91149	1.3401; 1.3403	X120Mn12; X 120 Mn 12; G-X120 Mn 12	BW 10	Z 120 M 12	2183	GX 120 Mn 12	F.240.A; F.240.A1; AM-X 120 Mn 12; F.8251	SCMnH 1; SCMnH 11	110G13L	
8	4142; G41420	1.2332	47CrMo4	708 M 40	42 CD 4	2244	42 CrMo 4	42 CrMo 4	SCM; SCM 440		47CrMo4
8	4140 H; 4140 RH; 4140 HT		42CrMo4+QT								
8											
8											
8		1.8705	21MnCr6-5								
8											
9		1.6659	31NiCrMo13-4	830 M 31		2534		F.270			
9		1.5864	35NiCr18								
9											
9											
9											
9		1.8715	17MnCr5-3								17MnCr5-3
10	K71340; K81340	1.5662	X8Ni9	1501-509; 1501-510; 502-650; 509-690	9 Ni; Z 8 N 09		X 10 Ni 9; X 12 Ni 09	F.2645; XBNi 09	SL9N520; SL9N590; STBL 690; STPL 690; SL9N53; SL9N60; STBL 70; STPL 70		X8Ni9
10	2515; A2515; 2517; E2517; K41583	1.5680	X12Ni5; 12Ni19;		Z 18 N 5; Z 10 N 05; 5 Ni				SL5N590; SL5N60		X12Ni5
10	D4; T30404; D6; T30406	1.2436	X210CrW12; X 210 CrW 12	BD6	Z 200 CD 12; Z 210 CW 12-01; X210CrW12-1	2312	X 215 CrW 12 1 KU	F.5213; X210 CrW 12	SKD 2		X210CrW12
10	H13; T20813	1.2344	X40CrMoV5-1; X40 CrMoV 5 1	BH 13	X 40 CrMoV 5; Z 40 CDV 5	2242	X 40 CrMoV 5 1 1 KU	F.5318; X 40 CrMoSiV 5	SKD 61	4Ch5MF1S	X40CrMoV5-1
10	A2; T30102	1.2363	X100CrMoV5; X100CrMoV5-1; X 100 CrMoV 5 1	BA 2	X 100 CrMoV 5; Z 100 CDW 5	2260	X 100 CrMoV 5 1 KU	F.536; F.5227; X 100 CrMoV 5	SKD 12		X100CrMoV5
10	H21; T20821	1.2581	X30WCrV9-3; X30WCrV9 3	BH 21	Z 30 WCV 9		X 30 WCrV 9 3 KU	F.5323; X 30 WCrV 9	SKD 5	3Ch2W8F	X30WCrV9-3; X30WCrV9 3
10		1.2601	X165CrMoV12; X 165 CrMoV 12			2310	X165CrMoW 12KU				X165CrMoV12
10		1.2316	X36CrMo17; X38CrMo16								X38CrMo16
10	M2; T11302	1.3343	HS6-5-2; HS 6-5-2; S 6-5-2	BM 2; BM2	Z 85 WDCV 06-05-04-02; 6-5-2; HS6-5-2	2722		F.550.A; F.5604	SKH 51	R6M5	HS6-5-2

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
10	H11; T20811	1.2343	X37CrMoV5-1; X38CrMoV5-1	BH 11	Z 38 CDV 5; X38CrMoV		X 37 CrMoV 5 1 KU	F.520.G; F.5137; X 37 CrMoSiV 5	SKD 6	4Ch5MFS	X37CrMoV5-1
10	H12; T20812	1.2606; 1.2605	X37CrMoW5-1; X 37 CrMoW 5 1; X35CrWMoV5; X 35 CrWMoV 5	BH 12	Z 35 CWDV 5; X35CrWMoV5		X 35 CrMoW 05 KU	F.537	SKD 62	5ChNM	X37CrMoW5-1; X35CrWMoV5
10	D2; T30402	1.2379	X153CrMoV12; X155CrVMo12-1; X155 CrVMo 12 1	BD 2	X 160 CrMoV 12; Z 160 CDV 12	2310	X 155 CrVMo 12 1 KU	F.520.A	SKD 10; SKD 11		X153CrMoV12
10		1.2085	X33CrS16; X 33 CrS 16		Z 35 V CD 17.S						X33CrS16
10		1.2162	21MnCr5; 21 MnCr 5		20 MC 5						21MnCr5
10		1.2767	X45NiCrMo4; 45NiCrMo16; X 45 NiCrMo 4		45 NCD 16		40 NiCrMoV 8 KU				X45NiCrMo4
10		1.2764	X19NiCrMo4; X 19 NiCrMo 4; GX19NiCrMo4								X19NiCrMo4
10	D3; T30403	1.2080	X210Cr12; X 210 Cr 12	BD 3	X200Cr12; Z 200 C 12		X 205 Cr 12 KU	F.521; F.5212; X 210 Cr 12	SKD 1	Ch12	X210Cr12
10		1.2367	X38CrMoV5-3; X 38 CrMoV 5 3								X38CrMoV5-3
10		1.6957	27NiCrMoV15-6; 26NiCrMoV14-5; 26 NiCrMoV 14 5								
10	501; 502; S50100; S50200; K41545	1.7362	X12CrMo5; X 11 CrMo 5; 12CrMo19-5; 12 CrMo 19 5					F.240.B; TU.J	SCMV 6; SFVA F 5 A; SFVA F 5 B; SFVA F 5 C; SFVA 5 D; SNB 5 Class 1; STBA 29; STFA 25; STPA 25		X12CrMo5
11	M33; T11333; M34; T11334	1.3249	HS2-9-2-8; S 2-9-2-8	BM 34				2-9-2-8; F.5611			
11	M41; T11341	1.3246	HS7-4-2-5; S 7-4-2-5		Z 110 WKCDV 07-05-04-04-02			F.5615; HS 7-4-2-5			HS7-4-2-5
11	M42; T11342	1.3247	HS2-10-1-8; S 2-10-1-8	BM 42	Z 110 DKCWV 09-08-04-02-01; 2-9-1-8; HS2-9-1-8	2716	HS 2-9-1-8	F.5617; HS 2-10-1-8	SKH 59		HS2-10-1-8
11		1.3207	HS10-4-3-10; S 10-4-3-10	BT 42	Z 130 WKCDV 10-10-04-04-03; 10-4-3-10; HS10-4-3-10		HS 10-4-3-10	F.550.B; F.5553; HS 10-4-3-10	SKH 57	R12F3K10M3-SCh	HS10-4-3-10
11	T15; T12015	1.3202	HS12-1-4-5; S 12-1-4-5	BT 15	HS12-1-4-5		HS 12-1-5-5	F.5563; HS 12-1-5-5		R13F4K5	
11		1.3243	HS6-5-2-5; S 6-5-2-5	BM 35	6-5-2-5; 6-5-2-5 HC; HS6-5-2-5; HS6-5-2-5HC; Z 85 WDKCV 06-05-05-04-02; Z 90 WDKCV 06-05-05-04-02	2723	HS 6-5-2-5	F.550.C; F.5613; HS 6-5-2-5	SKH 55	R6M5K5	HS6-5-2-5
11	M7; T11307	1.3348	HS2-9-2; S 2-9-2		Z 100 DCWV 09-04-02-02; 2-9-2; HS2-9-2	2782	HS 2 9 2	F.5607; HS 2-9-2	SKH 58		HS2-9-2
11	T4; T12004	1.3255	HS18-1-2-5; S 18-1-2-5	BT 4	Z 80 WKCV 19-05-04-01; HS 18-1-1-5		HS 18-1-1-5	F.5530; HS 18-1-1-5	SKH 3		HS18-1-2-5

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
11	T1; T12001	1.3355	HS18-0-1; S 18-0-1	BT 1	18-0-1; HS 18-0-1; Z 80 WCV 18-04-01	2750	HS 18-0-1	F.5520; HS 18-0-1	SKH 2	R18	HS18-0-1
11											
11											
11											
11											
11											
11											
11			X10NiMoCrV6								
12	430 F; S43020	1.4104	X12CrMoS17; X 12 CrMoS 17		Z 13 CF 17	2383	X 10 CrS 17	F.3413	SUS 430 F		X12CrMoS17
12	S31500	1.4417	GX2CrNiMoN25-7-3			2376					GX2CrNiMoN 25-7-3
12		1.4742	X10CrAlSi18; X10CrAl18		Z 12 CAS 18			F.3113; X 10 CrAl 18	SUS 21	15Ch18SJu	X10CrAlSi18
12		1.4724	X10CrAlSi13; X10CrAl13; X 10 CrAl 13				X 10 CrAl 12	F.3152; X 10 CrAl 13		10Ch13SJu	X10CrAlSi13
12	434; S43400	1.4113	X6CrMo17-1; X 6 CrMo 17 1	434 S 17	Z 8 CD 17-01	2325		F.3116	SUS 434		X6CrMo17-1
12	HNV-6; HNV6; S65006	1.4747	X80CrNiSi20; X 80 CrNiSi 20	443 S 65	Z 80 CSN 20-02		X 80 CrSiNi 20	F.320B	SUH 4		
12	446; S44600	1.4762	X10CrAlSi25; X10CrAl24; X 10 CrAl 24		Z 10 CAS 24	2322		F.3154	SUH 446		X10CrAlSi25
12	EV 8; S63008	1.4871	X53CrMnNiN21-9; X 53 CrMnNiN 21 9	349 S 52	Z 52 CMN 21-9 Az		X 53 CrMnNiN 21 9	F.3217	SUH 35, SUH 36	55Ch20G9AN4	X53CrMnNiN21-9
12		1.4001	X7Cr14; X 7 Cr 14; G-X 7 Cr 13		Z 8 C 13 FF				SUS 4105		X7Cr14
12	440 B; S44003	1.4112	X90CrMoV18		X 89 CrMoV 18-1			SUS 440B			X90CrMoV18
12	410 S; 403; S41008; S40300	1.4000	X6Cr13; X 6 Cr 13	403 S 17	Z 8 C 12	2301	X 6 Cr 13	F.3110	SUS 403; SUS 403 FB; SUS 410 S	08Ch13	X6Cr13
12	410; S41000; S41001; CA-15	1.4006	X12Cr13; GX12Cr13; X 12 Cr 13; X 10 Cr 13	410 S 21; ANC 1 grade A; En 56 A	Z 10 C 13; Z 13 C 13	2302	X 12 Cr 13 KG; X 12 Cr 13 KW	F.3401	SUS 410; SUS 410 FB; SUS 410 TB; SUS 410 TKA; SUS 410 TKC; SUS F 410-A; SUS F 410-B; SUS F 410-C	12Ch13; 15Ch13L	X13Cr13
12	405; S40500	1.4002	X6CrAl13; X 6 CrAl 13	405 S 17	Z 8 CA 12		X 6 CrAl 13	F.3111	SUS 405; SUS 405 TB; SUS 405 TP		X6CrAl13
12	416; S41600	1.4005	X12CrS13; X 12 CrS 13	416 S 21; En 56 AM	Z 11 CF 13	2380	X12 CrS 13	F.3411	SUS 416		X12CrS13
12		1.4015	X8Cr17								
12	430; S43000	1.4016	X6Cr17; X 6 Cr 17	430 S 17; 430 S 15; 430 S 18	Z 8 C 17	2320	X 8 Cr 17	F.310.D; F.3113	SUS 430; SUS 430 TB; SUS 430 TKA; SUS 430 TKC; SUS 430 TP	12Ch17	X6Cr17
12		1.4027	GX20Cr14	ANC 1 grade B; ANC 1 grade C; 420 C 24; 420 C 29	Z 20 C 13 M				SCS 2	20Ch13L	
12	420 F; S42020	1.4028	X30Cr13; X 30 Cr 13	420 S 37; 420 S 45; En 56 C; En 56 D	Z 33 C 13 Cl; Z 33 C 13; Z 30 C 13	2304	X 30 Cr 13	F.3403	SUS 420 F; SUS 420 J 2; SUS 420 J 2-CSP; SUS 420 J 2 FB; SUS 420 J 2 TKA	30Ch13	X30Cr13

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
12		1.4086	GX120Cr29; G-X 120 Cr 29	452 C 11							
12		1.4340	GX40CrNi27-4; G-X 40 CrNi 27 4								
12		1.4720	X20CrMo13; X 20 CrMo 13								
12	439; 430 Ti; S43035; S43036; XM 8	1.4510	X3CrTi17; X 6 CrTi 17		Z 4 CT 17		X 6 CrTi 17	F.3115; X 5 CrTi 17	SUS 430 LX; SUS 430 LXTB; SUS XM8TB	08Ch17T	X3CrTi17
12	446-1	1.4749	X18CrN28		Z 12 C 25						X18CrN28
12		1.4511	X3CrNb17; X 6 CrNb 17		Z 4 CNb 17		X 6 CrNb 17	F.3122; X 5 CrNb 17	SUS 430 LX; SUS 430 LXTB		X3CrNb17
12	409; S40900	1.4512	X2CrTi12; X 6 CrTi 12	LW 19; 409 S 19	Z 3 CT 12		X 6 CrTi 12	F.3121	SUH 409 L; SUS 409 LTB; SUS 409 TB		X2CrTi12
12		1.4418	X4CrNiMo16-5-1; X 4 CrNiMo 16 5		Z 6 CND 16-04-01	2387					X4CrNiMo16-5-1
12	420; S42000	1.4021	X20Cr13; X 20 Cr 13	420 S 37; 420 S 29; En 56 C	Z 20 C 13 Cl; Z 20 C 13	2303	X 20 Cr 13	F.310.J; F.3402	SUS 420 J 1; SUS 420 J 1 FB; SUS 420 J 1 TKA	20Ch13	X20Cr13
13	420; S42000; S42080	1.4031	X39Cr13; X 38 Cr 13		Z 40 C 14 Cl; Z 40 C 14	2304	X 40 Cr 14	F.3404; X40 Cr 13	SUS 420 J 2	40Ch13	X39Cr13
13		1.4922	X20CrMoV11-1; X20CrMoV12-1; X 20 CrMoV 12 1	BS 762		2317	X 20 CrMoNi 12 01				X20CrMoV11-1; X20CrMoV12-1
13		1.4923	X22CrMoV12-1; X21CrMoNiV12-1; X 22 CrMoV 12 1								X22CrMoV12-1; X21CrMoNiV12-1
13	420; S42000	1.4021	X20Cr13; X 20 Cr 13	420 S 37; 420 S 29; En 56 C	Z 20 C 13 Cl; Z 20 C 13	2303	X 20 Cr 13	F.310.J; F.3402; X 20 Cr 13	SUS 420 J 1; SUS 420 J 1 FB; SUS 420 J 1 TKA	20Ch13	X20Cr13
13	420; S42000	1.4034	X46Cr13; X 46 Cr 13		Z 44 C 14 Cl; Z 44 C 14; Z 38 C 13 M		X 40 Cr 14	F.3405; X 40 Cr 13		40Ch13	X46Cr13
13	431; S43100	1.4057	X17CrNi16-2; X 20 CrNi 17 2; X 22 CrNi 17	431 S 29; En 57	Z 15 CN 16.02 Cl; Z 15 CN 16-02	2321	X16 CrNi 16	F.313; F.3427; X 19 CrNi 17 2	SUS 431; SUS 431 FB	14Ch17N2; 20Ch17N2	X17CrNi16-2
13	CA 6-NM; S41500; J91540	1.4313	X3CrNiMo13-4; X 4 CrNi 13 4		Z 6 CN 13-04; Z 6 CN 13-4; Z 4 CND 13.4 M	2384					X3CrNiMo13-4
13		1.4122	X39CrMo17-1; X 35 CrMo 17				X 39 CrMo 17-1				X39CrMo17-1
13	422; S42200	1.4935	X20CrMoWV12-1; X 20 CrMoWV 12 1								X20CrMoWV12-1
13	HNV 3; S65007	1.4718	X45CrSi9-3; X 45 CrS 9 3; G-X 45 CrNi 9 3	401 S 45; En 52	Z 45 CS 9		X 45 CrSi 8	F.322; F.3220	SUH 1	40Ch9S2; 4Ch9S2	X45CrSi9-3
13		1.2083; 1.2083 ESR	X40Cr14; X 42 Cr 13		X40Cr14; Z 40 C 14	2314	X 41 Cr 13 KU	F.5263; X 40 Cr 13	SUS 420 J 2		X40Cr14
13	CA 6-NM; J91540	1.4317	GX4CrNi13-4; G-X 5 CrNi 13 4	425 C 11; 425 C 12	Z 4 CND 13 4 M		GX 6 CrNi 13 04		SCS 6; SCS 6X		GX4CrNi13-4
13	S13800; XM-13	1.4534	X3CrNiMoAl 13-8-2; X 3 CrNiMoAl 13 8 2	FE-PM1503							X3CrNiMoAl 13-8-2
14	15-5PH; 15-5 PH; XM-12; S15500; J92110	1.4545; 1.4545.9	X5CrNiCuNb15-5		Z 7 CNU 15-05						X5CrNiCu15-3
14	329; S31260; S32900	1.4460	X3CrNiMo27-5-2; X 4 CrNiMo 27 5 2		Z 3 CND 25-07 Az; Z 5 CND 27-05 Az	2324		F.3552; F.3309; X 8 CrNiMo 27-05; X 8 CrNiMo 26 6	SUS 329 J 1; SUS 329 J 1 FB; SUS 329 J 1 TB; SUS 329 J 1 TP	10Ch26N5M	X3CrNiMo27-5-2

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
14	321; S32100	1.4541	X6CrNiTi18-10	321 S 31; LW 18; LW 24; LWCF 18; LWCF 24; 321 S 12; 321 S 50; 321 S 51; 321 S 50-490; 1010; 1115	Z 6 CNT 18-10	2337	X 6 CrNiTi 18 11; X 6 CrNiTi 18 11 KG; X 6 CrNiTi 18 11 KW; X 6 CrNiTi 18 11 KT	F.332; F.3523; X 6 CrNiTi 18 10	SUS 321	06Ch18N10T; 08Ch18N10T; 09Ch18N10T; 12Ch18N10T	X6CrNiTi18-10
14		1.4425	X2CrNiMo18-13-3								
14	316; 316H; 316 H; S31600; S31609	1.4401	X5CrNiMo17-12-2; X 5 CrNiMo 18 10	316 S 31; 316 S 33; 316 S 17; 316 S 19; 316 S 40; 316 S 41; 845	Z 6 CND 17-11; Z 6 CND 17-11-02-FF; Z 7 CND 17-11-02; Z 7 CND 17-12-02	2347	X 5 CrNiMo 17 12; X 5 CrNiMo 17 12 KG; X 5 CrNiMo 17 12 KW	F.310.A; F.3534; X 5 CrNiMo 17 12 2	SUS 316; SUS 316 A; SUS 316 FB; SUS 316 HFB; SUS 316 HTB; SUS 316 HTP; SUS 316 TB; SUS 316 TBS	08Ch16N11M3	X5CrNiMo17-12-2
14		1.4821	X20CrNiSi25-4		Z20CNS25.04						X20CrNiSi25-4
14	J92701	1.4312	GX10CrNi18-8	ANC 3 grade A; ANC 3 A; 302 C 25	Z 10 CN 18.9 M				SCS 12; SCS 13A	10Ch18N9L	
14	J92605; J93005	1.4823	GX40CrNiSi27-4; G-X 40 CrNiSi 27 4						SCH 11 X		GX40CrNiSi27-4
14		1.4585	GX7CrNiMoCuNb18-18; G-X 7 CrNiMoCuNb 18 18				X 6 CrNiMoTi 17 12				
14	347; J92640; J82710	1.4552	GX5CrNiNb19-11; G-X 5 CrNiNb 18 9	347 C 17; 821 grade Nb	Z 4 CNNb 19.10 M; Z 6 CNNb 18.10 M			AM-X 7 CrNiNb 20 10; F.8413	SCS 21; SCS 21 X		GX5CrNiNb19-11
14		1.4500	GX7NiCrMoCuNb25-20; G-X 7 NiCrMoCuNb 25-20		23 NCDU 25.20 M						
14	304; S30400	1.4301	X5CrNi18-10; X 5 CrNi 18 9	304 S 15; 304 S 31; LW 13; LW 15; LW 21; LWCF 13; LWCF 15; 302 S 17; 304 S 16; 304 S 17; 304 S 40	Z 4 CN 19-10 FF; Z 5 CN 17-08; Z 6 CN 18-09; Z 7 CN 18-09	2333; 2332	X 5 CrNi 18 10; X 5 CrNi 18 10 KG; X 5 CrNi 18 10 KW; X 5 CrNi 18 10 KT	F.3504; X 5 CrNi 18 10	SUS 304; SUS 304 A; SUS 304-CSP; SUS 304 FB; SUS 304 TB; SUS 304 TBS; SUS 304 TKA; SUS 304 TKC	08Ch18N10	X5CrNi18-10
14	304L; 304 L; S30403; J92500; J92600	1.4306; 1.4309	X2CrNi19-11; GXCrNi19-11	304 S 11; LW 20; LWCF 20; S.536; T.74; 304 C 12; 305 S 11	Z 1 CN 18-12; Z 2 CN 18-10; Z 3 CN 19.10 M; Z 3 CN 18-10; Z 3 CN 19-11; Z 3 CN 19-11 FF	2352	X 3 CrNi 18 11; X 2 CrNi 18 11; GX 2 CrNi 19 10	F.310.G; F.3503; X 2 CrNi 19 10; AM-X 2 CrNi 19 10; F.8412	SCS19	03Ch18N11	X2CrNi19-11; GXCrNi19-11
14	304H; 304 H; CF-8; J92590; J92600; J92650; J92710	1.4308	GX5CrNi19-10; G-X 6 CrNi 18 9	304 C 15	Z 6 CN 18.10 M; Z 6 CN 19.9 M			AM-X 7 CrNi 20 10; F.8411	SCS 13; SCS 13 A; SCS 13 X	07Ch18N9L	GX5CrNi19-10; 58E
14	J92701	1.4312	GX10CrNi18-8; G-X 10 CrNi 18 8	ANC 3 grade A; ANC 3 A; 3025 S 25	Z 10 CND 18.9 M				SCS 12	10Ch18N9L	GX10CrNi18-8
14	S32304	1.4362	X2CrNiN23-4; X 2 CrNiN 23 4		Z 3 CN 23-04 Az	2327					X2CrNiN23-4
14	201; S20100	1.4372	X12CrMnNiN17-7-5		Z 12 CMN 17-07 Az				SUS 201		X12CrMnNiN 17-7-5

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
14	316; S31600	1.4436	X3CrNiMo17-13-3; X 5 CrNiMo 17 13 3	316 S 31; 316 S 33; LW 23; LWCF 23; 316 S 19; 316 S 40; 316 S 41; 1.4436	Z 6 CND 18-12-03; Z6 CND 18-13; Z 7 CND 18-12-03	2343	X 5 CrNiMo 17 13; X 8 CrNiMo 17 13	F.3538; X 5 CrNiMo 17 13 3	SUS 316; SUS 316 A; SUS 316 FB; SUS 316 TB; SUS 316 TBS; SUS 316 TKA; SUS 316 TKC; SUS 316 TP		X3CrNiMo17-13-3
14	316L; 316 L; S31603; J92700; J92800	1.4404	X2CrNiMo17-12-2; X2CrNiMo17-13-2; X 2 CrNiMo 17 12 2; X 2 CrNiMo 17 13 2	316 S 11; 316 S 13; 316 S 14; 316 S 30; S.161; S.537; T.75	Z 2 CND 17-12; Z 3 CND 17-11-02; Z 3 CND 17-12-02; Z 3 CND 17-12-02 FF; Z 3 CND 18-12-03	2348	X 2 CrNiMo 17 12	F.310.K; F.3533; F.3537	SUS 316 L; SUS 316 LFB; SUS 316 LTBS; SUS 316 LTP; SUS 316 F 316 L		X2CrNiMo17-13-2
14	316LN; 316 LN; S31653	1.4406	X2CrNiMoN17-11-2; X2CrNiMoN17-12-2; X 2 CrNiMoN 17 12 2	316 S 61; 316 S 63	Z 2 CND 17-11 Az		X 2 CrNiMoN 17 12	F.3542; X 2 CrNiMoN 17 12 2	SUS 316 LN; SUS F 316 LN		X2CrNiMoN 17-11-2
14	CF-8M; J92900	1.4408	GX5CrNiMo 19-11-2; G-X 6 CrNiMo 18 10	ANC 4 grade B; ANC 4 B; 316 C 16; 845 grade B				AM-X 7 CrNiMo 20 10; F.8414	SCS 14; SCS 14 A; SCS 14 X	07Ch18N10G2S2M2L	GX5CrNiMo 19-11-2
14	S32750	1.4410	X2CrNiMoN25-7-4; X 10 CrNiMo 18 9		Z 5 CND 25-06 Az	2328					X2CrNiMoN 25-7-4
14	316LN; 316 LN; S31563	1.4429	X2CrNiMoN17-13-3; X 2 CrNiMoN 17 13 3	316 S 63; 1.4429	Z 3 CND 17-12 Az	2375	X 2 CrNiMoN 17 13	F.3543; X 2 CrNiMoN 17 13 3	SUS 316 LN; SUS F 316 LN		X2CrNiMoN 17-13-3
14	316L; 316 L; S31603; J92800	1.4435	X2CrNiMo18-4-3; X 2 CrNiMo18 14 3	316 S 13; 316 S 11; 316 S 14; 316 S 31; LW 22; LWCF 22; 845 B	Z 3 CND 17-12-03; Z 3 CND 18-14-03	2353	X 2 CrNiMoN 17 13; X 2 CrNiMoN 17 13 KG; X 2 CrNiMoN 17 13 KW	F.3533-X2 CrNiMo 17 13 2	SUS 316 L; SUS 316 LFB; SUS 316 LTBS; SUS 316 LTP; SUS F 316 L	O3Ch17N14M3	X2CrNiMo18-4-3
14	S31726	1.4439	X2CrNiMoN17-13-5; X 2 CrNiMoN 17 13 5		Z 3 CND 18-14-05 Az			F.3544; X 2 CrNiMoN 17 13 5			X2CrNiMoN 17-13-5
14	317; S31700	1.4449	X3CrNiMo18-12-3	317 S 16			X 5 CrNiMo 18 15		SUS 317; SUS 317 TB; SUS 317 TP; SUS F 317		X3CrNiMo18-12-3
14	329; S31260; S32900	1.4460	X3CrNiMoN27-5-2; X 4 CrNiMoN 27 5 2		Z 5 CND 27-05 Az; Z 3 CND 25-07 Az	2324		F.3552; F.3309; X 8 CrNiMo 27-05; X 8 CrNiMo 26 6	SUS 329 J 1; SUS 329 J 1 FB; SUS 329 J 1 TB; SUS 329 J 1 TP	10Ch26N5M	X3CrNiMoN27-5-2
14	S31803; S31260; S32900	1.4462	X2CrNiMoN22-5-3; X 2 CrNiMoN 22 5 3	318 S 13; 1.4462	Z 2 CND 24-08 Az; Z 3 CND 25-06-03 Az; Z 3 CND 25 -05 Az	2377			SUS 329 J 3 L; SUS 329 J 3 LTB; SUS 329 J 3 LTP		X2CrNiMoN22-5-3
14	631; 17-7PH; 17-7 PH; S17700	1.4568; 1.4564; 1.4504	X7CrNiAl17-7; X 7 CrNiAl 17 7	301 S 81	Z 9 CNA 17-07; Z 8 CNA 17-07	2388		X 2 CrNiMo 17 12	SUS 631; SUS 631 J 1; SUS 631-CSP	09Ch17N7Ju1	X7CrNiAl17-7
14	443; 444; S44300; S44400	1.4521	X2CrMoTi18-2; X 2 CrMoTi 18 2		Z 3 CDT 18-02; Z 3 CDT 18-2	2326		F.3123; X 2 CrMoTiNb 18 2	SUS 444; SUS 444 TB; SUS 444 TP		X2CrMoTi18-2
14	904L; 904 L; N08904	1.4539	X1NiCrMoCu25-20-5; X 1 NiCrMoCuN 25 20 5	904 S 13	Z 2 NCDU 25-20	2562					X1NiCrMoCu 25-20-5
14	630; 17-4PH; 17-4 PH; S17400	1.4542	X5CrNiCuNb16-4; X 5 CrNiChNb 17 4		Z 7 CNU 15-05; Z 7 CNU 16-04; Z 7 CNU 17-04				SUS 630; SUS 630 FB; SUS F 630		X5CrNiCuNb16-4
14	S31254	1.4547	X1CrNiMoN20-18-7			2378					X1CrNiMoN 20-18-7

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
14	631; 17-7PH; 17-7 PH; S17700	1.4568	X7CrNiAl17-7; X 7 CrNiAl 17 7	301 S 81	Z 9 CNA 17-07; Z 8 CNA 17-07	2388		X 2 CrNiMo 17 12	SUS 631; SUS 631 J 1; SUS 631-CSP	09Ch17N7Ju1	X7CrNiAl17-7
14	316 Ti; S31635	1.4571	X6CrNiMoTi17-12-2; X 6 CrNiMoTi 17 12 2	320 S 31; 320 S 18	Z 6 CNDT 17-12	2350	X 6 CrNiMoTi 17 12; X 6 CrNiMoTi 17 12 KG; X 6 CrNiMoTi 17 12 KW	F.310.B; F.3535; X 6 CrNiMoTi 17 12 2	SUS 316 Ti; SUS 316 TiTB; SUS 316 TiTP	08Ch16N11M3T; 08Ch17N13M2T; 10Ch17N13M2T	X6CrNiMoTi 17-12-2
14	309S; 309 S; 309; S30908; S30900	1.4833	X12CrNi23-13; X 7 CrNi 23 14	309 S 24	Z 15 CN 23-13; Z 15 CN 24-13		X 6 CrNi 23 14		SUS 309 S; SUS 309 S TB; SUS 309 S TP		X12CrNi23-13
14	S30415	1.4891	X4CrNiSiN18-10; X 4 CrNiSiN 18 10			2372					X4CrNiSiN 18-10
14	S30815	1.4893	X9CrNiSiNCe21-11-2; X 8 CrNiSiN 21 11			2368					X9CrNiSiNCe 21-11-2
14	304H; 304 H; S30409; S30480	1.4948	X6CrNi18-10; X6CrNi18-11; X 6 CrNi 18 11;	304 S 50; 304 S 51; 801 grade A	Z 5 CN 18-09				SUS 302		X6CrNi18-10
14		1.4581	GX5CrNiMoNb19-11-2; G X 5 CrNiMoNb 18 10	ANC 4 grade C; ANC 4 C; 318 C 17; 845 grade Nb	Z 4 CNDNb 18.12 M		GX 6 CrNiMoNb 20 11		SCS 22		GX5CrNiMoNb 19-11-2
14	303; S30300	1.4305	X8CrNiS18-9; X 10 CrNiS 18 9	303 S 31	Z 8 CNF 18-09	2346	X 10 CrNiS 18 09	F.310.C; F.3508; X 10 CrNiS 18-09	SUS 303	30Ch18N11	X8CrNiS18-9; 58M
14	304L; 304 L; S30403	1.4306	X2CrNi19-11; X 2 CrNi 19 11	304 S 11; LW14; LW 20; LWCF 14; LWCF 20; S.536; T.74; 304 C 12; 304 S 11	Z 1 CN 18-12; Z 3 CN 18-10; Z 3 CN 19-11; Z 3 CN 19-11 FF	2352	X 2 CrNi 18 11; X 3 CrNi 18 11	F.310.G; F.3503; X 2 CrNi 18 10	SUS 304 L; SUS 304 LFP; SUS 304 LTB; SUS 304 LTBS; SUS 304 LTP; SUS F 304 L	03Ch18N11	X2CrNi19-11
14	301; J 230; S30100; S30200	1.4310	X10CrNi18-8; X 12 CrNi 17 7	301 S 21; 301 S 22	Z 11 CN 17-08; Z 11 CN 18-08; Z 12 18-09	2331	X 12 CrNi 17 07	F.3517; X 2 CrNiN 18 10	SUS 301; SUS 301-CSP; SUS 302; SUS 302 FB	12Ch18N9	X10CrNi18-8
14	304LN; 304 LN; S30453	1.4311	X2CrNiN18-10; X 2 CrNiN 18 10	304 S 61	Z 3 CN 18-10 Az; Z 3 CN 18-07 Az	2371	X 2 CrNiN 18 11	F.3541; X 2 CrNiN 18 10	SUS 304 LN; SUS F 304 LN		X2CrNiN18-10
14	304B1; 304B2; 304B3; 304 B1; 304 B2; 304 B3; S30461; S30462; S30463	1.4350	X5CrNi18-9	304 S 31	Z 6 CN 18.09	2332; 2333	X 5 CrNi 18 10	F.3551			58E
14	317L; 317 L; S31703	1.4438	X2CrNiMo18-15-4; X2 CrNiMo 18 16 4	317 S 12	Z 2 CND 19-15-04; Z 3 CND 19-15-04	2367	X 2 CrNiMo 18 16	F.3539; X2 CrNiMo 18 16 4	SUS 317 L; SUS 317 LFB; SUS 317 LTB; SUS 317 LTP; SUS F 317 L; SUS Y 317 L		X2CrNiMo18-15-4
14	321H; 321 H; S32109	1.4878	X12CrNiTi18-10; X 12 CrNiTi 18-9	321 S 31	Z 6 CNT 18-10	2337	X 6 CrNiTi 18.11	F.3553	SUS 321; SUS 321 HFB; SUS 321 HTB; SUS 321 HTP; SUS 321 TKA; SUS 321 TP; SUS F 321; SUS Y 321		X12CrNiTi18-10; 58B

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
14	347; 348; S34700; S34800	1.4550	X6CrNiNb18-10; X 6 CrNiNb 18 10	347 S 31; ANC 3 grade B; ANC 3 B; 347 S 20; 347 S 40; 347 S 50; 347 S 51	Z 6 CNNb 18-10	2338	X 6 CrNiNb 18 11; X 6 CrNiNb 18 11 KG; X 6 CrNiNb 18 11 KW; X 6 CrNiNb 18 11 KT	F.3524; X 6 CrNiNb 18 10	SUS 347; SUS 347 FB; SUS 347 HTB; SUS 347 TB; SUS 347 TKA; SUS 347 TP; SUS F 347	08Ch18N12B	X6CrNiNb18-10; 58F;
14	318; S31803	1.4583	X10CrNiMoNb18-12; X 10CrNiMoNb 18 12		Z 6 CNDNb 18-12		X 6 CrNiMoNb 20 11				
14	310H; 310 H; 310S; 310 S; S31008; S31009	1.4845	X8CrNi25-21; X 12 CrNi 25 21	310 S 16; 310 S 24; 310 S 25; 310 S 31	Z 8 CN 25-20; Z 12 CN 25-20; Z 12 CN 26-21	2361	X 6 CrNi 25 20 (X 6 CrNi 25 20)	F.331	SUS 310 S; SUS 310 FB; SUS 310 STG; SUS 310 STP; SUS310 TB; SYS Y 310 S	10Ch23N18; 20Ch23N18	X12CrNi25-21
14		1.4465; 1.4466	X1CrNiMoN25-22-2; X 2 CrNiMoN 25 22 7								X1CrNiMoN 25-22-2
14	309; S30900	1.4828	X15CrNiSi20-12; X 15 CrNiSi 20 12	309 S 24	Z 9 CN 24-13; Z 17 CNS 20-12		X 16 CrNi 23 14	F.3312; X 15 CrNiSi 20-12	SUH 309; SUS 309 TB; SUS 309 TP	20Ch20N14S2	58C; X15CrNiSi20-12
14	HK; J94203; J94204; J94224	1.4848	GX40CrNiSi25-20; G-X 40 CrNiSi 25 20	310 C 40; 310 C 45			G X 40 CrNi 26 20	AM-X 40 CrNi 25 20; F.8452	SCH 21; SCH 22; SCH 22 X		GX40CrNiSi25-20
14	HK 30; J93503; J94003; J94013; HH	1.4837; 1.4848+Nb	GX40CrNiSi25-12; G-X 40 CrNiSi 25 12	309 C 30			G X 35 CrNi 25 12		SCH 13; SCH 13 A; SCH 13 X; SCH 17; SCS 17	40Ch24N12SL	GX40CrNiSi25-12
14	310; 314; S3100; S31400; S31500	1.4841	X15CrNiSi25-21; X 15 CrNiSi 25 20	314 S 25	Z 15 CNS 25-20		X 16 CrNiSi 25 20	F.3310; X 15 CrNiSi 25-20	SUH 310; SUS 310 TB; SUS Y 310	20Ch25N20S2	X15CrNiSi25-21
14		1.4849	GX40NiCrSiNb38-19; G-X 40 NiCrSi 38 18								GX40NiCrSiNb 38-19
14	S32760; SA351/995; 25Cr-7Ni-Mo-N	1.4501	X2CrNiMoCuWN25-7-4	1.4501	Z 3 CNDU 25-06 Az						X2CrNiMoCuWN 25-7-4
14	348; S34800	1.4546	X5CrNiNb18-10	2 S.130; 2 S.143; 3 S.144; 3 S.145; S.525; S.527							
14		1.4544; 1.4544.9		S.524; S.526; 2 S 129	Z 10 CNT 18-11; 9160/C 63; 9160C201		X 6 CrNiTi 18 11			08Ch18N12T	FE-PA 13
14		1.6900	X12CrNi18-9; X 12 CrNi 18 9								
14		1.4829	X12CrNi22-12; X 12 CrNi 22 12								
14		1.4882	X50CrMnNiNbN21-9		Z 50 CMNNb 21.09						X50CrMnNiNbN 21-9
14	316N; 316 N; J92804	1.4409	GX2CrNiMo19-11-2; G-X 2 CrNiMo 19 11 2		Z 3 CND 19.10 M		GX2 CrNiMo 19 11	AM-X 2 CrNiMo 19 11; F.8415	SCS 16 A; SCS 16 AX SCS 16 AXN		GX2CrNiMo 19-11-2
14	304L; 304 L J92500; J92620	1.4309	GX2CrNi19-11	304 C 12	Z 3 CN 19.10 M		GX 2 CrNi 19 10	AM-X 2 CrNi 19 10; F.8412	SCS 19; SCS 19 A		GX2CrNi19-11
15	A48 25 B; Class 25; No 25 B	0.6015	EN-GJL-150; GG 15; EN-JL 1020	Grade 150	Ft 15 D; R 15 D	01 15-00	G 14; G 15	FG 15	FC 15; FC 150	SCh 15	EN-GJL-150; EN-JL 1020
15	A48-30 B; Class 30, No.30 B	0.6020	EN-GJL-200; GG 20; EN-JL 1030	Grade 220	Ft 20 D	01 20-00	G 20; Gh 190	FG 20	FC 20; FC 200	SCh 20	EN-GJL-200; EN-JL 1030
15	A48-20 B; Class 20; No 20 B	0.6010	EN-GJL-100; GG 10; EN-JL 1010		Ft 10 D	01 10-00	G 10	FG 10	FC 10; FC 100	SCh10	EN-GJL-100; EN-JL 1010

Material Group No.	USA	Germany		U.K.	France	Sweden	Italy	Spain	Japan	Russia	EURONORM
	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
16	A48-45 B; Class 45; No 45 B	0.6030	EN-GJL-300; GG 30; EN-JL 1050	Grade 300	Ft 30 D	01 30-00	G 30	FG 30	FC 30; FC 300	SCh 30	EN-GJL-300; EN-JL 1050
16	A48-50 B; Class 50; No 50 B	0.6035	EN-GJL-350; GG 35; EN-JL 1060	Grade 350	Ft 35 D	01 35-00	G 35	FG 35	FC 35; FC350	SCh 35	EN-GJL-350; GG 35; EN-JL 1060
16	A48-60 B; Class 60; No 60 B	0.6040	EN-JLZ; GG 40	Grade 400	Ft 40 D	01 40-00				SCh 40	EN-JLZ
16	A48-40 B; Class 40; No 40 B	0.6025	EN-GJL-250; GG 25; EN-JL 140	Grade260	Ft 25 D	01 25-00	G 25	FG 25	FC 25	SCh 25	EN-GJL-250; EN-JL 140
17		0.7033	EN-GJS-350-22-LT; GGG 35.3	350/22 L 40	FGS 370-/17	0717-15	GS 370-17	FNG 38-17	FCD 350-22L	VCh42-12	EN-GJS-350-22-LT
17	60-40-18; A536 60-40-18	0.7043	EN-GJS-400-18; EN-GJS-400-18-LT; GGG-40.3; EN-GJS-400-18A-LT	370/7; SNG 370/17	FGS 370-17	0717-15	GSO 400-12			VCh 42-2	EN-GJS-400-18; EN-GJS-400-18-LT; EN-GJS-400-18A-LT
17	60-40-18; A536 60-40-18	0.7040	EN-GJS-400-15; EN-JS 1030; GGG-40	420/12; SNG 420/12	FCS 400-12	0717-02	GS 400-12	FGE 38-17	FCD 40	VCh 42-12	EN-GJS-400-15; EN-JS 1030
17	65-45-12; A536 65-45-12	5.3107	EN-GJS-450-10	450/10; SNG 450/10	FGS 450-10		GS 400-12	FGE 42-12	FCD450	VCh 45	EN-GJS-450-10
18	65-45-12; A536 65-45-12	0.7050	EN-GJS-500-7; EN-GJS-500-7A; EN-JS 1050; GGG-50	500/7	FGS 500-7	0727-02	GS 500/7	FGE 50-7	FCD 50; FCD 500; FCD 500-7	VCh 50-2	EN-GJS-500-7; EN-GJS-500-7A; EN-JS 1050
18	80-55-06; A536 80-55-06	0.7060	EN-GJS-600-3; EN-GJS-600-3A; EN-JS 1060; GGG-60	600/3	FGS 600-3	0732-03	GS 600/3	FGE 60-2	FCD 60; FCD 600; FCD 600-3		
18		0.7652	GGG-NiMn 13 7	S-NiMn 13 7	S-NM 13 7	07 32-03	GGG 60	GGG 60			
18	100-70-03; A536 100-70-03	0.7070	EN-GJS-700-2; EN-JS 1070; GGG-70	700/2; SNG700/2	FGS 700-2	0737-01	GS 700-2	FGE 70-2	FCD 70; FCD 700; FCD 700-2	VCh 70-2	EN-GJS-700-2; EN-JS 1070
18	A439 Type D-2	0.7660	GGG-NiCr 20 2	S-NiCr 20 2	S-NC 20-2						
18	A439 Type D-2 B	0.7661	GGG-NiCr 20 3	S-NiCr 20 3	S-NC 20 3						
19	A47-32510; A47 Class 32510; A47 Grade 32510; 32510	0.8135	EN-GJMB-350-10; EN-JM 1130; GTS-35-10; GTS-35	B 340/12; 310 B340/12	MN 35-10; A32-702 MN 350-10	0810	B 35-10	GTS 35; 36114 Type A	FCMB 340; G5703 FCMB 340	KCh 35-10	EN-GJMB-350-10; EN-JM 1130
19	A47-35018, A47 Class 35018; A47 Grade 35018				MN 380-18; A32-702 MN 380-18					KCh 37-12	
19	A47-22010; A47 Class 22010; A47 Grade 22010; UNS F22200			B 32-10; 6681 B 32-10					FCMB 310	KCh 33-8	
20	A220-50005; A220 Class 50005; A220 Grade 50005	0.8155	EN-GJMB-550-4; EN-JM1160; GTS-55-04	P 55-04; P 510/4	MP 60-3; A32-703 MP 60-3; Mn 550-4	0856-00	P 55-04	Type C; 36116 Type C	FCMP 540	KCh 55-4; KCh60-3	EN-GJMB-550-4; EN-JM1160
20	A220-70003; A220 Class 70003; A220 Grade 70003	0.8165	EN-GJMB-650-2; EN-JM1180; GTS-65-02	P 65-02; 6681 P 65-02; P 570/3	Mn 650-3	0862-030	GMN 65		FCMP 590	KCh 63-3	EN-GJMB-650-2; EN-JM1180
20	A220-70003; A220 Class 70003; A220 Grade 70003	0.8170	EN-GJMB-700-2; EN-JM1190; GTS-70-02	P 70-2; 6681 P 70-2; P 690/2	MP 70-2; A 32-703 MP 70-2; Mn 700-2	0862-03	P 70-2; GMN 70	36116 Type A	FCMP 690	KCh 70-2	EN-GJMB-700-2; EN-JM1190

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
20	A220-45006; A220 Class 45006; A220 Grade 45006 A220-45008; A220 Class 45008; A220 Grade 45008	0.8145	EN-GJMD-450-6; EN-JM1140; GTS-45-06; GTS-45	P 45-06; 6681 P 45-06	MP 50-5; A32-703 MP 50-5	0854-00	P 45-06	Type E; 36116 Type E		KCh 45-7	EN-GJMD-450-6; EN-JM1140
20	A220-80002; A220 Class 80002; A220 Grade 80002			P 70-2	MN 700-2	854			FCMP 70; FCMP 700	KCh 80-1.5	
20	A220-90001; A220 Class 90001; A220 Grade 90001										
20	A220-60004; A220 Class 60004; A220 Grade 60004										
20	A220-40010; A220 Class 40010; A220 Grade 40010					0852-00					
20		0.8040	EN-GJMW-400-5; GTW-40-05	W 40-05	MB 400-5		W 40-05	36113 Type A	FCMW 370		EN-GJMW-400-5; EN-JM1030
20		0.8035	EN-GJMW-350-4; GTW-35-04	W 35-04	MB 35-7		W 35-04	36113 Type B	FCMW 330		EN-GJMW-350-4; EN-JM1010
21	AA5005; AA5006; A95005; A95006; 5005; 5005A; 5006	3.3315	AlMg1; AlMg1C	N41	A G0-6	144106	L3350		A5005	1510; AMg1	AlMg1C; 5005A
21	AA1050; A91050; 1050; 1050A	3.0255	Al99,5; Al99.5	1B	A5	14407	9001/2	L-3051		AD0	Al99.5; Al99,5; 1050A
21	AA1200; A91200 ; 1200; 1200A	3.0205	Al99,0; Al99.0; Al99	1C	A4	144010	Al99.0	L-3001	A1200	A0	Al99.0; AL99,0; 1200
22	AA2017; A92017; 2017; 2017A	3.1325; 3.1124	AlCu2,5Si(A); AlCu2.5Si(A); AlCuMg1		A-U4G			L-3120		V65	AlCu2,5Si(A); AlCu2.,5Si(A); 2017A
22		3.2315	AlMgSi1	H30	A-SGM0.7	144312	9006/4	L-3453		AD35	AlSiMgMn; 6082
22		3.4345	AlZnMgCuO,5; AlZnMgCuO.5								AlZnMgCu0.5; AlZnMgCu0,5; 7022
22		3.1655	AlCu6BiPb; AlCuBiPb	FC1	A-U5PbBi	144355	9002/5	L-3192	A2011		AlCu6BiPb; 2011
22	AA7075; A97075; 7075	3.4365; 3.4364	AlZn5,5MgCu; AlZn5.5MgCu; AlZnMgCu1,5; AlZnMgCu1.5	7075; L95; L96	A-Z5GU		9007/2	L-3710	A7075	B95	AlZn5.5MgCu; AlZn5,.5MgCu; AW-7075; 7075
22	AA2024; A92024; 2024	3.1355; 3.1354	AlCuMg2	2024; 2L97	A-U4G1		9002/4; 3583	L-3140	A2024	D16	AlCu4Mg1; 2024
22		3.4335	AlZn4,5Mg1; AlZn4.5Mg1	H17	A-Z5G	144425	9007/1	L-3741			AlZn4.5Mg1; AlZn4,5Mg1; 7020
22	AA6061; A96061; 6061	3.3211; 3.3214	AlMg1SiCu	H20	A-GSUC		9006/2	L-3420	A6061	AD33	EN AW-6061; EN AW-AlMg1SiCu; AlMg1SiCu

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
23		3.3261	G-AlMg5Si; GK-AlMg5Si; AlMg5Si; VDS 245	LM5		144163				AL13	EN AC-51400; EN AC-AlMg5Si; G-AlMg5Si; AlMg5Si
23		3.2982	GD-AlSi12(Cu); G-AlSi12(Cu); AlSi12(Cu); VDS 231 D		A-S12U		3048				EN AC-47100; EN AC-AlSi12C; G-AlSi12Cu; AlSi12Cu; AlSi12Cu1(Fe)
23	520.0; AA 520.0; A05200				A-G10S		3056	L-2310	AC7B	A18	
23	222.0; AA 222.0; A02220			LM12			3041	L-2110			
23	518.0; AA 518.0; A05180	3.3292	G-AlMg9; GD-AlMg9; AlMg9; VDS 349								EN AC-51200; EN AC-AlMg9; G-AlMg9; AlMg9
23	203.0; AA 203.0; A02030	3.1754	G-AlCu5Ni1,5; G-AlCu5Ni1.5		AU5NKZr						
23	ER4047; A94047	3.2585	SG-AlSi12	4047A; NG2		144262					SG-AlSi12; EL-AlSi12
23	712.0; AA 712.0; A07120		G-AlZn10Si8Mg; GK-AlZn10Si8Mg; AlZn10Si8Mg; VDS 108		A-Z5GF		3602				EN AC-71100; EN AC-AlZn10Si8Mg; G-AlZn10Si8Mg; AlZn10Si8Mg
23	514.0; 514.1; AA 514.0; AA 514.1; A05140; A05141	3.3561	G-AlMg5; GK-AlMg5; AlMg5; EN AC-51300; VDS 244		A-G6		3058	L-2331		AL28; AMg5Mz;	EN AC-51300; EN AC-AlMg5; G-AlMg5; AlMg5
23	B413.0; AA B413.0; A24130; B213.0; AA 213.0; A22130	3.2581; 3,2582	G-AlSi12; GK-AlSi12; GD-AlSi12; AlSi12	LM6	A-S13	144261	4514	L-2520	AC3		EN AC-44200; EN AC-AlSi12; G-AlSi12; GD-AlSi12; AlSi12
23		3.2211	G-AlSi11; GK-AlSi11; AlSi11								EN AC-44000; EN AC-AlSi11; G-AlSi11
23	A444.0; AA A444.0; A14440									AK7	
23		3.3541	G-AlMg3; GK-AlMg3; GF-AlMg3; AlMg3; VDC 244	H20	A-G3T	144224	3059	L-2341	ADC6		EN AC-51100; EN AC-AlMg3; G-AlMg3; AlMg3
24	515.0; AA 515.0; A05150	3.3241	G-AlMg3Si; GK-AlMg3Si; GF-AlMg3Si; AlMg3Si; AlMg3Si1								G-AlMg3Si1; AlMg3Si
24		3.2373	G-AlSi9Mg; GK-AlSi9Mg; AlSi9Mg		A-S9G		3051		AC4A	AK9	G-AlSi9Mg; AlSi9Mg
24	A356.0; AA A356.0; A13560; A356.2; AA A356.2; A13562	3.2371	G-AlSi7Mg; GK-AlSi7Mg; GF-AlSi7Mg; AlSi7Mg	2L99	A-S7G03			L-2651	AC4CH	AL9	G-AlSi7Mg; AlSi7Mg
24	204.0; AA 204.0; A02040	3.1371	G-AlCu4TiMg; GK-AlCu4TiMg; GF-AlCu4TiMg; AlCu4TiMg		AU5GT			L-2140	AC1B		EN AC-21000; EN AC-AlCu4TiMg; G-AlCu4TiMg
24	A333.0; AA A333.0; A13330	3.2161	G-AlSi8Cu3; GK-AlSi8Cu3			144163				AL13	EN AC-AlSi8Cu3; EN AC-AlSi8Cu3; G-AlSi8Cu3

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
24	380.0; AA 380.0; A03800	3.2163	G-AlSi9Cu3; GD-AlSi9Cu3; AlSi9Cu3; VDS 226	LM24	A-S9U3	144252	3610	L-2630	AC4B	AK8M3; AK8	EN AC-46200; EN AC-AlSi8Cu3; G-AlSi9Cu3; AlSi8Cu3
24	365.0; AA 365.0; A03650		G-AlSi10MnMg								EN AC-43500; EN AC-AlSi10MnMg; G-AlSi10MnMg
24	319.0; AA 319.0; A03190	3.2151	G-AlSi6Cu4; GK-AlSi6Cu4; AlSi6Cu4; VDS 225	LM21	A-S5UZ	144230	7369/4	L-2620	AC2B	AK5M	EN AC-45000; EN AC-AlSi6Cu4; G-AlSi6Cu4; AlSi6Cu4
24		3.2383	G-AlSi10MgCu; GK-AlSi10MgCu; G-AlSi10Mg(Cu); GK-AlSi10Mg(Cu); AlSi10MgCu; AlSi10Mg(Cu)		A-S10UG						
24		3.2381; 3.2385	G-AlSi10Mg; GK-AlSi10Mg; GD-AlSi10Mg; AlSi10Mg; VDS 239		A-S10G	144253					EN AC-43000; EN AC-AlSi10Mg; G-AlSi10Mg; AlSi10Mg
24		3.1841	G-AlCu4Ti; AlCu4Ti							AL19	EN AC-21100; EN AC-AlCu4Ti; G-AlCu4Ti; AlCu4Ti
25	390.0; AA 390.0; A03900		G-AlSi17Cu4Mg	LM30		4282					EN AB-48100; EN AC-48100; G-AlSi17Cu4Mg; AlSi17Cu4Mg
25	393.0; AA 393.0; A03930		G-AlSi20CuMgNi; AlSi20CuMgNi	LM29						AK21M2N2	
25			G-AlSi18Cu1MgNi; AlSi18Cu1MgNi	LM28							
26	C36000	2.0375	CuZn36Pb3	CZ124	CuZn36Pb3		12167		C3600; C3601; C3602		CuZn36Pb3; CW603N
26	C83810	2.1098	CuSn3Zn8Pb5-C; G-CuSn2ZnPb	LG1							CuSn3Zn8Pb5-C
26	C83600	2.1096; 2.1096.01	CuSn5Zn5Pb5-C; G-CuSn5ZnPb; Rg 5	LG2	CuPb5Sn5Zn5; UE5; U-E 5 Pb 5 Z 5	5204-15			H5111; H2203	BrO5Ts5S5	CuSn5Zn5Pb5-C
26	C93200	2.1090	CuSn7Zn4Pb7-C; G-CuSn7ZnPb; GC-CuSn7ZnPb; GZ-CuSn7ZnPb; Rg 7	GC 493K	CuSn7Pb6Zn4; UE7; U-E 7 Z 5 Pb 4						CuSn7Zn4Pb7-C
26	C93800	2.1182	CuSn7Pb15-C; G-CuPb15Sn; GC-CuPb15Sn; GZ-CuPb15Sn	LB1	U-Pb15E8; U-Pb 15 E8			C-3300			CuSn7Pb15-C; CC496K
26	C93700	2.1176	CuSn10Pb10-C; G-CuPb10Sn; GC-CuPb10Sn; GZ-CuPb10Sn	LB2	U-Pb10						CuSn10Pb10-C
27	C22000	2.0230	CuZn10; Ms90	CZ101	U-Z10; CuZn10		P-CuZn10; P-OT90		C2200	L90	CuZn10; CW501L
27	C86200; SAE 430A	2.0596	CuZn34Mn3Al2Fe1-C; G-CuZn34Al2; GK-CuZn34Al2; GZ-CuZn34Al2	HTB 1	U-Z36N3; CuZn19Al6Y20				HBSC4; H5102/class 3; H5102/class 4	LTs23A; LTs23A6Zh3MTs2	CuZn34Mn3Al2 Fe1-C; CC764S
27	C27200	2.0335	CuZn36; Ms64	CZ108	U-Z36; CuZn 36		C 2700			L63	CuZn36; CW507L
27	C27400	2.0321	CuZn37; Ms63	CZ108			P-CuZn37; P-OT63		C2720	L63	CuZn37; CW508L
27	C86400	2.0592	CuZn35Mn2Al1Fe1-C; G-CuZn35Al1; GK-CuZn35Al1; GZ-CuZn35Al1; G-Ms60	HTB 1					HBSC1; CAC301		CuZn35Mn2Al1 Fe1-C; CC765S

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
27	C46400	2.0530	CuZn38Sn1As; CuZn38Sn1	CZ112			P-CuZn39Sn1		C4640	LO60-1	CuZn38Sn1As; CW717R
27	C23000; 85Cu-15Zn	2.0240	CuZn15 ; CuZn 15	CZ102	U-Z15; CuZn15	5112-02; 5112-04; 5112-05			C2300		CuZn15; CW502L
27	C24000; 80Cu-20Zn	2.0250	CuZn20; CuZn 20; Ms80	CZ103	CuZn20	5114-02; 5114-04; 5114-05			C2400		CuZn20; CW503L
27	C26000; CA260	2.0265	CuZn30; CuZn 30	CZ106	CuZn30				C2600		CuZn30; CW505L
28	C63000	2.0966	CuAl10Ni5Fe4; CuAl 10 Ni 5 Fe 4	CA 104	U-A10N; CuAl9Ni5Fe3		P-CuAl10Ni5Fe5		C6301	BrAD; BrAZhN10-4-4; N10-4-4	CuAl10Ni5Fe4; CW307G
28	C90700	2.1050	CuSn10-C; G-CuSn 10; SnBz10	CT1	CuSn8						CuSn10-C; CC480K
28	C90800; C91700	2.1052; 2.1052.01; 2.1052.04; 2.1052.03	CuSn12-C; G-CuSn12; GZ-CuSn12; SnBz12, Gbz12	PB2	UE12P				CAC502C; PBC2C		CuSn12-C; CC483K
28	C95800; C95810	2.0975	G-CuAl10Fe5Ni5-C; G-CuAl 10 Ni; NiAlBz-F60		CuAl10Fe5Ni5 Y70				CAC703C		CC333G
28	C11000	2.0060	Cu-ETP; E-Cu57; E Cu 57	C101	Cu-B		Cu-DHP	C11020	C1100	M1	Cu-ETP; E-Cu57; CW004A
28	C81500	2.1292	G-CuCrF 35	CC1-FF	U-Cr0.8Zr						
28	C10300	2.0070	Cu-HCP; Cu-PHC; SE-Cu						C103	LS60-2	Cu-HCP; CW020A; Cu-PHC; CW021A
28	C10100; C10200	2.0040	Cu-OF; OF-Cu	C103; C110	Ci-c1; Cu-c2			C-1120	C1011; C1020	M0b	Cu-OF; CW008A
28	C86550	2.0590	G-CuZn40Fe; G-SoMsF30								G-CuZn40Fe
28	C18100; C18150	2.1293	CuCr1Zr; CuCrZr	CC102	U-C1Z; U-Cr0.8Zr						CuCr1Zr; CW106C
28	C11000; C12200	2.0090	Cu-DHP; E-Cu58; E Cu 58 SF-Cu	C106	Cu-B				C1100; C1220	M1f	Cu-DHP; E-Cu58; CW024A
28	C95500	2.0971	CuAl9Ni3Fe2		UA9					BrA10Zh4N4L	
28	C61000	2.0920	CuAl8; Cu Al 8		CuAl8					BrA7	CuAl8
29											
29											
30											
30											
31	330; N08330	1.4864	X12NiCrSi35-16; X12NiCrSi36-16; X12 NiCrSi 36 16	NA 17; INCOLOY alloy DS	Z 20 NCS 33-16; Z 12 NCS 37-18; Z 12 NCS 35-16			F.3313	SUH 330		
31	N08002; N08004; N08005; N08030	1.4865	GX40NiCrSi38-19 GX40NiCrSi38-18; G-X40 NiCrSi38 18	330 C 11; 330 C 40; 331 C 40			GX 50 NiCr 39 19		SCH 15; SCH 16		GX40NiCrSi38-18
31		1.4558	X2NiCrAlTi32-20; X2 NiCrAlTi 32 20	NA 15					NCF 800		X2NiCrAlTi32-20
31	N08031	1.4562	X1NiCrMoCu32-28-7; X1 NiCrMoCu 32 28 7								X1NiCrMoCu 32-28-7
31		1.4958	X5NiCrAlTi31-20; X5 NiCrAlTi 31 20	NA 15					NCF 800 H; NCF 718		X5NiCrAlTi31-20
31	N08811	1.4959	X8NiCrAlTi32-21; X8 NiCrAlTi 32 21	NA 15; NA 15 H	Z 8 NC 33-21; Z 10 NC 32-21						X8NiCrAlTi32-21

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
31	N08028	1.4563	X1NiCrMoCu31-27-4; X1 NiCrMoCu 31 27 4		Z 2 NCDU 31-27; Z 1 NCDU 31-27-03	2584				EK77; ChN30MDB	X1NiCrMoCu 31-27-4
31	B 163; N08800; N08810; N08332; N08811	1.4876	X10NiCrAlTi32-21; X10NiCrAlTi32-20; X10 NiCrAlTi 32 20	NA 15; NA 15 H	Z 10 NC 32-21; Z 8 NC 33-21			F.3314; F.3545	NCF 800; NCF 800 TB; NCF 800 TP		X10NiCrAlTi32-21
32	S590; J 467	1.4977	X40CoCrNi20-20; X40 CoCrNi 20 20		Z 42 CNKDWNb						
32	660; S66286	1.4980	X6NiCrTiMoVB25-15-2; X5NiCrTi26-15 X6 NiCrTiMoVB 25 15 2; X5 NiCrTi 26 15	HR 51; HR 52	Z 3 NCT 25; Z 6 NCTDV 25.15 B						X6NiCrTiMoVB 25-15-2; X5NiCrTi26-15
32		1.4943; 1.4944	X4NiCrTi25-15; X5NiCrTi26-15	HR 51	Z 6 NCTDV 25-15 B	2570					X4NiCrTi25-15; X5NiCrTi26-15
32	661; R30155	1.4971	X12CrCoNi21-20; X12 CrCoNi 21 20								X12CrCoNi21-20
32	Haynes 556; R30556										
33	Incoloy 825; N08825;	2.4858	NiCr21Mo	NA 16	NC 21 Fe DU					ChN38VT	
33	Hastelloy C-4; N06455	2.4610	NiMo16Cr16Ti								
33	Nimonic 75; N06075; AMS 5715	2.4630; 2.4951	NiCr20Ti	HR 5; HR 203-4	NC 20 T						
33	Inconel 625; N06625; AMS 5666	2.4856	NiCr22Mo9Nb	NA 21	NC 22 FeDNb						
33	Inconel 690; N06690	2.4642	NiC29Fe		NC 30 Fe						
33	Monel 400; N04400	2.4360; 2.4361	NiCu30Fe	NA 13	NU 30						
33	Hastelloy X; N06002; 5390A; AMS 5754; AMS 5536	2.4603; 2.4665	NiCr30FeMo; NiCr22Fe18Mo; NiCr21Fe18Mo9	HR 6	NC 22 FeD						
33	Inconel 617; N06617; AMS 5887	2.4663a	NiCr23Co12Mo		NC 14 K 9 T 5 DWA						
33	Nimonic 90; N07090; AMS 5829	2.4632; 2.4969	NiCr20Co18Ti; NiCr 20 Co 18 Ti	HR 2; HR202; HR 402; HR 501; HR 502; HR 503	Z 8 NCDT 42						NiCr20Co18Ti
33	Haynes 214; NO7214	2.4646	NiCr16Al								
33	Rene 41; N07041; AMS 5712; AMS 5713	2.4973	NiCr19Co11MoTi; NiCr 19 CoMo		NC 19 KDT						
33	Hastelloy B2; N10665	2.4617; 2.4616; 2.4615	NiMo28; EL-NiM29; SG(UP)-NiMo27						YNiMo-7		NiMo28
33	Udimet L-605; R30605	2.4964	CoCr20W15Ni								
33	Monel R-405; N04405	2.4360; 2.4361	NiCu30Fe	NA 13	NU 30						
33	Inconel 600; N06600; AMS 5665	2.4816	NiCr15Fe8; NiCr 15 Fe	NA 14	NC 16 FeT					ChN78T	NiCr15Fe8
33	Inconel 601; N06601	2.4851	NiCr23Fe15A; NiCr 23 Fe		N C 23 FeA					ChN60Yu	NiCr23Fe15A
33	Nimonic 263; N07263; AMS 5872; AMS 5886	2.4650	NiCo20Cr20MoTi; NiCo 20 Cr 20 MoTi MoTi	HR 10; HR 206; HR 404	NCK 20 D						NiCo20Cr20MoTi

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	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
34	Haynes 188; Jetalloy 209; R30188; AMS 5772	2.4964	CoCr22W14Ni		KC22WN						
34	Monel K-500; N05500	2.4375	NiCu30Al3Ti; NiCu 30 Al	NA 18	NU 30 AT						NiCu30Al3Ti
34	Inconel 718; N07718; AMS 5596; AMS 5589	2.4668	NiCr19Nb5Mo3; NiCr 19 NbMo; NiCr19Fe19Nb5Mo3	HR 8	NC 19 Fe Nb						NiCr19Nb5Mo3
34		2.4955	NiFe25Cr20NbTi; NiFe 25 Cr 20 NbTi		NiFe25Cr20NbTi						NiFe25Cr20NbTi
34	Incoloy 925; N09925	2.4670									
34	Nimonic 901; N09901; AMS 5660; AMS 5661	2.4662	NiFe35Cr14MoTi; NiCr13Mo6Ti3; NiCr 13 Mo 6 Ti 3		Z8 NCDT 42						
34	Udimet 500; N07500; AISI 684	2.4983	NiCr18Co18MoAlTi		NCK 19 DAT						NiCr18Co18MoAlTi
34	Nimonic 80A; N07080	2.4631; 2.4952	NiCr20TiAl; NiCr 20 TiAl	HR 401; HR 601	NC 20 TA				NCF 80 A	ChN77TYuR; ChN56VMTYu	NiCr20TiAl
34	Jetalloy 209; AMS 5772		CoCr22W14Ni		KC 22 WN						
34	Altemp S-816	2.4989	CoCr20Ni20W							Altemp S-816	
34	MAR-M 246	2.4675	NiCr23Mo16Cu; NiCr 23 Mo 16 Cu								NiCr23Mo16Cu
34	Inconel 722; N07722; AMS 5411										
34	Waspaloy; N07001; AISI 685; AMS 5704; AMS 5706; AMS 5708; AMS 5544	2.4654	NiCr20Co13Mo4Ti3AL; NiCr 19 Co 14 Mo 4 Ti		NC 20 K 14						NiCr20Co 13Mo4Ti3AL
34	Rene 80				NC14 K9 T5 DWA						
35	5388C; N30002; CW-12MW;	2.4883	G-NiM16CrW								
35	N7M; N-7M; N30007	2.4685	G-NiMo28		ND 30 M						
35	N12MV; N-12MV; N30012	2.4882; 9.4810; 2.4810/9.4810	G-NiMo30								
35	Nimocast PK24; N13100; AMS 5397	2.4674	G-NiCo15Cr10AlTiMo	HC 204	NK 15 CAT						
35	Jethete M-252; N07252; AMS 5551	2.4916	G-NiCr19Co; G-NICR 19 Co								
35	Nimocast 713; N07713; AMS 5391; Inconel 713LC	2.4670	G-NiCr13Al6MoNb	HC 203	NC 13 AD						
35	M-35-1; N214135	2.4365; 2.4365/9.4365	G-NiCu40Nb						NiCuC		
36	Titanium Grade 1; R50250; ASTM GR. 1	3.7024; 3.7025	Ti 1; Ti 99.8	TA1	T-35		Ti1-Type 1	Ti-PO1	Class 2; Gr-1	VT1-00	Ti 99.8

Material Group No.	USA	Germany		U.K.	France	Sweden	Italy	Spain	Japan	Russia	EURONORM
	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
36	Titanium Grade 2; R50400; AMS 4902; AMS 4941; AST M Gr. 2	3.7034; 3.7035; 3.7036	Ti 2; Ti 99.7	TA2; TA3; TA4; TA5	T-40		Ti1-Type 2	Ti-PO2	Class 2; Gr-2	VT1-0	Ti 99.7
36	Titanium Grade 3; R50500; ASTM Gr. 3	3.7055; 3.7056	Ti 3; Ti 99.6	DTD 5023, DTD 5273	T-50		Ti1-Type 3		Class 3; Gr-3		Ti 99.6
36	Titanium Grade 4; R50700; ASTM Gr. 4	3.7064; 3.7065; 3.7066	Ti 4; Ti 99.5	TA7; TA8; TA9	T-60		Ti1-Type 4		Class 4; Gr-4		Ti 99.5
36	Titanium Grade 7; R52400; Ti-0.15Pd	3.7235					Ti2Pd-Type 7		Class 13; Gr-13		
37	Titanium Grade 5; R56400; Ti-6Al-4V	3.7165; 3.7164	Ti6Al4V	TA10; TA11; TA12; TA13; TA 28; TA56; Ti-Al-V	TA6V; T-A 6 V; Ti-P.63		TiAl6V4-Type 5	Ti-P63	Class 6 0; Gr 6 0; SAT-64	VT6	Ti6Al4V
37	Titanium Grade 6Al-2Sn-4Zr-2Mo; R54620; 6Al-2Sn-4Zr-2Mo	3.7145; 3.7144	TiAl6Sn2Zr4Mo2							VT25	TiAl6Sn2Zr4Mo2
37		3.7175; 3.7174	TiAl6V6Sn2								
37	Titanium Grade 9; R56320; Ti-3Al-2.5V	3.7195; 3.7194	Ti6Al2.5V				TiAl3V2.5-Type 9		Class 6 1; Gr 6 1	PT-3V	Ti6Al2.5V
37		3.7124	TiCu2	TA 21; TA22; TA23; TA24	T-U2			Ti-P11			
37		3.7185; 3.7184	Ti4Al4Mo2Sn; TiAl4Mo4Sn4Si0.5	TA45; TA46; TA47; TA48; TA49; TA50; TA57	T-A4DE			Ti-P68			
37	Titanium Grade 6; R54520; Ti-5Al-2.5Sn	3.7115.1; 3.7115	TiAl5Sn2.5; TiAl 5 Sn 22	TA14; TA17	T-A5E; Ti-P.65				SAT-525	VT5-1	TiAl5Sn2.5
37	R56410; Ti-10V-2Fe-3Al										
37	Titanium grade 23; R56401; Ti-6Al-4V-ELI		Ti6Al4V ELI	TA11			TiAl6V4ELI-Type 5.1		Class 6 1; Gr 6 1		
37										VST 5553	Ti5Al5V5Mo3Cr; Ti-5Al-5V-5Mo-3Cr
37	Ti-4Al-3Mo-1V				T-A4D3V					VT14	
37										VT22	
38		1.2762	75CrMoNiW6-7; 75 CrMoNiW 6 7								75CrMoNiW6-7
38	W1; T72301	1.1625	C80W2; C 80 W2	BW 18				F.520.U; F.5107; C 80	SK 75; SK 85; SK 85 M; SK 5; SK 5 M; SK 6	U8-1	C80W2
38	W110; T72301	1.1545	C105U; C 105 W 1; C 105 U		C 105 E 2 U; Y1 105; C105E2U	1880	C 100 KU	F.515; F.516	SK 105; SK 3; TC 105	U10A-1; U10A-2; U11-1	C105U

Material Group No.	USA	Germany		U.K.	France	Sweden	Italy	Spain	Japan	Russia	EURONORM
	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
38		1.6746	32NiCrMo14-5; 32 NiCrMo 14-5	832 M 31	35 NCD 14			F.1262-32 NiCrMo 12			32NiCrMo14-5
38	W210; T72302	1.2833	100V1; 100 V 1	BW 2	C 105 E 2 UV 1; Y1 105 V; 100 V 2		102 V 2 KU		SKS 43		100V1
38	6145; 6150; 6150 H; G61500; H61500	1.8159	51CrV4; 50CrV4; 50 CrV 4	735 A 50; 735 A 51; 735 H 51; 735 M 50; En 47	50CrV4RR; 50 CV 4; 51 CV 4	2230	50 CrV 4	F.143; F.143.A; 51 CrV 4; F.1430	SUP 10; SUP 10-CSP; SUP 10 M	50ChFA; 50ChGFA	51CrV4
38	P20; T51620	1.2330	35CrMo4; 35 CrMo 4	708 A 37	34 CD 4	2234	35 CrMo 4				35CrMo4
38											
38											
38											
38											
38		1.8721	26MnCr6-3								26MnCr6-3
38											
38											
38											
38		1.2083; 1.2083 ESR	X40Cr14; X 42 Cr 13		X40Cr14; Z 40 C 14	2314	X 41 Cr 13 KU	F.5263; X 40 Cr 13	SUS 420 J 2		X40Cr14
38	300M; 4340M; K44220	1.6928	41SiNiCrMoV7-6								S 155
38										30ChGSA	
39	A2; T30102	1.2363	X100CrMoV5; X100CrMoV5-1; X 100 CrMoV 5 1	BA 2	X 100 CrMoV 5; Z 100 CDW 5	2260	X 100 CrMoV 5 1 KU	F.536; F.5227; X 100 CrMoV 5	SKD 12		X100CrMoV5
39	D2; T30402	1.2379	X153CrMoV12; X155CrVMo12-1; X155 CrVMo 12 1	BD 2	X 160 CrMoV 12; Z 160 CDV 12	2310	X 155 CrVMo 12 1 KU	F.520.A	SKD 10; SKD 11		X153CrMoV12
39	D3; T30403	1.2080	X210Cr12; X 210 Cr 12	BD 3	X200Cr12; Z 200 C 12		X 205 Cr 12 KU	F.521; F.5212; X 210 Cr 12	SKD 1	Ch12	X210Cr12
39	L3; T61203	1.2067	102Cr6; 102 Cr 6; 100 Cr 6	BL 3; BL3	100Cr6RR; 100 C 6; 100Cr6; Y 100 C 6		102 Cr 6 KU	F.5230; 100 Cr 6	SUJ 2	Ch	102Cr6
39	M1; H41; T11301; T20841	1.3346	HS2-9-1; S 2-9-1	BM 1	HS 2-8-1; Z 85 DCWV 08-04-02-01						HS2-9-1
39	T1; T12001	1.3355	HS18-0-1; S 18-0-1	BT 1	18-0-1; HS 18-0-1; Z 80 WCV 18-04-01	2750	HS 18-0-1	F.5520; HS 18-0-1	SKH 2	R18	HS18-0-1
39	O2; T31502	1.2842	90MnCrV8; 90 MnCrV 8	BO 2; BO2	90 MnV 8; 90 MV 8		90 MoVCr 8 KU	90 MnCrV 8; F.5229			90MnCrV8
39	H13; T20813	1.2344	X40CrMoV5-1; X40 CrMoV 5 1	BH 13	X 40 CrMoV 5; Z 40 CDV 5	2242	X 40 CrMoV 5 1 1 KU	F.5318; X 40 CrMoSiV 5	SKD 61	4Ch5MF1S	X40CrMoV5-1
39											
39											
39											
39											
39											
39	440C; S44004; S44025	1.4125	X105CrMo17; X105 CrMo 17		Z 100 CD 17 Cl; Z 100 CD 17				SUS 440 C	95Ch18; 110Ch18M-SChD	X105CrMo17
40	A 532 III A 25% Cr	0.9650	G-X 260 Cr 27	Grade 3 D		0466-00				ChWG	
40	Ni-Hard 4	0.9630	G-X 300 CrNiSi 9 5 2								
40	Ni-Hard 1	0.9625	G-X 330 NiCr 4 2	Grade 2 B		0513-00					
40	A 532 III A 25% Cr	0.9655	G-X 300 CrMo 27 1	Grade 3 E						20Ch25N20S2	
40	Ni-Hard 2	0.9620	G-X 260 NiCr 4 2	Grade 2 A		0512-00					

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41	A532 IID20%CrMo-LC	0.9645; 5.5609	G-X 260 CrMoNi 20 2 1	Grade 3C							EN-GJN-HV600(XCr23)
41	A532 IIC15%CrMo-HC	0.9635; 0.9640	G-X 300 CrMo 15 3; G-X 300 CrMoNi 15 2 1	Grade 3A; Grade 3B							EN-GJN-HV600(XCr14)

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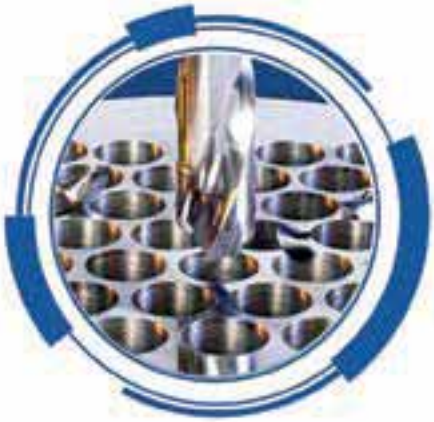


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