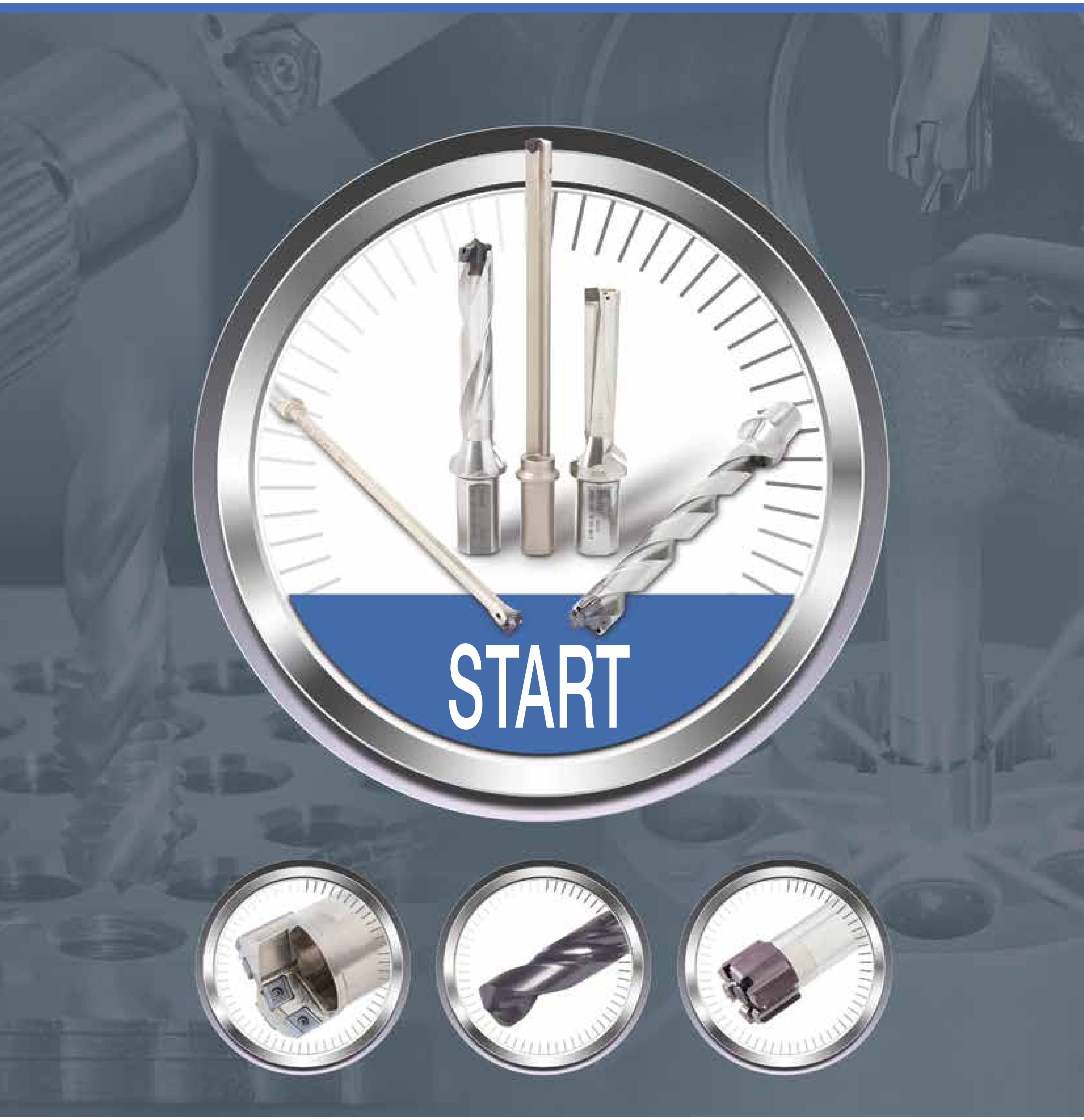
Complete Machining Solutions
HOLE MAKING TOOLS



Member IMC Group
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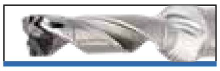

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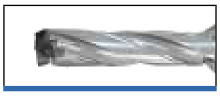

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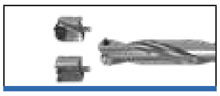

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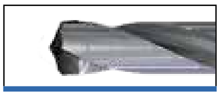

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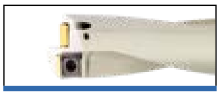

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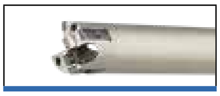

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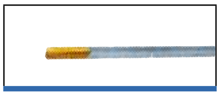

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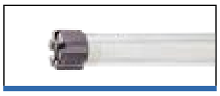


TAPS 781

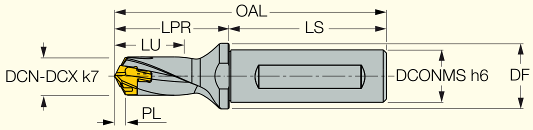
ITS BORE 821

INDEXABLE DRILLS

SUMOCHAM
CHAMDRILL LINE

DCN A-1.5D

Indexable 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]	
DCN 060-009-12A-1.5D	6.00	6.40	12.00	16.00	10.1	23.0	1.09	45.0	68.00	6.0	K DCN 6-9.99-Y
DCN 065-010-12A-1.5D	6.50	6.90	12.00	16.00	11.2	24.1	1.18	45.0	69.10	6.5	K DCN 6-9.99-Y
DCN 070-011-12A-1.5D	7.00	7.40	12.00	16.00	12.3	25.1	1.27	45.0	70.10	7.0	K DCN 6-9.99
DCN 075-011-12A-1.5D	7.50	7.90	12.00	16.00	12.4	25.9	1.36	45.0	70.90	7.0	K DCN 6-9.99
DCN 080-012-12A-1.5D	8.00	8.40	12.00	16.00	13.5	27.9	1.46	45.0	72.90	8.0	K DCN 6-9.99
DCN 085-013-12A-1.5D	8.50	8.90	12.00	16.00	14.6	28.2	1.55	45.0	73.20	8.0	K DCN 6-9.99
DCN 090-014-12A-1.5D	9.00	9.40	12.00	16.00	15.6	29.3	1.64	45.0	74.30	9.0	K DCN 6-9.99
DCN 095-014-12A-1.5D	9.50	9.90	12.00	16.00	15.7	30.1	1.73	45.0	75.10	9.0	K DCN 6-9.99
DCN 100-015-16A-1.5D	10.00	10.40	16.00	20.00	16.8	31.2	1.82	48.0	79.20	10.0	K DCN 10-13.99
DCN 105-016-16A-1.5D	10.50	10.90	16.00	20.00	17.9	32.0	1.91	48.0	80.00	10.0	K DCN 10-13.99
DCN 110-017-16A-1.5D	11.00	11.40	16.00	20.00	19.0	33.1	2.00	48.0	81.10	11.0	K DCN 10-13.99
DCN 115-017-16A-1.5D	11.50	11.90	16.00	20.00	19.1	33.9	2.09	48.0	81.90	11.0	K DCN 10-13.99
DCN 120-018-16A-1.5D	12.00	12.40	16.00	20.00	20.2	35.0	2.18	48.0	83.00	12.0	K DCN 10-13.99
DCN 125-019-16A-1.5D	12.50	12.90	16.00	20.00	21.3	35.8	2.27	48.0	83.80	12.0	K DCN 10-13.99
DCN 130-020-16A-1.5D	13.00	13.40	16.00	20.00	22.4	37.1	2.37	48.0	85.10	13.0	K DCN 10-13.99
DCN 135-020-16A-1.5D	13.50	13.90	16.00	20.00	22.5	37.9	2.46	48.0	85.90	13.0	K DCN 10-13.99
DCN 140-021-16A-1.5D	14.00	14.40	16.00	20.00	23.6	41.1	2.55	48.0	89.10	14.0	K DCN 14-17.99
DCN 145-022-16A-1.5D	14.50	14.90	16.00	20.00	24.6	41.9	2.64	48.0	89.90	14.0	K DCN 14-17.99
DCN 150-023-20A-1.5D	15.00	15.90	20.00	25.00	25.7	46.2	2.73	50.0	96.20	15.0	K DCN 14-17.99
DCN 160-024-20A-1.5D	16.00	16.90	20.00	25.00	26.9	49.3	2.91	50.0	99.30	16.0	K DCN 14-17.99
DCN 170-026-20A-1.5D	17.00	17.90	20.00	25.00	29.1	52.4	3.09	50.0	102.40	17.0	K DCN 14-17.99
DCN 180-027-25A-1.5D	18.00	18.90	25.00	32.00	30.3	55.5	3.28	56.0	111.50	18.0	K DCN 18-21.99
DCN 190-029-25A-1.5D	19.00	19.90	25.00	32.00	32.5	58.5	3.46	56.0	114.50	19.0	K DCN 18-21.99
DCN 200-030-25A-1.5D	20.00	20.90	25.00	32.00	33.6	61.6	3.64	56.0	117.60	20.0	K DCN 18-21.99
DCN 210-032-25A-1.5D	21.00	21.90	25.00	32.00	35.8	64.7	3.82	56.0	120.70	21.0	K DCN 18-21.99
DCN 220-033-25A-1.5D	22.00	22.90	25.00	32.00	37.0	67.8	4.00	56.0	123.80	22.0	K DCN 22-26.99
DCN 230-035-32A-1.5D	23.00	23.90	32.00	42.00	39.2	70.9	4.19	60.0	130.90	23.0	K DCN 22-26.99
DCN 240-036-32A-1.5D	24.00	24.90	32.00	42.00	40.4	73.9	4.37	60.0	133.90	24.0	K DCN 22-26.99
DCN 250-038-32A-1.5D	25.00	25.90	32.00	42.00	42.6	77.0	4.55	60.0	137.00	25.0	K DCN 22-26.99
DCN 260-039-32A-1.5D	26.00	26.90	32.00	42.00	43.7	80.1	4.73	60.0	140.10	26.0	K DCN 22-26.99
DCN 270-041-32A-1.5D	27.00	27.90	32.00	42.00	45.9	83.1	4.91	60.0	151.10	27.0	K DCN 27-32.99
DCN 280-042-32A-1.5D	28.00	28.90	32.00	42.00	47.1	86.2	5.10	60.0	146.20	28.0	K DCN 27-32.99
DCN 290-044-32A-1.5D	29.00	29.90	32.00	42.00	49.3	89.3	5.28	60.0	149.30	29.0	K DCN 27-32.99
DCN 300-045-32A-1.5D	30.00	30.90	32.00	42.00	50.5	92.4	5.46	60.0	152.40	30.0	K DCN 27-32.99
DCN 310-047-32A-1.5D	31.00	31.90	32.00	42.00	52.6	95.5	5.64	60.0	155.50	31.0	K DCN 27-32.99
DCN 320-048-32A-1.5D	32.00	32.90	32.00	42.00	53.8	98.5	5.82	60.0	158.50	32.0	K DCN 27-32.99

- For user guide and cutting conditions, see pages 556-570

[1] Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

[2] Cutting diameter maximum

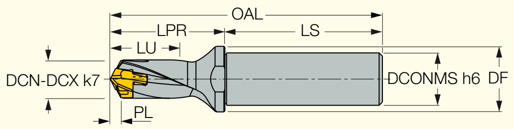
[3] Seat size code

For inserts, see pages: FCP (546) • HCP-IQ (542) • ICG (547) • ICK (543) • ICK-2M (545) • ICM (543) • ICN (549) • ICP-2M (545) • QCP-2M (544)

SUMOCHAM
CHAMDRILL LINE

DCN R-1.5D

Indexable 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]	
DCN 060-009-12R-1.5D	6.00	6.40	12.00	16.00	10.1	23.0	1.09	45.0	68.00	6.0	K DCN 6-9.99-Y
DCN 065-010-12R-1.5D	6.50	6.90	12.00	16.00	11.2	24.1	1.18	45.0	69.10	6.5	K DCN 6-9.99-Y
DCN 070-011-12R-1.5D	7.00	7.40	12.00	16.00	12.3	25.1	1.27	45.0	70.10	7.0	K DCN 6-9.99
DCN 075-011-12R-1.5D	7.50	7.90	12.00	16.00	12.4	25.9	1.36	45.0	70.90	7.0	K DCN 6-9.99
DCN 080-012-12R-1.5D	8.00	8.40	12.00	16.00	13.5	27.9	1.46	45.0	72.90	8.0	K DCN 6-9.99
DCN 085-013-12R-1.5D	8.50	8.90	12.00	16.00	14.6	28.2	1.55	45.0	73.20	8.0	K DCN 6-9.99
DCN 090-014-12R-1.5D	9.00	9.40	12.00	16.00	15.6	29.3	1.64	45.0	74.30	9.0	K DCN 6-9.99
DCN 095-014-12R-1.5D	9.50	9.90	12.00	16.00	15.7	30.1	1.73	45.0	75.10	9.0	K DCN 6-9.99
DCN 100-015-16R-1.5D	10.00	10.40	16.00	20.00	16.8	31.2	1.82	48.0	79.20	10.0	K DCN 10-13.99
DCN 105-016-16R-1.5D	10.50	10.90	16.00	20.00	17.9	32.0	1.91	48.0	80.00	10.0	K DCN 10-13.99
DCN 110-017-16R-1.5D	11.00	11.40	16.00	20.00	19.0	33.1	2.00	48.0	81.10	11.0	K DCN 10-13.99
DCN 115-017-16R-1.5D	11.50	11.90	16.00	20.00	19.1	33.9	2.09	48.0	81.90	11.0	K DCN 10-13.99
DCN 120-018-16R-1.5D	12.00	12.40	16.00	20.00	20.2	35.0	2.18	48.0	83.00	12.0	K DCN 10-13.99
DCN 125-019-16R-1.5D	12.50	12.90	16.00	20.00	21.3	35.8	2.27	48.0	83.80	12.0	K DCN 10-13.99
DCN 130-020-16R-1.5D	13.00	13.40	16.00	20.00	22.4	37.1	2.37	48.0	85.10	13.0	K DCN 10-13.99
DCN 135-020-16R-1.5D	13.50	13.90	16.00	20.00	22.5	37.9	2.46	48.0	85.90	13.0	K DCN 10-13.99
DCN 140-021-16R-1.5D	14.00	14.40	16.00	20.00	23.6	41.1	2.55	48.0	89.10	14.0	K DCN 14-17.99
DCN 145-022-16R-1.5D	14.50	14.90	16.00	20.00	24.6	41.9	2.64	48.0	89.90	14.0	K DCN 14-17.99
DCN 150-023-20R-1.5D	15.00	15.90	20.00	25.00	25.7	46.2	2.73	50.0	96.20	15.0	K DCN 14-17.99
DCN 160-024-20R-1.5D	16.00	16.90	20.00	25.00	26.9	49.3	2.91	50.0	99.30	16.0	K DCN 14-17.99
DCN 170-026-20R-1.5D	17.00	17.90	20.00	25.00	29.1	52.4	3.09	50.0	102.40	17.0	K DCN 14-17.99
DCN 180-027-25R-1.5D	18.00	18.90	25.00	32.00	30.3	55.5	3.28	56.0	111.50	18.0	K DCN 18-21.99
DCN 190-029-25R-1.5D	19.00	19.90	25.00	32.00	32.5	58.5	3.46	56.0	114.50	19.0	K DCN 18-21.99
DCN 200-030-25R-1.5D	20.00	20.90	25.00	32.00	33.6	61.6	3.64	56.0	117.60	20.0	K DCN 18-21.99
DCN 210-032-25R-1.5D	21.00	21.90	25.00	32.00	35.8	64.7	3.82	56.0	120.70	21.0	K DCN 18-21.99
DCN 220-033-25R-1.5D	22.00	22.90	25.00	32.00	37.0	67.8	4.00	56.0	123.80	22.0	K DCN 22-26.99
DCN 230-035-32R-1.5D	23.00	23.90	32.00	42.00	39.2	70.9	4.19	60.0	130.90	23.0	K DCN 22-26.99
DCN 240-036-32R-1.5D	24.00	24.90	32.00	42.00	40.4	74.0	4.37	60.0	134.00	24.0	K DCN 22-26.99
DCN 250-038-32R-1.5D	25.00	25.90	32.00	42.00	42.6	77.0	4.55	60.0	137.00	25.0	K DCN 22-26.99
DCN 260-039-32R-1.5D	26.00	26.90	32.00	42.00	43.7	80.1	4.73	60.0	140.10	26.0	K DCN 22-26.99
DCN 270-041-32R-1.5D	27.00	27.90	32.00	42.00	45.9	83.1	4.91	60.0	143.10	27.0	K DCN 27-32.99
DCN 280-042-32R-1.5D	28.00	28.90	32.00	42.00	47.1	86.2	5.10	60.0	146.20	28.0	K DCN 27-32.99
DCN 290-044-32R-1.5D	29.00	29.90	32.00	42.00	49.3	89.3	5.28	60.0	149.30	29.0	K DCN 27-32.99
DCN 300-045-32R-1.5D	30.00	30.90	32.00	42.00	50.5	92.4	5.46	60.0	152.40	30.0	K DCN 27-32.99
DCN 310-047-32R-1.5D	31.00	31.90	32.00	42.00	52.6	95.5	5.64	60.0	155.50	31.0	K DCN 27-32.99
DCN 320-048-32R-1.5D	32.00	32.90	32.00	42.00	53.8	98.5	5.82	60.0	158.50	32.0	K DCN 27-32.99

- For user guide and cutting conditions, see pages 556-570

[1] Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

[2] Cutting diameter maximum

[3] Seat size code

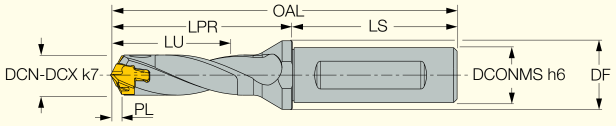
For inserts, see pages: FCP (546) • HCP-IQ (542) • ICK (543) • ICK-2M (545) • ICM (543) • ICN (549) • ICP-2M (545) • QCP-2M (544)

Member IMC Group

SUMOCHAM
CHAMDRILL LINE

DCN A-3D

Indexable 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]	
DCN 060-018-12A-3D	6.00	6.40	12.00	16.00	19.1	32.0	1.09	45.0	77.00	6.0	K DCN 6-9.99-Y
DCN 065-020-12A-3D	6.50	6.90	12.00	16.00	21.2	33.8	1.18	45.0	78.80	6.5	K DCN 6-9.99-Y
DCN 070-021-12A-3D	7.00	7.40	12.00	16.00	22.3	35.6	1.27	45.0	80.60	7.0	K DCN 6-9.99
DCN 075-023-12A-3D	7.50	7.90	12.00	16.00	24.4	37.1	1.36	45.0	82.10	7.0	K DCN 6-9.99
DCN 080-024-12A-3D	8.00	8.40	12.00	16.00	25.5	39.4	1.46	45.0	84.40	8.0	K DCN 6-9.99
DCN 085-025-12A-3D	8.50	8.90	12.00	16.00	26.6	40.9	1.55	45.0	85.90	8.0	K DCN 6-9.99
DCN 090-027-12A-3D	9.00	9.40	12.00	16.00	28.6	42.8	1.64	45.0	87.80	9.0	K DCN 6-9.99
DCN 095-029-12A-3D	9.50	9.90	12.00	16.00	30.7	44.3	1.73	45.0	89.30	9.0	K DCN 6-9.99
DCN 100-030-16A-3D	10.00	10.40	16.00	20.00	31.8	46.2	1.82	48.0	94.20	10.0	K DCN 10-13.99
DCN 105-032-16A-3D	10.50	10.90	16.00	20.00	33.9	47.7	1.91	48.0	95.70	10.0	K DCN 10-13.99
DCN 110-033-16A-3D	11.00	11.40	16.00	20.00	35.0	49.6	2.00	48.0	97.60	11.0	K DCN 10-13.99
DCN 115-035-16A-3D	11.50	11.90	16.00	20.00	37.1	51.1	2.09	48.0	99.10	11.0	K DCN 10-13.99
DCN 120-036-16A-3D	12.00	12.40	16.00	20.00	38.2	53.0	2.18	48.0	101.00	12.0	K DCN 10-13.99
DCN 125-037-16A-3D	12.50	12.90	16.00	20.00	39.3	54.5	2.27	48.0	102.50	12.0	K DCN 10-13.99
DCN 130-039-16A-3D	13.00	13.40	16.00	20.00	41.4	56.6	2.37	48.0	104.60	13.0	K DCN 10-13.99
DCN 135-041-16A-3D	13.50	13.90	16.00	20.00	43.5	58.1	2.46	48.0	106.10	13.0	K DCN 10-13.99
DCN 140-042-16A-3D	14.00	14.40	16.00	20.00	44.6	62.1	2.55	48.0	110.10	14.0	K DCN 14-17.99
DCN 145-044-16A-3D	14.50	14.90	16.00	20.00	46.6	63.6	2.64	48.0	111.60	14.0	K DCN 14-17.99
DCN 150-045-20A-3D	15.00	15.90	20.00	25.00	47.7	68.7	2.73	50.0	118.70	15.0	K DCN 14-17.99
DCN 160-048-20A-3D	16.00	16.90	20.00	25.00	50.9	73.3	2.91	50.0	123.30	16.0	K DCN 14-17.99
DCN 170-051-20A-3D	17.00	17.90	20.00	25.00	54.1	77.9	3.09	50.0	127.90	17.0	K DCN 14-17.99
DCN 180-054-25A-3D	18.00	18.90	25.00	32.00	57.3	82.5	3.28	56.0	138.50	18.0	K DCN 18-21.99
DCN 190-057-25A-3D	19.00	19.90	25.00	32.00	60.5	87.0	3.46	56.0	143.00	19.0	K DCN 18-21.99
DCN 200-060-25A-3D	20.00	20.90	25.00	32.00	63.6	91.6	3.64	56.0	147.60	20.0	K DCN 18-21.99
DCN 210-063-25A-3D	21.00	21.90	25.00	32.00	66.8	96.2	3.82	56.0	152.20	21.0	K DCN 18-21.99
DCN 220-066-25A-3D	22.00	22.90	25.00	32.00	70.0	100.8	4.00	56.0	156.80	22.0	K DCN 22-26.99
DCN 230-069-32A-3D	23.00	23.90	32.00	42.00	73.2	105.4	4.19	60.0	165.40	23.0	K DCN 22-26.99
DCN 240-072-32A-3D	24.00	24.90	32.00	42.00	76.4	110.0	4.37	60.0	170.00	24.0	K DCN 22-26.99
DCN 250-075-32A-3D	25.00	25.90	32.00	42.00	79.6	114.5	4.55	60.0	174.50	25.0	K DCN 22-26.99
DCN 260-078-32A-3D	26.00	26.90	32.00	42.00	82.7	119.0	4.73	60.0	179.00	26.0	K DCN 22-26.99
DCN 270-081-32A-3D	27.00	27.90	32.00	42.00	85.9	123.7	4.91	60.0	191.70	27.0	K DCN 27-32.99
DCN 270-081-40A-3D	27.00	27.90	40.00	50.00	85.9	123.7	4.91	68.0	183.70	27.0	K DCN 27-32.99
DCN 280-084-32A-3D	28.00	28.90	32.00	42.00	89.1	128.2	5.10	60.0	196.20	28.0	K DCN 27-32.99
DCN 280-084-40A-3D	28.00	28.90	40.00	50.00	89.1	128.2	5.10	68.0	188.20	28.0	K DCN 27-32.99
DCN 290-087-32A-3D	29.00	29.90	32.00	42.00	92.3	132.8	5.28	60.0	200.80	29.0	K DCN 27-32.99
DCN 290-087-40A-3D	29.00	29.90	40.00	50.00	92.3	132.8	5.28	68.0	192.80	29.0	K DCN 27-32.99
DCN 300-090-32A-3D	30.00	30.90	32.00	42.00	95.5	137.4	5.46	60.0	205.40	30.0	K DCN 27-32.99
DCN 300-090-40A-3D	30.00	30.90	40.00	50.00	95.5	137.4	5.46	68.0	197.40	30.0	K DCN 27-32.99
DCN 310-093-32A-3D	31.00	31.90	32.00	42.00	98.6	142.0	5.64	60.0	210.00	31.0	K DCN 27-32.99
DCN 320-096-32A-3D	32.00	32.90	32.00	42.00	101.8	146.5	5.82	60.0	214.50	32.0	K DCN 27-32.99
DCN 320-096-40A-3D	32.00	32.90	40.00	50.00	101.8	146.5	5.82	68.0	206.50	32.0	K DCN 27-32.99

- For user guide and cutting conditions, see pages 556-570

[1] Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

[2] Cutting diameter maximum

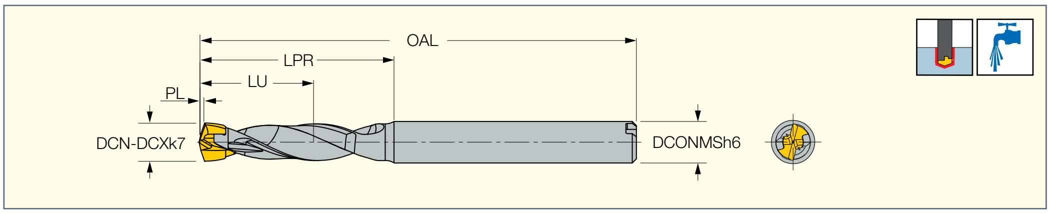
[3] Seat size code

For inserts, see pages: HCP-IQ (542) • QCP-2M (544) • ICM (543) • ICK (543) • ICN (549) • ICP-2M (545) • ICK-2M (545) • FCP (546)

SUMOCHAM
CHAMDRILL LINE

DCN C-3D

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



Designation	DCN(2)	DCX(3)	DCONMS	LU	LPR	PL	LS	OAL	SSC(4)	
DCN 045-014-06C-3D (1)	4.50	4.90	6.00	13.5	23.1	0.66	35.0	58.05	4.5	
DCN 050-015-06C-3D (1)	5.00	5.40	6.00	15.0	24.7	0.73	35.0	59.70	5	
DCN 055-017-06C-3D (1)	5.50	5.90	6.00	16.5	26.4	0.81	35.0	61.35	5.5	
DCN 060-018-08C-3D	6.00	6.40	8.00	18.0	28.0	0.96	36.0	64.00	6	K DCN 6-9.99-Y
DCN 065-020-08C-3D	6.50	6.90	8.00	19.5	29.8	1.18	36.0	65.80	6.5	K DCN 6-9.99-Y
DCN 070-021-08C-3D	7.00	7.40	8.00	21.0	31.6	1.01	36.0	67.60	7	K DCN 6-9.99
DCN 075-023-08C-3D	7.50	7.90	8.00	22.5	33.1	1.01	36.0	69.10	7	K DCN 6-9.99
DCN 080-024-10C-3D	8.00	8.40	10.00	24.0	35.4	1.20	40.0	75.40	8	K DCN 6-9.99
DCN 085-026-10C-3D	8.50	8.90	10.00	25.5	36.9	1.20	40.0	76.90	8	K DCN 6-9.99
DCN 090-027-10C-3D	9.00	9.40	10.00	27.0	38.8	1.25	40.0	78.80	9	K DCN 6-9.99
DCN 095-029-10C-3D	9.50	9.90	10.00	28.5	40.3	1.25	40.0	80.30	9	K DCN 6-9.99

- For user guide and cutting conditions, see pages 556-570

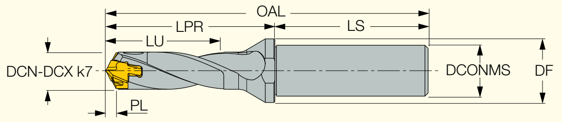
(1) The SK DCN key is supplied with the insert
(2) Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body
(3) Cutting diameter maximum
(4) Seat size code

For inserts, see pages: FCP (546) • HCP-IQ (542) • ICK (543) • ICK-2M (545) • ICM (543) • ICP-2M (545)

SUMOCHAM
CHAMDRILL LINE

DCN R-3D

Indexable 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]	
DCN 060-018-12R-3D	6.00	6.40	12.00	16.00	19.1	32.0	1.09	45.0	77.00	6.0	K DCN 6-9.99-Y
DCN 065-020-12R-3D	6.50	6.90	12.00	16.00	21.2	33.8	1.18	45.0	78.80	6.5	K DCN 6-9.99-Y
DCN 070-021-12R-3D	7.00	7.40	12.00	16.00	22.3	35.6	1.27	45.0	80.60	7.0	K DCN 6-9.99
DCN 075-023-12R-3D	7.50	7.90	12.00	16.00	24.4	37.1	1.36	45.0	82.10	7.0	K DCN 6-9.99
DCN 080-024-12R-3D	8.00	8.40	12.00	16.00	25.5	39.4	1.46	45.0	84.40	8.0	K DCN 6-9.99
DCN 085-025-12R-3D	8.50	8.90	12.00	16.00	26.6	40.9	1.55	45.0	85.90	8.0	K DCN 6-9.99
DCN 090-027-12R-3D	9.00	9.40	12.00	16.00	28.6	42.8	1.64	45.0	87.80	9.0	K DCN 6-9.99
DCN 095-029-12R-3D	9.50	9.90	12.00	16.00	30.7	44.3	1.73	45.0	89.30	9.0	K DCN 6-9.99
DCN 100-030-16R-3D	10.00	10.40	16.00	20.00	31.8	46.2	1.82	48.0	94.20	10.0	K DCN 10-13.99
DCN 105-032-16R-3D	10.50	10.90	16.00	20.00	33.9	47.7	1.91	48.0	95.70	10.0	K DCN 10-13.99
DCN 110-033-16R-3D	11.00	11.40	16.00	20.00	35.0	49.6	2.00	48.0	97.60	11.0	K DCN 10-13.99
DCN 115-035-16R-3D	11.50	11.90	16.00	20.00	37.1	51.1	2.09	48.0	99.10	11.0	K DCN 10-13.99
DCN 120-036-16R-3D	12.00	12.40	16.00	20.00	38.2	53.0	2.18	48.0	101.00	12.0	K DCN 10-13.99
DCN 125-037-16R-3D	12.50	12.90	16.00	20.00	39.3	54.5	2.27	48.0	102.50	12.0	K DCN 10-13.99
DCN 130-039-16R-3D	13.00	13.40	16.00	20.00	41.4	56.6	2.37	48.0	104.60	13.0	K DCN 10-13.99
DCN 135-041-16R-3D	13.50	13.90	16.00	20.00	43.5	58.1	2.46	48.0	106.10	13.0	K DCN 10-13.99
DCN 140-042-16R-3D	14.00	14.40	16.00	20.00	44.6	62.1	2.55	48.0	110.10	14.0	K DCN 14-17.99
DCN 145-044-16R-3D	14.50	14.90	16.00	20.00	46.6	63.6	2.64	48.0	111.60	14.0	K DCN 14-17.99
DCN 150-045-20R-3D	15.00	15.90	20.00	25.00	47.7	68.7	2.73	50.0	118.70	15.0	K DCN 14-17.99
DCN 160-048-20R-3D	16.00	16.90	20.00	25.00	50.9	73.3	2.91	50.0	123.30	16.0	K DCN 14-17.99
DCN 170-051-20R-3D	17.00	17.90	20.00	25.00	54.1	77.9	3.09	50.0	127.90	17.0	K DCN 14-17.99
DCN 180-054-25R-3D	18.00	18.90	25.00	32.00	57.3	82.5	3.28	56.0	138.50	18.0	K DCN 18-21.99
DCN 190-057-25R-3D	19.00	19.90	25.00	32.00	60.5	87.0	3.46	56.0	143.00	19.0	K DCN 18-21.99
DCN 200-060-25R-3D	20.00	20.90	25.00	32.00	63.6	91.6	3.64	56.0	147.60	20.0	K DCN 18-21.99
DCN 210-063-25R-3D	21.00	21.90	25.00	32.00	66.8	96.2	3.82	56.0	152.20	21.0	K DCN 18-21.99
DCN 220-066-25R-3D	22.00	22.90	25.00	32.00	70.0	100.8	4.00	56.0	156.80	22.0	K DCN 22-26.99
DCN 230-069-32R-3D	23.00	23.90	32.00	42.00	73.2	105.4	4.19	60.0	165.40	23.0	K DCN 22-26.99
DCN 240-072-32R-3D	24.00	24.90	32.00	42.00	76.4	110.0	4.37	60.0	170.00	24.0	K DCN 22-26.99
DCN 250-075-32R-3D	25.00	25.90	32.00	42.00	79.6	114.5	4.55	60.0	174.50	25.0	K DCN 22-26.99
DCN 260-078-32R-3D	26.00	26.90	32.00	42.00	82.7	119.0	4.73	60.0	179.00	26.0	K DCN 22-26.99
DCN 270-081-32R-3D	27.00	27.90	32.00	42.00	85.9	123.7	4.91	60.0	183.70	27.0	K DCN 27-32.99
DCN 280-084-32R-3D	28.00	28.90	32.00	42.00	89.1	128.2	5.10	60.0	188.20	28.0	K DCN 27-32.99
DCN 290-087-32R-3D	29.00	29.90	32.00	42.00	92.3	132.8	5.28	60.0	192.80	29.0	K DCN 27-32.99
DCN 300-090-32R-3D	30.00	30.90	32.00	42.00	95.5	137.4	5.46	60.0	197.40	30.0	K DCN 27-32.99
DCN 310-093-32R-3D	31.00	31.90	32.00	42.00	98.6	142.0	5.64	60.0	202.00	31.0	K DCN 27-32.99
DCN 320-096-32R-3D	32.00	32.90	32.00	42.00	101.8	146.5	5.82	60.0	206.50	32.0	K DCN 27-32.99

- For user guide and cutting conditions, see pages 556-570

[1] Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

[2] Cutting diameter maximum

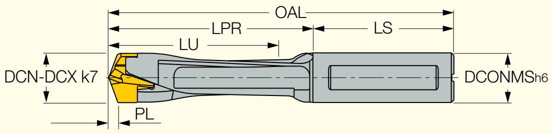
[3] Seat size code

For inserts, see pages: FCP (546) • HCP-IQ (542) • ICG (547) • ICK (543) • ICK-2M (545) • ICM (543) • ICN (549) • ICP-2M (545) • QCP-2M (544)

SUMO UNI CHAM

DCNS-3D

Indexable 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	23.9	34.2	1.36	36.0	70.20	7.0	K DCN 6-9.99
DCNS 080-024-080B-3D	8.00	8.40	8.00	25.5	34.7	1.46	36.0	70.70	8.0	K DCN 6-9.99
DCNS 085-025-090B-3D	8.50	8.90	9.00	27.1	36.8	1.55	36.0	72.90	8.0	K DCN 6-9.99
DCNS 090-027-090B-3D	9.00	9.40	9.00	28.6	38.8	1.64	36.0	74.80	9.0	K DCN 6-9.99
DCNS 095-029-100B-3D	9.50	9.90	10.00	30.2	40.3	1.73	36.0	76.30	9.0	K DCN 6-9.99
DCNS 100-030-100B-3D	10.00	10.40	10.00	31.8	45.2	1.82	41.0	86.20	10.0	K DCN 10-13.99
DCNS 105-032-110B-3D	10.50	10.90	11.00	33.4	46.7	1.91	41.0	87.70	10.0	K DCN 10-13.99
DCNS 110-033-110B-3D	11.00	11.40	11.00	35.0	48.6	2.00	41.0	89.60	11.0	K DCN 10-13.99
DCNS 115-035-120B-3D	11.50	11.90	12.00	36.6	50.1	2.09	41.0	91.10	11.0	K DCN 10-13.99
DCNS 120-036-120B-3D	12.00	12.40	12.00	38.2	52.0	2.18	41.0	93.00	12.0	K DCN 10-13.99
DCNS 125-037-130B-3D	12.50	12.90	13.00	39.8	53.5	2.27	46.0	99.50	12.0	K DCN 10-13.99
DCNS 130-039-130B-3D	13.00	13.40	13.00	41.4	55.6	2.37	47.0	102.60	13.0	K DCN 10-13.99
DCNS 135-041-140B-3D	13.50	13.90	14.00	43.0	57.1	2.46	43.0	100.10	13.0	K DCN 10-13.99
DCNS 140-042-140B-3D	14.00	14.40	14.00	44.6	59.2	2.54	44.0	103.20	14.0	K DCN 14-17.99
DCNS 145-044-150B-3D	14.50	14.90	15.00	46.1	60.7	2.64	45.0	105.70	14.0	K DCN 14-17.99
DCNS 150-045-150B-3D	15.00	15.90	15.00	47.7	62.7	2.72	45.0	107.70	15.0	K DCN 14-17.99
DCNS 160-048-160B-3D	16.00	16.90	16.00	50.9	69.6	2.92	48.0	117.70	16.0	K DCN 14-17.99
DCNS 170-051-170B-3D	17.00	17.90	17.00	54.1	71.9	3.09	48.0	119.90	17.0	K DCN 14-17.99
DCNS 180-054-180B-3D	18.00	18.90	18.00	57.3	75.5	3.28	48.0	123.50	18.0	K DCN 18-21.99
DCNS 190-057-190B-3D	19.00	19.90	19.00	60.5	78.6	3.46	54.0	132.60	19.0	K DCN 18-21.99
DCNS 200-060-200B-3D	20.00	20.90	20.00	63.6	88.1	3.64	54.0	142.10	20.0	K DCN 18-21.99
DCNS 210-063-210B-3D	21.00	21.90	21.00	66.8	90.7	3.81	60.0	150.70	21.0	K DCN 18-21.99
DCNS 220-066-220B-3D	22.00	22.90	22.00	70.0	94.3	4.00	60.0	154.30	22.0	K DCN 22-26.99
DCNS 230-069-230B-3D	23.00	23.90	23.00	73.2	97.8	4.19	60.0	157.80	23.0	K DCN 22-26.99
DCNS 240-072-240B-3D	24.00	24.90	24.00	76.4	101.3	4.37	60.0	161.40	24.0	K DCN 22-26.99
DCNS 250-075-250B-3D	25.00	25.90	25.00	79.6	105.0	4.55	60.0	165.00	25.0	K DCN 22-26.99

- For user guide and cutting conditions, see pages 556-570 • For chamring, see page 616

[1] Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

[2] Cutting diameter maximum

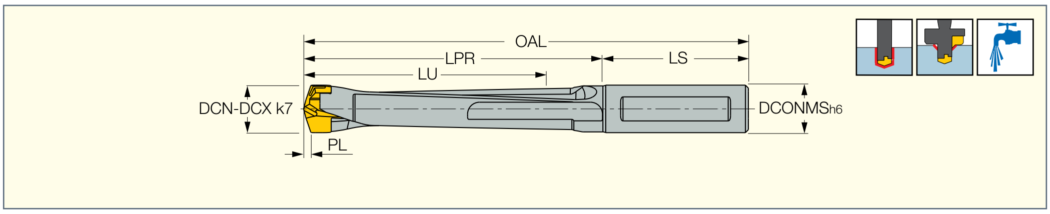
[3] Seat size code

For inserts, see pages: FCP (546) • HCP-IQ (542) • ICK (543) • ICK-2M (545) • ICM (543) • ICN (549) • ICP-2M (545) • QCP-2M (544)

SUMO UNI CHAM

DCNS-5D

Indexable 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	38.9	49.2	1.36	36.0	85.20	7.0	K DCN 6-9.99
DCNS 080-040-080B-5D	8.00	8.40	8.00	41.5	56.4	1.46	36.0	92.40	8.0	K DCN 6-9.99
DCNS 085-042-090B-5D	8.50	8.90	9.00	44.1	53.9	1.55	36.0	89.90	8.0	K DCN 6-9.99
DCNS 090-045-090B-5D	9.00	9.40	9.00	46.6	56.8	1.64	36.0	92.80	9.0	K DCN 6-9.99
DCNS 095-048-100B-5D	9.50	9.90	10.00	49.2	59.2	1.73	36.0	95.30	9.0	K DCN 6-9.99
DCNS 100-050-100B-5D	10.00	10.40	10.00	51.8	65.2	1.82	41.0	106.20	10.0	K DCN 10-13.99
DCNS 105-053-110B-5D	10.50	10.90	11.00	54.4	67.7	1.91	41.0	108.70	10.0	K DCN 10-13.99
DCNS 110-055-110B-5D	11.00	11.40	11.00	57.0	70.6	2.00	41.0	111.60	11.0	K DCN 10-13.99
DCNS 115-058-120B-5D	11.50	11.90	12.00	59.6	73.1	2.09	41.0	114.10	11.0	K DCN 10-13.99
DCNS 120-060-120B-5D	12.00	12.40	12.00	62.2	75.9	2.18	41.0	117.00	12.0	K DCN 10-13.99
DCNS 125-062-130B-5D	12.50	12.90	13.00	64.8	78.5	2.27	46.0	124.50	12.0	K DCN 10-13.99
DCNS 130-065-130B-5D	13.00	13.40	13.00	67.4	81.5	2.36	47.0	128.60	13.0	K DCN 10-13.99
DCNS 135-068-140B-5D	13.50	13.90	14.00	70.0	84.1	2.46	43.0	127.10	13.0	K DCN 10-13.99
DCNS 140-070-140B-5D	14.00	14.40	14.00	72.6	87.1	2.54	44.0	131.20	14.0	K DCN 14-17.99
DCNS 145-073-150B-5D	14.50	14.90	15.00	75.1	89.7	2.64	45.0	134.70	14.0	K DCN 14-17.99
DCNS 150-075-150B-5D	15.00	15.90	15.00	77.7	92.7	2.73	45.0	137.70	15.0	K DCN 14-17.99
DCNS 160-080-160B-5D	16.00	16.90	16.00	82.9	101.7	2.91	48.0	149.70	16.0	K DCN 14-17.99
DCNS 170-085-170B-5D	17.00	17.90	17.00	88.1	105.9	3.09	48.0	153.90	17.0	K DCN 14-17.99
DCNS 180-090-180B-5D	18.00	18.90	18.00	93.3	111.5	3.28	48.0	159.50	18.0	K DCN 18-21.99
DCNS 190-095-190B-5D	19.00	19.90	19.00	98.5	116.6	3.45	54.0	170.60	19.0	K DCN 18-21.99
DCNS 200-100-200B-5D	20.00	20.90	20.00	103.6	128.1	3.64	54.0	182.10	20.0	K DCN 18-21.99
DCNS 210-105-210B-5D	21.00	21.90	21.00	108.8	132.6	3.81	60.0	192.70	21.0	K DCN 18-21.99
DCNS 220-110-220B-5D	22.00	22.90	22.00	114.0	138.3	4.00	60.0	198.30	22.0	K DCN 22-26.99
DCNS 230-115-230B-5D	23.00	23.90	23.00	119.2	143.8	4.19	60.0	203.80	23.0	K DCN 22-26.99
DCNS 240-120-240B-5D	24.00	24.90	24.00	124.4	149.4	4.37	60.0	209.40	24.0	K DCN 22-26.99
DCNS 250-125-250B-5D	25.00	25.90	25.00	129.6	155.0	4.55	60.0	215.00	25.0	K DCN 22-26.99

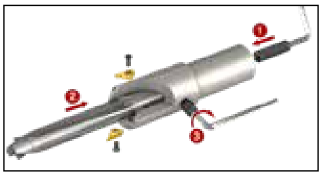
- For user guide and cutting conditions, see pages 556-570 • For chamring, see page 616

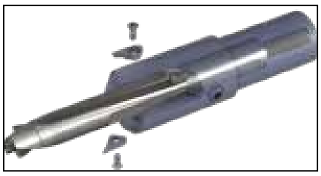
[1] Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

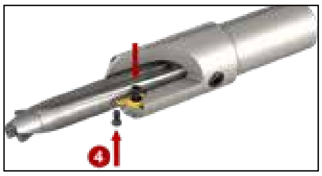
[2] Cutting diameter maximum

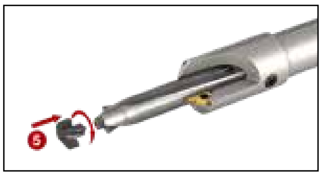
[3] Seat size code

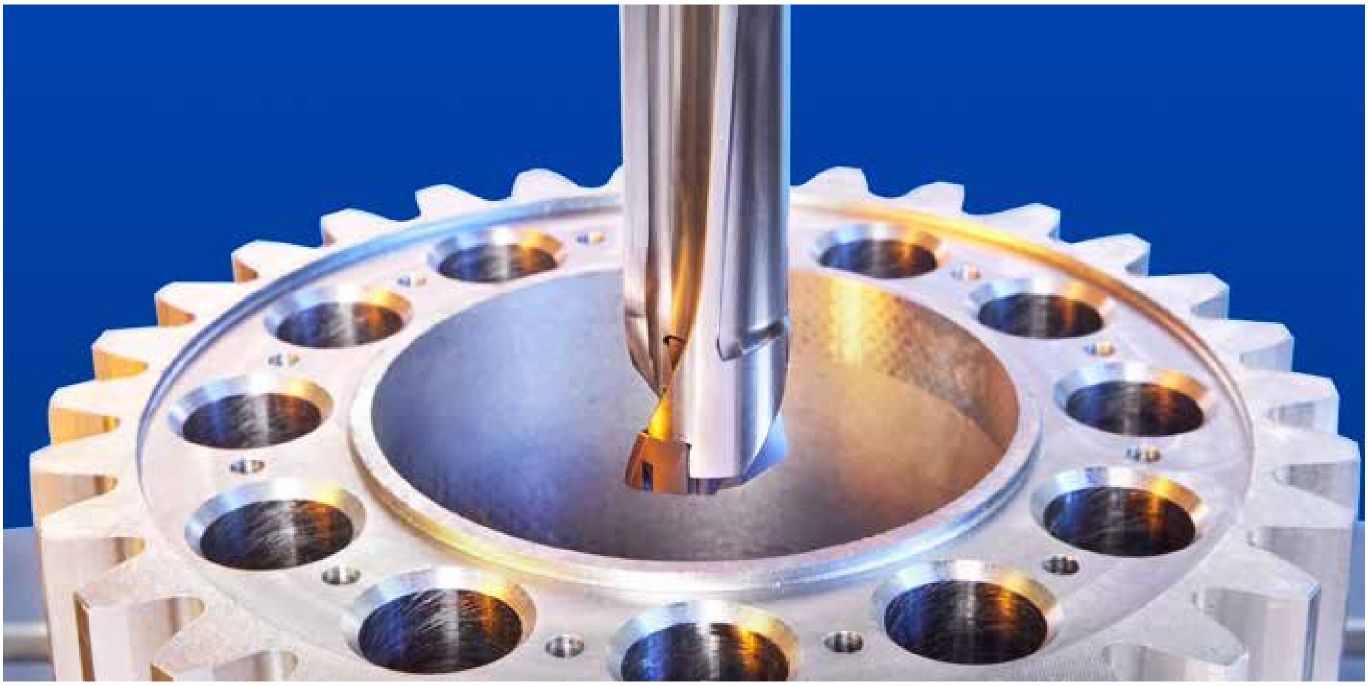
For inserts, see pages: FCP (546) • HCP-IQ (542) • ICK (543) • ICK-2M (545) • ICM (543) • ICN (549) • ICP-2M (545) • QCP-2M (544)







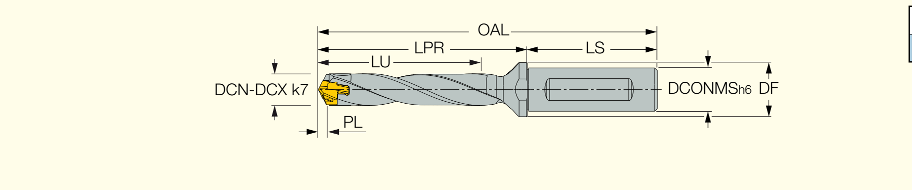




SUMOCHAM
CHAMDRILL LINE

DCN A-5D

Indexable 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]	
DCN 060-030-12A-5D	6.00	6.40	12.00	16.00	31.1	44.0	1.09	45.0	89.00	6.0	K DCN 6-9.99-Y
DCN 065-033-12A-5D	6.50	6.90	12.00	16.00	34.2	46.8	1.18	45.0	91.80	6.5	K DCN 6-9.99-Y
DCN 070-035-12A-5D	7.00	7.40	12.00	16.00	36.3	49.6	1.27	45.0	94.60	7.0	K DCN 6-9.99
DCN 075-038-12A-5D	7.50	7.90	12.00	16.00	39.4	52.1	1.36	45.0	97.10	7.0	K DCN 6-9.99
DCN 080-040-12A-5D	8.00	8.40	12.00	16.00	41.5	55.4	1.46	45.0	100.40	8.0	K DCN 6-9.99
DCN 085-042-12A-5D	8.50	8.90	12.00	16.00	44.1	57.9	1.55	45.0	102.90	8.0	K DCN 6-9.99
DCN 090-045-12A-5D	9.00	9.40	12.00	16.00	46.6	60.8	1.64	45.0	105.80	9.0	K DCN 6-9.99
DCN 095-048-12A-5D	9.50	9.90	12.00	16.00	49.7	63.3	1.73	45.0	108.30	9.0	K DCN 6-9.99
DCN 100-050-16A-5D	10.00	10.40	16.00	20.00	51.8	66.2	1.82	48.0	114.20	10.0	K DCN 10-13.99
DCN 105-053-16A-5D	10.50	10.90	16.00	20.00	54.9	68.7	1.91	48.0	116.70	10.0	K DCN 10-13.99
DCN 110-055-16A-5D	11.00	11.40	16.00	20.00	57.0	71.6	2.00	48.0	119.60	11.0	K DCN 10-13.99
DCN 115-058-16A-5D	11.50	11.90	16.00	20.00	60.1	74.1	2.09	48.0	122.10	11.0	K DCN 10-13.99
DCN 120-060-16A-5D	12.00	12.40	16.00	20.00	62.2	77.0	2.18	48.0	125.00	12.0	K DCN 10-13.99
DCN 125-062-16A-5D	12.50	12.90	16.00	20.00	64.3	79.5	2.27	48.0	127.50	12.0	K DCN 10-13.99
DCN 130-065-16A-5D	13.00	13.40	16.00	20.00	67.4	82.6	2.37	48.0	130.60	13.0	K DCN 10-13.99
DCN 135-068-16A-5D	13.50	13.90	16.00	20.00	70.5	85.1	2.46	48.0	133.10	13.0	K DCN 10-13.99
DCN 140-070-16A-5D	14.00	14.40	16.00	20.00	72.6	90.2	2.55	48.0	138.20	14.0	K DCN 14-17.99
DCN 145-073-16A-5D	14.50	14.90	16.00	20.00	75.6	92.7	2.64	48.0	140.70	14.0	K DCN 14-17.99
DCN 150-075-20A-5D	15.00	15.90	20.00	25.00	77.7	98.7	2.73	50.0	148.70	15.0	K DCN 14-17.99
DCN 160-080-20A-5D	16.00	16.90	20.00	25.00	82.9	105.3	2.91	50.0	155.30	16.0	K DCN 14-17.99
DCN 170-085-20A-5D	17.00	17.90	20.00	25.00	88.1	111.9	3.09	50.0	161.90	17.0	K DCN 14-17.99
DCN 180-090-25A-5D	18.00	18.90	25.00	32.00	93.3	118.5	3.28	56.0	174.50	18.0	K DCN 18-21.99
DCN 190-095-25A-5D	19.00	19.90	25.00	32.00	98.5	125.0	3.46	56.0	181.00	19.0	K DCN 18-21.99
DCN 200-100-25A-5D	20.00	20.90	25.00	32.00	103.6	131.6	3.64	56.0	187.60	20.0	K DCN 18-21.99
DCN 210-105-25A-5D	21.00	21.90	25.00	32.00	108.8	138.2	3.82	56.0	194.20	21.0	K DCN 18-21.99
DCN 220-110-25A-5D	22.00	22.90	25.00	32.00	114.0	144.8	4.00	56.0	200.80	22.0	K DCN 22-26.99
DCN 230-115-32A-5D	23.00	23.90	32.00	42.00	119.2	151.4	4.19	60.0	211.40	23.0	K DCN 22-26.99
DCN 240-120-32A-5D	24.00	24.90	32.00	42.00	124.4	158.0	4.37	60.0	218.00	24.0	K DCN 22-26.99
DCN 250-125-32A-5D	25.00	25.90	32.00	42.00	129.6	164.5	4.55	60.0	224.50	25.0	K DCN 22-26.99
DCN 260-130-32A-5D	26.00	26.90	32.00	42.00	134.7	171.0	4.73	60.0	231.00	26.0	K DCN 22-26.99
DCN 270-135-32A-5D	27.00	27.90	32.00	42.00	139.9	177.7	4.91	60.0	245.70	27.0	K DCN 27-32.99
DCN 270-135-40A-5D	27.00	27.90	40.00	50.00	139.9	177.7	4.91	68.0	237.70	27.0	K DCN 27-32.99
DCN 280-140-32A-5D	28.00	28.90	32.00	42.00	145.1	184.2	5.10	60.0	252.20	28.0	K DCN 27-32.99
DCN 280-140-40A-5D	28.00	28.90	40.00	50.00	145.1	184.2	5.10	68.0	244.20	28.0	K DCN 27-32.99
DCN 290-145-32A-5D	29.00	29.90	32.00	42.00	150.3	190.8	5.28	60.0	258.80	29.0	K DCN 27-32.99
DCN 290-145-40A-5D	29.00	29.90	40.00	50.00	150.3	190.8	5.28	68.0	250.80	29.0	K DCN 27-32.99
DCN 300-150-32A-5D	30.00	30.90	32.00	42.00	155.5	197.4	5.46	60.0	265.40	30.0	K DCN 27-32.99
DCN 300-150-40A-5D	30.00	30.90	40.00	50.00	155.5	197.4	5.46	68.0	257.40	30.0	K DCN 27-32.99
DCN 310-155-32A-5D	31.00	31.90	32.00	42.00	160.6	204.0	5.64	60.0	272.00	31.0	K DCN 27-32.99
DCN 310-155-40A-5D	31.00	31.90	40.00	50.00	160.6	204.0	5.64	68.0	264.00	31.0	K DCN 27-32.99
DCN 320-160-32A-5D	32.00	32.90	32.00	42.00	165.8	210.5	5.82	60.0	278.50	32.0	K DCN 27-32.99
DCN 320-160-40A-5D	32.00	32.90	40.00	50.00	165.8	210.5	5.82	68.0	270.50	32.0	K DCN 27-32.99

- For user guide and cutting conditions, see pages 556-570

[1] Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

[2] Cutting diameter maximum

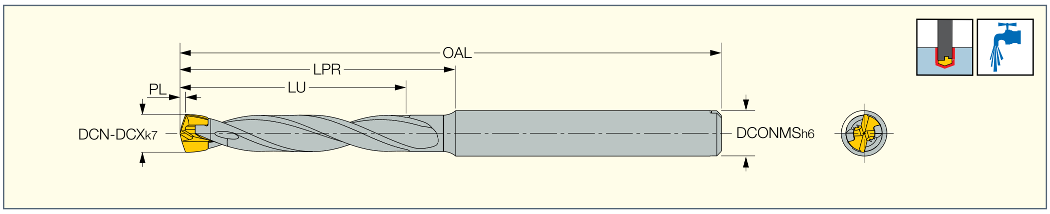
[3] Seat size code

For inserts, see pages: FCP (546) • HCP-IQ (542) • ICK (543) • ICK-2M (545) • ICM (543) • ICN (549) • ICP-2M (545) • QCP-2M (544)

SUMOCHAM
CHAMDRILL LINE

DCN C-5D

Indexable Head Drills with Coolant Holes and Cylindrical Shanks, Drilling Depth 5xD



Designation	DCN (2)	DCX (3)	DCONMS	LU	LPR	PL	LS	OAL	SSC (4)	
DCN 045-023-06C-5D (1)	4.50	4.90	6.00	22.5	32.1	0.66	35.0	67.05	4.5	
DCN 050-025-06C-5D (1)	5.00	5.40	6.00	25.0	34.7	0.73	35.0	69.70	5	
DCN 055-028-06C-5D (1)	5.50	5.90	6.00	27.5	37.4	0.81	35.0	72.35	5.5	
DCN 060-030-08C-5D	6.00	6.40	8.00	30.0	40.0	0.96	36.0	76.00	6	K DCN 6-9.99-Y
DCN 065-033-08C-5D	6.50	6.90	8.00	32.5	42.8	1.18	36.0	78.80	6.5	K DCN 6-9.99-Y
DCN 070-035-08C-5D	7.00	7.40	8.00	35.0	45.6	1.01	36.0	81.60	7	K DCN 6-9.99
DCN 075-038-08C-5D	7.50	7.90	8.00	37.5	48.1	1.01	36.0	84.10	7	K DCN 6-9.99
DCN 080-040-10C-5D	8.00	8.40	10.00	40.0	51.4	1.20	40.0	91.40	8	K DCN 6-9.99
DCN 085-043-10C-5D	8.50	8.90	10.00	42.5	53.9	1.20	40.0	93.90	8	K DCN 6-9.99
DCN 090-045-10C-5D	9.00	9.40	10.00	45.0	56.8	1.25	40.0	96.80	9	K DCN 6-9.99
DCN 095-048-10C-5D	9.50	9.90	10.00	47.5	59.3	1.25	40.0	99.30	9	K DCN 6-9.99

- For user guide and cutting conditions, see pages 556-570

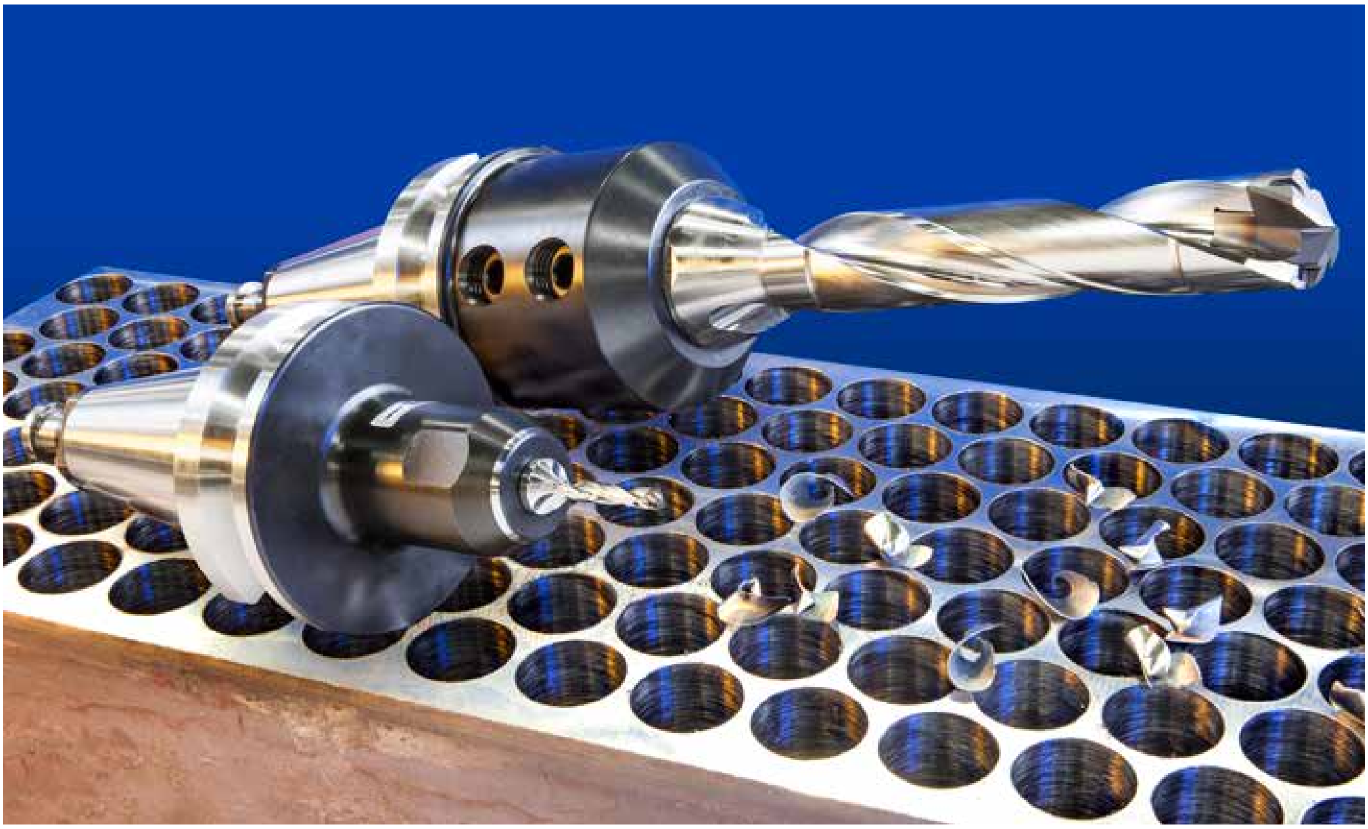
(1) The SK DCN key is supplied with the insert

(2) Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

(3) Cutting diameter maximum

(4) Seat size code

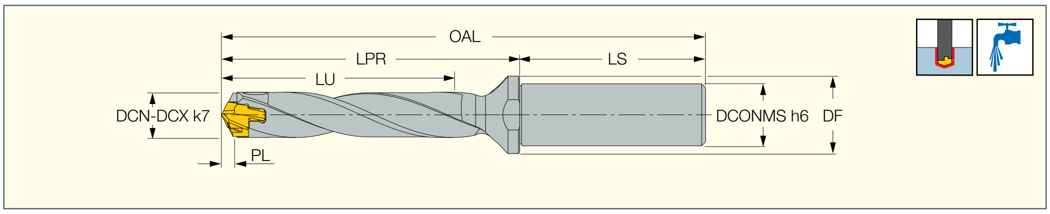
For inserts, see pages: FCP (546) • HCP-IQ (542) • ICK (543) • ICK-2M (545) • ICM (543) • ICP-2M (545)



SUMOCHAM
CHAMDRILL LINE

DCN R-5D

Indexable Head Drills with Coolant Holes and Cylindrical Shanks, Drilling Depth 5xD



Designation	DCN(1)	DCX(2)	DCONMS	DF	LU	LPR	PL	LS	OAL	SSC(3)	
DCN 060-030-12R-5D	6.00	6.40	12.00	16.00	31.1	44.0	1.09	45.0	89.00	6.0	K DCN 6-9.99-Y
DCN 065-033-12R-5D	6.50	6.90	12.00	16.00	34.2	46.8	1.18	45.0	91.80	6.5	K DCN 6-9.99-Y
DCN 070-035-12R-5D	7.00	7.40	12.00	16.00	36.3	49.6	1.27	45.0	94.60	7.0	K DCN 6-9.99
DCN 075-038-12R-5D	7.50	7.90	12.00	16.00	39.4	52.1	1.36	45.0	97.10	7.0	K DCN 6-9.99
DCN 080-040-12R-5D	8.00	8.40	12.00	16.00	41.5	55.4	1.46	45.0	100.40	8.0	K DCN 6-9.99
DCN 085-042-12R-5D	8.50	8.90	12.00	16.00	43.6	57.9	1.55	45.0	102.90	8.0	K DCN 6-9.99
DCN 090-045-12R-5D	9.00	9.40	12.00	16.00	46.6	60.8	1.64	45.0	105.80	9.0	K DCN 6-9.99
DCN 095-048-12R-5D	9.50	9.90	12.00	16.00	49.7	63.3	1.73	45.0	108.30	9.0	K DCN 6-9.99
DCN 100-050-16R-5D	10.00	10.40	16.00	20.00	51.8	66.2	1.82	48.0	114.20	10.0	K DCN 10-13.99
DCN 105-053-16R-5D	10.50	10.90	16.00	20.00	54.9	68.7	1.91	48.0	116.70	10.0	K DCN 10-13.99
DCN 110-055-16R-5D	11.00	11.40	16.00	20.00	57.0	71.6	2.00	48.0	119.60	11.0	K DCN 10-13.99
DCN 115-058-16R-5D	11.50	11.90	16.00	20.00	60.1	74.1	2.09	48.0	122.10	11.0	K DCN 10-13.99
DCN 120-060-16R-5D	12.00	12.40	16.00	20.00	62.2	77.0	2.18	48.0	125.00	12.0	K DCN 10-13.99
DCN 125-062-16R-5D	12.50	12.90	16.00	20.00	64.3	79.5	2.27	48.0	127.50	12.0	K DCN 10-13.99
DCN 130-065-16R-5D	13.00	13.40	16.00	20.00	67.4	82.6	2.37	48.0	130.60	13.0	K DCN 10-13.99
DCN 135-068-16R-5D	13.50	13.90	16.00	20.00	70.5	85.1	2.46	48.0	133.10	13.0	K DCN 10-13.99
DCN 140-070-16R-5D	14.00	14.40	16.00	20.00	72.6	90.2	2.55	48.0	138.20	14.0	K DCN 14-17.99
DCN 145-073-16R-5D	14.50	14.90	16.00	20.00	75.6	92.7	2.64	48.0	140.70	14.0	K DCN 14-17.99
DCN 150-075-20R-5D	15.00	15.90	20.00	25.00	77.7	98.7	2.73	50.0	148.70	15.0	K DCN 14-17.99
DCN 160-080-20R-5D	16.00	16.90	20.00	25.00	82.9	105.3	2.91	50.0	155.30	16.0	K DCN 14-17.99
DCN 170-085-20R-5D	17.00	17.90	20.00	25.00	88.1	111.9	3.09	50.0	161.90	17.0	K DCN 14-17.99
DCN 180-090-25R-5D	18.00	18.90	25.00	32.00	93.3	118.5	3.28	56.0	174.50	18.0	K DCN 18-21.99
DCN 190-095-25R-5D	19.00	19.90	25.00	32.00	98.5	125.0	3.46	56.0	181.00	19.0	K DCN 18-21.99
DCN 200-100-25R-5D	20.00	20.90	25.00	32.00	103.6	131.6	3.64	56.0	187.60	20.0	K DCN 18-21.99
DCN 210-105-25R-5D	21.00	21.90	25.00	32.00	108.8	138.2	3.82	56.0	194.20	21.0	K DCN 18-21.99
DCN 220-110-25R-5D	22.00	22.90	25.00	32.00	114.0	144.8	4.00	56.0	200.80	22.0	K DCN 22-26.99
DCN 230-115-32R-5D	23.00	23.90	32.00	42.00	119.2	151.4	4.19	60.0	211.40	23.0	K DCN 22-26.99
DCN 240-120-32R-5D	24.00	24.90	32.00	42.00	124.4	158.0	4.37	60.0	218.00	24.0	K DCN 22-26.99
DCN 250-125-32R-5D	25.00	25.90	32.00	42.00	129.6	164.5	4.55	60.0	224.50	25.0	K DCN 22-26.99
DCN 260-130-32R-5D	26.00	26.90	32.00	42.00	134.7	171.0	4.73	60.0	231.00	26.0	K DCN 22-26.99
DCN 270-135-32R-5D	27.00	27.90	32.00	42.00	139.9	177.7	4.91	60.0	237.70	27.0	K DCN 27-32.99
DCN 280-140-32R-5D	28.00	28.90	32.00	42.00	145.1	184.2	5.10	60.0	244.20	28.0	K DCN 27-32.99
DCN 290-145-32R-5D	29.00	29.90	32.00	42.00	150.3	190.8	5.28	60.0	250.80	29.0	K DCN 27-32.99
DCN 300-150-32R-5D	30.00	30.90	32.00	42.00	155.5	197.4	5.46	60.0	257.40	30.0	K DCN 27-32.99
DCN 310-155-32R-5D	31.00	31.90	32.00	42.00	160.6	204.0	5.64	60.0	264.00	31.0	K DCN 27-32.99
DCN 320-160-32R-5D	32.00	32.90	32.00	42.00	165.8	210.5	5.82	60.0	270.50	32.0	K DCN 27-32.99

- For user guide and cutting conditions, see pages 556-570

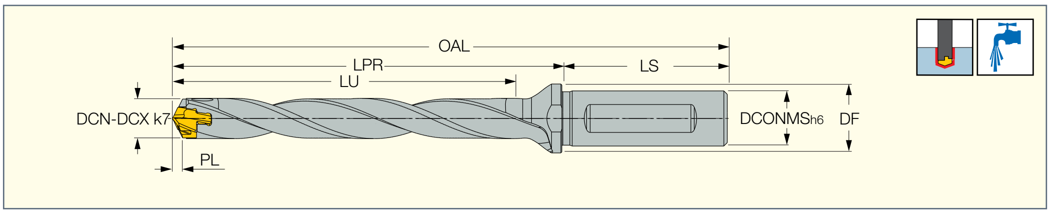
(1) Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body
(2) Cutting diameter maximum
(3) Seat size code

For inserts, see pages: FCP (546) • HCP-IQ (542) • ICK (543) • ICK-2M (545) • ICM (543) • ICN (549) • ICP-2M (545) • QCP-2M (544)

SUMOCHAM
CHAMDRILL LINE

DCN A-8D

Indexable 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]	
DCN 060-048-12A-8D	6.00	6.40	12.00	16.00	49.1	62.0	1.09	45.0	107.00	6.0	K DCN 6-9.99-Y
DCN 065-052-12A-8D	6.50	6.90	12.00	16.00	53.2	66.3	1.18	45.0	111.30	6.5	K DCN 6-9.99-Y
DCN 070-056-12A-8D	7.00	7.40	12.00	16.00	57.3	70.6	1.27	45.0	115.60	7.0	K DCN 6-9.99
DCN 075-060-12A-8D	7.50	7.90	12.00	16.00	61.4	74.6	1.36	45.0	120.00	7.0	K DCN 6-9.99
DCN 080-064-12A-8D	8.00	8.40	12.00	16.00	65.5	79.4	1.46	45.0	124.40	8.0	K DCN 6-9.99
DCN 085-068-12A-8D	8.50	8.90	12.00	16.00	69.6	83.4	1.55	45.0	128.40	8.0	K DCN 6-9.99
DCN 090-072-12A-8D	9.00	9.40	12.00	16.00	73.6	87.8	1.64	45.0	132.80	9.0	K DCN 6-9.99
DCN 095-076-12A-8D	9.50	9.90	12.00	16.00	77.7	91.8	1.73	45.0	136.80	9.0	K DCN 6-9.99
DCN 100-080-16A-8D	10.00	10.40	16.00	20.00	81.8	96.2	1.82	48.0	144.20	10.0	K DCN 10-13.99
DCN 105-084-16A-8D	10.50	10.90	16.00	20.00	85.9	100.2	1.91	48.0	148.20	10.0	K DCN 10-13.99
DCN 110-088-16A-8D	11.00	11.40	16.00	20.00	90.0	104.6	2.00	48.0	152.60	11.0	K DCN 10-13.99
DCN 115-092-16A-8D	11.50	11.90	16.00	20.00	94.1	108.6	2.09	48.0	156.60	11.0	K DCN 10-13.99
DCN 120-096-16A-8D	12.00	12.40	16.00	20.00	98.2	113.0	2.18	48.0	161.00	12.0	K DCN 10-13.99
DCN 125-100-16A-8D	12.50	12.90	16.00	20.00	102.3	117.0	2.27	48.0	165.00	12.0	K DCN 10-13.99
DCN 130-104-16A-8D	13.00	13.40	16.00	20.00	106.4	121.6	2.37	48.0	169.60	13.0	K DCN 10-13.99
DCN 135-108-16A-8D	13.50	13.90	16.00	20.00	110.5	125.6	2.46	48.0	173.60	13.0	K DCN 10-13.99
DCN 140-112-16A-8D	14.00	14.40	16.00	20.00	114.6	132.1	2.55	48.0	180.10	14.0	K DCN 14-17.99
DCN 145-116-16A-8D	14.50	14.90	16.00	20.00	118.6	136.2	2.64	48.0	184.20	14.0	K DCN 14-17.99
DCN 150-120-20A-8D	15.00	15.90	20.00	25.00	122.7	143.7	2.73	50.0	193.70	15.0	K DCN 14-17.99
DCN 160-128-20A-8D	16.00	16.90	20.00	25.00	130.9	153.3	2.91	50.0	203.30	16.0	K DCN 14-17.99
DCN 170-136-20A-8D	17.00	17.90	20.00	25.00	139.1	162.9	3.09	50.0	212.90	17.0	K DCN 14-17.99
DCN 180-144-25A-8D	18.00	18.90	25.00	32.00	147.3	172.5	3.28	56.0	228.50	18.0	K DCN 18-21.99
DCN 190-152-25A-8D	19.00	19.90	25.00	32.00	155.5	182.0	3.46	56.0	238.00	19.0	K DCN 18-21.99
DCN 200-160-25A-8D	20.00	20.90	25.00	32.00	163.6	191.6	3.64	56.0	247.60	20.0	K DCN 18-21.99
DCN 210-168-25A-8D	21.00	21.90	25.00	32.00	171.8	201.2	3.82	56.0	257.20	21.0	K DCN 18-21.99
DCN 220-176-25A-8D	22.00	22.90	25.00	32.00	180.0	210.8	4.00	56.0	266.80	22.0	K DCN 22-26.99
DCN 230-184-32A-8D	23.00	23.90	32.00	42.00	188.2	220.4	4.19	60.0	280.40	23.0	K DCN 22-26.99
DCN 240-192-32A-8D	24.00	24.90	32.00	42.00	196.4	230.0	4.37	60.0	290.00	24.0	K DCN 22-26.99
DCN 250-200-32A-8D	25.00	25.90	32.00	42.00	204.6	239.5	4.55	60.0	299.50	25.0	K DCN 22-26.99
DCN 260-208-32A-8D	26.00	26.90	32.00	42.00	212.7	249.3	4.73	60.0	309.30	26.0	K DCN 22-26.99
DCN 270-216-32A-8D	27.00	27.90	32.00	42.00	220.9	258.6	4.91	60.0	318.60	27.0	K DCN 27-32.99
DCN 280-224-32A-8D	28.00	28.90	32.00	42.00	229.1	268.2	5.10	60.0	328.20	28.0	K DCN 27-32.99
DCN 290-232-32A-8D	29.00	29.90	32.00	42.00	237.3	277.8	5.28	60.0	337.80	29.0	K DCN 27-32.99
DCN 300-240-32A-8D	30.00	30.90	32.00	42.00	245.5	287.4	5.46	60.0	347.40	30.0	K DCN 27-32.99
DCN 310-248-32A-8D	31.00	31.90	32.00	42.00	253.6	297.0	5.64	60.0	357.00	31.0	K DCN 27-32.99
DCN 320-256-32A-8D	32.00	32.90	32.00	42.00	261.8	306.5	5.82	60.0	366.50	32.0	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 drilling head is used
- For user guide and cutting conditions, see pages 556-570

[1] Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

[2] Cutting diameter maximum

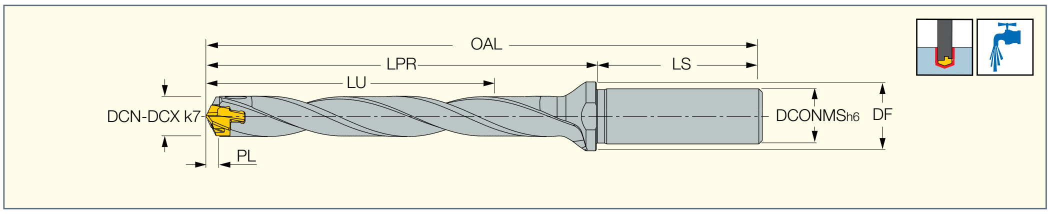
[3] Seat size code

For inserts, see pages: FCP (546) • HCP-IQ (542) • ICK (543) • ICK-2M (545) • ICM (543) • ICN (549) • ICP-2M (545) • QCP-2M (544)

SUMOCHAM
CHAMDRILL LINE

DCN R-8D

Indexable 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)	
DCN 060-048-12R-8D	6.00	6.40	12.00	16.00	49.1	62.0	1.09	45.0	107.00	6.0	K DCN 6-9.99-Y
DCN 065-052-12R-8D	6.50	6.90	12.00	16.00	53.2	66.3	1.18	45.0	111.30	6.5	K DCN 6-9.99-Y
DCN 070-056-12R-8D	7.00	7.40	12.00	16.00	57.3	70.6	1.27	45.0	115.60	7.0	K DCN 6-9.99
DCN 075-060-12R-8D	7.50	7.90	12.00	16.00	61.4	74.6	1.36	45.0	120.00	7.0	K DCN 6-9.99
DCN 080-064-12R-8D	8.00	8.40	12.00	16.00	65.5	79.4	1.46	45.0	124.40	8.0	K DCN 6-9.99
DCN 085-068-12R-8D	8.50	8.90	12.00	16.00	69.6	83.4	1.55	45.0	128.40	8.0	K DCN 6-9.99
DCN 090-072-12R-8D	9.00	9.40	12.00	16.00	73.6	87.8	1.64	45.0	132.80	9.0	K DCN 6-9.99
DCN 095-076-12R-8D	9.50	9.90	12.00	16.00	77.7	91.8	1.73	45.0	136.80	9.0	K DCN 6-9.99
DCN 100-080-16R-8D	10.00	10.40	16.00	20.00	81.8	96.2	1.82	48.0	144.20	10.0	K DCN 10-13.99
DCN 105-084-16R-8D	10.50	10.90	16.00	20.00	85.9	100.2	1.91	48.0	148.20	10.0	K DCN 10-13.99
DCN 110-088-16R-8D	11.00	11.40	16.00	20.00	90.0	104.6	2.00	48.0	152.60	11.0	K DCN 10-13.99
DCN 115-092-16R-8D	11.50	11.90	16.00	20.00	94.1	108.6	2.09	48.0	156.60	11.0	K DCN 10-13.99
DCN 120-096-16R-8D	12.00	12.40	16.00	20.00	98.2	113.0	2.18	48.0	161.00	12.0	K DCN 10-13.99
DCN 125-100-16R-8D	12.50	12.90	16.00	20.00	102.3	117.0	2.27	48.0	165.00	12.0	K DCN 10-13.99
DCN 130-104-16R-8D	13.00	13.40	16.00	20.00	106.4	121.6	2.37	48.0	169.60	13.0	K DCN 10-13.99
DCN 135-108-16R-8D	13.50	13.90	16.00	20.00	110.5	125.6	2.46	48.0	173.60	13.0	K DCN 10-13.99
DCN 140-112-16R-8D	14.00	14.40	16.00	20.00	114.6	132.1	2.55	48.0	180.10	14.0	K DCN 14-17.99
DCN 145-116-16R-8D	14.50	14.90	16.00	20.00	118.6	136.2	2.64	48.0	184.20	14.0	K DCN 14-17.99
DCN 150-120-20R-8D	15.00	15.90	20.00	25.00	122.7	143.7	2.73	50.0	193.70	15.0	K DCN 14-17.99
DCN 160-128-20R-8D	16.00	16.90	20.00	25.00	130.9	153.3	2.91	50.0	203.30	16.0	K DCN 14-17.99
DCN 170-136-20R-8D	17.00	17.90	20.00	25.00	139.1	162.9	3.09	50.0	212.90	17.0	K DCN 14-17.99
DCN 180-144-25R-8D	18.00	18.90	25.00	32.00	147.3	172.5	3.28	56.0	228.50	18.0	K DCN 18-21.99
DCN 190-152-25R-8D	19.00	19.90	25.00	32.00	155.5	182.0	3.46	56.0	238.00	19.0	K DCN 18-21.99
DCN 200-160-25R-8D	20.00	20.90	25.00	32.00	163.6	191.6	3.64	56.0	247.60	20.0	K DCN 18-21.99
DCN 210-168-25R-8D	21.00	21.90	25.00	32.00	171.8	201.2	3.82	56.0	257.20	21.0	K DCN 18-21.99
DCN 220-176-25R-8D	22.00	22.90	25.00	32.00	180.0	210.8	4.00	56.0	266.80	22.0	K DCN 22-26.99
DCN 230-184-32R-8D	23.00	23.90	32.00	42.00	188.2	220.4	4.19	60.0	280.40	23.0	K DCN 22-26.99
DCN 240-192-32R-8D	24.00	24.90	32.00	42.00	196.4	230.0	4.37	60.0	290.00	24.0	K DCN 22-26.99
DCN 250-200-32R-8D	25.00	25.90	32.00	42.00	204.6	239.5	4.55	60.0	299.50	25.0	K DCN 22-26.99
DCN 260-208-32R-8D	26.00	26.90	32.00	42.00	212.7	249.3	4.73	60.0	309.30	26.0	K DCN 22-26.99
DCN 270-216-32R-8D	27.00	27.90	32.00	42.00	220.9	258.6	4.91	60.0	318.60	27.0	K DCN 27-32.99
DCN 280-224-32R-8D	28.00	28.90	32.00	42.00	229.1	268.2	5.10	60.0	328.20	28.0	K DCN 27-32.99
DCN 290-232-32R-8D	29.00	29.90	32.00	42.00	237.3	277.8	5.28	60.0	337.80	29.0	K DCN 27-32.99
DCN 300-240-32R-8D	30.00	30.90	32.00	42.00	245.5	287.4	5.46	60.0	347.40	30.0	K DCN 27-32.99
DCN 310-248-32R-8D	31.00	31.90	32.00	42.00	253.6	297.0	5.64	60.0	357.00	31.0	K DCN 27-32.99
DCN 320-256-32R-8D	32.00	32.90	32.00	42.00	261.8	306.5	5.82	60.0	366.50	32.0	K DCN 27-32.99

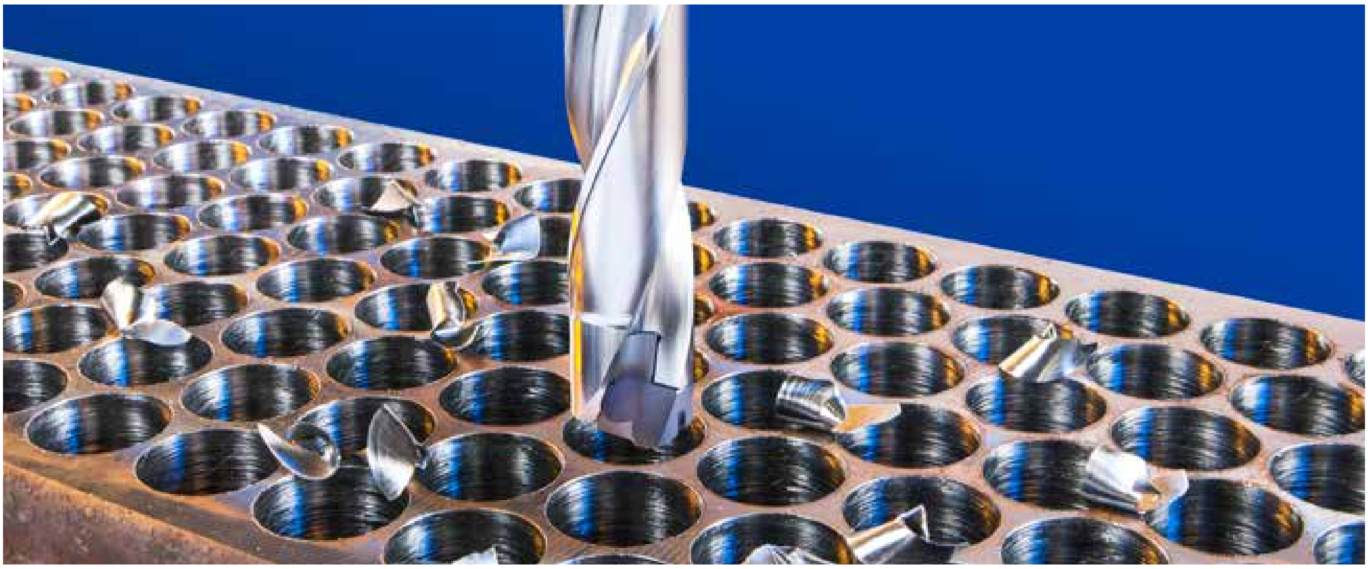
- Prior to using the 8xD drill, it is recommended to drill a pre-hole by using a DCN 1.5xD drill or a centering drill. It is not required if HCP drilling head is used
- For user guide and cutting conditions, see pages 556-570

(1) Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

(2) Cutting diameter maximum

(3) Seat size code

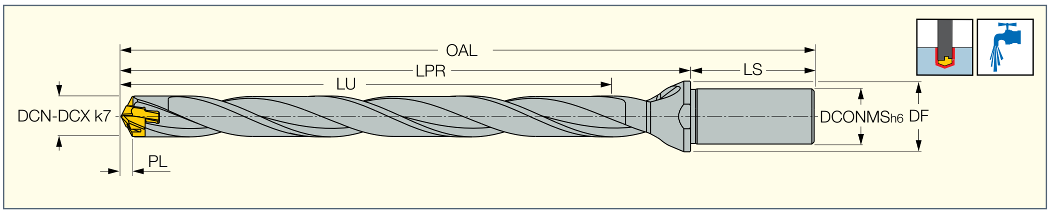
For inserts, see pages: FCP (546) • HCP-IQ (542) • ICK (543) • ICK-2M (545) • ICM (543) • ICN (549) • ICP-2M (545) • QCP-2M (544)



SUMOCHAM
CHAMDRILL LINE

DCN R-12D

Indexable 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)	
DCN 080-096-12R-12D	8.00	8.40	12.00	16.00	97.5	111.4	1.46	45.0	156.40	8.0	K DCN 6-9.99
DCN 085-102-12R-12D	8.50	8.90	12.00	16.00	103.6	117.4	1.55	45.0	162.40	8.0	K DCN 6-9.99
DCN 090-108-12R-12D	9.00	9.40	12.00	16.00	109.6	123.8	1.64	45.0	168.80	9.0	K DCN 6-9.99
DCN 095-114-12R-12D	9.50	9.90	12.00	16.00	115.7	129.8	1.73	45.0	174.80	9.0	K DCN 6-9.99
DCN 100-120-16R-12D	10.00	10.40	16.00	20.00	121.8	136.2	1.82	48.0	184.20	10.0	K DCN 10-13.99
DCN 105-126-16R-12D	10.50	10.90	16.00	20.00	127.9	142.2	1.91	48.0	190.20	10.0	K DCN 10-13.99
DCN 110-132-16R-12D	11.00	11.40	16.00	20.00	134.0	148.6	2.00	48.0	196.60	11.0	K DCN 10-13.99
DCN 115-138-16R-12D	11.50	11.90	16.00	20.00	140.1	154.6	2.09	48.0	202.60	11.0	K DCN 10-13.99
DCN 120-144-16R-12D	12.00	12.40	16.00	20.00	146.2	161.0	2.18	48.0	209.00	12.0	K DCN 10-13.99
DCN 125-150-16R-12D	12.50	12.90	16.00	20.00	152.3	167.0	2.27	48.0	215.00	12.0	K DCN 10-13.99
DCN 130-156-16R-12D	13.00	13.40	16.00	20.00	158.4	173.6	2.37	48.0	221.60	13.0	K DCN 10-13.99
DCN 135-162-16R-12D	13.50	13.90	16.00	20.00	164.5	179.0	2.46	48.0	227.00	13.0	K DCN 10-13.99
DCN 140-168-16R-12D	14.00	14.40	16.00	20.00	170.6	188.0	2.55	48.0	236.00	14.0	K DCN 14-17.99
DCN 145-174-16R-12D	14.50	14.90	16.00	20.00	176.6	194.0	2.64	48.0	242.00	14.0	K DCN 14-17.99
DCN 150-180-20R-12D	15.00	15.90	20.00	25.00	182.7	203.7	2.73	50.0	253.73	15.0	K DCN 14-17.99
DCN 160-192-20R-12D	16.00	16.90	20.00	25.00	194.9	217.3	2.91	50.0	267.30	16.0	K DCN 14-17.99
DCN 170-204-20R-12D	17.00	17.90	20.00	25.00	207.1	230.9	3.09	50.0	280.90	17.0	K DCN 14-17.99
DCN 180-216-25R-12D	18.00	18.90	25.00	32.00	219.3	244.5	3.28	56.0	300.50	18.0	K DCN 18-21.99
DCN 190-228-25R-12D	19.00	19.90	25.00	32.00	231.5	258.0	3.46	56.0	314.00	19.0	K DCN 18-21.99
DCN 200-240-25R-12D	20.00	20.90	25.00	32.00	243.6	271.6	3.64	56.0	327.60	20.0	K DCN 18-21.99
DCN 210-252-25R-12D	21.00	21.90	25.00	32.00	255.8	285.2	3.82	56.0	341.20	21.0	K DCN 18-21.99
DCN 220-264-25R-12D	22.00	22.90	25.00	32.00	268.0	298.8	4.00	56.0	354.80	22.0	K DCN 22-26.99
DCN 230-276-32R-12D	23.00	23.90	32.00	42.00	280.2	302.4	4.19	60.0	362.40	23.0	K DCN 22-26.99
DCN 240-288-32R-12D	24.00	24.90	32.00	42.00	292.4	326.0	4.37	60.0	386.00	24.0	K DCN 22-26.99
DCN 250-300-32R-12D	25.00	25.90	32.00	42.00	304.6	339.5	4.55	60.0	399.50	25.0	K DCN 22-26.99
DCN 260-312-32R-12D	26.00	26.90	32.00	42.00	316.7	381.1	4.00	60.0	441.10	26.0	K DCN 22-26.99
DCN 290-348-32R-12D	29.00	29.90	32.00	42.00	353.3	418.8	4.40	60.0	478.80	29.0	K DCN 27-32.99
DCN 310-372-32R-12D	31.00	31.90	32.00	42.00	377.6	444.0	4.75	60.0	504.00	31.0	K DCN 27-32.99
DCN 320-384-32R-12D	32.00	32.90	32.00	42.00	389.8	456.5	4.85	60.0	516.50	32.0	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 drilling head may eliminate the need for a pre-hole
- For user guide and cutting conditions, see pages 556-570

(1) Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

(2) Cutting diameter maximum

(3) Seat size code

For inserts, see pages: FCP (546) • HCP-IQ (542) • ICK (543) • ICK-2M (545) • ICM (543) • ICN (549) • ICP-2M (545) • QCP-2M (544)

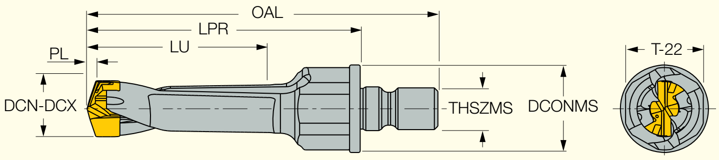
Standard Tools

FLEXFIT

SUMOCHAM
CHAMDRILL LINE

DCNM

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



Designation	DCN[1]	DCX[2]	DCONMS	LU	L_1	PL	OAL	SSC[3]	THSZMS	
DCNM 060-018-M12-3D	6.00	6.40	25.00	22.0	42.0	0.96	64.00	6	M12	K DCN 6-9.99-Y
DCNM 065-020-M12-3D	6.50	6.90	25.00	24.3	44.3	1.18	66.30	6.5	M12	K DCN 6-9.99-Y
DCNM 070-021-M12-3D	7.00	7.40	25.00	25.6	45.6	1.01	67.60	7	M12	K DCN 6-9.99
DCNM 075-023-M12-3D	7.50	7.90	25.00	27.6	47.6	1.10	69.60	7	M12	K DCN 6-9.99
DCNM 080-024-M12-3D	8.00	8.40	25.00	29.4	49.4	1.20	71.40	8	M12	K DCN 6-9.99
DCNM 085-025-M12-3D	8.50	8.90	25.00	30.4	50.4	1.29	72.40	8	M12	K DCN 6-9.99
DCNM 090-027-M12-3D	9.00	9.40	25.00	32.8	52.8	1.35	74.80	9	M12	K DCN 6-9.99
DCNM 095-029-M12-3D	9.50	9.90	25.00	34.8	54.8	1.44	76.80	9	M12	K DCN 6-9.99
DCNM 100-030-M12-3D	10.00	10.40	25.00	36.2	56.2	1.50	78.20	10	M12	K DCN 10-13.99
DCNM 105-032-M12-3D	10.50	10.90	25.00	38.2	58.2	1.59	80.20	10	M12	K DCN 10-13.99
DCNM 110-033-M12-3D	11.00	11.40	25.00	39.6	59.6	1.67	81.60	11	M12	K DCN 10-13.99
DCNM 115-035-M12-3D	11.50	11.90	25.00	41.6	61.6	1.76	83.60	11	M12	K DCN 10-13.99
DCNM 120-036-M12-3D	12.00	12.40	25.00	43.0	63.0	1.82	85.00	12	M12	K DCN 10-13.99
DCNM 125-037-M12-3D	12.50	12.90	25.00	44.0	64.0	1.91	86.00	12	M12	K DCN 10-13.99
DCNM 130-039-M12-3D	13.00	13.40	25.00	46.6	66.6	1.96	88.60	13	M12	K DCN 10-13.99
DCNM 135-041-M12-3D	13.50	13.90	25.00	48.6	68.6	2.05	90.60	13	M12	K DCN 10-13.99
DCNM 140-042-M12-3D	14.00	14.40	25.00	50.2	70.2	2.12	92.15	14	M12	K DCN 14-17.99
DCNM 145-044-M12-3D	14.50	14.90	25.00	52.2	72.2	2.21	94.15	14	M12	K DCN 14-17.99
DCNM 150-045-M12-3D	15.00	15.90	25.00	53.7	73.7	2.27	95.73	15	M12	K DCN 14-17.99
DCNM 160-048-M12-3D	16.00	16.90	25.00	57.3	77.3	2.42	99.30	16	M12	K DCN 14-17.99
DCNM 170-051-M12-3D	17.00	17.90	25.00	60.9	80.9	2.59	102.90	17	M12	K DCN 14-17.99
DCNM 180-054-M12-3D	18.00	18.90	25.00	64.5	84.5	2.73	106.50	18	M12	K DCN 18-21.99
DCNM 190-057-M12-3D	19.00	19.90	25.00	68.0	88.0	2.88	110.00	19	M12	K DCN 18-21.99
DCNM 200-060-M12-3D	20.00	20.90	25.00	71.6	91.6	3.02	113.60	20	M12	K DCN 18-21.99

- 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 drilling head may eliminate the need for a pre-hole
- For user guide and cutting conditions, see pages 556-570

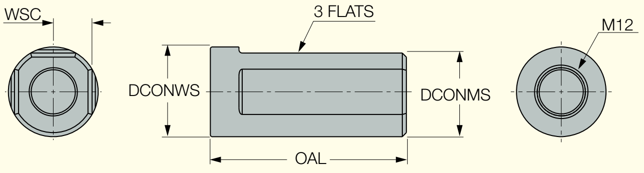
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Seat size code

For inserts, see pages: FCP (546) • HCP-IQ (542) • ICK (543) • ICK-2M (545) • ICM (543) • ICP-2M (545)
For holders, see pages: C#-ODP (FLEXFIT) (1001) • ER-ODP (1048) • FLEXFIT HOLDER (541) • HSK A-ODP (FLEXFIT) (309)

FLEXFIT

FLEXFIT HOLDER

FLEXFIT Threaded Modular Shank with 3 Flats for Side Clamping



Designation	DCONWS	OAL	WSC[1]
FLEXFIT 160-HOLDER-DCN-MS	16.00	36.00	7.5
FLEXFIT 1905-HOLDER-DCNMS	19.05	36.00	8.5
FLEXFIT 200-HOLDER-DCN-MS	20.00	36.00	8.5
FLEXFIT 220-HOLDER-DCN-MS	22.00	48.00	9.5
FLEXFIT 250-HOLDER-DCN-MS	25.00	54.00	11.0
FLEXFIT 254-HOLDER-DCN-MS	25.40	54.00	11.0

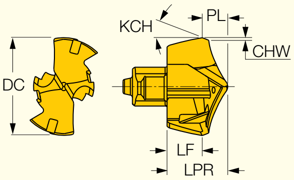
(1) For all 3 flats

For tools, see pages: DCNM (541)

SUMOCHAMIQ
CHAMDRILL LINE

HCP-IQ

Exchangeable DCN Drill
Self-Centering Heads for
Alloy Steel and Cast Iron



	Dimensions							
Designation	DC(1)	LPR	LF	PL	CHW	KCH	SSC(1)	IC908
HCP...-IQ	6.00-6.40	4.00	2.4	1.65	0.29	30	6.0	●
	6.50-6.90	4.30	2.6	1.67	0.29	30	6.5	●
	7.00-7.90	4.60	2.8	1.77	0.35	30	7.0	●
	8.00-8.90	5.40	3.2	2.16	0.40	30	8.0	●
	9.00-9.90	5.80	3.6	2.25	0.46	30	9.0	●
	10.00-10.90	6.20	3.5	2.72	0.46	30	10.0	●
	11.00-11.90	6.60	3.9	2.75	0.52	30	11.0	●
	12.00-12.90	7.00	3.8	3.16	0.52	30	12.0	●
	13.00-13.90	7.60	4.1	3.51	0.58	30	13.0	●
	14.00-14.90	8.15	4.5	3.63	0.64	30	14.0	●
	15.00-15.90	8.73	4.9	3.88	0.69	30	15.0	●
	16.00-16.90	9.30	5.4	3.91	0.64	30	16.0	●
	17.00-17.90	9.90	5.3	4.57	0.87	30	17.0	●
	18.00-18.90	10.50	5.8	4.66	0.81	30	18.0	●
	19.00-19.90	11.00	6.3	4.66	0.75	30	19.0	●
	20.00-20.90	11.60	6.8	4.81	0.58	30	20.0	●
	21.00-21.90	12.18	7.2	4.94	0.69	30	21.0	●
	22.00-22.90	12.76	7.6	5.20	0.69	30	22.0	●
	23.00-23.90	13.33	7.9	5.28	0.75	30	23.0	●
	24.00-24.90	13.90	8.3	5.63	0.81	30	24.0	●
	25.00-25.90	14.50	8.5	5.70	0.64	30	25.0	●
	26.00-26.90	15.07	9.1	5.95	0.58	30	26.0	●
	27.00-27.90	15.65	9.5	6.20	0.64	30	27.0	●
	28.00-28.90	16.22	9.8	6.42	0.64	30	28.0	●
	29.00-29.90	16.80	10.2	6.64	0.64	30	29.0	●
	30.00-30.90	17.38	10.5	6.88	0.69	30	30.0	●
	31.00-31.90	17.96	11	6.96	0.69	30	31.0	●
	32.00-32.90	18.54	11.2	7.34	0.75	30	32.0	●

- The drilling heads are available in increments of 0.1 mm for the 6.0-25.9 diameters and in increments of 0.5 mm for the 26.0 mm and larger
- Ordering example for the HCP 10.3 mm drilling head: HCP 103-IQ

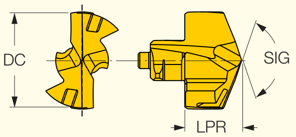
(1) Seat size code

For tools, see pages: DCN C-3D (531) • DCN C-5D (536) • DCNM (541) • MNC-7/8D (555) • MNSNT (730) • DCN A-1.5D (528) • DCN R-1.5D (529) • DCN A-3D (530) • DCN R-3D (532) • DCNS-3D (533) • DCN A-5D (535) • DCN R-5D (537) • DCNS-5D (534) • DCN A-8D (538) • DCN R-8D (539) • DCN R-12D (540) • MNC (554) • MNCNT-T2 (729)

SUMOCHAM
CHAMDRILL LINE

ICP\ICM\ICK

Exchangeable DCN Drill Heads



Designation	DC(1)	LPR	SSC(2)	SIG		IC908	IC907(3)
ICP ...	4.0-4.4	3.40	4.0	140	SK DCN 4-4.99	●	
	4.5-4.9	3.55	4.5	140	SK DCN 4-4.99	●	
ICP ... **ICM ...** **ICK ...**	5.0-5.4	3.70	5.0	140	SK DCN 5-5.99	●	
	5.5-5.9	3.85	5.5	140	SK DCN 5-5.99	●	
	6.0-6.4	4.00	6.0	140		●	
	6.5-6.9	4.30	6.0	140		●	
	7.0-7.9	4.60	7.0	140		●	●
	8.0-8.9	5.40	8.0	140		●	●
	9.0-9.9	5.80	9.0	140		●	●
	10.0-10.9	6.20	10.0	140		●	●
	11.0-11.9	6.60	11.0	140		●	●
	12.0-12.9	7.00	12.0	140		●	●
	13.0-13.9	7.60	13.0	140		●	●
	14.0-14.9	8.15	14.0	140		●	●
	15.0-15.9	8.73	15.0	140		●	●
	16.0-16.9	9.30	16.0	140		●	●
	17.0-17.9	9.90	17.0	140		●	●
	18.0-18.9	10.50	18.0	140		●	●
	19.0-19.9	11.00	19.0	140		●	●
	20.0-20.9	11.60	20.0	140		●	●
	21.0-21.9	12.20	21.0	140		●	●
	22.0-22.9	12.80	22.0	140		●	●
	23.0-23.9	13.40	23.0	140		●	●
	24.0-24.9	14.00	24.0	140		●	●
	25.0-25.9	14.50	25.0	140		●	●
	26.00-26.9	15.30	26.0	140		●	
	27.00-27.9	16.20	27.0	140		●	
	28.00-28.9	17.00	28.0	140		●	
	29.00-29.9	17.90	29.0	140		●	
	30.00-30.9	18.70	30.0	140		●	
	31.00-31.9	19.60	31.0	140		●	
	32.00-32.9	20.40	32.0	140		●	

- **ICP** for use on carbon and alloy steel (ISO P). The drill head has a honed cutting edge
- **ICM** for use on stainless and high temperature alloys (ISO M). The drill head features a T-land on the cutting edge
- **ICK** for use on cast iron (ISO K). The drill head is produced with a ground chamfer and a honed cutting edge
- IC907 is available for several ICM and ICK drilling heads

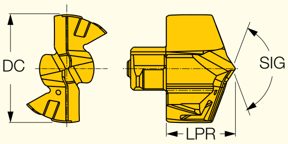
(1) Drilling heads are available in increments of 0.1 mm
(2) Seat size code
(3) IC907 is available for select inserts only

For tools, see pages: DCN C-3D (531) • DCN C-5D (536) • DCNM (541) • DCNT (M8-M24) (613) • MNSNT (730) • DCN A-1.5D (528) • DCN R-1.5D (529) • MNCNT-T2 (729) • DCN A-3D (530) • DCN R-3D (532) • DCNS-3D (533) • DCN A-5D (535) • DCN R-5D (537) • DCNS-5D (534) • DCN A-8D (538) • DCN R-8D (539) • DCN R-12D (540)

SUMOCHAM
CHAMDRILL LINE

QCP-2M

Double Margin Drilling Heads for DCN Drills for Machining Steel with High Surface Finish Results



	Dimensions				
Designation	DC[1]	LPR	SIG	SSC[2]	IC908
QCP...-2M	8.00-8.90	5.40	136	8.0	●
	9.00-9.90	5.80	136	9.0	●
	10.00-10.90	6.79	136	10.0	●
	11.00-11.90	7.25	136	11.0	●
	12.00-12.90	7.63	136	12.0	●
	13.00-13.90	8.35	136	13.0	●
	14.00-14.90	8.96	136	14.0	●
	15.00-15.90	9.64	136	15.0	●
	16.00-16.90	10.27	136	16.0	●
	17.00-17.90	10.88	136	17.0	●
	18.00-18.90	11.55	136	18.0	●
	19.00-19.90	12.11	136	19.0	●
	20.00-20.90	12.82	136	20.0	●
	21.00-21.90	13.40	136	21.0	●
	22.00-22.90	14.04	136	22.0	●
	23.00-23.90	14.71	136	23.0	●
	24.00-24.90	15.31	136	24.0	●
	25.00-25.90	15.98	136	25.0	●

(1) Drilling heads are available in increments of 0.1 mm
(2) Seat size code

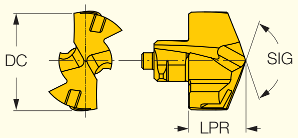
- Can provide high surface finish of up to 1.6 Ra hole cylindricity and straightness of up to 0.05 mm

For tools, see pages: DCN A-1.5D (528) • DCN A-3D (530) • DCN A-5D (535) • DCN A-8D (538) • DCN R-1.5D (529) • DCN R-12D (540) • DCN R-3D (532) • DCN R-5D (537) • DCN R-8D (539) • DCNS-3D (533) • DCNS-5D (534) • DCNT (M8-M24) (613) • MNCNT-T2 (729) • MNSNT (730)

SUMOCHAM
CHAMDRILL LINE

ICP-2M\ICK-2M

Double Margin Drilling Heads for
DCN Drills for High Surface Finish

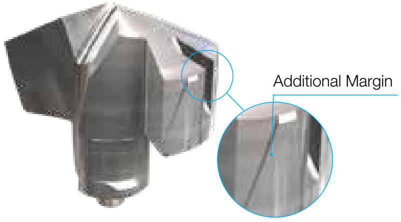


Designation	Dimensions				IC908
	DC[1]	LPR	SIG	SSC[2]	
ICP-2M... **ICK-2M...**	6.0-6.4	4.00	140	6.0	●
	6.5-6.9	4.30	140	6.5	●
	7.00-7.90	4.60	140	7.0	●
	8.00-8.90	5.40	140	8.0	●
	9.00-9.90	5.80	140	9.0	●
	10.00-10.90	6.20	140	10.0	●
	11.00-11.90	6.60	140	11.0	●
	12.00-12.90	7.00	140	12.0	●
	13.00-13.90	7.60	140	13.0	●
	14.00-14.90	8.15	140	14.0	●
	15.00-15.90	8.73	140	15.0	●
	16.00-16.90	9.30	140	16.0	●
	17.00-17.90	9.90	140	17.0	●
	18.00-18.90	10.50	140	18.0	●
	19.00-19.90	11.00	140	19.0	●
	20.00-20.90	11.60	140	20.0	●
	21.00-21.90	12.20	140	21.0	●
	22.00-22.90	12.80	140	22.0	●
	23.00-23.90	13.30	140	23.0	●
	24.00-24.90	13.90	140	24.0	●
	25.00-25.90	14.50	140	25.0	●

- **ICP** for use on carbon and alloy steel (ISO P).
  The drill head has a honed cutting edge
- **ICK** for use on cast iron (ISO K).
  The drill head is produced with a ground chamfer and a honed cutting edge
- Can provide high surface finish of up to 1.6 Ra; hole cylindricity and straightness of up to 0.05 mm
- Ordering example for the ICP 13.3 mm drilling head: ICP 133-2M IC908

[1] Drilling heads are available in increments of 0.1 mm

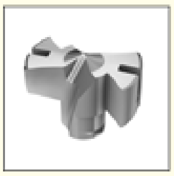
[2] Seat size code

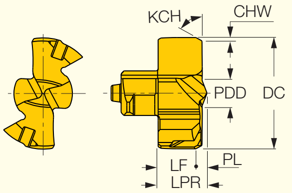


For tools, see pages: DCN A-1.5D (528) • DCN A-3D (530) • DCN A-5D (535) • DCN A-8D (538) • DCN C-3D (531) • DCN C-5D (536) • DCN R-1.5D (529) • DCN R-12D (540) • DCN R-3D (532) • DCN R-5D (537) • DCN R-8D (539) • DCNM (541) • DCNS-3D (533) • DCNS-5D (534) • DCNT (M8-M24) (613) • MNCNT-T2 (729) • MNSNT (730)

SUMOCHAM
FLAT HEAD

FCP
Exchangeable Flat Bottom DCN Drill Heads for Steel and Cast Iron (ISO P and ISO K Materials)





	Dimensions								
Designation	DC	PDD	PL	LPR	LF	CHW	SSC[1]	KCH	IC908
FCP...	6.00-6.40	1.15	0.61	3.01	2.40	0.23	6.0	60	●
	6.50-6.90	1.54	0.68	3.28	2.60	0.23	6.5	60	●
	7.00-7.40	1.54	0.68	3.58	2.90	0.23	7.0	60	●
	7.50-7.90	1.54	0.68	3.58	2.90	0.23	7.0	60	●
	8.00-8.90	2.44	1.09	4.39	3.30	0.40	8.0	60	●
	9.00-9.90	2.55	1.11	4.61	3.50	0.40	9.0	60	●
	10.00-10.90	2.89	1.17	4.87	3.70	0.40	10.0	60	●
	11.00-11.90	2.98	1.25	5.05	3.80	0.40	11.0	60	●
	12.00-12.90	3.13	1.26	5.36	4.10	0.40	12.0	60	●
	13.00-13.90	3.52	1.28	5.68	4.40	0.40	13.0	60	●
	14.00-14.90	3.81	1.31	6.11	4.80	0.40	14.0	60	●
	15.00-15.90	4.24	1.35	6.58	5.23	0.40	15.0	60	●
	16.00-16.90	4.06	1.39	6.99	5.60	0.40	16.0	60	●
	17.00-17.90	4.14	1.40	7.30	5.90	0.40	17.0	60	●
	18.00-18.90	4.16	1.42	7.60	6.18	0.40	18.0	60	●
	19.00-19.90	4.25	1.44	7.94	6.50	0.40	19.0	60	●
	20.00-20.90	6.56	1.77	9.27	7.50	0.40	20.0	60	●
	21.00-21.90	6.92	1.79	9.69	7.90	0.40	21.0	60	●
	22.00-22.90	7.13	1.81	10.01	8.20	0.40	22.0	60	●
	23.00-23.90	7.42	1.83	10.43	8.60	0.40	23.0	60	●
	24.00-24.90	7.45	1.86	10.86	9.00	0.40	24.0	60	●
	25.00-25.90	7.54	1.90	11.30	9.40	0.40	25.0	60	●
	26.00-26.90	8.00	1.99	11.69	9.70	0.40	26.0	60	●
	27.00-27.90	8.10	2.05	12.45	10.40	0.40	27.0	60	●
	28.00-28.90	8.80	2.15	12.65	10.50	0.40	28.0	60	●
	29.00-29.90	9.00	2.20	13.00	10.80	0.40	29.0	60	●
	30.00-30.90	9.10	2.15	13.55	11.40	0.40	30.0	60	●
	31.00-31.90	9.10	2.18	13.88	11.70	0.40	31.0	60	●
	32.00-32.90	9.80	2.21	14.10	12.30	0.40	32.0	60	●

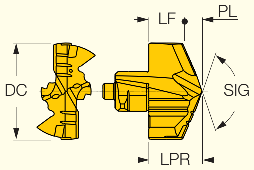
- The drilling heads are available in increments of 0.1 mm for the 8.0-25.9 diameters and in increments of 0.5 mm for the 26.0 mm and larger
- Ordering example for the FCP 10.3 mm drilling head: FCP 103

[1] Seat size code

For tools, see pages: DCN A-1.5D (528) • DCN A-3D (530) • DCN A-5D (535) • DCN A-8D (538) • DCN C-3D (531) • DCN C-5D (536) • DCN R-1.5D (529) • DCN R-12D (540) • DCN R-3D (532) • DCN R-5D (537) • DCN R-8D (539) • DCNM (541) • DCNS-3D (533) • DCNS-5D (534)

SUMOCHAM
CHAMDRILL LINE

ICG
Exchangeable Chip Splitting Drill Heads for Stainless and Alloyed Steel



Designation	Dimensions						
	DC	LPR	PL	SSC[1]	LF	SIG	IC908
ICG 140	14.00	7.85	2.77	14.0	5.08	130	●
ICG 142	14.20	7.85	2.77	14.0	5.08	130	●
ICG 145	14.50	7.85	2.77	14.0	5.08	130	●
ICG 150	15.00	8.43	2.98	15.0	5.45	130	●
ICG 155	15.50	8.43	2.98	15.0	5.45	130	●
ICG 160	16.00	9.00	3.19	16.0	5.81	130	●
ICG 163	16.30	9.00	3.19	16.0	5.81	130	●
ICG 165	16.50	9.00	3.19	16.0	5.81	130	●
ICG 170	17.00	9.60	3.40	17.0	6.20	130	●
ICG 175	17.50	9.60	3.40	17.0	6.20	130	●
ICG 177	17.70	9.60	3.40	17.0	6.20	130	●
ICG 180	18.00	10.20	3.60	18.0	6.60	130	●
ICG 185	18.50	10.20	3.60	18.0	6.60	130	●
ICG 190	19.00	10.70	3.81	19.0	6.89	130	●
ICG 193	19.30	10.70	3.81	19.0	6.89	130	●
ICG 195	19.50	10.70	3.81	19.0	6.89	130	●
ICG 200	20.00	11.20	3.98	20.0	7.22	130	●
ICG 203	20.30	11.20	3.98	20.0	7.22	130	●
ICG 205	20.50	11.20	3.98	20.0	7.22	130	●
ICG 210	21.00	11.78	4.13	21.0	7.65	130	●
ICG 215	21.50	11.78	4.13	21.0	7.65	130	●
ICG 220	22.00	12.36	4.31	22.0	8.05	130	●
ICG 225	22.50	12.36	4.31	22.0	8.05	130	●
ICG 230	23.00	12.93	4.49	23.0	8.44	130	●
ICG 235	23.50	12.93	4.49	23.0	8.44	130	●
ICG 240	24.00	13.50	4.69	24.0	8.81	130	●
ICG 245	24.50	13.50	4.69	24.0	8.81	130	●
ICG 250	25.00	14.10	4.92	25.0	9.18	130	●
ICG 253	25.30	14.10	4.92	25.0	9.18	130	●
ICG 257	25.70	14.10	4.92	25.0	9.18	130	●
ICG 259	25.90	14.10	4.92	25.0	9.18	130	●

(1) Seat size code

For tools, see pages: DCN A-1.5D (528) • DCN A-3D (530) • DCN A-5D (535) • DCN A-8D (538) • DCN R-1.5D (529) • DCN R-12D (540) • DCN R-3D (532) • DCN R-5D (537) • DCN R-8D (539) • DCNS-3D (533) • DCNS-5D (534) • DCNT (M8-M24) (613) • MNC (554) • MNCNT-T2 (729) • MNSNT (730)

Recommended Machining Conditions for ICG Inserts

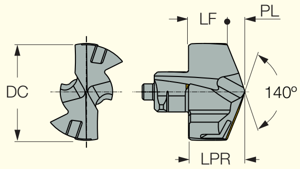
Material group	Material number	Cutting Speed Vc m/min	Feed mm/rev		
			D=14-15.99	D=16-19.9	D=20-25.9
P	3	80-100-120	0.15 0.22 0.27	0.18 0.24 0.3	0.2 0.27 0.35
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12	60-80-100	0.12 0.2 0.27	0.16 0.23 0.3	0.18 0.26 0.35
	13				
M	14	60-80-100	0.12 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

SUMOCHAM
CHAMDRILL LINE

ICN

Exchangeable DCN Drill Heads,
for Aluminum (ISO N Materials)



Designation	Dimensions					
	DC	LPR	SSC[1]	PL	LF	IC08
ICN 100	10.00	6.20	10.0	1.82	4.38	●
ICN 102	10.20	6.20	10.0	1.86	4.34	●
ICN 103	10.30	6.20	10.0	1.87	4.33	●
ICN 105	10.50	6.20	10.0	1.91	4.29	●
ICN 108	10.80	6.20	10.0	1.97	4.23	●
ICN 110	11.00	6.60	11.0	2.00	4.60	●
ICN 111	11.10	6.60	11.0	2.02	4.58	●
ICN 115	11.50	6.60	11.0	2.09	4.51	●
ICN 119	11.90	6.60	11.0	2.17	4.43	●
ICN 120	12.00	7.00	12.0	2.18	4.82	●
ICN 123	12.30	7.00	12.0	2.24	4.76	●
ICN 125	12.50	7.00	12.0	2.27	4.73	●
ICN 127	12.70	7.00	12.0	2.31	4.69	●
ICN 130	13.00	7.60	13.0	2.37	5.23	●
ICN 135	13.50	7.60	13.0	2.46	5.14	●
ICN 137	13.70	7.60	13.0	2.49	5.11	●
ICN 140	14.00	8.15	14.0	2.55	5.60	●
ICN 142	14.20	8.15	14.0	2.58	5.57	●
ICN 145	14.50	8.15	14.0	2.64	5.51	●
ICN 150	15.00	8.73	15.0	2.73	6.00	●
ICN 157	15.70	8.73	15.0	2.86	5.87	●
ICN 158	15.80	8.73	15.0	2.88	5.85	●
ICN 160	16.00	9.30	16.0	2.91	6.39	●
ICN 165	16.50	9.30	16.0	3.00	6.30	●
ICN 167	16.70	9.30	16.0	3.04	6.26	●
ICN 170	17.00	9.90	17.0	3.09	6.81	●
ICN 175	17.50	9.90	17.0	3.18	6.72	●
ICN 180	18.00	10.50	18.0	3.28	7.22	●
ICN 185	18.50	10.50	18.0	3.37	7.13	●
ICN 190	19.00	11.00	19.0	3.46	7.54	●
ICN 1905	19.05	11.00	19.0	3.47	7.53	●
ICN 195	19.50	11.00	19.0	3.55	7.45	●

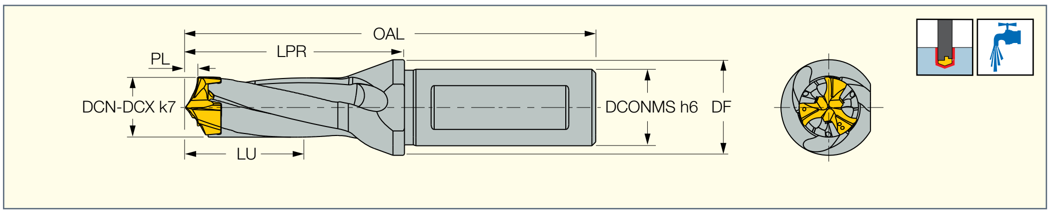
[1] Seat size code

For tools, see pages: DCN A-1.5D (528) • DCN A-3D (530) • DCN A-5D (535) • DCN A-8D (538) • DCN R-1.5D (529) • DCN R-12D (540) • DCN R-3D (532) • DCN R-5D (537) • DCN R-8D (539) • DCNS-3D (533) • DCNS-5D (534) • DCNT (M8-M24) (613)

LOGIQ3CHAM
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 100-015-16A-1.5D	10.00	10.40	16.00	20.00	20.0	35.70	2.90	83.70	10	K D3N 10-11.99
D3N 105-016-16A-1.5D	10.50	10.90	16.00	20.00	21.0	37.20	3.06	85.20	10	K D3N 10-11.99
D3N 110-017-16A-1.5D	11.00	11.40	16.00	20.00	22.0	39.30	3.10	87.30	11	K D3N 10-11.99
D3N 115-017-16A-1.5D	11.50	11.90	16.00	20.00	23.0	40.80	3.26	88.80	11	K D3N 10-11.99
D3N 120-018-16A-1.5D	12.00	12.40	16.00	20.00	24.0	42.90	3.25	90.90	12	K D3N 12-13.99
D3N 125-019-16A-1.5D	12.50	12.90	16.00	20.00	25.0	44.40	3.41	92.40	12	K D3N 12-13.99
D3N 130-020-16A-1.5D	13.00	13.40	16.00	20.00	26.0	46.50	3.35	94.50	13	K D3N 12-13.99
D3N 135-020-16A-1.5D	13.50	13.90	16.00	20.00	27.0	48.00	3.51	96.00	13	K D3N 12-13.99
D3N 140-021-16A-1.5D	14.00	14.40	16.00	20.00	28.0	50.10	3.39	98.10	14	K D3N 14-15.99
D3N 145-022-16A-1.5D	14.50	14.90	16.00	20.00	29.0	51.60	3.55	99.60	14	K D3N 14-15.99
D3N 170-026-20A-1.5D	17.00	17.90	20.00	25.00	34.0	60.90	3.44	110.90	17	K D3N 16-17.99
D3N 180-027-25A-1.5D	18.00	18.90	25.00	32.00	36.0	64.50	3.44	120.50	18	K D3N 18-19.99
D3N 190-029-25A-1.5D	19.00	19.90	25.00	32.00	38.0	68.10	3.44	124.10	19	K D3N 18-19.99
D3N 200-030-25A-1.5D	20.00	20.90	25.00	32.00	40.0	71.70	3.44	127.70	20	K D3N 20-21.99
D3N 210-032-25A-1.5D	21.00	21.90	25.00	32.00	42.0	75.30	3.44	131.30	21	
D3N 220-033-25A-1.5D	22.00	22.90	25.00	32.00	44.0	78.90	3.44	134.90	22	K D3N 22-23.99
D3N 230-035-32A-1.5D	23.00	23.90	32.00	40.00	46.0	82.50	3.44	142.50	23	
D3N 240-036-32A-1.5D	24.00	24.90	32.00	40.00	48.0	86.10	3.44	146.10	24	
D3N 250-038-32A-1.5D	25.00	25.90	32.00	40.00	50.0	89.70	3.44	149.70	25	K D3N 24-25.99

- For user guide and cutting conditions, see pages 556-570

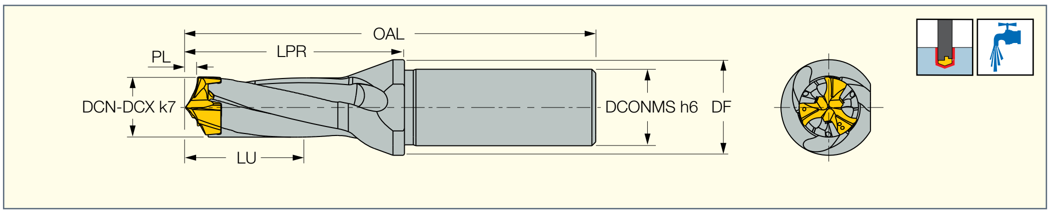
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Seat size code

For inserts, see pages: H3P (553)

LOGIQ3CHAM
THREE FLUTE CHAMDRILL

D3N R-1.5D

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



Designation	DCN(1)	DCX(2)	DCONMS	DF	LU	LPR	PL	OAL	SSC(3)	
D3N 100-015-16R-1.5D	10.00	10.40	16.00	20.00	20.0	35.70	2.90	83.70	10	K D3N 10-11.99
D3N 105-016-16R-1.5D	10.50	10.90	16.00	20.00	21.0	37.20	3.06	85.20	10	K D3N 10-11.99
D3N 110-017-16R-1.5D	11.00	11.40	16.00	20.00	22.0	39.30	3.10	87.30	11	K D3N 10-11.99
D3N 115-017-16R-1.5D	11.50	11.90	16.00	20.00	23.0	40.80	3.26	88.80	11	K D3N 10-11.99
D3N 120-018-16R-1.5D	12.00	12.40	16.00	20.00	24.0	42.90	3.25	90.90	12	K D3N 12-13.99
D3N 125-019-16R-1.5D	12.50	12.90	16.00	20.00	25.0	44.40	3.41	92.40	12	K D3N 12-13.99
D3N 130-020-16R-1.5D	13.00	13.40	16.00	20.00	26.0	46.50	3.35	94.50	13	K D3N 12-13.99
D3N 135-020-16R-1.5D	13.50	13.90	16.00	20.00	27.0	48.00	3.51	96.00	13	K D3N 12-13.99
D3N 140-021-16R-1.5D	14.00	14.40	16.00	20.00	28.0	50.10	3.39	98.10	14	K D3N 14-15.99
D3N 145-022-16R-1.5D	14.50	14.90	16.00	20.00	29.0	51.60	3.55	99.60	14	K D3N 14-15.99
D3N 160-024-20R-1.5D	16.00	16.90	20.00	25.00	32.0	57.30	3.44	107.30	16	K D3N 16-17.99
D3N 170-026-20R-1.5D	17.00	17.90	20.00	25.00	34.0	60.90	3.44	110.90	17	K D3N 16-17.99
D3N 180-027-25R-1.5D	18.00	18.90	25.00	32.00	36.0	64.50	3.44	120.50	18	K D3N 18-19.99
D3N 190-029-25R-1.5D	19.00	19.90	25.00	32.00	38.0	68.10	3.44	124.10	19	K D3N 18-19.99
D3N 200-030-25R-1.5D	20.00	20.90	25.00	32.00	40.0	71.70	3.44	127.70	20	K D3N 20-21.99
D3N 210-032-25R-1.5D	21.00	21.90	25.00	32.00	42.0	75.30	3.44	131.30	21	
D3N 220-033-25R-1.5D	22.00	22.90	25.00	32.00	44.0	78.90	3.44	134.90	22	K D3N 22-23.99
D3N 230-035-32R-1.5D	23.00	23.90	32.00	40.00	46.0	82.50	3.44	142.50	23	
D3N 240-036-32R-1.5D	24.00	24.90	32.00	40.00	48.0	86.10	3.44	146.10	24	
D3N 250-038-32R-1.5D	25.00	25.90	32.00	40.00	50.0	89.70	3.44	149.70	25	K D3N 24-25.99

- For user guide and cutting conditions, see pages 556-570

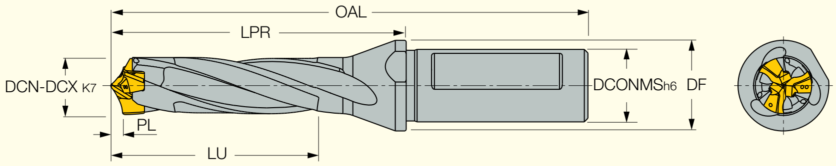
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Seat size code

For inserts, see pages: H3P (553)

LOGIQ3CHAM 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	39.3	61.00	3.30	109.00	12	K D3N 12-13.99
D3N 125-037-16A-3D	12.50	12.90	16.00	20.00	40.3	63.30	3.30	110.50	12	K D3N 12-13.99
D3N 130-039-16A-3D	13.00	13.40	16.00	20.00	42.3	66.10	3.30	114.08	13	K D3N 12-13.99
D3N 135-041-16A-3D	13.50	13.90	16.00	20.00	43.8	68.30	3.30	116.33	13	K D3N 12-13.99
D3N 140-042-16A-3D	14.00	14.40	16.00	20.00	45.3	71.20	3.30	119.16	14	K D3N 14-15.99
D3N 145-044-16A-3D	14.50	14.90	16.00	20.00	46.8	73.40	3.30	121.41	14	K D3N 14-15.99
D3N 180-054-25A-3D	18.00	18.90	25.00	32.00	58.4	91.50	4.40	147.50	18	K D3N 18-19.99
D3N 190-057-25A-3D	19.00	19.90	25.00	32.00	61.4	96.60	4.40	152.58	19	K D3N 18-19.99
D3N 200-060-25A-3D	20.00	20.90	25.00	32.00	64.4	101.70	4.40	157.66	20	K D3N 20-21.99
D3N 210-063-25A-3D	21.00	21.90	25.00	32.00	67.4	106.70	4.40	162.74	21	K D3N 20-21.99
D3N 220-066-25A-3D	22.00	22.90	25.00	32.00	70.4	111.80	4.40	167.83	22	K D3N 22-23.99
D3N 230-069-32A-3D	23.00	23.90	32.00	42.00	74.7	116.90	5.70	176.90	23	K D3N 22-23.99
D3N 240-072-32A-3D	24.00	24.90	32.00	42.00	77.7	122.00	5.70	182.00	24	K D3N 24-25.99
D3N 250-075-32A-3D	25.00	25.90	32.00	42.00	80.7	127.10	5.70	187.08	25	K D3N 24-25.99

- For user guide and cutting conditions, see pages 556-570

[1] Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

[2] Cutting diameter maximum

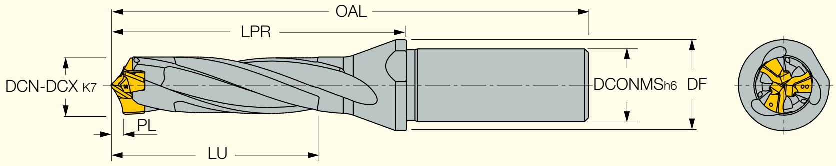
[3] Seat size code

For inserts, see pages: H3P (553)

LOGIQ3CHAM THREE FLUTE CHAMDRILL

D3N R-3D

Exchangeable Head 3 Flute Drills with Coolant Holes and 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	43.0	61.00	3.28	109.00	12	K D3N 12-13.99
D3N 125-037-16R-3D	12.50	12.90	16.00	20.00	44.5	63.25	3.28	111.25	12	K D3N 12-13.99
D3N 130-039-16R-3D	13.00	13.40	16.00	20.00	46.6	66.08	3.40	114.08	13	K D3N 12-13.99
D3N 135-041-16R-3D	13.50	13.90	16.00	20.00	47.3	68.33	3.40	116.33	13	K D3N 12-13.99
D3N 140-042-16R-3D	14.00	14.40	16.00	20.00	50.2	71.16	3.32	119.16	14	K D3N 14-15.99
D3N 145-044-16R-3D	14.50	14.90	16.00	20.00	51.7	73.41	3.32	121.41	14	K D3N 14-15.99
D3N 160-048-20R-3D	16.00	16.90	20.00	25.00	57.3	81.33	3.86	131.33	16	K D3N 16-17.99
D3N 170-051-20R-3D	17.00	17.90	20.00	25.00	60.9	86.41	4.10	136.41	17	K D3N 16-17.99
D3N 180-054-25R-3D	18.00	18.90	25.00	32.00	63.0	91.50	4.20	147.50	18	K D3N 18-19.99
D3N 190-057-25R-3D	19.00	19.90	25.00	32.00	68.1	96.58	4.41	152.58	19	K D3N 18-19.99
D3N 200-060-25R-3D	20.00	20.90	25.00	32.00	70.0	101.66	4.55	157.66	20	K D3N 20-21.99
D3N 210-063-25R-3D	21.00	21.90	25.00	32.00	74.0	106.74	4.70	162.74	21	K D3N 20-21.99
D3N 220-066-25R-3D	22.00	22.90	25.00	32.00	78.8	111.82	4.92	167.82	22	K D3N 22-23.99
D3N 230-069-32R-3D	23.00	23.90	32.00	42.00	81.0	116.90	5.25	176.90	23	K D3N 22-23.99
D3N 240-072-32R-3D	24.00	24.90	32.00	42.00	84.0	122.00	5.50	182.00	24	K D3N 24-25.99
D3N 250-075-32R-3D	25.00	25.90	32.00	42.00	89.6	127.08	5.71	187.08	25	K D3N 24-25.99

- For user guide and cutting conditions, see pages 556-570

[1] Do not mount smaller drilling heads other than the specified range of the drill body

[2] Cutting diameter maximum

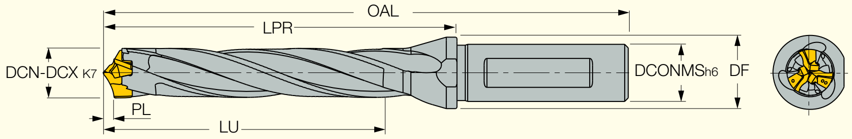
[3] Seat size code

For inserts, see pages: H3P (553)

LOGIQ3CHAM 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	63.3	85.00	3.30	133.00	12	K D3N 12-13.99
D3N 125-062-16A-5D	12.50	12.90	16.00	20.00	65.3	88.30	3.30	136.30	12	K D3N 12-13.99
D3N 130-065-16A-5D	13.00	13.40	16.00	20.00	68.3	92.10	3.30	140.10	13	K D3N 12-13.99
D3N 135-068-16A-5D	13.50	13.90	16.00	20.00	70.8	95.30	3.30	143.30	13	K D3N 12-13.99
D3N 140-070-16A-5D	14.00	14.40	16.00	20.00	73.3	99.20	3.30	147.20	14	K D3N 14-15.99
D3N 145-073-16A-5D	14.50	14.90	16.00	20.00	75.8	102.40	3.30	150.40	14	K D3N 14-15.99
D3N 160-080-20A-5D	16.00	16.90	20.00	25.00	83.9	113.30	3.90	163.30	16	K D3N 16-17.99
D3N 180-090-25A-5D	18.00	18.90	25.00	32.00	94.4	127.50	4.40	183.50	18	K D3N 18-19.99
D3N 190-095-25A-5D	19.00	19.90	25.00	32.00	99.4	134.60	4.40	190.60	19	K D3N 18-19.99
D3N 200-100-25A-5D	20.00	20.90	25.00	32.00	104.4	141.70	4.40	197.70	20	K D3N 20-21.99
D3N 210-105-25A-5D	21.00	21.90	25.00	32.00	109.4	148.70	4.40	204.70	21	K D3N 20-21.99
D3N 220-110-25A-5D	22.00	22.90	25.00	32.00	114.4	155.80	4.40	211.80	22	K D3N 22-23.99
D3N 230-115-32A-5D	23.00	23.90	32.00	42.00	120.7	162.90	5.70	222.90	23	K D3N 22-23.99
D3N 240-120-32A-5D	24.00	24.90	32.00	42.00	125.7	170.00	5.70	230.00	24	K D3N 24-25.99
D3N 250-125-32A-5D	25.00	25.90	32.00	42.00	130.7	177.10	5.70	237.10	25	K D3N 24-25.99

- For user guide and cutting conditions, see pages 556-570

(1) Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

(2) Cutting diameter maximum

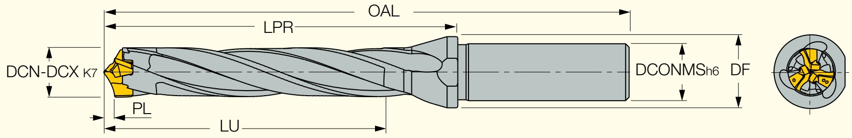
(3) Seat size code

For inserts, see pages: H3P (553)

LOGIQ3CHAM THREE FLUTE CHAMDRILL

D3N R-5D

Exchangeable Head 3 Flute Drills with Coolant Holes and 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	67.0	85.00	3.28	133.00	12	K D3N 12-13.99
D3N 125-062-16R-5D	12.50	12.90	16.00	20.00	69.5	88.25	3.28	136.25	12	K D3N 12-13.99
D3N 130-065-16R-5D	13.00	13.40	16.00	20.00	72.6	92.08	3.40	140.08	13	K D3N 12-13.99
D3N 135-068-16R-5D	13.50	13.90	16.00	20.00	74.3	95.33	3.40	143.33	13	K D3N 12-13.99
D3N 140-070-16R-5D	14.00	14.40	16.00	20.00	78.2	99.16	3.32	147.16	14	K D3N 14-15.99
D3N 145-073-16R-5D	14.50	14.90	16.00	20.00	80.7	102.41	3.32	150.41	14	K D3N 14-15.99
D3N 160-080-20R-5D	16.00	16.90	20.00	25.00	89.3	113.33	3.86	163.33	16	K D3N 16-17.99
D3N 170-085-20R-5D	17.00	17.90	20.00	25.00	94.9	120.41	4.10	170.41	17	K D3N 16-17.99
D3N 180-090-25R-5D	18.00	18.90	25.00	32.00	99.0	127.50	4.20	183.50	18	K D3N 18-19.99
D3N 190-095-25R-5D	19.00	19.90	25.00	32.00	106.1	134.58	4.41	190.58	19	K D3N 18-19.99
D3N 200-100-25R-5D	20.00	20.90	25.00	32.00	110.0	141.66	4.55	197.66	20	K D3N 20-21.99
D3N 210-105-25R-5D	21.00	21.90	25.00	32.00	115.5	148.74	4.70	204.74	21	K D3N 20-21.99
D3N 220-110-25R-5D	22.00	22.90	25.00	32.00	122.8	155.82	4.92	211.82	22	K D3N 22-23.99
D3N 230-115-32R-5D	23.00	23.90	32.00	42.00	126.5	162.90	5.25	222.90	23	K D3N 22-23.99
D3N 240-120-32R-5D	24.00	24.90	32.00	42.00	132.0	170.00	5.50	230.00	24	K D3N 24-25.99
D3N 250-125-32R-5D	25.00	25.90	32.00	42.00	139.6	177.08	5.71	237.08	25	K D3N 24-25.99

- For user guide and cutting conditions, see pages 556-570

(1) Cutting diameter minimum

(2) Cutting diameter maximum

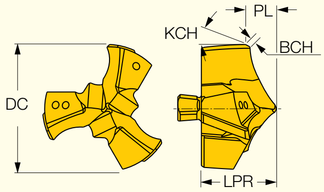
(3) Seat size code

For inserts, see pages: H3P (553)

LOGIQ3CHAM
THREE FLUTE CHAMDRILL

H3P

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



	Dimensions						
Designation	DC	LPR[1]	SSC[2]	PL[3]	KCH	BCH	IC908
H3P ...-IQ	12.00-12.99	6.92	12	2.71	15.0	0.40	●
	13.00-13.99	7.58	13	2.91	15.0	0.40	●
	14.00-14.99	8.10	14	3.11	15.0	0.40	●
	15.00-15.99	8.66	15	3.47	15.0	0.40	●
	16.00-16.99	9.26	16	3.44	15.0	0.40	●
	17.00-17.99	9.72	17	3.52	15.0	0.40	●
	18.00-18.99	10.36	18	3.90	15.0	0.40	●
	19.00-19.99	10.92	19	4.10	15.0	0.40	●
	20.00-20.99	11.24	20	4.32	15.0	0.40	●
	21.00-21.99	11.80	21	4.55	15.0	0.40	●
	22.00-22.99	12.63	22	4.70	15.0	0.40	●
	23.00-23.99	13.00	23	4.91	15.0	0.40	●
	24.00-24.99	13.54	24	5.20	15.0	0.40	●
	25.00-25.99	14.11	25	5.32	15.0	0.40	●

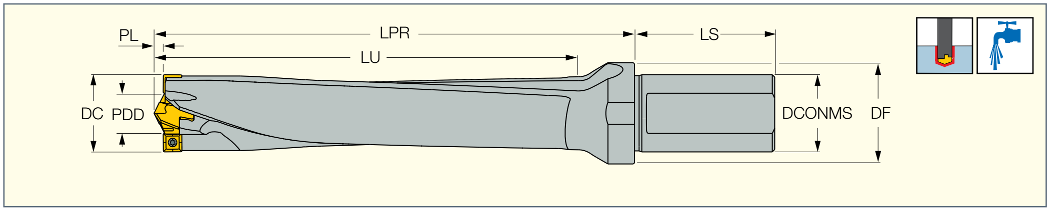
(1) LPR tolerance: ±0.05 mm
(2) Seat size code
(3) PL tolerance: ±0.1 mm

For tools, see pages: D3N A-1.5D (550) • D3N A-3D (551) • D3N A-5D (552) • D3N R-1.5D (550) • D3N R-3D (551) • D3N R-5D (552)

COMBICHAM

MNC

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	133.0	2.95	32.00	15.00	42.00	60.0	166.95	SOGX 060304-W	ICP 150
MNC 265-132 A32-155-06-5D	26.50	135.1	3.05	32.00	15.50	42.00	60.0	167.05	SOGX 060304-W	ICP 155
MNC 270-135 A32-160-06-5D	27.00	138.1	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	143.3	3.25	32.00	17.00	42.00	60.0	174.25	SOGX 060304-W	ICP 170
MNC 290-145 A32-160-07-5D	29.00	148.1	3.10	32.00	16.00	42.00	60.0	180.10	SOGX 070305-W	ICP 160
MNC 295-148 A32-165-07-5D	29.50	151.2	3.20	32.00	16.50	42.00	60.0	183.20	SOGX 070305-W	ICP 165
MNC 300-150 A32-165-07-5D	30.00	153.2	3.20	32.00	16.50	42.00	60.0	186.20	SOGX 070305-W	ICP 165
MNC 310-155 A32-175-07-5D	31.00	158.4	3.35	32.00	17.50	42.00	60.0	193.35	SOGX 070305-W	ICP 175
MNC 320-160 A32-185-07-5D	32.00	163.5	3.50	32.00	18.50	42.00	60.0	198.50	SOGX 070305-W	ICP 185
MNC 330-165 A32-175-09-5D	33.00	168.7	3.65	32.00	17.50	42.00	60.0	203.65	SOGT 09T306-W	ICP 175
MNC 340-170 A32-180-09-5D	34.00	173.7	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	178.9	3.85	32.00	18.90	42.00	60.0	213.85	SOGT 09T306-W	ICP 189
MNC 360-180 A32-190-10-5D	36.00	183.9	3.85	32.00	19.00	42.00	60.0	218.85	SOGT 100408-W	ICP 190
MNC 370-185 A32-200-10-5D	37.00	189.0	4.00	32.00	20.00	42.00	60.0	224.00	SOGT 100408-W	ICP 200
MNC 375-188 A32-205-10-5D	37.50	192.1	4.10	32.00	20.50	42.00	60.0	227.10	SOGT 100408-W	ICP 205
MNC 380-190 A40-209-10-5D	38.00	194.2	4.15	40.00	20.90	50.00	68.0	231.15	SOGT 100408-W	ICP 209
MNC 390-195 A40-215-10-5D	39.00	199.3	4.25	40.00	21.50	50.00	68.0	237.25	SOGT 100408-W	ICP 215
MNC 400-200 A40-225-10-5D	40.00	204.4	4.40	40.00	22.50	50.00	68.0	244.40	SOGT 100408-W	ICP 225
MNC 405-203 A40-235-10-5D	40.50	207.6	4.55	40.00	23.50	50.00	68.0	247.55	SOGT 100408-W	ICP 235
MNC 410-205 A40-239-10-5D	41.00	209.7	4.65	40.00	23.90	50.00	68.0	249.65	SOGT 100408-W	ICP 239
MNC 420-210 A40-249-10-5D	42.00	214.8	4.75	40.00	24.90	50.00	68.0	254.75	SOGT 100408-W	ICP 249
MNC 430-215 A40-259-10-5D	43.00	220.0	5.00	40.00	25.90	50.00	68.0	263.00	SOGT 100408-W	ICP 259
MNC 440-220 A40-210-12-5D	44.00	225.2	5.15	40.00	21.00	50.00	68.0	264.15	SOGT 120408-W	ICP 210
MNC 450-225 A40-219-12-5D	45.00	230.4	5.35	40.00	21.90	50.00	68.0	269.35	SOGT 120408-W	ICP 219
MNC 460-230 A40-229-12-5D	46.00	235.5	5.50	40.00	22.90	50.00	68.0	274.50	SOGT 120408-W	ICP 229
MNC 470-235 A40-239-12-5D	47.00	240.7	5.65	40.00	23.90	50.00	68.0	280.65	SOGT 120408-W	ICP 239
MNC 480-240 A40-249-12-5D	48.00	247.8	7.75	40.00	24.90	50.00	68.0	286.75	SOGT 120408-W	ICP 249
MNC 490-245 A40-259-12-5D	49.00	251.0	6.00	40.00	25.90	50.00	68.0	292.00	SOGT 120408-W	ICP 259
MNC 500-250 A40-269-12-5D	50.00	256.1	6.10	40.00	26.90	50.00	68.0	297.10	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 556-570

[1] Outer insert

[2] Central insert

For inserts, see pages: HCP-IQ (542) • ICG (547) • SOGT-W (555) • SOGX-W (555)

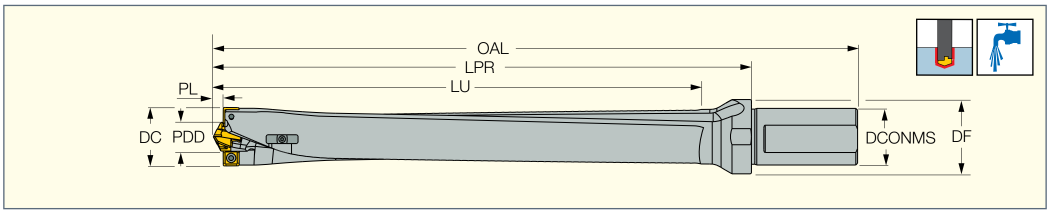
Spare Parts

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 22-33
MNC 450-225 A40-219-12-5D	SR 14-544/S		BLD T15/S7	SW6-SD	K MNC 22-33
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	270.6	5.57	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	294.6	5.57	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	294.9	5.94	352.20	414.30	40.00	50.00	SOGT 100408-W	HCP 219-IQ

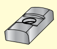
• Hole tolerance: D+0.10/-0.05 in average conditions. However, it can be higher or lower according to machine and tooling conditions • Intermediate sizes are available on request • For user guide and cutting conditions, see pages 556-570

(1) Outer insert

(2) Central insert

For inserts, see pages: HCP-IQ (542) • SOGT-W (555)

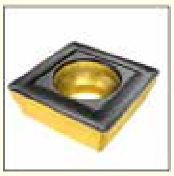
Spare Parts

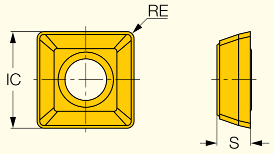
Designation							
MNC 332-265 A32-175-09-8D	SR 34-506	BLD T09/M7-SW4	SW4-SD	K MNC MULTI	SR 34-508/S-HG	T-7/51	GPS-05-18-060
MNC 362-289 A32-190-10-8D	SR 14-571	BLD T10/S7	SW6-SD	K MNC MULTI	SR 34-508/S-HG	T-7/51	GPS-05-18-060
MNC 392-289 A40-219-10-7D	SR 14-571	BLD T10/S7	SW6-SD	K MNC MULTI	SR 34-508/S-HG	T-7/51	GPS-05-18-060

COMBICHAM

SOGX-W

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





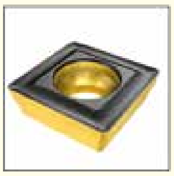
	Dimensions			Tough ↔ Hard	
Designation	IC	S	RE	IC808	IC8080
SOGX 050204-W	5.40	2.40	0.40	●	
SOGX 060304-W	6.20	3.20	0.40	●	
SOGX 070305-W	7.70	3.60	0.50	●	●

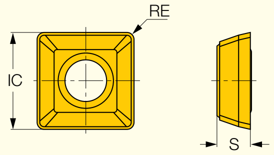
For tools, see pages: MNC (554)

COMBICHAM

SOGT-W

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





	Dimensions			Tough ↔ Hard	
Designation	IC	S	RE	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	●	

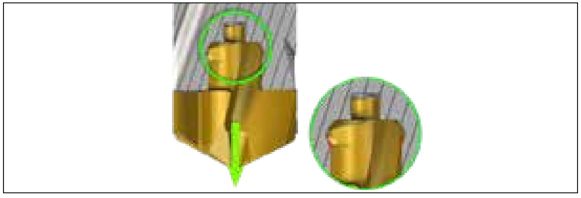
For tools, see pages: MNC (554) • MNC-7/8D (555)

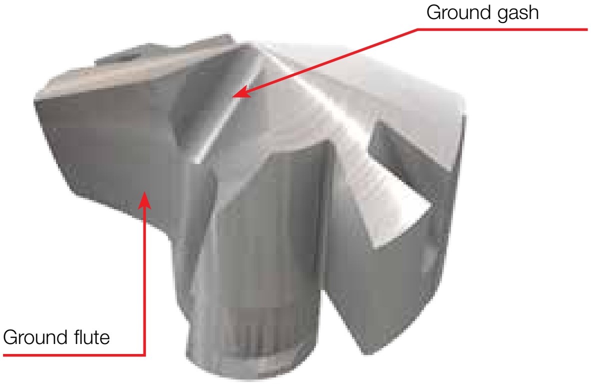
Drilling Heads

- **SUMOCHAM** features four different standard drill head geometries, designed for optimal performance and high reliability when used on various materials.

- **ICP** for use on carbon and alloy steel (**ISO P**). The drill head has a honed cutting edge.
- **ICK** for use on cast iron (**ISO K**). The drill head is produced with a ground chamfer and a honed cutting edge.
- **ICM** for use on stainless and high temperature alloys (**ISO M**). The drill head features a T-land on the cutting edge.

- The **ICP**, **ICK** and **ICM** drilling heads are available in 0.1 mm drilling diameter increments.





The drill head has ground flutes for smooth, uninterrupted chip flow and a ground gash for improved penetration.

To prevent the insert from being pulled out during the drilling process, there is an axial stopper in the pocket. It is effective even after the clamping force has been lost (which may happen when the drill's pocket wears out).

General Recommendations

- **SUMOCHAM** drills can be used in any type of adaptation. However, concentric adaptation such as spring collets and 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 endmill holders, power or hydraulic chucks.

- Dry drilling should not be performed under any circumstances.

- Semi-synthetic or emulsion lubricants are recommended in order to extend tool life.

- It is essential to use internal coolant in all **SUMOCHAM** applications. In the event of low coolant pressure or when used in a stationary application, adding an external coolant can improve tool life.

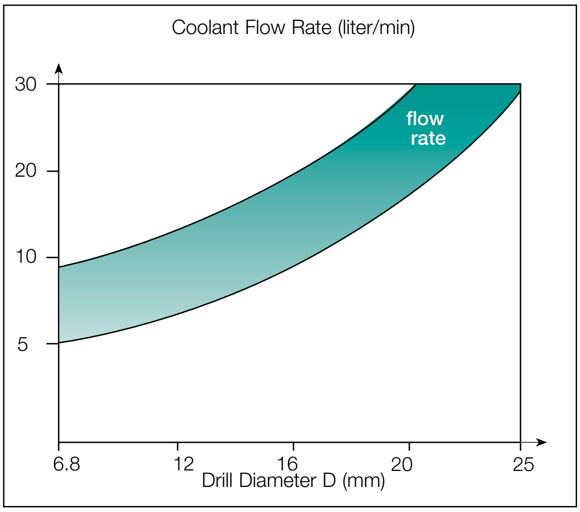
- When only external coolant can be applied, it is recommended to drill into maximum depth of 2xD hole depth to diameter ratio.

- When using **M.Q.L.** coolant, there is no need for special accessories. For smooth **M.Q.L.** coolant flow there is a spherical cavity on the rear side of the drill shank.

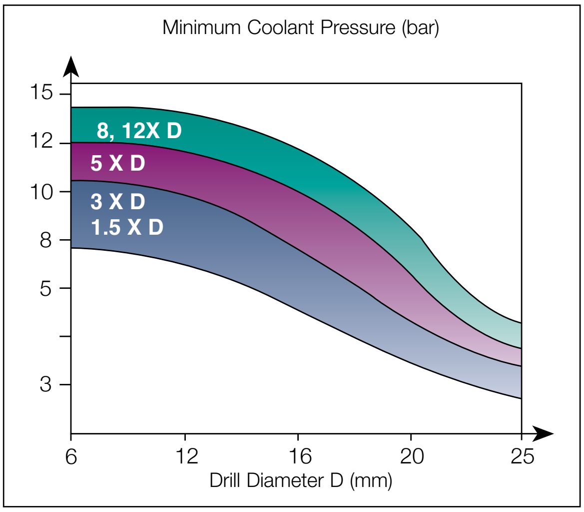
- There is a special plug with an internal thread for a coolant connection used on stationary machines that can be pressed into the cavity on the back end of the drill.

Shank Diameter	Plug	Internal Thread
12	DL-12	G 1/16
16	DL-16	G 1/16
20	DL-20	G 1/8
25	DL-25	G 1/8

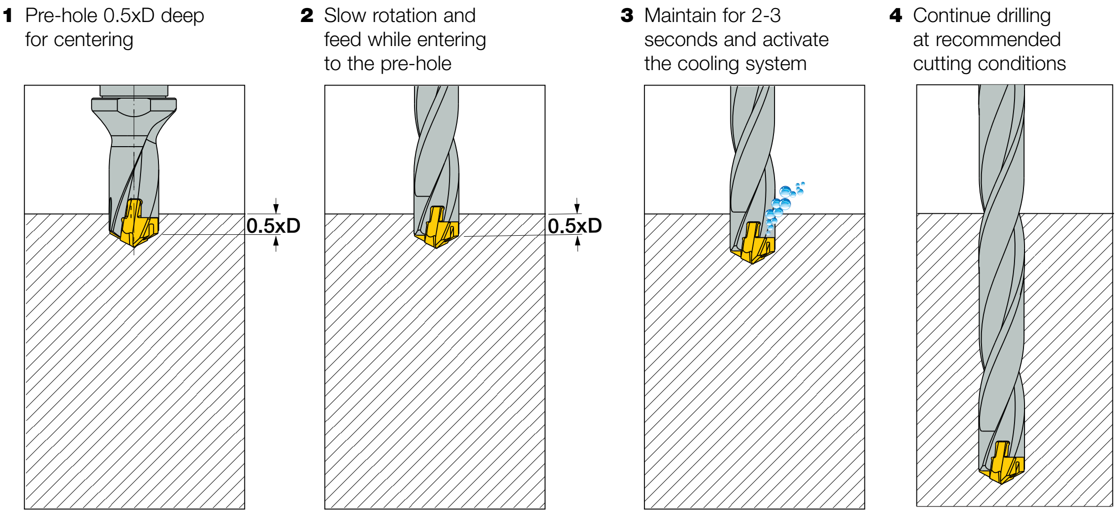
- When drilling stainless steel or high temperature alloys using the **ICM** drilling head, it is highly recommended to apply high pressure oil or 7-10% mineral or vegetable based oil emulsion.



- Following is the recommended coolant flow rate and pressure.

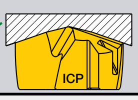
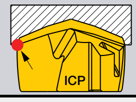
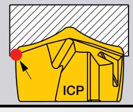
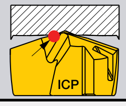
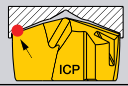
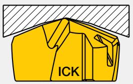
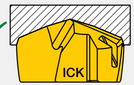
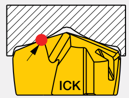
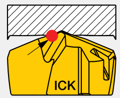
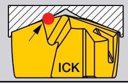
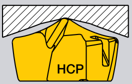
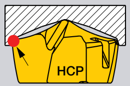
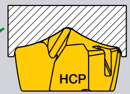
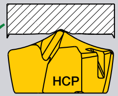
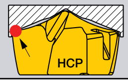
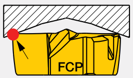
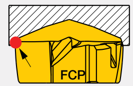
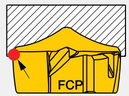
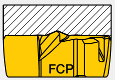
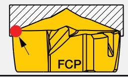
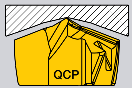
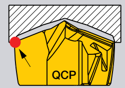
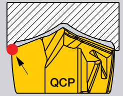
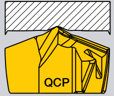
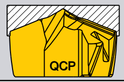


- For optimal performance, it is recommended to adjust runout of outer points or chisel with a maximum of 0.02 mm. Large runout will influence drill performance tool life and hole quality.
- No setup time is needed after indexing the **SUMOCHAM** drill head.
- **SUMOCHAM** drills can be used either on 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.

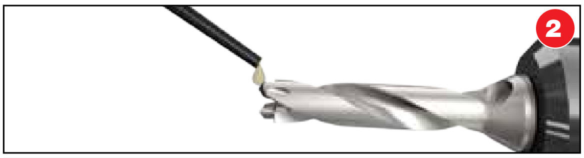


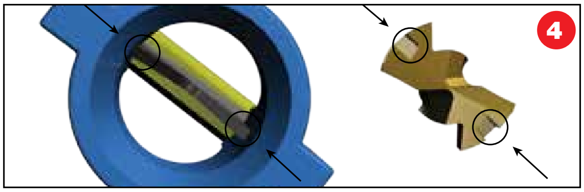
- Prior to using 8xD or 12xD drills, it is recommended to drill a 0.5xD pre-hole using a short or centering drill.
Enter the pre-hole at slow speed and feed until 2-5 mm from its bottom. Start the cooling system and increase rotation to recommended drilling speed. Hold for 2-3 seconds, then, continue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

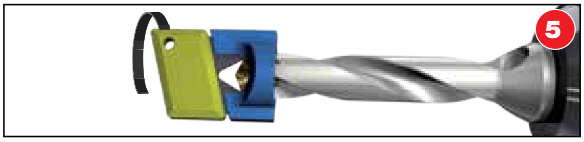
PreHole Adjustment

PreHole Hole	ICP	ICK	HCP	FCP	QCP
ICP	ICP PreHole ✓ 	ICK PreHole ✗ 	HCP PreHole ✗ 	FCP PreHole ✗ 	QCP PreHole ✗ 
ICK	ICP PreHole ✓ 	ICK PreHole ✓ 	HCP PreHole ✗ 	FCP PreHole ✗ 	QCP PreHole ✗ 
HCP	ICP PreHole ✓ 	ICK PreHole ✗ 	HCP PreHole ✓ 	FCP PreHole ✓ 	QCP PreHole ✗ 
FCP	ICP PreHole ✗ 	ICK PreHole ✗ 	HCP PreHole ✗ 	FCP PreHole ✓ 	QCP PreHole ✗ 
QCP	ICP PreHole ✓ 	ICK PreHole ✗ 	HCP PreHole ✗ 	FCP PreHole ✓ 	QCP PreHole ✓ 

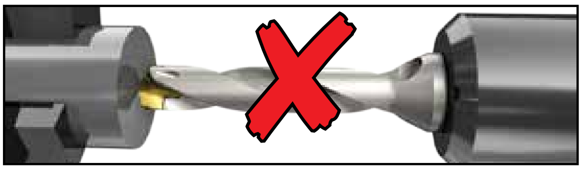
Drilling Head Mounting Procedure

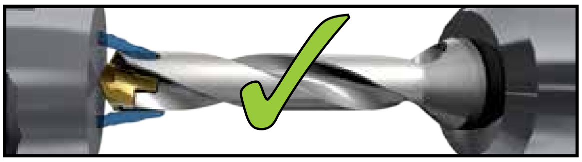


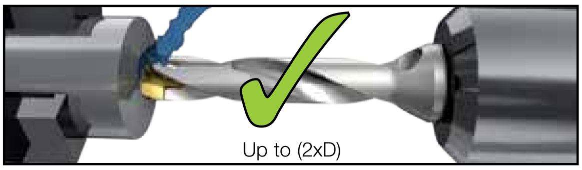




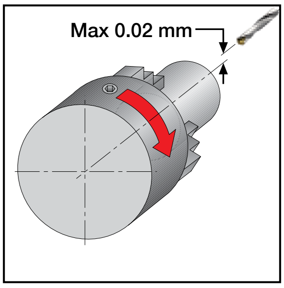
Coolant Recommendations







Maximum Runout, Misalignment

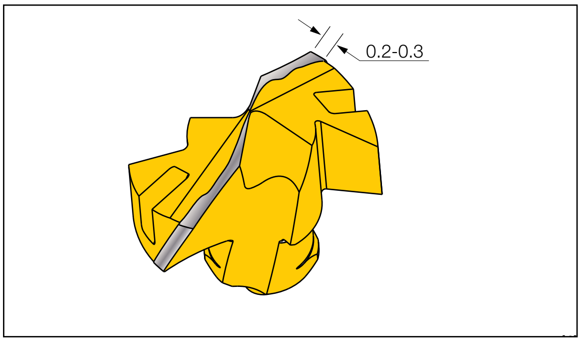


K DCN MULTI

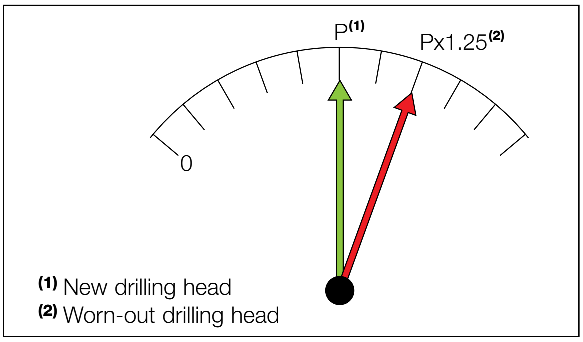
The optional K **DCN MULTI** key enables clamping all currently available **SUMOCHAM** drilling heads in a 6-26.9 mm diameter range.

Indication of Drill Head Wear

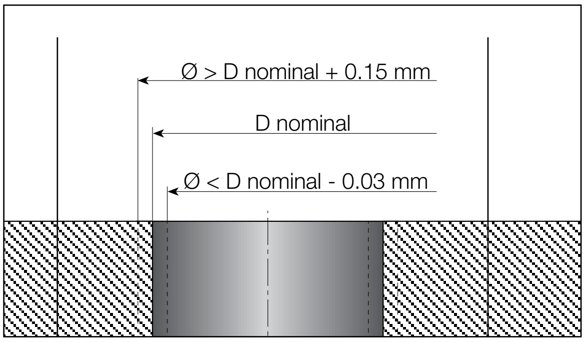
Wear Limit



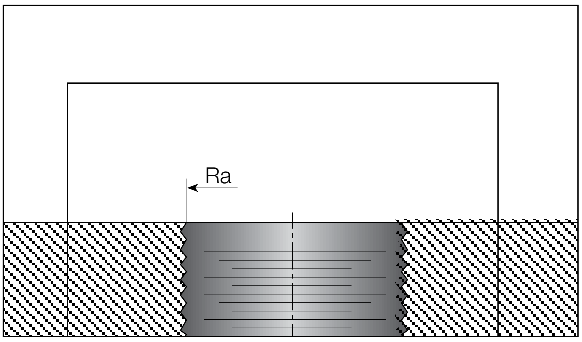
Power Restriction



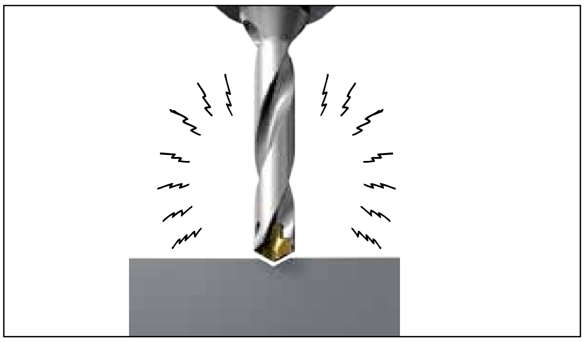
Diameter Change



Surface Finish Declines



Vibration Noise Drastically Increases



Drilling Limitations

Material Groups

ISO	Material		Condition	Tensile Strength [N/mm^2]	Hardness HB	Material No.
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 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
			Quenched and tempered	1100	325	11
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20

- When using external coolant supply only, reduce cutting speed by 10%.
- Use internal coolant supply when machining austenitic stainless steel.

Recommended Machining Conditions

		SUMOCHAM							
		Feed vs. Drill Diameter							
Mtl. No.(1)	V m/min	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							
1	80-**110**-140	0.09 **0.11** 0.13	0.12 **0.17** 0.22	0.15 **0.21** 0.28	0.18 **0.24** 0.30	0.20 **0.27** 0.35	0.25 **0.35** 0.45	0.25 **0.35** 0.45	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	0.09 **0.12** 0.15	0.12 **0.18** 0.25	0.14 **0.21** 0.28	0.16 **0.24** 0.32	0.18 **0.26** 0.35	0.23 **0.31** 0.40	0.25 **0.35** 0.45	0.30 **0.40** 0.50
7	70-**90**-110								
8	50-**70**-90								
9	40-**55**-70								
10	50-**70**-90	0.09 **0.11** 0.12	0.12 **0.16** 0.20	0.12 **0.17** 0.22	0.15 **0.20** 0.25	0.18 **0.23** 0.28	0.20 **0.25** 0.30	0.22 **0.27** 0.33	0.25 **0.30** 0.35
11	40-**60**-80								
15	90-**125**-160	0.12 **0.15** 0.18	0.15 **0.22** 0.30	0.20 **0.27** 0.35	0.25 **0.32** 0.40	0.30 **0.37** 0.45	0.35 **0.45** 0.55	0.35 **0.47** 0.60	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 cutting data

[1] For workpiece materials list, see pages 1114-1149 . 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
No need to reduce the cutting parameters while using 8XD and up holders

Material Groups

ISO	Material		Condition	Tensile Strength [N/mm^2]	Hardness HB	Material No.
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 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
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			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
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39

- 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%

Recommended Machining Conditions

Mtl. No.[1]	V m/min	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
		SUMOCHAM								
		Feed vs. Drill Diameter								
		mm/rev								
1	80-110-140	0.07 **0.09** 0.11	0.09 **0.11** 0.13	0.12 **0.17** 0.22	0.15 **0.21** 0.28	0.18 **0.24** 0.30	0.20 **0.27** 0.35	0.25 **0.35** 0.45	0.25 **0.35** 0.45	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	0.07 **0.10** 0.13	0.09 **0.12** 0.15	0.12 **0.18** 0.25	0.14 **0.21** 0.28	0.16 **0.24** 0.32	0.18 **0.26** 0.35	0.23 **0.31** 0.40	0.25 **0.35** 0.45	0.30 **0.40** 0.50
7	70-**90**-110									
8	50-**70**-90									
9	40-**55**-70									
10	50-**70**-90	0.07 **0.09** 0.10	0.09 **0.11** 0.12	0.12 **0.16** 0.20	0.12 **0.17** 0.22	0.15 **0.20** 0.25	0.18 **0.23** 0.28	0.20 **0.25** 0.30	0.22 **0.27** 0.33	0.25 **0.30** 0.35
11	40-**60**-80									
12	40-**55**-70	0.06 **0.07** 0.08	0.08 **0.09** 0.10	0.10 **0.12** 0.15	0.12 **0.15** 0.18	0.14 **0.17** 0.20	0.16 **0.20** 0.24	0.16 **0.21** 0.26	0.18 **0.24** 0.30	0.20 **0.27** 0.35
13	40-**55**-70									
14	30-**50**-70	0.06 **0.07** 0.08	0.08 **0.09** 0.10	0.10 **0.12** 0.15	0.12 **0.15** 0.18	0.14 **0.17** 0.20	0.16 **0.20** 0.24	0.16 **0.21** 0.26	0.18 **0.24** 0.30	0.20 **0.27** 0.35
15	90-**125**-160	0.10 **0.13** 0.15	0.12 **0.15** 0.18	0.15 **0.22** 0.30	0.20 **0.27** 0.35	0.25 **0.32** 0.40	0.30 **0.37** 0.45	0.35 **0.45** 0.55	0.35 **0.47** 0.60	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									
21	90-**155**-220			0.20 **0.27** 0.35	0.25 **0.32** 0.40	0.30 **0.37** 0.45	0.35 **0.42** 0.50	0.40 **0.50** 0.60	0.45 **0.57** 0.70	0.50 **0.67** 0.75
22										
23										
24										
25	80-**120**-160									
26	90-**155**-220									
27										
28										
29										
30										
31	30-**45**-60		0.05 **0.06** 0.07	0.06 **0.08** 0.11	0.08 **0.10** 0.13	0.10 **0.12** 0.15	0.12 **0.15** 0.18	0.12 **0.16** 0.20	0.14 **0.18** 0.22	0.16 **0.20** 0.25
32	20-**35**-50									
33										
34										
35										
36	20-**35**-50		0.05 **0.06** 0.07	0.06 **0.09** 0.12	0.08 **0.11** 0.15	0.10 **0.14** 0.18	0.12 **0.16** 0.20	0.14 **0.18** 0.22	0.16 **0.20** 0.25	0.18 **0.22** 0.27
37										
38	20-**35**-50		0.05 **0.06** 0.07	0.06 **0.09** 0.12	0.08 **0.11** 0.15	0.10 **0.14** 0.18	0.12 **0.16** 0.20	0.14 **0.18** 0.22	0.16 **0.20** 0.25	0.18 **0.22** 0.27
39										

■ Recommended cutting data

[1] For workpiece materials list, see pages 1114-1149 . 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

Machining Data for MNC drills

ISO	Material		Condition	Tensile Strength [N/mm^2]	Hardness HB	Material 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 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
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			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
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

- Grades: first choice IC808

[1] For workpiece materials list, see pages 1114-1149

			Feed vs. Drill Diameter F [mm/rev]									
	Cutting Speed Vc [m/min]		26< ØD <28		29< ØD <32		33< ØD <35		36< ØD <43		44< ØD <50	
Mat. No.	Vc min	Vc max	f min	f max	f min	f max	f min	f max	f min	f max	f min	f max
1	120	200	0.25	0.35	0.25	0.35	0.25	0.40	0.25	0.40	0.28	0.45
2												
3	130	190										
4												
5												
6	120	180	0.25	0.33	0.25	0.33	0.25	0.38	0.25	0.38	0.26	0.43
7												
8												
9												
10	100	160	0.25	0.33	0.25	0.33	0.25	0.36	0.25	0.36	0.26	0.41
11												
12	90	140	0.12	0.24	0.12	0.24	0.16	0.25	0.18	0.25	0.18	0.30
13												
14	90	140	0.12	0.24	0.12	0.24	0.16	0.25	0.18	0.25	0.18	0.30
15	150	250	0.25	0.40	0.25	0.45	0.3	0.50	0.3	0.50	0.35	0.55
16												
17												
18												
19												
20												
21	160	260	0.3	0.50	0.3	0.50	0.35	0.55	0.35	0.55	0.4	0.60
22												
23												
24												
25												
26												
27												
28												
29												
30												
31	30	60	0.1	0.16	0.1	0.18	0.15	0.20	0.15	0.22	0.16	0.24
32	20	50										
33												
34												
35												
36												
37												
38	20	50	0.1	0.16	0.12	0.18	0.14	0.2	0.14	0.2	0.16	0.22
39												
40												
41												

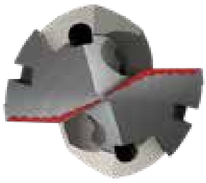
Troubleshooting

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

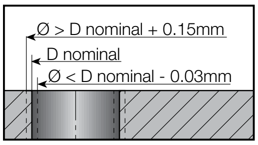
1. Check that the correct geometry is used.
2. Reduce cutting speed.
3. Increase internal coolant pressure.

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

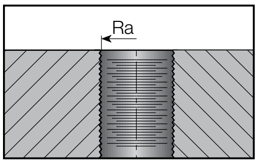
1. Increase cutting speed/feed.
2. Increase coolant pressure.



Deviation of Hole Tolerance

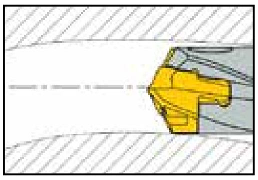
1. Check the runout and make sure it is within 0.02 mm **T.I.R.** (radial and axial cutting points).
2. Reduce feed rate.
3. Check the chisel point runout and make sure that it is within 0.02 mm **T.I.R.**
4. Wrong cutting edge. Replace head.
5. Increase workpiece chucking force.
6. Check the adaptation.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

Troubleshooting



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.

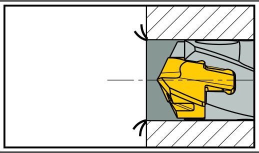


Hole Not Straight:

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

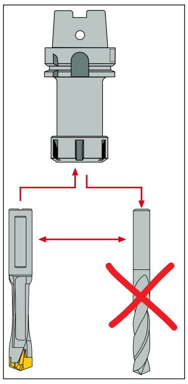
1. Check the runout and make sure it is within 0.02 mm **T.I.R.** (radial and axial).
2. Check the stability of the machine spindle, tool and workpiece clamping rigidity.
3. When drilling rough, hard or sloped surfaces (up to 7°), reduce the feed rate by 30%-50% when entering.
4. Drill a pre-hole with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



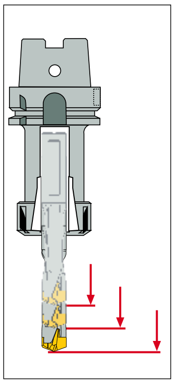
Burrs on Exit

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.

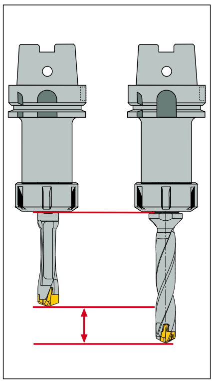
Applications for DCNS Drills



Replaces solid carbide drills without changing any holding components



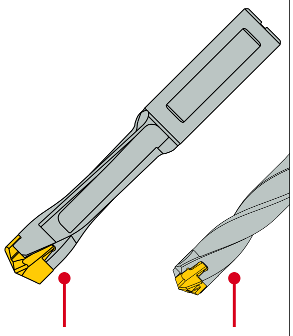
When using SUMOUNICHAM, the drill's projection can be adjusted



Shorter projection compared to SUMOCHAM, when required

SUMOGUNCHAM SUMOCHAM

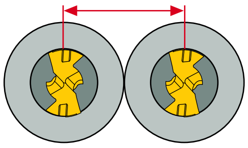
For better stability in rough applications and interrupted cuts



Moderate Helix

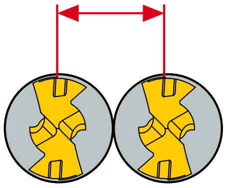
High Helix

SUMOCHAM



SUMOGUNCHAM

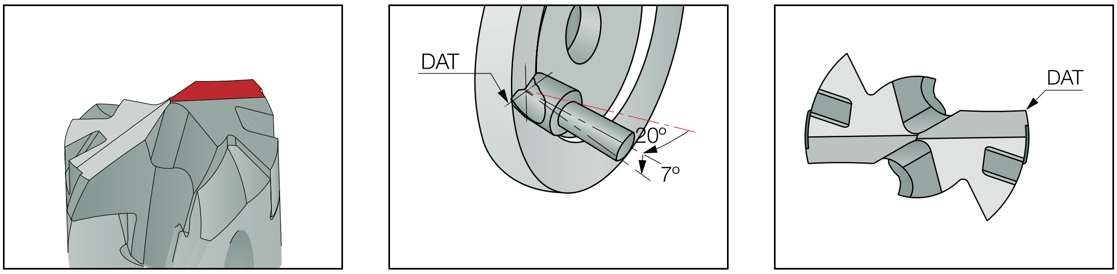
Can be used on multi-spindle applications for close spacing between adjacent drills



Regrinding Instructions for ICM Geometry

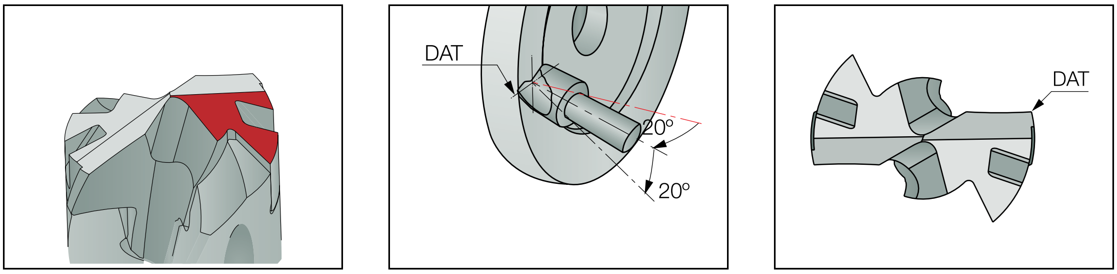
After Each Grinding Operation Rotate the Drill
180° and Repeat the Grinding Procedure

1



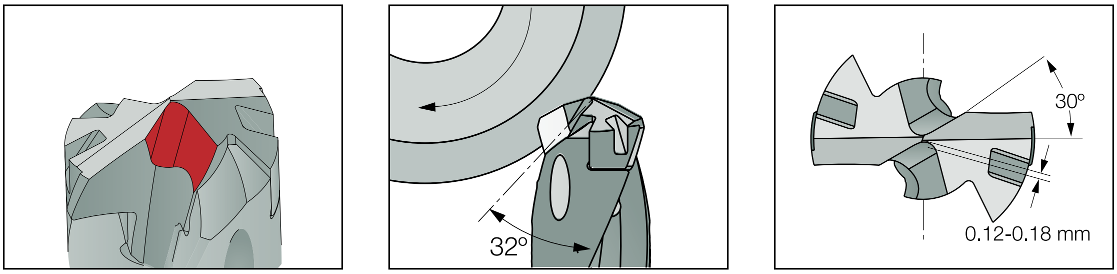
Primary Clearance

2



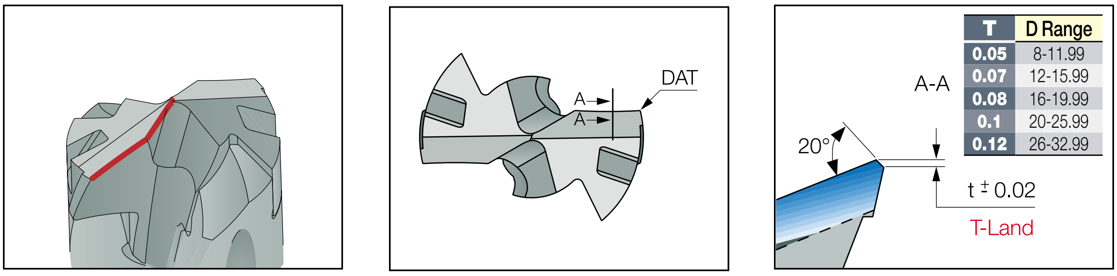
Secondary Clearance

3



Chisel

4



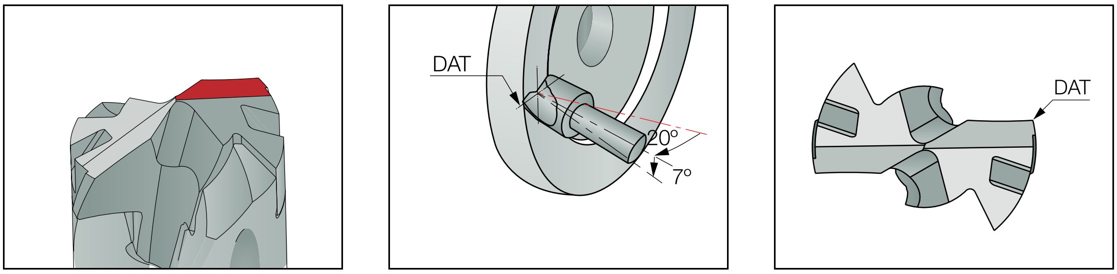
T	D Range
0.05	8-11.99
0.07	12-15.99
0.08	16-19.99
0.1	20-25.99
0.12	26-32.99

Edge Preparation

Regrinding Instructions for ICP Geometry

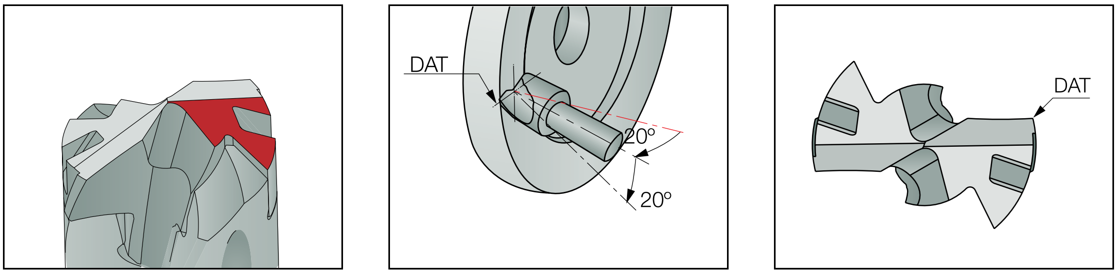
After Each Grinding Operation Rotate the Drill
180° and Repeat the Grinding Procedure

1



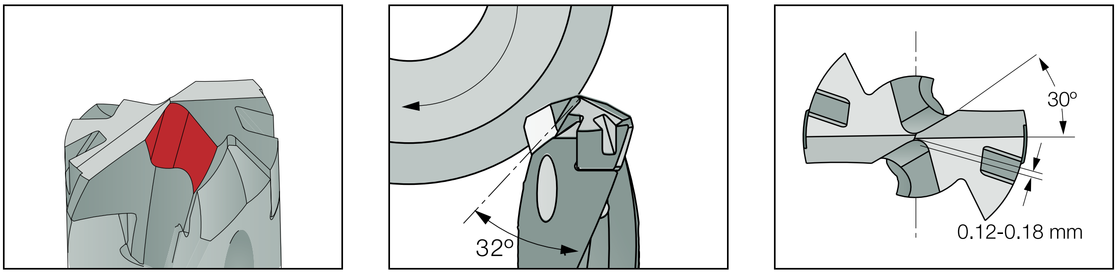
Primary Clearance

2



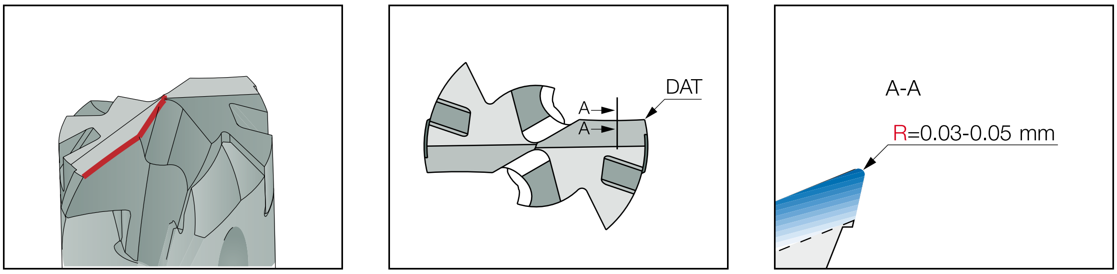
Secondary Clearance

3



Chisel

4

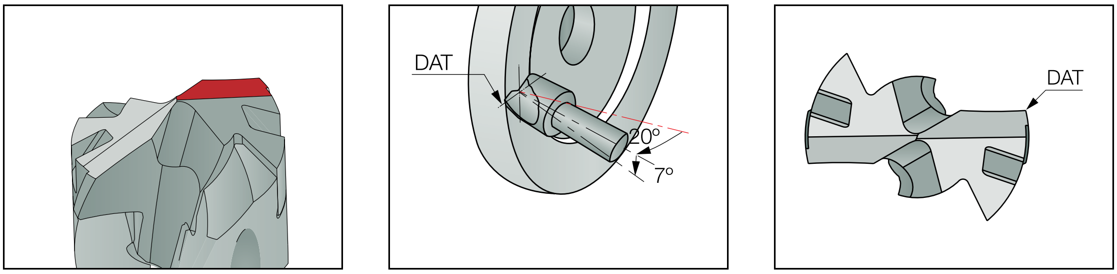


Edge Preparation

Regrinding Instructions for ICK Geometry

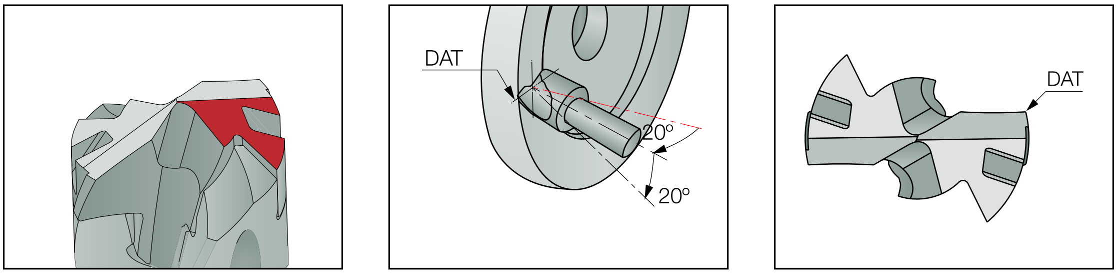
After Each Grinding Operation Rotate the Drill
180° and Repeat the Grinding Procedure

①



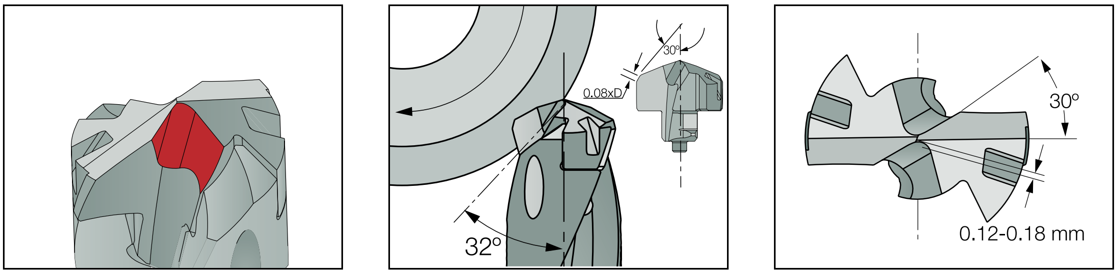
Primary Clearance

②



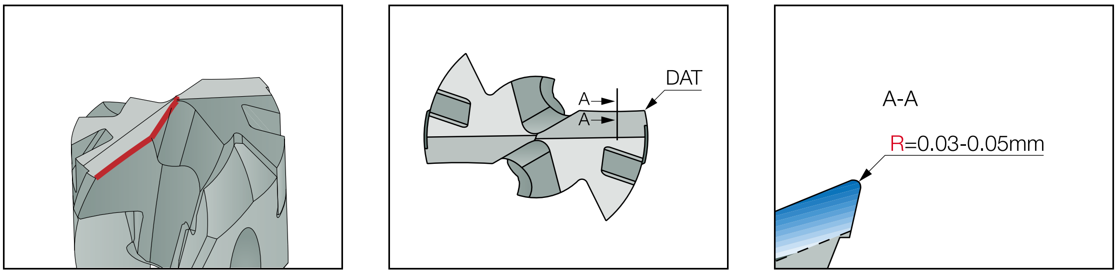
Secondary Clearance

③



Chisel

④

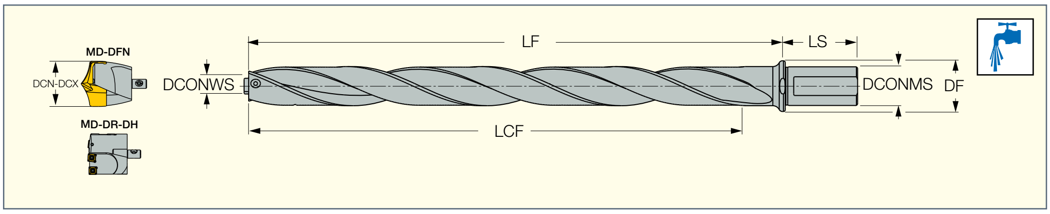


Edge Preparation

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

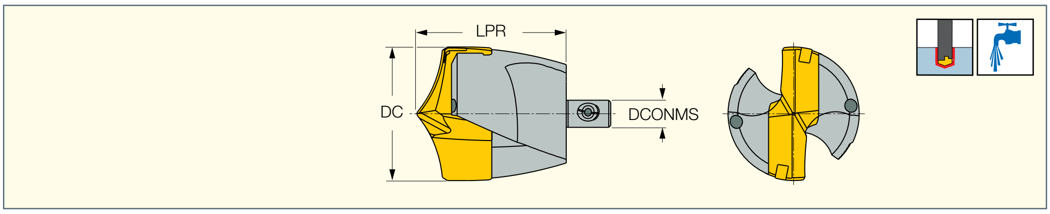
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) HEAD connection size

For tools, see pages: MD-DFN-HEAD (571) • MD-DR-DH-HEAD (572)

MODUDRILL
MODULAR HEADS

MD-DFN-HEAD

Exchangeable Drilling Heads Carrying CHAMIQDRILL Solid Carbide Inserts



Designation	DCN(1)	DCX(2)	LPR	DCONMS	SSC(3)	MIID(4)	
MD-DFN 330 HEAD	33.00	33.90	36.90	6.70	33	HFP 330-IQ	K DFN 30-40
MD-DFN 340 HEAD	34.00	34.90	37.20	6.70	34	HFP 340-IQ	K DFN 30-40
MD-DFN 350 HEAD	35.00	35.90	37.20	6.70	35	HFP 350-IQ	K DFN 30-40
MD-DFN 360 HEAD	36.00	36.90	37.60	6.70	36	HFP 360-IQ	K DFN 30-40
MD-DFN 370 HEAD	37.00	37.90	37.60	6.90	37	HFP 370-IQ	K DFN 30-40
MD-DFN 380 HEAD	38.00	38.90	38.00	6.90	38	HFP 380-IQ	K DFN 30-40
MD-DFN 390 HEAD	39.00	40.00	38.00	6.90	39	HFP 390-IQ	K DFN 30-40

- For user guide and cutting conditions, see pages 575-578

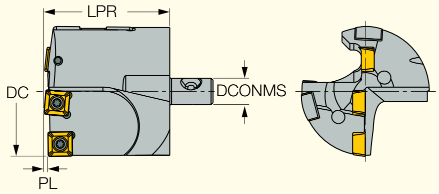
(1) Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body
(2) Cutting diameter maximum
(3) Seat size code
(4) Master insert identification

For inserts, see pages: HFP-IQ (574)
For holders, see pages: MD-BODY (571)

MODUDRILL
MODULAR HEADS

MD-DR-DH-HEAD

Exchangeable Drilling Heads with Guide Pads, Carrying Square Inserts



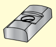
Designation	DC	LPR	DCONMS	MIID[1]	MIID_2[2]	PL
MD-DR-DH 330 070606-06	33.00	33.00	6.70	SOMX 06	SOMX 07 [3]	1.00
MD-DR-DH 340 070606-06	34.00	33.00	6.70	SOMX 06	SOMX 07 [3]	1.00
MD-DR-DH 350 070606-06	35.00	33.00	6.70	SOMX 07	-	1.00
MD-DR-DH 370 070707-06	37.00	39.00	6.90	SOMX 07	-	1.00
MD-DR-DH 380 070707-06	38.00	39.00	6.90	SOMX 07	-	1.00
MD-DR-DH 390 070707-06	39.00	39.00	6.90	SOMX 07	-	1.00

- For user guide and cutting conditions, see pages 597-610

[1] Master insert identification
[2] Master insert identification 2
[3] Inner insert

For inserts, see pages: SOMX-DT (595) • SOMX-GF (595) • SOMX-HD (595)
For holders, see pages: MD-BODY (571)

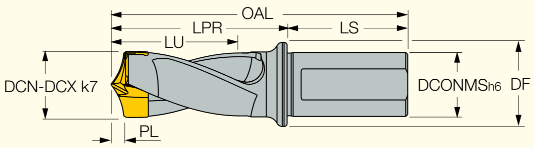
Spare Parts

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

CHAMIQDRILL
700 LINE

DFN A-1.5D-IQ

Indexable 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]	
DFN 330-050-32A-1.5D-IQ	33.00	33.90	32.00	42.00	50.0	87.5	7.33	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	7.62	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	7.65	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	8.15	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	8.04	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	8.20	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	8.43	60.0	163.40	39.0	K DFN 30-40

- For user guide and cutting conditions, see pages 575-578

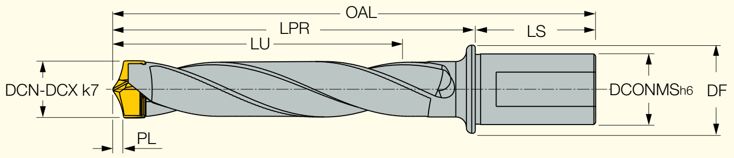
[1] Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body
[2] Cutting diameter maximum
[3] Seat size code

For inserts, see pages: HFP-IQ (574)

CHAMIQDRILL
700 LINE

DFN A-3D-IQ

Indexable 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]	
DFN 330-099-32A-3D-IQ	33.00	33.90	32.00	42.00	99.0	137.0	7.33	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	7.62	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	7.65	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	8.15	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	8.04	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	8.20	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	8.43	60.0	221.90	39.0	K DFN 30-40

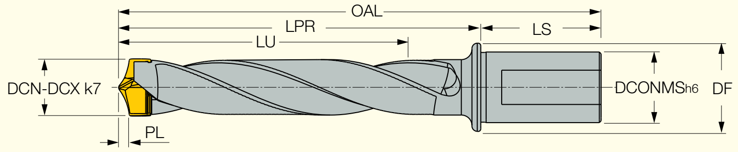
- For user guide and cutting conditions, see pages 575-578

[1] Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body
[2] Cutting diameter maximum
[3] Seat size code

For inserts, see pages: HFP-IQ (574)

DFN A-5D-IQ

Indexable 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)	
DFN 330-165-32A-5D-IQ	33.00	33.90	32.00	42.00	165.0	203.0	7.33	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	7.62	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	7.65	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	8.15	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	8.04	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	8.20	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	8.43	60.0	299.90	39.0	K DFN 30-40

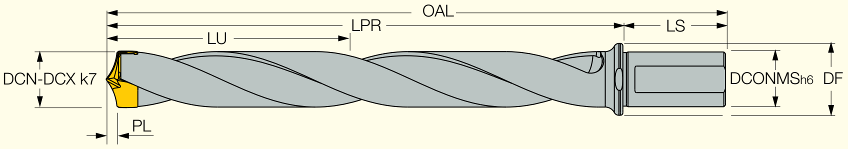
- For user guide and cutting conditions, see pages 575-578

(1) Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body
(2) Cutting diameter maximum
(3) Seat size code

For inserts, see pages: HFP-IQ (574)

DFN A-8D-IQ

Indexable 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)	
DFN 330-264-32A-8D-IQ	33.00	33.90	32.00	42.00	264.0	302.0	7.33	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	7.62	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	7.65	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	8.15	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	8.04	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	8.20	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	8.43	60.0	416.90	39.0	K DFN 30-40

- For user guide and cutting conditions, see pages 575-578

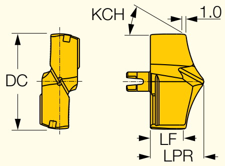
(1) Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body
(2) Cutting diameter maximum
(3) Seat size code

For inserts, see pages: HFP-IQ (574)

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	●

- Intermediate sizes can be supplied on request

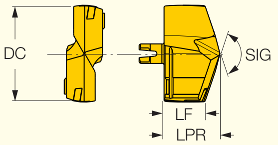
(1) Seat size code

For tools, see pages: DFN A-1.5D-IQ (572) • DFN A-3D-IQ (572) • DFN A-5D-IQ (573) • DFN A-8D-IQ (573)

CHAMIQDRILL
700 LINE

IFP-IQ

Exchangeable DFN Drill Heads for Stainless Steel (ISO M) and High temp. alloys (ISO S)

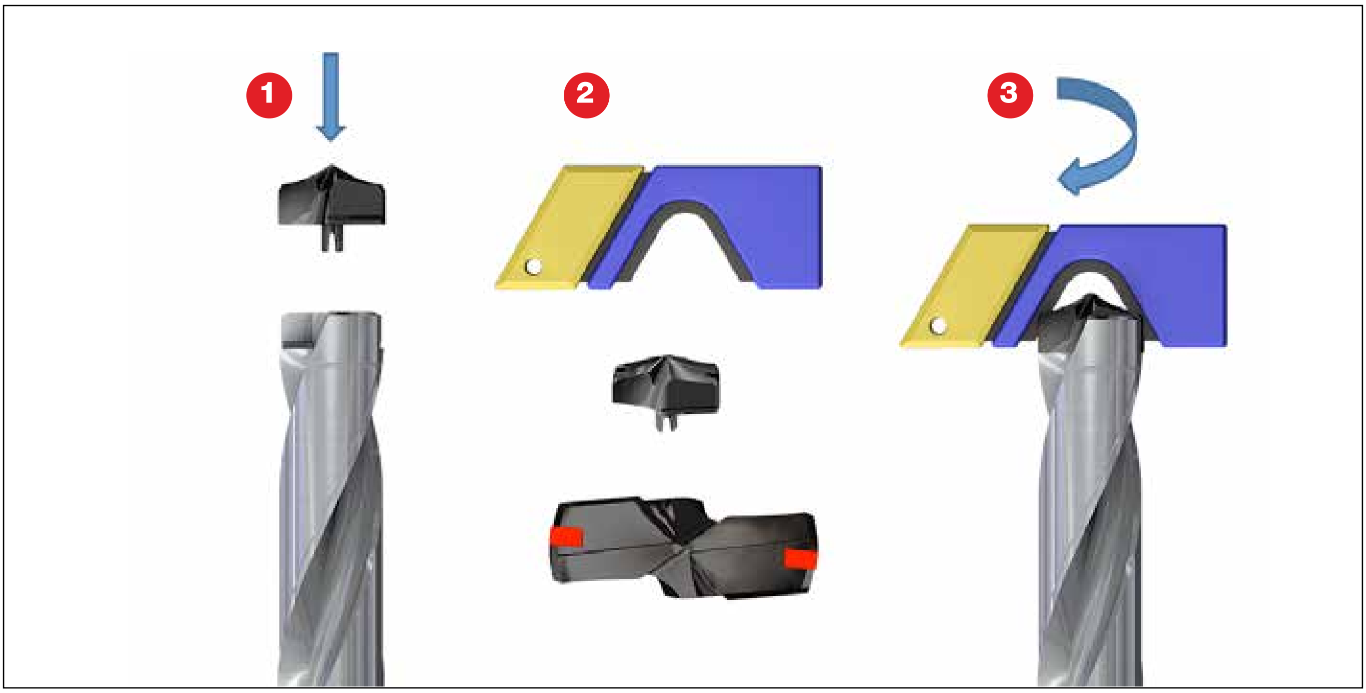


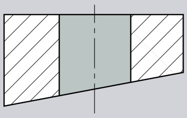
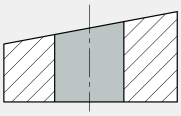
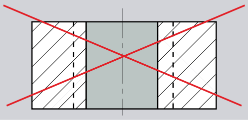
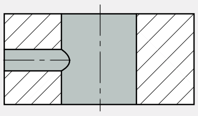
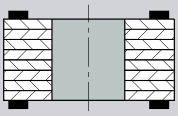
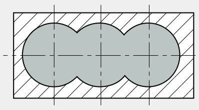
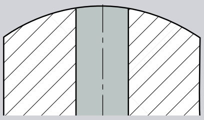
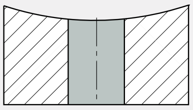
Designation	Dimensions					IC908
	DC	LPR	LF	SSC[1]	SIG	
IFP 330-IQ	33.00	18.50	13.48	33	140	●
IFP 332-IQ	33.20	18.50	13.45	33	140	●
IFP 335-IQ	33.50	18.50	13.41	33	140	●
IFP 340-IQ	34.00	19.70	14.53	34	140	●
IFP 345-IQ	34.50	19.70	14.46	34	140	●
IFP 350-IQ	35.00	19.70	14.38	35	140	●
IFP 355-IQ	35.50	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	●

(1) Seat size code

For tools, see pages: DFN A-1.5D-IQ (572) • DFN A-3D-IQ (572) • DFN A-5D-IQ (573) • DFN A-8D-IQ (573)

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

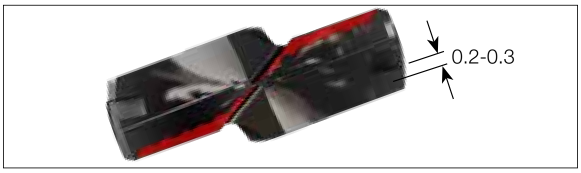
		CHAMIQDRILL
		Feed vs. Drill Diameter
Mtl. No.	V m/min	D=33.0-40.0 mm/rev
1	80-**110**-140	0.30 **0.40** 0.50
2	80-**105**-130	
3	80-**100**-120	
4	70-**90**-110	
5	50-**70**-90	
6	80-**100**-120	0.30 **0.40** 0.50
7	70-**90**-110	
8	50-**70**-90	
9	40-**55**-70	
10	50-**70**-90	0.25 **0.30** 0.35
11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

Flow Rate vs. Pressure and Drill Diameter

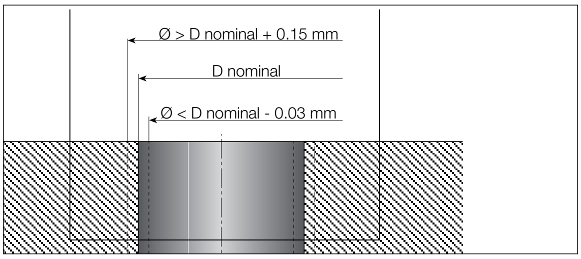
Drill Diameter (mm)	Pressure (bar)	Flow Rate (liter/min)
33	20	60
34	20	60
35	20	60
36	20	60
37	20	60
38	20	70
39	20	70
40	20	70

Indication of Drill Head Wear

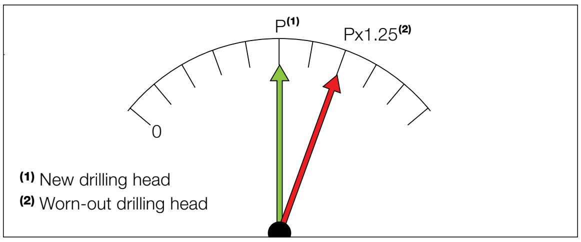
Wear Limit



Diameter Change

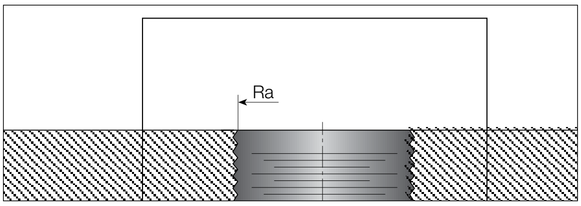


Power Restriction



(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

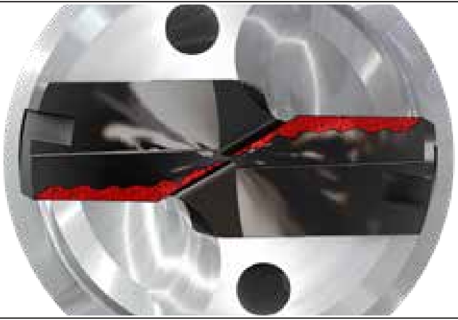
400 mm Modular Drills Alloy and Carbon Steel and Cast Iron

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.

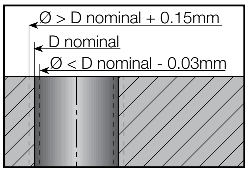


Excessive Flank Wear
1. Reduce cutting speed.
2. Increase internal coolant pressure.

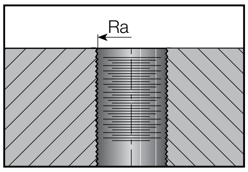
Excessive Land Wear
1. Check the runout and make sure it is within 0.03 mm **T.I.R.** (radial and axial).
2. Reduce cutting speed.
3. When drilling rough, hard or sloped surfaces (up to 7°), reduce the feed rate by 50%-70% when entering and exiting.
4. Increase coolant pressure.
5. Check the chisel point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

Troubleshooting

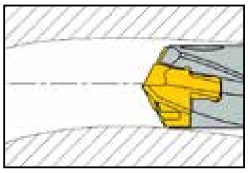
Built-Up Edge
1. Increase cutting speed/feed.
2. Increase coolant pressure.



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.

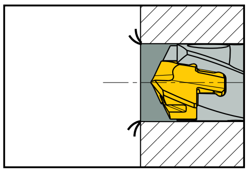


Surface Finish Too Rough
1. Check the runout and make sure it is within 0.03 mm **T.I.R.** (radial and axial).
2. Adjust the feed for improved chip formation.
3. In case of chip jamming - increase the coolant flow and/or reduce the cutting speed.
4. Increase the coolant pressure.
5. Check the chisel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

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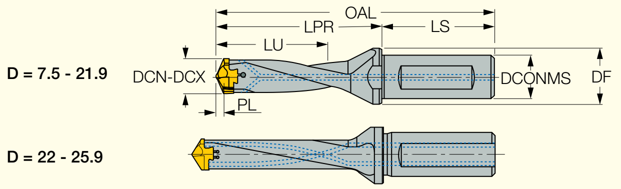
DCM-3D (7.5-25.9 mm)

Indexable 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	1.36	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	1.46	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	1.55	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	1.64	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	1.73	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	1.82	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	1.91	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	2.00	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	2.09	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	2.18	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	2.27	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	2.37	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	2.46	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	2.55	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	2.64	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	2.73	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	2.91	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	3.09	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	3.28	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	3.46	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	3.64	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	3.82	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	4.00	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	4.19	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	4.37	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	4.55	56.0	165.00	25.0	K DCM-25

• Drill tolerance: k7 • For user guide and cutting conditions, see pages 582-587

(1) Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

(2) Cutting diameter maximum

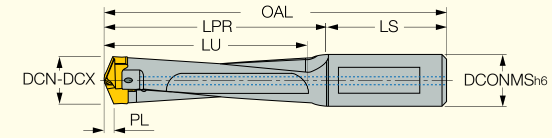
(3) Seat size code

For inserts, see pages: IDI-SG (581) • IDI-SK (581)

UNICHAMDRILL

DCM-3.5D (7.5-20.9 mm)

Indexable Head Drills without a Flange and One Flat Shank, Drilling Depth 3.5xD, Suitable 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	1.36	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	1.46	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	1.55	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	1.64	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	1.73	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	1.83	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	1.91	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	2.00	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	2.09	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	2.18	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	2.27	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	2.36	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	2.46	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	2.54	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	2.64	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	2.72	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	2.92	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	3.09	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	3.28	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	3.46	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	3.63	54.0	138.60	20.0	K DCM-20

- Drill tolerance: k7 • For user guide and cutting conditions, see pages 582-587

(1) Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

(2) Cutting diameter maximum

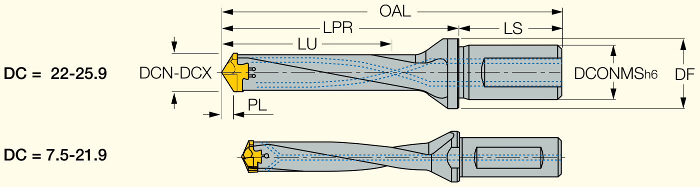
(3) Seat size code

For inserts, see pages: IDI-SG (581) • IDI-SK (581)

CHAMDRILL

DCM-5D (7.5-25.9 mm)

Indexable 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	1.36	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	1.46	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	1.55	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	1.64	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	1.73	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	1.82	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	1.91	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	2.00	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	2.09	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	2.18	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	2.27	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	2.37	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	2.46	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	2.55	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	2.64	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	2.73	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	2.91	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	3.09	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	3.28	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	3.46	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	3.64	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	3.82	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	4.00	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	4.19	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	4.37	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	4.55	56.0	215.00	25.0	K DCM-25

- Drill tolerance: k7 • For user guide and cutting conditions, see pages 582-587

(1) Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

(2) Cutting diameter maximum

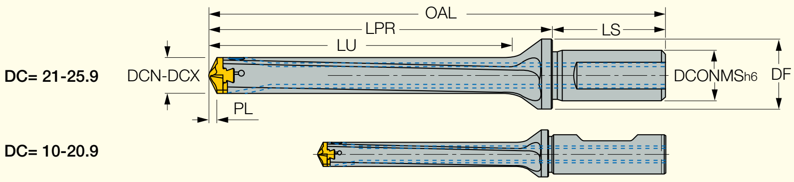
(3) Seat size code

For inserts, see pages: IDI-SG (581) • IDI-SK (581)

CHAMDRILL

DCM-8D (10-25.9 mm)

Indexable 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	1.82	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	2.00	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	2.18	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	2.37	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	2.55	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	2.73	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	2.91	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	3.09	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	3.28	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	3.46	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	3.64	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	3.82	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	4.00	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	4.19	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	4.37	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	4.55	56.0	289.70	25.0	K DCM-25

- Drill tolerance: k7 • For user guide and cutting conditions, see pages 582-587

(1) Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

(2) Cutting diameter maximum

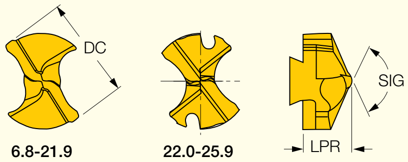
(3) Seat size code

For inserts, see pages: IDI-SG (581) • IDI-SK (581)

CHAMDRILL

IDI-SG/IDI-SK

SG-for General Use and
SK-for Cast Iron



Designation	Dimensions				
	DC (1)	LPR	SIG	SSC(2)	IC908
IDI-SG... IDI-SK...	6.8	4.1	140	6.8	●
	7.5-7.9	4.1	140	8.0	●
	8.0-8.9	4.1	140	8.0	●
	9.0-9.9	4.3	140	9.0	●
	10-10.9	5.3	140	10.0	●
	11-11.9	5.5	140	11.0	●
	12-12.9	5.8	140	12.0	●
	13-13.9	6.0	140	13.0	●
	14-14.9	6.8	140	14.0	●
	15-15.9	7.4	140	15.0	●
	16-16.9	7.9	140	16.0	●
	17-17.9	7.4	140	17.0	●
	18-18.9	8.3	140	18.0	●
	19-19.9	8.5	140	19.0	●
	20-20.9	9.3	140	20.0	●
	21-21.9	9.5	140	21.0	●
	22-22.9	10.3	140	22.0	●
	23-23.9	10.4	140	23.0	●
	24-24.9	10.8	140	24.0	●
	25-25.9	11.0	140	25.0	●

(1) The drilling bits are available in increments of 0.1 mm

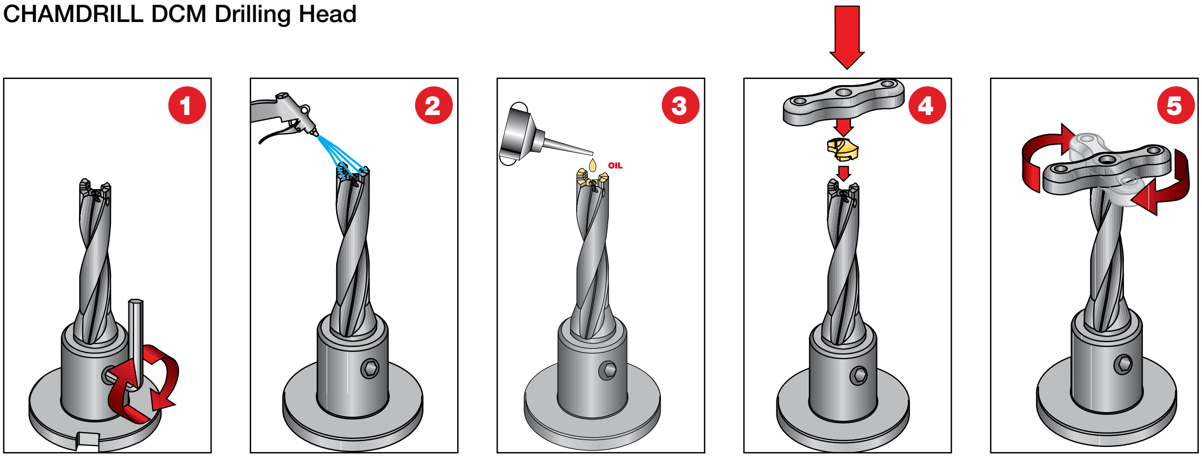
(2) Seat size code

Ordering example for the IDI 10.0 mm drilling head: IDI 100-SG IC908

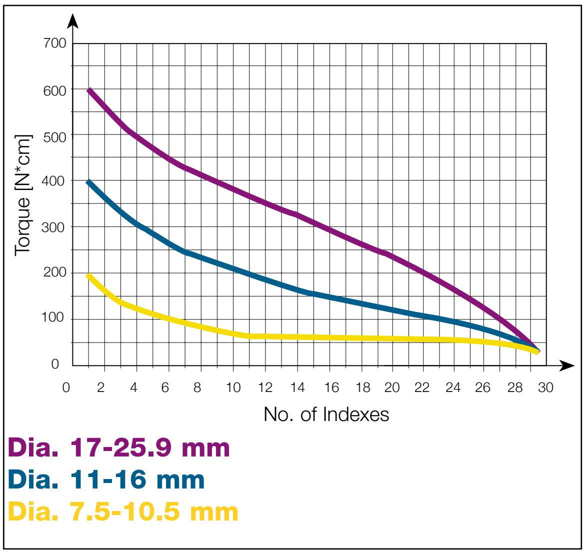
For tools, see pages: DCM-3.5D (7.5-20.9 mm) (580) • DCM-3D (7.5-25.9 mm) (579) • DCM-5D (7.5-25.9 mm) (580) • DCM-8D (10-25.9 mm) (581) • DCT (M8-M24) (611)

Drilling Head Mounting Procedure

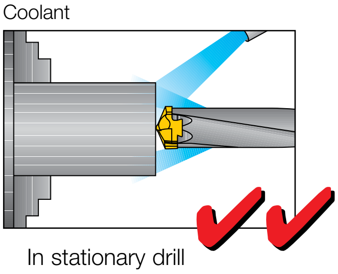
CHAMDRILL DCM Drilling Head



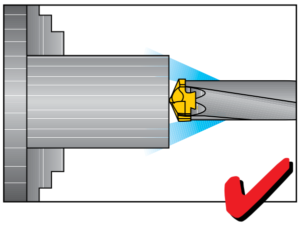
CHAMDRILL Unlocking Change in Torque
Typical Unlocking Torque Range

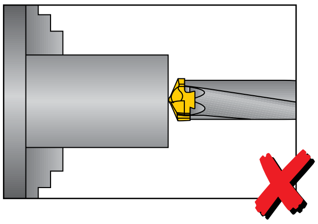


The number of indexing changes according to machine/clamping rigidity, machining conditions, workpiece material, coolant, cooling pressure and correct usage.

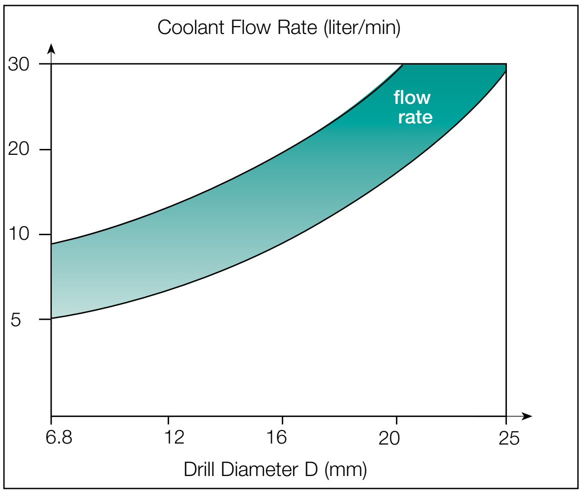


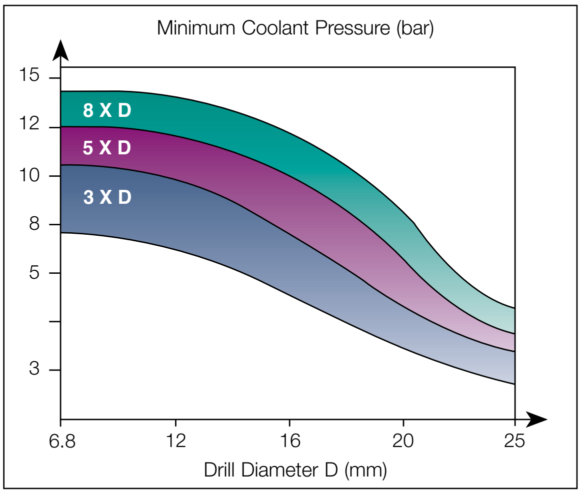
In stationary drill applications both internal and external coolant supply is recommended.





Recommended Coolant Pressure and Flow Rate





* **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.

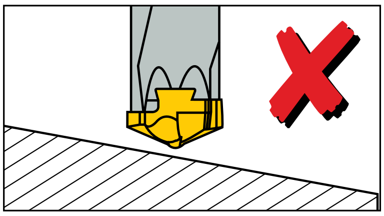
Coolant Mix

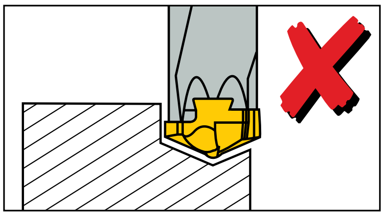
Recommended emulsion mix is 6-8%.
When drilling in stainless and high strength steels, a mix of 10% is recommended.
When using the **IDI** drilling head, high pressure oil or 7-15% mineral or vegetable based oil emulsion is highly recommended for drilling stainless steel and high temperature alloys.

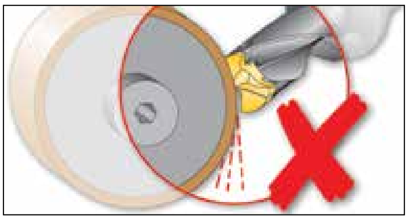
Dry Drilling

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.

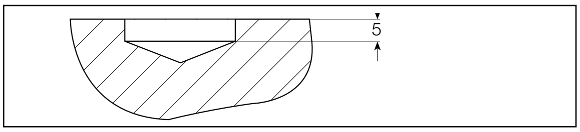
Power/Force Requirements

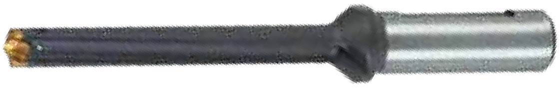
Power/Force Requirements

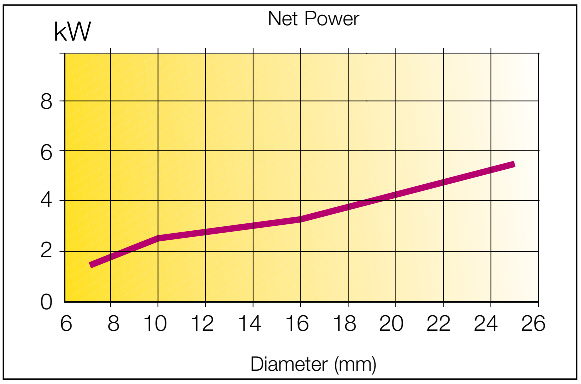
Centering Hole Data for DCM 8xD

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.







Material:SAE 4340
Speed: 100 m/min
Feed: 0.2 mm/rev
Values change for different materials and drilling conditions.

Material Groups

ISO	Material		Condition	Tensile Strength [N/mm^2]	Hardness HB	Material No.
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 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
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			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
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

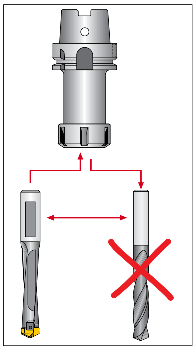
- When using external coolant supply only, reduce cutting speed by 10%
- When using more than 5XD drill ratio, reduce cutting parameters by 10%

Recommended Machining Conditions

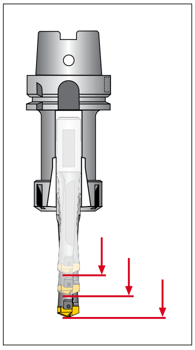
Mat.No.	Cutting Speed Vc m/min		Feed vs. Drill Diameter mm/rev				
		D=6.8-10.9	D=11-12.9	D=13-14.9	D=15-16.9	D=17-20.9	D=21-25.9
1	50-130	0.12-0.2	0.15-0.25	0.2-0.3	0.25-0.35	0.25-0.45	0.25-0.45
2	100-120						
3	90-110						
4	90-120						
5	70-90						
6	80-130	0.12-0.2	0.15-0.25	0.2-0.3	0.25-0.35	0.3-0.4	0.3-0.45
7	70-110						
8	60-90						
9	40-70						
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
11	40-70						
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
13							
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
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
16	80-130						
17	100-180						
18	90-160						
19							
20							
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
22							
23							
24							
25	80-120						
26	90-160						
27							
28							
29							
30							
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
32	20-40						
33							
34							
35							
36	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
37							
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
39							
40							
41							

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%.

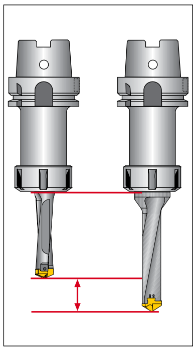
Applications for DCM 3.5D



Replaces solid carbide drils without changing any holding components



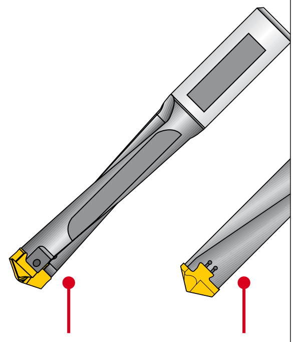
When using UNICHAMDRILL, the drill's projection can be adjusted



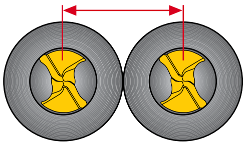
Shorter projection compared to CHAMDRILL when required

UNICHAMDRILL CHAMDRILL

For better stability
in rough applications
and interrupted cuts

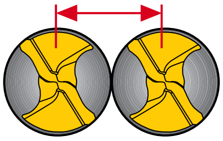


CHAMDRILL

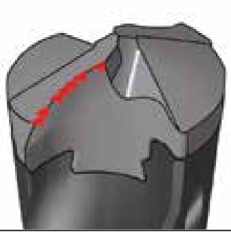


UNICHAMDRILL

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

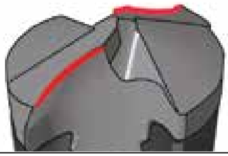


Troubleshooting



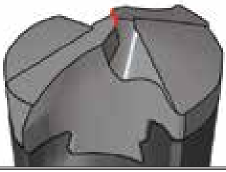
Cutting Edge Chipping

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.



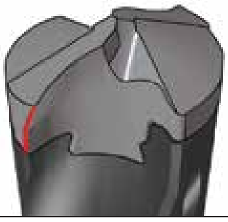
Excessive Flank Wear

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.



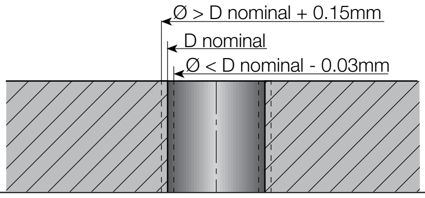
Excessive Flute Land Wear

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.

Troubleshooting

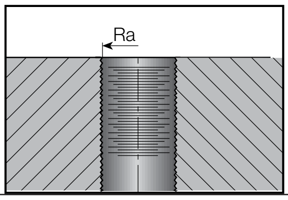
Built-Up Edge

1. Increase cutting speed.
2. Increase coolant pressure.



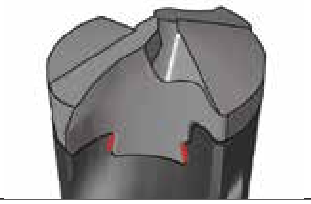
Deviation of Hole Tolerance

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.

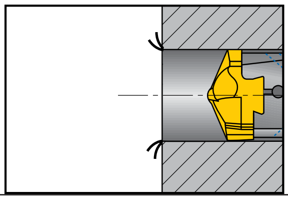


Insufficient Pocket Gripping Torque

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.

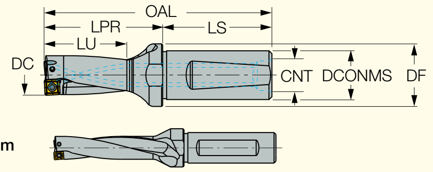
DR-TWIST
INDEXABLE DRILL LINE

DR-2D-N

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

DC= 14-60 mm

DC= 12-13.5 mm



Designation	DC	DCX[1]	LU	LPR	LS	OAL	DCONMS	DF	CNT	Insert
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
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

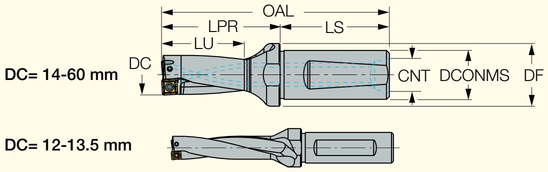
- Hole tolerance D+0.15/-0.05 in average conditions. However it can be higher or lower according to machine and tooling conditions
- For user guide and cutting conditions, see pages 597-605 • For eccenter sleeves (used with tool diameter range of 14.00-60.00 only), see page 605

[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

For inserts, see pages: AOMT (594) • SOGX/T-AL (595) • SOMT-DT (596) • SOMT-GF (596) • SOMT-HD (596) • SOMX-DT (595) • SOMX-GF (595) • SOMX-HD (595)

DR-2D-N (continued)

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



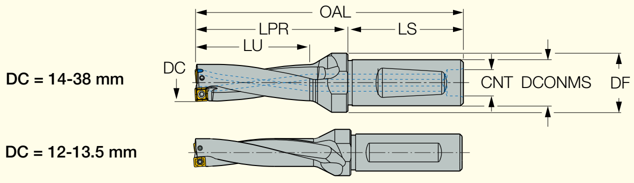
Spare Parts

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 34-508/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-SW4	SW4-SD	
DR(035-044)....-12-2D-N	SR 14-544/S			BLD T15/S7	SW6-SD	
DR(044-060)....-16-2D-N	SR 76-961			BLD T15/M7		SW6-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	Insert
DR120-036-16-04-3D-N	12.00	12.40	36.0	54.0	48.0	102.00	16.00	20.00	-	AOMT 04
DR125-038-16-04-3D-N	12.50	12.90	38.0	55.5	48.0	103.50	16.00	20.00	-	AOMT 04
DR130-039-16-04-3D-N	13.00	13.40	39.0	57.0	48.0	105.00	16.00	20.00	-	AOMT 04
DR135-041-16-04-3D-N	13.50	13.90	41.0	58.5	48.0	106.50	16.00	20.00	-	AOMT 04
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 05
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 05
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 05
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 05
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 05
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 05
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 05
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 05
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 06
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 06
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 06
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 06
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 06
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 06
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 07
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 07
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 07
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 07
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 07
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 07
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 07
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 09
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 09
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 09
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 09
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 09
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 09
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 09
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 09
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 09
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 09
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 12
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 12
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 12
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 12

- Hole tolerance D+0.25/-0.05 in average conditions. However it can be higher or lower according to machine and tooling conditions
- For user guide and cutting conditions, see pages 597-605 • For eccenter sleeves (used with tool diameter range of 14.00-38.00 only), see page 605

(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

For inserts, see pages: AOMT (594) • SOGX/T-AL (595) • SOMT-DT (596) • SOMT-GF (596) • SOMT-HD (596) • SOMX-DT (595) • SOMX-GF (595) • SOMX-HD (595)

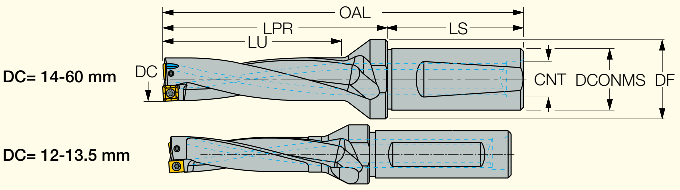
Spare Parts

Designation					
DR(120-135)....-04-3D-N	SR 34-533	T-6/5			
DR(140-175)....-05-3D-N	SR 34-533/L	T-6/5			
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-SW4	SW4-SD
DR(035-038)....-12-3D-N	SR 14-544/S			BLD T15/S7	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	OAL	DCONMS	DF	CNT	Insert
DR120-048-16-04-4D-N	12.00	12.40	48.0	66.0	48.0	114.00	16.00	20.00	-	AOMT 04
DR125-050-16-04-4D-N	12.50	12.90	50.0	68.0	48.0	116.00	16.00	20.00	-	AOMT 04
DR130-052-16-04-4D-N	13.00	13.40	52.0	70.0	48.0	118.00	16.00	20.00	-	AOMT 04
DR135-054-16-04-4D-N	13.50	13.90	54.0	72.0	48.0	120.00	16.00	20.00	-	AOMT 04
DR140-056-20-05-4D-N	14.00	16.80	56.0	74.0	50.0	124.00	20.00	25.00	G1/4"	SOMX 05
DR145-058-20-05-4D-N	14.50	17.10	58.0	76.0	50.0	126.00	20.00	25.00	G1/4"	SOMX 05
DR150-060-20-05-4D-N	15.00	17.40	60.0	78.0	50.0	128.00	20.00	25.00	G1/4"	SOMX 05
DR155-062-20-05-4D-N	15.50	17.60	62.0	80.0	50.0	130.00	20.00	25.00	G1/4"	SOMX 05
DR160-064-20-05-4D-N	16.00	17.80	64.0	82.0	50.0	132.00	20.00	25.00	G1/4"	SOMX 05
DR165-066-20-05-4D-N	16.50	18.10	66.0	84.0	50.0	134.00	20.00	25.00	G1/4"	SOMX 05
DR170-068-20-05-4D-N	17.00	18.30	68.0	86.0	50.0	136.00	20.00	25.00	G1/4"	SOMX 05
DR175-070-20-05-4D-N	17.50	18.50	70.0	88.0	50.0	138.00	20.00	25.00	G1/4"	SOMX 05
DR180-072-25-06-4D-N	18.00	20.30	72.0	92.0	56.0	148.00	25.00	32.00	G3/8"	SOMX 06
DR185-074-25-06-4D-N	18.50	20.50	74.0	94.0	56.0	150.00	25.00	32.00	G3/8"	SOMX 06
DR190-076-25-06-4D-N	19.00	20.80	76.0	96.0	56.0	152.00	25.00	32.00	G3/8"	SOMX 06
DR195-078-25-06-4D-N	19.50	21.00	78.0	98.0	56.0	154.00	25.00	32.00	G3/8"	SOMX 06
DR200-080-25-06-4D-N	20.00	21.30	80.0	100.0	56.0	156.00	25.00	32.00	G3/8"	SOMX 06
DR205-082-25-06-4D-N	20.50	21.60	82.0	102.0	56.0	158.00	25.00	32.00	G3/8"	SOMX 06
DR210-084-25-07-4D-N	21.00	24.50	84.0	104.0	56.0	160.00	25.00	32.00	G3/8"	SOMX 07
DR215-086-25-07-4D-N	21.50	24.70	86.0	106.0	56.0	162.00	25.00	32.00	G3/8"	SOMX 07
DR220-088-25-07-4D-N	22.00	25.00	88.0	108.0	56.0	164.00	25.00	32.00	G3/8"	SOMX 07
DR225-090-25-07-4D-N	22.50	25.20	90.0	110.0	56.0	166.00	25.00	32.00	G3/8"	SOMX 07
DR230-092-25-07-4D-N	23.00	25.50	92.0	112.0	56.0	168.00	25.00	32.00	G3/8"	SOMX 07
DR235-094-25-07-4D-N	23.50	25.70	94.0	114.0	56.0	170.00	25.00	32.00	G3/8"	SOMX 07
DR240-096-25-07-4D-N	24.00	26.00	96.0	116.0	56.0	172.00	25.00	32.00	G3/8"	SOMX 07
DR025-100-32-09-4D-N	25.00	29.50	100.0	132.0	58.0	190.00	32.00	42.00	G1/2"	SOMT 09
DR026-104-32-09-4D-N	26.00	30.00	104.0	136.0	58.0	194.00	32.00	42.00	G1/2"	SOMT 09
DR027-108-32-09-4D-N	27.00	30.50	108.0	140.0	58.0	198.00	32.00	42.00	G1/2"	SOMT 09
DR028-112-32-09-4D-N	28.00	31.00	112.0	144.0	58.0	202.00	32.00	42.00	G1/2"	SOMT 09
DR029-116-32-09-4D-N	29.00	31.50	116.0	148.0	58.0	206.00	32.00	42.00	G1/2"	SOMT 09
DR030-120-32-09-4D-N	30.00	32.00	120.0	152.0	58.0	210.00	32.00	42.00	G1/2"	SOMT 09
DR031-124-32-09-4D-N	31.00	32.50	124.0	156.0	58.0	214.00	32.00	42.00	G1/2"	SOMT 09
DR032-128-32-09-4D-N	32.00	33.00	128.0	160.0	58.0	218.00	32.00	42.00	G1/2"	SOMT 09
DR033-132-32-09-4D-N	33.00	34.00	132.0	164.0	58.0	222.00	32.00	42.00	G1/2"	SOMT 09
DR034-136-32-09-4D-N	34.00	34.50	136.0	168.0	58.0	226.00	32.00	42.00	G1/2"	SOMT 09
DR035-140-32-12-4D-N	35.00	40.50	140.0	176.0	58.0	234.00	32.00	50.00	G 1/2"-14	SOMT 12
DR036-144-32-12-4D-N	36.00	41.00	144.0	180.0	58.0	238.00	32.00	50.00	G 1/2"-14	SOMT 12
DR037-148-32-12-4D-N	37.00	41.50	148.0	184.0	58.0	242.00	32.00	50.00	G 1/2"-14	SOMT 12
DR038-152-32-12-4D-N	38.00	42.00	152.0	188.0	58.0	246.00	32.00	50.00	G 1/2"-14	SOMT 12
DR039-156-32-12-4D-N	39.00	42.50	156.0	192.0	58.0	250.00	32.00	50.00	G 1/2"-14	SOMT 12
DR040-160-40-12-4D-N	40.00	43.00	160.0	196.0	68.0	264.00	40.00	50.00	G 3/4"-14	SOMT 12
DR041-164-40-12-4D-N	41.00	43.50	164.0	200.0	68.0	268.00	40.00	50.00	G 3/4"-14	SOMT 12
DR042-168-40-12-4D-N	42.00	44.00	168.0	204.0	68.0	272.00	40.00	50.00	G 3/4"-14	SOMT 12
DR043-172-40-12-4D-N	43.00	44.50	172.0	208.0	68.0	276.00	40.00	50.00	G 3/4"-14	SOMT 12
DR044-176-40-12-4D-N	44.00	45.00	176.0	212.0	68.0	280.00	40.00	50.00	G 3/4"-14	SOMT 12
DR045-180-40-16-4D-N	45.00	51.00	180.0	215.0	68.0	283.00	40.00	60.00	G 3/4"-14	SOMT 16
DR046-184-40-16-4D-N	46.00	51.50	184.0	219.0	68.0	287.00	40.00	60.00	G 3/4"-14	SOMT 16
DR047-188-40-16-4D-N	47.00	52.00	188.0	223.0	68.0	291.00	40.00	60.00	G 3/4"-14	SOMT 16
DR048-192-40-16-4D-N	48.00	52.50	192.0	227.0	68.0	295.00	40.00	60.00	G 3/4"-14	SOMT 16
DR049-196-40-16-4D-N	49.00	53.00	196.0	231.0	68.0	299.00	40.00	60.00	G 3/4"-14	SOMT 16
DR050-200-40-16-4D-N	50.00	54.00	200.0	235.0	68.0	303.00	40.00	60.00	G 3/4"-14	SOMT 16
DR051-204-40-16-4D-N	51.00	54.50	204.0	239.0	68.0	307.00	40.00	60.00	G 3/4"-14	SOMT 16
DR052-208-40-16-4D-N	52.00	55.00	208.0	243.0	68.0	311.00	40.00	60.00	G 3/4"-14	SOMT 16
DR053-212-40-16-4D-N	53.00	55.50	212.0	247.0	68.0	315.00	40.00	60.00	G 3/4"-14	SOMT 16
DR054-216-40-16-4D-N	54.00	56.00	216.0	251.0	68.0	319.00	40.00	60.00	G 3/4"-14	SOMT 16
DR055-220-40-16-4D-N	55.00	56.50	220.0	255.0	68.0	323.00	40.00	60.00	G 3/4"-14	SOMT 16
DR056-224-40-16-4D-N	56.00	57.00	224.0	259.0	68.0	327.00	40.00	60.00	G 3/4"-14	SOMT 16
DR057-228-40-16-4D-N	57.00	57.50	228.0	263.0	68.0	331.00	40.00	60.00	G 3/4"-14	SOMT 16
DR058-232-40-16-4D-N	58.00	58.00	232.0	267.0	68.0	335.00	40.00	60.00	G 3/4"-14	SOMT 16
DR059-236-40-16-4D-N	59.00	59.00	236.0	271.0	68.0	339.00	40.00	60.00	G 3/4"-14	SOMT 16
DR060-240-40-16-4D-N	60.00	60.00	240.0	275.0	68.0	343.00	40.00	60.00	G 3/4"-14	SOMT 16

- 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 605
- For user guide and cutting conditions, see pages 597-605

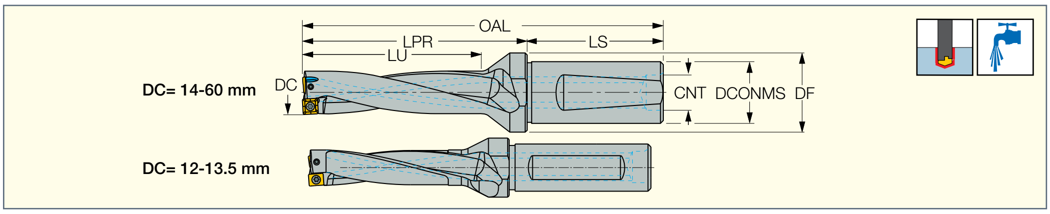
(1) The hole diameter can be enlarged by shifting the drill center along the lathe X-axis, or by using eccentric sleeves in drill rotating applications

For inserts, see pages: AOMT (594) • SOGX/T-AL (595) • SOMT-DT (596) • SOMT-GF (596) • SOMT-HD (596) • SOMX-DT (595) • SOMX-GF (595) • SOMX-HD (595)

DR-TWIST
INDEXABLE DRILL LINE

DR-4D-N (continued)

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



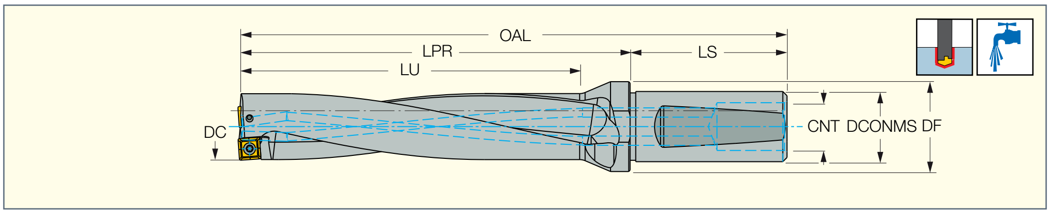
Spare Parts

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 34-508/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 T09/M7-SW4	SW4-SD
DR(035-044)....-12-4D-N	SR 14-544/S			BLD T15/S7	SW6-SD
DR(045-060)....-16-4D-N	SR 76-961			BLD T15/M7	SW6-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	Insert
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 05
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 05
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 05
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 05
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 06
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 06
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 06
DR210-105-25-07-5D-N	21.00	23.63	105.0	125.0	56.0	181.00	25.00 (2)	32.00	G3/8"	SOMX 07
DR220-110-25-07-5D-N	22.00	24.25	110.0	130.0	56.0	186.00	25.00 (2)	32.00	G3/8"	SOMX 07
DR230-115-25-07-5D-N	23.00	24.88	115.0	135.0	56.0	191.00	25.00 (2)	32.00	G3/8"	SOMX 07
DR240-120-25-07-5D-N	24.00	25.50	120.0	140.0	56.0	196.00	25.00 (2)	32.00	G3/8"	SOMX 07

- 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 605
- For user guide and cutting conditions, see pages 597-605

(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) One flat shank

For inserts, see pages: SOGX/T-AL (595) • SOMX-DT (595) • SOMX-GF (595) • SOMX-HD (595)

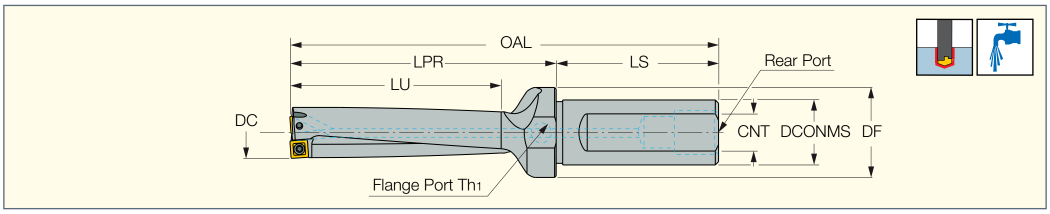
Spare Parts

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	Insert
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 05
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 05
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 06
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 07
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 09
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 09
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 09
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 09
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 12
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 12
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 16
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 16
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 16
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 16
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 16

- 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 605
- For user guide and cutting conditions, see pages 597-605

[(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

For inserts, see pages: SOGX/T-AL (595) • SOMT-DT (596) • SOMT-GF (596) • SOMT-HD (596) • SOMX-DT (595) • SOMX-GF (595) • SOMX-HD (595)

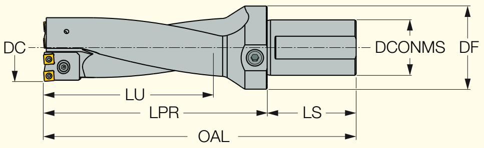
Spare Parts

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



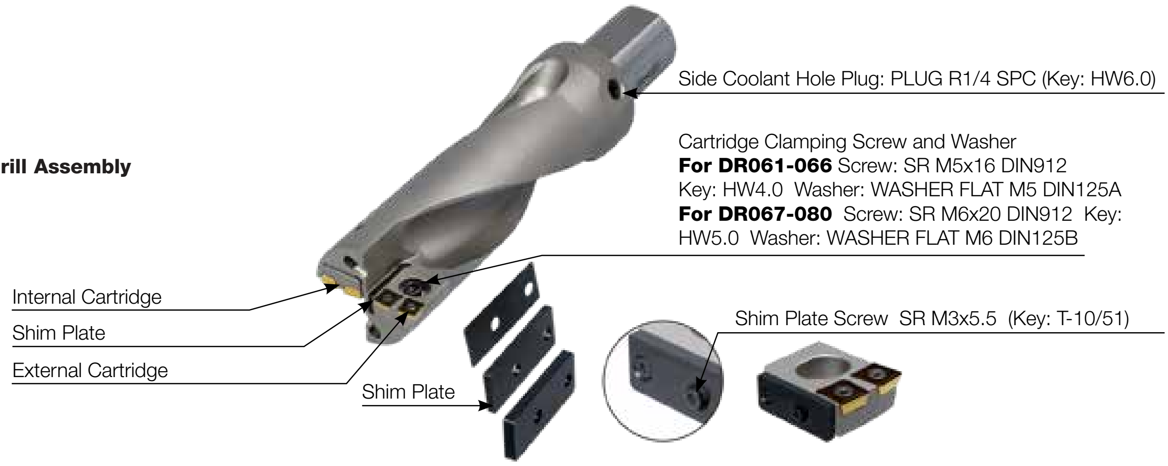
Designation	Dimensions						DCX(1)	Shim Plate	Cartridges	Inserts	Insert Clamping Screw	Key Blade & Handle
	DC	LU	DCONMS	DF	LPR	LS						
DR057>062-155-50-10/11CA	57 58 59 60 61 62	155 155 155 155 155 155	50 50 50 50 50 50	75 75 75 75 75 75	201 201 201 201 201 201	80 80 80 80 80 80	63	ISP-10-D058 ISP-10-D059 ISP-10-D060 ISP-10-D061 ISP-10-D062	Internal: CA57>62-IN-10/10 External: CA57>62-EX-10/11	On internal cartridge: Ext.-SOMT 100408-DT Int.-SOMT 100408-DT On external cartridge: Ext.-SOMT 110408-DT Int.-SOMT 100408-DT	On internal cartridge: Ext.&Int.-SR 14-571 On external cartridge: Ext.-SR 14-544/S Int.-SR 14-571	On internal cartridge: Ext.&Int.-BLD T10/S7 On external cartridge: Ext.-BLD T15/S7 Int.-BLD T10/S7
DR063>066-165-50-10/11CA	63 64 65 66	165 165 165 165	50 50 50 50	75 75 75 75	215 215 215 215	80 80 80 80	67	ISP-10-D064 ISP-10-D065 ISP-10-D066	Internal: CA63>66-IN-10/10 External: CA63>66-EX-10/11	On internal cartridge: Ext.-SOMT 100408-DT Int.-SOMT 100408-DT On external cartridge: Int.-SOMT 100408-DT Ext.-SOMT 110408-DT	On internal cartridge: Ext.&Int.-SR 14-571 On external cartridge: Ext.-SR 14-544/S Int.-SR 14-571	On internal cartridge: Ext.&Int.-BLD T10/S7 On external cartridge: Ext.-BLD T15/S7 Int.-BLD T10/S7
DR067>073-183-50-11/12CA	67 68 69 70 71 72 73	183 183 183 183 183 183 183	50 50 50 50 50 50 50	75 75 75 75 75 75 75	240 240 240 240 240 240 240	80 80 80 80 80 80 80	74	ISP-11-D068 ISP-11-D069 ISP-11-D070 ISP-11-D071 ISP-11-D072 ISP-11-D073	Internal: CA67>73-IN-11/11 External: CA67>73-EX-11/12	On internal cartridge: Ext.-SOMT 110408-DT Int.-SOMT 110408-DT On external cartridge: Ext.-SOMT 120408-DT Int.-SOMT 110408-DT	On internal cartridge: Ext.-SR 14-544/S Int.-SR 14-544/S On external cartridge: Ext.-SR 14-544/S Int.-SR 14-544/S	On internal cartridge: Ext.&Int.-BLD T15/S7 On external cartridge: Ext.&Int.-BLD T15/S7
DR074>080-200-50-12/14CA	74 75 76 77 78 79 80	200 200 200 200 200 200 200	50 50 50 50 50 50 50	75 75 75 75 75 75 75	250 250 250 250 250 250 250	80 80 80 80 80 80 80	81	ISP-12-D075 ISP-12-D076 ISP-12-D077 ISP-12-D078 ISP-12-D079 ISP-12-D080	Internal: CA74>80-IN-12/12 External: CA74>80-EX-12/14	On internal cartridge: Ext.-SOMT 120408-DT Int.-SOMT 120408-DT On external cartridge: Ext.-SOMT 140512-DT Int.-SOMT 120408-DT	On internal cartridge: Ext.&Int.-SR 14-544/S On external cartridge: Ext.-SO 50090I Int.-SR 14-544/S	On internal cartridge: Ext.&Int.-BLD T15/S7 On external cartridge: Ext.-BLD T20/S7 Int.-BLD T15/S7

- Hole tolerance: D±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 597-604

(1) Cutting diameter maximum

For inserts, see pages: SOMT-DT (596) • SOMT-GF (596) • SOMT-HD (596)

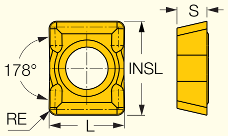
Drill Assembly



DR-TWIST
INDEXABLE DRILL LINE

AOMT

Inserts for DR Drills



Designation	Dimensions				Tough ↔ Hard			
	L	S	RE	INSL	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			●	

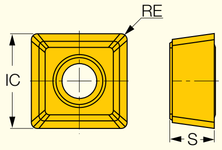
- Used on 12-13.5 mm DR drills

(1) For low carbon steel and soft materials.

DR-TWIST
INDEXABLE DRILL LINE

SOMX-DT

Inserts for DR Drills with a DT General Use Chipformer



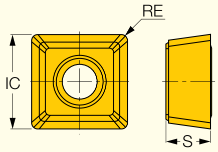
Designation	Dimensions			Tough ↔ Hard				
	IC	S	RE	IC5500	IC808	IC908	IC8080	IC9080
SOMX 050204-DT	5.40	2.40	0.40		●	●	●	●
SOMX 060304-DT	6.20	3.20	0.40	●	●	●	●	●
SOMX 070305-DT	7.70	3.60	0.50	●	●	●	●	●
SOMX 160512-DT	16.00	5.56	1.20			●		

- DT - a general use chipformer for medium to high feed rates

DR-TWIST
INDEXABLE DRILL LINE

SOMX-GF

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



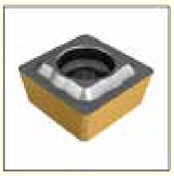
Designation	Dimensions			
	IC	S	RE	IC908
SOMX 050204-GF	5.40	2.40	0.40	●
SOMX 060304-GF	6.20	3.20	0.40	●
SOMX 070305-GF	7.70	3.60	0.50	●

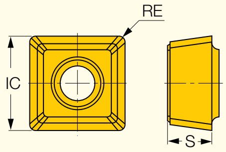
- GF - a narrow chipformer for use on soft materials at low to medium feed rates

DR-TWIST
INDEXABLE DRILL LINE

SOMX-HD

Inserts for DR Drills for Carbon Steel and Soft Materials



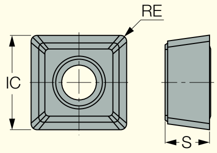


Designation	Dimensions			
	IC	S	RE	IC808
SOMX 050204-HD	5.40	2.40	0.40	●
SOMX 060304-HD	6.20	3.20	0.40	●
SOMX 070305-HD	7.70	3.60	0.50	●

DR-TWIST
INDEXABLE DRILL LINE

SOGX/T-AL

Inserts for DR Drills for Aluminum



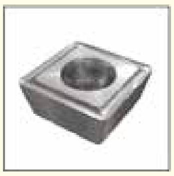
Designation	Dimensions			
	IC	S	RE	IC08
SOGX 050204-AL	5.40	2.40	0.40	●
SOGX 060304-AL	6.20	3.20	0.40	●
SOGX 070305-AL	7.70	3.60	0.50	●
SOGT 09T306-AL	9.00	3.81	0.60	●
SOGT 120408-AL	12.70	4.76	0.80	●

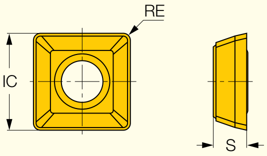
- Sharp cutting edge with polished rake for aluminum

DR-TWIST INDEXABLE DRILL LINE

SOMT-GF

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



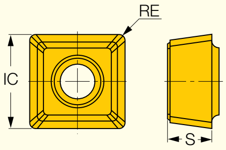


Designation	Dimensions			Tough ↔ Hard	
	IC	S	RE	IC328	IC908
SOMT 09T306-GF	9.00	3.81	0.60	●	●
SOMT 120408-GF	12.70	4.76	0.80		●
SOMT 160512-GF	16.00	5.56	1.20		●

DR-TWIST INDEXABLE DRILL LINE

SOMT-HD

Inserts for DR Drills for Carbon Steel and Soft Materials

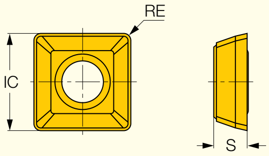


Designation	Dimensions			
	IC	S	RE	IC808
SOMT 09T306-HD	9.00	3.81	0.60	●
SOMT 100408-HD	9.80	4.30	0.80	●
SOMT 110408-HD	11.50	4.80	0.80	●
SOMT 120408-HD	12.70	4.76	0.80	●
SOMT 160512-HD	16.00	5.56	1.20	●

DR-TWIST INDEXABLE DRILL LINE

SOMT-DT

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



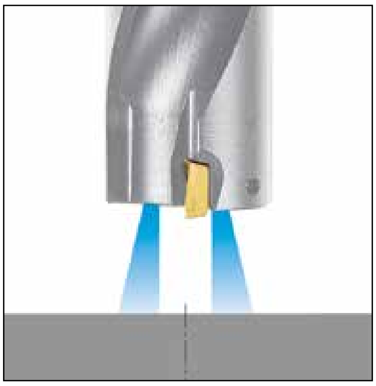
Designation	Dimensions			Tough ↔ Hard					
	IC	S	RE	IC328	IC5500	IC808	IC908	IC8080	IC9080
SOMT 060204-DT	6.00	1.96	0.40	●		●	●		
SOMT 09T306-DT	9.00	3.81	0.60		●	●	●	●	●
SOMT 100408-DT	9.80	4.30	0.80			●	●	●	
SOMT 110408-DT	11.50	4.80	0.80			●	●		
SOMT 120408-DT	12.70	4.76	0.80			●	●		●
SOMT 140512-DT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

Insert Positioning

Machining Conditions

Cooling Methods

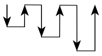
Directing the coolant through the tool is essential for reliable machining. This method prevents chip pile up, insert damage or breakage, and damage to the workpiece surface.



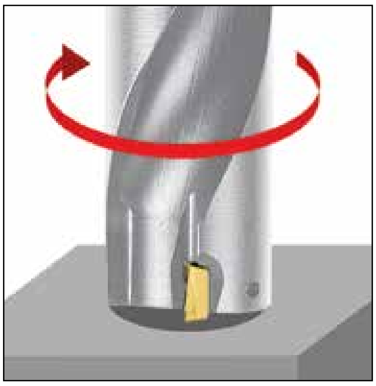
Internal Coolant

Apply standard cutting data.

External Coolant

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

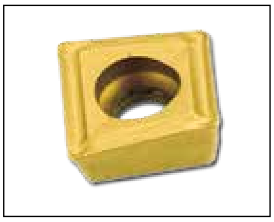
Step 1 - Prior to Drilling

- Use charts on pages 600-601 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
may cause insert damage

Optimal Shape

Too Long
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

Increase speed within recommended limits. If not satisfactory, decrease feed.

→ Optimal Shape ←

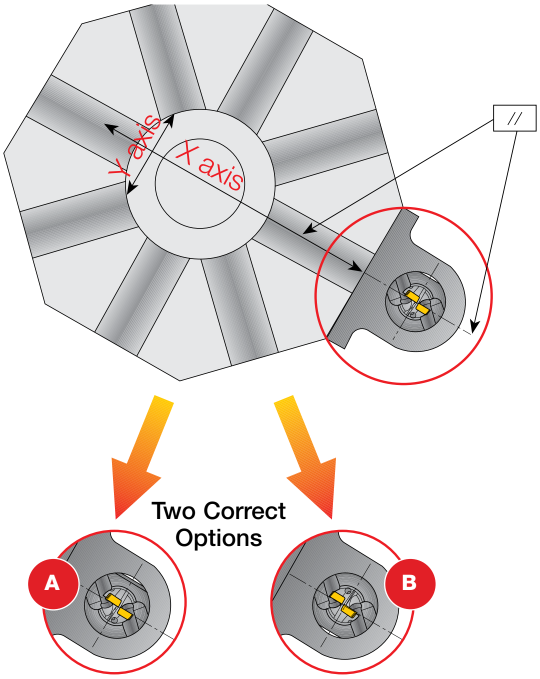
Too Long

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 **180**° rotation

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

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

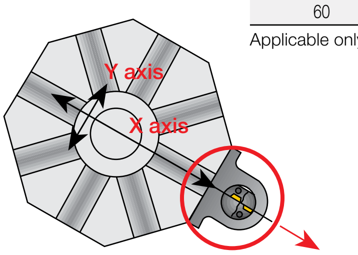
D Nominal	D Max. on Lathe
23	28.5
24	29.0
25	29.5
26	30.0
27	30.5
28	31.0
29	31.5
30	32.0
31	32.5
32	33.3
33	34.0
34	34.5
35	35.0

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

D Nominal	D Max. on Lathe
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



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

Shifting Direction

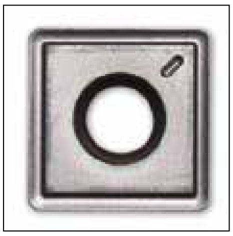
Machining Conditions

Optimizing Chip Shape for DR Drills

SOMT...DT

A general-use chipformer for medium to high feed rates.

SOMT...GF

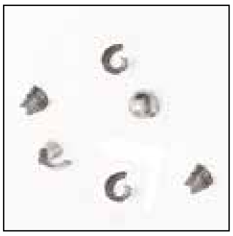


A narrow chipformer for use on soft materials, at low to medium feed rates.

Chip Formation Examples

SOMT...DT

SOMT...GF

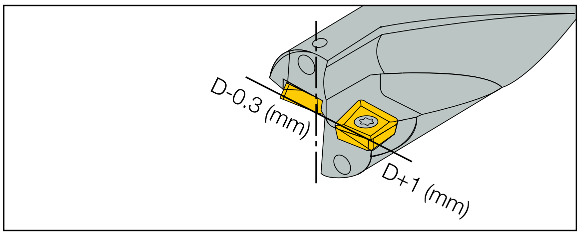


Cutting Conditions:
Material: SAE 1060
V=120 m/min
f=0.14 mm/rev

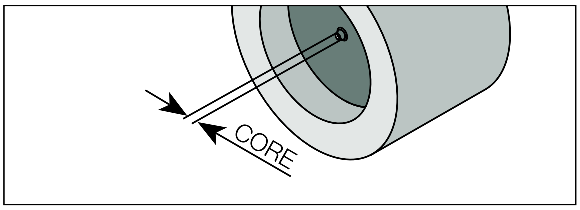
Setup of Non-Rotating Drills

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.

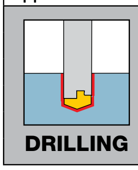


1. Drill a hole 6 mm deep with the drill center line aligned with the spindle center line.
2. Check the existing core. If there is no core, check the alignment of the Y-axis of the drill and spindle. Correct by checking the adapter or adjusting the Y-axis.
3. Check that the hole diameter equals the drill 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 ↕ Tougher	IC808(908) IC5500	IC808(908)	IC808(908)	IC8080(1)(9080) IC808 (908)	IC808(908)	IC808(908)	IC808(908)

(1) Use for an outer insert on DR drills

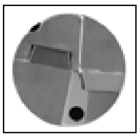
Default recommendation

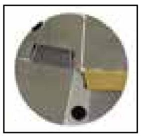
Machining Data for DR Drills

ISO	Material		Condition	Tensile Strength [N/mm²]	Hardness HB	Material 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 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
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			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
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

- Grades: first choice IC808, IC8080
- 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 1114-1149





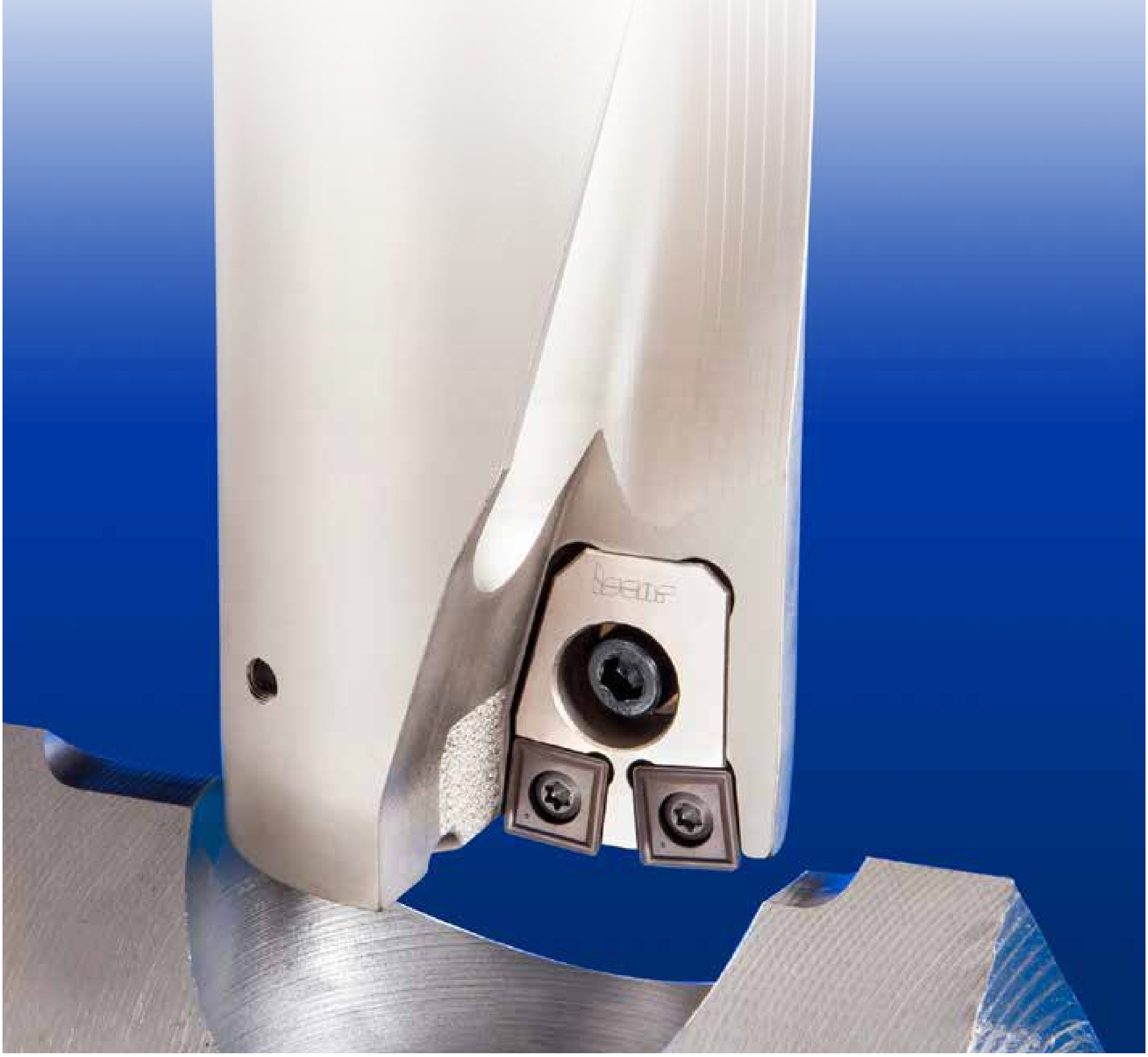
Cutting Speed [1]				Feed vs. Drill Diameter mm/rev					
Mat. No.	Vc m/min IC808/908 external	Vc m/min IC8080/9080 external	DR-04 DT/HD	DR-05 GF/DT/AL/HD	DR-06 GF/DT/AL/HD	DR-07 GF/DT/AL/HD	DR-09/10 GF/DT/AL/HD	DR-11/12 GF/DT/HD	DR-14/16 GF/DT/HD
1	200-300	260-390	0.04-0.08 0.02-0.06	0.06-0.10 0.10-0.15 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				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
6	150-220	190-290							
7	120-180	160-230							
8									
9									
10	120-190	160-250		0.06-0.10 0.10-0.14	0.06-0.10 0.10-0.14	0.06-0.10 0.10-0.14	0.08-0.12 0.12-0.18	0.10-0.15 0.14-0.20	0.14-0.17 0.16-0.24
11	100-160	210-310							
12	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
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

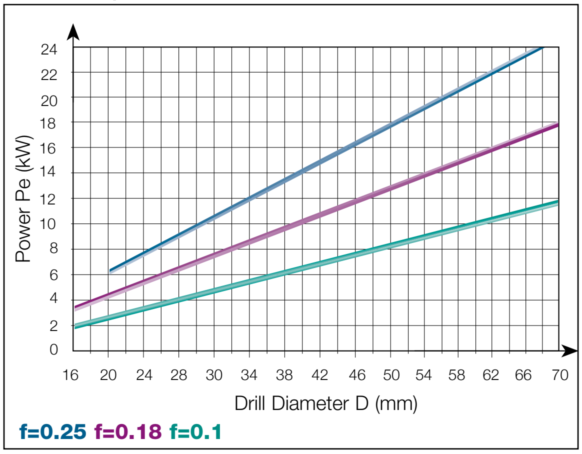
Material	Vc (m/min)	Feed (mm/rev)		
		60-66 dia.	67-73 dia.	74-80 dia.
Low Carbon Steel (<0.3% C)	180-250	0.08-0.12	0.08-0.12	0.09-0.14
Carbon Steel (>0.3% C)	160-220	0.12-0.18	0.12-0.18	0.14-0.21
Low Alloy Steel (<HB300)	150-220	0.10-0.18	0.10-0.18	0.12-0.21
High Alloy Steel (>HB300)	130-180	0.10-0.15	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



Required Machine Power
Material: SAE 4140
Cutting speed: 100 m/min

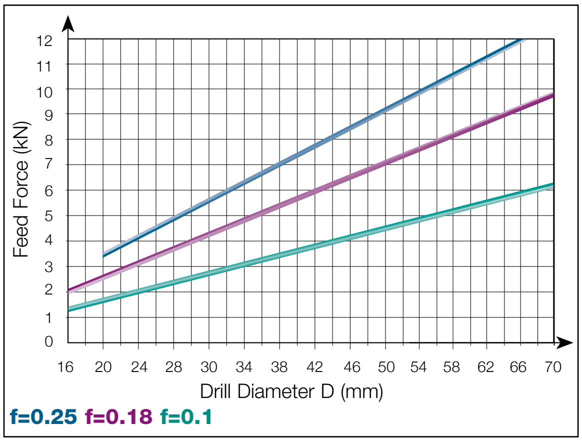
For different cutting speeds,
use factor as follows:

Machine Power $\mathbf{P}=\frac{Pe \cdot C}{\eta}$

η=Machine efficiency

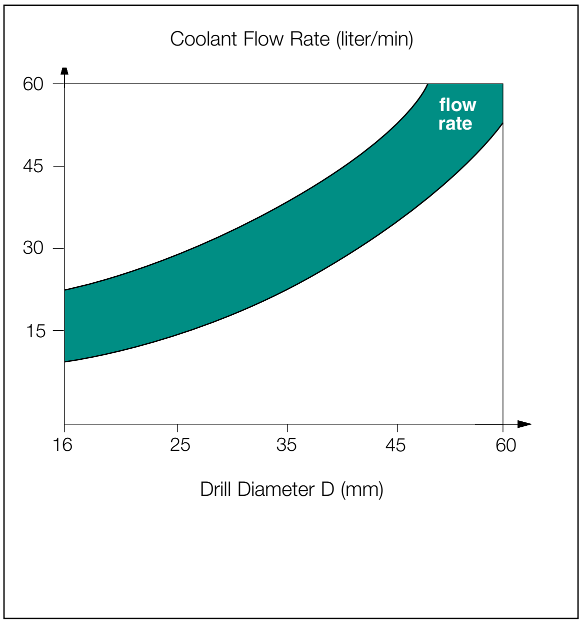
Vc [m/min]	100	150	200
C	1.0	1.5	2.0

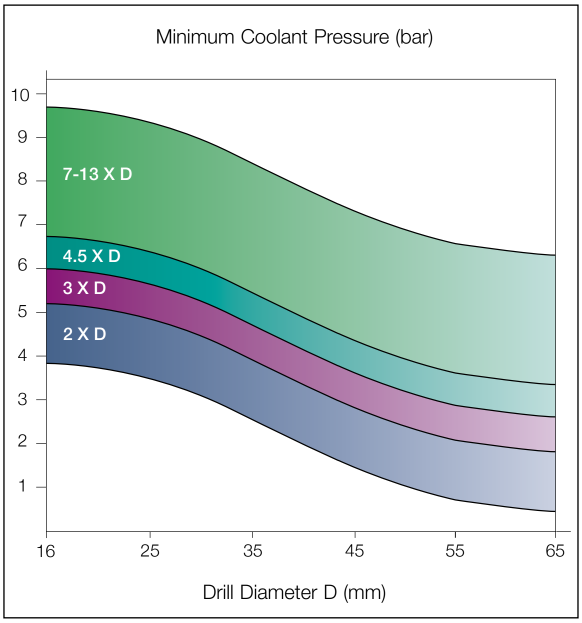
Feed force (thrust force) required, in relation to drill diameter



Required Feed Force
Material: SAE 4140

Internal Coolant Pressure
Selecting Coolant Pressure and Flow Rate

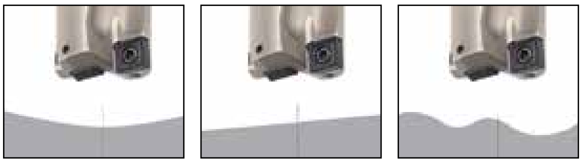




* For special drills more than 4xD, it is recommended to use high coolant pressure 15–70 bar

Troubleshooting

Irregular Conditions for DR Drills



If surface slope exceeds 5°, reduce feed by 50% during penetration or exit.
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.

Regular Conditions for DR Drills

Stacked Plates

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

Apply standard cutting data.

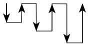
Note: For irregular applications, use **DR** drills with **XOMT** inserts as a first priority.

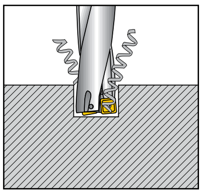
Indexable Insert Drills - Troubleshooting DR Chips

Chip Jamming due to Long Chips

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.

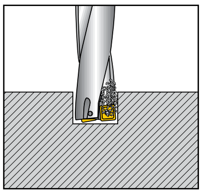




Chip Jamming despite Short Chips

Solutions

1. Increase coolant pressure/volume.
2. Reduce cutting speed.



Chipping Along Cutting Edge

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.

Chipping of Center Insert

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).

Excessive Flank Wear

Solutions

1. Reduce cutting speed.
2. Increase coolant pressure/volume.
3. Choose a better wear resistant grade.

Machine Troubleshooting

Vibrations

Solutions

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.

Insufficient Torque

Solutions

1. Reduce feed.*
2. Choose a geometry with a looser chipformer.

Insufficient Power

Solutions

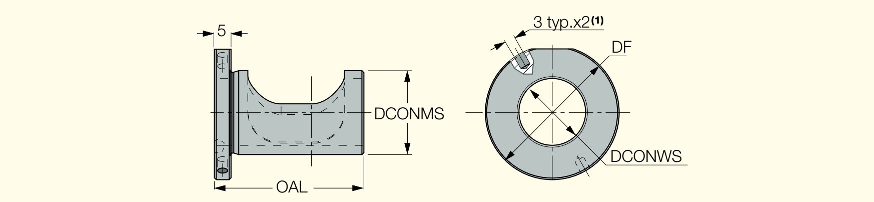
1. Reduce cutting speed.
2. Reduce feed.*
3. Choose a geometry with a looser chipformer.

* Use GF chipformer

Accessories

Drilling Eccenter Sleeves

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

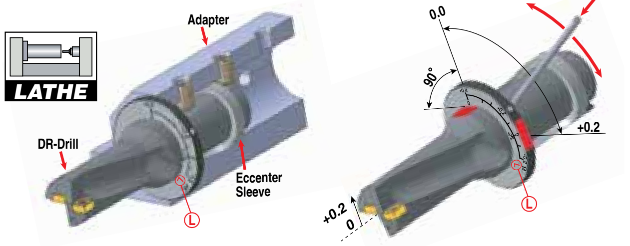


Designation	DCONWS	DCONMS	DF	OAL
ECCENTER SLEEVE 20X25	20.00	25.00	40.00	44.00
ECCENTER SLEEVE 25X32	25.00	32.00	50.00	46.00
ECCENTER SLEEVE 32X40	32.00	40.00	65.00	55.00
ECCENTER SLEEVE 40X50	40.00	50.00	75.00	77.00

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

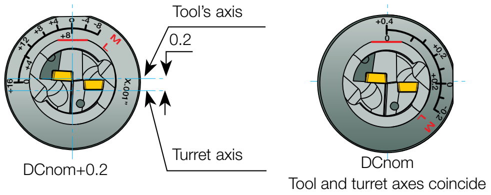
For tools, see pages: DR-2D-N (588) • DR-3D-N (590) • DR-4D-N (591) • DR-4D-T (593) • DR-5D-N (592)

Eccenter Sleeve Operating Instructions

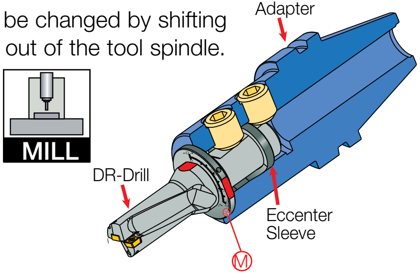


On a lathe the eccenter sleeve can shift the drill's axis to coincide with the spindle axis.
The eccentric sleeve enables alignment of the drill's axis with the spindle axis within a 0.2 mm range (turn the sleeve counterclockwise to raise it).

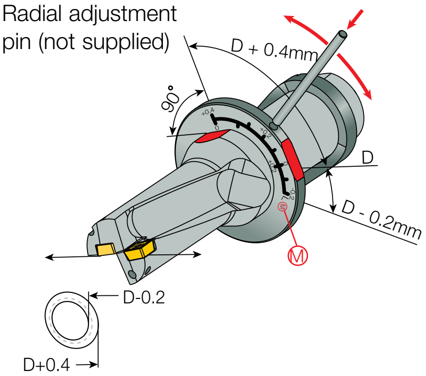
Operation on a Lathe



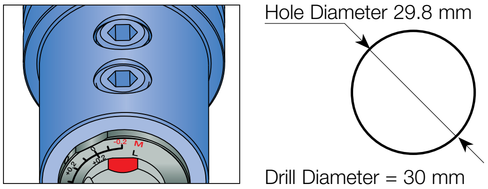
On a milling machine the drill's nominal diameter can be changed by shifting the drill's axis out of the tool spindle.

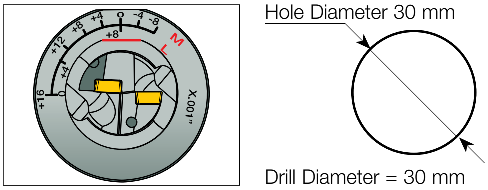


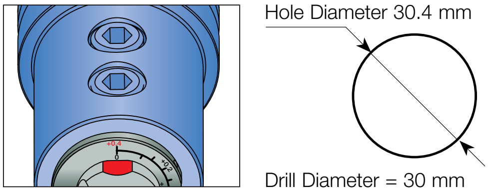
To enlarge the diameter, turn the sleeve clockwise.



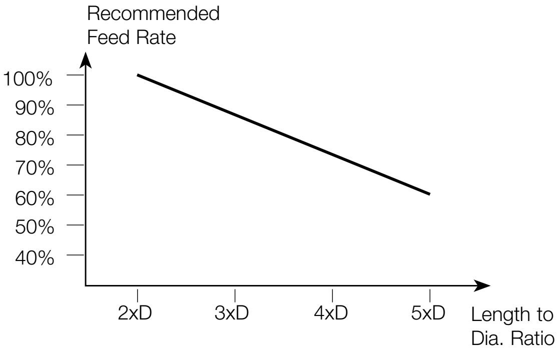
Operation on a Milling Machine







Recommended Feed When Using Eccenter Sleeves



The adjustment markings should be located perpendicular to the flat circumference of the **DR** flange.

To facilitate the rotation of the sleeve, a metal rod or a screw key may be inserted into a hole on the eccentric sleeve flange. Unlock adapter screw before adjusting sleeve.

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 easily to cut materials such as cast iron and low alloyed steel
- Patented chip gullet design

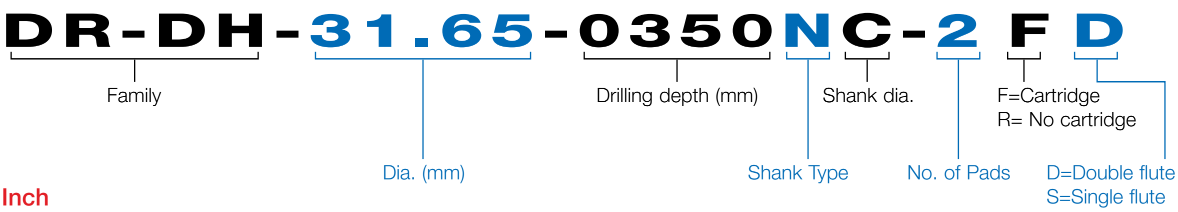
Double Flute

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



Inch

DR-DH-1.500-12.00NC-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...) _______________________ Straightness (mm/100)___________________________

Material

Material (**DIN**, **AISI**, **JIS**...)

Hardness (**HB**, **HS**, **HRC**...)

Condition ☐ Annealed ☐ Quenched ☐ Tempered ☐ Cast ☐ Other

MACHINE

Machine supplier name

Machine type/model ☐ **NC** lathe Machining center ☐ Horizontal ☐ Vertical

Rigidity ☐ Good ☐ Normal ☐ Poor

Spindle power (kW) _________________

Tool and/or workpiece rotation (**TR**/**WR**) ☐ Tool and workpiece ☐ Rotating workpiece (**WR**) ☐ Rotating tool (**TR**)

TYPE OF COOLANT

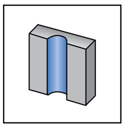
Water based ☐ Soluble ☐ Emulsio _______________%

Oil based ☐ Coolant Pressure (bar) ______________ Coolant Volume (L/min) __________________

Hole Data

Need a pre-hole drill quotation ☐ Pre-drilled hole size _______________% (mm/inch)

Bore Type

①


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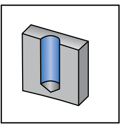

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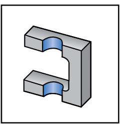

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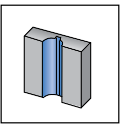

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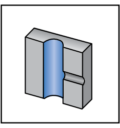

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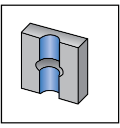

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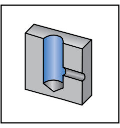

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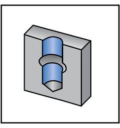

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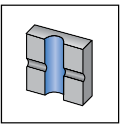
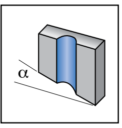


⑩


Please sketch your drilling application

GENERAL PRODUCTION INFORMATION

Quantity of parts per year____

Grade, tool life, etc ____

Cutting data

Perfomance expectation Vc=________m/min N=________RPM F=_______mm/min f=________mm/rev

Description of present system in use ______________________________________

____

____

____

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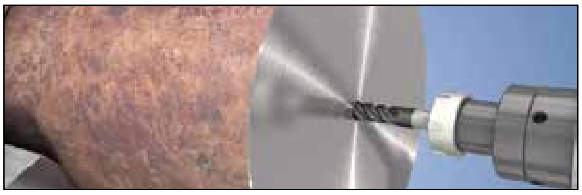
Please fill in and return to your **ISCAR** representative.

User Guide

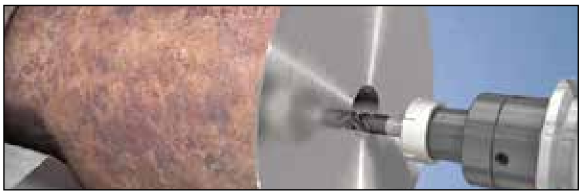
1. A short pre-hole 20 mm long (minimum) with **H8** hole tolerance should be prepared to guide the long drill (a standard **DR** drill or an endmill can be used).

Option No.1

1.1- Penetration with an endmill



2.1- Enlargement with the endmill



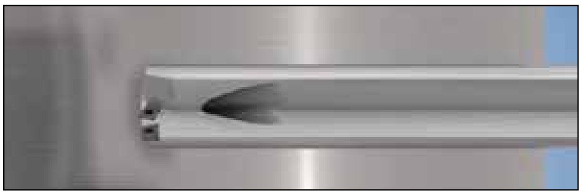
Hole Tolerance H8

Option No.2

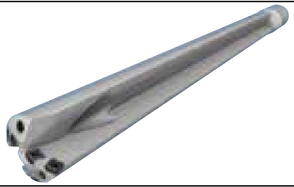
1.2- Penetration by drilling

2.2- **DRG-MF** boring

3- Deep hole drilling with **DR-DH**



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

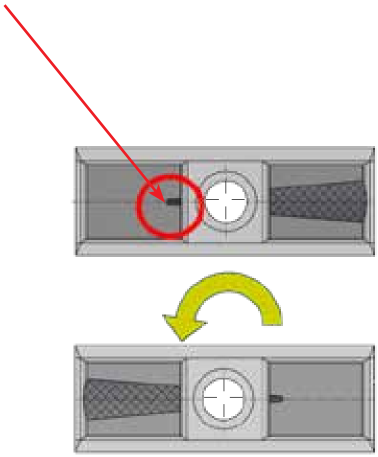
- **DR**-**DH** drills can be used with any type of adaptation. However, concentric adapters such as hydraulic chucks are advantageous for better runout. When machining high temperature alloys or applying very high machining loads, it is advisable to use strong gripping adapters such as: side lock adapters, 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



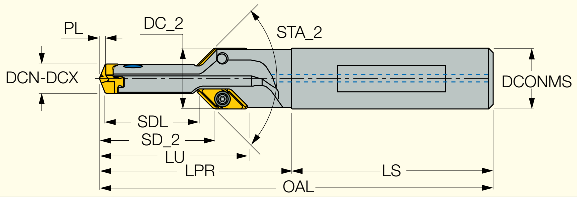
DR-DH Machining Recommendations

ISO	Material		Condition	Tensile Strength Rm [N/mm2]	Hardness HB	Mtl. No.	Cutting Speed vc m/min	Feed mm/rev
P	Non-alloy steel, 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 steel and cast steel (less than 5% 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 alloy 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		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)

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



Designation	DCN[2]	PHD[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	31.7	43.10	88.14	45.0	90.0	1.24	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	36.6	48.00	93.05	45.0	90.0	1.55	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	39.8	53.90	98.86	45.0	90.0	1.86	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	45.1	60.20	108.18	48.0	90.0	2.18	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	49.6	62.50	110.55	48.0	90.0	2.55	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	53.0	66.20	116.18	50.0	90.0	3.18	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	60.3	72.80	128.82	56.0	90.0	3.82	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.
- For user guide and cutting conditions, see page 612

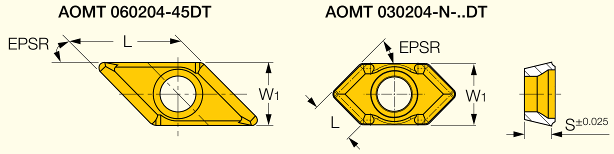
[1] Reduce recommended feed for DCT 6.8 mm drills by 10%
[2] Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body
[3] Pre-thread hole diameter
[4] Cutting diameter maximum
[5] Seat size code
[6] Used for standard thread size

For inserts, see pages: AOMT-Chamfering (611) • IDI-SG (581) • IDI-SK (581)

PRETHREAD

AOMT-Chamfering

Chamfering Inserts



Designation	Dimensions				Tough ↔ Hard		
	L	W1	S	EPSR	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

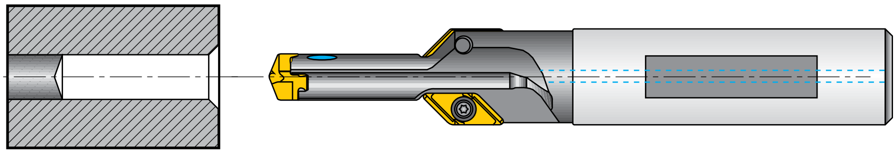
[1] For low carbon steel
[2] Used for specially tailored tools

Pre-Thread DCT Drills

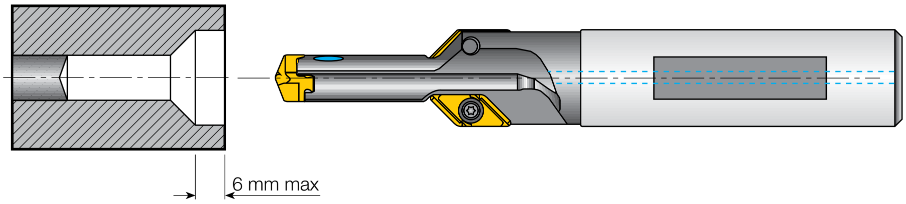
There are two main applications
for pre-thread hole drilling:

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								

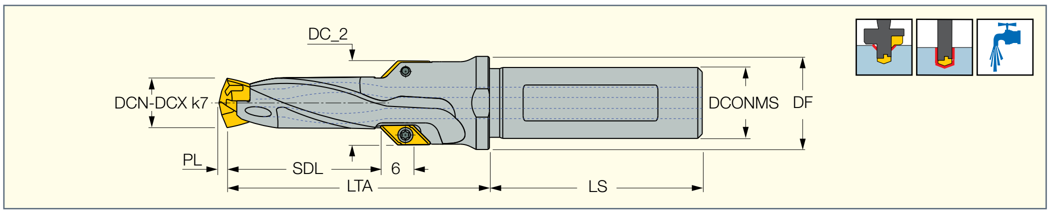
Inch Threads

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)

Indexable 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	1.24	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	1.20	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	1.50	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	1.80	59.20	16.00	21.00	48.0	12.0
DCNT 140-039-16A-M16	14.00	M16	14.00	14.40	21.00	39.00	2.10	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	2.70	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	3.20	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 cutting conditions, see pages 561-563

(1) Pre-thread hole diameter
(2) Used for standard thread size
(3) Cutting diameter minimum
(4) Cutting diameter maximum
(5) Pocket size

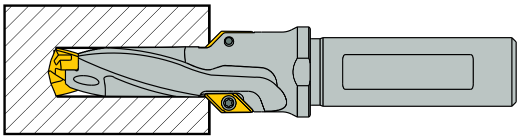
For inserts, see pages: AOMT-Chamfering (611) • FCP (546) • HCP-IQ (542) • ICG (547) • ICK (543) • ICK-2M (545) • ICM (543) • ICN (549) • ICP-2M (545) • QCP-2M (544)

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

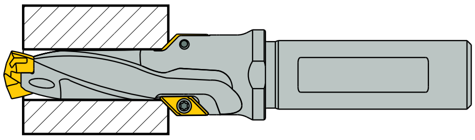
1. Drilling pre-thread blind holes:

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				

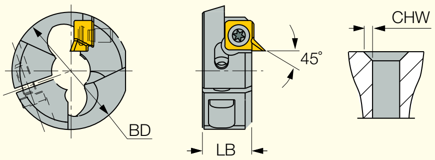
Drill Designation	Dia. Range	UNF Thread	Head Dia.	UNC Thread	Head Dia.	BSW Thread	Head Dia.	BSF Thread	Head Dia.
DCNT 068-021-12A-M8	6.5-6.99								
DCNT 085-026-12A-M10	8.5-8.99	UNF3/8-24	8.5						
DCNT 102-030-16A-M12	10.0-10.99			UNC1/2-13	10.8	BSW1/2-12	10.5	BSF1/2-16	10.99
DCNT 120-035-16A-M14	12.0-12.99			UNC9/16-12	12.3			BSF9/16-16	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 the CHAMDRILL Drills for Drilling and Chamfering in One Operation



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

- RING DCM can be mounted only on DCM 3XD and DCM 5XD drills • For mounting instructions, see page 615

[1] Drill size

[2] Cutting diameter minimum

[3] Cutting diameter maximum

[4] BD=D ring

For inserts, see pages: XOGX-DT (614)

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

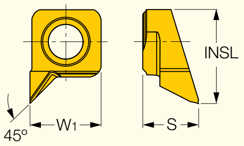
[a] Maximum tightening torque 10(Nm), [88(lb.inch)]

[b] Maximum tightening torque 7(Nm), [62(lb.inch)]

CHAMDRILL

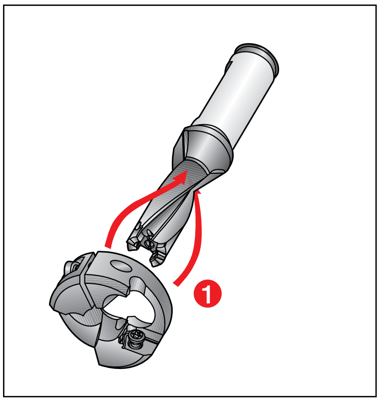
XOGX-DT

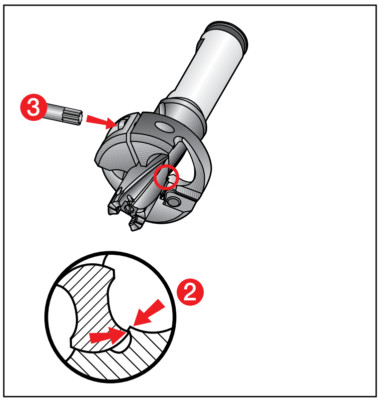
Inserts Used on Chamfering Rings

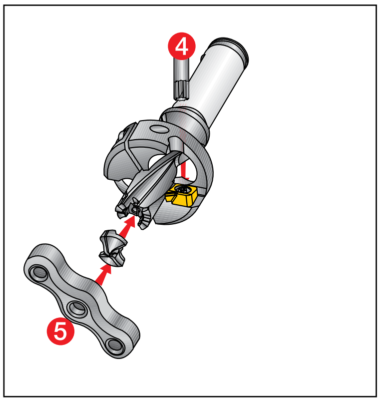


Designation	Dimensions			
	W_1	S	INSL	IC528
XOGX 090700-45DT	9.00	7.00	12.00	●

Chamfer Ring



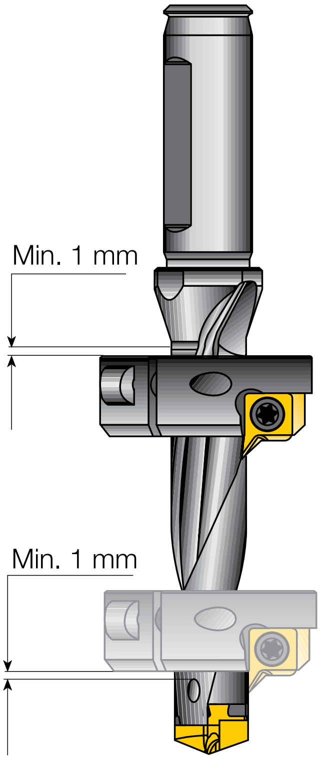




Mounting Instructions

① Insert the chamfer 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 614.
④ Mount the chamfer insert.
⑤ Mount the **CHAMDRILL** head.

NO SETUP TIME!



Chamfer Ring Position Range

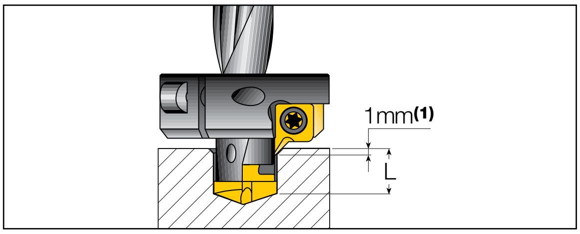
Drill Diameter	Drill Body 3xD L (min-max)	Drill Body 5xD L (min-max)	Maximum Chamfer Size
10	8-16	15-36	1.5
10.5	8-18	17-39	
11	8-19	18-41	
11.5	8-21	20-44	
12	8-22	21-46	
12.5	8-24	23-49	
13	8-25	24-51	
13.5	8-27	26-54	
14	9-29	28-57	
14.5	9-30	29-60	
15	9-31	30-60	
16	9-33	32-65	2.0
17	11-35	34-69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

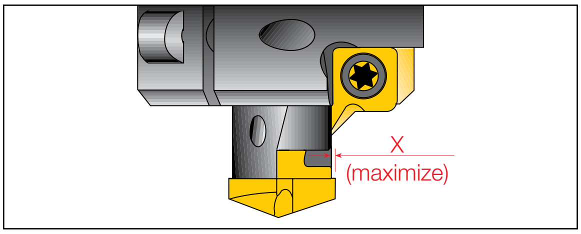
User Guide

Recommendations for better stability:

1. Use 3xD drill instead of 5xD, if possible.
2. Mount the chamfer 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 head 14.6 mm, use body of 14 mm rather than of 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.

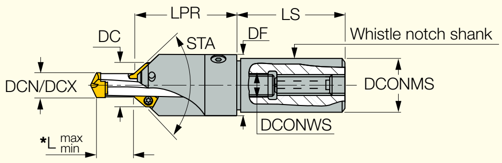




CHAMRING

CHAMRING

Drill Holders for Drilling and Chamfering in One Operation



Designation		DCN	DCX	DCNS 3D		DCM 3.5D		DCNS 5D		DCONWS	DF	DC_2	LPR	LS	DCONMS	Inserts
				L min	L max	L min	L max	L min	L max							
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	12.3	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	38	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	50.8	11	38	25.9	67.3	60	32	XCGT 09...
	DC... 110	11	11.4	14.4	31.4	18	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	38	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	60.8	13	38	27.9	67.3	60	32	XCGT 09...
	DC... 130	13	13.4	17.8	37.6	21.4	38.4	43.8	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	38	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	38	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	58.2	83.6	16	38	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	38	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	38	32.4	67.3	60	32	XCGT 09...
CHAMRING 190-WN32-09	DC... 190	19	19.9	28.3	58.3	32.3	63.3	66.3	96.3	19	38	33.4	75	60	32	XCGT 09...
CHAMRING 200-WN32-09	DC... 200	20	20.9	38.3	68.4	36.6	67.1	78.3	108.3	20	38	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 • Lmin & Lmax dimensions are based on the 45° chamfering insert • Chamfering angle (STA) depends on the chamfering insert being used

For inserts, see pages: XCGT-DT (617)

For UNICHAMDRILLS, see pages: DCM-3.5D (7.5-20.9 mm 3.5xD) (580) , DCNS-3D (533), DCNS-5D (534)

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

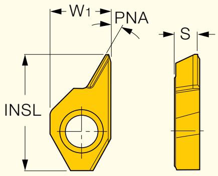
Spare Parts

Designation								
CHAMRING 8-9	SR M6X6DIN916	HW 3.0	SR M6X1S	SW6-T-SH	SR 14-560	T-8/53		
CHAMRING 10-20	SR M10X10DIN916	HW 5.0	SR M10X1.5S	SW6-T-SH	SR 14-544/S		BLD T15/S7	SW6-SD
CHAMRING 21-25	SR M16X16 DIN1835-B	HW 8.0	SR M12X1.75S	SW6-T-SH	SR 14-544/S		BLD T15/S7	SW6-SD

CHAMRING

XCGT-DT

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



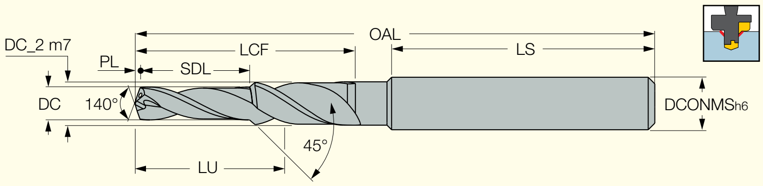
Designation	Dimensions W$_1$	INSL	S	PNA	IC508
XCGT 060300-30DT	6.20	12.30	2.80	30.0	●
XCGT 060300-45DT	6.20	12.30	2.80	45.0	●
XCGT 060300-60DT	6.20	12.30	2.80	60.0	●
XCGT 090300-30DT	8.50	16.00	3.30	30.0	●
XCGT 090300-45DT	8.50	16.00	3.30	45.0	●
XCGT 090300-60DT	8.50	16.00	3.30	60.0	●

SOLIDDRILL

PRETHREAD

SCDT

Pre-Thread Solid Carbide Drills with Coolant Holes



Designation	Dimensions DC	SDL	DCONMS	Th(1)	DC_2	PL	LU	LCF	OAL	LS	IC908
SCDT 025-009-060-M3	2.50	8.8	6.00	M3	4.00	0.45	16.0	20.0	62.00	36.0	●
SCDT 033-011-060-M4	3.30	11.4	6.00	M4	4.50	0.60	19.0	24.0	62.00	36.0	●
SCDT 042-014-060-M5	4.20	13.6	6.00	M5	5.50	0.76	22.0	28.0	66.00	36.0	●
SCDT 050-017-080-M6	5.00	16.5	8.00	M6	6.60	0.91	27.0	34.0	79.00	40.0	●
SCDT 068-021-100-M8	6.80	21.0	10.00	M8	9.00	1.24	38.0	47.0	89.00	40.0	●
SCDT 085-026-120-M10	8.50	25.5	12.00	M10	11.00	1.55	45.0	55.0	102.00	40.0	●

- For user guide and cutting conditions, see pages 651-667

(1) Used for standard thread size

MULTIFUNCTION TOOLS

MULTIFUNCTION TOOLS

DRG-MF

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

Fig. 1

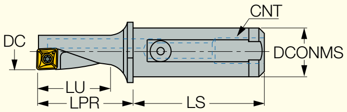
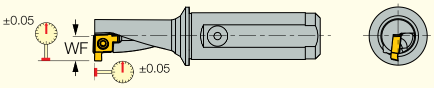


Fig. 2



Right-hand shown

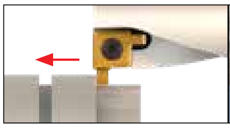
Designation	DC	DMIN	WF	LU	LPR	LS	DCONMS	CNT	Insert	Fig.		
DR-MF-08R/L-2.25D-12A-04	8.00	8.00	-	18.0	22.5	42.0	12.00	G 1/16	XCMT 04...	1	SR 18034/HG-P	IP-6/5
DRG-MF-10R/L-2.25D-12A-05	10.00	12.00	7.10	22.5	27.5	42.0	12.00	G 1/16	XCMT 05...	2	SR 20038/HG-P	IP-6/5
DRG-MF-12R/L-2.25D-16A-06	12.00	14.50	8.50	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

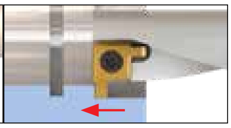
For inserts, see pages: XCMT-MF (619) • XCMT-MG (620)

Typical Applications

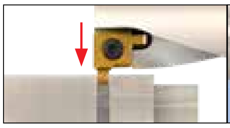
External



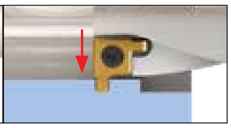
Internal



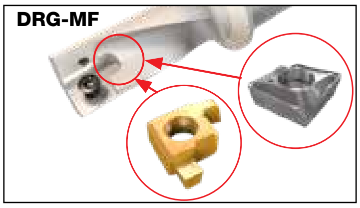
External



Internal



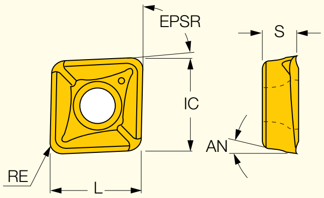
DRG-MF



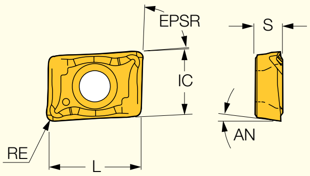
MULTIFUNCTION TOOLS

XCMT-MF

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



XCMT 040104R-MF



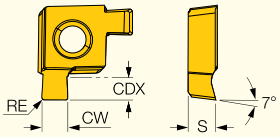
Designation	Dimensions						IC908
	IC	L	S	RE	AN	EPSR	
XCMT 040104R/L-MF	4.40	6.37	1.70	0.40	7.0	83.5	●
XCMT 050204-MF	5.60	5.60	2.10	0.40	7.0	83.5	●
XCMT 060204-MF	6.40	6.40	2.38	0.40	7.0	83.5	●
XCMT 070304-MF	7.50	7.50	3.18	0.40	7.0	83.5	●
XCMT 080304-MF	8.40	8.40	3.18	0.40	7.0	83.5	●
XCMT 10T304-MF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

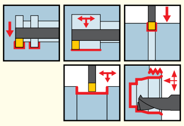
For tools, see pages: DRG-MF (619)

MULTIFUNCTION TOOLS

XCMT-MG

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





Designation	Dimensions					Tough ↔ Hard		Recommended Machining Data	
	CW	CDX[1]	CWTOL[2]	RE	S	IC808	IC808G	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

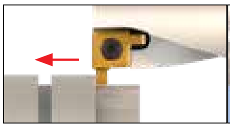
[1] Cutting depth maximum

[2] Cutting width tolerance (+/-)

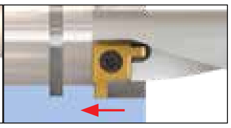
For tools, see pages: DRG-MF (619)

Typical Applications

External



Internal



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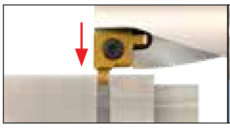
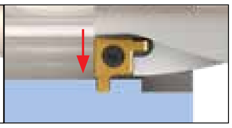
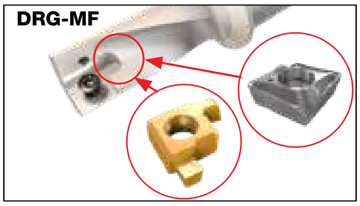


Internal





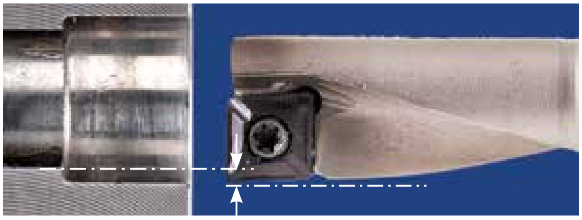
User guide for DRG-MF

Coolant Pressure

- Apply above 6 Bar in 2.**25**xD tools (optimal pressure is above 10 Bar).

Radial Adjustment (off-center drilling)

- Radial adjustment is depending 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.	D_{min}	D_{max}
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

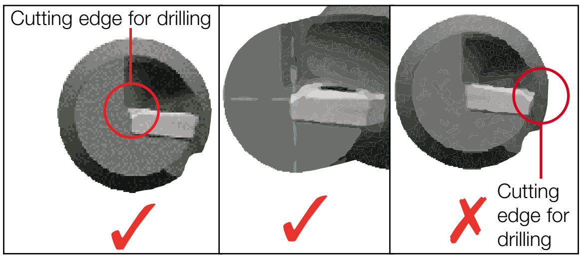
Troubleshooting

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

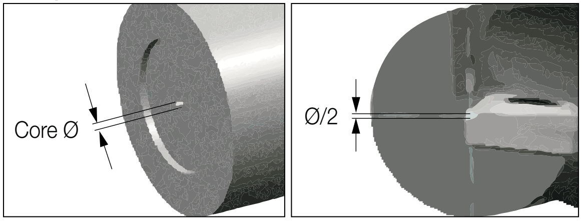
Insert Positioning

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



Correct Correct Wrong

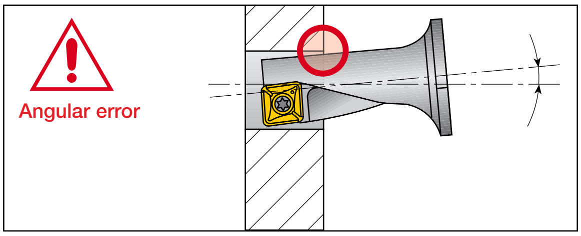
Setup

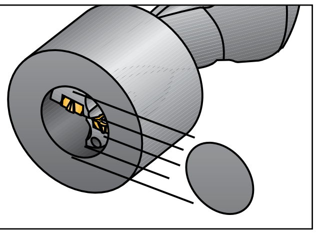


Check formation of core and its size after drilling 3 mm to 6 mm depth.
The diameter of the core should be within 0.15-0.45 mm.
Adjust Y-axis of the tool body by using the new adjustable clamping unit (if it is available) or rotate the tool body 180° and secure it into a turret. Check the core again.

Important: If a core does not appear, this can cause breakage of insert and vibration when drilling or turning.

If the size of the core is over the recommended size, it will cause overload and vibration.





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

Recommended Cutting Conditions for XCMT-MF Inserts

Cutting speed (Vc)

Workpiece Materials	Material No. VDI 3323	Hardness (BHN)	Cutting speed: Vc (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

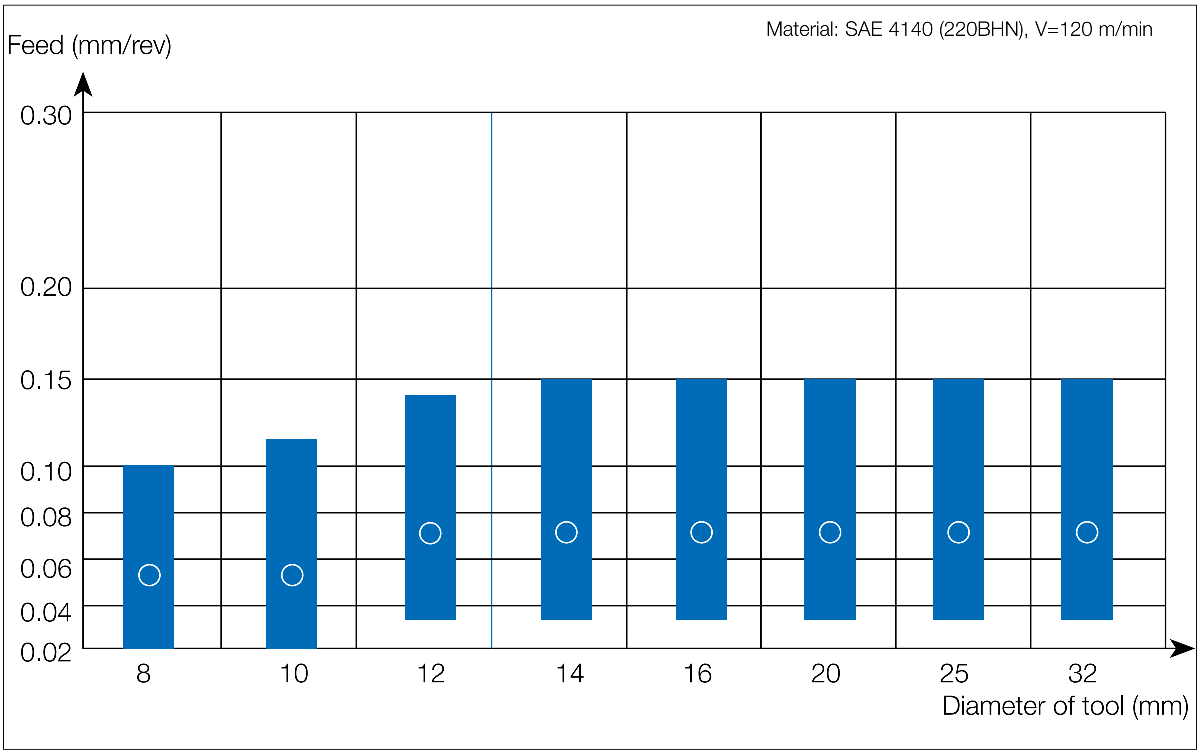
Recommended Cutting Conditions

Insert	Machining Type	Cutting Conditions	
		ap (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)

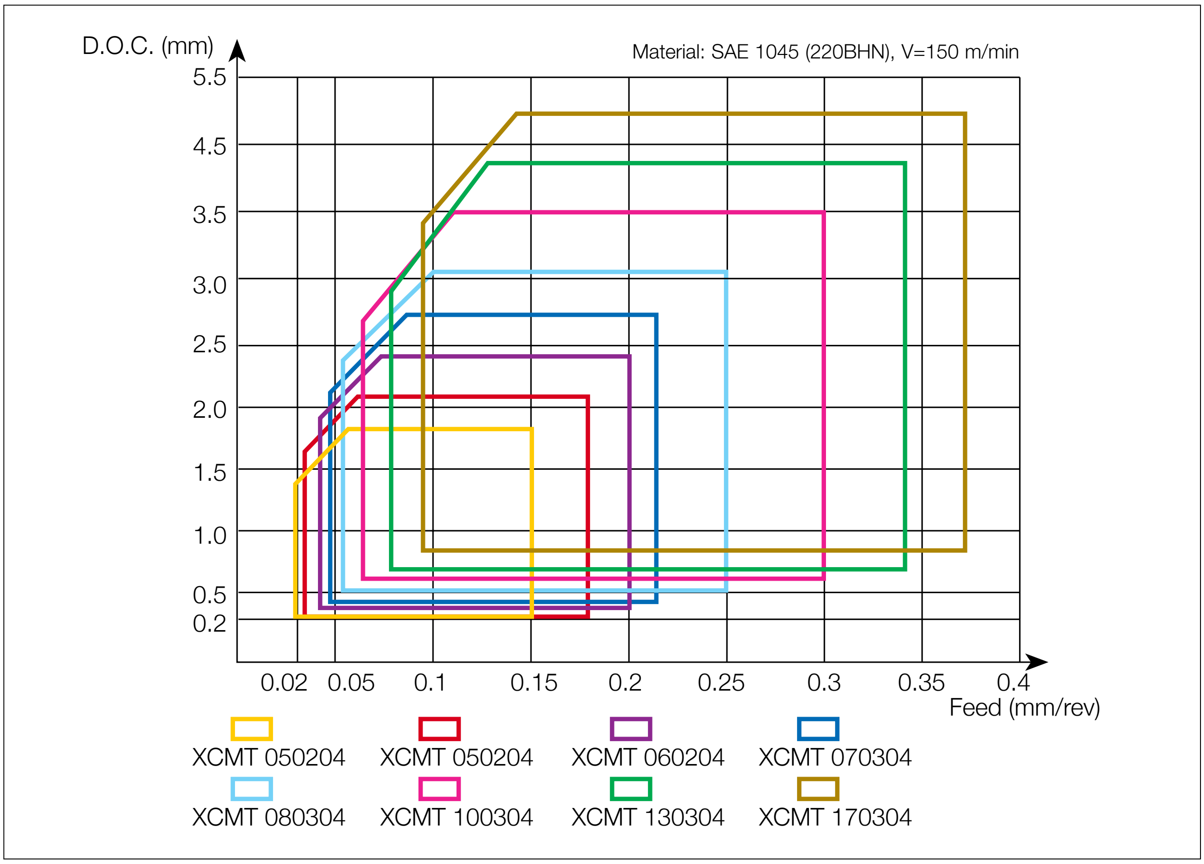
Cutting parameters are for 2.25xD steel shank
Internal coolant supply is recommended

Chip Control Range for DRG-MF

Drilling



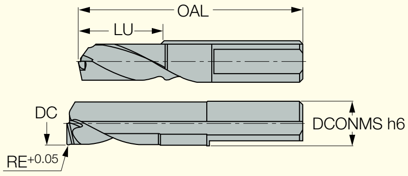
Turning



MULTIFUNCTION ***TOOLS***

PICCO-MF

Multifunction Solid Carbide Tools for Drilling, Facing, Int. and Ext. Turning on Swiss and Small CNC Machines



Right-hand shown

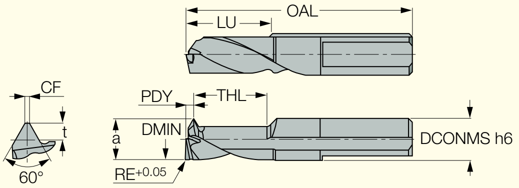
	Dimensions					
Designation	DC	LU	OAL	DCONMS	RE	IC908
PICCO R-MF 6-3 L06	3.00	6.0	28.00	6.00	0.10	●
PICCO R/L-MF 6-4 L08	4.00	8.0	30.00	6.00	0.10	●
PICCO R/L-MF 6-4 L12	4.00	12.0	34.00	6.00	0.20	●
PICCO R/L-MF 6-5 L10	5.00	10.0	32.00	6.00	0.10	●
PICCO R/L-MF 6-5 L15	5.00	15.0	41.00	6.00	0.30	●
PICCO 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, Int. and Ext. Turning and Threading on Swiss and Small CNC Machines

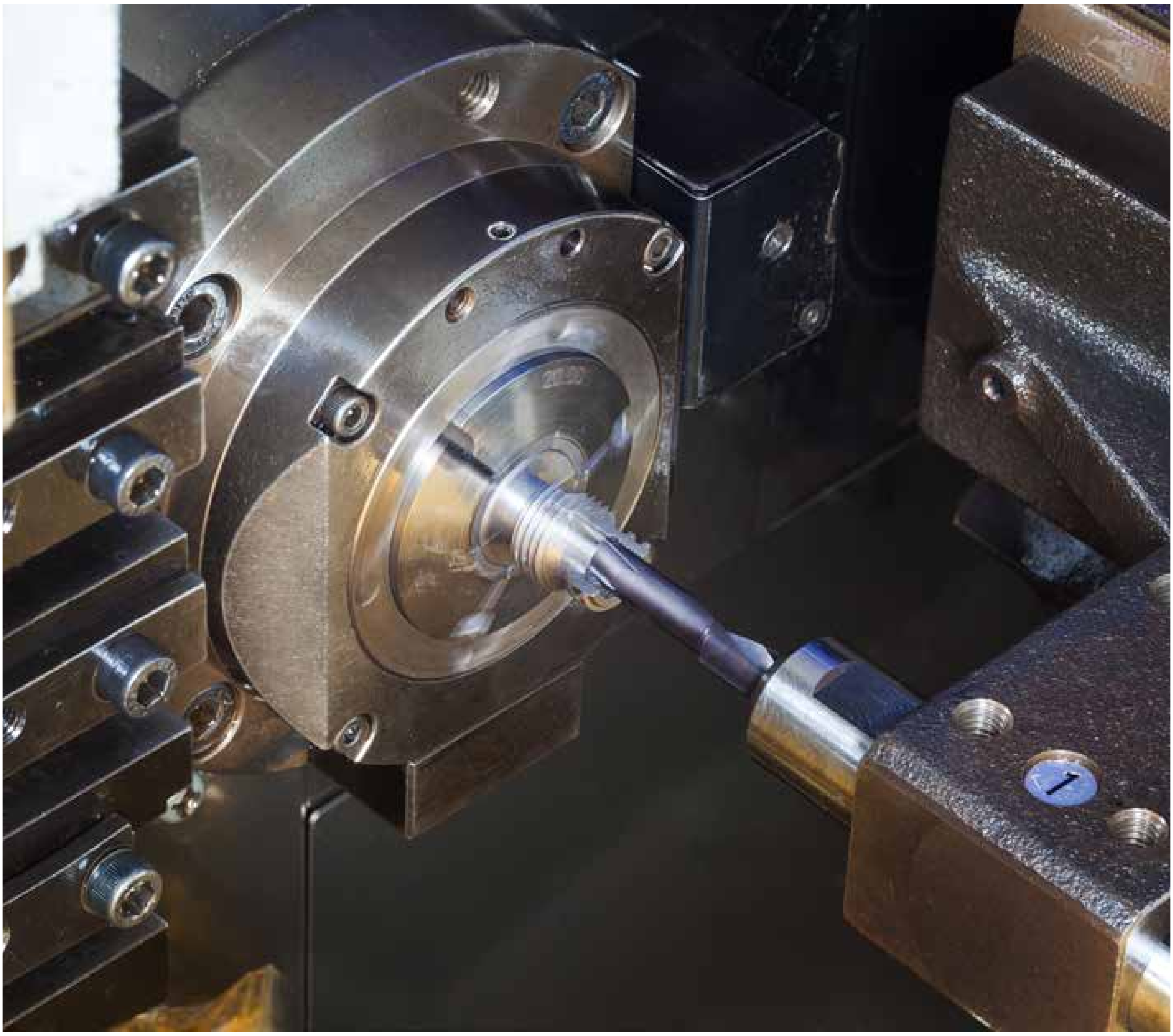


Right-hand shown

	Dimensions												
Designation	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 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 6-5 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-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 6-6 L18	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/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 R/L-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 (Vc)

Workpiece Materials	Material No. VDI 3323	Hardness (BHN)	Cutting Speed: Vc (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 (ap) 2xD

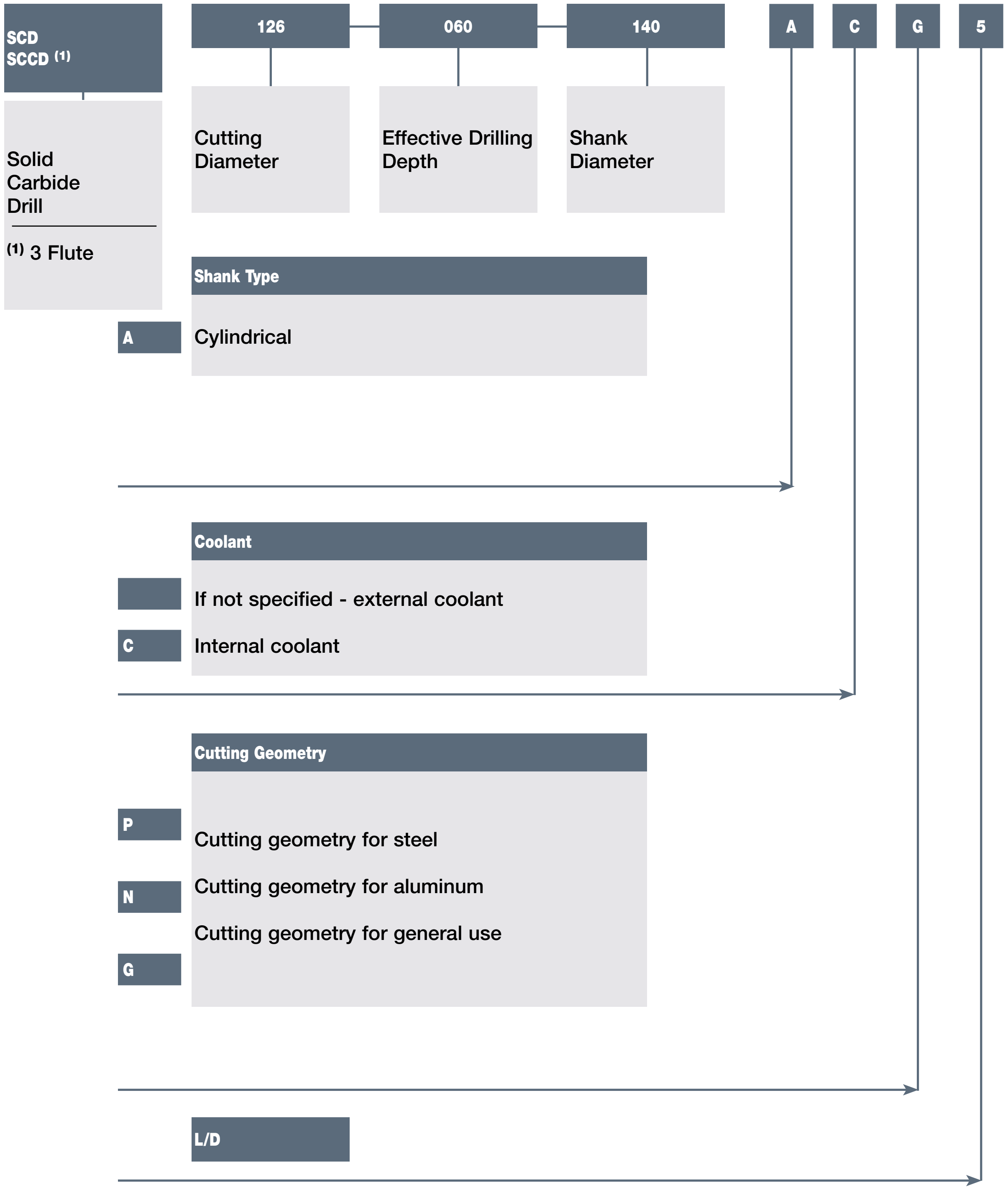
Tool Diameter (mm)	Machining Type	Cutting Conditions	
		ap (mm)	f (mm/rev)
3-4	External Turning	0.8 (0.2-2.5)	0.04 (0.01-0.08)
	Face Turning	0.6 (0.02-1.7)	0.03 (0.01-0.06)
	Drilling	-	0.02 (0.01-0.06)
5-6	External Turning	1.0 (0.2-3.0)	0.04 (0.01-0.08)
	Face Turning	0.8 (0.2-2.5)	0.03 (0.01-0.06)
	Drilling	-	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 (ap) 4xD

Tool Diameter (mm)	Machining Type	Cutting Conditions	
		ap (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



SCD
SCCD (1)

Solid Carbide Drill

(1) 3 Flute

126 – Cutting Diameter

060 – Effective Drilling Depth

140 – Shank Diameter

A **C** **G** **5**

Shank Type

A	Cylindrical

Coolant

	If not specified - external coolant
C	Internal coolant

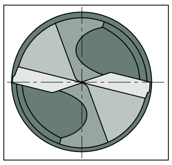
Cutting Geometry

P	Cutting geometry for steel
N	Cutting geometry for aluminum
G	Cutting geometry for general use

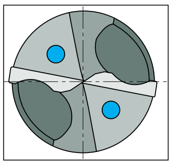
L/D

Cutting Edge Configurations

AP



ACG



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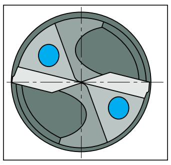
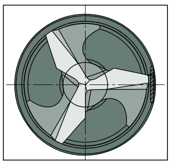
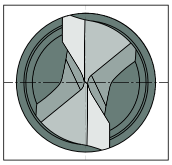


SCCD



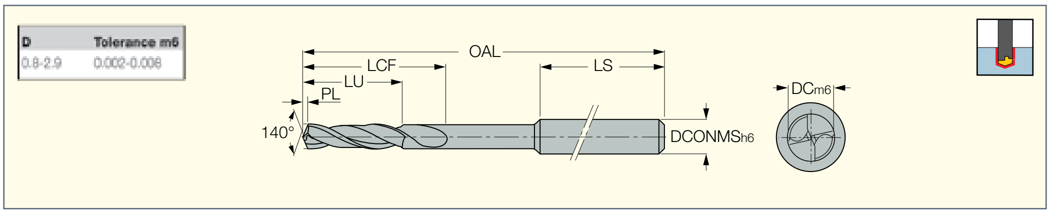
SCD... AH



SOLIDDRILL

SCD-AP4 (4xD)

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



Designation	DC	DCONMS	LU	LCF	LS	OAL	Th[1]	PL	IC908
	Dimensions								
SCD 008-003-030 AP4	0.80	3.00	3.2	4.8	37.2	46.00	-	0.15	●
SCD 009-003-030 AP4	0.90	3.00	3.6	5.4	36.6	46.00	-	0.16	●
SCD 010-004-030 AP4	1.00	3.00	4.0	6.0	36.0	46.00	-	0.18	●
SCD 011-004-030 AP4	1.10	3.00	4.4	6.6	35.4	46.00	M1.4	0.20	●
SCD 012-004-030 AP4	1.20	3.00	4.8	7.2	34.8	46.00	-	0.22	●
SCD 013-005-030 AP4	1.30	3.00	5.2	7.8	34.2	46.00	-	0.24	●
SCD 014-005-030 AP4	1.40	3.00	5.6	8.4	33.6	46.00	-	0.25	●
SCD 015-006-030 AP4	1.50	3.00	6.0	9.0	33.0	46.00	-	0.27	●
SCD 016-006-030 AP4	1.60	3.00	6.4	9.6	32.4	46.00	M2	0.29	●
SCD 017-006-030 AP4	1.70	3.00	6.8	10.2	31.8	46.00	-	0.31	●
SCD 018-007-030 AP4	1.80	3.00	7.2	10.8	31.2	46.00	-	0.33	●
SCD 019-007-030 AP4	1.90	3.00	7.6	11.4	30.6	46.00	-	0.35	●
SCD 020-008-030 AP4	2.00	3.00	8.0	12.0	44.0	60.00	-	0.36	●
SCD 021-008-030 AP4	2.10	3.00	8.4	12.6	43.4	60.00	-	0.38	●
SCD 022-008-030 AP4	2.20	3.00	8.8	13.2	42.8	60.00	-	0.40	●
SCD 023-009-030 AP4	2.30	3.00	9.2	13.8	42.2	60.00	-	0.42	●
SCD 024-009-030 AP4	2.40	3.00	9.6	14.4	41.6	60.00	-	0.44	●
SCD 025-010-030 AP4	2.50	3.00	10.0	15.0	41.0	60.00	M3	0.45	●
SCD 026-010-030 AP4	2.60	3.00	10.4	15.6	40.4	60.00	-	0.47	●
SCD 027-010-030 AP4	2.70	3.00	10.8	16.2	39.8	60.00	-	0.49	●
SCD 028-011-030 AP4	2.80	3.00	11.2	16.8	39.2	60.00	-	0.51	●
SCD 029-011-030 AP4	2.90	3.00	11.6	17.4	38.6	60.00	M3.5	0.53	●

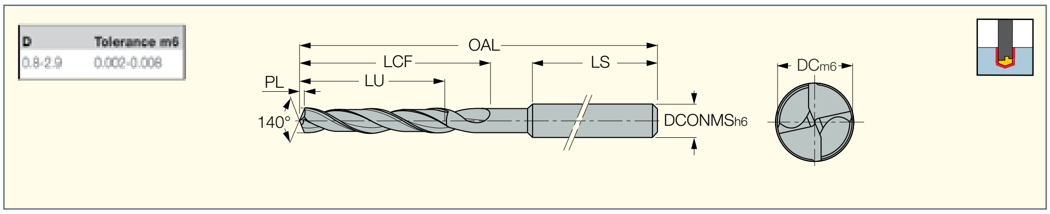
- For user guide and cutting conditions, see pages 651-667
- For regrinding instructions, see pages 662-666

(1) Used for standard thread size

SOLIDDRILL

SCD-AP6 (6xD)

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



Designation	DC	DCONMS	LU	LCF	LS	OAL	Th[1]	PL	IC908
	Dimensions								
SCD 008-004-030 AP6	0.80	3.00	4.8	6.4	35.5	46.00	-	0.15	●
SCD 009-005-030 AP6	0.90	3.00	5.4	7.2	34.5	46.00	-	0.16	●
SCD 010-006-030 AP6	1.00	3.00	6.0	8.0	33.8	46.00	-	0.18	●
SCD 011-006-030 AP6	1.10	3.00	6.6	8.8	33.0	46.00	M1.4	0.20	●
SCD 012-007-030 AP6	1.20	3.00	7.2	9.6	32.3	46.00	-	0.22	●
SCD 013-007-030 AP6	1.30	3.00	7.8	10.4	31.5	46.00	-	0.24	●
SCD 014-008-030 AP6	1.40	3.00	8.4	11.2	30.8	46.00	-	0.25	●
SCD 015-009-030 AP6	1.50	3.00	9.0	12.0	30.0	46.00	-	0.27	●
SCD 016-009-030 AP6	1.60	3.00	9.6	12.8	29.3	46.00	M2	0.29	●
SCD 017-010-030 AP6	1.70	3.00	10.2	13.6	42.5	60.00	-	0.31	●
SCD 018-010-030 AP6	1.80	3.00	10.8	14.4	41.8	60.00	-	0.33	●
SCD 019-011-030 AP6	1.90	3.00	11.4	15.2	41.1	60.00	-	0.35	●
SCD 020-012-030 AP6	2.00	3.00	12.0	16.0	40.3	60.00	-	0.36	●
SCD 021-012-030 AP6	2.10	3.00	12.6	16.8	39.6	60.00	-	0.38	●
SCD 022-013-030 AP6	2.20	3.00	13.2	17.6	38.9	60.00	-	0.40	●
SCD 023-013-030 AP6	2.30	3.00	13.8	18.4	38.2	60.00	-	0.42	●
SCD 024-014-030 AP6	2.40	3.00	14.4	19.2	37.5	60.00	-	0.44	●
SCD 025-015-030 AP6	2.50	3.00	15.0	20.0	36.8	60.00	M3	0.45	●
SCD 026-015-030 AP6	2.60	3.00	15.6	20.8	36.1	60.00	-	0.47	●
SCD 027-016-030 AP6	2.70	3.00	16.2	21.6	35.5	60.00	-	0.49	●
SCD 028-016-030 AP6	2.80	3.00	16.8	22.4	34.8	60.00	-	0.51	●
SCD 029-017-030 AP6	2.90	3.00	17.4	23.2	34.4	60.00	M3.5	0.53	●

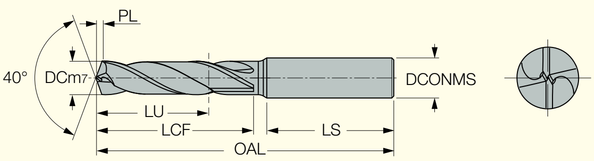
- For user guide and cutting conditions, see pages 651-667
- For regrinding instructions, see pages 662-666

(1) Used for standard thread size

SOLIDDRILL

SCD-AP3N (3xD)

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



Designation	Dimensions								IC908
	DC	DCONMS	OAL	LU	LCF	PL	LS	Th[1]	
SCD 030-014-060 AP3N	3.00	6.00	62.00	14.0	20.0	0.50	34.0	-	●
SCD 031-014-060 AP3N	3.10	6.00	62.00	14.0	20.0	0.50	34.0	-	●
SCD 032-014-060 AP3N	3.20	6.00	62.00	14.0	20.0	0.50	34.0	-	●
SCD 033-014-060 AP3N	3.30	6.00	62.00	14.0	20.0	0.50	34.0	M4	●
SCD 034-014-060 AP3N	3.40	6.00	62.00	14.0	20.0	0.50	34.0	-	●
SCD 035-014-060 AP3N	3.50	6.00	62.00	14.0	20.0	0.60	34.0	-	●
SCD 036-014-060 AP3N	3.60	6.00	62.00	14.0	20.0	0.60	34.0	-	●
SCD 037-014-060 AP3N	3.70	6.00	62.00	14.0	20.0	0.60	34.0	-	●
SCD 038-017-060 AP3N	3.80	6.00	66.00	17.0	24.0	0.60	35.0	-	●
SCD 039-017-060 AP3N	3.90	6.00	66.00	17.0	24.0	0.60	35.0	-	●
SCD 040-017-060 AP3N	4.00	6.00	66.00	17.0	24.0	0.60	35.0	-	●
SCD 041-017-060 AP3N	4.10	6.00	66.00	17.0	24.0	0.70	35.0	-	●
SCD 042-017-060 AP3N	4.20	6.00	66.00	17.0	24.0	0.70	35.0	M5	●
SCD 043-017-060 AP3N	4.30	6.00	66.00	17.0	24.0	0.70	35.0	-	●
SCD 044-017-060 AP3N	4.40	6.00	66.00	17.0	24.0	0.70	35.0	-	●
SCD 045-017-060 AP3N	4.50	6.00	66.00	17.0	24.0	0.70	35.0	-	●
SCD 046-017-060 AP3N	4.60	6.00	66.00	17.0	24.0	0.70	35.0	-	●
SCD 047-017-060 AP3N	4.70	6.00	66.00	17.0	24.0	0.80	35.0	-	●
SCD 048-020-060 AP3N	4.80	6.00	66.00	20.0	28.0	0.80	36.0	-	●
SCD 049-020-060 AP3N	4.90	6.00	66.00	20.0	28.0	0.80	36.0	-	●
SCD 050-020-060 AP3N	5.00	6.00	66.00	20.0	28.0	0.80	36.0	M6	●
SCD 051-020-060 AP3N	5.10	6.00	66.00	20.0	28.0	0.80	36.0	-	●
SCD 052-020-060 AP3N	5.20	6.00	66.00	20.0	28.0	0.80	36.0	-	●
SCD 053-020-060 AP3N	5.30	6.00	66.00	20.0	28.0	0.80	36.0	-	●
SCD 054-020-060 AP3N	5.40	6.00	66.00	20.0	28.0	0.80	36.0	-	●
SCD 055-020-060 AP3N	5.50	6.00	66.00	20.0	28.0	0.90	36.0	-	●
SCD 056-020-060 AP3N	5.60	6.00	66.00	20.0	28.0	0.90	36.0	-	●
SCD 057-020-060 AP3N	5.70	6.00	66.00	20.0	28.0	0.90	36.0	-	●
SCD 058-020-060 AP3N	5.80	6.00	66.00	20.0	28.0	0.90	36.0	-	●
SCD 059-020-060 AP3N	5.90	6.00	66.00	20.0	28.0	0.90	36.0	-	●
SCD 060-020-060 AP3N	6.00	6.00	66.00	20.0	28.0	0.90	36.0	M7	●
SCD 061-024-080 AP3N	6.10	8.00	79.00	24.0	34.0	1.00	36.0	-	●
SCD 062-024-080 AP3N	6.20	8.00	79.00	24.0	34.0	1.00	36.0	-	●
SCD 063-024-080 AP3N	6.30	8.00	79.00	24.0	34.0	1.00	36.0	-	●
SCD 064-024-080 AP3N	6.40	8.00	79.00	24.0	34.0	1.00	36.0	-	●
SCD 065-024-080 AP3N	6.50	8.00	79.00	24.0	34.0	1.00	36.0	-	●
SCD 066-024-080 AP3N	6.60	8.00	79.00	24.0	34.0	1.00	36.0	-	●
SCD 067-024-080 AP3N	6.70	8.00	79.00	24.0	34.0	1.10	36.0	-	●
SCD 068-024-080 AP3N	6.80	8.00	79.00	24.0	34.0	1.10	36.0	M8	●
SCD 069-024-080 AP3N	6.90	8.00	79.00	24.0	34.0	1.10	36.0	-	●
SCD 070-024-080 AP3N	7.00	8.00	79.00	24.0	34.0	1.10	36.0	-	●
SCD 071-029-080 AP3N	7.10	8.00	79.00	29.0	41.0	1.10	36.0	-	●
SCD 072-029-080 AP3N	7.20	8.00	79.00	29.0	41.0	1.10	36.0	-	●
SCD 073-029-080 AP3N	7.30	8.00	79.00	29.0	41.0	1.10	36.0	-	●
SCD 074-029-080 AP3N	7.40	8.00	79.00	29.0	41.0	1.20	36.0	-	●
SCD 075-029-080 AP3N	7.50	8.00	79.00	29.0	41.0	1.20	36.0	-	●
SCD 076-029-080 AP3N	7.60	8.00	79.00	29.0	41.0	1.20	36.0	-	●
SCD 077-029-080 AP3N	7.70	8.00	79.00	29.0	41.0	1.20	36.0	-	●
SCD 078-029-080 AP3N	7.80	8.00	79.00	29.0	41.0	1.20	36.0	M9	●
SCD 079-029-080 AP3N	7.90	8.00	79.00	29.0	41.0	1.30	36.0	-	●
SCD 080-029-080 AP3N	8.00	8.00	79.00	29.0	41.0	1.30	36.0	-	●
SCD 081-035-100 AP3N	8.10	10.00	89.00	35.0	47.0	1.30	40.0	-	●
SCD 082-035-100 AP3N	8.20	10.00	89.00	35.0	47.0	1.30	40.0	-	●
SCD 083-035-100 AP3N	8.30	10.00	89.00	35.0	47.0	1.30	40.0	-	●
SCD 084-035-100 AP3N	8.40	10.00	89.00	35.0	47.0	1.30	40.0	-	●
SCD 085-035-100 AP3N	8.50	10.00	89.00	35.0	47.0	1.30	40.0	M10	●
SCD 086-035-100 AP3N	8.60	10.00	89.00	35.0	47.0	1.40	40.0	-	●
SCD 087-035-100 AP3N	8.70	10.00	89.00	35.0	47.0	1.40	40.0	-	●
SCD 088-035-100 AP3N	8.80	10.00	89.00	35.0	47.0	1.40	40.0	-	●
SCD 089-035-100 AP3N	8.90	10.00	89.00	35.0	47.0	1.40	40.0	-	●
SCD 090-035-100 AP3N	9.00	10.00	89.00	35.0	47.0	1.40	40.0	-	●

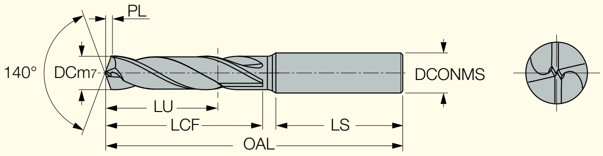
- For user guide and cutting conditions, see pages 651-667
- For regrinding instructions, see pages 662-666

(1) Used for standard thread size.

SOLIDDRILL

SCD-AP3N (3xD) (continued)

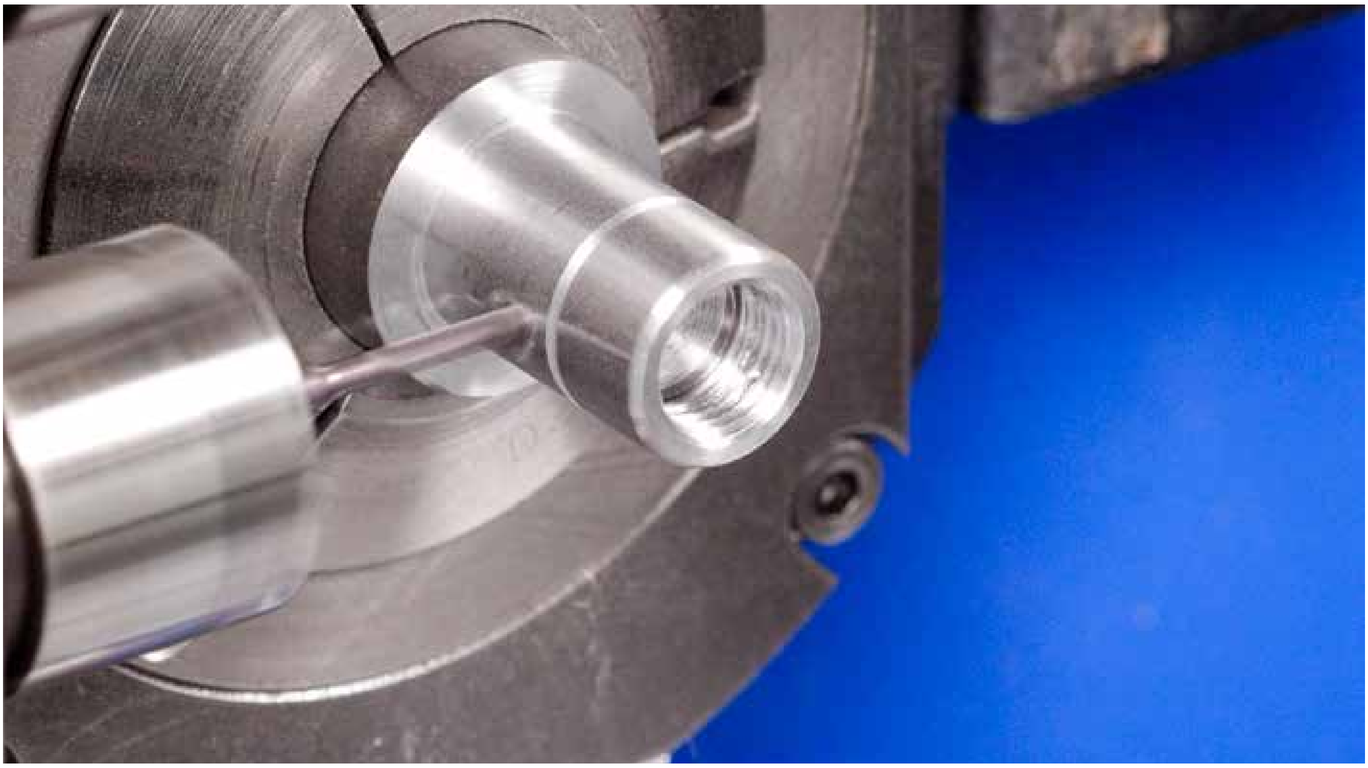
DIN 6537 Solid Carbide Drills Without Coolant Holes, Drilling Depth 3xD



	Dimensions								
Designation	DC	DCONMS	OAL	LU	LCF	PL	LS	Th(1)	IC908
SCD 091-035-100 AP3N	9.10	10.00	89.00	35.0	47.0	1.40	40.0	-	●
SCD 092-035-100 AP3N	9.20	10.00	89.00	35.0	47.0	1.40	40.0	-	●
SCD 093-035-100 AP3N	9.30	10.00	89.00	35.0	47.0	1.50	40.0	-	●
SCD 094-035-100 AP3N	9.40	10.00	89.00	35.0	47.0	1.50	40.0	-	●
SCD 095-035-100 AP3N	9.50	10.00	89.00	35.0	47.0	1.50	40.0	M11	●
SCD 096-035-100 AP3N	9.60	10.00	89.00	35.0	47.0	1.50	40.0	-	●
SCD 097-035-100 AP3N	9.70	10.00	89.00	35.0	47.0	1.50	40.0	-	●
SCD 098-035-100 AP3N	9.80	10.00	89.00	35.0	47.0	1.60	40.0	-	●
SCD 099-035-100 AP3N	9.90	10.00	89.00	35.0	47.0	1.60	40.0	-	●
SCD 100-035-100 AP3N	10.00	10.00	89.00	35.0	47.0	1.60	40.0	-	●
SCD 101-040-120 AP3N	10.10	12.00	101.00	40.0	55.0	1.60	45.0	-	●
SCD 102-040-120 AP3N	10.20	12.00	101.00	40.0	55.0	1.60	45.0	M12	●
SCD 103-040-120 AP3N	10.30	12.00	101.00	40.0	55.0	1.60	45.0	-	●
SCD 104-040-120 AP3N	10.40	12.00	101.00	40.0	55.0	1.60	45.0	-	●
SCD 105-040-120 AP3N	10.50	12.00	101.00	40.0	55.0	1.60	45.0	-	●
SCD 106-040-120 AP3N	10.60	12.00	101.00	40.0	55.0	1.70	45.0	-	●
SCD 107-040-120 AP3N	10.70	12.00	101.00	40.0	55.0	1.70	45.0	-	●
SCD 108-040-120 AP3N	10.80	12.00	101.00	40.0	55.0	1.70	45.0	-	●
SCD 109-040-120 AP3N	10.90	12.00	101.00	40.0	55.0	1.70	45.0	-	●
SCD 110-040-120 AP3N	11.00	12.00	101.00	40.0	55.0	1.70	45.0	-	●
SCD 111-040-120 AP3N	11.10	12.00	101.00	40.0	55.0	1.70	45.0	-	●
SCD 112-040-120 AP3N	11.20	12.00	101.00	40.0	55.0	1.80	45.0	-	●
SCD 113-040-120 AP3N	11.30	12.00	101.00	40.0	55.0	1.80	45.0	-	●
SCD 114-040-120 AP3N	11.40	12.00	101.00	40.0	55.0	1.80	45.0	-	●
SCD 115-040-120 AP3N	11.50	12.00	101.00	40.0	55.0	1.80	45.0	-	●
SCD 116-040-120 AP3N	11.60	12.00	101.00	40.0	55.0	1.80	45.0	-	●
SCD 117-040-120 AP3N	11.70	12.00	101.00	40.0	55.0	1.90	45.0	-	●
SCD 118-040-120 AP3N	11.80	12.00	101.00	40.0	55.0	1.90	45.0	-	●
SCD 119-040-120 AP3N	11.90	12.00	101.00	40.0	55.0	1.90	45.0	-	●
SCD 120-040-120 AP3N	12.00	12.00	101.00	40.0	55.0	1.90	45.0	M14	●

- For user guide and cutting conditions, see pages 651-667
- For regrinding instructions, see pages 662-666

(1) Used for standard thread size.

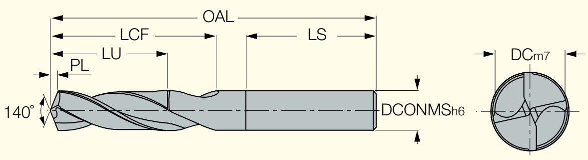


SOLIDDRILL

SCD-AP3 (3xD)

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

D	Tolerance m7
3.00- 6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



	Dimensions								
Designation	DC	DCONMS	LU	LCF	OAL	LS	Th(1)	PL	IC908
SCD 121-043-140 AP3	12.10	14.00	43.0	60.0	107.00	45.0	-	2.20	●
SCD 122-043-140 AP3	12.20	14.00	43.0	60.0	107.00	45.0	-	2.22	●
SCD 123-043-140 AP3	12.30	14.00	43.0	60.0	107.00	45.0	-	2.24	●
SCD 124-043-140 AP3	12.40	14.00	43.0	60.0	107.00	45.0	-	2.26	●
SCD 125-043-140 AP3	12.50	14.00	43.0	60.0	107.00	45.0	-	2.27	●
SCD 126-043-140 AP3	12.60	14.00	43.0	60.0	107.00	45.0	-	2.29	●
SCD 127-043-140 AP3	12.70	14.00	43.0	60.0	107.00	45.0	-	2.31	●
SCD 128-043-140 AP3	12.80	14.00	43.0	60.0	107.00	45.0	-	2.33	●
SCD 129-043-140 AP3	12.90	14.00	43.0	60.0	107.00	45.0	-	2.35	●
SCD 130-043-140 AP3	13.00	14.00	43.0	60.0	107.00	45.0	-	2.37	●
SCD 131-043-140 AP3	13.10	14.00	43.0	60.0	107.00	45.0	-	2.38	●
SCD 132-043-140 AP3	13.20	14.00	43.0	60.0	107.00	45.0	-	2.40	●
SCD 133-043-140 AP3	13.30	14.00	43.0	60.0	107.00	45.0	-	2.42	●
SCD 135-043-140 AP3	13.50	14.00	43.0	60.0	107.00	45.0	-	2.46	●
SCD 136-043-140 AP3	13.60	14.00	43.0	60.0	107.00	45.0	-	2.47	●
SCD 137-043-140 AP3	13.70	14.00	43.0	60.0	107.00	45.0	-	2.49	●
SCD 138-043-140 AP3	13.80	14.00	43.0	60.0	107.00	45.0	-	2.51	●
SCD 139-043-140 AP3	13.90	14.00	43.0	60.0	107.00	45.0	-	2.53	●
SCD 140-043-140 AP3	14.00	14.00	43.0	60.0	107.00	45.0	M16	2.55	●
SCD 141-045-160 AP3	14.10	16.00	45.0	65.0	115.00	45.0	-	2.57	●
SCD 142-045-160 AP3	14.20	16.00	45.0	65.0	115.00	45.0	-	2.58	●
SCD 143-045-160 AP3	14.30	16.00	45.0	65.0	115.00	45.0	-	2.60	●
SCD 144-045-160 AP3	14.40	16.00	45.0	65.0	115.00	45.0	-	2.62	●
SCD 145-045-160 AP3	14.50	16.00	45.0	65.0	115.00	45.0	-	2.64	●
SCD 146-045-160 AP3	14.60	16.00	45.0	65.0	115.00	45.0	-	2.66	●
SCD 147-045-160 AP3	14.70	16.00	45.0	65.0	115.00	45.0	-	2.68	●
SCD 148-045-160 AP3	14.80	16.00	45.0	65.0	115.00	45.0	-	2.69	●
SCD 149-045-160 AP3	14.90	16.00	45.0	65.0	115.00	45.0	-	2.71	●
SCD 150-045-160 AP3	15.00	16.00	45.0	65.0	115.00	45.0	-	2.73	●
SCD 151-045-160 AP3	15.10	16.00	45.0	65.0	115.00	45.0	-	2.75	●
SCD 152-045-160 AP3	15.20	16.00	45.0	65.0	115.00	45.0	-	2.77	●
SCD 153-045-160 AP3	15.30	16.00	45.0	65.0	115.00	45.0	-	2.78	●
SCD 154-045-160 AP3	15.40	16.00	45.0	65.0	115.00	45.0	-	2.80	●
SCD 155-045-160 AP3	15.50	16.00	45.0	65.0	115.00	45.0	M18	2.82	●
SCD 156-045-160 AP3	15.60	16.00	45.0	65.0	115.00	45.0	-	2.84	●
SCD 157-045-160 AP3	15.70	16.00	45.0	65.0	115.00	45.0	-	2.86	●
SCD 158-045-160 AP3	15.80	16.00	45.0	65.0	115.00	45.0	-	2.88	●
SCD 159-045-160 AP3	15.90	16.00	45.0	65.0	115.00	45.0	-	2.89	●
SCD 160-045-160 AP3	16.00	16.00	45.0	65.0	115.00	45.0	-	2.91	●
SCD 161-051-180 AP3	16.10	18.00	51.0	73.0	123.00	48.0	-	2.93	●
SCD 162-051-180 AP3	16.20	18.00	51.0	73.0	123.00	48.0	-	2.95	●
SCD 164-051-180 AP3	16.40	18.00	51.0	73.0	123.00	48.0	-	2.98	●
SCD 165-051-180 AP3	16.50	18.00	51.0	73.0	123.00	48.0	-	3.00	●
SCD 166-051-180 AP3	16.60	18.00	51.0	73.0	123.00	48.0	-	3.02	●
SCD 167-051-180 AP3	16.70	18.00	51.0	73.0	123.00	48.0	-	3.04	●
SCD 168-051-180 AP3	16.80	18.00	51.0	73.0	123.00	48.0	-	3.06	●
SCD 170-051-180 AP3	17.00	18.00	51.0	73.0	123.00	48.0	-	3.09	●
SCD 171-051-180 AP3	17.10	18.00	51.0	73.0	123.00	48.0	-	3.11	●
SCD 172-051-180 AP3	17.20	18.00	51.0	73.0	123.00	48.0	-	3.13	●
SCD 173-051-180 AP3	17.30	18.00	51.0	73.0	123.00	48.0	-	3.15	●
SCD 174-051-180 AP3	17.40	18.00	51.0	73.0	123.00	48.0	-	3.17	●
SCD 175-051-180 AP3	17.50	18.00	51.0	73.0	123.00	48.0	M20	3.18	●
SCD 176-051-180 AP3	17.60	18.00	51.0	73.0	123.00	48.0	-	3.20	●
SCD 177-051-180 AP3	17.70	18.00	51.0	73.0	123.00	48.0	-	3.22	●
SCD 178-051-180 AP3	17.80	18.00	51.0	73.0	123.00	48.0	-	3.24	●
SCD 179-051-180 AP3	17.90	18.00	51.0	73.0	123.00	48.0	-	3.26	●
SCD 180-051-180 AP3	18.00	18.00	51.0	73.0	123.00	48.0	-	3.28	●
SCD 181-055-200 AP3	18.10	20.00	55.0	79.0	131.00	48.0	-	3.29	●
SCD 182-055-200 AP3	18.20	20.00	55.0	79.0	131.00	48.0	-	3.31	●

• For user guide and cutting conditions, see pages 651-667 • For regrinding instructions, see pages 662-666

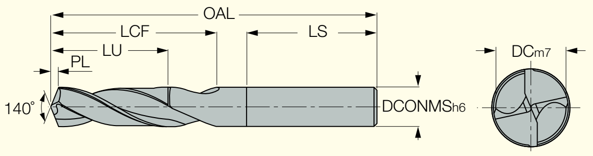
(1) Used for standard thread size.

SOLIDDRILL

SCD-AP3 (3xD) (continued)

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

D	Tolerance m7
3.00- 6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC908
	DC	DCONMS	LU	LCF	OAL	LS	Th(1)	PL	
SCD 183-055-200 AP3	18.30	20.00	55.0	79.0	131.00	48.0	-	3.33	●
SCD 184-055-200 AP3	18.40	20.00	55.0	79.0	131.00	48.0	-	3.35	●
SCD 185-055-200 AP3	18.50	20.00	55.0	79.0	131.00	48.0	-	3.37	●
SCD 187-055-200 AP3	18.70	20.00	55.0	79.0	131.00	48.0	-	3.40	●
SCD 188-055-200 AP3	18.80	20.00	55.0	79.0	131.00	48.0	-	3.42	●
SCD 189-055-200 AP3	18.90	20.00	55.0	79.0	131.00	48.0	-	3.44	●
SCD 190-055-200 AP3	19.00	20.00	55.0	79.0	131.00	48.0	-	3.46	●
SCD 191-055-200 AP3	19.10	20.00	55.0	79.0	131.00	48.0	-	3.48	●
SCD 192-055-200 AP3	19.20	20.00	55.0	79.0	131.00	48.0	-	3.49	●
SCD 193-055-200 AP3	19.30	20.00	55.0	79.0	131.00	48.0	-	3.51	●
SCD 194-055-200 AP3	19.40	20.00	55.0	79.0	131.00	48.0	-	3.53	●
SCD 195-055-200 AP3	19.50	20.00	55.0	79.0	131.00	48.0	M22	3.55	●
SCD 197-055-200 AP3	19.70	20.00	55.0	79.0	131.00	48.0	-	3.59	●
SCD 198-055-200 AP3	19.80	20.00	55.0	79.0	131.00	48.0	-	3.60	●
SCD 199-055-200 AP3	19.90	20.00	55.0	79.0	131.00	48.0	-	3.62	●
SCD 200-055-200 AP3	20.00	20.00	55.0	79.0	131.00	48.0	-	3.64	●

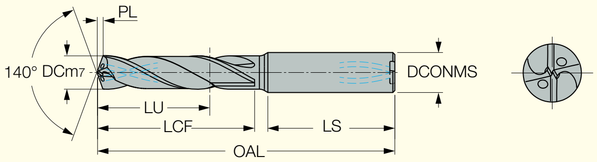
- For user guide and cutting conditions, see pages 651-667 • For regrinding instructions, see pages 662-666

(1) Used for standard thread size.

SOLIDDRILL

SCD-ACP3N (3XD)

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



	Dimensions								
Designation	**DC**	**DCONMS**	**OAL**	**LU**	**LCF**	**PL**	**LS**	**Th(1)**	**IC908**
SCD 030-014-060 ACP3N	3.00	6.00	62.00	14.0	20.0	0.50	34.0	-	●
SCD 031-014-060 ACP3N	3.10	6.00	62.00	14.0	20.0	0.50	34.0	-	●
SCD 032-014-060 ACP3N	3.20	6.00	62.00	14.0	20.0	0.50	34.0	-	●
SCD 033-014-060 ACP3N	3.30	6.00	62.00	14.0	20.0	0.50	34.0	M4	●
SCD 034-014-060 ACP3N	3.40	6.00	62.00	14.0	20.0	0.50	34.0	-	●
SCD 035-014-060 ACP3N	3.50	6.00	62.00	14.0	20.0	0.60	34.0	-	●
SCD 036-014-060 ACP3N	3.60	6.00	62.00	14.0	20.0	0.60	34.0	-	●
SCD 037-014-060 ACP3N	3.70	6.00	62.00	14.0	20.0	0.60	34.0	-	●
SCD 038-017-060 ACP3N	3.80	6.00	66.00	17.0	24.0	0.60	35.0	-	●
SCD 039-017-060 ACP3N	3.90	6.00	66.00	17.0	24.0	0.60	35.0	-	●
SCD 040-017-060 ACP3N	4.00	6.00	66.00	17.0	24.0	0.60	35.0	-	●
SCD 041-017-060 ACP3N	4.10	6.00	66.00	17.0	24.0	0.70	35.0	-	●
SCD 042-017-060 ACP3N	4.20	6.00	66.00	17.0	24.0	0.70	35.0	M5	●
SCD 043-017-060 ACP3N	4.30	6.00	66.00	17.0	24.0	0.70	35.0	-	●
SCD 044-017-060 ACP3N	4.40	6.00	66.00	17.0	24.0	0.70	35.0	-	●
SCD 045-017-060 ACP3N	4.50	6.00	66.00	17.0	24.0	0.70	35.0	-	●
SCD 046-017-060 ACP3N	4.60	6.00	66.00	17.0	24.0	0.70	35.0	-	●
SCD 047-017-060 ACP3N	4.70	6.00	66.00	17.0	24.0	0.80	35.0	-	●
SCD 048-020-060 ACP3N	4.80	6.00	66.00	20.0	28.0	0.80	36.0	-	●
SCD 049-020-060 ACP3N	4.90	6.00	66.00	20.0	28.0	0.80	36.0	-	●
SCD 050-020-060 ACP3N	5.00	6.00	66.00	20.0	28.0	0.80	36.0	M6	●
SCD 051-020-060 ACP3N	5.10	6.00	66.00	20.0	28.0	0.80	36.0	-	●
SCD 052-020-060 ACP3N	5.20	6.00	66.00	20.0	28.0	0.80	36.0	-	●
SCD 053-020-060 ACP3N	5.30	6.00	66.00	20.0	28.0	0.80	36.0	-	●
SCD 054-020-060 ACP3N	5.40	6.00	66.00	20.0	28.0	0.80	36.0	-	●
SCD 055-020-060 ACP3N	5.50	6.00	66.00	20.0	28.0	0.90	36.0	-	●
SCD 056-020-060 ACP3N	5.60	6.00	66.00	20.0	28.0	0.90	36.0	-	●
SCD 057-020-060 ACP3N	5.70	6.00	66.00	20.0	28.0	0.90	36.0	-	●
SCD 058-020-060 ACP3N	5.80	6.00	66.00	20.0	28.0	0.90	36.0	-	●
SCD 059-020-060 ACP3N	5.90	6.00	66.00	20.0	28.0	0.90	36.0	-	●
SCD 060-020-060 ACP3N	6.00	6.00	66.00	20.0	28.0	0.90	36.0	M7	●
SCD 061-024-080 ACP3N	6.10	8.00	79.00	24.0	34.0	1.00	36.0	-	●
SCD 062-024-080 ACP3N	6.20	8.00	79.00	24.0	34.0	1.00	36.0	-	●
SCD 063-024-080 ACP3N	6.30	8.00	79.00	24.0	34.0	1.00	36.0	-	●
SCD 064-024-080 ACP3N	6.40	8.00	79.00	24.0	34.0	1.00	36.0	-	●
SCD 065-024-080 ACP3N	6.50	8.00	79.00	24.0	34.0	1.00	36.0	-	●
SCD 066-024-080 ACP3N	6.60	8.00	79.00	24.0	34.0	1.00	36.0	-	●
SCD 067-024-080 ACP3N	6.70	8.00	79.00	24.0	34.0	1.10	36.0	-	●
SCD 068-024-080 ACP3N	6.80	8.00	79.00	24.0	34.0	1.10	36.0	M8	●
SCD 069-024-080 ACP3N	6.90	8.00	79.00	24.0	34.0	1.10	36.0	-	●
SCD 070-024-080 ACP3N	7.00	8.00	79.00	24.0	34.0	1.10	36.0	-	●
SCD 071-029-080 ACP3N	7.10	8.00	79.00	29.0	41.0	1.10	36.0	-	●
SCD 072-029-080 ACP3N	7.20	8.00	79.00	29.0	41.0	1.10	36.0	-	●
SCD 073-029-080 ACP3N	7.30	8.00	79.00	29.0	41.0	1.10	36.0	-	●
SCD 074-029-080 ACP3N	7.40	8.00	79.00	29.0	41.0	1.20	36.0	-	●
SCD 075-029-080 ACP3N	7.50	8.00	79.00	29.0	41.0	1.20	36.0	-	●
SCD 076-029-080 ACP3N	7.60	8.00	79.00	29.0	41.0	1.20	36.0	-	●
SCD 077-029-080 ACP3N	7.70	8.00	79.00	29.0	41.0	1.20	36.0	-	●
SCD 078-029-080 ACP3N	7.80	8.00	79.00	29.0	41.0	1.20	36.0	M9	●
SCD 079-029-080 ACP3N	7.90	8.00	79.00	29.0	41.0	1.30	36.0	-	●
SCD 080-029-080 ACP3N	8.00	8.00	79.00	29.0	41.0	1.30	36.0	-	●
SCD 081-035-100 ACP3N	8.10	10.00	89.00	35.0	47.0	1.30	40.0	-	●
SCD 082-035-100 ACP3N	8.20	10.00	89.00	35.0	47.0	1.30	40.0	-	●
SCD 083-035-100 ACP3N	8.30	10.00	89.00	35.0	47.0	1.30	40.0	-	●
SCD 084-035-100 ACP3N	8.40	10.00	89.00	35.0	47.0	1.30	40.0	-	●
SCD 085-035-100 ACP3N	8.50	10.00	89.00	35.0	47.0	1.30	40.0	M10	●
SCD 086-035-100 ACP3N	8.60	10.00	89.00	35.0	47.0	1.40	40.0	-	●
SCD 087-035-100 ACP3N	8.70	10.00	89.00	35.0	47.0	1.40	40.0	-	●
SCD 088-035-100 ACP3N	8.80	10.00	89.00	35.0	47.0	1.40	40.0	-	●
SCD 089-035-100 ACP3N	8.90	10.00	89.00	35.0	47.0	1.40	40.0	-	●

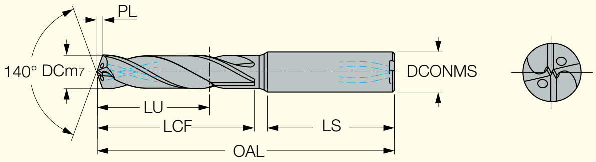
• For user guide and cutting conditions, see pages 651-667 • For regrinding instructions, see pages 662-666

(1) Used for standard thread size.

SOLIDDRILL

SCD-ACP3N (3XD) (continued)

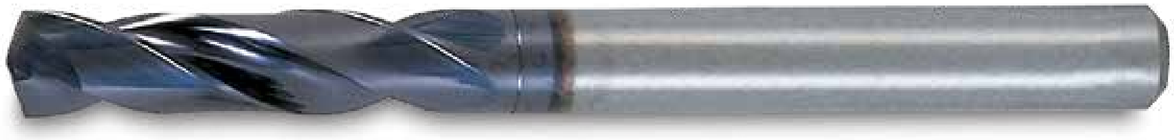
DIN 6537 Solid Carbide Drills with Coolant Holes, Drilling Depth 3xD



Designation	Dimensions								IC908
	DC	DCONMS	OAL	LU	LCF	PL	LS	Th(1)	
SCD 090-035-100 ACP3N	9.00	10.00	89.00	35.0	47.0	1.40	40.0	-	●
SCD 091-035-100 ACP3N	9.10	10.00	89.00	35.0	47.0	1.40	40.0	-	●
SCD 092-035-100 ACP3N	9.20	10.00	89.00	35.0	47.0	1.40	40.0	-	●
SCD 093-035-100 ACP3N	9.30	10.00	89.00	35.0	47.0	1.50	40.0	-	●
SCD 094-035-100 ACP3N	9.40	10.00	89.00	35.0	47.0	1.50	40.0	-	●
SCD 095-035-100 ACP3N	9.50	10.00	89.00	35.0	47.0	1.50	40.0	M11	●
SCD 096-035-100 ACP3N	9.60	10.00	89.00	35.0	47.0	1.50	40.0	-	●
SCD 097-035-100 ACP3N	9.70	10.00	89.00	35.0	47.0	1.50	40.0	-	●
SCD 098-035-100 ACP3N	9.80	10.00	89.00	35.0	47.0	1.60	40.0	-	●
SCD 099-035-100 ACP3N	9.90	10.00	89.00	35.0	47.0	1.60	40.0	-	●
SCD 100-035-100 ACP3N	10.00	10.00	89.00	35.0	47.0	1.60	40.0	-	●
SCD 101-040-120 ACP3N	10.10	12.00	102.00	40.0	55.0	1.60	45.0	-	●
SCD 102-040-120 ACP3N	10.20	12.00	102.00	40.0	55.0	1.60	45.0	M12	●
SCD 103-040-120 ACP3N	10.30	12.00	102.00	40.0	55.0	1.60	45.0	-	●
SCD 104-040-120 ACP3N	10.40	12.00	102.00	40.0	55.0	1.60	45.0	-	●
SCD 105-040-120 ACP3N	10.50	12.00	102.00	40.0	55.0	1.60	45.0	-	●
SCD 106-040-120 ACP3N	10.60	12.00	102.00	40.0	55.0	1.70	45.0	-	●
SCD 107-040-120 ACP3N	10.70	12.00	102.00	40.0	55.0	1.70	45.0	-	●
SCD 108-040-120 ACP3N	10.80	12.00	102.00	40.0	55.0	1.70	45.0	-	●
SCD 109-040-120 ACP3N	10.90	12.00	102.00	40.0	55.0	1.70	45.0	-	●
SCD 110-040-120 ACP3N	11.00	12.00	102.00	40.0	55.0	1.70	45.0	-	●
SCD 111-040-120 ACP3N	11.10	12.00	102.00	40.0	55.0	1.70	45.0	-	●
SCD 112-040-120 ACP3N	11.20	12.00	102.00	40.0	55.0	1.80	45.0	-	●
SCD 113-040-120 ACP3N	11.30	12.00	102.00	40.0	55.0	1.80	45.0	-	●
SCD 114-040-120 ACP3N	11.40	12.00	102.00	40.0	55.0	1.80	45.0	-	●
SCD 115-040-120 ACP3N	11.50	12.00	102.00	40.0	55.0	1.80	45.0	-	●
SCD 116-040-120 ACP3N	11.60	12.00	102.00	40.0	55.0	1.80	45.0	-	●
SCD 117-040-120 ACP3N	11.70	12.00	102.00	40.0	55.0	1.90	45.0	-	●
SCD 118-040-120 ACP3N	11.80	12.00	102.00	40.0	55.0	1.90	45.0	-	●
SCD 119-040-120 ACP3N	11.90	12.00	102.00	40.0	55.0	1.90	45.0	-	●
SCD 120-040-120 ACP3N	12.00	12.00	102.00	40.0	55.0	1.90	45.0	M14	●

- For user guide and cutting conditions, see pages 651-667 • For regrinding instructions, see pages 662-666

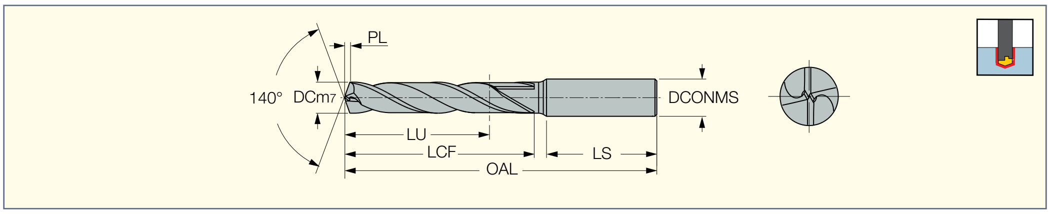
(1) Used for standard thread size.



SOLIDDRILL

SCD-AP5N (5xD)

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



	Dimensions								
Designation	DC	DCONMS	OAL	LU	LCF	PL	LS	Th(1)	IC908
SCD 030-023-060 AP5N	3.00	6.00	66.00	23.0	28.0	0.50	34.0	-	●
SCD 031-023-060 AP5N	3.10	6.00	66.00	23.0	28.0	0.50	34.0	-	●
SCD 032-023-060 AP5N	3.20	6.00	66.00	23.0	28.0	0.50	34.0	-	●
SCD 033-023-060 AP5N	3.30	6.00	66.00	23.0	28.0	0.50	34.0	M4	●
SCD 034-023-060 AP5N	3.40	6.00	66.00	23.0	28.0	0.50	34.0	-	●
SCD 035-023-060 AP5N	3.50	6.00	66.00	23.0	28.0	0.60	34.0	-	●
SCD 036-023-060 AP5N	3.60	6.00	66.00	23.0	28.0	0.60	34.0	-	●
SCD 037-023-060 AP5N	3.70	6.00	66.00	23.0	28.0	0.60	34.0	-	●
SCD 038-029-060 AP5N	3.80	6.00	74.00	29.0	36.0	0.60	35.0	-	●
SCD 039-029-060 AP5N	3.90	6.00	74.00	29.0	36.0	0.60	35.0	-	●
SCD 040-029-060 AP5N	4.00	6.00	74.00	29.0	36.0	0.60	35.0	-	●
SCD 041-029-060 AP5N	4.10	6.00	74.00	29.0	36.0	0.70	35.0	-	●
SCD 042-029-060 AP5N	4.20	6.00	74.00	29.0	36.0	0.70	35.0	M5	●
SCD 043-029-060 AP5N	4.30	6.00	74.00	29.0	36.0	0.70	35.0	-	●
SCD 044-029-060 AP5N	4.40	6.00	74.00	29.0	36.0	0.70	35.0	-	●
SCD 045-029-060 AP5N	4.50	6.00	74.00	29.0	36.0	0.70	35.0	-	●
SCD 046-029-060 AP5N	4.60	6.00	74.00	29.0	36.0	0.70	35.0	-	●
SCD 047-029-060 AP5N	4.70	6.00	74.00	29.0	36.0	0.80	35.0	-	●
SCD 048-035-060 AP5N	4.80	6.00	74.00	35.0	44.0	0.80	36.0	-	●
SCD 049-035-060 AP5N	4.90	6.00	82.00	35.0	44.0	0.80	36.0	-	●
SCD 050-035-060 AP5N	5.00	6.00	82.00	35.0	44.0	0.80	36.0	M6	●
SCD 051-035-060 AP5N	5.10	6.00	82.00	35.0	44.0	0.80	36.0	-	●
SCD 052-035-060 AP5N	5.20	6.00	82.00	35.0	44.0	0.80	36.0	-	●
SCD 053-035-060 AP5N	5.30	6.00	82.00	35.0	44.0	0.80	36.0	-	●
SCD 054-035-060 AP5N	5.40	6.00	82.00	35.0	44.0	0.80	36.0	-	●
SCD 055-035-060 AP5N	5.50	6.00	82.00	35.0	44.0	0.90	36.0	-	●
SCD 056-035-060 AP5N	5.60	6.00	82.00	35.0	44.0	0.90	36.0	-	●
SCD 057-035-060 AP5N	5.70	6.00	82.00	35.0	44.0	0.90	36.0	-	●
SCD 058-035-060 AP5N	5.80	6.00	82.00	35.0	44.0	0.90	36.0	-	●
SCD 059-035-060 AP5N	5.90	6.00	82.00	35.0	44.0	0.90	36.0	-	●
SCD 060-035-060 AP5N	6.00	6.00	82.00	35.0	44.0	0.90	36.0	M7	●
SCD 061-043-080 AP5N	6.10	8.00	91.00	43.0	53.0	1.00	36.0	-	●
SCD 062-043-080 AP5N	6.20	8.00	91.00	43.0	53.0	1.00	36.0	-	●
SCD 063-043-080 AP5N	6.30	8.00	91.00	43.0	53.0	1.00	36.0	-	●
SCD 064-043-080 AP5N	6.40	8.00	91.00	43.0	53.0	1.00	36.0	-	●
SCD 065-043-080 AP5N	6.50	8.00	91.00	43.0	53.0	1.00	36.0	-	●
SCD 066-043-080 AP5N	6.60	8.00	91.00	43.0	53.0	1.00	36.0	-	●
SCD 067-043-080 AP5N	6.70	8.00	91.00	43.0	53.0	1.10	36.0	-	●
SCD 068-043-080 AP5N	6.80	8.00	91.00	43.0	53.0	1.10	36.0	M8	●
SCD 069-043-080 AP5N	6.90	8.00	91.00	43.0	53.0	1.10	36.0	-	●
SCD 070-043-080 AP5N	7.00	8.00	91.00	43.0	53.0	1.10	36.0	-	●
SCD 071-043-080 AP5N	7.10	8.00	91.00	43.0	53.0	1.10	36.0	-	●
SCD 072-043-080 AP5N	7.20	8.00	91.00	43.0	53.0	1.10	36.0	-	●
SCD 073-043-080 AP5N	7.30	8.00	91.00	43.0	53.0	1.10	36.0	-	●
SCD 074-043-080 AP5N	7.40	8.00	91.00	43.0	53.0	1.20	36.0	-	●
SCD 075-043-080 AP5N	7.50	8.00	91.00	43.0	53.0	1.20	36.0	-	●
SCD 076-043-080 AP5N	7.60	8.00	91.00	43.0	53.0	1.20	36.0	-	●
SCD 077-043-080 AP5N	7.70	8.00	91.00	43.0	53.0	1.20	36.0	-	●
SCD 078-043-080 AP5N	7.80	8.00	91.00	43.0	53.0	1.20	36.0	M9	●
SCD 079-043-080 AP5N	7.90	8.00	91.00	43.0	53.0	1.30	36.0	-	●
SCD 080-043-080 AP5N	8.00	8.00	91.00	43.0	53.0	1.30	36.0	-	●
SCD 081-049-100 AP5N	8.10	10.00	103.00	49.0	61.0	1.30	40.0	-	●
SCD 082-049-100 AP5N	8.20	10.00	103.00	49.0	61.0	1.30	40.0	-	●
SCD 083-049-100 AP5N	8.30	10.00	103.00	49.0	61.0	1.30	40.0	-	●
SCD 084-049-100 AP5N	8.40	10.00	103.00	49.0	61.0	1.30	40.0	-	●
SCD 085-049-100 AP5N	8.50	10.00	103.00	49.0	61.0	1.30	40.0	M10	●
SCD 086-049-100 AP5N	8.60	10.00	103.00	49.0	61.0	1.40	40.0	-	●
SCD 087-049-100 AP5N	8.70	10.00	103.00	49.0	61.0	1.40	40.0	-	●
SCD 088-049-100 AP5N	8.80	10.00	103.00	49.0	61.0	1.40	40.0	-	●
SCD 089-049-100 AP5N	8.90	10.00	103.00	49.0	61.0	1.40	40.0	-	●

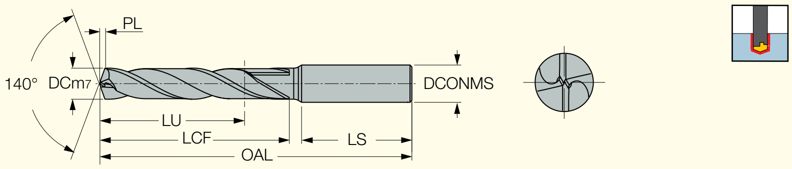
• For user guide and cutting conditions, see pages 651-667 • For regrinding instructions, see pages 662-666

(1) Used for standard thread size.

SOLIDDRILL

SCD-AP5N (5xD) (continued)

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



	Dimensions								
Designation	**DC**	**DCONMS**	**OAL**	**LU**	**LCF**	**PL**	**LS**	**Th(1)**	**IC908**
SCD 090-049-100 AP5N	9.00	10.00	103.00	49.0	61.0	1.40	40.0	-	●
SCD 091-049-100 AP5N	9.10	10.00	103.00	49.0	61.0	1.40	40.0	-	●
SCD 092-049-100 AP5N	9.20	10.00	103.00	49.0	61.0	1.40	40.0	-	●
SCD 093-049-100 AP5N	9.30	10.00	103.00	49.0	61.0	1.50	40.0	-	●
SCD 094-049-100 AP5N	9.40	10.00	103.00	49.0	61.0	1.50	40.0	-	●
SCD 095-049-100 AP5N	9.50	10.00	103.00	49.0	61.0	1.50	40.0	M11	●
SCD 096-049-100 AP5N	9.60	10.00	103.00	49.0	61.0	1.50	40.0	-	●
SCD 097-049-100 AP5N	9.70	10.00	103.00	49.0	61.0	1.50	40.0	-	●
SCD 098-049-100 AP5N	9.80	10.00	103.00	49.0	61.0	1.60	40.0	-	●
SCD 099-049-100 AP5N	9.90	10.00	103.00	49.0	61.0	1.60	40.0	-	●
SCD 100-049-100 AP5N	10.00	10.00	103.00	49.0	61.0	1.60	40.0	-	●
SCD 101-056-120 AP5N	10.10	12.00	118.00	56.0	71.0	1.60	45.0	-	●
SCD 102-056-120 AP5N	10.20	12.00	118.00	56.0	71.0	1.60	45.0	M12	●
SCD 103-056-120 AP5N	10.30	12.00	118.00	56.0	71.0	1.60	45.0	-	●
SCD 104-056-120 AP5N	10.40	12.00	118.00	56.0	71.0	1.60	45.0	-	●
SCD 105-056-120 AP5N	10.50	12.00	118.00	56.0	71.0	1.60	45.0	-	●
SCD 106-056-120 AP5N	10.60	12.00	118.00	56.0	71.0	1.70	45.0	-	●
SCD 107-056-120 AP5N	10.70	12.00	118.00	56.0	71.0	1.70	45.0	-	●
SCD 108-056-120 AP5N	10.80	12.00	118.00	56.0	71.0	1.70	45.0	-	●
SCD 109-056-120 AP5N	10.90	12.00	118.00	56.0	71.0	1.70	45.0	-	●
SCD 110-056-120 AP5N	11.00	12.00	118.00	56.0	71.0	1.70	45.0	-	●
SCD 111-056-120 AP5N	11.10	12.00	118.00	56.0	71.0	1.70	45.0	-	●
SCD 112-056-120 AP5N	11.20	12.00	118.00	56.0	71.0	1.80	45.0	-	●
SCD 113-056-120 AP5N	11.30	12.00	118.00	56.0	71.0	1.80	45.0	-	●
SCD 114-056-120 AP5N	11.40	12.00	118.00	56.0	71.0	1.80	45.0	-	●
SCD 115-056-120 AP5N	11.50	12.00	118.00	56.0	71.0	1.80	45.0	-	●
SCD 116-056-120 AP5N	11.60	12.00	118.00	56.0	71.0	1.80	45.0	-	●
SCD 117-056-120 AP5N	11.70	12.00	118.00	56.0	71.0	1.90	45.0	-	●
SCD 118-056-120 AP5N	11.80	12.00	118.00	56.0	71.0	1.90	45.0	-	●
SCD 119-056-120 AP5N	11.90	12.00	118.00	56.0	71.0	1.90	45.0	-	●
SCD 120-056-120 AP5N	12.00	12.00	118.00	56.0	71.0	1.90	45.0	M14	●

• For user guide and cutting conditions, see pages 651-667 • For regrinding instructions, see pages 662-666

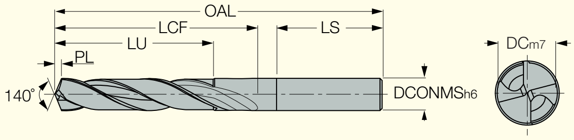
(1) Used for standard thread size.

SOLIDDRILL

SCD-AP5 (5xD)

Solid Carbide Drills Without Coolant Holes, Drilling Depth 5xD

D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								
	DC	DCONMS	LU	LCF	OAL	LS	Th(1)	PL	IC908
SCD 121-060-140 AP5	12.10	14.00	60.0	77.0	124.00	45.0	-	2.20	●
SCD 122-060-140 AP5	12.20	14.00	60.0	77.0	124.00	45.0	-	2.22	●
SCD 123-060-140 AP5	12.30	14.00	60.0	77.0	124.00	45.0	-	2.24	●
SCD 124-060-140 AP5	12.40	14.00	60.0	77.0	124.00	45.0	-	2.26	●
SCD 125-060-140 AP5	12.50	14.00	60.0	77.0	124.00	45.0	-	2.27	●
SCD 126-060-140 AP5	12.60	14.00	60.0	77.0	124.00	45.0	-	2.29	●
SCD 127-060-140 AP5	12.70	14.00	60.0	77.0	124.00	45.0	-	2.31	●
SCD 128-060-140 AP5	12.80	14.00	60.0	77.0	124.00	45.0	-	2.33	●
SCD 129-060-140 AP5	12.90	14.00	60.0	77.0	124.00	45.0	-	2.35	●
SCD 130-060-140 AP5	13.00	14.00	60.0	77.0	124.00	45.0	-	2.37	●
SCD 131-060-140 AP5	13.10	14.00	60.0	77.0	124.00	45.0	-	2.38	●
SCD 132-060-140 AP5	13.20	14.00	60.0	77.0	124.00	45.0	-	2.40	●
SCD 133-060-140 AP5	13.30	14.00	60.0	77.0	124.00	45.0	-	2.42	●
SCD 134-060-140 AP5	13.40	14.00	60.0	77.0	124.00	45.0	-	2.44	●
SCD 135-060-140 AP5	13.50	14.00	60.0	77.0	124.00	45.0	-	2.46	●
SCD 136-060-140 AP5	13.60	14.00	60.0	77.0	124.00	45.0	-	2.47	●
SCD 137-060-140 AP5	13.70	14.00	60.0	77.0	124.00	45.0	-	2.49	●
SCD 138-060-140 AP5	13.80	14.00	60.0	77.0	124.00	45.0	-	2.51	●
SCD 139-060-140 AP5	13.90	14.00	60.0	77.0	124.00	45.0	-	2.53	●
SCD 140-060-140 AP5	14.00	14.00	60.0	77.0	124.00	45.0	M16	2.55	●
SCD 141-063-160 AP5	14.10	16.00	63.0	83.0	133.00	45.0	-	2.57	●
SCD 142-063-160 AP5	14.20	16.00	63.0	83.0	133.00	45.0	-	2.58	●
SCD 143-063-160 AP5	14.30	16.00	63.0	83.0	133.00	45.0	-	2.60	●
SCD 145-063-160 AP5	14.50	16.00	63.0	83.0	133.00	45.0	-	2.64	●
SCD 146-063-160 AP5	14.60	16.00	63.0	83.0	133.00	45.0	-	2.66	●
SCD 147-063-160 AP5	14.70	16.00	63.0	83.0	133.00	45.0	-	2.68	●
SCD 148-063-160 AP5	14.80	16.00	63.0	83.0	133.00	45.0	-	2.69	●
SCD 150-063-160 AP5	15.00	16.00	63.0	83.0	133.00	45.0	-	2.73	●
SCD 151-063-160 AP5	15.10	16.00	63.0	83.0	133.00	45.0	-	2.75	●
SCD 153-063-160 AP5	15.30	16.00	63.0	83.0	133.00	45.0	-	2.78	●
SCD 155-063-160 AP5	15.50	16.00	63.0	83.0	133.00	45.0	M18	2.82	●
SCD 156-063-160 AP5	15.60	16.00	63.0	83.0	133.00	45.0	-	2.84	●
SCD 157-063-160 AP5	15.70	16.00	63.0	83.0	133.00	45.0	-	2.86	●
SCD 158-063-160 AP5	15.80	16.00	63.0	83.0	133.00	45.0	-	2.88	●
SCD 159-063-160 AP5	15.90	16.00	63.0	83.0	133.00	45.0	-	2.89	●
SCD 160-063-160 AP5	16.00	16.00	63.0	83.0	133.00	45.0	-	2.91	●
SCD 161-071-180 AP5	16.10	18.00	71.0	93.0	143.00	48.0	-	2.93	●
SCD 163-071-180 AP5	16.30	18.00	71.0	93.0	143.00	48.0	-	2.97	●
SCD 164-071-180 AP5	16.40	18.00	71.0	93.0	143.00	48.0	-	2.98	●
SCD 165-071-180 AP5	16.50	18.00	71.0	93.0	143.00	48.0	-	3.00	●
SCD 166-071-180 AP5	16.60	18.00	71.0	93.0	143.00	48.0	-	3.02	●
SCD 167-071-180 AP5	16.70	18.00	71.0	93.0	143.00	48.0	-	3.04	●
SCD 168-071-180 AP5	16.80	18.00	71.0	93.0	143.00	48.0	-	3.06	●
SCD 169-071-180 AP5	16.90	18.00	71.0	93.0	143.00	48.0	-	3.08	●
SCD 170-071-180 AP5	17.00	18.00	71.0	93.0	143.00	48.0	-	3.09	●
SCD 171-071-180 AP5	17.10	18.00	71.0	93.0	143.00	48.0	-	3.11	●
SCD 172-071-180 AP5	17.20	18.00	71.0	93.0	143.00	48.0	-	3.13	●
SCD 173-071-180 AP5	17.30	18.00	71.0	93.0	143.00	48.0	-	3.15	●
SCD 174-071-180 AP5	17.40	18.00	71.0	93.0	143.00	48.0	-	3.17	●
SCD 175-071-180 AP5	17.50	18.00	71.0	93.0	143.00	48.0	M20	3.18	●
SCD 176-071-180 AP5	17.60	18.00	71.0	93.0	143.00	48.0	-	3.20	●
SCD 177-071-180 AP5	17.70	18.00	71.0	93.0	143.00	48.0	-	3.22	●
SCD 178-071-180 AP5	17.80	18.00	71.0	93.0	143.00	48.0	-	3.24	●
SCD 179-071-180 AP5	17.90	18.00	71.0	93.0	143.00	48.0	-	3.26	●
SCD 180-071-180 AP5	18.00	18.00	71.0	93.0	143.00	48.0	-	3.28	●
SCD 182-077-200 AP5	18.20	20.00	77.0	101.0	153.00	48.0	-	3.31	●
SCD 183-077-200 AP5	18.30	20.00	77.0	101.0	153.00	48.0	-	3.33	●
SCD 184-077-200 AP5	18.40	20.00	77.0	101.0	153.00	48.0	-	3.35	●
SCD 185-077-200 AP5	18.50	20.00	77.0	101.0	153.00	48.0	-	3.37	●

- For user guide and cutting conditions, see pages 651-667
- For regrinding instructions, see pages 662-666

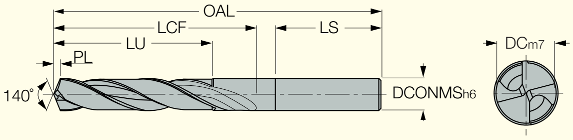
(1) Used for standard thread size

SOLIDDRILL

SCD-AP5 (5xD) (continued)

Solid Carbide Drills Without Coolant Holes, Drilling Depth 5xD

D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC908
	DC	DCONMS	LU	LCF	OAL	LS	Th[(1)]	PL	
SCD 186-077-200 AP5	18.60	20.00	77.0	101.0	153.00	48.0	-	3.38	●
SCD 187-077-200 AP5	18.70	20.00	77.0	101.0	153.00	48.0	-	3.40	●
SCD 188-077-200 AP5	18.80	20.00	77.0	101.0	153.00	48.0	-	3.42	●
SCD 189-077-200 AP5	18.90	20.00	77.0	101.0	153.00	48.0	-	3.44	●
SCD 190-077-200 AP5	19.00	20.00	77.0	101.0	153.00	48.0	-	3.46	●
SCD 191-077-200 AP5	19.10	20.00	77.0	101.0	153.00	48.0	-	3.48	●
SCD 192-077-200 AP5	19.20	20.00	77.0	101.0	153.00	48.0	-	3.49	●
SCD 193-077-200 AP5	19.30	20.00	77.0	101.0	153.00	48.0	-	3.51	●
SCD 194-077-200 AP5	19.40	20.00	77.0	101.0	153.00	48.0	-	3.53	●
SCD 195-077-200 AP5	19.50	20.00	77.0	101.0	153.00	48.0	M22	3.55	●
SCD 196-077-200 AP5	19.60	20.00	77.0	101.0	153.00	48.0	-	3.57	●
SCD 197-077-200 AP5	19.70	20.00	77.0	101.0	153.00	48.0	-	3.59	●
SCD 198-077-200 AP5	19.80	20.00	77.0	101.0	153.00	48.0	-	3.60	●
SCD 199-077-200 AP5	19.90	20.00	77.0	101.0	153.00	48.0	-	3.62	●
SCD 200-077-200 AP5	20.00	20.00	77.0	101.0	153.00	48.0	-	3.64	●

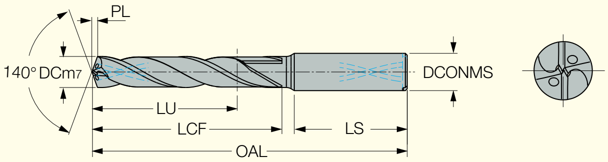
- For user guide and cutting conditions, see pages 651-667
- For regrinding instructions, see pages 662-666

(1) Used for standard thread size

SOLIDDRILL

SCD-ACP5N (5xD)

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



Designation	Dimensions								IC908
	DC	DCONMS	OAL	LU	LCF	PL	LS	Th(1)	
SCD 030-023-060 ACP5N	3.00	6.00	66.00	23.0	28.0	0.50	34.0	-	●
SCD 031-023-060 ACP5N	3.10	6.00	66.00	23.0	28.0	0.50	34.0	-	●
SCD 032-023-060 ACP5N	3.20	6.00	66.00	23.0	28.0	0.50	34.0	-	●
SCD 033-023-060 ACP5N	3.30	6.00	66.00	23.0	28.0	0.50	34.0	M4	●
SCD 034-023-060 ACP5N	3.40	6.00	66.00	23.0	28.0	0.50	34.0	-	●
SCD 035-023-060 ACP5N	3.50	6.00	66.00	23.0	28.0	0.60	34.0	-	●
SCD 036-023-060 ACP5N	3.60	6.00	66.00	23.0	28.0	0.60	34.0	-	●
SCD 037-023-060 ACP5N	3.70	6.00	66.00	23.0	28.0	0.60	34.0	-	●
SCD 038-029-060 ACP5N	3.80	6.00	74.00	29.0	36.0	0.60	35.0	-	●
SCD 039-029-060 ACP5N	3.90	6.00	74.00	29.0	36.0	0.60	35.0	-	●
SCD 040-029-060 ACP5N	4.00	6.00	74.00	29.0	36.0	0.60	35.0	-	●
SCD 041-029-060 ACP5N	4.10	6.00	74.00	29.0	36.0	0.70	35.0	-	●
SCD 042-029-060 ACP5N	4.20	6.00	74.00	29.0	36.0	0.70	35.0	M5	●
SCD 043-029-060 ACP5N	4.30	6.00	74.00	29.0	36.0	0.70	35.0	-	●
SCD 044-029-060 ACP5N	4.40	6.00	74.00	29.0	36.0	0.70	35.0	-	●
SCD 045-029-060 ACP5N	4.50	6.00	74.00	29.0	36.0	0.70	35.0	-	●
SCD 046-029-060 ACP5N	4.60	6.00	74.00	29.0	36.0	0.70	35.0	-	●
SCD 047-029-060 ACP5N	4.70	6.00	74.00	29.0	36.0	0.80	35.0	-	●
SCD 048-035-060 ACP5N	4.80	6.00	82.00	35.0	44.0	0.80	36.0	-	●
SCD 049-035-060 ACP5N	4.90	6.00	82.00	35.0	44.0	0.80	36.0	-	●
SCD 050-035-060 ACP5N	5.00	6.00	82.00	35.0	44.0	0.80	36.0	M6	●
SCD 051-035-060 ACP5N	5.10	6.00	82.00	35.0	44.0	0.80	36.0	-	●
SCD 052-035-060 ACP5N	5.20	6.00	82.00	35.0	44.0	0.80	36.0	-	●
SCD 053-035-060 ACP5N	5.30	6.00	82.00	35.0	44.0	0.80	36.0	-	●
SCD 054-035-060 ACP5N	5.40	6.00	82.00	35.0	44.0	0.80	36.0	-	●
SCD 055-035-060 ACP5N	5.50	6.00	82.00	35.0	44.0	0.90	36.0	-	●
SCD 056-035-060 ACP5N	5.60	6.00	82.00	35.0	44.0	0.90	36.0	-	●
SCD 057-035-060 ACP5N	5.70	6.00	82.00	35.0	44.0	0.90	36.0	-	●
SCD 058-035-060 ACP5N	5.80	6.00	82.00	35.0	44.0	0.90	36.0	-	●
SCD 059-035-060 ACP5N	5.90	6.00	82.00	35.0	44.0	0.90	36.0	-	●
SCD 060-035-060 ACP5N	6.00	6.00	82.00	35.0	44.0	0.90	36.0	M7	●
SCD 061-043-080 ACP5N	6.10	8.00	91.00	43.0	53.0	1.00	36.0	-	●
SCD 062-043-080 ACP5N	6.20	8.00	91.00	43.0	53.0	1.00	36.0	-	●
SCD 063-043-080 ACP5N	6.30	8.00	91.00	43.0	53.0	1.00	36.0	-	●
SCD 064-043-080 ACP5N	6.40	8.00	91.00	43.0	53.0	1.00	36.0	-	●
SCD 065-043-080 ACP5N	6.50	8.00	91.00	43.0	53.0	1.00	36.0	-	●
SCD 066-043-080 ACP5N	6.60	8.00	91.00	43.0	53.0	1.00	36.0	-	●
SCD 067-043-080 ACP5N	6.70	8.00	91.00	43.0	53.0	1.10	36.0	-	●
SCD 068-043-080 ACP5N	6.80	8.00	91.00	43.0	53.0	1.10	36.0	M8	●
SCD 069-043-080 ACP5N	6.90	8.00	91.00	43.0	53.0	1.10	36.0	-	●
SCD 070-043-080 ACP5N	7.00	8.00	91.00	43.0	53.0	1.10	36.0	-	●
SCD 071-043-080 ACP5N	7.10	8.00	91.00	43.0	53.0	1.10	36.0	-	●
SCD 072-043-080 ACP5N	7.20	8.00	91.00	43.0	53.0	1.10	36.0	-	●
SCD 073-043-080 ACP5N	7.30	8.00	91.00	43.0	53.0	1.10	36.0	-	●
SCD 074-043-080 ACP5N	7.40	8.00	91.00	43.0	53.0	1.20	36.0	-	●
SCD 075-043-080 ACP5N	7.50	8.00	91.00	43.0	53.0	1.20	36.0	-	●
SCD 076-043-080 ACP5N	7.60	8.00	91.00	43.0	53.0	1.20	36.0	-	●
SCD 077-043-080 ACP5N	7.70	8.00	91.00	43.0	53.0	1.20	36.0	-	●
SCD 078-043-080 ACP5N	7.80	8.00	91.00	43.0	53.0	1.20	36.0	M9	●
SCD 079-043-080 ACP5N	7.90	8.00	91.00	43.0	53.0	1.30	36.0	-	●
SCD 080-043-080 ACP5N	8.00	8.00	91.00	43.0	53.0	1.30	36.0	-	●
SCD 081-049-100 ACP5N	8.10	10.00	103.00	49.0	61.0	1.30	40.0	-	●
SCD 082-049-100 ACP5N	8.20	10.00	103.00	49.0	61.0	1.30	40.0	-	●
SCD 083-049-100 ACP5N	8.30	10.00	103.00	49.0	61.0	1.30	40.0	-	●
SCD 084-049-100 ACP5N	8.40	10.00	103.00	49.0	61.0	1.30	40.0	-	●
SCD 085-049-100 ACP5N	8.50	10.00	103.00	49.0	61.0	1.30	40.0	M10	●
SCD 086-049-100 ACP5N	8.60	10.00	103.00	49.0	61.0	1.40	40.0	-	●
SCD 087-049-100 ACP5N	8.70	10.00	103.00	49.0	61.0	1.40	40.0	-	●
SCD 088-049-100 ACP5N	8.80	10.00	103.00	49.0	61.0	1.40	40.0	-	●
SCD 089-049-100 ACP5N	8.90	10.00	103.00	49.0	61.0	1.40	40.0	-	●

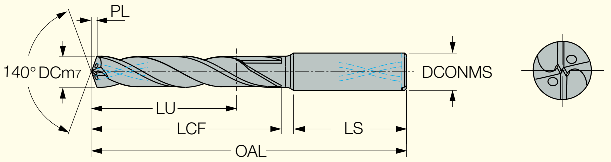
- For user guide and cutting conditions, see pages 651-667 • For regrinding instructions, see pages 662-666

(1) Used for standard thread size.

SOLIDDRILL

SCD-ACP5N (5xD) (continued)

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



Designation	Dimensions								IC908
	DC	DCONMS	OAL	LU	LCF	PL	LS	Th(1)	
SCD 090-049-100 ACP5N	9.00	10.00	103.00	49.0	61.0	1.40	40.0	-	●
SCD 091-049-100 ACP5N	9.10	10.00	103.00	49.0	61.0	1.40	40.0	-	●
SCD 092-049-100 ACP5N	9.20	10.00	103.00	49.0	61.0	1.40	40.0	-	●
SCD 093-049-100 ACP5N	9.30	10.00	103.00	49.0	61.0	1.50	40.0	-	●
SCD 094-049-100 ACP5N	9.40	10.00	103.00	49.0	61.0	1.50	40.0	-	●
SCD 095-049-100 ACP5N	9.50	10.00	103.00	49.0	61.0	1.50	40.0	M11	●
SCD 096-049-100 ACP5N	9.60	10.00	103.00	49.0	61.0	1.50	40.0	-	●
SCD 097-049-100 ACP5N	9.70	10.00	103.00	49.0	61.0	1.50	40.0	-	●
SCD 098-049-100 ACP5N	9.80	10.00	103.00	49.0	61.0	1.60	40.0	-	●
SCD 099-049-100 ACP5N	9.90	10.00	103.00	49.0	61.0	1.60	40.0	-	●
SCD 100-049-100 ACP5N	10.00	10.00	103.00	49.0	61.0	1.60	40.0	-	●
SCD 101-056-120 ACP5N	10.10	12.00	118.00	56.0	71.0	1.60	45.0	-	●
SCD 102-056-120 ACP5N	10.20	12.00	118.00	56.0	71.0	1.60	45.0	M12	●
SCD 103-056-120 ACP5N	10.30	12.00	118.00	56.0	71.0	1.60	45.0	-	●
SCD 104-056-120 ACP5N	10.40	12.00	118.00	56.0	71.0	1.60	45.0	-	●
SCD 105-056-120 ACP5N	10.50	12.00	118.00	56.0	71.0	1.60	45.0	-	●
SCD 106-056-120 ACP5N	10.60	12.00	118.00	56.0	71.0	1.70	45.0	-	●
SCD 107-056-120 ACP5N	10.70	12.00	118.00	56.0	71.0	1.70	45.0	-	●
SCD 108-056-120 ACP5N	10.80	12.00	118.00	56.0	71.0	1.70	45.0	-	●
SCD 109-056-120 ACP5N	10.90	12.00	118.00	56.0	71.0	1.70	45.0	-	●
SCD 110-056-120 ACP5N	11.00	12.00	118.00	56.0	71.0	1.70	45.0	-	●
SCD 111-056-120 ACP5N	11.10	12.00	118.00	56.0	71.0	1.70	45.0	-	●
SCD 112-056-120 ACP5N	11.20	12.00	118.00	56.0	71.0	1.80	45.0	-	●
SCD 113-056-120 ACP5N	11.30	12.00	118.00	56.0	71.0	1.80	45.0	-	●
SCD 114-056-120 ACP5N	11.40	12.00	118.00	56.0	71.0	1.80	45.0	-	●
SCD 115-056-120 ACP5N	11.50	12.00	118.00	56.0	71.0	1.80	45.0	-	●
SCD 116-056-120 ACP5N	11.60	12.00	118.00	56.0	71.0	1.80	45.0	-	●
SCD 117-056-120 ACP5N	11.70	12.00	118.00	56.0	71.0	1.90	45.0	-	●
SCD 118-056-120 ACP5N	11.80	12.00	118.00	56.0	71.0	1.90	45.0	-	●
SCD 119-056-120 ACP5N	11.90	12.00	118.00	56.0	71.0	1.90	45.0	-	●
SCD 120-056-120 ACP5N	12.00	12.00	118.00	56.0	71.0	1.90	45.0	M14	●

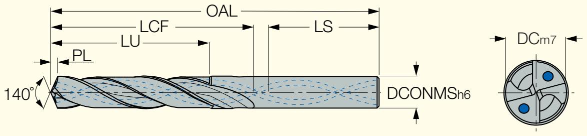
- For user guide and cutting conditions, see pages 651-667 • For regrinding instructions, see pages 662-666

(1) Used for standard thread size.

SOLIDDRILL

SCD-ACP5 (5xD)

Solid Carbide Drills with Coolant Holes, Drilling Depth 5xD



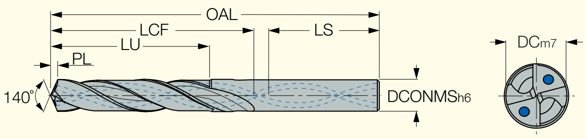
Designation	Dimensions								
	DC	DCONMS	LU	LCF	OAL	Th(1)	LS	PL	IC908
SCD 121-060-140 ACP5	12.10	14.00	60.0	77.0	124.00	-	45.0	2.20	●
SCD 122-060-140 ACP5	12.20	14.00	60.0	77.0	124.00	M14	45.0	2.22	●
SCD 123-060-140 ACP5	12.30	14.00	60.0	77.0	124.00	-	45.0	2.24	●
SCD 124-060-140 ACP5	12.40	14.00	60.0	77.0	124.00	-	45.0	2.26	●
SCD 125-060-140 ACP5	12.50	14.00	60.0	77.0	124.00	-	45.0	2.27	●
SCD 126-060-140 ACP5	12.60	14.00	60.0	77.0	124.00	-	45.0	2.29	●
SCD 127-060-140 ACP5	12.70	14.00	60.0	77.0	124.00	-	45.0	2.31	●
SCD 128-060-140 ACP5	12.80	14.00	60.0	77.0	124.00	-	45.0	2.33	●
SCD 129-060-140 ACP5	12.90	14.00	60.0	77.0	124.00	-	45.0	2.35	●
SCD 130-060-140 ACP5	13.00	14.00	60.0	77.0	124.00	-	45.0	2.37	●
SCD 131-060-140 ACP5	13.10	14.00	60.0	77.0	124.00	-	45.0	2.38	●
SCD 132-060-140 ACP5	13.20	14.00	60.0	77.0	124.00	-	45.0	2.40	●
SCD 133-060-140 ACP5	13.30	14.00	60.0	77.0	124.00	-	45.0	2.42	●
SCD 135-060-140 ACP5	13.50	14.00	60.0	77.0	124.00	-	45.0	2.46	●
SCD 136-060-140 ACP5	13.60	14.00	60.0	77.0	124.00	-	45.0	2.47	●
SCD 137-060-140 ACP5	13.70	14.00	60.0	77.0	124.00	-	45.0	2.49	●
SCD 138-060-140 ACP5	13.80	14.00	60.0	77.0	124.00	-	45.0	2.51	●
SCD 139-060-140 ACP5	13.90	14.00	60.0	77.0	124.00	-	45.0	2.53	●
SCD 140-060-140 ACP5	14.00	14.00	60.0	77.0	124.00	M16	45.0	2.55	●
SCD 141-063-160 ACP5	14.10	16.00	63.0	83.0	133.00	-	45.0	2.57	●
SCD 142-063-160 ACP5	14.20	16.00	63.0	83.0	133.00	-	45.0	2.58	●
SCD 143-063-160 ACP5	14.30	16.00	63.0	83.0	133.00	-	45.0	2.60	●
SCD 144-063-160 ACP5	14.40	16.00	63.0	83.0	133.00	-	45.0	2.62	●
SCD 145-063-160 ACP5	14.50	16.00	63.0	83.0	133.00	-	45.0	2.64	●
SCD 146-063-160 ACP5	14.60	16.00	63.0	83.0	133.00	-	45.0	2.66	●
SCD 147-063-160 ACP5	14.70	16.00	63.0	83.0	133.00	-	45.0	2.68	●
SCD 148-063-160 ACP5	14.80	16.00	63.0	83.0	133.00	-	45.0	2.69	●
SCD 149-063-160 ACP5	14.90	16.00	63.0	83.0	133.00	-	45.0	2.71	●
SCD 150-063-160 ACP5	15.00	16.00	63.0	83.0	133.00	-	45.0	2.73	●
SCD 151-063-160 ACP5	15.10	16.00	63.0	83.0	133.00	-	45.0	2.75	●
SCD 152-063-160 ACP5	15.20	16.00	63.0	83.0	133.00	-	45.0	2.77	●
SCD 153-063-160 ACP5	15.30	16.00	63.0	83.0	133.00	-	45.0	2.78	●
SCD 155-063-160 ACP5	15.50	16.00	63.0	83.0	133.00	M18	45.0	2.82	●
SCD 156-063-160 ACP5	15.60	16.00	63.0	83.0	133.00	-	45.0	2.84	●
SCD 157-063-160 ACP5	15.70	16.00	63.0	83.0	133.00	-	45.0	2.86	●
SCD 158-063-160 ACP5	15.80	16.00	63.0	83.0	133.00	-	45.0	2.88	●
SCD 159-063-160 ACP5	15.90	16.00	63.0	83.0	133.00	-	45.0	2.89	●
SCD 160-063-160 ACP5	16.00	16.00	63.0	83.0	133.00	-	45.0	2.91	●
SCD 161-071-180 ACP5	16.10	18.00	71.0	93.0	143.00	-	48.0	2.93	●
SCD 162-071-180 ACP5	16.20	18.00	71.0	93.0	143.00	-	48.0	2.95	●
SCD 163-071-180 ACP5	16.30	18.00	71.0	93.0	143.00	-	48.0	2.97	●
SCD 164-071-180 ACP5	16.40	18.00	71.0	93.0	143.00	-	48.0	2.98	●
SCD 165-071-180 ACP5	16.50	18.00	71.0	93.0	143.00	-	48.0	3.00	●
SCD 167-071-180 ACP5	16.70	18.00	71.0	93.0	143.00	-	48.0	3.04	●
SCD 168-071-180 ACP5	16.80	18.00	71.0	93.0	143.00	-	48.0	3.06	●
SCD 169-071-180 ACP5	16.90	18.00	71.0	93.0	143.00	-	48.0	3.08	●
SCD 170-071-180 ACP5	17.00	18.00	71.0	93.0	143.00	-	48.0	3.09	●
SCD 171-071-180 ACP5	17.10	18.00	71.0	93.0	143.00	-	48.0	3.11	●
SCD 172-071-180 ACP5	17.20	18.00	71.0	93.0	143.00	-	48.0	3.13	●
SCD 174-071-180 ACP5	17.40	18.00	71.0	93.0	143.00	-	48.0	3.17	●
SCD 175-071-180 ACP5	17.50	18.00	71.0	93.0	143.00	-	48.0	3.18	●
SCD 176-071-180 ACP5	17.60	18.00	71.0	93.0	143.00	-	48.0	3.20	●
SCD 177-071-180 ACP5	17.70	18.00	71.0	93.0	143.00	-	48.0	3.22	●
SCD 178-071-180 ACP5	17.80	18.00	71.0	93.0	143.00	-	48.0	3.24	●
SCD 179-071-180 ACP5	17.90	18.00	71.0	93.0	143.00	-	48.0	3.26	●
SCD 180-071-180 ACP5	18.00	18.00	71.0	93.0	143.00	-	48.0	3.28	●
SCD 181-077-200 ACP5	18.10	20.00	77.0	101.0	153.00	-	48.0	3.29	●
SCD 182-077-200 ACP5	18.20	20.00	77.0	101.0	153.00	-	48.0	3.31	●

- For user guide and cutting conditions, see pages 651-667
- For regrinding instructions, see pages 662-666

(1) Used for standard thread size.

SCD-ACP5 (5xD) (continued)

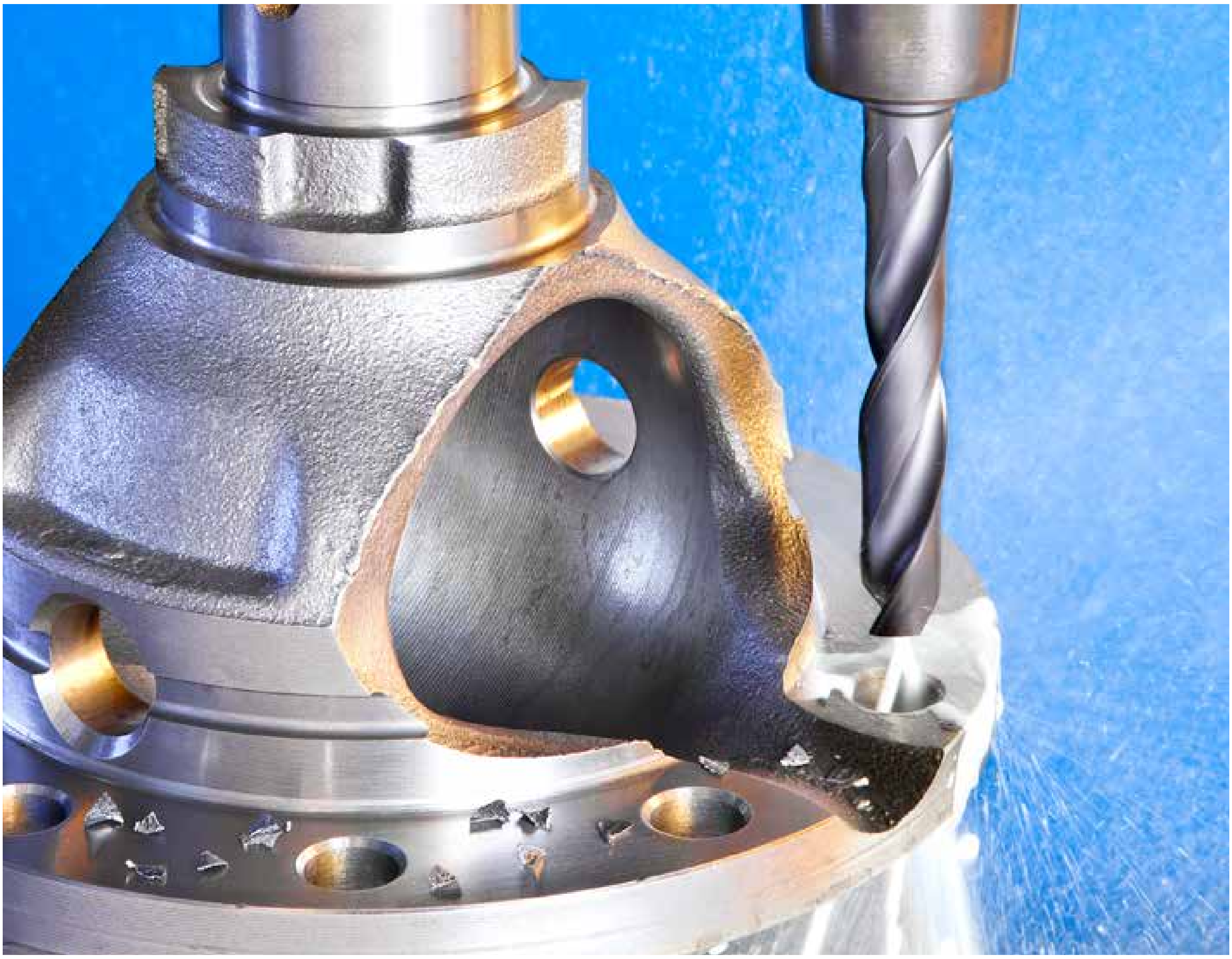
Solid Carbide Drills with Coolant Holes, Drilling Depth 5xD



	Dimensions								
Designation	DC	DCONMS	LU	LCF	OAL	Th(1)	LS	PL	IC908
SCD 183-077-200 ACP5	18.30	20.00	77.0	101.0	153.00	-	48.0	3.33	●
SCD 184-077-200 ACP5	18.40	20.00	77.0	101.0	153.00	-	48.0	3.35	●
SCD 185-077-200 ACP5	18.50	20.00	77.0	101.0	153.00	-	48.0	3.37	●
SCD 186-077-200 ACP5	18.60	20.00	77.0	101.0	153.00	-	48.0	3.38	●
SCD 187-077-200 ACP5	18.70	20.00	77.0	101.0	153.00	-	48.0	3.40	●
SCD 188-077-200 ACP5	18.80	20.00	77.0	101.0	153.00	-	48.0	3.42	●
SCD 189-077-200 ACP5	18.90	20.00	77.0	101.0	153.00	-	48.0	3.44	●
SCD 191-077-200 ACP5	19.10	20.00	77.0	101.0	153.00	-	48.0	3.48	●
SCD 192-077-200 ACP5	19.20	20.00	77.0	101.0	153.00	-	48.0	3.49	●
SCD 193-077-200 ACP5	19.30	20.00	77.0	101.0	153.00	-	48.0	3.51	●
SCD 194-077-200 ACP5	19.40	20.00	77.0	101.0	153.00	-	48.0	3.53	●
SCD 195-077-200 ACP5	19.50	20.00	77.0	101.0	153.00	M22	48.0	3.55	●
SCD 196-077-200 ACP5	19.60	20.00	77.0	101.0	153.00	-	48.0	3.57	●
SCD 197-077-200 ACP5	19.70	20.00	77.0	101.0	153.00	-	48.0	3.59	●
SCD 198-077-200 ACP5	19.80	20.00	77.0	101.0	153.00	-	48.0	3.60	●
SCD 199-077-200 ACP5	19.90	20.00	77.0	101.0	153.00	-	48.0	3.62	●
SCD 200-077-200 ACP5	20.00	20.00	77.0	101.0	153.00	-	48.0	3.64	●

- For user guide and cutting conditions, see pages 651-667
- For regrinding instructions, see pages 662-666

(1) Used for standard thread size.

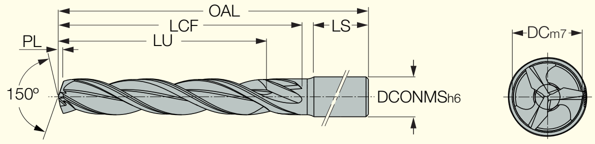


SOLIDDRILL

SCCD-AP5

DIN 6537 Three Flute Solid Carbide Drills Without Coolant Holes, Drilling Depth 5xD

D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC908
	DC	DCONMS	LU	LCF	OAL	LS	Th(1)	PL	
SCCD 030-023-060 AP5	3.00	6.00	23.0	28.0	66.00	34.0	-	0.40	●
SCCD 031-023-060 AP5	3.10	6.00	23.0	28.0	66.00	34.0	-	0.42	●
SCCD 032-023-060 AP5	3.20	6.00	23.0	28.0	66.00	34.0	-	0.43	●
SCCD 033-023-060 AP5	3.30	6.00	23.0	28.0	66.00	34.0	M4	0.44	●
SCCD 037-023-060 AP5	3.70	6.00	23.0	28.0	66.00	34.0	-	0.50	●
SCCD 038-029-060 AP5	3.80	6.00	29.0	36.0	74.00	34.0	-	0.51	●
SCCD 040-029-060 AP5	4.00	6.00	29.0	36.0	74.00	34.0	-	0.54	●
SCCD 041-029-060 AP5	4.10	6.00	29.0	36.0	74.00	34.0	-	0.55	●
SCCD 042-029-060 AP5	4.20	6.00	29.0	36.0	74.00	34.0	M5	0.56	●
SCCD 043-029-060 AP5	4.30	6.00	29.0	36.0	74.00	34.0	-	0.58	●
SCCD 045-029-060 AP5	4.50	6.00	29.0	36.0	74.00	34.0	-	0.60	●
SCCD 046-029-060 AP5	4.60	6.00	29.0	36.0	74.00	34.0	-	0.62	●
SCCD 047-029-060 AP5	4.70	6.00	29.0	47.0	74.00	34.0	-	0.63	●
SCCD 050-035-060 AP5	5.00	6.00	35.0	44.0	82.00	34.0	M6	0.67	●
SCCD 051-035-060 AP5	5.10	6.00	35.0	44.0	82.00	34.0	-	0.68	●
SCCD 052-035-060 AP5	5.20	6.00	35.0	44.0	82.00	34.0	-	0.70	●
SCCD 055-035-060 AP5	5.50	6.00	35.0	44.0	82.00	34.0	-	0.74	●
SCCD 056-035-060 AP5	5.60	6.00	35.0	44.0	82.00	34.0	-	0.75	●
SCCD 057-035-060 AP5	5.70	6.00	35.0	44.0	82.00	34.0	-	0.76	●
SCCD 058-035-060 AP5	5.80	6.00	35.0	44.0	82.00	34.0	-	0.78	●
SCCD 059-035-060 AP5	5.90	6.00	35.0	44.0	82.00	34.0	-	0.79	●
SCCD 060-035-060 AP5	6.00	6.00	35.0	44.0	82.00	34.0	M7	0.80	●
SCCD 061-043-080 AP5	6.10	8.00	43.0	53.0	91.00	35.0	-	0.82	●
SCCD 063-043-080 AP5	6.30	8.00	43.0	53.0	91.00	35.0	-	0.84	●
SCCD 064-043-080 AP5	6.40	8.00	43.0	53.0	91.00	35.0	-	0.86	●
SCCD 065-043-080 AP5	6.50	8.00	43.0	53.0	91.00	35.0	-	0.87	●
SCCD 066-043-080 AP5	6.60	8.00	43.0	53.0	91.00	35.0	-	0.88	●
SCCD 067-043-080 AP5	6.70	8.00	43.0	53.0	91.00	35.0	-	0.90	●
SCCD 068-043-080 AP5	6.80	8.00	43.0	53.0	91.00	35.0	M8	0.91	●
SCCD 069-043-080 AP5	6.90	8.00	43.0	53.0	91.00	35.0	-	0.92	●
SCCD 070-043-080 AP5	7.00	8.00	43.0	53.0	91.00	35.0	-	0.94	●
SCCD 071-043-080 AP5	7.10	8.00	43.0	53.0	91.00	35.0	-	0.95	●
SCCD 074-043-080 AP5	7.40	8.00	43.0	53.0	91.00	35.0	-	0.99	●
SCCD 075-043-080 AP5	7.50	8.00	43.0	53.0	91.00	35.0	-	1.00	●
SCCD 076-043-080 AP5	7.60	8.00	43.0	53.0	91.00	35.0	-	1.02	●
SCCD 078-043-080 AP5	7.80	8.00	43.0	53.0	91.00	35.0	M9	1.05	●
SCCD 079-043-080 AP5	7.90	8.00	43.0	53.0	91.00	35.0	-	1.06	●
SCCD 080-043-080 AP5	8.00	8.00	43.0	53.0	91.00	35.0	-	1.07	●
SCCD 081-049-100 AP5	8.10	10.00	49.0	61.0	103.00	39.0	-	1.09	●
SCCD 082-049-100 AP5	8.20	10.00	49.0	61.0	103.00	39.0	-	1.10	●
SCCD 083-049-100 AP5	8.30	10.00	49.0	61.0	103.00	39.0	-	1.11	●
SCCD 084-049-100 AP5	8.40	10.00	49.0	61.0	103.00	39.0	-	1.13	●
SCCD 085-049-100 AP5	8.50	10.00	49.0	61.0	103.00	39.0	M10	1.14	●
SCCD 086-049-100 AP5	8.60	10.00	49.0	61.0	103.00	39.0	-	1.15	●
SCCD 087-049-100 AP5	8.70	10.00	49.0	61.0	103.00	39.0	-	1.17	●
SCCD 088-049-100 AP5	8.80	10.00	49.0	61.0	103.00	39.0	-	1.18	●
SCCD 090-049-100 AP5	9.00	10.00	49.0	61.0	103.00	39.0	-	1.21	●
SCCD 091-049-100 AP5	9.10	10.00	49.0	61.0	103.00	39.0	-	1.22	●
SCCD 093-049-100 AP5	9.30	10.00	49.0	61.0	103.00	39.0	-	1.25	●
SCCD 095-049-100 AP5	9.50	10.00	49.0	61.0	103.00	39.0	M11	1.27	●
SCCD 096-049-100 AP5	9.60	10.00	49.0	61.0	103.00	39.0	-	1.29	●
SCCD 097-049-100 AP5	9.70	10.00	49.0	61.0	103.00	39.0	-	1.30	●
SCCD 098-049-100 AP5	9.80	10.00	49.0	61.0	103.00	39.0	-	1.31	●
SCCD 100-049-100 AP5	10.00	10.00	49.0	61.0	103.00	39.0	-	1.34	●
SCCD 101-056-120 AP5	10.10	12.00	56.0	71.0	118.00	44.0	-	1.35	●
SCCD 102-056-120 AP5	10.20	12.00	56.0	71.0	118.00	44.0	M12	1.37	●
SCCD 103-056-120 AP5	10.30	12.00	56.0	71.0	118.00	44.0	-	1.38	●
SCCD 105-056-120 AP5	10.50	12.00	56.0	71.0	118.00	44.0	-	1.41	●
SCCD 107-056-120 AP5	10.70	12.00	56.0	71.0	118.00	44.0	-	1.43	●
SCCD 108-056-120 AP5	10.80	12.00	56.0	71.0	118.00	44.0	-	1.45	●
SCCD 110-056-120 AP5	11.00	12.00	56.0	71.0	118.00	44.0	-	1.47	●

• For user guide and cutting conditions, see pages 651-667 • For regrinding instructions, see pages 662-666

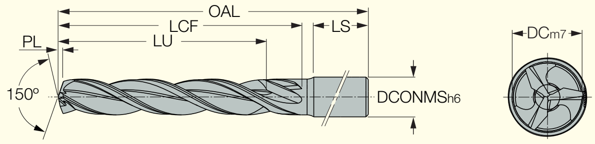
(1) Used for standard thread size.

SOLIDDRILL

SCCD-AP5 (continued)

DIN 6537 Three Flute Solid Carbide Drills Without Coolant Holes, Drilling Depth 5xD

D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	DC	DCONMS	LU	LCF	OAL	LS	Th(1)	PL	IC908
	Dimensions								
SCCD 111-056-120 AP5	11.10	12.00	56.0	71.0	118.00	44.0	-	1.49	●
SCCD 112-056-120 AP5	11.20	12.00	56.0	71.0	118.00	44.0	-	1.50	●
SCCD 115-056-120 AP5	11.50	12.00	56.0	71.0	118.00	44.0	-	1.54	●
SCCD 117-056-120 AP5	11.70	12.00	56.0	71.0	118.00	44.0	-	1.57	●
SCCD 118-056-120 AP5	11.80	12.00	56.0	71.0	118.00	44.0	-	1.58	●
SCCD 120-056-120 AP5	12.00	12.00	56.0	71.0	118.00	44.0	M14	1.61	●
SCCD 121-060-140 AP5	12.10	14.00	60.0	77.0	124.00	44.0	-	1.62	●
SCCD 125-060-140 AP5	12.50	14.00	60.0	77.0	124.00	44.0	-	1.67	●
SCCD 127-060-140 AP5	12.70	14.00	60.0	77.0	124.00	44.0	-	1.70	●
SCCD 128-060-140 AP5	12.80	14.00	60.0	77.0	124.00	44.0	-	1.71	●
SCCD 130-060-140 AP5	13.00	14.00	60.0	77.0	124.00	44.0	-	1.74	●
SCCD 131-060-140 AP5	13.10	14.00	60.0	77.0	124.00	44.0	-	1.76	●
SCCD 135-060-140 AP5	13.50	14.00	60.0	77.0	124.00	44.0	-	1.81	●
SCCD 138-060-140 AP5	13.80	14.00	60.0	77.0	124.00	44.0	-	1.85	●
SCCD 140-060-140 AP5	14.00	14.00	60.0	77.0	124.00	47.0	M16	1.88	●
SCCD 142-063-160 AP5	14.20	16.00	63.0	83.0	133.00	47.0	-	1.90	●
SCCD 145-063-160 AP5	14.50	16.00	63.0	83.0	133.00	47.0	-	1.94	●
SCCD 150-063-160 AP5	15.00	16.00	63.0	83.0	133.00	47.0	-	2.01	●
SCCD 151-063-160 AP5	15.10	16.00	63.0	83.0	133.00	47.0	-	2.02	●
SCCD 155-063-160 AP5	15.50	16.00	63.0	83.0	133.00	47.0	M18	2.08	●
SCCD 158-063-160 AP5	15.80	16.00	63.0	83.0	133.00	47.0	-	2.12	●
SCCD 160-063-160 AP5	16.00	16.00	63.0	83.0	133.00	47.0	-	2.14	●
SCCD 165-071-180 AP5	16.50	18.00	71.0	93.0	143.00	47.0	-	2.21	●
SCCD 169-071-180 AP5	16.90	18.00	71.0	93.0	143.00	47.0	-	2.26	●
SCCD 170-071-180 AP5	17.00	18.00	71.0	93.0	143.00	47.0	-	2.28	●
SCCD 175-071-180 AP5	17.50	18.00	71.0	93.0	143.00	47.0	M20	2.34	●
SCCD 177-071-180 AP5	17.70	18.00	71.0	93.0	143.00	47.0	-	2.37	●
SCCD 180-071-180 AP5	18.00	18.00	71.0	93.0	143.00	49.0	-	2.41	●
SCCD 185-077-200 AP5	18.50	20.00	77.0	101.0	153.00	49.0	-	2.48	●
SCCD 190-077-200 AP5	19.00	20.00	77.0	101.0	153.00	49.0	-	2.55	●
SCCD 195-077-200 AP5	19.50	20.00	77.0	101.0	153.00	49.0	M22	2.61	●
SCCD 200-077-200 AP5	20.00	20.00	77.0	101.0	153.00	49.0	-	2.68	●

- For user guide and cutting conditions, see pages 651-667
- For regrinding instructions, see pages 662-666

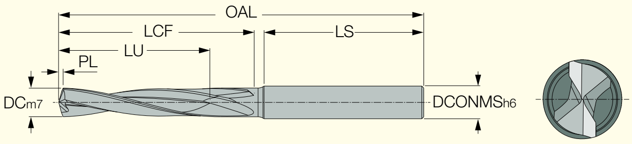
(1) Used for standard thread size.

SOLIDDRILL

SCD-AH5 (5xD)

Solid Carbide Drills for Hard Materials, Drilling Depth 5xD

D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	Dimensions								IC903
	DC	LU	LCF	DCONMS	LS	OAL	Th(1)	PL	
SCD 030-015-060 AH5	3.00	15.0	26.0	6.00	35.0	66.00	-	0.55	●
SCD 033-017-060 AH5	3.30	16.5	26.0	6.00	35.0	66.00	M4	0.60	●
SCD 040-020-060 AH5	4.00	20.0	29.0	6.00	32.0	66.00	-	0.73	●
SCD 042-021-060 AH5	4.20	21.0	32.0	6.00	46.0	82.00	M5	0.76	●
SCD 044-022-060 AH5	4.40	22.0	32.0	6.00	46.0	82.00	-	0.80	●
SCD 045-023-060 AH5	4.50	22.5	32.0	6.00	46.0	82.00	-	0.82	●
SCD 050-025-060 AH5	5.00	25.0	37.0	6.00	41.0	82.00	M6	0.91	●
SCD 053-027-060 AH5	5.30	26.5	39.0	6.00	37.0	82.00	-	0.96	●
SCD 055-028-060 AH5	5.50	27.5	39.0	6.00	37.0	82.00	-	1.00	●
SCD 060-030-060 AH5	6.00	30.0	43.0	6.00	37.0	82.00	M7	1.09	●
SCD 068-034-080 AH5	6.80	34.0	49.0	8.00	39.0	91.00	M8	1.24	●
SCD 070-035-080 AH5	7.00	35.0	49.0	8.00	39.0	91.00	-	1.27	●
SCD 075-038-080 AH5	7.50	37.5	52.0	8.00	34.0	91.00	-	1.36	●
SCD 078-039-080 AH5	7.80	42.0	55.0	8.00	34.0	91.00	M9	1.42	●
SCD 080-040-080 AH5	8.00	40.0	55.0	8.00	34.0	91.00	-	1.46	●
SCD 085-043-100 AH5	8.50	42.5	59.0	10.00	46.0	112.00	M10	1.55	●
SCD 088-044-100 AH5	8.80	44.0	63.0	10.00	46.0	112.00	-	1.60	●
SCD 090-045-100 AH5	9.00	45.0	63.0	10.00	46.0	112.00	-	1.64	●
SCD 095-048-100 AH5	9.50	47.5	66.0	10.00	39.0	112.00	M11	1.73	●
SCD 100-050-100 AH5	10.00	50.0	70.0	10.00	39.0	112.00	-	1.82	●
SCD 105-053-120 AH5	10.50	52.5	71.0	12.00	45.0	122.00	-	1.91	●
SCD 110-055-120 AH5	11.00	55.0	74.0	12.00	45.0	122.00	-	2.00	●
SCD 115-058-120 AH5	11.50	57.5	77.0	12.00	40.0	122.00	-	2.09	●

• For user guide and cutting conditions, see pages 651-667 • For regrinding instructions, see pages 662-666

(1) Used for standard thread size

Recommended Machining Conditions for SCD...AH5 Solid Drills

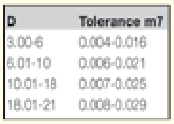
ISO	Material	Hardness	Material No.	Cutting Speed	Feed vs. Drill Diameter (mm/rev)		
				Vc (m/min)	Ø3-5	Ø5.1-8	Ø8.1-12
H	Hardened steel	50-55 HRc	38	25-40	0.04-0.07	0.05-0.08	0.06-0.10
	Hardened steel	56-60 HRc	39	15-25	0.03-0.06	0.04-0.07	0.05-0.08
	Hardened steel	61-70 HRc	39	10-15	0.02-0.04	0.03-0.05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

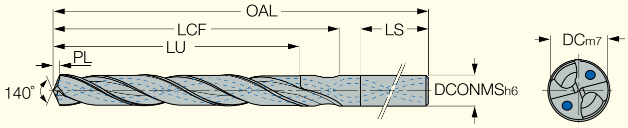
SOLIDDRILL

SCD-ACG8 (8xD)

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



D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



Designation	DC	DCONMS	LU	LCF	OAL	LS	PL	IC908
	Dimensions							
SCD 084-080-100 ACG8	8.40	10.00	80.0	95.0	142.00	38.0	1.53	●
SCD 089-080-100 ACG8	8.90	10.00	80.0	95.0	142.00	38.0	1.62	●
SCD 092-080-100 ACG8	9.20	10.00	80.0	95.0	142.00	38.0	1.67	●
SCD 096-080-100 ACG8	9.60	10.00	80.0	95.0	142.00	38.0	1.75	●

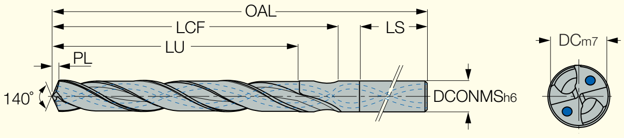
• For user guide and cutting conditions, see pages 651-667 • For regrinding instructions, see pages 662-666

SOLIDDRILL

SCD-ACP8 (8xD)

Solid Carbide Drills with Coolant Holes, Drilling Depth 8xD

D	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



	Dimensions							
Designation	DC	DCONMS	LU	LCF	OAL	LS	PL	IC908
SCD 049-048-060 ACP8	4.90	6.00	48.0	57.0	95.00	35.0	0.89	●
SCD 051-048-060 ACP8	5.10	6.00	48.0	57.0	95.00	35.0	0.93	●
SCD 054-048-060 ACP8	5.40	6.00	48.0	57.0	95.00	35.0	0.98	●
SCD 056-048-060 ACP8	5.60	6.00	48.0	57.0	95.00	35.0	1.02	●
SCD 057-048-060 ACP8	5.70	6.00	48.0	57.0	95.00	35.0	1.04	●
SCD 059-048-060 ACP8	5.90	6.00	48.0	57.0	95.00	35.0	1.07	●
SCD 062-064-080 ACP8	6.20	8.00	64.0	76.0	114.00	35.0	1.13	●
SCD 063-064-080 ACP8	6.30	8.00	64.0	76.0	114.00	35.0	1.15	●
SCD 064-064-080 ACP8	6.40	8.00	64.0	76.0	114.00	35.0	1.16	●
SCD 065-064-080 ACP8	6.50	8.00	64.0	76.0	114.00	35.0	1.18	●
SCD 066-064-080 ACP8	6.60	8.00	64.0	76.0	114.00	35.0	1.20	●
SCD 067-064-080 ACP8	6.70	8.00	64.0	76.0	114.00	35.0	1.22	●
SCD 069-064-080 ACP8	6.90	8.00	64.0	76.0	114.00	35.0	1.26	●
SCD 072-064-080 ACP8	7.20	8.00	64.0	76.0	114.00	35.0	1.31	●
SCD 073-064-080 ACP8	7.30	8.00	64.0	76.0	114.00	35.0	1.33	●
SCD 074-064-080 ACP8	7.40	8.00	64.0	76.0	114.00	35.0	1.35	●
SCD 075-064-080 ACP8	7.50	8.00	64.0	76.0	114.00	35.0	1.36	●
SCD 076-064-080 ACP8	7.60	8.00	64.0	76.0	114.00	35.0	1.38	●
SCD 077-064-080 ACP8	7.70	8.00	64.0	76.0	114.00	35.0	1.40	●
SCD 079-064-080 ACP8	7.90	8.00	64.0	76.0	114.00	35.0	1.44	●
SCD 082-080-100 ACP8	8.20	10.00	80.0	95.0	142.00	38.0	1.49	●
SCD 083-080-100 ACP8	8.30	10.00	80.0	95.0	142.00	38.0	1.51	●
SCD 084-080-100 ACP8	8.40	10.00	80.0	95.0	142.00	38.0	1.53	●
SCD 086-080-100 ACP8	8.60	10.00	80.0	95.0	142.00	38.0	1.57	●
SCD 087-080-100 ACP8	8.70	10.00	80.0	95.0	142.00	38.0	1.58	●
SCD 092-080-100 ACP8	9.20	10.00	80.0	95.0	142.00	38.0	1.67	●
SCD 093-080-100 ACP8	9.30	10.00	80.0	95.0	142.00	38.0	1.69	●
SCD 094-080-100 ACP8	9.40	10.00	80.0	95.0	142.00	38.0	1.71	●
SCD 096-080-100 ACP8	9.60	10.00	80.0	95.0	142.00	38.0	1.75	●
SCD 097-080-100 ACP8	9.70	10.00	80.0	95.0	142.00	38.0	1.77	●
SCD 098-080-100 ACP8	9.80	10.00	80.0	95.0	142.00	38.0	1.78	●
SCD 099-080-100 ACP8	9.90	10.00	80.0	95.0	142.00	38.0	1.80	●

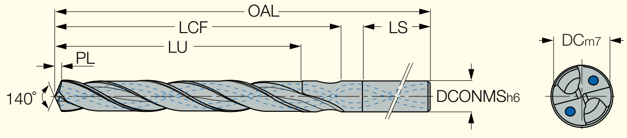
- For user guide and cutting conditions, see pages 651-667
- For regrinding instructions, see pages 662-666

SOLIDDRILL

SCD-ACP8N (8xD)

Solid Carbide Drills with Coolant Holes, Drilling Depth 8xD

DC	Tolerance m7
3.00-6	0.004-0.016
6.01-10	0.006-0.021
10.01-18	0.007-0.025
18.01-21	0.008-0.029



	Dimensions								
Designation	DC	DCONMS	LU	LCF	OAL	LS	Th(1)	PL	IC908
SCD 030-029-060 ACP8N	3.00	6.00	29.0	34.0	72.00	34.0		0.55	●
SCD 031-029-060 ACP8N	3.10	6.00	29.0	34.0	72.00	34.0		0.56	●
SCD 032-029-060 ACP8N	3.20	6.00	29.0	34.0	72.00	34.0		0.58	●
SCD 033-029-060 ACP8N	3.30	6.00	29.0	34.0	72.00	34.0	M4	0.60	●
SCD 034-029-060 ACP8N	3.40	6.00	29.0	34.0	72.00	34.0		0.62	●
SCD 035-029-060 ACP8N	3.50	6.00	29.0	34.0	72.00	34.0		0.64	●
SCD 036-029-060 ACP8N	3.60	6.00	29.0	34.0	72.00	34.0		0.66	●
SCD 037-029-060 ACP8N	3.70	6.00	29.0	34.0	72.00	34.0		0.67	●
SCD 038-036-060 ACP8N	3.80	6.00	36.0	43.0	81.00	35.0		0.69	●
SCD 039-036-060 ACP8N	3.90	6.00	36.0	43.0	81.00	35.0		0.71	●
SCD 040-036-060 ACP8N	4.00	6.00	36.0	43.0	81.00	35.0		0.73	●
SCD 041-036-060 ACP8N	4.10	6.00	36.0	43.0	81.00	35.0		0.75	●
SCD 042-036-060 ACP8N	4.20	6.00	36.0	43.0	81.00	35.0	M5	0.76	●
SCD 043-036-060 ACP8N	4.30	6.00	36.0	43.0	81.00	35.0		0.78	●
SCD 044-036-060 ACP8N	4.40	6.00	36.0	43.0	81.00	35.0		0.80	●
SCD 045-036-060 ACP8N	4.50	6.00	36.0	43.0	81.00	35.0		0.82	●
SCD 046-036-060 ACP8N	4.60	6.00	36.0	43.0	81.00	35.0		0.84	●
SCD 047-036-060 ACP8N	4.70	6.00	36.0	43.0	81.00	35.0		0.86	●
SCD 048-048-060 ACP8N	4.80	6.00	48.0	57.0	95.00	36.0		0.87	●
SCD 050-048-060 ACP8N	5.00	6.00	48.0	57.0	95.00	36.0	M6	0.91	●
SCD 052-048-060 ACP8N	5.20	6.00	48.0	57.0	95.00	36.0		0.95	●
SCD 053-048-060 ACP8N	5.30	6.00	48.0	57.0	95.00	36.0		0.96	●
SCD 055-048-060 ACP8N	5.50	6.00	48.0	57.0	95.00	36.0		1.00	●
SCD 058-048-060 ACP8N	5.80	6.00	48.0	57.0	95.00	36.0		1.06	●
SCD 060-048-060 ACP8N	6.00	6.00	48.0	57.0	95.00	36.0	M7	1.09	●
SCD 061-064-080 ACP8N	6.10	8.00	64.0	76.0	114.00	36.0		1.11	●
SCD 062-064-080 ACP8N	6.20	8.00	64.0	76.0	114.00	36.0		1.13	●
SCD 070-064-080 ACP8N	7.00	8.00	64.0	76.0	114.00	36.0		1.27	●
SCD 071-064-080 ACP8N	7.10	8.00	64.0	76.0	114.00	36.0		1.29	●
SCD 080-064-080 ACP8N	8.00	8.00	64.0	76.0	114.00	36.0		1.46	●
SCD 081-080-100 ACP8N	8.10	10.00	80.0	95.0	142.00	40.0		1.47	●
SCD 085-080-100 ACP8N	8.50	10.00	80.0	95.0	142.00	40.0	M10	1.55	●
SCD 088-080-100 ACP8N	8.80	10.00	80.0	95.0	142.00	40.0		1.60	●
SCD 090-080-100 ACP8N	9.00	10.00	80.0	95.0	142.00	40.0		1.64	●
SCD 095-080-100 ACP8N	9.50	10.00	80.0	95.0	142.00	40.0	M11	1.73	●
SCD 100-080-100 ACP8N	10.00	10.00	80.0	95.0	142.00	40.0		1.82	●

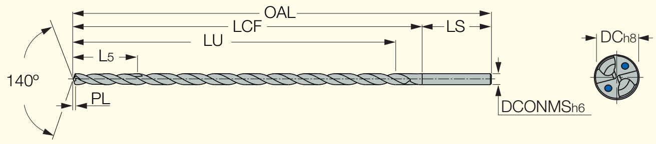
- For user guide and cutting conditions, see pages 651-667 • For regrinding instructions, see pages 662-666

(1) Used for standard thread size.

SOLIDDRILL

SCD-ACP20 (20xD)

Solid Carbide Drills with Coolant Holes, Drilling Depth 20xD



	Dimensions								
Designation	DC	LU	OAL	LCF	LS	L5(1)	DCONMS	PL	IC908
SCD 050-100-050ACP20	5.00	100.0	165.00	115.0	50.0	40.00	5.00	0.91	●
SCD 060-120-060ACP20	6.00	120.0	190.00	140.0	50.0	40.00	6.00	1.09	●
SCD 070-140-070ACP20	7.00	140.0	210.00	160.0	50.0	55.00	7.00	1.27	●
SCD 080-160-080ACP20	8.00	160.0	230.00	180.0	50.0	55.00	8.00	1.46	●
SCD 090-180-090ACP20	9.00	180.0	265.00	205.0	60.0	55.00	9.00	1.64	●
SCD 100-200-100ACP20	10.00	200.0	285.00	225.0	60.0	55.00	10.00	1.82	●

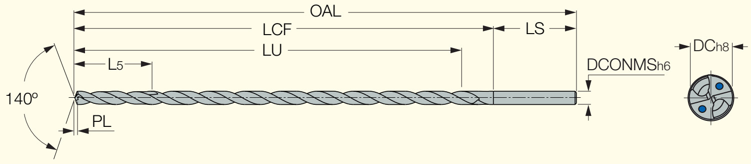
- For user guide and cutting conditions, see pages 651-667

(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



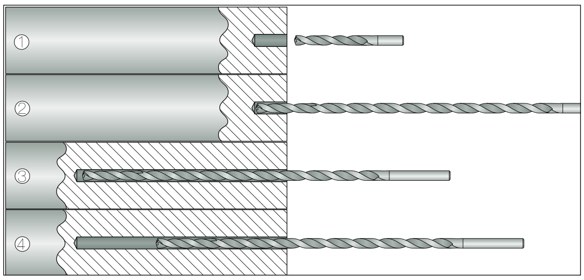
	Dimensions								
Designation	DC	LU	LCF	OAL	DCONMS	PL	LS	L5(1)	IC908
SCD 050-103-060ACP-CS	5.00	103.0	118.0	156.00	6.00	0.91	38.0	40.00	●
SCD 060-120-060ACP-CS	6.00	120.0	140.0	178.00	6.00	1.09	38.0	40.00	●

- For user guide and cutting conditions, see pages 651-667

(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 1-2xD 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 Drilling 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

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.

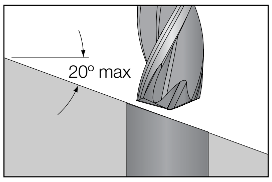
Advantages

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 150˚ point head can serve as centering drills for **CHAMDRILL/ SUMOCHAM** or **CHAMGUN** if necessary.

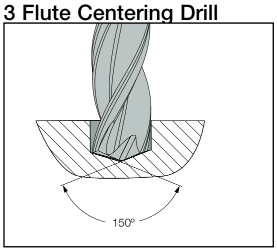
- See pages 660-661 for troubleshooting guide for common problems.
- Solid carbide drills can be used on a wide range of materials and different cutting conditions with high reliability and performance repeatability. This can reduce tool inventory and logistic costs.

3 Flute Solid Carbide Drills

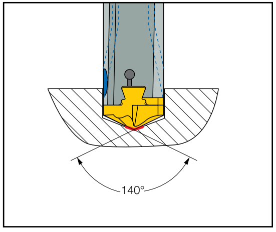
Three flute drills are used extensively on nonferrous metals because of their excellent performance on these materials. These solid carbide drills were designed with a special cutting edge geometry that can be used on a broad spectrum of materials including steel, stainless steel, high temperature alloys, 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, 150° 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.



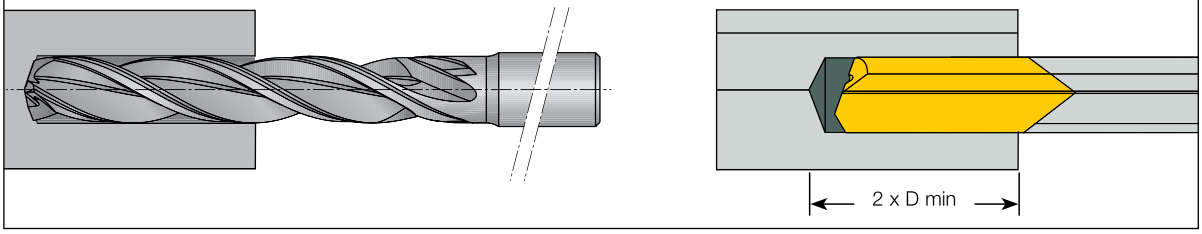
3 Flute Centering Drill



Followed by a CHAMDRILL SUMOCHAM/CHAMGUN



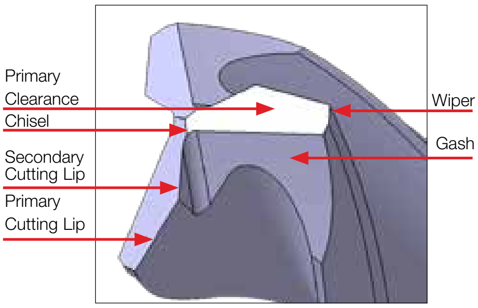
3 Flute Solid Carbide Drills



1 3 flute drill, drilling a pre-hole (drill diameter +0.02 mm)

2 Gundrill penetration through the pre-hole

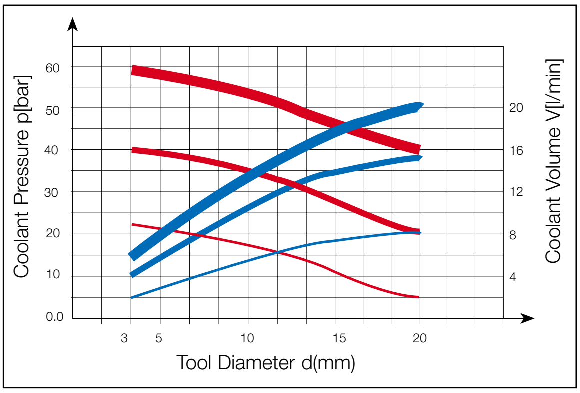
- The solid carbide drills can be re-sharpened and re-coated at least 10 times (see re-grinding instructions on page 665).
- The 3 flute drills feature high dynamic stability and reduced vibrations, which enable high speed drilling on nonferrous materials. (It is recommended to use balanceable adapters when exceeding 10,000 RPM).
- 3 flute, solid carbide drills can be used with minimal quantity lubrication or emulsion spray (MMS or MQL systems) or even dry machining for nonferrous materials.
- The 3 flute solid carbide drill has a unique cutting edge and gash geometry, producing an optimal chip on all kinds of materials, providing excellent chip evacuation.



- Excellent performance on low carbon steel or other gummy materials, when compared to any other 3 flute solid carbide drills which are usually not recommended to be used on such materials.
- Higher cutting edge life, when compared to 2 flute solid carbide drills without internal coolant holes. (The load is divided among three cutting edges, versus two).

  When compared to 2 flute solid carbide drills:
- Prolonged cutting edge life increases productivity, due to decrease in drill change and setup time.
- Less torque per cutting edge, therefore, can be used at higher feed rates or used to reduce torque on machines with limited torque
- The 3 flute solid carbide drills can be used on any CNC machining center, lathe machine, or drilling machine (which usually provides better and more stable conditions).

Coolant Pressure and Volume Recommendations



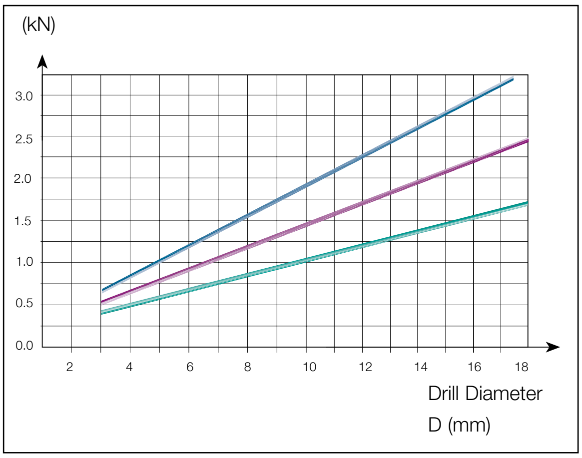
Required Coolant Pressure
🟥 Optimum pressure
🟥 Good pressure
🟥 Minimum pressure

Required Coolant Volume
🟦 Optimum volume
🟦 Good volume
🟦 Minimum volume

Required coolant pressure and volume for **SCD** drills with internal coolant spiral nozzles.

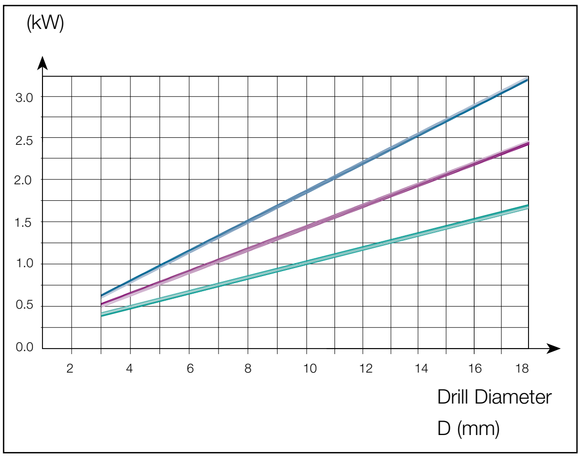
Force and Power Characteristics

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

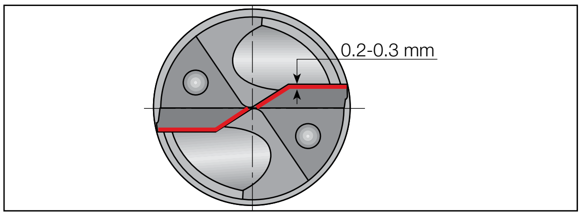
Material: SAE 4340
Speed: 100 m/min
Values may change for different materials and drilling conditions.

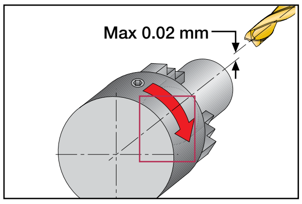
Stability

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.

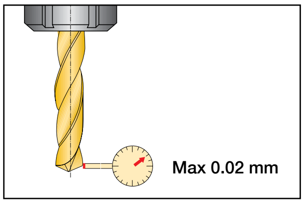
Tool Life

Drills should not be used with flank wear exceeding 0.2-0.3 mm.

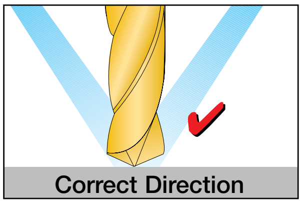




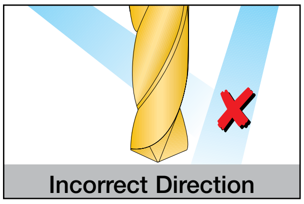
Stationary Drill



Rotating Drill



External Coolant



External Coolant

Machining Data for Solid Carbide Drills D=0.8-2.9 mm

ISO	Material		Condition	Tensile Strength $[N/mm^2]$	Hardness HB	Material 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 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
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			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
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

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
) For workpiece materials list, see pages 1114-1149

Mtl. No.	Cutting Speed Vc (m/min)	Feed (mm/rev) vs· Drill Diameter			
		Ø0.8-1.4	Ø1.5-1.9	Ø2-2.4	Ø2.5-2.9
1	50-100	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
2	40-100	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
3	40-85	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
4	40-85	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
5	40-85	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
6	40-75	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
7	40-60	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
8	40-60	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
9	40-60	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
10	30-50	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
11	30-50	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
12	20-35	0.03-0.06	0.04-0.08	0.05-0.10	0.06-0.10
13	20-35	0.03-0.06	0.04-0.08	0.05-0.10	0.06-0.10
14	20-35	0.03-0.06	0.04-0.08	0.05-0.10	0.06-0.10
15	40-80	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
16	40-70	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
17	40-95	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
18	50-95	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
19	40-80	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
20	40-80	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
21	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
22	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
23	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
24	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
25	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
26	80-150	0.03-0.10	0.05-0.15	0.07-0.17	0.08-0.20
27	50-150	0.05-0.12	0.07-0.15	0.08-0.18	0.09-0.18
28	60-160	0.05-0.15	0.07-0.18	0.08-0.20	0.09-0.22
29					
30					
31	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
32	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
33	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
34	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
35	10-20	0.02-0.04	0.03-0.06	0.04-0.07	0.04-0.08
36	10-20	0.02-0.03	0.02-0.03	0.03-0.04	0.03-0.04
37	10-20	0.02-0.03	0.02-0.03	0.03-0.04	0.03-0.04
38	10-20	0.01-0.02	0.01-0.02	0.02-0.03	0.02-0.03
39	10-20	0.01-0.02	0.01-0.02	0.02-0.03	0.02-0.03
40	10-20	0.01-0.02	0.01-0.02	0.02-0.03	0.02-0.03
41	10-20	0.01-0.02	0.01-0.02	0.02-0.03	0.02-0.03

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.

Machining Data for Solid Carbide Drills - IC908 D=3.0-20.0 mm

ISO	Material		Condition	Tensile Strength [N/mm^2]	Hardness HB	Material 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 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
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			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
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

When using external coolant supply only, reduce cutting speed by 10%
Use internal coolant supply when machining austenitic stainless steel
) For workpiece materials list, see pages 1114-1149

Mtl. No.	Cutting Speed Vc m/min	Feed (mm/rev) vs· Drill Diameter				
		Ø3-5	Ø5.1-8	Ø8.1-12	Ø12.1-16	Ø16.1-20
1	80-120	0.10-0.18	0.15-0.25	0.2-0.30	0.20-0.35	0.25-0.40
2	80-110	0.10-0.18	0.15-0.25	0.2-0.30	0.20-0.35	0.25-0.40
3	70-100	0.10-0.20	0.15-0.28	0.2-0.35	0.20-0.38	0.25-0.42
4						
5						
6	70-90	0.10-0.18	0.15-0.25	0.2-0.30	0.20-0.35	0.25-0.40
7						
8	60-80	0.10-0.18	0.15-0.25	0.2-0.30	0.20-0.35	0.25-0.40
9	50-70	0.10-0.20	0.15-0.28	0.2-0.35	0.20-0.38	0.25-0.42
10	60-80	0.10-0.20	0.15-0.28	0.18-0.35	0.20-0.38	0.25-0.42
11	50-70	0.10-0.15	0.12-0.20	0.14-0.25	0.16-0.30	0.18-0.32
12	25-75	0.04-0.10	0.05-0.15	0.05-0.18	0.08-0.20	0.10-0.20
13	25-75	0.04-0.10	0.05-0.15	0.05-0.18	0.08-0.20	0.10-0.20
14	25-75	0.04-0.10	0.05-0.15	0.05-0.18	0.08-0.20	0.10-0.20
15	85-105	0.15-0.25	0.20-0.35	0.25-0.45	0.30-0.50	0.35-0.55
16	75-90	0.15-0.25	0.20-0.35	0.25-0.45	0.30-0.50	0.35-0.55
17	65-80	0.12-0.20	0.15-0.25	0.20-0.35	0.25-0.40	0.30-0.45
18						
19						
20						
21	70-300	0.10-0.25	0.15-0.35	0.25-0.45	0.30-0.50	0.35-0.55
22						
23						
24	70-200					
25	70-300	0.07-0.18	0.12-0.25	0.20-0.35	0.25-0.45	0.30-0.50
26						
27						
28						
29						
30						
31	15-35	0.02-0.07	0.04-0.10	0.06-0.12	0.08-0.15	0.08-0.18
32						
33						
34						
35						
36						
37						
38	40-70	0.06-0.10	0.08-0.12	0.10-0.14	0.12-0.16	0.14-0.18
39						
40						
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.

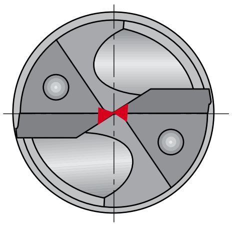
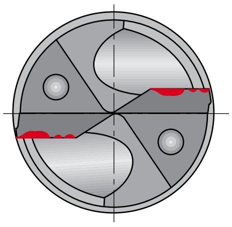
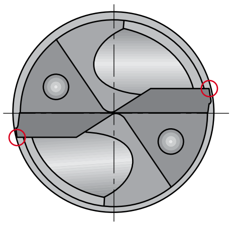
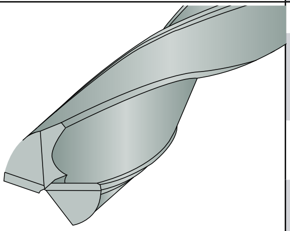
Cutting Recommendations for 3 Flute Solid Carbide Drills

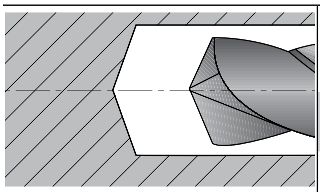
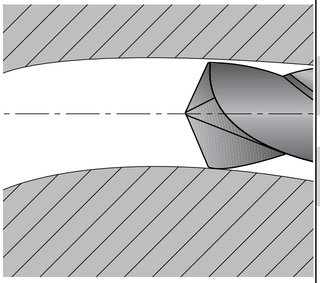
ISO	Material		Condition	Tensile Strength [N/mm^2]	Hardness HB	Material No.
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	1
		>= 0.25 %C	Annealed	650	190	2
		< 0.55 %C	Quenched and tempered	850	250	3
		>= 0.55 %C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Low alloy 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
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			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
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

Mtl. No.[1]	Cutting speed Vc m/min	Feed (mm/rev) vs. Drill Diameter				
		3-5	5.1-8	8.1-12	12.1-16	16.1-20
1	60-120	0.08-0.15	0.12-0.2	0.15-0.22	0.18-0.3	0.24-0.38
2	60-120					
3	70-100	0.08-0.16	0.12-0.23	0.15-0.28	0.2-0.34	0.25-0.40
4	70-110					
5	70-90					
6	60-120	0.08-0.15	0.12-0.2	0.15-0.22	0.16-0.28	0.2-0.32
7	70-110					
8	60-90					
9	50-80	0.08-0.16	0.12-0.23	0.15-0.28	0.15-0.31	0.2-0.34
10	60-120	0.08-0.16	0.12-0.23	0.15-0.28	0.15-0.31	0.2-0.34
11	40-70	0.08-0.12	0.1-0.16	0.11-0.2	0.13-0.24	0.15-0.26
12	25-80	0.03-0.08	0.04-0.12	0.04-0.15	0.065-0.16	0.08-0.18
13						
14	25-80	0.03-0.08	0.04-0.12	0.04-0.15	0.065-0.16	0.08-0.18
15	60-110	0.1-0.2	0.14-0.24	0.18-0.32	0.22-0.38	0.26-0.4
16	60-110					
17	80-150	0.12-0.24	0.16-0.28	0.2-0.36	0.24-0.45	0.28-0.48
18	80-150					
19	90-115					
20	90-115					
21	100-300	0.14-0.25	0.18-0.35	0.25-0.45	0.3-0.5	0.35-0.55
22						
23						
24						
25	100-200					
26	80-180	0.1-0.18	0.12-0.25	0.2-0.34	0.24-0.42	0.26-0.5
27						
28						
29						
30						
31	15-40	0.03-0.06	0.04-0.08	0.05-0.1	0.06-0.12	0.08-0.15
32						
33	15-25[1]					
34						
35						
36	15-40					
37						
38	20-50	0.03-0.06	0.04-0.08	0.05-0.1	0.06-0.12	0.08-0.15
39						
40						
41						

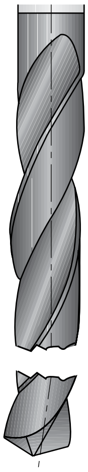
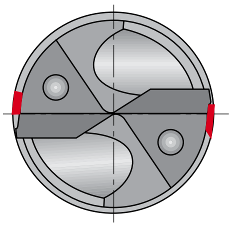
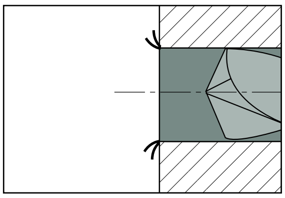
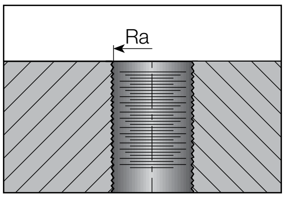
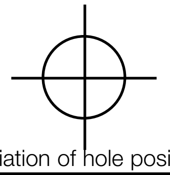
[1] For workpiece materials list, see pages 1114-1149

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.

Problem	Cause	Solution
 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

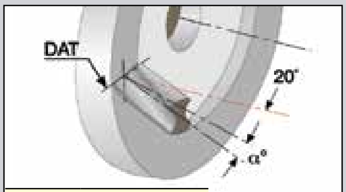
Problem	Cause	Solution
 Drill breakage	• Poor clamping of the chuck	• Check the clamping. Use hydraulic clamping chuck, maxin power chuck or a shrink system.
	• Workpiece movement	• Increase workpiece chucking force.
	• Wrong drill	• Check drill type and drilling depth, cooling system and workpiece material.
	• 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	**Cause**	**Solution**
 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 for AP and ACP Geometries

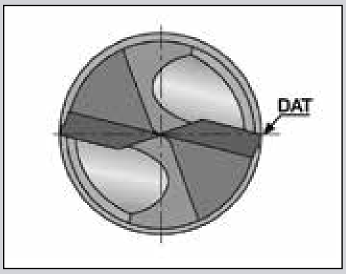
For each grinding operation, rotate the drill 180° and repeat the grinding procedure.

1

Primary Clearance

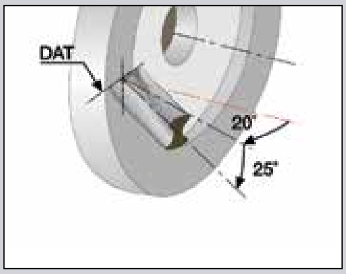


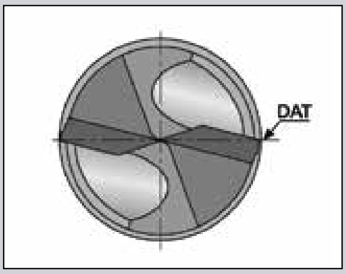
a°	D Range
7	0.8-6.0
10	>6.1



2

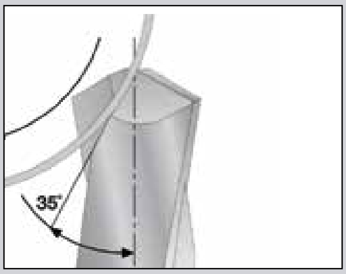
Secondary Clearance



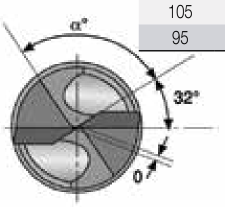


3

Chisel

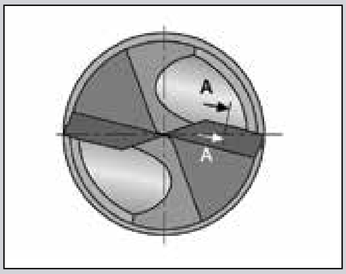


a°	D Range
100	3.0-4.8
105	4.9-10
95	10.1-20

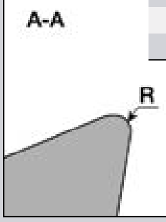


4

Edge Preparation



R	D Range
0.02	0.8-6.0
0.03	6.1-18.0
0.04	18.1>UP



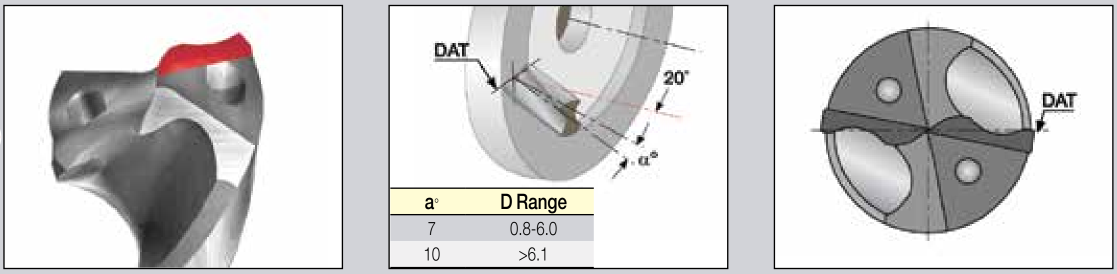
Grinding Wheel Recommended Specifications:

1. Diameter grinding wheel: **GA2**
2. Grinding wheel bond: synthetic resin
3. Grit size: 325**/**400 mesh (45**/38**μ)
4. Diamond concentration: **C**-75 (3.3 carat/cm3)
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.

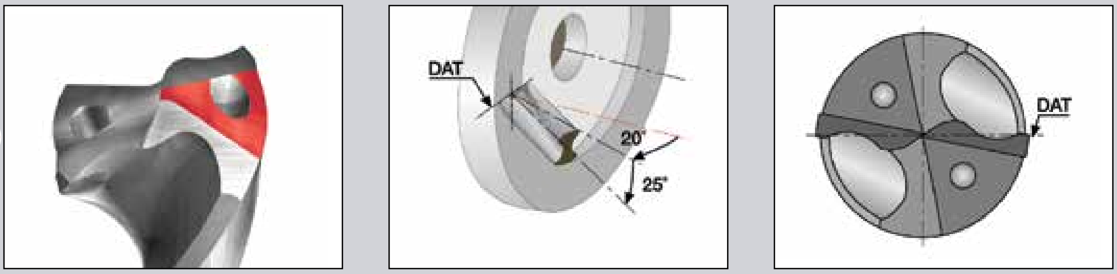
1



a°	D Range
7	0.8-6.0
10	>6.1

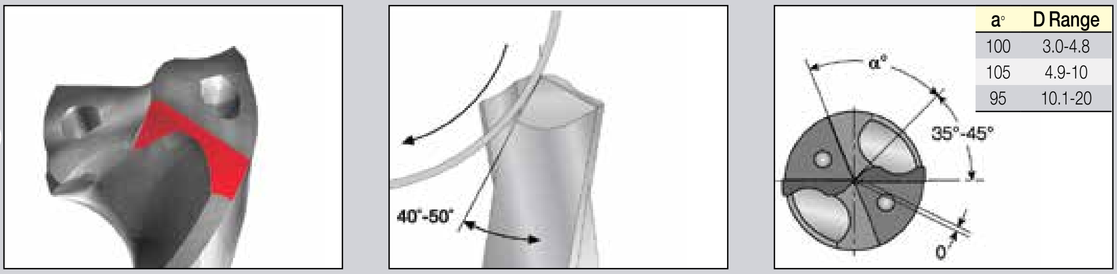
Primary Clearance

2



Secondary Clearance

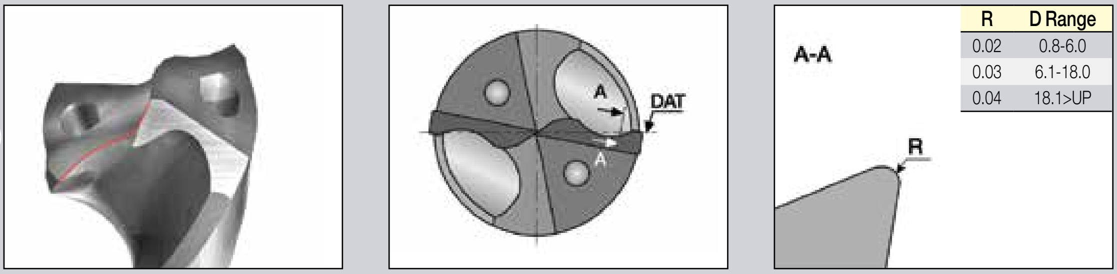
3



a°	D Range
100	3.0-4.8
105	4.9-10
95	10.1-20

Chisel

4



R	D Range
0.02	0.8-6.0
0.03	6.1-18.0
0.04	18.1>UP

Edge Preparation

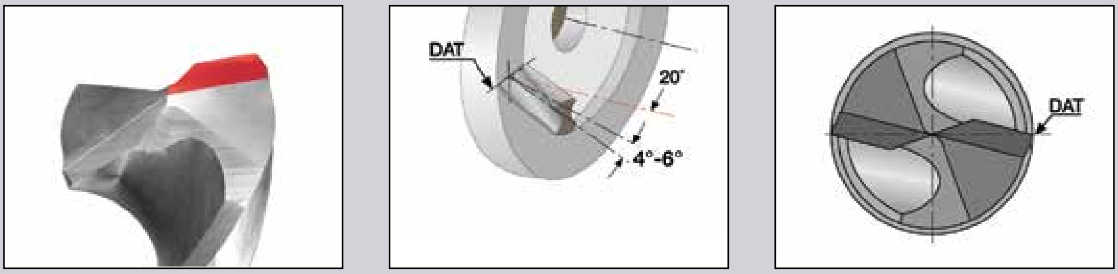
Grinding Wheel Recommended Specifications:

1. Diameter grinding wheel: **GA2**
2. Grinding wheel bond: synthetic resin
3. Grit size: 325/400 mesh (45/**38**μ)
4. Diamond concentration: **C**-75 (3.3 carat/cm3)
5. Cutting fluid emulsion 3%

Regrinding Instructions for AH Geometry

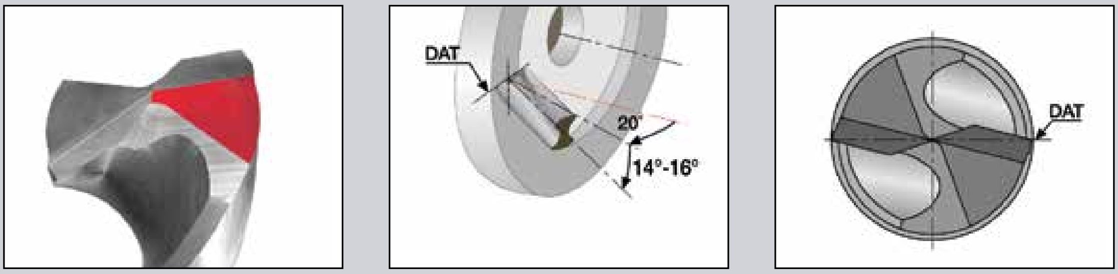
For each grinding operation, rotate the drill 180° and repeat the grinding procedure.

1



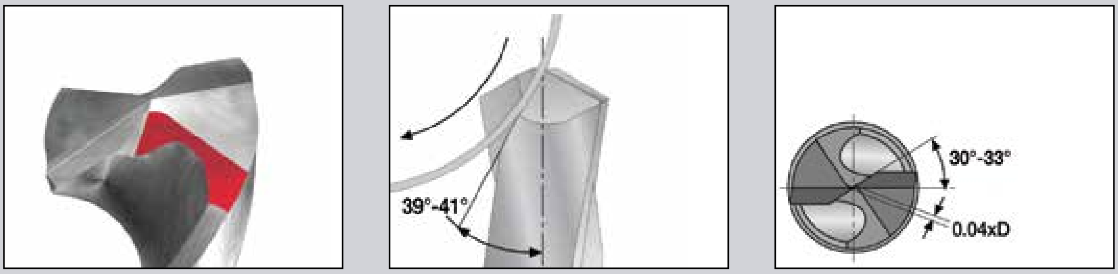
Primary Clearance

2



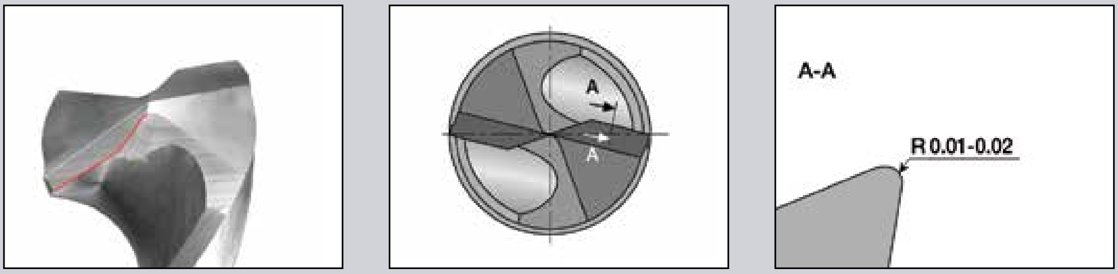
Secondary Clearance

3



Chisel

4



Edge Preparation

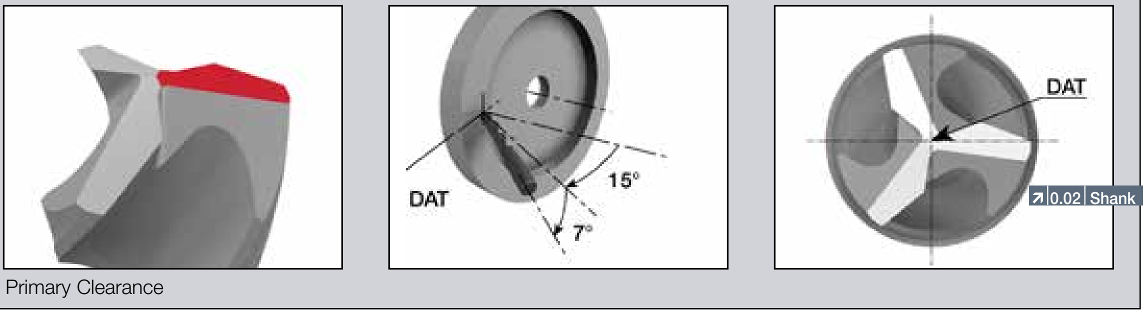
Grinding Wheel Recommended Specifications:

1. Diameter grinding wheel: **GA2**
2. Grinding wheel bond: synthetic resin
3. Grit size: 325**/**400 mesh (45**/38**μ)
4. Diamond concentration: **C**-75 (3.3 carat/cm3)
5. Cutting fluid emulsion 3%

Regrinding Instructions for 3 Flute SCCD Drills

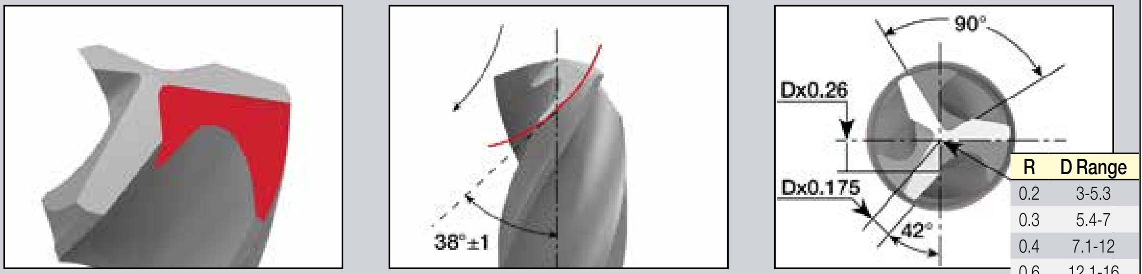
For each grinding operation, rotate the drill 120° and repeat the grinding procedure.

1



Primary Clearance

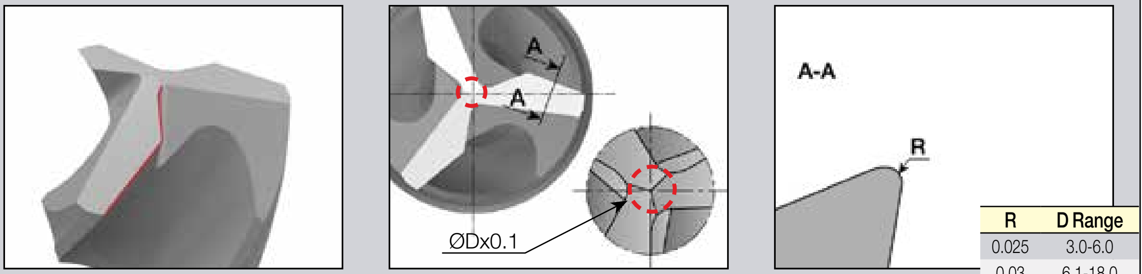
2



R	D Range
0.2	3-5.3
0.3	5.4-7
0.4	7.1-12
0.6	12.1-16
0.8	16.1-20

Chisel

3



R	D Range
0.025	3.0-6.0
0.03	6.1-18.0
0.04	18.1-20.0

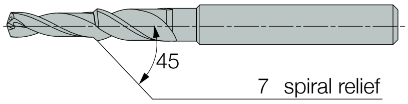
Edge Preparation

Grinding Wheel Recommended Specifications:

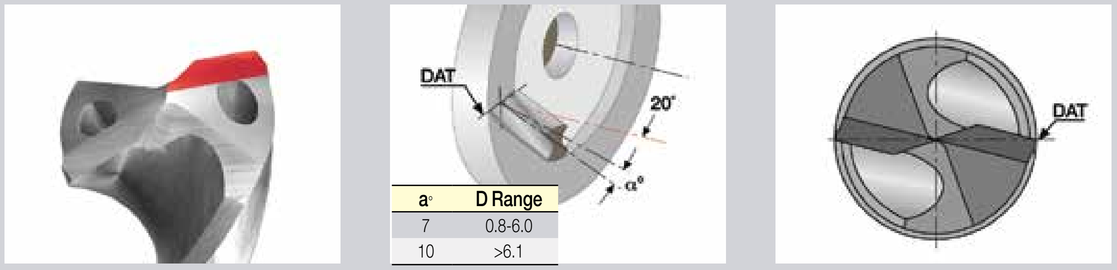
1. Diameter grinding wheel: **GA2**
2. Grinding wheel bond: synthetic resin
3. Grit size: 325**/**400 mesh (45/38µ)
4. Diamond concentration: C-75 (3.3 carat/cm3)
5. Cutting fluid emulsion 3%

Regrinding Instructions for SCDT Pre-Thread Solid Drills

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



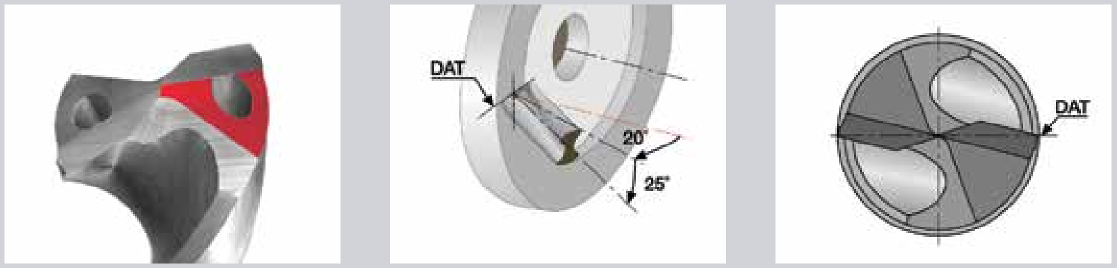
1



a°	D Range
7	0.8-6.0
10	>6.1

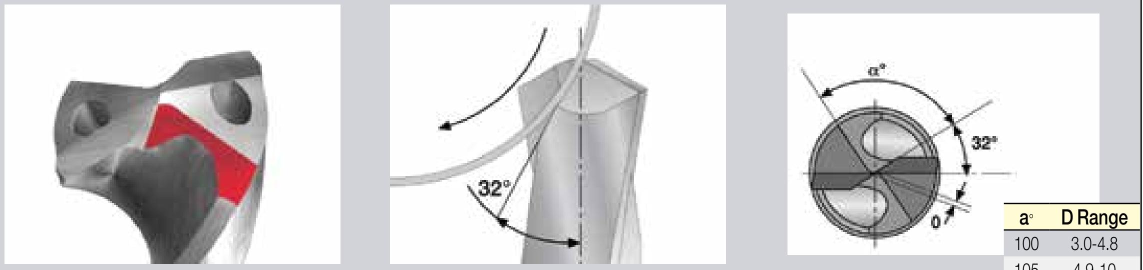
Primary Clearance

2



Secondary Clearance

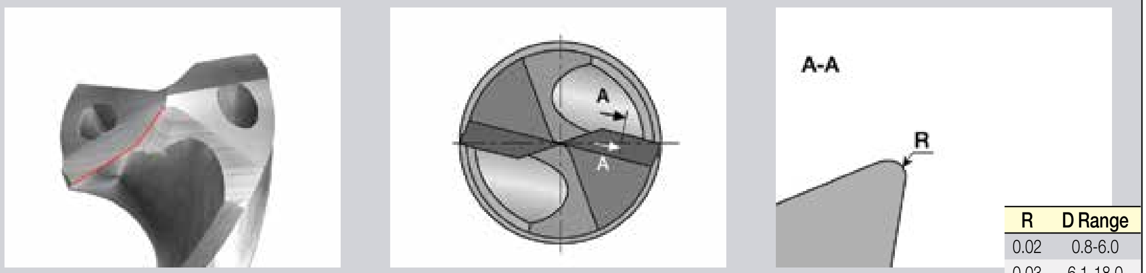
3



a°	D Range
100	3.0-4.8
105	4.9-10
95	10.1-20

Chisel

4



R	D Range
0.02	0.8-6.0
0.03	6.1-18.0
0.04	18.1>UP

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/cm3)
5. Cutting fluid emulsion 3%

General - Calculations

Spindle Speed (min^{-1})

$$n=\frac{vc \bullet 1000}{\pi \bullet D}$$

Power Requirement (kW)

$$Pc=\frac{Q}{60.000 \bullet \eta} \bullet kc \bullet \sin k$$

Cutting Speed (m/min)

$$vc = \frac{\pi \bullet D \bullet n}{1000}$$

Torque (Nm)

$$Mc=\frac{f \bullet kc}{1000} \bullet \frac{D^2}{8} \bullet \sin k \bullet km$$

Table Feed (mm/min)

$$vf = f \bullet n$$

Feed Force (approx.) (N)

$$Ff = 0.63 \bullet \frac{D}{2} \bullet f \bullet kc \bullet \sin k \bullet kf$$

Material Removal Rate (cm^3/min)

$$Q=\frac{vf \bullet \pi \bullet D^2}{4000}$$

Machining Time (min/piece)

$$Tc = \frac{L+h}{vf}$$

Machining Cost ($/piece)

$$Cc=\frac{CMh}{60} \bullet Tc$$

f = Feed/rev mm/rev
kc = Material specific cutting force N/mm^2
h = Distance from drill point to workpiece before feeding mm
L = Depth of hole mm
CMh = 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

SCD.., DCM.., DCN..

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) k=90°; sin k=1
Material No. 4 kc=2200 N/mm^2 CMh=50 $/h η=0.75
vc=200 m/min f=0.15 mm/rev L=25 mm h=10 mm
km=1 kf=1

$$n= \frac{vc \bullet 1000}{\pi \bullet D} = \frac{200 \bullet 1000}{\pi \bullet 22} =2894 \text{ min}^{-1}$$

$$vf = f \bullet n=0.15 \bullet 2894=434 \text{ mm/min}$$

$$Q= \frac{vf \bullet \pi \bullet D^2}{4000} = \frac{434 \bullet 3.14 \bullet (22)^2}{4000} =165 \text{ cm}^3\text{/min}$$

$$Pc= \frac{Q}{60.000 \bullet \eta} \bullet kc \bullet \sin k= \frac{165}{60.000 \bullet 0.75} \bullet 2200 \bullet 1 =8.06 \text{ kW}$$

$$Mc= \frac{f \bullet kc}{1000} \bullet \frac{D^2}{8} \bullet \sin k= \frac{0.15 \bullet 2200}{1000} \bullet \frac{222}{8} \bullet 1 \bullet 1=20 \text{ Nm}$$

$$Ff=0.63 \bullet \frac{D}{2} \bullet f \bullet kc \bullet \sin k= 0.63 \bullet \frac{22}{2} \bullet 0.15 \bullet 2200 \bullet 1 \bullet 1=2286 \text{ N}$$

$$Tc = \frac{L+h}{vf} = \frac{25+10}{434} = 0.08 \text{ min/piece}$$

$$Cc= \frac{CMh}{60} \bullet Tc = \frac{50 \bullet 0.08}{60} = 0.067 \text{ \$/piece}$$

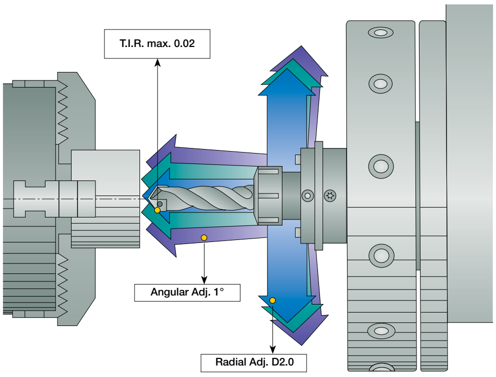
For material groups, see pages 1114-1149

k_C Values

Material Group	kc 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
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
4 1	4500

GYRO Auxiliary Devices for Lathe Machines

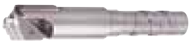
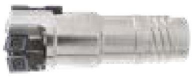
Designed to Correct Misalignment on Stationary Operation



- 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 performance.

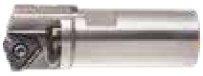
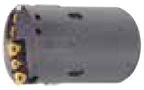
DEEP HOLE DRILLING

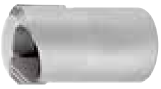
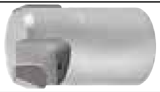
SINGLE TUBE SYSTEM - EXTERNAL THREAD

Drilling Head		Diameter Range	Hole Tolerance	Surface Finish	Fixture	Page
DSD-E0		8.00-14.79	**IT9**	2µm	Brazed Tips	**672**
DSD-E1		12.60-20.00				**672**
DSD-E2/E3		12.60-65.00				**673**
DSD-EC		38.00-232.99		3µm	Indexable Inserts	**674**
DSD-EF-FT		16.00-28.00				**674**
DSD-EF-FB		25.00-65.00				**675**

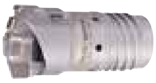
Counterbore Head		Diameter Range	Hole Tolerance	Surface Finish	Fixture	Page
DSC-E1 By special request only		18.91-65.00	**IT7**	1µm	Brazed Tips	**675**
DST-E1 By special request only		18.91-65.00				**676**
DSC-EA		25.00-39.99	**IT8**	2µm	Indexable Inserts	**676**
DSC-EC		40.00-99.99				**677**

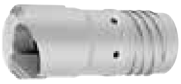
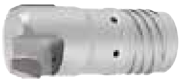
SINGLE TUBE SYSTEM - INTERNAL THREAD

Drilling Head		Diameter Range	Hole Tolerance	Surface Finish	Fixture	Page
DSD-I1 By special request only		14.51-65.00	IT9	3µm	Brazed Tips	**678**
DSD-IF-FT		16.00-28.00			Indexable Inserts	**679**
DSD-IF-FB		25.00-65.00				**679**
DSD-IC		38.00-245.99				**680**

Counterbore Head		Diameter Range	Hole Tolerance	Surface Finish	Fixture	Page
DSC-I1 By special request only		14.51-65.00	IT7	1µm	Brazed Tips	**681**
DST-I1 By special request only		14.51-65.00				**682**
DSC-IA		25.00-39.99	IT8	2µm	Indexable Inserts	**683**
DSC-IC		40.00-110.99				**683**

DOUBLE TUBE SYSTEM

Drilling Head		Diameter Range	Hole Tolerance	Surface Finish	Fixture	Page
DDD-E3		18.41-65.00	IT9	2µm	Brazed Tips	**684**
DDD-EF-FT		18.41-28.00		3µm	Indexable Inserts	**685**
DDD-EF-FB		25.00-65.00				**686**
DDD-EC		38.00-168.99				**686**

Counterbore Head		Diameter Range	Hole Tolerance	Surface Finish	Fixture	Page
DDC-E1 By special request only		18.41-65.00	IT7	1µm	Brazed Tips	**687**
DDT-E1 By special request only		18.41-65.00				**688**

DEEP HOLE DRILLING Index

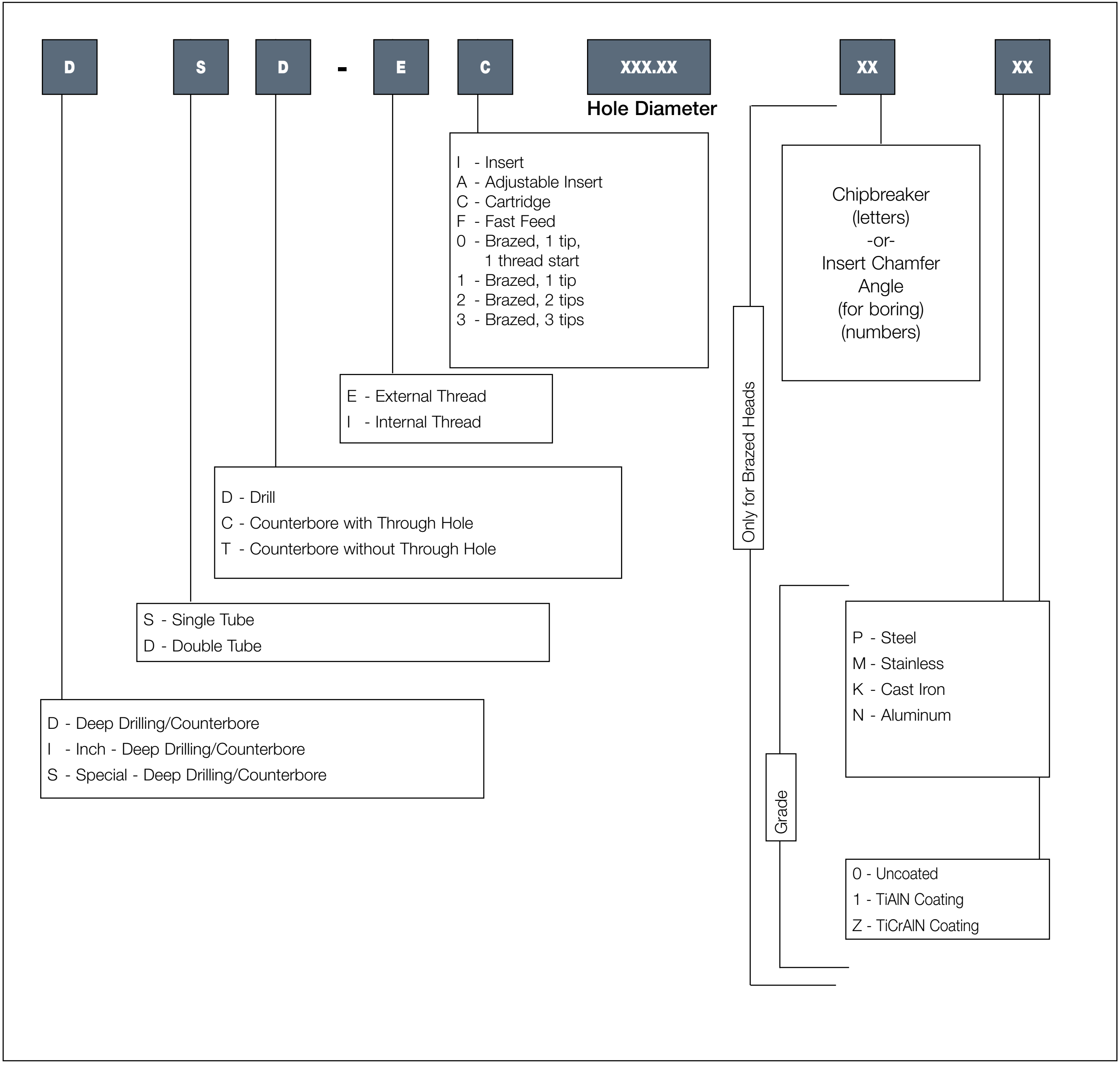
Single Tube System

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



D S D - E C XXX.XX XX XX

Hole Diameter

I - Insert
A - Adjustable Insert
C - Cartridge
F - Fast Feed
0 - Brazed, 1 tip, 1 thread start
1 - Brazed, 1 tip
2 - Brazed, 2 tips
3 - Brazed, 3 tips

E - External Thread
I - Internal Thread

D - Drill
C - Counterbore with Through Hole
T - Counterbore without Through Hole

S - Single Tube
D - Double Tube

D - Deep Drilling/Counterbore
I - Inch - Deep Drilling/Counterbore
S - Special - Deep Drilling/Counterbore

Only for Brazed Heads

Chipbreaker
(letters)
-or-
Insert Chamfer
Angle
(for boring)
(numbers)

Grade

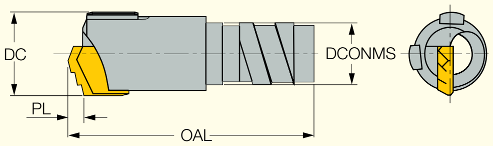
P - Steel
M - Stainless
K - Cast Iron
N - Aluminum

0 - Uncoated
1 - TiAlN Coating
Z - TiCrAlN Coating

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 702-719 • Ordering example: DSD-E0 11.30 DT-PO

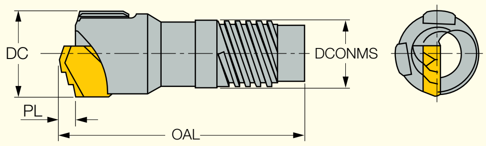
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For holders, see pages: TS*** (697)

ISCARDEEPDRILL

DSD-E1

Deep Single Tube Drills with External 2 and 4 Start Thread 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 702-719 • Ordering example: DSD-E1 14.50 DT-PO

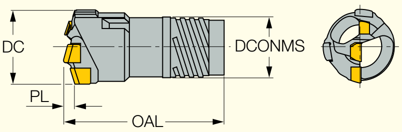
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) No. of thread starts
(4) Tube designation

For holders, see pages: TS-I** (698)

ISCARDEEPDRILL

DSD-E2/E3

Deep Single Tube Drills with External 2 and 4 Start Thread 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 2	14.11	14.60	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 14.61-15.10 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	52.60	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 702-719 • Ordering example: DSD-E343.30 DT-PO

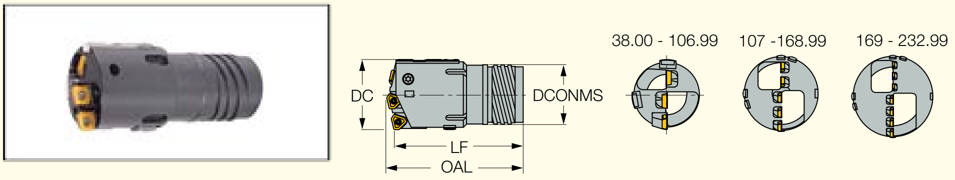
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Number of thread starts
(4) Tube designation

For holders, see pages: TS-I** (698)

ISCARDEEPDRILL

DSD-EC

Deep Single Tube Drills with External 4 Start Thread and Cartridges (29-233 dia.)



Designation	DCN(1)	DCX(2)	OAL	LF	DCONMS	Ts(3)
DSD-EC 38.00-39.60	38.00	36.90	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 232.00-232.99	232.00	232.99	293.00	270.00	220.00	TS-I34

- 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 691
- For quotation form and user guide, see pages 702-719 • For spare parts, see page 691 • Ordering example: DSD-EC 067.30

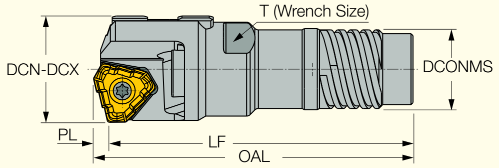
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For inserts, see pages: NPMX 0803 RB/RG (692) • TPMX (692)
For holders, see pages: TS-I** (698)

TRIDEEP
DEEP DRILLING

DSD-EF-FT

Deep Single Tube Drills with External 4 Start Thread Connection Carrying Triangular Inserts (16-28 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

- Note: Each item in the attached catalog page represents a diameter range • For spare parts, insert information and user guide, see pages 689, 702-719
- Inserts and guide pads should be ordered separately • Ordering example: DSD-EF 016.50-FT

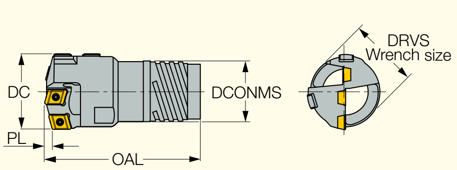
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For inserts, see pages: TOGT (722)
For holders, see pages: TS-I** (698)

FINEBEAM

DSD-EF-FB

Deep Single Tube Drills with External 4 Start Thread for High Feed (25-65 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

- For spare parts and insert information, see page 689 • For user guide and quotation form, see pages 702-719 • Inserts and guide pads should be ordered separately
- Ordering example: DSD-EF 043.10-FB

[1] Cutting diameter minimum

[2] Cutting diameter maximum

[3] Key flat size

[4] Tube designation

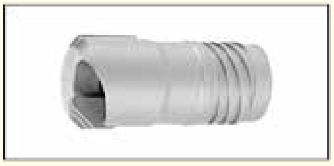
For inserts, see pages: NPHT-RG (694) • NPMT-L2/R2 (693)

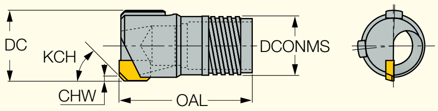
For holders, see pages: TS-I** (698)

ISCARDEEPDRILL

DSC-E1

Deep Single Tube Counterborer with Through Hole, External 4 Start Thread and a Brazed Tip (18.9-65 dia.)





NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	DCN[1]	DCX[2]	KCH	CHW	OAL	DCONMS	Ts[3]
DSC-E1 18.91-20.00 NOM 0	18.91	20.00	20/45	1.0	57.00	15.50	TS-I3
DSC-E1 18.91-20.00 NOM 2	18.91	20.00	20/45	1.0	57.00	15.50	TS-I3
DSC-E1 20.01-21.80 NOM 0	20.01	21.80	20/45	2.0	65.00	16.00	TS-I4
DSC-E1 20.01-21.80 NOM 2	20.01	21.80	20/45	2.0	65.00	16.00	TS-I4
DSC-E1 21.81-24.10 NOM 0	21.81	24.10	20/45	2.0	65.00	18.00	TS-I5
DSC-E1 21.81-24.10 NOM 2	21.81	24.10	20/45	2.0	65.00	18.00	TS-I5
DSC-E1 24.11-26.40 NOM 0	24.11	26.40	20/45	2.0	65.00	19.50	TS-I6
DSC-E1 24.11-26.40 NOM 2	24.11	26.40	20/45	2.0	65.00	19.50	TS-I6
DSC-E1 26.41-28.70 NOM 0	26.41	28.70	20/45	2.0	65.00	21.00	TS-I7
DSC-E1 26.41-28.70 NOM 2	26.41	28.70	20/45	2.0	65.00	21.00	TS-I7
DSC-E1 28.71-31.00 NOM 0	28.71	31.00	20/45	2.0	70.00	23.50	TS-I8
DSC-E1 28.71-31.00 NOM 2	28.71	31.00	20/45	2.0	70.00	23.50	TS-I8
DSC-E1 31.01-33.30 NOM 0	31.01	33.30	20/45	3.0	70.00	25.50	TS-I9
DSC-E1 31.01-33.30 NOM 2	31.01	33.30	20/45	3.0	70.00	25.50	TS-I9
DSC-E1 33.31-36.20 NOM 0	33.31	36.20	20/45	3.0	70.00	28.00	TS-I10
DSC-E1 33.31-36.20 NOM 2	33.31	36.20	20/45	3.0	70.00	28.00	TS-I10
DSC-E1 36.21-39.60 NOM 0	36.21	39.60	20/45	3.0	82.00	30.00	TS-I11
DSC-E1 36.21-39.60 NOM 2	36.21	39.60	20/45	3.0	82.00	30.00	TS-I11
DSC-E1 39.61-43.00 NOM 0	39.61	43.00	20/45	3.0	82.00	33.00	TS-I12
DSC-E1 39.61-43.00 NOM 2	39.61	43.00	20/45	3.0	82.00	33.00	TS-I12
DSC-E1 43.01-47.00 NOM 0	43.01	47.00	20/45	3.0	82.00	36.00	TS-I13
DSC-E1 43.01-47.00 NOM 2	43.01	47.00	20/45	3.0	82.00	36.00	TS-I13
DSC-E1 47.01-51.70 NOM 0	47.01	51.70	20/45	3.0	82.00	39.00	TS-I14
DSC-E1 47.01-51.70 NOM 2	47.01	51.70	20/45	3.0	82.00	39.00	TS-I14
DSC-E1 51.71-56.20 NOM 0	51.71	56.20	20/45	3.0	93.00	43.00	TS-I15
DSC-E1 51.71-56.20 NOM 2	51.71	56.20	20/45	3.0	93.00	43.00	TS-I15
DSC-E1 56.21-60.60 NOM 0	56.21	60.60	20/45	3.0	93.00	47.00	TS-I16
DSC-E1 56.21-60.60 NOM 2	56.21	60.60	20/45	3.0	93.00	47.00	TS-I16
DSC-E1 60.61-65.00 NOM 0	60.61	65.00	20/45	3.0	93.00	51.00	TS-I17
DSC-E1 60.61-65.00 NOM 2	60.61	65.00	20/45	3.0	93.00	51.00	TS-I17

- The drill tip is supplied in a grade that is suitable to machine the material group which is indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron • For quotation form and user guide, see pages 702-719 • Ordering example: DSC-E1 42.20 45-P0

[1] Cutting diameter minimum

[2] Cutting diameter maximum

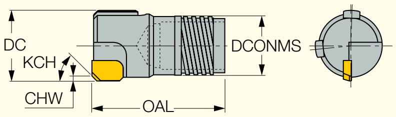
[3] Tube designation

For holders, see pages: TS-I** (698)

ISCARDEEPDRILL

DST-E1

Deep Single Tube Counterborer with Through Hole, External 4 Start Thread and a Brazed Tip (18.9-65 dia.)



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	DCN(1)	DCX(2)	KCH	CHW	OAL	DCONMS	Ts(3)
DST-E1 18.91-20.00 NOM 0	18.91	20.00	20/45	1.0	57.00	15.50	TS-I3
DST-E1 18.91-20.00 NOM 2	18.91	20.00	20/45	1.0	57.00	15.50	TS-I3
DST-E1 20.01-21.80 NOM 0	20.01	21.80	20/45	2.0	65.00	16.00	TS-I4
DST-E1 20.01-21.80 NOM 2	20.01	21.80	20/45	2.0	65.00	16.00	TS-I4
DST-E1 21.81-24.10 NOM 0	21.81	24.10	20/45	2.0	65.00	18.00	TS-I5
DST-E1 21.81-24.10 NOM 2	21.81	24.10	20/45	2.0	65.00	18.00	TS-I5
DST-E1 24.11-26.40 NOM 0	24.11	26.40	20/45	2.0	65.00	19.50	TS-I6
DST-E1 24.11-26.40 NOM 2	24.11	26.40	20/45	2.0	65.00	19.50	TS-I6
DST-E1 26.41-28.70 NOM 0	26.41	28.70	20/45	2.0	65.00	21.00	TS-I7
DST-E1 26.41-28.70 NOM 2	26.41	28.70	20/45	2.0	65.00	21.00	TS-I7
DST-E1 28.71-31.00 NOM 0	28.71	31.00	20/45	2.0	70.00	23.50	TS-I8
DST-E1 28.71-31.00 NOM 2	28.71	31.00	20/45	2.0	70.00	23.50	TS-I8
DST-E1 31.01-33.30 NOM 0	31.01	33.30	20/45	3.0	70.00	25.50	TS-I9
DST-E1 31.01-33.30 NOM 2	31.01	33.30	20/45	3.0	70.00	25.50	TS-I9
DST-E1 33.31-36.20 NOM 0	33.31	36.20	20/45	3.0	70.00	28.00	TS-I10
DST-E1 33.31-36.20 NOM 2	33.31	36.20	20/45	3.0	70.00	28.00	TS-I10
DST-E1 36.21-39.60 NOM 0	36.21	39.60	20/45	3.0	82.00	30.00	TS-I11
DST-E1 36.21-39.60 NOM 2	36.21	39.60	20/45	3.0	82.00	30.00	TS-I11
DST-E1 39.61-43.00 NOM 0	39.61	43.00	20/45	3.0	82.00	33.00	TS-I12
DST-E1 39.61-43.00 NOM 2	39.61	43.00	20/45	3.0	82.00	33.00	TS-I12
DST-E1 43.01-47.00 NOM 0	43.01	47.00	20/45	3.0	82.00	36.00	TS-I13
DST-E1 43.01-47.00 NOM 2	43.01	47.00	20/45	3.0	82.00	36.00	TS-I13
DST-E1 47.01-51.70 NOM 0	47.01	51.70	20/45	3.0	82.00	39.00	TS-I14
DST-E1 47.01-51.70 NOM 2	47.01	51.70	20/45	3.0	82.00	39.00	TS-I14
DST-E1 51.71-56.20 NOM 0	51.71	56.20	20/45	3.0	93.00	43.00	TS-I15
DST-E1 51.71-56.20 NOM 2	51.71	56.20	20/45	3.0	93.00	43.00	TS-I15
DST-E1 56.21-60.60 NOM 0	56.21	60.60	20/45	3.0	93.00	47.00	TS-I16
DST-E1 56.21-60.60 NOM 2	56.21	60.60	20/45	3.0	93.00	47.00	TS-I16
DST-E1 60.61-65.00 NOM 0	60.61	65.00	20/45	3.0	93.00	51.00	TS-I17
DST-E1 60.61-65.00 NOM 2	60.61	65.00	20/45	3.0	93.00	51.00	TS-I17

- The drill tip is supplied in a grade that is suitable to machine the material group which is indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron
- For quotation form and user guide, see pages 702-719 • Ordering example: DST-E1 42.20 45-P0

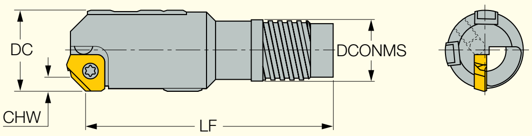
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For holders, see pages: TS-I** (698)

ISCARDEEPDRILL

DSC-EA

Deep Single Tube Counterborer 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 spare parts and insert information, see pages 690 • For user guide and quotation form, see pages 702-719 • Ordering example: DSC-EA 033.20

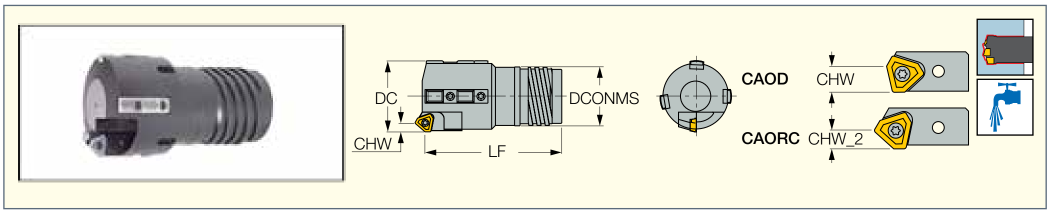
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designationm

For inserts, see pages: XPMT-45 (693)
For holders, see pages: TS-I** (698)

ISCARDEEPDRILL

DSC-EC

Deep Single Tube Counterborer
with Through Hole, External
4 Start Thread and a
Cartridge (40-100 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

• CAOD - Rough boring cartridge (for large D.O.C.), supplied with the cartridge, unless ordered differently • CAORC - Precision boring cartridge • For spare parts and insert information, see page 690 • For quotation form and user guide, see pages 702-719

[1] Cutting diameter minimum

[2] Cutting diameter maximum

[3] Tube designation

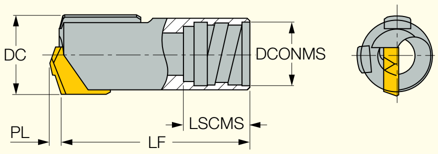
For inserts, see pages: TPMX (692) • XPMT-45 (693)

For holders, see pages: TS-I** (698)

ISCARDEEPDRILL

DSD-I1

Deep Single Tube Drills with Internal Single Start Thread and a Brazed Tip (14.5-65 dia.)



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	DCN(1)	DCX(2)	LF	LSCMS	DCONMS	PL	Ts(3)
DSD-I1 14.51-15.00 NOM 0	14.51	15.00	52.00	22.00	11.50	2.20	TS-O0
DSD-I1 14.51-15.00 NOM 2	14.51	15.00	52.00	22.00	11.50	2.20	TS-O0
DSD-I1 15.01-15.50 NOM 0	15.01	15.50	52.30	22.80	11.80	2.30	TS-O1
DSD-I1 15.01-15.50 NOM 2	15.01	15.50	52.30	22.80	11.80	2.30	TS-O1
DSD-I1 15.51-16.00 NOM 0	15.51	16.00	52.30	22.80	12.40	2.30	TS-O2
DSD-I1 15.51-16.00 NOM 2	15.51	16.00	52.30	22.80	12.40	2.30	TS-O2
DSD-I1 16.01-16.50 NOM 0	16.01	16.50	52.40	22.80	12.70	2.40	TS-O3
DSD-I1 16.01-16.50 NOM 2	16.01	16.50	52.40	22.80	12.70	2.40	TS-O3
DSD-I1 16.51-17.25 NOM 0	16.51	17.25	52.70	22.80	13.40	2.70	TS-O4
DSD-I1 16.51-17.25 NOM 2	16.51	17.25	52.70	22.80	13.40	2.70	TS-O4
DSD-I1 17.26-18.00 NOM 0	17.26	18.00	52.70	22.80	13.70	2.70	TS-O5
DSD-I1 17.26-18.00 NOM 2	17.26	18.00	52.70	22.80	13.70	2.70	TS-O5
DSD-I1 18.01-19.00 NOM 0	18.01	19.00	52.80	22.80	14.40	2.80	TS-O6
DSD-I1 18.01-19.00 NOM 2	18.01	19.00	52.80	22.80	14.40	2.80	TS-O6
DSD-I1 19.01-19.99 NOM 0	19.01	19.99	52.90	22.80	15.40	2.90	TS-O7
DSD-I1 19.01-19.99 NOM 2	19.01	19.99	52.90	22.80	15.40	2.90	TS-O7
DSD-I1 20.00-21.99 NOM 0	20.00	21.99	62.10	25.00	16.50	3.10	TS-O8
DSD-I1 20.00-21.99 NOM 2	20.00	21.99	62.10	25.00	16.50	3.10	TS-O8
DSD-I1 22.00-24.99 NOM 0	22.00	24.99	62.40	25.00	19.00	3.40	TS-O9
DSD-I1 22.00-24.99 NOM 2	22.00	24.99	62.40	25.00	19.00	3.40	TS-O9
DSD-I1 25.00-26.99 NOM 0	25.00	26.99	69.70	25.00	20.00	3.70	TS-O10
DSD-I1 25.00-26.99 NOM 2	25.00	26.99	69.70	25.00	20.00	3.70	TS-O10
DSD-I1 27.00-29.99 NOM 0	27.00	29.99	70.00	25.00	22.00	4.00	TS-O11
DSD-I1 27.00-29.99 NOM 2	27.00	29.99	70.00	25.00	22.00	4.00	TS-O11
DSD-I1 30.00-31.99 NOM 0	30.00	31.99	75.40	25.00	24.00	4.40	TS-O12
DSD-I1 30.00-31.99 NOM 2	30.00	31.99	75.40	25.00	24.00	4.40	TS-O12
DSD-I1 32.00-33.99 NOM 0	32.00	33.99	85.60	25.00	26.00	4.60	TS-O13
DSD-I1 32.00-33.99 NOM 2	32.00	33.99	85.60	25.00	26.00	4.60	TS-O13
DSD-I1 34.00-36.99 NOM 0	34.00	36.99	86.00	40.00	27.00	5.00	TS-O14
DSD-I1 34.00-36.99 NOM 2	34.00	36.99	86.00	40.00	27.00	5.00	TS-O14
DSD-I1 37.00-39.99 NOM 0	37.00	39.99	86.20	40.00	30.00	5.20	TS-O15
DSD-I1 37.00-39.99 NOM 2	37.00	39.99	86.20	40.00	30.00	5.20	TS-O15
DSD-I1 40.00-43.99 NOM 0	40.00	43.99	86.60	40.00	33.00	5.10	TS-O16
DSD-I1 40.00-43.99 NOM 2	40.00	43.99	86.60	40.00	33.00	5.10	TS-O16
DSD-I1 44.00-46.99 NOM 0	44.00	46.99	97.00	40.00	37.00	5.50	TS-O17
DSD-I1 44.00-46.99 NOM 2	44.00	46.99	97.00	40.00	37.00	5.50	TS-O17
DSD-I1 47.00-51.99 NOM 0	47.00	51.99	97.40	40.00	41.00	5.90	TS-O18
DSD-I1 47.00-51.99 NOM 2	47.00	51.99	97.40	40.00	41.00	5.90	TS-O18
DSD-I1 52.00-56.99 NOM 0	52.00	56.99	97.70	40.00	44.00	6.20	TS-O19
DSD-I1 52.00-56.99 NOM 2	52.00	56.99	97.70	40.00	44.00	6.20	TS-O19
DSD-I1 57.00-60.99 NOM 0	57.00	60.99	98.20	40.00	49.00	6.70	TS-O20
DSD-I1 57.00-60.99 NOM 2	57.00	60.99	98.20	40.00	49.00	6.70	TS-O20
DSD-I1 61.00-65.00 NOM 0	61.00	65.00	98.70	40.00	53.00	7.20	TS-O21
DSD-I1 61.00-65.00 NOM 2	61.00	65.00	98.70	40.00	53.00	7.20	TS-O21

- 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 quotation form and user guide, see pages 702-719 • Ordering example: DSD-I1 38.20 DT-P0

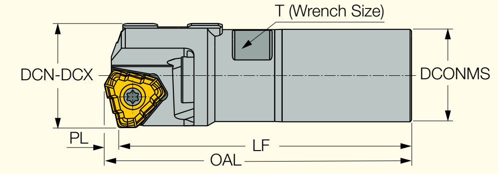
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For holders, see pages: TS-O** (699)

TRIDEEP DEEP DRILLING

DSD-IF-FT

Deep Single Tube Drills with Internal Single Start Thread Carrying Triangular Inserts (16-28 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-03
DSD-IF 16.51-17.25-FT	16.51	17.25	53.50	55.70	2.20	13.40	TS-04
DSD-IF 17.26-18.00-FT	17.26	18.00	53.50	55.70	2.20	13.70	TS-05
DSD-IF 18.01-19.00-FT	18.01	19.00	53.50	56.50	3.00	14.40	TS-06
DSD-IF 19.01-19.99-FT	19.01	19.99	53.50	56.70	3.20	15.40	TS-07
DSD-IF 20.00-21.99-FT	20.00	21.99	58.00	61.20	3.20	16.50	TS-08
DSD-IF 22.00-24.99-FT	22.00	24.99	60.00	63.40	3.40	19.00	TS-09
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

• Note: Each item in the attached catalog page represents a diameter range • For spare parts, insert information and user guide, see pages 689, 702-719
• Inserts and guide pads should be ordered separately • Ordering example: DSD-IF 018.50-FT

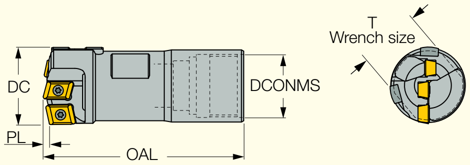
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For inserts, see pages: TOGT (722)
For holders, see pages: TS-O** (699)

FINEBEAM

DSD-IF-FB

Deep Single Tube Drills with Internal Single Start Thread (25-65 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

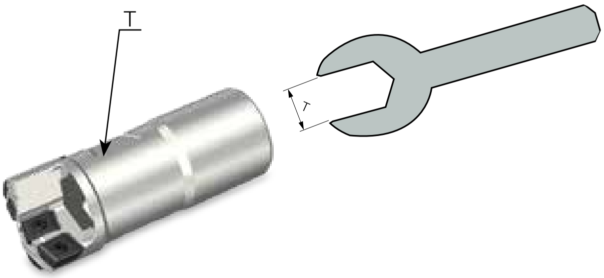
• For spare parts and insert information, see page 689 • For user guide and quotation form, see pages 702-719 • Inserts and guide pads should be ordered separately
• Ordering example: DSD-IF 043.10-FB

(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For inserts, see pages: NPHT-RG (694) • NPMT-L2/R2 (693)
For holders, see pages: TS-O** (699)

Wrench Size

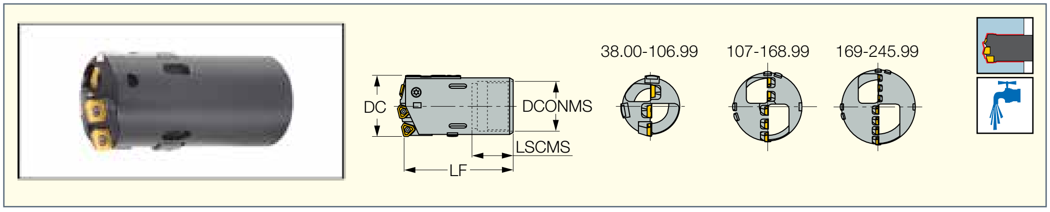
Diameter Dc (mm)	Wrench size T (mm)
25.00 -26.40	19
26.41 -28.70	21
28.71 -31.00	24
31.01 -33.30	26
33.31 -36.20	28
36.21 -39.60	30
39.61 -43.00	32
43.01 -47.00	36
47.01 -51.70	38
51.71 -56.20	46
56.21 -60.60	50
60.61-65.00	54



ISCARDEEPDRILL

DSD-IC

Deep Single Tube Drills with Internal Single Start Thread and Cartridges (29-246 dia.)



Designation	DCN(1)	DCX(2)	LF	LSCMS	DCONMS	Ts(3)
DSD-IC 38.00-39.99	38.00	39.99	80.00	40.00	30.00	TS-O15
DSD-IC 40.00-43.99	40.00	43.99	80.00	40.00	33.00	TS-O16
DSD-IC 44.00-46.99	44.00	46.99	90.00	40.00	37.00	TS-O17
DSD-IC 47.00-51.99	47.00	51.99	90.00	40.00	41.00	TS-O18
DSD-IC 52.00-56.99	52.00	56.99	100.00	40.00	44.00	TS-O19
DSD-IC 57.00-60.99	57.00	60.99	110.00	40.00	49.00	TS-O20
DSD-IC 61.00-67.99	61.00	67.99	110.00	40.00	53.00	TS-O21
DSD-IC 68.00-74.99	68.00	74.99	120.00	40.00	59.00	TS-O22
DSD-IC 75.00-80.99	75.00	80.99	150.00	70.00	65.00	TS-O23
DSD-IC 81.00-90.99	81.00	90.99	150.00	70.00	71.00	TS-O24
DSD-IC 91.00-98.99	91.00	98.99	150.00	70.00	79.00	TS-O25
DSD-IC 99.00-106.99	99.00	106.99	150.00	70.00	90.00	TS-O26
DSD-IC 107.00-110.99	107.00	110.99	150.00	70.00	90.00	TS-O26
DSD-IC 111.00-122.99	111.00	122.99	150.00	70.00	102.00	TS-O27
DSD-IC 123.00-134.99	123.00	134.99	150.00	70.00	114.00	TS-O28
DSD-IC 135.00-148.99	135.00	148.99	150.00	70.00	126.00	TS-O29
DSD-IC 149.00-161.99	149.00	161.99	150.00	70.00	139.00	TS-O30
DSD-IC 162.00-168.99	162.00	168.99	190.00	85.00	151.00	TS-O31
DSD-IC 169.00-173.99	169.00	173.99	190.00	85.00	151.00	TS-O31
DSD-IC 174.00-185.99	174.00	185.99	190.00	85.00	163.00	TS-O32
DSD-IC 186.00-197.99	186.00	197.99	190.00	85.00	175.00	TS-O33
DSD-IC 198.00-209.99	198.00	209.99	190.00	85.00	187.00	TS-O34
DSD-IC 210.00-221.99	210.00	221.99	190.00	85.00	199.00	TS-O35
DSD-IC 222.00-233.99	222.00	233.99	190.00	85.00	211.00	TS-O36
DSD-IC 234.00-245.99	234.00	245.99	190.00	85.00	223.00	TS-O37

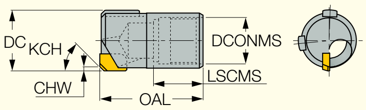
- Important: The specified drilling range using the original outer cartridge and pad may be enlarged by using optional outer cartridges and pads as specified on page 691
- For spare parts and insert information, see page 691 • For user guide and quotation form, see pages 702-719

(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For inserts, see pages: NPMX 0803 RB/RG (692) • TPMX (692)
For holders, see pages: TS-O** (699)

DSC-I1

Deep Single Tube Counterborer with Through Hole, Internal Single Start Thread and a Brazed Tip (14.5-65 dia.)



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	DCN[1]	DCX[2]	KCH	CHW	OAL	LSCMS	DCONMS	Ts[3]
DSC-I1 14.51-15.00 NOM 0	14.51	15.00	20/45	3.0	52.00	23.00	11.50	TS-O0
DSC-I1 14.51-15.00 NOM 2	14.51	15.00	20/45	3.0	52.00	23.00	11.50	TS-O0
DSC-I1 15.01-15.50 NOM 0	15.01	15.50	20/45	3.0	52.00	23.00	11.80	TS-O1
DSC-I1 15.01-15.50 NOM 2	15.01	15.50	20/45	3.0	52.00	23.00	11.80	TS-O1
DSC-I1 15.51-16.00 NOM 0	15.51	16.00	20/45	3.0	52.00	23.00	12.40	TS-O2
DSC-I1 15.51-16.00 NOM 2	15.51	16.00	20/45	3.0	52.00	23.00	12.40	TS-O2
DSC-I1 16.01-16.50 NOM 0	16.01	16.50	20/45	3.0	52.00	23.00	12.70	TS-O3
DSC-I1 16.01-16.50 NOM 2	16.01	16.50	20/45	3.0	52.00	23.00	12.70	TS-O3
DSC-I1 16.51-17.25 NOM 0	16.51	17.25	20/45	3.0	52.00	23.00	13.40	TS-O4
DSC-I1 16.51-17.25 NOM 2	16.51	17.25	20/45	3.0	52.00	23.00	13.40	TS-O4
DSC-I1 17.26-18.00 NOM 0	17.26	18.00	20/45	3.0	52.00	23.00	13.70	TS-O5
DSC-I1 17.26-18.00 NOM 2	17.26	18.00	20/45	3.0	52.00	23.00	13.70	TS-O5
DSC-I1 18.01-19.00 NOM 0	18.01	19.00	20/45	3.0	52.00	23.00	14.40	TS-O6
DSC-I1 18.01-19.00 NOM 2	18.01	19.00	20/45	3.0	52.00	23.00	14.40	TS-O6
DSC-I1 19.01-19.99 NOM 0	19.01	19.99	20/45	3.0	52.00	23.00	15.40	TS-O7
DSC-I1 19.01-19.99 NOM 2	19.01	19.99	20/45	3.0	52.00	23.00	15.40	TS-O7
DSC-I1 20.00-21.99 NOM 0	20.00	21.99	20/45	3.0	57.00	25.00	16.50	TS-O8
DSC-I1 20.00-21.99 NOM 2	20.00	21.99	20/45	3.0	57.00	25.00	16.50	TS-O8
DSC-I1 22.00-24.99 NOM 0	22.00	24.99	20/45	3.0	57.00	25.00	19.00	TS-O9
DSC-I1 22.00-24.99 NOM 2	22.00	24.99	20/45	3.0	57.00	25.00	19.00	TS-O9
DSC-I1 25.00-26.99 NOM 0	25.00	26.99	20/45	3.0	67.00	25.00	20.00	TS-O10
DSC-I1 25.00-26.99 NOM 2	25.00	26.99	20/45	3.0	67.00	25.00	20.00	TS-O10
DSC-I1 27.00-29.99 NOM 0	27.00	29.99	20/45	3.0	67.00	25.00	22.00	TS-O11
DSC-I1 27.00-29.99 NOM 2	27.00	29.99	20/45	3.0	67.00	25.00	22.00	TS-O11
DSC-I1 30.00-31.99 NOM 0	30.00	31.99	20/45	3.0	67.00	25.00	24.00	TS-O12
DSC-I1 30.00-31.99 NOM 2	30.00	31.99	20/45	3.0	67.00	25.00	24.00	TS-O12
DSC-I1 32.00-33.99 NOM 0	32.00	33.99	20/45	3.0	67.00	25.00	26.00	TS-O13
DSC-I1 32.00-33.99 NOM 2	32.00	33.99	20/45	3.0	67.00	25.00	26.00	TS-O13
DSC-I1 34.00-36.99 NOM 0	34.00	36.99	20/45	3.0	80.00	40.00	27.00	TS-O14
DSC-I1 34.00-36.99 NOM 2	34.00	36.99	20/45	3.0	80.00	40.00	27.00	TS-O14
DSC-I1 37.00-39.99 NOM 0	37.00	39.99	20/45	3.0	80.00	40.00	30.00	TS-O15
DSC-I1 37.00-39.99 NOM 2	37.00	39.99	20/45	3.0	80.00	40.00	30.00	TS-O15
DSC-I1 40.00-43.99 NOM 0	40.00	43.99	20/45	3.0	80.00	40.00	33.00	TS-O16
DSC-I1 40.00-43.99 NOM 2	40.00	43.99	20/45	3.0	80.00	40.00	33.00	TS-O16
DSC-I1 44.00-46.99 NOM 0	44.00	46.99	20/45	3.0	90.00	40.00	37.00	TS-O17
DSC-I1 44.00-46.99 NOM 2	44.00	46.99	20/45	3.0	90.00	40.00	37.00	TS-O17
DSC-I1 47.00-51.99 NOM 0	47.00	51.99	20/45	5.0	90.00	40.00	41.00	TS-O18
DSC-I1 47.00-51.99 NOM 2	47.00	51.99	20/45	5.0	90.00	40.00	41.00	TS-O18
DSC-I1 52.00-56.99 NOM 0	52.00	56.99	20/45	5.0	90.00	40.00	44.00	TS-O19
DSC-I1 52.00-56.99 NOM 2	52.00	56.99	20/45	5.0	90.00	40.00	44.00	TS-O19
DSC-I1 57.00-60.99 NOM 0	57.00	60.99	20/45	5.0	90.00	40.00	49.00	TS-O20
DSC-I1 57.00-60.99 NOM 2	57.00	60.99	20/45	5.0	90.00	40.00	49.00	TS-O20
DSC-I1 61.00-65.00 NOM 0	61.00	65.00	20/45	5.0	90.00	40.00	53.00	TS-O21
DSC-I1 61.00-65.00 NOM 2	61.00	65.00	20/45	5.0	90.00	40.00	53.00	TS-O21

- 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 quotation form and user guide, see pages 702-719
- Ordering example: DSC-I1 25.10 45-P0

[1] Cutting diameter minimum

[2] Cutting diameter maximum

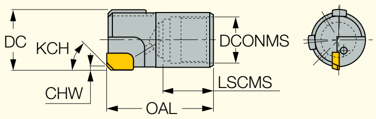
[3] Tube designation

For holders, see pages: TS-O** (699)

ISCARDEEPDRILL

DST-I1

Deep Single Tube Counterborer Without a Through Hole, Internal Single Start Thread and a Brazed Tip (14.5-65 dia.)



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	DCN(1)	DCX(2)	KCH	CHW	OAL	LSCMS	DCONMS	Ts(3)
DST-I1 14.51-15.00 NOM 0	14.51	15.00	20/45	3.0	52.00	23.00	11.50	TS-00
DST-I1 14.51-15.00 NOM 2	14.51	15.00	20/45	3.0	52.00	23.00	11.50	TS-00
DST-I1 15.01-15.50 NOM 0	15.01	15.50	20/45	3.0	52.00	23.00	11.80	TS-01
DST-I1 15.01-15.50 NOM 2	15.01	15.50	20/45	3.0	52.00	23.00	11.80	TS-01
DST-I1 15.51-16.00 NOM 0	15.51	16.00	20/45	3.0	52.00	23.00	12.40	TS-02
DST-I1 15.51-16.00 NOM 2	15.51	16.00	20/45	3.0	52.00	23.00	12.40	TS-02
DST-I1 16.01-16.50 NOM 0	16.01	16.50	20/45	3.0	52.00	23.00	12.70	TS-03
DST-I1 16.01-16.50 NOM 2	16.01	16.50	20/45	3.0	52.00	23.00	12.70	TS-03
DST-I1 16.51-17.25 NOM 0	16.51	17.25	20/45	3.0	52.00	23.00	13.40	TS-04
DST-I1 16.51-17.25 NOM 2	16.51	17.25	20/45	3.0	52.00	23.00	13.40	TS-04
DST-I1 17.26-18.00 NOM 0	17.26	18.00	20/45	3.0	52.00	23.00	13.70	TS-05
DST-I1 17.26-18.00 NOM 2	17.26	18.00	20/45	3.0	52.00	23.00	13.70	TS-05
DST-I1 18.01-19.00 NOM 0	18.01	19.00	20/45	3.0	52.00	23.00	14.40	TS-06
DST-I1 18.01-19.00 NOM 2	18.01	19.00	20/45	3.0	52.00	23.00	14.40	TS-06
DST-I1 19.01-19.99 NOM 0	19.01	19.99	20/45	3.0	52.00	23.00	15.40	TS-07
DST-I1 19.01-19.99 NOM 2	19.01	19.99	20/45	3.0	52.00	23.00	15.40	TS-07
DST-I1 20.00-21.99 NOM 0	20.00	21.99	20/45	3.0	57.00	25.00	16.50	TS-08
DST-I1 20.00-21.99 NOM 2	20.00	21.99	20/45	3.0	57.00	25.00	16.50	TS-08
DST-I1 22.00-24.99 NOM 0	22.00	24.99	20/45	3.0	57.00	25.00	19.00	TS-09
DST-I1 22.00-24.99 NOM 2	22.00	24.99	20/45	3.0	57.00	25.00	19.00	TS-09
DST-I1 25.00-26.99 NOM 0	25.00	26.99	20/45	3.0	67.00	25.00	20.00	TS-010
DST-I1 25.00-26.99 NOM 2	25.00	26.99	20/45	3.0	67.00	25.00	20.00	TS-010
DST-I1 27.00-29.99 NOM 0	27.00	29.99	20/45	3.0	67.00	25.00	22.00	TS-011
DST-I1 27.00-29.99 NOM 2	27.00	29.99	20/45	3.0	67.00	25.00	22.00	TS-011
DST-I1 30.00-31.99 NOM 0	30.00	31.99	20/45	3.0	67.00	25.00	24.00	TS-012
DST-I1 30.00-31.99 NOM 2	30.00	31.99	20/45	3.0	67.00	25.00	24.00	TS-012
DST-I1 32.00-33.99 NOM 0	32.00	33.99	20/45	3.0	67.00	25.00	26.00	TS-013
DST-I1 32.00-33.99 NOM 2	32.00	33.99	20/45	3.0	67.00	25.00	26.00	TS-013
DST-I1 34.00-36.99 NOM 0	34.00	36.99	20/45	3.0	80.00	40.00	27.00	TS-014
DST-I1 34.00-36.99 NOM 2	34.00	36.99	20/45	3.0	80.00	40.00	27.00	TS-014
DST-I1 37.00-39.99 NOM 0	37.00	39.99	20/45	3.0	80.00	40.00	30.00	TS-015
DST-I1 37.00-39.99 NOM 2	37.00	39.99	20/45	3.0	80.00	40.00	30.00	TS-015
DST-I1 40.00-43.99 NOM 0	40.00	43.99	20/45	3.0	80.00	40.00	33.00	TS-016
DST-I1 40.00-43.99 NOM 2	40.00	43.99	20/45	3.0	80.00	40.00	33.00	TS-016
DST-I1 44.00-46.99 NOM 0	44.00	46.99	20/45	3.0	90.00	40.00	37.00	TS-017
DST-I1 44.00-46.99 NOM 2	44.00	46.99	20/45	3.0	90.00	40.00	37.00	TS-017
DST-I1 47.00-51.99 NOM 0	47.00	51.99	20/45	5.0	90.00	40.00	41.00	TS-018
DST-I1 47.00-51.99 NOM 2	47.00	51.99	20/45	5.0	90.00	40.00	41.00	TS-018
DST-I1 52.00-56.99 NOM 0	52.00	56.99	20/45	5.0	90.00	40.00	44.00	TS-019
DST-I1 52.00-56.99 NOM 2	52.00	56.99	20/45	5.0	90.00	40.00	44.00	TS-019
DST-I1 57.00-60.99 NOM 0	57.00	60.99	20/45	5.0	90.00	40.00	49.00	TS-020
DST-I1 57.00-60.99 NOM 2	57.00	60.99	20/45	5.0	90.00	40.00	49.00	TS-020
DST-I1 61.00-65.00 NOM 0	61.00	65.00	20/45	5.0	90.00	40.00	53.00	TS-021
DST-I1 61.00-65.00 NOM 2	61.00	65.00	20/45	5.0	90.00	40.00	53.00	TS-021

- 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 quotation form and user guide, see pages 702-719 • Ordering example: DST-I1 25.10 20-P0

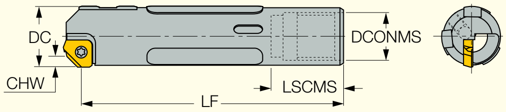
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For holders, see pages: TS-O** (699)

ISCARDEEPDRILL

DSC-IA

Deep Single Tube Counterbore with a Through Hole, Internal Single Start Thread 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 spare parts and insert information, see page 690 • For user guide and quotation form, see pages 702-719 • Ordering example: DSC-IA 30.35

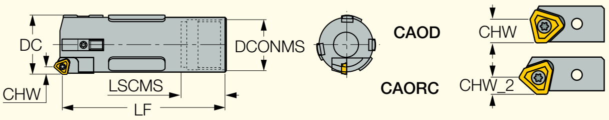
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For inserts, see pages: XPMT-45 (693)
For holders, see pages: TS-O** (699)

ISCARDEEPDRILL

DSC-IC

Deep Single Tube Counterborer with a Through Hole, Internal Single Start Thread and a Cartridge (40-111 dia.)



Designation	DCN(1)	DCX(2)	CHW	CHW_2	LF	LSCMS	DCONMS	Ts(3)
DSC-IC 40.00-43.99	40.00	43.99	6.4	4.0	135.00	40.00	33.00	TS-O16
DSC-IC 44.00-46.99	44.00	46.99	6.4	4.0	135.00	40.00	37.00	TS-O17
DSC-IC 47.00-51.99	47.00	51.99	6.4	4.0	145.00	40.00	41.00	TS-O18
DSC-IC 52.00-56.99	52.00	56.99	7.2	4.8	145.00	40.00	44.00	TS-O19
DSC-IC 57.00-60.99	57.00	60.99	7.2	4.8	170.00	40.00	49.00	TS-O20
DSC-IC 61.00-67.99	61.00	67.99	7.2	4.8	170.00	40.00	53.00	TS-O21
DSC-IC 68.00-74.99	68.00	74.99	10.4	6.4	170.00	40.00	59.00	TS-O22
DSC-IC 75.00-80.99	75.00	80.99	10.4	6.4	205.00	70.00	65.00	TS-O23
DSC-IC 81.00-90.99	81.00	90.99	10.4	6.4	205.00	70.00	71.00	TS-O24
DSC-IC 91.00-98.99	91.00	98.99	10.4	6.4	215.00	70.00	79.00	TS-O25
DSC-IC 99.00-110.99	99.00	110.99	10.4	6.4	225.00	70.00	90.00	TS-O26

- 10OD - Rough boring cartridge (for large D.O.C.) supplied with the cartridge, unless ordered differently • CAORC - Precision boring cartridge
- For spare parts and insert information, see page 690 • For user guide and quotation form, see pages 702-719 • Ordering example: DSC-IC 091.10

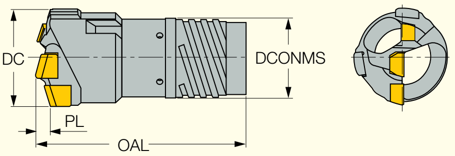
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Tube designation

For inserts, see pages: TPMX (692) • XPMT-45 (693)
For holders, see pages: TS-O** (699)

ISCARDEEPDRILL

DDD-E3

Deep Double Tube Drills with External 4 Start Thread and Brazed Tips (18.4-65 dia.)



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 702-719

[1] Cutting diameter minimum

[2] Cutting diameter maximum

[3] Outer tube designation

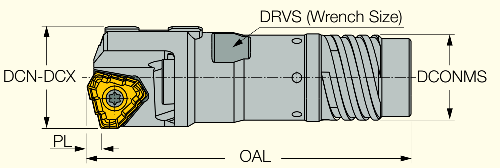
[4] Inner tube designation

For holders, see pages: TDO-I (D18.41-65.00) (701)

TRIDEEP DEEP DRILLING

DDD-EF-FT

Deep Double Tube Drills with External 4 Start Thread 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 689, 702-719
- Inserts and guide pads should be ordered separately • Ordering example: DDD-EF 018.50-FT

[1] Cutting diameter minimum

[2] Cutting diameter maximum

[3] Outer tube designation

[4] Inner tube designation

For inserts, see pages: TOGT (722)

For holders, see pages: TDO-I (D18.41-65.00) (701)

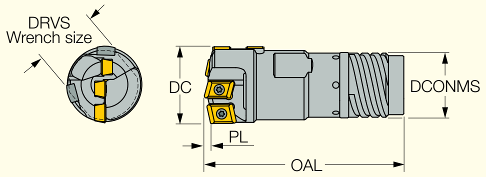
TRIDEEP Spare Parts List

Diameter Range	Insert	Insert Clamping Screw	Key	Solid Carbide Guide Pad	Guide Pad Clamping Screw	Key
16.00-18.00	TOGT 080305-DT	SR 11201753-3S	T-8	GP-06-075FC	SR 11201753-1	T-7
18.01-20.00	TOGT 090305-DT	SR 11201753-3S	T-8	GP-06-085FC		
20.01-20.99	TOGT 100305-DT	SR 11201753-4	T-8	GP-06-085FC		
21.00-21.99	TOGT 100305-DT			GP-06-100FC		
22.00-25.00	TOGT 110405-DT	SR 11201753-6H	T-15	GP-06-100FC		
25.01-28.00	TOGT 120405-DT	SR 11201753-8	T-15	GP-06-120FC		

FINEBEAM

DDD-EF-FB

Deep Double Tube Drills with External 4 Start Thread 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 689 • For user guide and quotation form see pages 702-719 • Inserts and guide pads should be ordered separately
- Ordering example: DDD-EF 043.00-FB

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Key flat size

(4) Outer tube designation

(5) Inner tube designation

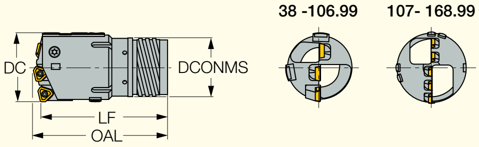
For inserts, see pages: NPHT-RG (694) • NPMT-L2/R2 (693)

For holders, see pages: TDO-I (D18.41-65.00) (701)

ISCARDEEPDRILL

DDD-EC

Deep Double Tube Drills with External 4 Start Thread and Cartridges (38.4-169 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-I20	TDI-N20
DDD-EC 112.00-123.99	112.00	123.99	221.00	205.00	101.00	TDO-I21	TDI-N21
DDD-EC 124.00-135.99	124.00	135.99	222.00	205.00	113.00	TDO-I22	TDI-N22
DDD-EC 136.00-147.99	136.00	147.99	223.00	205.00	125.00	TDO-I23	TDI-N23
DDD-EC 148.00-159.99	148.00	159.99	245.00	225.00	137.00	TDO-I24	TDI-N24
DDD-EC 160.00-168.99	160.00	168.99	246.00	225.00	149.00	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 691
- For spare parts and insert information, see page 691 • For user guide and quotation form see pages 702-719 • Ordering example: DDD-EC 148.00

(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Outer tube designation

(4) Inner tube designation

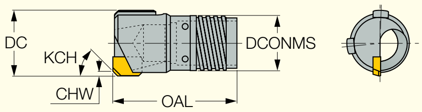
For inserts, see pages: NPMX 0803 RB/RG (692) • TPMX (692)

For holders, see pages: TDO-I (D18.41-65.00) (701) • TDO-I (D65.00-171.99) (701)

ISCARDEEPDRILL

DDC-E1

Deep Double Tube Counterborer
with a Through Hole,
External 4 Start Thread and
a Brazed Tip (18.4-65 dia.)



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	DCN[1]	DCX[2]	KCH	CHW	OAL	DCONMS	Ts[3]	Tsi[4]
DDC-E1 18.41-20.00 NOM 0	18.41	20.00	20/45	1.0	57.00	16.00	TDO-I0	TDI-N0
DDC-E1 18.41-20.00 NOM 2	18.41	20.00	20/45	1.0	57.00	16.00	TDO-I0	TDI-N0
DDC-E1 20.01-21.80 NOM 0	20.01	21.80	20/45	2.0	65.00	18.00	TDO-I1	TDI-N1
DDC-E1 20.01-21.80 NOM 2	20.01	21.80	20/45	2.0	65.00	18.00	TDO-I1	TDI-N1
DDC-E1 21.81-24.10 NOM 0	21.81	24.10	20/45	2.0	65.00	19.50	TDO-I2	TDI-N2
DDC-E1 21.81-24.10 NOM 2	21.81	24.10	20/45	2.0	65.00	19.50	TDO-I2	TDI-N2
DDC-E1 24.11-26.40 NOM 0	24.11	26.40	20/45	2.0	65.00	21.00	TDO-I3	TDI-N3
DDC-E1 24.11-26.40 NOM 2	24.11	26.40	20/45	2.0	65.00	21.00	TDO-I3	TDI-N3
DDC-E1 26.41-28.70 NOM 0	26.41	28.70	20/45	2.0	65.00	23.50	TDO-I4	TDI-N4
DDC-E1 26.41-28.70 NOM 2	26.41	28.70	20/45	2.0	65.00	23.50	TDO-I4	TDI-N4
DDC-E1 28.71-31.00 NOM 0	28.71	31.00	20/45	2.0	70.00	25.50	TDO-I5	TDI-N5
DDC-E1 28.71-31.00 NOM 2	28.71	31.00	20/45	2.0	70.00	25.50	TDO-I5	TDI-N5
DDC-E1 31.01-33.30 NOM 0	31.01	33.30	20/45	3.0	70.00	28.00	TDO-I6	TDI-N6
DDC-E1 31.01-33.30 NOM 2	31.01	33.30	20/45	3.0	70.00	28.00	TDO-I6	TDI-N6
DDC-E1 33.31-36.20 NOM 0	33.31	36.20	20/45	3.0	70.00	30.00	TDO-I7	TDI-N7
DDC-E1 33.31-36.20 NOM 2	33.31	36.20	20/45	3.0	70.00	30.00	TDO-I7	TDI-N7
DDC-E1 36.21-39.60 NOM 0	36.21	39.60	20/45	3.0	82.00	33.00	TDO-I8	TDI-N8
DDC-E1 36.21-39.60 NOM 2	36.21	39.60	20/45	3.0	82.00	33.00	TDO-I8	TDI-N8
DDC-E1 39.61-43.00 NOM 0	39.61	43.00	20/45	3.0	82.00	36.00	TDO-I9	TDI-N9
DDC-E1 39.61-43.00 NOM 2	39.61	43.00	20/45	3.0	82.00	36.00	TDO-I9	TDI-N9
DDC-E1 43.01-47.00 NOM 0	43.01	47.00	20/45	3.0	82.00	39.00	TDO-I10	TDI-N10
DDC-E1 43.01-47.00 NOM 2	43.01	47.00	20/45	3.0	82.00	39.00	TDO-I10	TDI-N10
DDC-E1 47.01-51.70 NOM 0	47.01	51.70	20/45	3.0	82.00	43.00	TDO-I11	TDI-N11
DDC-E1 47.01-51.70 NOM 2	47.01	51.70	20/45	3.0	82.00	43.00	TDO-I11	TDI-N11
DDC-E1 51.71-56.20 NOM 0	51.71	56.20	20/45	3.0	93.00	47.00	TDO-I12	TDI-N12
DDC-E1 51.71-56.20 NOM 2	51.71	56.20	20/45	3.0	93.00	47.00	TDO-I12	TDI-N12
DDC-E1 56.21-65.00 NOM 0	56.21	65.00	20/45	3.0	93.00	51.00	TDO-I13	TDI-N13
DDC-E1 56.21-65.00 NOM 2	56.21	65.00	20/45	3.0	93.00	51.00	TDO-I13	TDI-N13

- The drill tip is supplied in a grade that is suitable to machine the material group which is indicated in the drill head designation: P-Steel, M-Stainless Steel, K-Cast Iron
- For quotation form and user guide, see pages 702-719 • Ordering example: DDC-E1 36.00 20-P0

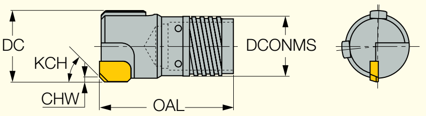
(1) Cutting diameter minimum
(2) Cutting diameter maximum
(3) Outer tube designation
(4) Inner tube designation

For holders, see pages: TDO-I (D18.41-65.00) (701)

ISCARDEEPDRILL

DDT-E1

Deep Double Tube Counterborer Without a Through Hole, External 4 Start Thread and a Brazed Tip (18.4-65 dia.)



NOM 0 refers to non-coated drill head, NOM 2 refers to coated drill head.

Designation	DCN[1]	DCX[2]	KCH	CHW	OAL	DCONMS	Ts[3]	Tsi[4]
DDT-E1 18.41-20.00 NOM 0	18.41	20.00	20/45	1.0	57.00	16.00	TDO-I0	TDI-N0
DDT-E1 18.41-20.00 NOM 2	18.41	20.00	20/45	1.0	57.00	16.00	TDO-I0	TDI-N0
DDT-E1 20.01-21.80 NOM 0	20.01	21.80	20/45	2.0	65.00	18.00	TDO-I1	TDI-N1
DDT-E1 20.01-21.80 NOM 2	20.01	21.80	20/45	2.0	65.00	18.00	TDO-I1	TDI-N1
DDT-E1 21.81-24.10 NOM 0	21.81	24.10	20/45	2.0	65.00	19.50	TDO-I2	TDI-N2
DDT-E1 21.81-24.10 NOM 2	21.81	24.10	20/45	2.0	65.00	19.50	TDO-I2	TDI-N2
DDT-E1 24.11-26.40 NOM 0	24.11	26.40	20/45	2.0	65.00	21.00	TDO-I3	TDI-N3
DDT-E1 24.11-26.40 NOM 2	24.11	26.40	20/45	2.0	65.00	21.00	TDO-I3	TDI-N3
DDT-E1 26.41-28.70 NOM 0	26.41	28.70	20/45	2.0	65.00	23.50	TDO-I4	TDI-N4
DDT-E1 26.41-28.70 NOM 2	26.41	28.70	20/45	2.0	65.00	23.50	TDO-I4	TDI-N4
DDT-E1 28.71-31.00 NOM 0	28.71	31.00	20/45	2.0	70.00	25.50	TDO-I5	TDI-N5
DDT-E1 28.71-31.00 NOM 2	28.71	31.00	20/45	2.0	70.00	25.50	TDO-I5	TDI-N5
DDT-E1 31.01-33.30 NOM 0	31.01	33.30	20/45	3.0	70.00	28.00	TDO-I6	TDI-N6
DDT-E1 31.01-33.30 NOM 2	31.01	33.30	20/45	3.0	70.00	28.00	TDO-I6	TDI-N6
DDT-E1 33.31-36.20 NOM 0	33.31	36.20	20/45	3.0	70.00	30.00	TDO-I7	TDI-N7
DDT-E1 33.31-36.20 NOM 2	33.31	36.20	20/45	3.0	70.00	30.00	TDO-I7	TDI-N7
DDT-E1 36.21-39.60 NOM 0	36.21	39.60	20/45	3.0	82.00	33.00	TDO-I8	TDI-N8
DDT-E1 36.21-39.60 NOM 2	36.21	39.60	20/45	3.0	82.00	33.00	TDO-I8	TDI-N8
DDT-E1 39.61-43.00 NOM 0	39.61	43.00	20/45	3.0	82.00	36.00	TDO-I9	TDI-N9
DDT-E1 39.61-43.00 NOM 2	39.61	43.00	20/45	3.0	82.00	36.00	TDO-I9	TDI-N9
DDT-E1 43.01-47.00 NOM 0	43.01	47.00	20/45	3.0	82.00	39.00	TDO-I10	TDI-N10
DDT-E1 43.01-47.00 NOM 2	43.01	47.00	20/45	3.0	82.00	39.00	TDO-I10	TDI-N10
DDT-E1 47.01-51.70 NOM 0	47.01	51.70	20/45	3.0	82.00	43.00	TDO-I11	TDI-N11
DDT-E1 47.01-51.70 NOM 2	47.01	51.70	20/45	3.0	82.00	43.00	TDO-I11	TDI-N11
DDT-E1 51.71-56.20 NOM 0	51.71	56.20	20/45	3.0	93.00	47.00	TDO-I12	TDI-N12
DDT-E1 51.71-56.20 NOM 2	51.71	56.20	20/45	3.0	93.00	47.00	TDO-I12	TDI-N12
DDT-E1 56.21-65.00 NOM 0	56.21	65.00	20/45	3.0	93.00	51.00	TDO-I13	TDI-N13
DDT-E1 56.21-65.00 NOM 2	56.21	65.00	20/45	3.0	93.00	51.00	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: P-Steel, M-Stainless Steel, K-Cast Iron
- For quotation form and user guide, see pages 702-719 • Order example: DDT-E1 036.00 20-PO

[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) (701)

DDD-EF-FT / DSD-EF-FT / DSD-IF-FT

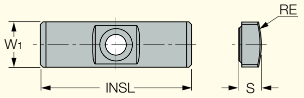
Diameter Range	Insert	Insert Clamping Screw	Key	Solid Carbide Guide Pad	Guide Pad Clamping Screw	Key
14.00-15.99	TOGT 070304-DT	SR-14-560/S	T-8	GPS-05-18-060	SR34-508	T-7
16.00-18.00	TOGT 080305-DT	SR-14-560/S	T-8	GPS-05-18-075		
18.01-20.00	TOGT 090305-DT	SR-14-560/S	T-8	GPS-06-20-085		
20.01-20.99	TOGT 100305-DT	SR-34-506	T-8	GPS-06-20-085		
21.00-21.99	TOGT 100305-DT			GPS-06-20-100		
22.00-25.00	TOGT 110405-DT	SR-14-571/S	T-15	GPS-06-20-100		
25.01-28.00	TOGT 120405-DT	SR-14-506	T-15	GPS-06-20-120		

DSD-EF-FT / DDD-EF-FT / DSD-IF-FT

Cutting Diameter DC (mm)	Wrench size T (mm)
16.00-16.70	12
16.71-17.70	13
17.71-18.00	14
18.01-18.90	14
18.91-20.00	15
20.01-21.00	16
21.01-21.80	16
21.81-22.00	18
22.01-24.10	18
24.11-25.00	19
25.01-26.40	19
26.41-28.00	21

DSD-EF-FB / DDD-EF-FB / DSD-IF-FB

	Insert									Guide Pad		
Drill Diameter	① Peripheral Insert	Screw	Key	② Inner Insert	Screw	Key	③ Center Insert	Screw	Key	④	Screw	Key
25.00 - 28.00	NPHT 06003RG	SR 11201753-2	T-7/5	NPMT 05503R2	SR 11201753-2	T-7/5	NPMT 05503L2	SR 11201753-2	T-7/5	GPS06	SR 11201753-1	T-7/5
28.01 - 29.99	NPHT 06003RG	SR 11201753-2	T-7/5	NPMT 05503R2	SR 11201753-2	T-7/5	NPMT 06504L2	SR 11201753-2	T-8/5	GPS06	SR 11201753-1	T-7/5
30.00 - 35.00	NPHT 07504RG	SR 11201753-3	T-8/5	NPMT 06504R2	SR 11201753-3	T-8/5	NPMT 06504L2	SR 11201753-3	T-8/5	GPS07	SR 11201753-4	T-9/5
35.01 - 38.00	NPHT 07504RG	SR 11201753-3	T-8/5	NPMT 06504R2	SR 11201753-3	T-8/5	NPMT 0804L2	SR 11201753-3	T-8/5	GPS07	SR 11201753-4	T-9/5
38.01 - 39.00	NPHT 09004RG	SR 11201753-3	T-8/5	NPMT 06504R2	SR 11201753-3	T-8/5	NPMT 0804L2	SR 11201753-3	T-8/5	GPS07	SR 11201753-4	T-9/5
39.01 - 41.00	NPHT 09004RG	SR 11201753-3	T-8/5	NPMT 06504R2	SR 11201753-3	T-8/5	NPMT 0804L2	SR 11201753-3	T-8/5	GPS08	SR 11201753-4	T-9/5
41.01 - 44.00	NPHT 09004RG	SR 11201753-3	T-8/5	NPMT 0804R2	SR 11201753-3	T-8/5	NPMT 0804L2	SR 11201753-3	T-8/5	GPS08	SR 11201753-4	T-9/5
44.01 - 45.00	NPHT 09004RG	SR 11201753-3	T-8/5	NPMT 0804R2	SR 11201753-3	T-8/5	NPMT 09504L2	SR 11201753-3	T-8/5	GPS08	SR 11201753-4	T-9/5
45.01 - 47.00	NPHT 09004RG	SR 11201753-3	T-8/5	NPMT 0804R2	SR 11201753-3	T-8/5	NPMT 09504L2	SR 11201753-3	T-8/5	GPS10	SR 11201753-6	T-15/5
47.01 - 51.00	NPHT 11004RG	SR 11201753-3	T-8/5	NPMT 0804R2	SR 11201753-3	T-8/5	NPMT 09504L2	SR 11201753-3	T-8/5	GPS10	SR 11201753-6	T-15/5
51.01 - 54.00	NPHT 11004RG	SR 11201753-3	T-8/5	NPMT 09504R2	SR 11201753-3	T-8/5	NPMT 09504L2	SR 11201753-3	T-8/5	GPS10	SR 11201753-6	T-15/5
54.01 - 57.00	NPHT 11004RG	SR 11201753-3	T-8/5	NPMT 09504R2	SR 11201753-3	T-8/5	NPMT 12504L2	SR 11201753-3	T-8/5	GPS10	SR 11201753-6	T-15/5
57.01 - 60.00	NPHT 11004RG	SR 11201753-3	T-8/5	NPMT 09504R2	SR 11201753-3	T-8/5	NPMT 12504L2	SR 11201753-3	T-8/5	GPS12	SR 11201753-6	T-15/5
60.01 - 64.00	NPHT 13004RG	SR 11201753-3	T-8/5	NPMT 09504R2	SR 11201753-3	T-8/5	NPMT 12504L2	SR 11201753-3	T-8/5	GPS12	SR 11201753-6	T-15/5
64.01 - 65.00	NPHT 13004RG	SR 11201753-3	T-8/5	NPMT 12504R2	SR 11201753-3	T-8/5	NPMT 12504L2	SR 11201753-3	T-8/5	GPS12	SR 11201753-6	T-15/5



	Tool Diameter		Dimensions (mm)				Solid Carbide
	Min	Max	b	L	R	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	65.00	12	35	25	5.5	GPS-12-35-250

DSC-EA

	Pg. 696	Pg. 696	Pg. 693	
Diameter	Guide Pads (3 pcs)	Guide Pad Protectors (3 pcs)	Close Tolerance Insert	Insert Clamping Screw
25.00-27.99	GPS-06-20-120	GPP-04	XPMT16002-45	SR 11201754-4
28.00-29.99	GPS-06-20-120	GPP-04	XPMT16002-45	SR 11201754-4
30.00-37.99	GPS-07-20-120	GPP-05	XPMT16002-45	SR 11201754-4
38.00-39.99	GPS-08-25-155	GPP-06	XPMT16002-45	SR 11201754-4

DSC-EC

	Pg. 694	Pg. 694	Pg. 696	Pg. 695	Pg. 696	Pg. 692	Pg. 692
Diameter	Close Tolerance Cartridge	Normal Tolerance Cartridge	Guide Pads (3 pcs)	Sub Guide Pad (1 pc)	Guide Pad Protectors (3 pcs)	Close Tolerance Insert	Normal Tolerance Insert
40.00-45.99	CAORC-0845	CAOD-0845	GPS-08-25-155	SGP-02	GPP-06	TPMX 1403LG	TPMX 1403RG
46.00-51.99	CAORC-0845	CAOD-0845	GPS-10-35-200	SGP-02	GPP-07	TPMX 1403LG	TPMX 1403RG
52.00-56.99	CAORC-103	CAOD-103	GPS-10-35-200	SGP-02	GPP-07	TPMX 1704LG	TPMX 1704RG
57.00-59.99	CAORC-103	CAOD-103	GPS-10-35-200	SGP-02	GPP-07	TPMX 1704LG	TPMX 1704RG
60.00-66.99	CAORC-103	CAOD-103	GPS-14-40-250	SGP-03	GPP-08	TPMX 1704LG	TPMX 1704RG
67.00-80.99	CAORC-142	CAOD-142	GPS-14-40-250	SGP-03	GPP-08	TPMX 2405LG	TPMX 2405RG
81.00-90.99	CAORC-142	CAOD-142	GPS-14-40-250	SGP-03	GPP-08	TPMX 2405LG	TPMX 2405RG
91.00-99.99	CAORC-142	CAOD-142	GPS-14-40-250	SGP-03	GPP-08	TPMX 2405LG	TPMX 2405RG
100.00-122.99	CAORC-142	CAOD-142	GPS-18-40-300	SGP-04	GPP-09	TPMX 2405LG	TPMX 2405RG

DSC-IA

	Pg. 696	Pg. 695	Pg. 693	
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

DSC-IC

	Pg. 694	Pg. 694	Pg. 696	Pg. 695	Pg. 692	Pg. 692
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







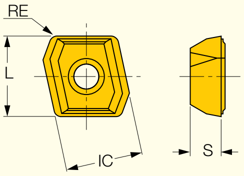


DSD-EC / DDD-EC / DSD-IC	Pg. 694		Pg. 694		Pg. 696		Pg. 696		Pg. 695		Pg. 692		Pg. 692	
Diameter	Peripheral	Qty.	Inner/ Central	Qty.	Guide Pad	Qty.	Guide Pad Protectors	Qty.	Sub Guide Pad	Qty.	Peripheral Insert	Qty.	Inner/ Central Insert	Qty.
38.00 - 39.99	CAOD-080	1	CAID-080	2	GPS-08-25-155	2	GPP-06	2	SGP-02	1	NPMX 0803RG	1	NPMX 0803RG	2
40.00-44.99	CAOD-0845	1	CAID-080	2	GPS-08-25-155	2	GPP-06	2	SGP-02	1	TPMX 1403RG	1	NPMX 0803RG	2
45.00-47.99	CAOD-0845	1	CAID-080 CAID-0845	1 1	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 1403RG	1	NPMX 0803RG TPMX 1403RG	1 1
48.00-51.99	CAOD-0845	1	CAID-0845	2	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 1403RG	1	TPMX 1403RG	2
52.00-54.99	CAOD-103	1	CAID-0845	2	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 1704RG	1	TPMX 1403RG	2
55.00-57.99	CAOD-103	1	CAID-0845 CAID-103	1 1	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 1704RG	1	TPMX 1403RG TPMX 1704RG	1 1
58.00-59.99	CAOD-103	1	CAID-103	2	GPS-10-35-200	2	GPP-07	2	SGP-02	1	TPMX 1704RG	1	TPMX 1704RG	2
60.00-63.99	CAOD-103	1	CAID-103	2	GPS-14-40-250	2	GPP-08	2	SGP-02	1	TPMX 1704RG	1	TPMX 1704RG	2
64.00-67.99	CAOD-142	1	CAID-103	2	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 2405RG	1	TPMX 1704RG	2
68.00-77.99	CAOD-103	1	CAID-142	2	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 1704RG	1	TPMX 2405RG	2
78.00-84.99	CAOD-142	1	CAID-142	2	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 2405RG	1	TPMX 2405RG	2
85.00-91.99	CAOD-170	1	CAID-142	2	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 2807RG	1	TPMX 2405RG	2
92.00-98.99	CAOD-142	1	CAID-170	2	GPS-14-40-250	2	GPP-08	2	SGP-03	1	TPMX 2405RG	1	TPMX 2807RG	2
99.00-106.99	CAOD-170	1	CAID-170	2	GPS-18-40-300	2	GPP-09	2	SGP-04	1	TPMX 2807RG	1	TPMX 2807RG	2
107.00-117.99	CAOD-142	1	CAID-103 CAID-142	3 1	GPS-18-40-300	2	GPP-09	2	SGP-04	1	TPMX 2405RG	1	TPMX 1704RG TPMX 2405RG	3 1
118.00-135.99	CAOD-142	1	CAID-142	4	GPS-18-40-300	2	GPP-09	2	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG	4
136.00-144.99	CAOD-142	1	CAID-142 CAID-170	3 1	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG TPMX 2807RG	3 1
145.00-150.99	CAOD-142	1	CAID-142 CAID-170	2 2	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG TPMX 2807RG	2 2
151.00-156.99	CAOD-170	1	CAID-142 CAID-170	2 2	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2807RG	1	TPMX 2405RG TPMX 2807RG	2 2
157.00-162.99	CAOD-170	1	CAID-142 CAID-170	1 3	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2807RG	1	TPMX 2405RG TPMX 2807RG	1 3
163.00-168.99	CAOD-170	1	CAID-170	4	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2807RG	1	TPMX 2807RG	4
169.00-188.99	CAOD-142	1	CAID-142	6	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG	6
189.00-196.99	CAOD-142	1	CAID-142 CAID-170	5 1	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG TPMX 2807RG	5 1
197.00-202.99	CAOD-142	1	CAID-142 CAID-170	4 2	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG TPMX 2807RG	4 2
203.00-208.99	CAOD-142	1	CAID-142 CAID-170	3 3	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2405RG	1	TPMX 2405RG TPMX 2807RG	3 3
209.00-214.99	CAOD-170	1	CAID-142 CAID-170	3 3	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2807RG	1	TPMX 2405RG TPMX 2807RG	3 3
215.00-220.99	CAOD-170	1	CAID-142 CAID-170	2 4	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2807RG	1	TPMX 2405RG TPMX 2807RG	2 4
221.00-226.99	CAOD-170	1	CAID-142 CAID-170	1 5	GPS-18-40-300	4	GPP-09	4	SGP-04	1	TPMX 2807RG	1	TPMX 2405RG TPMX 2807RG	1 5

ISCARDEEPDRILL

NPMX 0803 RB/RG

Inserts for Drilling Heads
DSD-EC / DDD-EC / DSD-IC

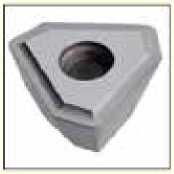


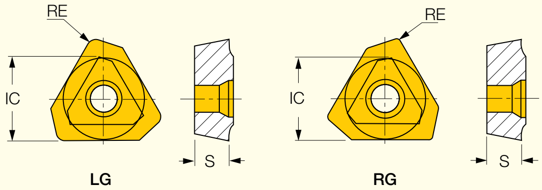
Designation	Dimensions				Tough ↔ Hard		
	IC	S	RE	L	IC9025	IC908	IC520
NPMX 0803RB	8.00	3.18	0.40	8.36	●	●	●
NPMX 0803RG	8.00	3.18	0.80	8.36	●	●	

ISCARDEEPDRILL

TPMX

Inserts for Drilling Heads
DSD-EC / DDD-EC / DSD-IC /
DSC-EC / DSC-IC





Designation	Dimensions			Tough ↔ Hard		
	IC	S	RE	IC9025	IC908	IC520
TPMX 1403R/LG	8.45	3.50	0.80	●	●	●
TPMX 1403R-DT	8.45	3.50	0.80		●	
TPMX 1403RB	8.45	3.50	0.40	●	●	●
TPMX 1704R-DT	10.30	4.00	0.80			●
TPMX 1704RB	10.30	4.00	0.40	●	●	●
TPMX 1704R/LBG	10.30	4.00	0.80		●	●
TPMX 1704R/LG	10.30	4.00	0.80	●	●	●
TPMX 2405R-DT	14.20	5.50	1.20	●		●
TPMX 2405RB	14.20	5.50	0.40	●	●	●
TPMX 2405R/LBG	14.20	5.50	1.20	●	●	●
TPMX 2405R/LG	14.20	5.50	1.20	●	●	●
TPMX 2807R-DT	17.00	7.50	1.60		●	●
TPMX 2807RB	17.00	7.50	0.80	●	●	
TPMX 2807R/LBG	17.00	7.50	1.60		●	●
TPMX 2807R/LG	17.00	7.50	1.60	●	●	●

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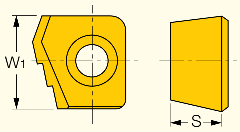
XPMT-UB

Inserts for Drilling Heads
DSD-EA / DSD-IA



Designation	Dimensions		IC908
	W_1	S	
XPMT 16002UB	9.50	2.80	●
XPMT 18003UB	11.00	3.05	●
XPMT 21003UB	13.00	3.55	●
XPMT 25003UB	14.50	3.40	●

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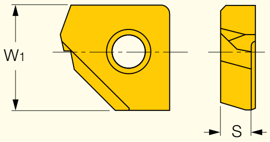
XPMT-45

Insert for Drilling Heads
DSC-EC / DSC-IC / DSC-EA



Designation	Dimensions		IC520M
	W_1	S	
XPMT 16002-45	9.50	2.80	●

For tools, see pages: DSC-IA (683)

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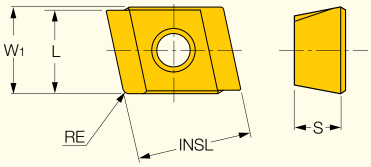
NPMT-R1/2-DT

Inserts for Drilling Heads
DSD-EI / DDD-EI



Designation	Dimensions					Tough ↔ Hard		
	W_1	S	INSL	L	RE	IC9025	IC908	IC520
NPMT 07504R2-DT	7.50	4.00	10.00	7.20	0.40		●	●
NPMT 09504R2-DT	9.50	4.00	10.00	9.20	0.40	●		●

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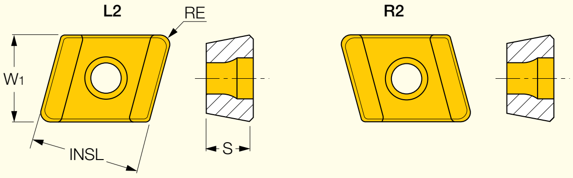
NPMT-L2/R2

Inserts for Drilling Heads
DSD-EF-FB / DDD-EF-FB



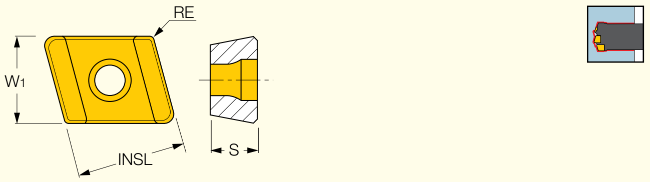
Designation	Dimensions				Tough ↔ Hard		
	W_1	RE	S	INSL	IC9025	IC908	IC520
NPMT 05503R/L2	5.50	0.30	3.00	8.00		●	●
NPMT 06504R/L2	6.50	0.40	4.00	10.00	●	●	●
NPMT 0804R/L2	8.00	0.80	4.00	10.00	●	●	●
NPMT 09504R/L2	9.50	0.80	4.00	10.00	●	●	●
NPMT 12504R/L2	12.50	0.40	4.00	10.00	●	●	●

For tools, see pages: DDD-EF-FB (686) • DSD-EF-FB (675) • DSD-IF-FB (679)

FINEBEAM

NPHT-RG

Peripheral Precision Inserts
for Drilling Heads DSD-EF-FB
/ DDD-EF-FB / DSD-IF-FB



Designation	Dimensions				Tough ↔ Hard	
	W1	RE	S	INSL	IC908	IC520
NPHT 06003RG	6.00	0.30	3.00	8.00	●	●
NPHT 07504RG	7.50	0.40	4.00	10.00	●	●
NPHT 09004RG	9.00	0.40	4.00	10.00	●	●
NPHT 11004RG	11.00	0.40	4.00	10.00	●	●
NPHT 13004RG	13.00	0.40	4.00	10.00	●	●

For tools, see pages: DDD-EF-FB (686) • DSD-EF-FB (675) • DSD-IF-FB (679)

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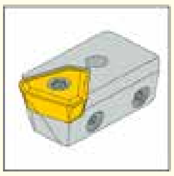
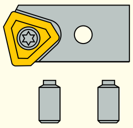
CAOD

Boring Head Peripheral Cartridge





Designation	Adjustment Screw	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAOD-080	SR 11201755-7	HW 1.5	SR 11201756-11	HW 2.0	NPMX 0803RG	SR 11201753-2
CAOD-0845	SR 11201755-6	HW 2.0	SR 11201756-10	HW 2.5	TPMX 1403RG	SR 11201753-3
CAOD-085	SR 11201755-6	HW 2.0	SR 11201756-10	HW 2.5	TPMX 1403RG	SR 11201753-3
CAOD-103	SR 11201755-8	HW 2.5	SR 11201756-12	HW 3.0	TPMX 1704RG	SR 11201753-7
CAOD-142	SR 11201755-9	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405RG	SR 11201753-9
CAOD-170	SR 11201755-11	HW 3.0	SR 11201756-15	HW 4.0	TPMX 2807RG	SR 11201753-10

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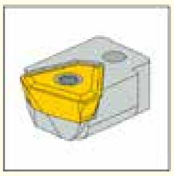
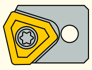
CAID

Boring Head Inner Cartridge





Designation	Key	Locking Screw	Key	Insert	Insert Clamping Screw
CAID-080	HW 1.5	SR 11201753-5	T-9/51	NPMX 0803RG	SR 11201753-2
CAID-0845	HW 2.0	SR 11201753-5	T-15/51	TPMX 1403RG	SR 11201753-3
CAID-085	HW 2.0	SR 11201753-5	T-15/51	TPMX 1403RG	SR 11201753-3
CAID-103	HW 2.5	SR 11201752-1	T-15/51	TPMX 1704RG	SR 11201753-7
CAID-142	HW 2.5	SR 11201756-7	HW 3.0	TPMX 2405RG	SR 11201753-9
CAID-170	HW 2.5	SR 11201756-7	HW 3.0	TPMX 2807RG	SR 11201753-10

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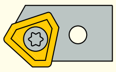
CAORC

Boring Head Central Cartridge



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 1403LG	SR 11201753-3
CAORC-103	SR 11201755-10	HW 2.5	SR 11201756-12	HW 3.0	TPMX 1704LG	SR 11201753-7
CAORC-142	SR 11201755-11	HW 2.5	SR 11201756-15	HW 4.0	TPMX 2405LG	SR 11201753-9

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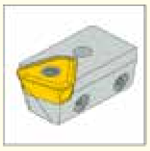
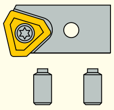
CAOD Cartridges and Pads for Diameter Enlargement

Outer Cartridge Enlargement





Original Outer Cartridge	Cartridges for the Specified Enlargement Increments				
	+1 mm	+2 mm	+3 mm	+4 mm	+5 mm
CAOD-080	CAOD-080+1	CAOD-080+2			
CAOD-085	CAOD-085+1	CAOD-085+2	CAOD-085+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

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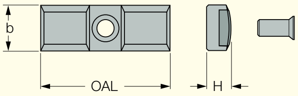
GP Cartridges and Pads for Diameter Enlargement

Enlargement Guide Pad



Guide Pad

Original Guide Pad	Guide Pads for the Specified Enlargement Increments				
	+1 mm	+2 mm	+3 mm	+4 mm	+5 mm
GPB-08	GPB-08+1	GPB-08+2	GPB-08+3		
GPB-10	GPB-10+1	GPB-10+2	GPB-10+3	GPB-10+4	
GPB-14	GPB-14+1	GPB-14+2	GPB-14+3	GPB-14+4	GPB-14+5
GPB-18	GPB-18+1	GPB-18+2	GPB-18+3	GPB-18+4	GPB-18+5

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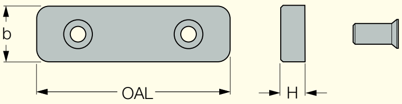
RGP

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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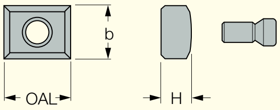
SGP

Boring Head Sub-Guide Pads

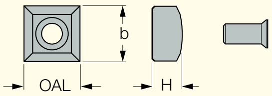


Designation	OAL	b	H
SGP-01	10.00	6.0	3.0
SGP-02	10.00	8.0	4.5
SGP-03	10.00	10.0	5.0
SGP-04	20.00	14.0	7.0

- Select an outer cartridge and pad for the required enlarged diameter.

ISCARDEEPDRILL

GPP
Boring Head Guide Pad Protectors



Designation	OAL	b	H
GPP-01	6.00	6.0	3.3
GPP-02	6.00	6.0	3.8
GPP-03	6.00	6.0	3.9
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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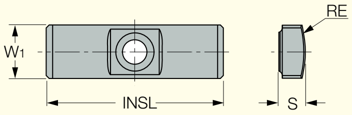
GPS
Deep Drilling Solid Carbide Guide Pads



	Dimensions				Tough ↔ Hard	
Designation	W_1	RE	INSL	S	IC950	IC908
GPS-04-16-055	4.0	5.50	16.00	2.0		●
GPS-05-18-060	5.0	6.00	18.00	2.5		●
GPS-06-20-075	6.0	7.50	20.00	3.0	●	●
GPS-06-20-085	6.0	8.50	20.00	3.0	●	●
GPS-06-20-100	6.0	10.00	20.00	3.0	●	●
GPS-06-20-120	6.0	12.00	20.00	3.0	●	●
GPS-07-20-120	7.0	12.00	20.00	3.5	●	●
GPS-08-25-155	8.0	15.50	25.00	4.5	●	●
GPS-10-30-200	10.0	20.00	30.00	4.5	●	●
GPS-10-35-200	10.0	20.00	35.00	6.0	●	●
GPS-12-35-250	12.0	25.00	35.00	5.5	●	●
GPS-14-40-250	14.0	25.00	40.00	7.5		●
GPS-18-40-300	18.0	30.00	40.00	9.0		●

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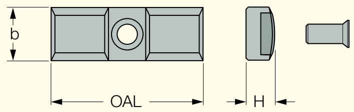
GP/GPB

Deep Drilling Head Guide Pads



Designation		b	OAL	H
GPB-06-20-120	CDZAP	6.0	20.00	3.0
GPB-08-25-155	CDZAP	8.0	25.00	4.5
GPB-10-35-200	CDZAP	10.0	35.00	6.0
GPB-12-35-250	CDZAP	12.0	35.00	5.5
GPB-14-40-250	CDZAP	14.0	40.00	7.5
GPB-14-40-250+5CD		14.0	40.00	7.5
GPB-18-40-300	CDZAP	18.0	40.00	9.0

- Select an outer cartridge and pad for the required enlarged diameter.
- Pads without grade identification are made from steel with brazed carbide tips.

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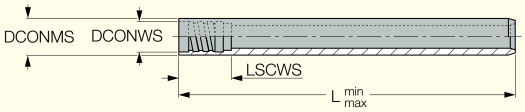
TS***

Drill Tubes - STS System - Inner Single Start Thread Connection



Designation	d Range	DCONMS	DCONWS	LSCWS	L min	L max
TS001 L=(0-1749)MM	8.00-8.99	7.10	6.00	16.00	0.0	1749.0
TS001 L=(1750-2600)MM	8.00-8.99	7.10	6.00	16.00	1750.0	2600.0
TS002 L=(0-1749)MM	9.00-9.99	8.30	7.20	16.00	0.0	1749.0
TS002 L=(1750-2600)MM	9.00-9.99	8.30	7.20	16.00	1750.0	2600.0
TS003 L=(0-1749)MM	10.00-10.99	9.00	7.60	16.00	0.0	1749.0
TS003 L=(1750-2600)MM	10.00-10.99	9.00	7.60	16.00	1750.0	2600.0
TS004 L=(0-1749)MM	11.00-11.99	10.00	8.60	16.00	0.0	1749.0
TS004 L=(1750-2600)MM	11.00-11.99	10.00	8.60	16.00	1750.0	2600.0
TS005 L=(0-1749)MM	12.00-13.49	11.00	9.10	16.00	0.0	1749.0
TS005 L=(1750-2600)MM	12.00-13.49	11.00	9.10	16.00	1750.0	2600.0
TS006 L=(0-1749)MM	13.50-14.79	12.00	10.80	16.00	0.0	1749.0
TS006 L=(1750-2600)MM	13.50-14.79	12.00	10.80	16.00	1750.0	2600.0

- Indicate overall length (L) when ordering.
- Ordering example: TS004-L1500

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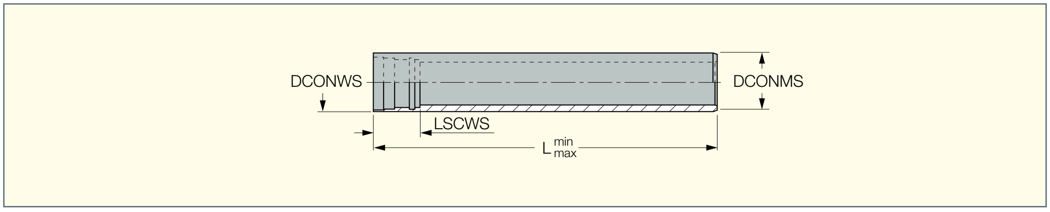
TS-I**

Drill Tubes - STS System - Inner
4 Start Thread Connection



Designation	d Range	DCONMS	DCONWS	LSCWS	L min	L max
TS-I01 L=(0-1749)MM	12.60-13.60	11.00	9.60	22.00	0.0	1749.0
TS-I01 L=(1750-2600)MM	12.60-13.60	11.00	9.60	22.00	1750.0	2600.0
TS-I02 L=(0-1749)MM	13.61-14.60	12.00	10.60	22.00	0.0	1749.0
TS-I02 L=(1750-2600)MM	13.61-14.60	12.00	10.60	22.00	1750.0	2600.0
TS-I03 L=(0-1749)MM	14.61-15.59	13.00	11.60	22.00	0.0	1749.0
TS-I03 L=(1750-2600)MM	14.61-15.59	13.00	11.60	22.00	1750.0	2600.0
TS-I0 L=(0-1749)MM	15.60-16.70	14.00	12.60	21.00	0.0	1749.0
TS-I0 L=(1750-2600)MM	15.60-16.70	14.00	12.60	21.00	1750.0	2600.0
TS-I1 L=(0-1749)MM	16.71-17.70	15.00	13.60	21.00	0.0	1749.0
TS-I1 L=(1750-2600)MM	16.71-17.70	15.00	13.60	21.00	1750.0	2600.0
TS-I2 L=(0-1749)MM	17.71-18.90	16.00	14.50	22.00	0.0	1749.0
TS-I2 L=(1750-2600)MM	17.71-18.90	16.00	14.50	22.00	1750.0	2600.0
TS-I3 L=(0-1749)MM	18.91-20.00	17.00	15.50	22.00	0.0	1749.0
TS-I3 L=(1750-2600)MM	18.91-20.00	17.00	15.50	22.00	1750.0	2600.0
TS-I4 L=(0-1749)MM	20.01-21.80	18.00	16.00	27.50	0.0	1749.0
TS-I4 L=(1750-2600)MM	20.01-21.80	18.00	16.00	27.50	1750.0	2600.0
TS-I5 L=(0-1749)MM	21.81-24.10	20.00	18.00	30.00	0.0	1749.0
TS-I5 L=(1750-2600)MM	21.81-24.10	20.00	18.00	30.00	1750.0	2600.0
TS-I6 L=(0-1749)MM	24.11-26.40	22.00	19.50	30.00	0.0	1749.0
TS-I6 L=(1750-2600)MM	24.11-26.40	22.00	19.50	30.00	1750.0	2600.0
TS-I7 L=(0-1749)MM	26.41-28.70	24.00	21.00	30.00	0.0	1749.0
TS-I7 L=(1750-2600)MM	26.41-28.70	24.00	21.00	30.00	1750.0	2600.0
TS-I8 L=(0-1749)MM	28.71-31.00	26.00	23.50	33.00	0.0	1749.0
TS-I8 L=(1750-2600)MM	28.71-31.00	26.00	23.50	33.00	1750.0	2600.0
TS-I9 L=(0-1749)MM	31.01-33.30	28.00	25.50	33.00	0.0	1749.0
TS-I9 L=(1750-2600)MM	31.01-33.30	28.00	25.50	33.00	1750.0	2600.0
TS-I10 L=(0-1749)MM	33.31-36.20	30.00	28.00	33.00	0.0	1749.0
TS-I10 L=(1750-2600)MM	33.31-36.20	30.00	28.00	33.00	1750.0	2600.0
TS-I11 L=(0-1749)MM	36.21-39.60	33.00	30.00	40.00	0.0	1749.0
TS-I11 L=(1750-2600)MM	36.21-39.60	33.00	30.00	40.00	1750.0	2600.0
TS-I12 L=(0-1749)MM	39.61-43.00	36.00	33.00	40.00	0.0	1749.0
TS-I12 L=(1750-2600)MM	39.61-43.00	36.00	33.00	40.00	1750.0	2600.0
TS-I13 L=(0-1749)MM	43.01-47.00	39.00	36.00	40.00	0.0	1749.0
TS-I13 L=(1750-2600)MM	43.01-47.00	39.00	36.00	40.00	1750.0	2600.0
TS-I14 L=(0-1749)MM	47.01-51.70	43.00	39.00	40.00	0.0	1749.0
TS-I14 L=(1750-2600)MM	47.01-51.70	43.00	39.00	40.00	1750.0	2600.0
TS-I15 L=(0-1749)MM	51.71-56.20	47.00	43.00	44.00	0.0	1749.0
TS-I15 L=(1750-2600)MM	51.71-56.20	47.00	43.00	44.00	1750.0	2600.0
TS-I16 L=(0-1749)MM	56.21-60.60	51.00	47.00	44.00	0.0	1749.0
TS-I16 L=(1750-2600)MM	56.21-60.60	51.00	47.00	44.00	1750.0	2600.0
TS-I17 L=(0-1749)MM	60.61-64.99	56.00	51.00	44.00	0.0	1749.0
TS-I17 L=(1750-2600)MM	60.61-64.99	56.00	51.00	44.00	1750.0	2600.0
TS-I18 L=(0-1749)MM	65.00-66.99	56.00	52.00	75.00	0.0	1749.0
TS-I18 L=(1750-2600)MM	65.00-66.99	56.00	52.00	75.00	1750.0	2600.0
TS-I19 L=(0-1749)MM	67.00-72.99	62.00	58.00	75.00	0.0	1749.0
TS-I19 L=(1750-2600)MM	67.00-72.99	62.00	58.00	75.00	1750.0	2600.0
TS-I20 L=(0-1749)MM	73.00-79.99	68.00	63.00	75.00	0.0	1749.0
TS-I20 L=(1750-2600)MM	73.00-79.99	68.00	63.00	75.00	1750.0	2600.0
TS-I21 L=(0-1749)MM	80.00-86.99	75.00	70.00	97.00	0.0	1749.0
TS-I21 L=(1750-2600)MM	80.00-86.99	75.00	70.00	97.00	1750.0	2600.0
TS-I22 L=(0-1749)MM	87.00-99.99	82.00	77.00	97.00	0.0	1749.0
TS-I22 L=(1750-2600)MM	87.00-99.99	82.00	77.00	97.00	1750.0	2600.0
TS-I23 L=(0-1749)MM	100.00-111.99	94.00	89.00	97.00	0.0	1749.0
TS-I23 L=(1750-2600)MM	100.00-111.99	94.00	89.00	97.00	1750.0	2600.0
TS-I24 L=(0-1749)MM	112.00-123.99	106.00	101.00	118.00	0.0	1749.0
TS-I24 L=(1750-2600)MM	112.00-123.99	106.00	101.00	118.00	1750.0	2600.0
TS-I25 L=(0-1749)MM	124.00-135.99	118.00	113.00	118.00	0.0	1749.0
TS-I25 L=(1750-2600)MM	124.00-135.99	118.00	113.00	118.00	1750.0	2600.0
TS-I26 L=(0-1749)MM	136.00-147.99	130.00	125.00	118.00	0.0	1749.0
TS-I26 L=(1750-2600)MM	136.00-147.99	130.00	125.00	118.00	1750.0	2600.0
TS-I27 L=(0-1749)MM	148.00-159.99	142.00	137.00	139.00	0.0	1749.0
TS-I27 L=(1750-2600)MM	148.00-159.99	142.00	137.00	139.00	1750.0	2600.0
TS-I28 L=(0-1749)MM	160.00-171.99	154.00	149.00	139.00	0.0	1749.0
TS-I28 L=(1750-2600)MM	160.00-171.99	154.00	149.00	139.00	1750.0	2600.0

• Indicate overall length (L) when ordering. • Ordering example: TS-I12-L2000

For tools, see pages: DSD-EF-FB (675) • DSD-EF-FT (674)

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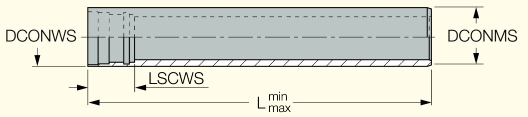
TS-I** (continued)

Drill Tubes - STS System - Inner
4 Start Thread Connection



Designation	d Range	DCONMS	DCONWS	LSCWS	L min	L max
TS-I29 L=(0-1749)MM	172.00-183.99	166.00	161.00	139.00	0.0	1749.0
TS-I29 L=(1750-2600)MM	172.00-183.99	166.00	161.00	139.00	1750.0	2600.0
TS-I30 L=(0-1749)MM	184.00-195.99	178.00	173.00	144.00	0.0	1749.0
TS-I30 L=(1750-2600)MM	184.00-195.99	178.00	173.00	144.00	1750.0	2600.0
TS-I31 L=(0-1749)MM	196.00-207.99	190.00	185.00	144.00	0.0	1749.0
TS-I31 L=(1750-2600)MM	196.00-207.99	190.00	185.00	144.00	1750.0	2600.0
TS-I32 L=(0-1749)MM	208.00-219.99	202.00	197.00	144.00	0.0	1749.0
TS-I32 L=(1750-2600)MM	208.00-219.99	202.00	197.00	144.00	1750.0	2600.0
TS-I33 L=(0-1749)MM	220.00-231.99	214.00	208.00	164.00	0.0	1749.0
TS-I33 L=(1750-2600)MM	220.00-231.99	214.00	208.00	164.00	1750.0	2600.0
TS-I34 L=(0-1749)MM	232.00-243.99	226.00	220.00	164.00	0.0	1749.0
TS-I34 L=(1750-2600)MM	232.00-243.99	226.00	220.00	164.00	1750.0	2600.0

• Indicate overall length (L) when ordering. • Ordering example: TS-I12-L2000
For tools, see pages: DSD-EF-FB (675) • DSD-EF-FT (674)

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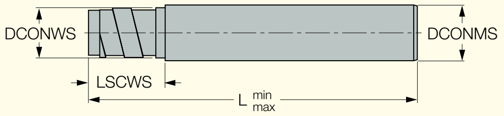
TS-O**

Drill Tubes - STS System - Outer
Single Start Thread Connection



Designation	d Range	DCONMS	DCONWS	LSCWS	L min	L max
TS-O0 L=(0-660)MM	14.50-15.00	12.00	11.50	23.00	0.0	660.0
TS-O0 L=(661-1100)MM	14.50-15.00	12.00	11.50	23.00	661.0	1100.0
TS-O1 L=(0-660)MM	15.01-15.50	12.00	11.80	23.00	0.0	660.0
TS-O1 L=(661-1100)MM	15.01-15.50	12.00	11.80	23.00	661.0	1100.0
TS-O2 L=(0-660)MM	15.51-16.00	13.00	12.40	23.00	0.0	660.0
TS-O2 L=(661-1100)MM	15.51-16.00	13.00	12.40	23.00	661.0	1100.0
TS-O3 L=(0-660)MM	16.01-16.50	13.00	12.70	23.00	0.0	660.0
TS-O3 L=(661-1100)MM	16.01-16.50	13.00	12.70	23.00	661.0	1100.0
TS-O4 L=(0-660)MM	16.51-17.25	14.00	13.40	23.00	0.0	660.0
TS-O4 L=(661-1100)MM	16.51-17.25	14.00	13.40	23.00	661.0	1100.0
TS-O5 L=(0-1749)MM	17.26-18.00	14.00	13.70	23.00	0.0	1749.0
TS-O5 L=(1750-2600)MM	17.26-18.00	14.00	13.70	23.00	1750.0	2600.0
TS-O6 L=(0-1749)MM	18.01-19.00	15.00	14.40	23.00	0.0	1749.0
TS-O6 L=(1750-2600)MM	18.01-19.00	15.00	14.40	23.00	1750.0	2600.0
TS-O7 L=(0-1749)MM	19.01-19.99	16.50	15.40	23.00	0.0	1749.0
TS-O7 L=(1750-2600)MM	19.01-19.99	16.50	15.40	23.00	1750.0	2600.0
TS-O8 L=(0-1749)MM	20.00-21.99	18.00	16.50	26.00	0.0	1749.0
TS-O8 L=(1750-2600)MM	20.00-21.99	18.00	16.50	26.00	1750.0	2600.0
TS-O9 L=(0-1749)MM	22.00-24.99	20.00	19.00	26.00	0.0	1749.0
TS-O9 L=(1750-2600)MM	22.00-24.99	20.00	19.00	26.00	1750.0	2600.0
TS-O10 L=(0-1749)MM	25.00-26.99	22.00	20.00	26.00	0.0	1749.0
TS-O10 L=(1750-2600)MM	25.00-26.99	22.00	20.00	26.00	1750.0	2600.0
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=(0-1749)MM	30.00-31.99	26.00	24.00	26.00	0.0	1749.0
TS-O12 L=(1750-2600)MM	30.00-31.99	26.00	24.00	26.00	1750.0	2600.0
TS-O13 L=(0-1749)MM	32.00-33.99	30.00	27.00	26.00	0.0	1749.0
TS-O13 L=(1750-2600)MM	32.00-33.99	30.00	27.00	26.00	1750.0	2600.0
TS-O14 L=(0-1749)MM	34.00-36.99	30.00	27.00	41.00	0.0	1749.0
TS-O14 L=(1750-2600)MM	34.00-36.99	30.00	27.00	41.00	1750.0	2600.0
TS-O15 L=(0-1749)MM	37.00-39.99	33.00	30.00	41.00	0.0	1749.0
TS-O15 L=(1750-2600)MM	37.00-39.99	33.00	30.00	41.00	1750.0	2600.0
TS-O16 L=(0-1749)MM	40.00-43.99	36.00	33.00	41.00	0.0	1749.0
TS-O16 L=(1750-2600)MM	40.00-43.99	36.00	33.00	41.00	1750.0	2600.0
TS-O17 L=(0-1749)MM	44.00-46.99	39.00	37.00	41.00	0.0	1749.0
TS-O17 L=(1750-2600)MM	44.00-46.99	39.00	37.00	41.00	1750.0	2600.0
TS-O18 L=(0-1749)MM	47.00-51.99	43.00	41.00	41.00	0.0	1749.0
TS-O18 L=(1750-2600)MM	47.00-51.99	43.00	41.00	41.00	1750.0	2600.0
TS-O19 L=(0-1749)MM	52.00-56.99	47.00	44.00	41.00	0.0	1749.0
TS-O19 L=(1750-2600)MM	52.00-56.99	47.00	44.00	41.00	1750.0	2600.0

• Indicate overall length (L) when ordering. • Ordering example: TS-036-L1100
For tools, see pages: DSD-IF-FB (679) • DSD-IF-FT (679)

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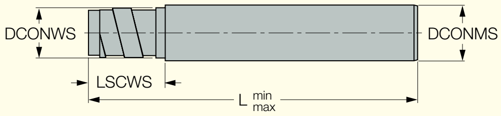
TS-O** (continued)

Drill Tubes - STS System - Outer Single Start Thread Connection



Designation	d Range	DCONMS	DCONWS	LSCWS	L min	L max
TS-020 L=(0-1749)MM	57.00-60.99	51.00	49.00	41.00	0.0	1749.0
TS-020 L=(1750-2600)MM	57.00-60.99	51.00	49.00	41.00	1750.0	2600.0
TS-021 L=(0-1749)MM	61.00-67.99	56.00	53.00	41.00	0.0	1749.0
TS-021 L=(1750-2600)MM	61.00-67.99	56.00	53.00	41.00	1750.0	2600.0
TS-022 L=(0-1749)MM	68.00-74.99	62.00	59.00	41.00	0.0	1749.0
TS-022 L=(1750-2600)MM	68.00-74.99	62.00	59.00	41.00	1750.0	2600.0
TS-023 L=(0-1749)MM	75.00-80.99	68.00	65.00	71.00	0.0	1749.0
TS-023 L=(1750-2600)MM	75.00-80.99	68.00	65.00	71.00	1750.0	2600.0
TS-024 L=(0-1749)MM	81.00-90.99	75.00	71.00	71.00	0.0	1749.0
TS-024 L=(1750-2600)MM	81.00-90.99	75.00	71.00	71.00	1750.0	2600.0
TS-025 L=(0-1749)MM	91.00-98.99	82.00	79.00	71.00	0.0	1749.0
TS-025 L=(1750-2600)MM	91.00-98.99	82.00	79.00	71.00	1750.0	2600.0
TS-026 L=(0-1749)MM	99.00-110.99	94.00	90.00	71.00	0.0	1749.0
TS-026 L=(1750-2600)MM	99.00-110.99	94.00	90.00	71.00	1750.0	2600.0
TS-027 L=(0-1749)MM	111.00-122.99	106.00	102.00	71.00	0.0	1749.0
TS-027 L=(1750-2600)MM	111.00-122.99	106.00	102.00	71.00	1750.0	2600.0
TS-028 L=(0-1749)MM	123.00-134.99	118.00	114.00	71.00	0.0	1749.0
TS-028 L=(1750-2600)MM	123.00-134.99	118.00	114.00	71.00	1750.0	2600.0
TS-029 L=(0-1749)MM	135.00-148.99	130.00	126.00	71.00	0.0	1749.0
TS-029 L=(1750-2600)MM	135.00-148.99	130.00	126.00	71.00	1750.0	2600.0
TS-030 L=(0-1749)MM	149.00-161.99	142.00	139.00	71.00	0.0	1749.0
TS-030 L=(1750-2600)MM	149.00-161.99	142.00	139.00	71.00	1750.0	2600.0
TS-031 L=(0-1749)MM	162.00-173.99	154.00	151.00	86.00	0.0	1749.0
TS-031 L=(1750-2600)MM	162.00-173.99	154.00	151.00	86.00	1750.0	2600.0
TS-032 L=(0-1749)MM	174.00-185.99	166.00	163.00	86.00	0.0	1749.0
TS-032 L=(1750-2600)MM	174.00-185.99	166.00	163.00	86.00	1750.0	2600.0
TS-033 L=(0-1749)MM	186.00-197.99	178.00	175.00	86.00	0.0	1749.0
TS-033 L=(1750-2600)MM	186.00-197.99	178.00	175.00	86.00	1750.0	2600.0
TS-034 L=(0-1749)MM	198.00-209.99	190.00	187.00	86.00	0.0	1749.0
TS-034 L=(1750-2600)MM	198.00-209.99	190.00	187.00	86.00	1750.0	2600.0
TS-035 L=(0-1749)MM	210.00-221.99	202.00	199.00	86.00	0.0	1749.0
TS-035 L=(1750-2600)MM	210.00-221.99	202.00	199.00	86.00	1750.0	2600.0
TS-036 L=(0-1749)MM	222.00-233.99	214.00	211.00	86.00	0.0	1749.0
TS-036 L=(1750-2600)MM	222.00-233.99	214.00	211.00	86.00	1750.0	2600.0
TS-037 L=(0-1749)MM	234.00-245.99	226.00	223.00	86.00	0.0	1749.0
TS-037 L=(1750-2600)MM	234.00-245.99	226.00	223.00	86.00	1750.0	2600.0

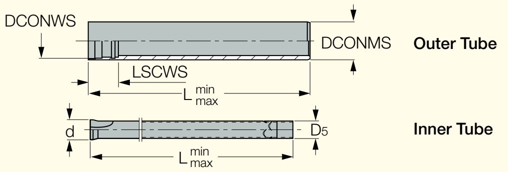
• Indicate overall length (L) when ordering. • Ordering example: TS-036-L1100

For tools, see pages: DSD-IF-FB (679) • DSD-IF-FT (679)

ISCARDEEPDRILL

TDO-I (D18.41-65.00)

Double-Tube Drill System
with 4 Start Thread
Connection Outer Tubes



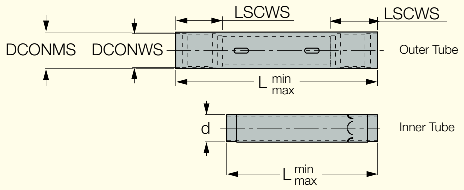
Designation	d Range	DCONMS	DCONWS	LSCWS	Int Tube	d	D_5	L min	L max
TDO-I0 L=(0-630)MM	18.41-20.00	18.00	16.00	27.50	TDI-N0	12.00	10.00	0.0	630.0
TDO-I0 L=(631-1070)MM	18.41-20.00	18.00	16.00	27.50	TDI-N0	12.00	10.00	631.0	1070.0
TDO-I1 L=(0-630)MM	20.01-21.80	19.50	18.00	30.00	TDI-N1	14.00	12.00	0.0	630.0
TDO-I1 L=(631-1070)MM	20.01-21.80	19.50	18.00	30.00	TDI-N1	14.00	12.00	631.0	1070.0
TDO-I2 L=(0-630)MM	21.81-24.10	21.50	19.50	30.00	TDI-N2	15.00	13.00	0.0	630.0
TDO-I2 L=(631-1070)MM	21.81-24.10	21.50	19.50	30.00	TDI-N2	15.00	13.00	631.0	1070.0
TDO-I3 L=(0-630)MM	24.11-26.40	23.50	21.00	30.00	TDI-N3	16.00	14.00	0.0	630.0
TDO-I3 L=(631-1070)MM	24.11-26.40	23.50	21.00	30.00	TDI-N3	16.00	14.00	631.0	1070.0
TDO-I4 L=(0-630)MM	26.41-28.70	26.00	23.50	33.00	TDI-N4	18.00	16.00	0.0	630.0
TDO-I4 L=(631-1070)MM	26.41-28.70	26.00	23.50	33.00	TDI-N4	18.00	16.00	631.0	1070.0
TDO-I5 L=(0-630)MM	28.71-31.00	28.00	25.50	33.00	TDI-N5	20.00	18.00	0.0	630.0
TDO-I5 L=(631-1070)MM	28.71-31.00	28.00	25.50	33.00	TDI-N5	20.00	18.00	631.0	1070.0
TDO-I6 L=(0-630)MM	31.01-33.30	30.50	28.00	33.00	TDI-N6	22.00	20.00	0.0	630.0
TDO-I6 L=(631-1070)MM	31.01-33.30	30.50	28.00	33.00	TDI-N6	22.00	20.00	631.0	1070.0
TDO-I7 L=(0-630)MM	33.31-36.20	33.00	30.00	40.00	TDI-N7	24.00	22.00	0.0	630.0
TDO-I7 L=(631-1070)MM	33.31-36.20	33.00	30.00	40.00	TDI-N7	24.00	22.00	631.0	1070.0
TDO-I8 L=(0-630)MM	36.21-39.60	35.50	33.00	40.00	TDI-N8	26.00	24.00	0.0	630.0
TDO-I8 L=(631-1070)MM	36.21-39.60	35.50	33.00	40.00	TDI-N8	26.00	24.00	631.0	1070.0
TDO-I9 L=(0-630)MM	39.61-43.00	39.00	36.00	40.00	TDI-N9	29.00	27.00	0.0	630.0
TDO-I9 L=(631-1070)MM	39.61-43.00	39.00	36.00	40.00	TDI-N9	29.00	27.00	631.0	1070.0
TDO-I10 L=(0-630)MM	43.01-47.00	42.50	39.00	40.00	TDI-N10	32.00	30.00	0.0	630.0
TDO-I10 L=(631-1070)MM	43.01-47.00	42.50	39.00	40.00	TDI-N10	32.00	30.00	631.0	1070.0
TDO-I11 L=(0-630)MM	47.01-51.70	46.50	43.00	44.00	TDI-N11	35.00	32.00	0.0	630.0
TDO-I11 L=(631-1070)MM	47.01-51.70	46.50	43.00	44.00	TDI-N11	35.00	32.00	631.0	1070.0
TDO-I12 L=(0-630)MM	51.71-56.20	51.00	47.00	44.00	TDI-N12	39.00	36.00	0.0	630.0
TDO-I12 L=(631-1070)MM	51.71-56.20	51.00	47.00	44.00	TDI-N12	39.00	36.00	631.0	1070.0
TDO-I13 L=(0-630)MM	56.21-65.00	55.50	51.00	44.00	TDI-N13	43.00	40.00	0.0	630.0
TDO-I13 L=(631-1070)MM	56.21-65.00	55.50	51.00	44.00	TDI-N13	43.00	40.00	631.0	1070.0

• 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

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=(0-660)MM	65.00-66.99	56.00	52.00	75.00	TDI-N14	40.00	0.0	660.0
TDO-I14 L=(661-1100)MM	65.00-66.99	56.00	52.00	75.00	TDI-N14	40.00	661.0	1100.0
TDO-I15 L=(0-660)MM	67.00-72.99	62.00	58.00	75.00	TDI-N15	44.00	0.0	660.0
TDO-I15 L=(661-1100)MM	67.00-72.99	62.00	58.00	75.00	TDI-N15	44.00	661.0	1100.0
TDO-I16 L=(0-630)MM	73.00-79.99	68.00	63.00	75.00	TDI-N16	48.00	0.0	630.0
TDO-I16 L=(631-1070)MM	73.00-79.99	68.00	63.00	75.00	TDI-N16	48.00	631.0	1070.0
TDO-I17 L=(0-630)MM	80.00-86.99	75.00	70.00	97.00	TDI-N17	54.00	0.0	630.0
TDO-I17 L=(631-1070)MM	80.00-86.99	75.00	70.00	97.00	TDI-N17	54.00	631.0	1070.0
TDO-I18 L=(0-630)MM	87.00-99.99	82.00	77.00	97.00	TDI-N18	60.00	0.0	630.0
TDO-I18 L=(631-1070)MM	87.00-99.99	82.00	77.00	97.00	TDI-N18	60.00	631.0	1070.0
TDO-I19 L=(0-630)MM	100.00-111.99	94.00	89.00	97.00	TDI-N19	70.00	0.0	630.0
TDO-I19 L=(631-1070)MM	100.00-111.99	94.00	89.00	97.00	TDI-N19	70.00	631.0	1070.0
TDO-I20 L=(0-630)MM	112.00-123.99	106.00	101.00	118.00	TDI-N20	80.00	0.0	630.0
TDO-I20 L=(631-1070)MM	112.00-123.99	106.00	101.00	118.00	TDI-N20	80.00	631.0	1070.0
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

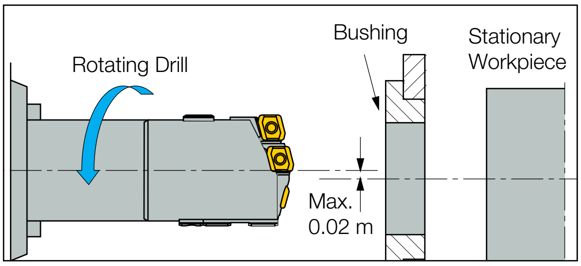
• Indicate overall length (L) when ordering • Ordering example: TDO-I18-L1150 • For 65.00-123.99 diameter range, the inner tube should be 190 mm longer than the outer tube. • For 124.00-183.99 diameter range, the inner tube should be 220 mm longer than the outer tube.

For tools, see pages: DDD-EC (686)

Drill Setup

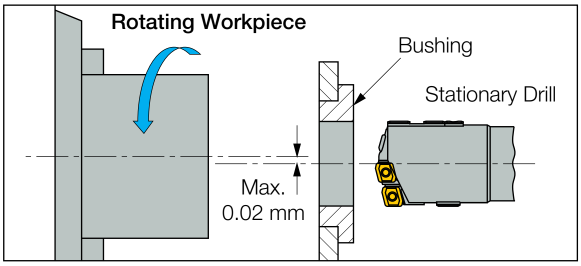
Rotating Drill

- Can be applied on symmetrical and non-symmetrical workpieces
- Drill to bushing center misalignment should not exceed 0.02 mm



Stationary Drill

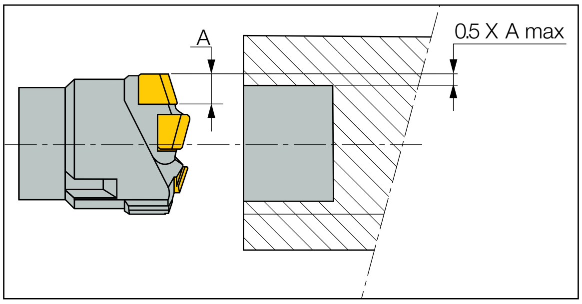
- Applied on symmetrical workpieces
- Improved hole straightness and bushing wear
- Drill to bushing center misalignment should not exceed 0.02 mm

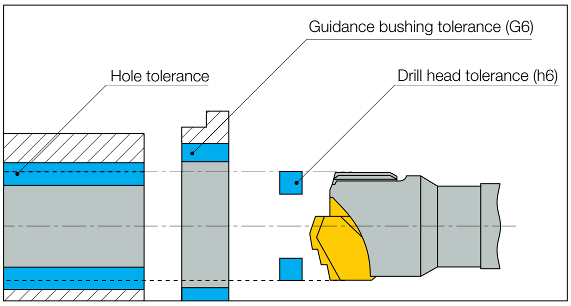


Drill Bushing and Workpiece Tolerance Relative Positioning

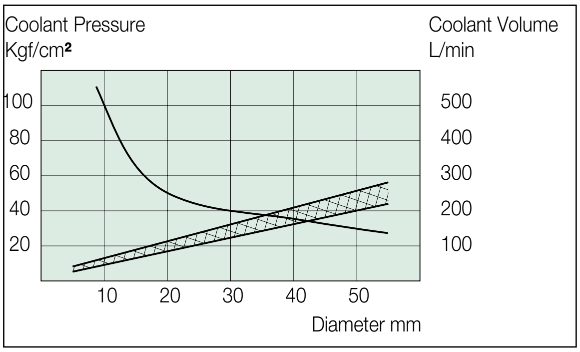
Pre-drilled Hole

A large pre-drilled hole (larger than D-a) ensures precise hole size and center location.

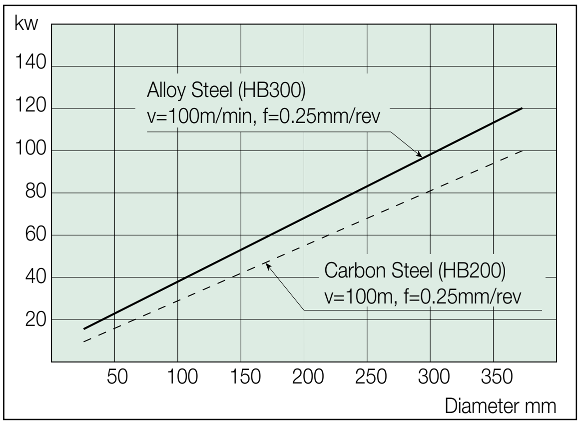




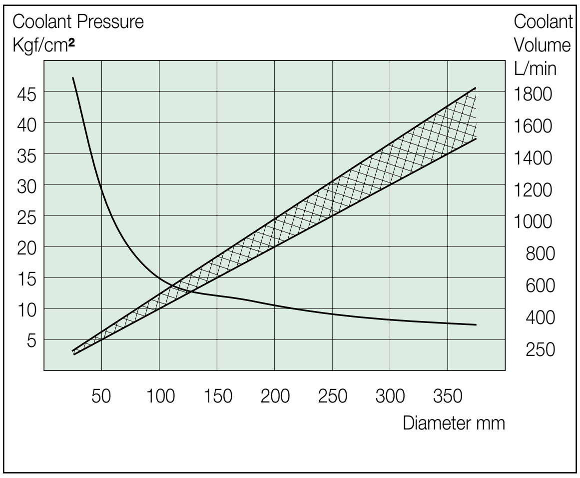
Recommended Coolant Pressure and Volume ≤ 50 mm



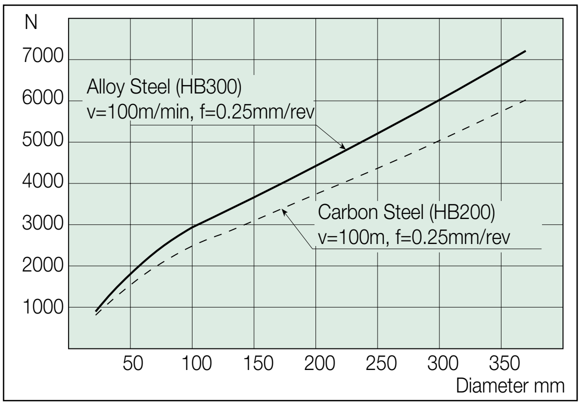
Machine Power



Recommended Coolant Pressure and Volume > 50 mm



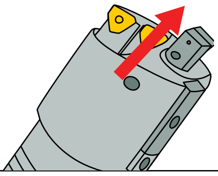
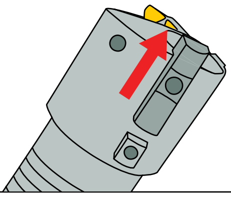
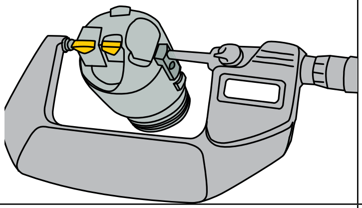
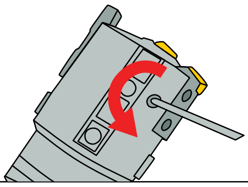
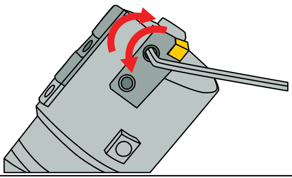
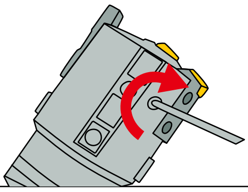
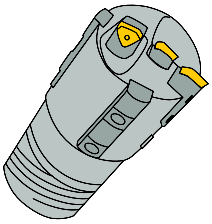
Machine Thrust Force



Technical Information - Cartridge Style Drill Head Diameter Setting

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.

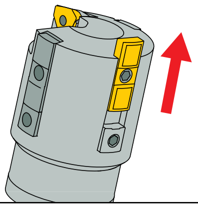
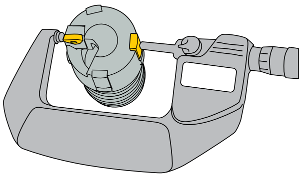
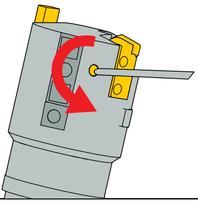
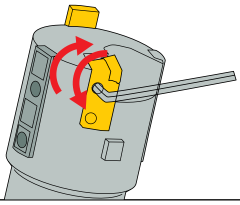
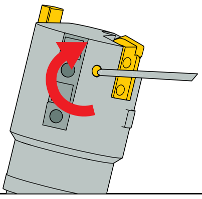
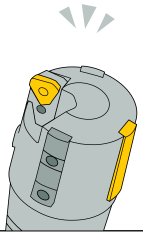
Note: When a corner change is made on the insert, it must be adjusted to the correct size or damage can be caused to the head body or workpiece material.

	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.

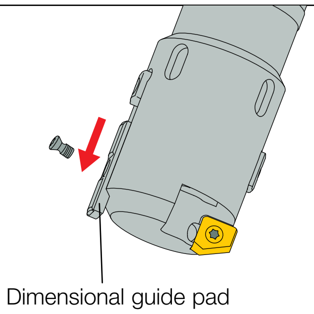
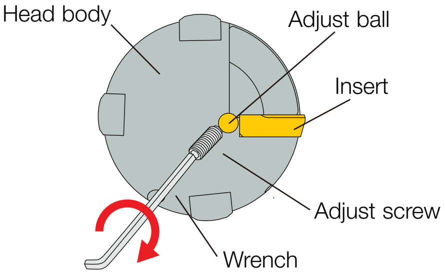
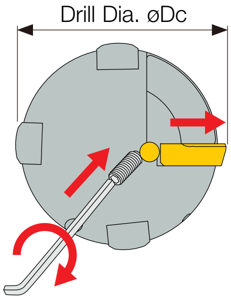
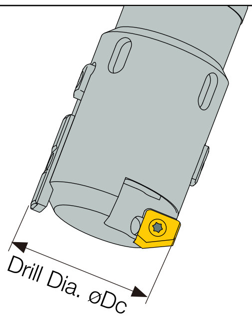
Diameter Setting

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 a work piece material.

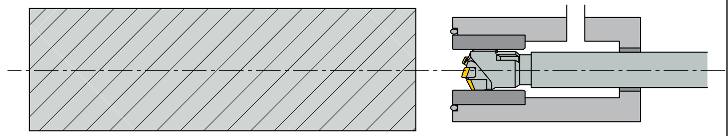
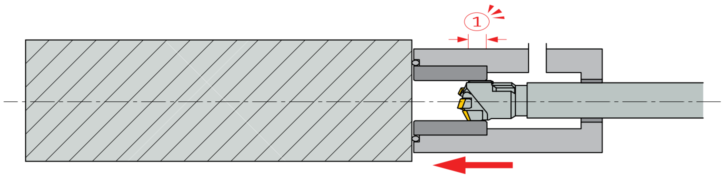
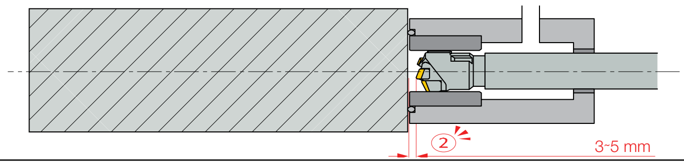
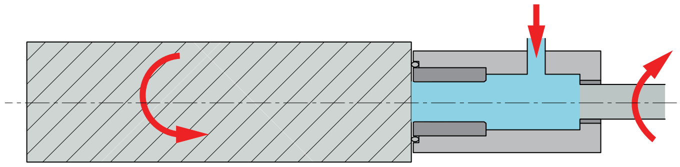
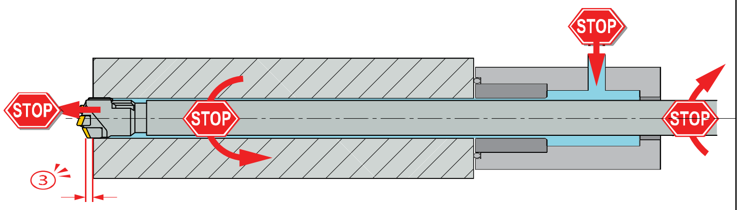
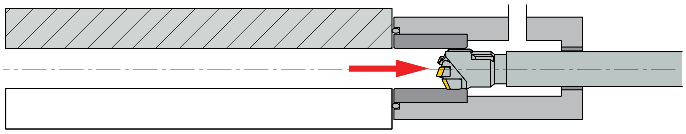
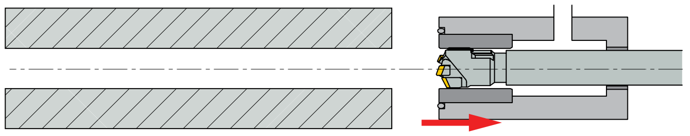
	1. The dimensional guide pad must be slid forward to measure the diameter. 1.1 Loosen the lock screw and slide the guide pad forward. 1.2 Retighten the lock screw at the measuring position.
	2. Measure the diameter with a micrometer. We recommend setting the tool diameter at h8 tolerance to the cutting diameter. Note: If the diameter is incorrect, go to **step 3.** If it's correct, go below **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.

Drill diameter is adjusted with an adjust ball for diameter ø25 - ø39.99mm
with the following method.

	1. Slide the dimensional guide pad forward and then retighten the lock screw at the measuring position.
	2. Tighten the adjust screw.
	3. As the adjust screw moves forward, insert moves peripheral direction.
	4. Measure the diameter with a micrometer. If the diameter is larger than expected, loosen the adjust screw and insert screw, then retighen the insert screw. Repeat the procedure from step 2

Technical Information -
NC Cycle

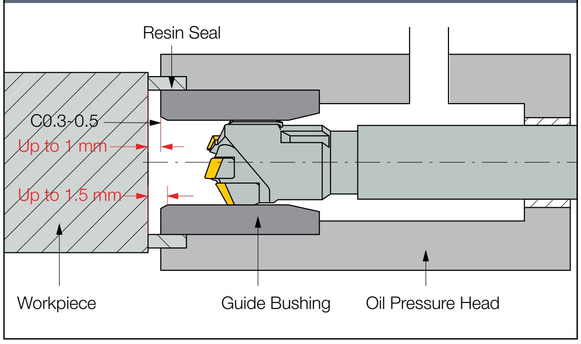
Use the **NC** cycle as instructed below to optimize tool performance more safely.

	**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**

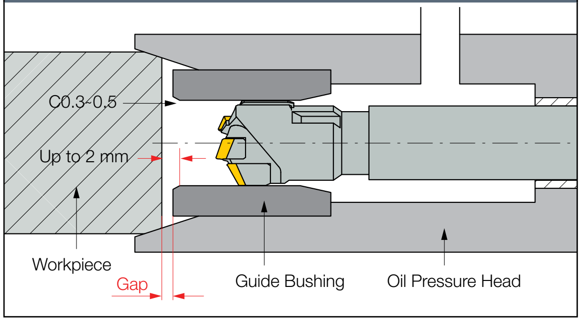
Technical Information - Notes for Guide Bushing Installation

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.

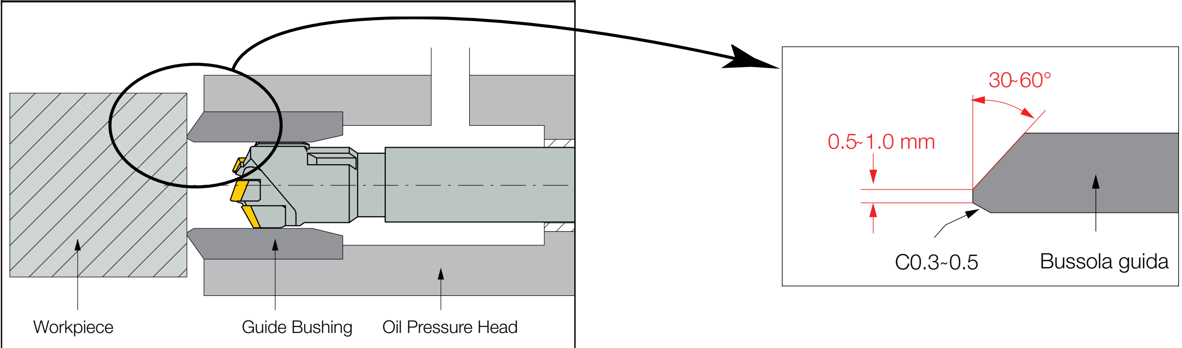
Resin Seal Type



Taper Cone Type

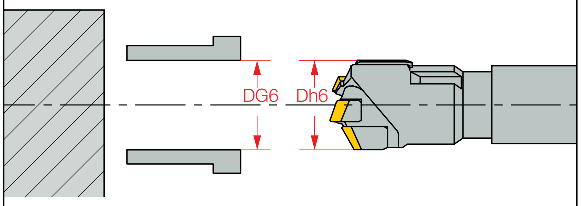


Flat-edge Type



Recommended for Ø65 mm and less

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

Technical Information - Cutting Fluid Management

Successful deep hole drilling can be achieved not only by tooling but also by an optimized combination of the tool, the machine and the cutting fluid. The cutting fluid is one of the essential components to obtain safe, stable and cost efficient deep hole drilling. Therefore, it is very important to choose and use the cutting fluid correctly.

Cutting Fluid

The cutting fluid plays a large role in lubrication of the tool, cooling of cutting edges and chips and evacuation of chips in deep hole drilling. It also contributes to improved tool life, surface finish and cutting accuracy when being fed continuously during cutting.

Lubrication

Lubrication of cutting edges and guide pads is necessary in deep hole drilling. To get efficient lubrication, it is recommended to use **EP** (Extreme Pressure) additives that contain sulfur or chlorine.

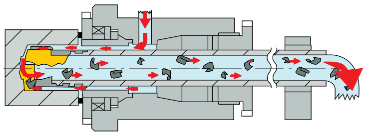
Heat dissipation

The coolability of cutting fluid depends on thermal characteristics such as thermal conductivity and specific heat. The cutting fluid of good coolability increases tool life, but a water-soluble type is not preferred in deep hole drilling because of a lesser lubrication effect. If water-soluble fluid is used, the concentration is recommended to be 10% (dilution rate 1/10) or more. Cooling of chips is important as well as cooling of cutting edges and guide pads in deep hole drilling. Temperature control is also important to maintain long tool life, stable cutting conditions and cutting accuracy.

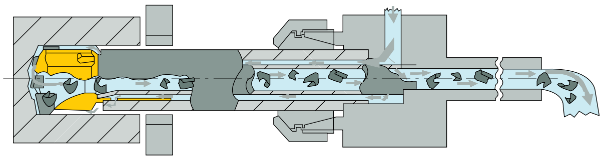
Chip evacuation

Cutting fluid has an important role in deep hole drilling as it evacuates chips through to the back end of boring bar (for **STS**) or inner tube (for **DTS**), whereas it finishes its role as soon as the chips are separated from the workpiece in general cutting. It is also important to control the flow and the pressure of cutting fluid.

STS (**Single Tube System**)



DTS (**Double Tube System**)



Coolant Unit

The coolant unit is also important to obtain the optimal effect of the cutting fluid, which has an important role in deep hole drilling.

Supply cutting fluid continuously at constant pressure and flow. Fluid pressure and flow are recommended to be continuously variable and monitored with a pressure gauge and a flow gauge. Screw pumps with an inverter are suitable.

Maintain constant temperature

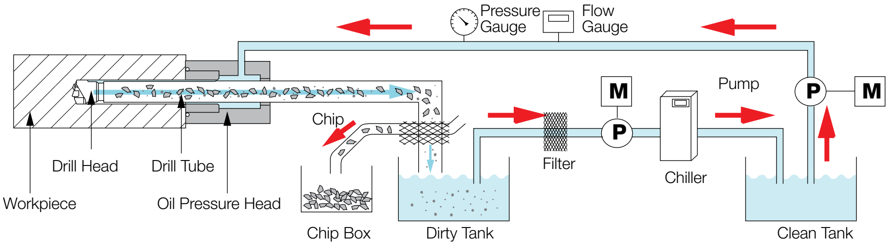
The cutting fluid is heated by factors such as:
- Cutting edge
- Friction of guide pad
- Contact duration of heated chips and cutting fluid
- Pump

Maintenance of the constant cutting fluid temperature is important for 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 cutting fluid temperature should be kept at 30-40°C (90-100°F) throughout the cutting operation.

Filtration

A lot of particles are contained in cutting fluid after finishing cutting and chip evacuation; thus filtration is necessary to remove them. The filter size should be selected to catch particles but not **EP** additives. The size depends on the cutting fluid, but generally it is suggested to be around 10-20 µm. For iron-based workpieces, a magnetic separator will be helpful, which decreases filter maintenance frequency.

Flow chart of cutting fluid in deep hole drilling



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.

Recommended Machining Conditions

ISO	Material		Condition	Tensile Strength [N/mm^2]	Hardness HB	Material 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 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
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			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
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

(1) For material groups see pages 1114-1149

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
Vc (m/min)	Feed Rate f (mm/rev)					Vc (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/mm^2]	Hardness HB	Material 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 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
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			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
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

(1) For material groups see pages 1114-1149

Adjustable Counterboring Heads DSD-EF-FB, DDD-EF-FB, DSD-IF-FB (Width of Cut, mm)			Adjustable Solid Drill Heads DSD-EC, DDD-EC, DSD-IC					
Dia. Range	25.00 - 43.00	43.01 - 65.00	Dia. Range	38.00-39.99	40.00-51.99	52.00-63.99	64.00-84.99	85.00-
Vc (m/min)	Feed Rate f (mm/rev)		Vc (m/min)	Feed Rate f (mm/rev)				
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-120	0.1-0.3	0.12-0.35	60-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.1-0.3	0.12-0.35	60-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.1-0.3	0.12-0.35	50-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
60-120	0.1-0.3	0.12-0.35	50-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-120	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-110	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-110	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
70-130	0.1-0.3	0.12-0.35	60-110	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
50-110	0.1-0.25	0.12-0.35	60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
50-110	0.1-0.25	0.12-0.35	60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
60-110	0.1-0.25	0.12-0.35	60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
60-110	0.1-0.25	0.12-0.35	60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
70-110	0.1-0.25	0.12-0.35	60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
70-110	0.1-0.25	0.12-0.35	60-100	0.08-0.13	0.1-0.15	0.13-0.18	0.15-0.2	0.18-0.23
65-130	0.1-0.25	0.12-0.35	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
65-130	0.08-0.23	0.12-0.27	60-130	0.08-0.2	0.1-0.25	0.13-0.28	0.15-0.3	0.18-0.33
20-50	0.08-0.23	0.12-0.27	20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
20-50	0.08-0.23	0.12-0.27	20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
20-50	0.08-0.23	0.12-0.27	20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
20-50	0.08-0.23	0.12-0.27	20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
20-50	0.08-0.23	0.12-0.27	20-65	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
30-60	0.08-0.23	0.12-0.27	30-100	0.08-0.15	0.1-0.2	0.13-0.23	0.15-0.25	0.18-0.3
30-60	0.08-0.23	0.12-0.27	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/mm^2]	Hardness HB	Material 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 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
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			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
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

[1] For material groups see pages 1114-1149

Adjustable Counterboring Heads DSC-EA, DSC-EC, DSC-I1, DST-I1, DSC-IA, DSC-IC, DDC-E1, DDT-E1 (Width of Cut, mm)				Trepanning Heads		Ground Brazed Counterboring Heads DSC-E1, DST-E1, DSC-I1, DST-I1, DDC-E1 (Width of Cut, mm)		
Dia. Range	1-3	3-8	8-23	Dia. Range	120-400	Dia. Range	1-3	3-5
Vc (m/min)	Feed Rate f (mm/rev)			Vc (m/min)	Feed Rate f (mm/rev)	Vc (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

ISO	Material		Condition	Tensile Strength [N/mm2]	Hardness HB
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125
		>= 0.25 %C	Annealed	650	190
		< 0.55 %C	Quenched and tempered	850	250
		>= 0.55 %C	Annealed	750	220
			Quenched and tempered	1000	300
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200
			Quenched and tempered	930	275
				1000	300
				1200	350
	High alloyed steel, cast steel, and tool steel		Annealed	680	200
			Quenched and tempered	1100	325
	Stainless steel		Ferritic/martensitic	680	200
			Martensitic	820	240
M	Stainless steel		Austenitic	600	180
K	Grey cast iron (GG)		Ferritic/pearlitic		180
			Pearlitic		260
	Nodular cast iron (GGG)		Ferritic		160
			Pearlitic		250
	Malleable cast iron		Ferritic		130
			Pearlitic		230
N	Aluminum-wrought alloy		Not cureable		60
			Cured		100
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75
			Cured		90
		>12% Si	High temperature		130
	Copper alloys	>1% Pb	Free cutting		110
			Brass		90
			Electrolitic copper		100
	Non-metallic		Duroplastics, fiber plastics		
			Hard rubber		
S	High temp. alloys	Fe based	Annealed		200
			Cured		280
		Ni or Co based	Annealed		250
			Cured		350
			Cast		320
	Titanium Ti alloys			RM 400	
			Alpha+beta alloys cured	RM 1050	

Machining Recommendations for TRIDEEP Drills

	TRIDEEP Gundrills			TRIDEEP BTA Drilling Heads	
		Feed Rate (mm/rev)			Feed Rate (mm/rev)
Material No.	Cutting Speed (m/min)	Drill Dia. Dc (mm) 12.00-15.99	Drill Dia. Dc (mm) 16.00-28.00	Cutting Speed (m/min)	Drill Dia. Dc (mm) 16.00-28.00
1	80-140	0.05-0.10	0.10-0.20	90-130	0.15-0.20
2	80-140	0.05-0.10	0.10-0.20	90-130	0.15-0.20
3	80-140	0.05-0.16	0.10-0.20	90-130	0.15-0.20
4	80-140	0.05-0.16	0.10-0.20	70-130	0.10-0.25
5	80-140	0.05-0.16	0.10-0.20	70-130	0.10-0.25
6	80-120	0.05-0.10	0.10-0.20	70-120	0.10-0.25
7	80-120	0.05-0.16	0.10-0.20	60-120	0.10-0.25
8	80-120	0.05-0.16	0.10-0.20	60-120	0.10-0.25
9	80-120	0.05-0.16	0.10-0.20	60-120	0.10-0.25
10	80-120	0.05-0.10	0.10-0.20	70-130	0.10-0.25
11	80-120	0.05-0.16	0.10-0.20	70-130	0.10-0.25
12	80-140	0.05-0.10	0.08-0.10	80-130	0.06-0.10
13	80-140	0.05-0.10	0.08-0.10	80-130	0.06-0.10
14	80-140	0.05-0.10	0.08-0.10	80-130	0.06-0.10
15	80-140	0.05-0.25	0.10-0.30	50-110	0.10-0.20
16	80-140	0.05-0.25	0.10-0.30	50-110	0.10-0.20
17	80-140	0.05-0.25	0.10-0.30	60-110	0.10-0.20
18	80-140	0.05-0.25	0.10-0.30	60-110	0.10-0.20
19	80-140	0.05-0.25	0.10-0.30	70-110	0.10-0.20
20	80-140	0.05-0.25	0.10-0.30	70-110	0.10-0.20
21	65-130	0.05-0.20	0.10-0.20	65-130	0.10-0.20
22	65-130	0.05-0.20	0.08-0.18	65-130	0.08-0.18
23	65-130	0.05-0.20	0.08-0.18	65-130	0.08-0.18
24	65-130	0.05-0.20	0.08-0.18	65-130	0.08-0.18
25	65-130		0.08-0.18	65-130	0.08-0.18
26	65-130		0.08-0.18	65-130	0.08-0.18
27	65-130		0.08-0.18	65-130	0.08-0.18
28	65-130		0.08-0.18	65-130	0.08-0.18
29	65-130		0.08-0.18	65-130	0.08-0.18
30	65-130		0.08-0.18	65-130	0.08-0.18
31	20-50	0.04-0.08	0.08-0.18	20-50	0.08-0.18
32	20-50	0.04-0.08	0.08-0.18	20-50	0.08-0.18
33	20-50	0.04-0.08	0.08-0.18	20-50	0.08-0.18
34	20-50	0.04-0.08	0.08-0.18	20-50	0.08-0.18
35	20-50	0.04-0.08	0.08-0.18	20-50	0.08-0.18
36	30-60	0.05-0.13	0.08-0.18	30-60	0.08-0.18
37	30-60	0.05-0.13	0.08-0.18	30-60	0.08-0.18

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: ☐ Annealed ☐ Quenched ☐ Tempered ☐ Cast

☐ Other ____________________

MACHINE

Machine supplier name: ____________________

Machine type/model: ☐ **NC** lathe ☐ Machining center ☐ Other ________

Rigidity: ☐ Good ☐ Normal ☐ Poor

Spindle power (kW): ________

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

☐ Tool and workpiece ☐ Rotating workpiece (**WR**) ☐ Rotating tool (**TR**)

TYPE OF COOLANT

Water based: ☐ Soluble ☐ Emulsion ________ %

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

TOOL

Drill Head

Drill diameter: ____________ (mm/inch)

Thread: ☐ Inner ☐ Outer Brazed: ☐

Indexable: ☐ Adjustable ☐ Direct mount Coating: ☐ Coated ☐ Uncoated

Solid drilling: ☐ Counterboring: ☐

Pre-drilled hole size: ____________ (mm/inch)

Bottom finishing: ☐ Full ball R ☐ Flat bottom R ☐ Corner R ☐ Other ________

Trepanning: ☐ Y ☐ 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 ☐ Starts 2 ☐ Starts 1 ☐ Starts

Tube Thread: 1 ☐ End ☐ Both ends

Inner Tube Length: ____________ (mm/inch)

Inner Tube Slit: 1 ☐ End ☐ Both ends

Drilling System & Boring Conditions

Single Tube System: ☐ Blind Hole Drilling: ☐ Double Tube System: ☐

Cross Hole Drilling: ☐ Through Hole Drilling: ☐

Please sketch your drilling application

GENERAL PRODUCTION INFORMATION

Quantity of parts per year: ______________________________

Grade, tool life, etc.: ______________________________

Perfomance expectation: Vc= ____ m/min N= _____ RPM F= ______ mm/min f= ____ mm/rev

Cutting data: ______________________________

Description of present system in use: ______________________________

____

____

____

____

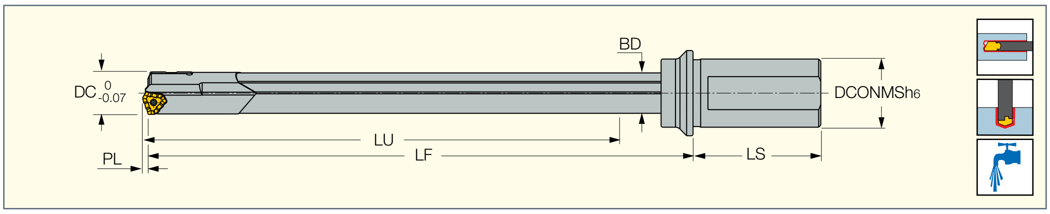
Please fill in and return to your **ISCAR** representative.

GUNDRILLS

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	227.0	25.00	13.50	261.0	1.95	56.0	TOGT 07..
GD-DH 14.00-20D-M25-07	14.00	302.0	25.00	13.50	336.0	1.95	56.0	TOGT 07..
GD-DH 14.00-25D-M25-07	14.00	377.0	25.00	13.50	411.0	1.95	56.0	TOGT 07..
GD-DH 14.50-15D-M25-07	14.50	227.0	25.00	14.00	262.0	1.95	56.0	TOGT 07..
GD-DH 14.50-20D-M25-07	14.50	302.0	25.00	14.00	337.0	1.95	56.0	TOGT 07..
GD-DH 14.50-25D-M25-07	14.50	377.0	25.00	14.00	412.0	1.95	56.0	TOGT 07..
GD-DH 15.00-15D-M25-07	15.00	242.0	25.00	14.50	278.0	1.95	56.0	TOGT 07..
GD-DH 15.00-20D-M25-07	15.00	322.0	25.00	14.50	358.0	1.95	56.0	TOGT 07..
GD-DH 15.00-25D-M25-07	15.00	402.0	25.00	14.50	438.0	1.95	56.0	TOGT 07..
GD-DH 16.00-10D-M25-08-N	16.00	172.2	25.00	15.50	209.0	2.20	56.0	TOGT 08..
GD-DH 16.00-15D-M25-08-N	16.00	257.2	25.00	15.50	294.0	2.20	56.0	TOGT 08..
GD-DH 16.00-25D-M25-08-N	16.00	427.2	25.00	15.50	464.0	2.20	56.0	TOGT 08..
GD-DH 16.50-10D-M25-08-N	16.50	172.2	25.00	15.50	209.0	2.20	56.0	TOGT 08..
GD-DH 16.50-15D-M25-08-N	16.50	257.2	25.00	15.50	294.0	2.20	56.0	TOGT 08..
GD-DH 16.50-25D-M25-08-N	16.50	427.2	25.00	15.50	464.0	2.20	56.0	TOGT 08..
GD-DH 17.00-10D-M25-08-N	17.00	182.2	25.00	16.20	220.0	2.20	56.0	TOGT 08..
GD-DH 17.00-15D-M25-08-N	17.00	272.2	25.00	16.20	310.0	2.20	56.0	TOGT 08..
GD-DH 17.00-25D-M25-08-N	17.00	452.2	25.00	16.20	490.0	2.20	56.0	TOGT 08..
GD-DH 17.50-25D-M25-08-N	17.50	452.2	25.00	16.20	490.0	2.20	56.0	TOGT 08..
GD-DH 18.00-10D-M25-08-N	18.00	193.0	25.00	16.20	232.0	3.00	56.0	TOGT 08..
GD-DH 18.00-15D-M25-08-N	18.00	288.0	25.00	17.20	327.0	3.00	56.0	TOGT 08..
GD-DH 18.00-25D-M25-08-N	18.00	478.0	25.00	17.20	517.0	3.00	56.0	TOGT 08..
GD-DH 18.50-15D-M25-09	18.50	288.0	25.00	17.20	327.0	3.00	56.0	TOGT 09..
GD-DH 18.50-25D-M25-09	18.50	478.0	25.00	17.20	517.0	3.00	56.0	TOGT 09..
GD-DH 19.00-10D-M25-09	19.00	203.0	25.00	18.20	243.0	3.00	56.0	TOGT 09..
GD-DH 19.00-15D-M25-09	19.00	303.0	25.00	18.20	343.0	3.00	56.0	TOGT 09..
GD-DH 19.00-25D-M25-09	19.00	503.0	25.00	18.20	543.0	3.00	56.0	TOGT 09..
GD-DH 19.50-15D-M25-09	19.50	303.0	25.00	18.20	343.0	3.00	56.0	TOGT 09..
GD-DH 19.50-25D-M25-09	19.50	503.0	25.00	18.20	543.0	3.00	56.0	TOGT 09..
GD-DH 20.00-10D-M32-09	20.00	213.2	32.00	19.00	255.0	3.20	60.0	TOGT 09..
GD-DH 20.00-15D-M32-09	20.00	318.2	32.00	19.00	360.0	3.20	60.0	TOGT 09..
GD-DH 20.00-25D-M32-09	20.00	528.2	32.00	19.00	570.0	3.20	60.0	TOGT 09..
GD-DH 21.00-10D-M32-10	21.00	223.2	32.00	20.00	266.0	3.20	60.0	TOGT 10..
GD-DH 21.00-15D-M32-10	21.00	333.2	32.00	20.00	376.0	3.20	60.0	TOGT 10..
GD-DH 21.00-25D-M32-10	21.00	553.2	32.00	20.00	596.0	3.20	60.0	TOGT 10..
GD-DH 22.00-10D-M32-11	22.00	233.4	32.00	21.00	278.0	3.40	60.0	TOGT 11..
GD-DH 22.00-15D-M32-11	22.00	348.4	32.00	21.00	393.0	3.40	60.0	TOGT 11..
GD-DH 22.00-25D-M32-11	22.00	578.4	32.00	21.00	623.0	3.40	60.0	TOGT 11..
GD-DH 23.00-10D-M32-11	23.00	243.4	32.00	22.00	289.0	3.40	60.0	TOGT 11..
GD-DH 23.00-15D-M32-11	23.00	363.4	32.00	22.00	409.0	3.40	60.0	TOGT 11..
GD-DH 23.00-25D-M32-11	23.00	603.4	32.00	22.00	649.0	3.40	60.0	TOGT 11..
GD-DH 24.00-10D-M32-11	24.00	253.4	32.00	23.00	301.0	3.40	60.0	TOGT 11..
GD-DH 24.00-15D-M32-11	24.00	378.4	32.00	23.00	426.0	3.40	60.0	TOGT 11..
GD-DH 24.00-25D-M32-11	24.00	628.4	32.00	23.00	676.0	3.40	60.0	TOGT 11..
GD-DH 25.00-10D-M32-11	25.00	263.6	32.00	24.00	312.0	3.60	60.0	TOGT 11..
GD-DH 25.00-15D-M32-11	25.00	393.6	32.00	24.00	442.0	3.60	60.0	TOGT 11..
GD-DH 25.00-25D-M32-11	25.00	653.6	32.00	24.00	702.0	3.60	60.0	TOGT 11..
GD-DH 26.00-10D-M40-12	26.00	273.6	40.00	25.00	324.0	3.60	70.0	TOGT 12..
GD-DH 26.00-15D-M40-12	26.00	408.6	40.00	25.00	459.0	3.60	70.0	TOGT 12..
GD-DH 26.00-25D-M40-12	26.00	678.6	40.00	25.00	729.0	3.60	70.0	TOGT 12..
GD-DH 27.00-10D-M40-12	27.00	283.6	40.00	26.00	335.0	3.60	70.0	TOGT 12..
GD-DH 27.00-15D-M40-12	27.00	423.6	40.00	26.00	475.0	3.60	70.0	TOGT 12..
GD-DH 27.00-25D-M40-12	27.00	703.6	40.00	26.00	755.0	3.60	70.0	TOGT 12..
GD-DH 28.00-10D-M40-12	28.00	283.6	40.00	27.00	337.0	3.60	70.0	TOGT 12..
GD-DH 28.00-15D-M40-12	28.00	423.6	40.00	27.00	477.0	3.60	70.0	TOGT 12..
GD-DH 28.00-25D-M40-12	28.00	703.6	40.00	27.00	757.0	3.60	70.0	TOGT 12..

- 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 724-728
- 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 (722)

Spare Parts

Diameter Range	Insert	Insert Clamping Screw	Key	Solid Carbide Guide Pad	Guide Pad Clamping Screw	Key
14.00-15.99	TOGT 070304-DT	SR-14-560/S	T-8	GPS-05-18-060	SR34-508	T-7
16.00-18.00	TOGT 080305-DT	SR-14-560/S	T-8	GPS-05-18-075		
18.01-20.00	TOGT 090305-DT	SR-14-560/S	T-8	GPS-06-20-085		
20.01-20.99	TOGT 100305-DT	SR-34-506	T-8	GPS-06-20-085		
21.00-21.99	TOGT 100305-DT			GPS-06-20-100		
22.00-25.00	TOGT 110405-DT	SR-14-571/S	T-15	GPS-06-20-100		
25.01-28.00	TOGT 120405-DT	SR-14-506	T-15	GPS-06-20-120		

TRIDEEP DEEP DRILLING

TOGT

Deep Drilling Inserts with 3 Chip Splitting Cutting Edges, Positive Rake Chipbreaker and a Wiper

Fig. 1

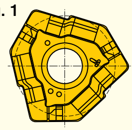
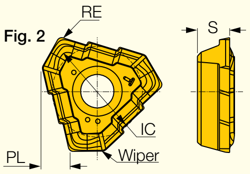


Fig. 2



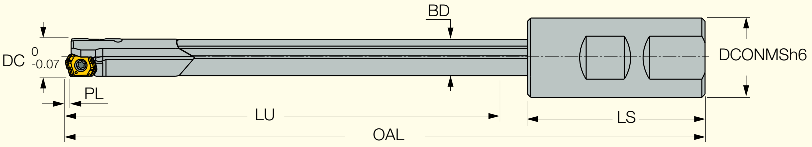
Designation	Dimensions					IC908
	IC	RE	PL	S	Fig.	
TOGT 070304-DT	7.69	0.40	1.95	2.30	1.	●
TOGT 080305-DT	8.55	0.50	2.20	2.80	1.	●
TOGT 090305-DT	8.32	0.50	3.00	3.00	2.	●
TOGT 100305-DT	9.23	0.50	3.20	3.30	2.	●
TOGT 110405-DT	10.40	0.50	3.40	3.80	2.	●
TOGT 120405-DT	11.59	0.50	3.60	4.30	2.	●

For tools, see pages: DDD-EF-FT (685) • DSD-EF-FT (674) • DSD-IF-FT (679) • GD-DH (721)

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	OAL	LU	DCONMS	BD	PL	LS
GD-DHL 12.00X800-U03	12.00	801.80	713.8	19.05	11.50	1.80	70.0
GD-DHL 12.00X800-22	12.00	801.80	733.8	20.00	11.50	1.80	50.0
GD-DHL 12.00X800-34	12.00	801.80	733.8	20.00	11.50	1.80	50.0
GD-DHL 12.00X1000-U03	12.00	1001.80	913.8	19.05	11.50	1.80	70.0
GD-DHL 12.00X1000-22	12.00	1001.80	933.8	20.00	11.50	1.80	50.0
GD-DHL 12.00X1000-34	12.00	1001.80	933.8	20.00	11.50	1.80	50.0
GD-DHL 12.00X1650-U03	12.00	1651.80	1563.8	19.05	11.50	1.80	70.0
GD-DHL 12.00X1650-22	12.00	1651.80	1583.8	20.00	11.50	1.80	50.0
GD-DHL 12.00X1650-34	12.00	1651.80	1583.8	20.00	11.50	1.80	50.0
GD-DHL 13.00X800-U04	13.00	801.80	711.8	25.40	12.50	1.80	70.0
GD-DHL 13.00X800-23	13.00	801.80	725.8	25.00	12.50	1.80	56.0
GD-DHL 13.00X800-35	13.00	801.80	725.8	25.00	12.50	1.80	56.0
GD-DHL 13.00X1000-U04	13.00	1001.80	911.8	25.40	12.50	1.80	70.0
GD-DHL 13.00X1000-23	13.00	1001.80	925.8	25.00	12.50	1.80	56.0
GD-DHL 13.00X1000-35	13.00	1001.80	925.8	25.00	12.50	1.80	56.0
GD-DHL 13.00X1650-U04	13.00	1651.80	1561.8	25.40	12.50	1.80	70.0
GD-DHL 13.00X1650-23	13.00	1651.80	1575.8	25.00	12.50	1.80	56.0
GD-DHL 13.00X1650-35	13.00	1651.80	1575.8	25.00	12.50	1.80	56.0

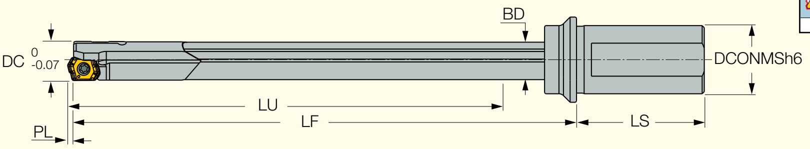
• Note: Gundrills can be supplied with up to 2400 mm length on request. • Inserts and guide pads should be ordered separately (they are not included with the tools).
• For user guide and cutting conditions, see pages 724-728 • Preventative measures: • Do NOT operate the deep hole drill at full speed before engaging the guide hole.
• Enter the guide hole slowly at a speed of 50 - 100 rpm.

For inserts, see pages: LOGT (723)

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	MIID(1)
GD-DH 12.00-M20-15D-04	12.00	218.00	1.80	189.8	20.00	11.50	50.0	LOGT 06..
GD-DH 12.00-M20-20D-04	12.00	280.00	1.80	251.8	20.00	11.50	50.0	LOGT 06..
GD-DH 12.00-M20-25D-04	12.00	343.00	1.80	314.8	20.00	11.50	50.0	LOGT 06..
GD-DH 12.50-M20-15D-04	12.50	226.00	1.80	196.8	20.00	12.00	50.0	LOGT 06..
GD-DH 12.50-M20-20D-04	12.50	291.00	1.80	261.8	20.00	12.00	50.0	LOGT 06..
GD-DH 12.50-M20-25D-04	12.50	356.00	1.80	326.8	20.00	12.00	50.0	LOGT 06..
GD-DH 13.00-M25-15D-04	13.00	238.00	1.80	204.8	25.00	12.50	56.0	LOGT 06..
GD-DH 13.00-M25-20D-04	13.00	305.00	1.80	271.8	25.00	12.50	56.0	LOGT 06..
GD-DH 13.00-M25-25D-04	13.00	373.00	1.80	339.8	25.00	12.50	56.0	LOGT 06..
GD-DH 13.50-M25-15D-04	13.50	245.00	1.80	211.8	25.00	13.00	56.0	LOGT 06..
GD-DH 13.50-M25-20D-04	13.50	315.00	1.80	281.8	25.00	13.00	56.0	LOGT 06..
GD-DH 13.50-M25-25D-04	13.50	385.00	1.80	351.8	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 724-728 • 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.

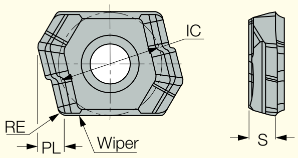
(1) Master insert identification

For inserts, see pages: LOGT (723)

TRIDEEP DEEP DRILLING

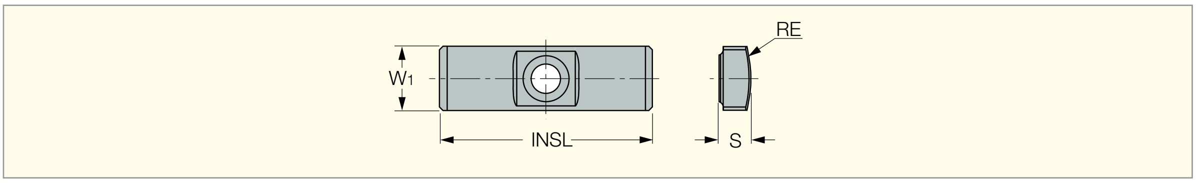
LOGT

Deep Drilling Inserts with 2 Chip Splitting Cutting Edges, Positive Rake Chipbreaker and a Wiper



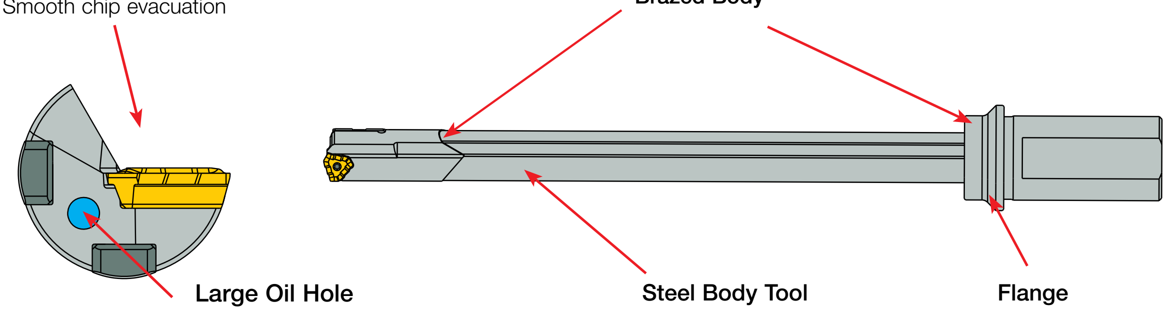
Designation	Dimensions				
	IC	RE	PL	S	IC908
LOGT 060204R-DT	7.00	0.40	1.80	2.00	●

For tools, see pages: GD-DH (12-13.5) (723) • GD-DHL (722)



Following is a table of all the available pads with their new designations, the tools they are used on and priority recommendations for use:

	Tool Diameter		Dimensions (mm)				Solid Carbide Guide Pad	1st option	2nd option	3rd option (brazed)
	Min	Max	W_1	INSL	RE	S	Description	IC908	IC950	Description
TRIDEEP	14.00	15.99	5	18	6	2.5	GPS-05-18-060	●		
	16.00	18.00	6	20	7.5	3	GPS-05-18-075	●	●	
	18.01	21.00	6	20	8.5	3	GPS-06-20-085	●	●	GPB-06-20-085 CDZAP
	21.01	25.00	6	20	10	3	GPS-06-20-100	●	●	GPB-06-20-100 CDZAP
	25.01	28.00	6	20	12	3	GPS-06-20-120	●	●	GPB-06-20-120 CDZAP



Wide Flute Angle
- Smooth chip evacuation

Brazed Body

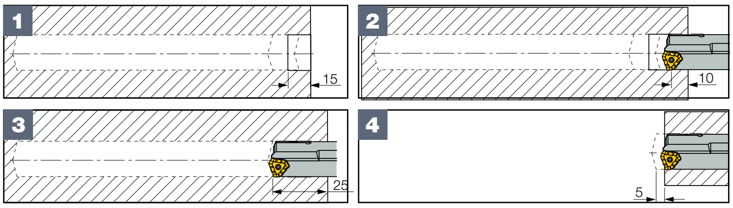
Large Oil Hole
- Efficient lubrication
- Longer life of inserts and guide pads

Steel Body Tool
- Extremely high rigidity
- Simple direct mounting setup

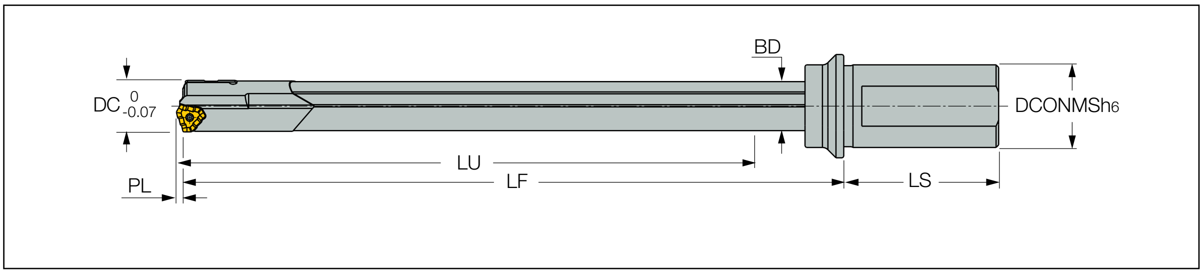
Flange
- Superior rigidity for higher speeds and feeds

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).Vc=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 (Vc=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)



Inquiry Form



1. Tool

Quantity...

Nominal diameter and tolerance ....

Please fill in dimensions on the sketch below.

Driver

Driver: for standard drivers please use codes from page 728 ....

☐ Code No.

☐ 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

☐ Blind Hole ☐ Drilling into Pre-hole

☐ Angled Entry

☐ Drilling into Solid ☐ Boring ☐ Angled Exit

Drilling Depth mm Hole Tolerance

2.3 Application:

Workpiece: ☐ Stationary ☐ Rotating

Tool: ☐ Stationary ☐ 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 Vc .... m/min ....

Revolutions Nmin .... **RPM**, Nmax .... **RPM**

Feed Fmin..................... mm/rev,

Fmax............. mm/rev..........

Feed Rate **VF** .... mm/min ....

Coolant:

☐ Oil ☐ Soluble Oil ☐ Other

Coolant Pressure: .... Bar ....

Specially Tailored TRIDEEP Code Key

GD - DH ##.## - #### - ##

Dia.

Drilling length

Shank Type

ISO	Material		Condition	Tensile Strength [N/mm2]	Hardness HB
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125
		>= 0.25 %C	Annealed	650	190
		< 0.55 %C	Quenched and tempered	850	250
		>= 0.55 %C	Annealed	750	220
			Quenched and tempered	1000	300
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200
			Quenched and tempered	930	275
				1000	300
				1200	350
	High alloyed steel, cast steel, and tool steel		Annealed	680	200
			Quenched and tempered	1100	325
	Stainless steel		Ferritic/martensitic	680	200
			Martensitic	820	240
M	Stainless steel		Austenitic	600	180
K	Grey cast iron (GG)		Ferritic/pearlitic		180
			Pearlitic		260
	Nodular cast iron (GGG)		Ferritic		160
			Pearlitic		250
	Malleable cast iron		Ferritic		130
			Pearlitic		230
N	Aluminum-wrought alloy		Not cureable		60
			Cured		100
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75
			Cured		90
		>12% Si	High temperature		130
	Copper alloys	>1% Pb	Free cutting		110
			Brass		90
			Electrolitic copper		100
	Non-metallic		Duroplastics, fiber plastics		
			Hard rubber		
S	High temp. alloys	Fe based	Annealed		200
			Cured		280
		Ni or Co based	Annealed		250
			Cured		350
			Cast		320
	Titanium Ti alloys			RM 400	
			Alpha+beta alloys cured	RM 1050	

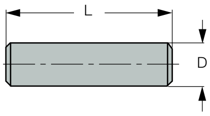
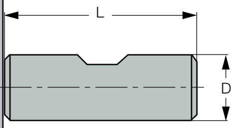
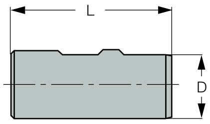
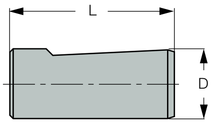
Machining Recommendations for TRIDEEP Drills

	TRIDEEP Gundrills			TRIDEEP BTA Drilling Heads	
		Feed Rate (mm/rev)			Feed Rate (mm/rev)
Material No.	Cutting Speed (m/min)	Drill Dia. Dc (mm) 12.00-15.99	Drill Dia. Dc (mm) 16.00-28.00	Cutting Speed (m/min)	Drill Dia. Dc (mm) 16.00-28.00
1	80-140	0.05-0.10	0.10-0.20	90-130	0.15-0.20
2	80-140	0.05-0.10	0.10-0.20	90-130	0.15-0.20
3	80-140	0.05-0.16	0.10-0.20	90-130	0.15-0.20
4	80-140	0.05-0.16	0.10-0.20	70-130	0.10-0.25
5	80-140	0.05-0.16	0.10-0.20	70-130	0.10-0.25
6	80-120	0.05-0.10	0.10-0.20	70-120	0.10-0.25
7	80-120	0.05-0.16	0.10-0.20	60-120	0.10-0.25
8	80-120	0.05-0.16	0.10-0.20	60-120	0.10-0.25
9	80-120	0.05-0.16	0.10-0.20	60-120	0.10-0.25
10	80-120	0.05-0.10	0.10-0.20	70-130	0.10-0.25
11	80-120	0.05-0.16	0.10-0.20	70-130	0.10-0.25
12	80-140	0.05-0.10	0.08-0.10	80-130	0.06-0.10
13	80-140	0.05-0.10	0.08-0.10	80-130	0.06-0.10
14	80-140	0.05-0.10	0.08-0.10	80-130	0.06-0.10
15	80-140	0.05-0.25	0.10-0.30	50-110	0.10-0.20
16	80-140	0.05-0.25	0.10-0.30	50-110	0.10-0.20
17	80-140	0.05-0.25	0.10-0.30	60-110	0.10-0.20
18	80-140	0.05-0.25	0.10-0.30	60-110	0.10-0.20
19	80-140	0.05-0.25	0.10-0.30	70-110	0.10-0.20
20	80-140	0.05-0.25	0.10-0.30	70-110	0.10-0.20
21	65-130	0.05-0.20	0.10-0.20	65-130	0.10-0.20
22	65-130	0.05-0.20	0.08-0.18	65-130	0.08-0.18
23	65-130	0.05-0.20	0.08-0.18	65-130	0.08-0.18
24	65-130	0.05-0.20	0.08-0.18	65-130	0.08-0.18
25	65-130		0.08-0.18	65-130	0.08-0.18
26	65-130		0.08-0.18	65-130	0.08-0.18
27	65-130		0.08-0.18	65-130	0.08-0.18
28	65-130		0.08-0.18	65-130	0.08-0.18
29	65-130		0.08-0.18	65-130	0.08-0.18
30	65-130		0.08-0.18	65-130	0.08-0.18
31	20-50	0.04-0.08	0.08-0.18	20-50	0.08-0.18
32	20-50	0.04-0.08	0.08-0.18	20-50	0.08-0.18
33	20-50	0.04-0.08	0.08-0.18	20-50	0.08-0.18
34	20-50	0.04-0.08	0.08-0.18	20-50	0.08-0.18
35	20-50	0.04-0.08	0.08-0.18	20-50	0.08-0.18
36	30-60	0.05-0.13	0.08-0.18	30-60	0.08-0.18
37	30-60	0.05-0.13	0.08-0.18	30-60	0.08-0.18

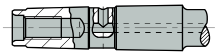
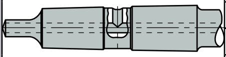
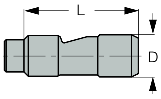
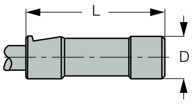
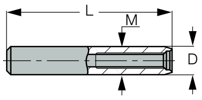
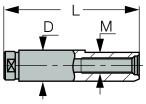
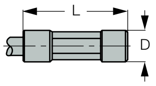
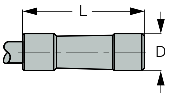
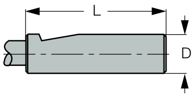
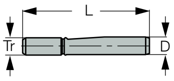
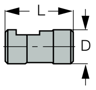
Standard Gundrill Drivers for Machining Centers, Lathes, etc.

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	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

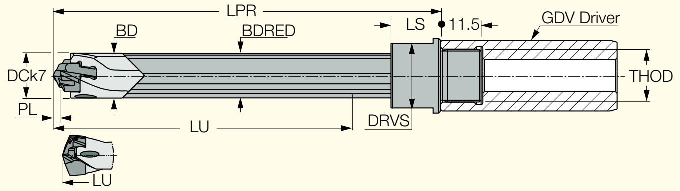
Standard Drivers for Gundrill Machines

Driver Type	Drawing	øD x L	Driver Code
DIN228AK		CM1	45
		CM2	46
		CM3	47
		CM4	48
DIN228BK		CM1	49
		CM2	50
		CM3	51
		CM4	52
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

MNCNT-T2

Indexable SUMCHAM Inserts and Modular Shank Gundrills



Designation	DCN[1]	DCX[2]	LU	PL	THOD	BD	BDRED	LPR	LS	DRVS[3]	SSC[4]	MIID[5]	
MNCNT 100-400-MF16X1-T2	10.00	10.49	401.8	1.82	MF16X1	9.70	9.60	440.00	10.00	16.0	10.0	ICP 100	K DCN 10-13.99
MNCNT 100-800-MF16X1-T2	10.00	10.49	801.8	1.82	MF16X1	9.70	9.60	840.00	10.00	16.0	10.0	ICP 100	K DCN 10-13.99
MNCNT 105-400-MF16X1-T2	10.50	10.99	401.9	1.91	MF16X1	10.20	10.10	440.00	10.00	16.0	10.0	ICP 105	K DCN 10-13.99
MNCNT 105-800-MF16X1-T2	10.50	10.99	801.9	1.91	MF16X1	10.20	10.10	840.00	10.00	16.0	10.0	ICP 105	K DCN 10-13.99
MNCNT 110-400-MF16X1-T2	11.00	11.49	402.0	2.00	MF16X1	10.70	10.60	440.00	10.00	16.0	11.0	ICP 110	K DCN 10-13.99
MNCNT 110-800-MF16X1-T2	11.00	11.49	802.0	2.00	MF16X1	10.70	10.60	840.00	10.00	16.0	11.0	ICP 110	K DCN 10-13.99
MNCNT 115-400-MF16X1-T2	11.50	11.99	402.1	2.09	MF16X1	11.20	11.10	440.00	10.00	16.0	11.0	ICP 115	K DCN 10-13.99
MNCNT 115-800-MF16X1-T2	11.50	11.99	802.1	2.09	MF16X1	11.20	11.10	840.00	10.00	16.0	11.0	ICP 115	K DCN 10-13.99
MNCNT 120-400-MF16X1-T2	12.00	12.49	402.2	2.18	MF16X1	11.70	11.60	440.00	10.00	16.0	12.0	ICP 120	K DCN 10-13.99
MNCNT 120-800-MF16X1-T2	12.00	12.49	802.2	2.18	MF16X1	11.70	11.60	840.00	10.00	16.0	12.0	ICP 120	K DCN 10-13.99
MNCNT 125-400-MF16X1-T2	12.50	12.99	402.3	2.27	MF16X1	12.20	12.10	442.00	12.00	16.0	12.0	ICP 125	K DCN 10-13.99
MNCNT 125-800-MF16X1-T2	12.50	12.99	802.3	2.27	MF16X1	12.20	12.10	842.00	12.00	16.0	12.0	ICP 125	K DCN 10-13.99
MNCNT 130-400-MF16X1-T2	13.00	13.49	402.4	2.37	MF16X1	12.70	12.60	442.00	12.00	16.0	13.0	ICP 130	K DCN 10-13.99
MNCNT 130-800-MF16X1-T2	13.00	13.49	802.4	2.37	MF16X1	12.70	12.60	842.00	12.00	16.0	13.0	ICP 130	K DCN 10-13.99
MNCNT 135-400-MF16X1-T2	13.50	13.99	402.5	2.46	MF16X1	13.20	13.10	442.00	12.00	16.0	13.0	ICP 135	K DCN 10-13.99
MNCNT 135-800-MF16X1-T2	13.50	13.99	802.5	2.46	MF16X1	13.20	13.10	842.00	12.00	16.0	13.0	ICP 135	K DCN 10-13.99
MNCNT 140-400-MF16X1-T2	14.00	14.49	402.6	2.55	MF16X1	13.70	13.60	442.00	12.00	16.0	14.0	ICP 140	K DCN 14-17.99
MNCNT 140-800-MF16X1-T2	14.00	14.49	802.5	2.55	MF16X1	13.70	13.60	842.00	12.00	16.0	14.0	ICP 140	K DCN 14-17.99
MNCNT 145-400-MF16X1-T2	14.50	14.99	402.6	2.64	MF16X1	14.20	14.10	442.00	12.00	16.0	14.0	ICP 145	K DCN 14-17.99
MNCNT 145-800-MF16X1-T2	14.50	14.99	802.6	2.64	MF16X1	14.20	14.10	842.00	12.00	16.0	14.0	ICP 145	K DCN 14-17.99
MNCNT 150-400-MF16X1-T2	15.00	15.99	402.7	2.73	MF16X1	14.70	14.60	442.00	12.00	16.0	15.0	ICP 150	K DCN 14-17.99
MNCNT 150-800-MF16X1-T2	15.00	15.99	802.7	2.73	MF16X1	14.70	14.60	842.00	12.00	16.0	15.0	ICP 150	K DCN 14-17.99
MNCNT 160-400-MF20X1-T2	16.00	16.99	402.9	2.91	MF20X1	15.50	15.40	442.00	12.00	22.0	16.0	ICP 160	K DCN 14-17.99
MNCNT 160-800-MF20X1-T2	16.00	16.99	802.9	2.91	MF20X1	15.50	15.40	842.00	12.00	22.0	16.0	ICP 160	K DCN 14-17.99
MNCNT 170-400-MF20X1-T2	17.00	17.99	403.1	3.09	MF20X1	16.50	16.40	442.00	12.00	22.0	17.0	ICP 170	K DCN 14-17.99
MNCNT 170-800-MF20X1-T2	17.00	17.99	803.1	3.09	MF20X1	16.50	16.40	842.00	12.00	22.0	17.0	ICP 170	K DCN 14-17.99
MNCNT 180-400-MF20X1-T2	18.00	18.99	403.3	3.28	MF20X1	17.50	17.40	442.00	12.00	22.0	18.0	ICP 180	K DCN 18-21.99
MNCNT 180-800-MF20X1-T2	18.00	18.99	803.3	3.28	MF20X1	17.50	17.40	842.00	12.00	22.0	18.0	ICP 180	K DCN 18-21.99
MNCNT 190-400-MF20X1-T2	19.00	19.99	403.5	3.46	MF20X1	18.50	18.40	442.00	12.00	22.0	19.0	ICP 190	K DCN 18-21.99
MNCNT 190-800-MF20X1-T2	19.00	19.99	803.5	3.46	MF20X1	18.50	18.40	842.00	12.00	22.0	19.0	ICP 190	K DCN 18-21.99
MNCNT 200-400-MF20X1-T2	20.00	20.99	403.6	3.64	MF20X1	19.50	19.40	444.00	14.00	22.0	20.0	ICP 200	K DCN 18-21.99
MNCNT 200-800-MF20X1-T2	20.00	20.99	803.6	3.64	MF20X1	19.50	19.40	844.00	14.00	22.0	20.0	ICP 200	K DCN 18-21.99
MNCNT 210-400-MF20X1-T2	21.00	21.99	403.8	3.82	MF20X1	20.50	20.40	444.00	14.00	22.0	21.0	ICP 210	K DCN 18-21.99
MNCNT 210-800-MF20X1-T2	21.00	21.99	803.8	3.82	MF20X1	20.50	20.40	844.00	14.00	22.0	21.0	ICP 210	K DCN 18-21.99
MNCNT 220-400-MF20X1-T2	22.00	22.99	404.0	4.00	MF20X1	21.50	21.40	444.00	14.00	22.0	22.0	ICP 220	K DCN 22-26.99
MNCNT 220-800-MF20X1-T2	22.00	22.99	804.0	4.00	MF20X1	21.50	21.40	844.00	14.00	22.0	22.0	ICP 220	K DCN 22-26.99
MNCNT 230-400-MF20X1-T2	23.00	23.99	404.2	4.19	MF20X1	22.50	22.40	444.00	14.00	22.0	23.0	ICP 230	K DCN 22-26.99
MNCNT 230-800-MF20X1-T2	23.00	23.99	804.2	4.19	MF20X1	22.50	22.40	844.00	14.00	22.0	23.0	ICP 230	K DCN 22-26.99
MNCNT 240-400-MF20X1-T2	24.00	24.99	404.4	4.37	MF20X1	23.50	23.40	444.00	14.00	22.0	24.0	ICP 240	K DCN 22-26.99
MNCNT 240-800-MF20X1-T2	24.00	24.99	804.4	4.37	MF20X1	23.50	23.40	844.00	14.00	22.0	24.0	ICP 240	K DCN 22-26.99
MNCNT 250-400-MF20X1-T2	25.00	25.99	404.6	4.55	MF20X1	24.50	24.50	444.00	14.00	22.0	25.0	ICP 250	K DCN 22-26.99
MNCNT 250-800-MF20X1-T2	25.00	25.99	804.5	4.55	MF20X1	24.50	24.50	844.00	14.00	22.0	25.0	ICP 250	K DCN 22-26.99

- For user guide and cutting conditions, see pages 732-749

[1] Cutting diameter minimum • Do not mount smaller drilling heads other than the specified range of the drill body

[2] Cutting diameter maximum

[3] Key flat size

[4] Seat size code

[5] Master insert identification

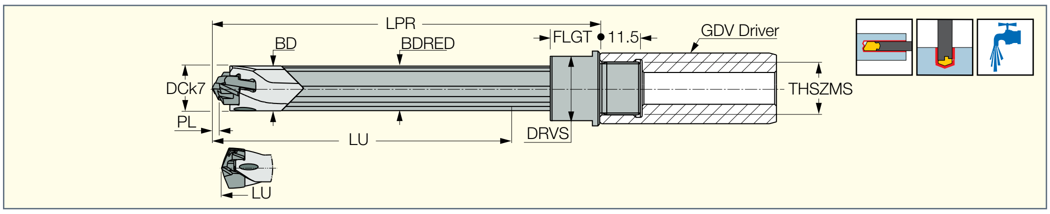
For inserts, see pages: HCP-IQ (542) • ICG (547) • ICK (543) • ICK-2M (545) • ICP-2M (545) • QCP-2M (544)

For holders, see pages: GDV (731)

SUMOGUN

MNSNT

Indexable SUMCHAM 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	10.49	200.0	2.72	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	10.99	200.0	2.72	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	11.49	200.0	2.75	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	11.99	200.0	2.75	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	12.49	200.0	3.16	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	12.99	200.0	3.16	MF16X1	12.20	12.10	275.00	12.00	16.0	12.0	HCP 125	K DCN 10-13.99
MNSNT 130-250-MF16X1	13.00	13.49	250.0	3.51	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	13.99	250.0	3.51	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	14.49	250.0	3.63	MF16X1	13.70	13.60	326.00	12.00	16.0	14.0	HCP 140	K DCN 10-13.99
MNSNT 145-250-MF16X1	14.50	14.99	250.0	3.63	MF16X1	14.20	14.10	326.00	12.00	18.0	14.0	HCP 145	K DCN 14-17.99
MNSNT 120-400-MF16X1	12.00	12.49	400.0	3.16	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	12.99	400.0	3.16	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	13.49	400.0	3.51	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	13.99	400.0	3.51	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	14.49	400.0	3.63	MF16X1	13.70	13.60	476.00	12.00	16.0	14.0	HCP 140	K DCN 10-13.99
MNSNT 145-400-MF16X1	14.50	14.99	400.0	3.63	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	15.99	400.0	3.88	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	16.99	400.0	3.91	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	17.99	400.0	4.57	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	18.99	400.0	4.66	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	19.99	400.0	4.66	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	20.99	400.0	4.81	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	21.99	400.0	4.94	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	22.99	400.0	5.20	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	23.99	400.0	5.28	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	24.99	400.0	5.63	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	25.99	400.0	5.70	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 732-749

[1] Do not mount smaller drilling heads than the specified range of the drill body

[2] Cutting diameter maximum

[3] Key flat size

[4] Seat size code

[5] Master insert identification

For inserts, see pages: HCP-IQ (542) • ICG (547) • ICK (543) • ICK-2M (545) • ICP-2M (545) • QCP-2M (544)
For holders, see pages: GDV (731)

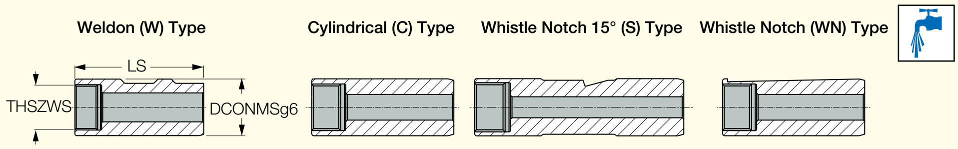
Machining Conditions for MNSNT

ISO	Material	Tool Dia mm	Vc m/min		f mm/rev		Mtl. No.
			Min	Max	Min	Max	
P	ASTM	10 (L=200)	60	150	0.08	0.14	2
		12	-	-	-	-	
		19	60	120	0.10	0.30	
		25	60	100	0.15	0.40	
	4340	10 (L=200)	50	80	0.08	0.16	7
		12	60	80	0.10	0.18	
		19	60	120	0.10	0.30	
		25	60	100	0.15	0.30	
M	316L	10 (L=200)	30	50	0.05	0.08	14
		12	-	-	-	-	
		19	40	80	0.10	0.30	
		25	60	100	0.20	0.26	
K	GG30	10 (L=200)	60	100	0.10	0.40	16
		12	60	100	0.10	0.18	
		19	-	-	-	-	
		25	60	110	0.20	0.35	

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

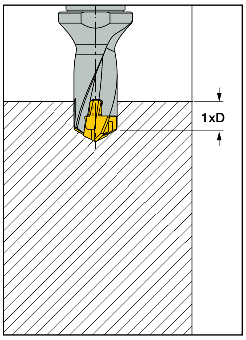
For tools, see pages: MNCNT-T2 (729) • MNSNT (730)

Drill Penetration Instructions on Milling or Turning Machines:

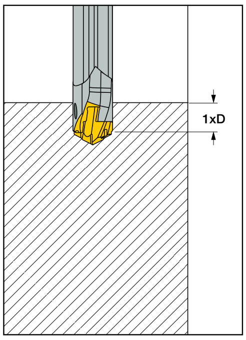
Note: The following procedure (1-4) is recommended for up to 400 mm hole depths using **MNCNT …**-400**…** drills
For hole depths between 400 up to 800 mm, use **MNCNT …**-800**…** drill only after reaching 400 mm depth with an **MNCNT …**-400**…** drill.

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.

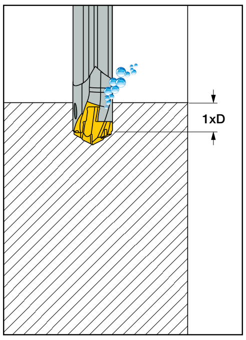
1. Pre-hole 1xD deep for centering



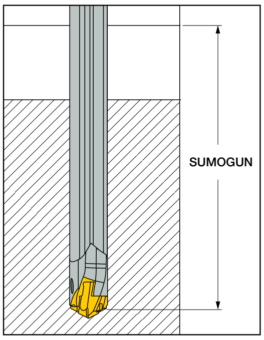
2. Slow rotation and feed while entering to the pre-hole



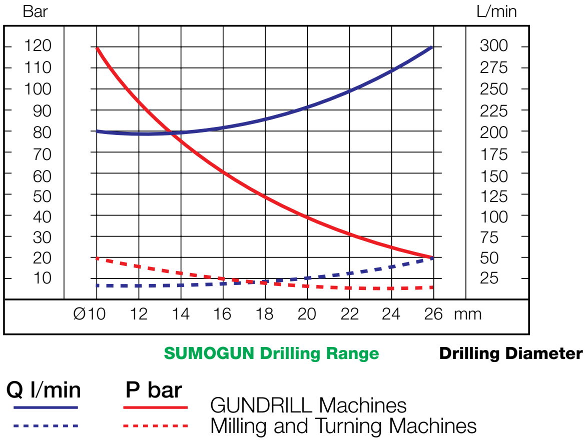
3. Maintain for 2-3 seconds and activate the cooling system



4. Continue drilling at recommended cutting conditions



Pressure and Coolant Flow Rate for SUMOGUN



Gundrill Lubrication and Cooling

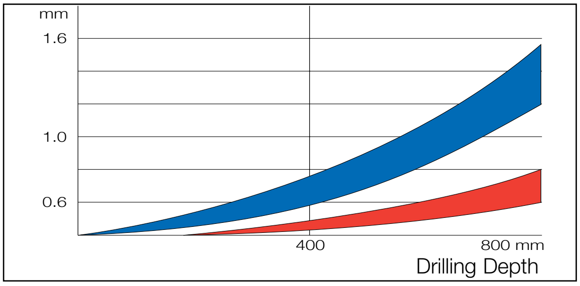
The best performance is obtained by using oil.
On equipment that uses water-soluble fluids (i.e. machining centers and **CNC** machines) a concentration between 10% and 15% is recommended.

Guidelines for Optimal Gundrill Performance

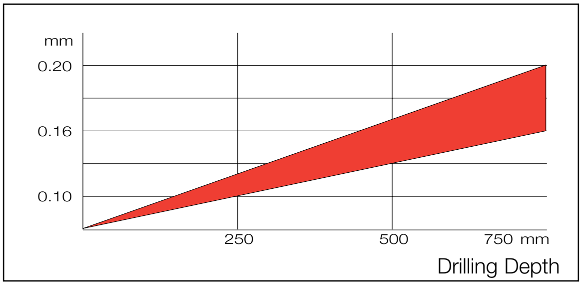
- Coolant pressure and flow
- It is recommended to use a strong coolant flow for efficient chip flushing and cooling of the cutting edge
- Filtration
  It is recommended to use a filter under 20 µm.
- **Note:** Improper filtration may result in interrupted flow of the lubricating oil. This creates a sticky surface on the bearing pads and leads to premature wear of the tool and overloading the coolant pump and spindle seals.
- Temperature of the coolant
  The coolant temperature should be between 20 and 22° **C**.

Note: Above 50° C the viscosity of the coolant is reduced by 50% and becomes ineffective.

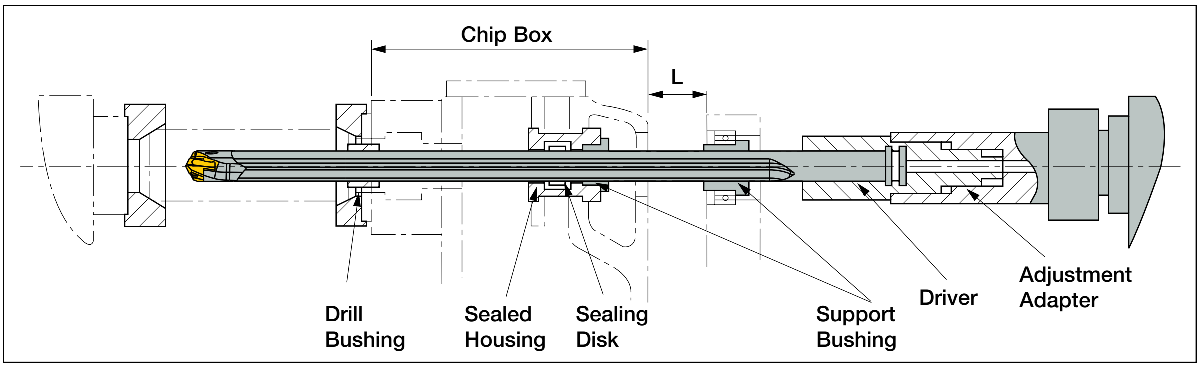
Concentricity



Straightness



🟦 Stationary workpiece – rotating tool 🟥 Rotating workpiece – stationary tool



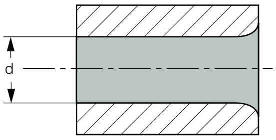
L = 20xD

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

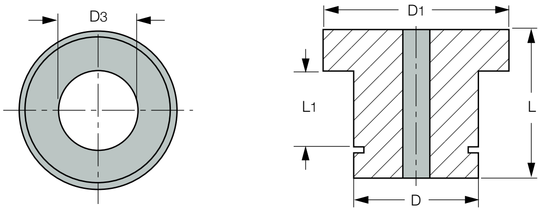


Guide Bushing

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

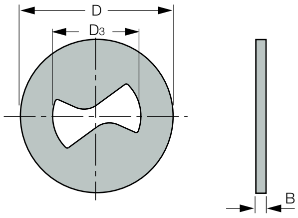
D3 indicate the tube diameter



Support Bushing				
D_3	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		
D_3	Ext. Ø “D”	Thick. “ B”
9.6 to 15,559	32	4
15,6 to 25,999	40	4

Recommended Machining Conditions

Material Groups

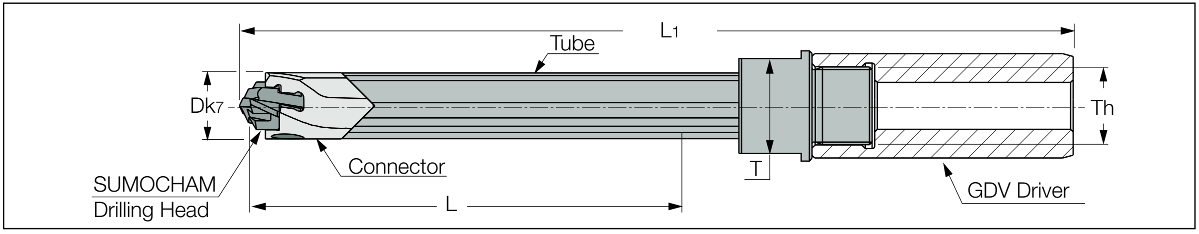
ISO	Material		Condition	Tensile Strength Rm [N/mm2]	Hardness HB	Mtl. No.
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	**1**
		> = 0.25 %C	Annealed	650	190	**2**
		< 0.55 %C	Quenched and tempered	850	250	**3**
		> = 0.55 %C	Annealed	750	220	**4**
			Quenched and tempered	1000	300	**5**
	Low alloy steel and cast steel (less than 5% alloying elements)		Annealed	600	200	**6**
			Quenched and tempered	930	275	**7**
				1000	300	**8**
				1200	350	**9**
	High alloy steel, cast steel and tool steel		Annealed	680	200	**10**
			Quenched and tempered	1100	325	**11**
K	Grey cast iron (GG)		Ferritic/pearlitic		180	**15**
			Pearlitic		260	**16**
	Nodular cast iron (GGG)		Ferritic		160	**17**
			Pearlitic		250	**18**
	Malleable cast iron		Ferritic		130	**19**
			Pearlitic		230	**20**

Recommended Machining Conditions for SUMOGUN

Mtl. No.	Vc m/min	SUMOGUN				
		Feed vs. Drill Diameter				
		D=10-11.9	D=12-13.9	D=14-15.9	D=16-19.9	D=20-25.9
		mm/rev				
1	60-**90**-110	0.10 **0.14** 0.18	0.11 **0.16** 0.20	0.13 **0.18** 0.24	0.13 **0.19** 0.25	0.14 **0.20** 0.27
2	60-**80**-100					
3	60-**80**-100					
4	50-**70**-90					
5	40-**50**-70					
6	50-**70**-100	0.10 **0.14** 0.18	0.10 **0.15** 0.20	0.12 **0.17** 0.22	0.12 **0.18** 0.24	0.13 **0.20** 0.26
7	50-**70**-90					
8	40-**50**-70					
9	30-**40**-50					
10	40-**50**-70	0.09 **0.14** 0.18	0.09 **0.14** 0.18	0.10 **0.15** 0.20	0.10 **0.16** 0.22	0.11 **0.17** 0.24
11	30-**40**-60					
15	60-**80**-100	0.16 **0.20** 0.25	0.18 **0.22** 0.28	0.18 **0.22** 0.28	0.18 **0.22** 0.28	0.18 **0.22** 0.28
16	60-**90**-100					
17	60-**100**-120					
18	60-**90**-110					
19	70-**100**-120					
20	60-**90**-110					

🟥 Recommended cutting data

SUMOGUN Inquiry Form



1. Tool

Quantity..
Nominal diameter and tolerance ....
Please fill in dimensions on the sketch below.

Driver

Driver: for standard drivers please use codes
from page 731..
☐ Code No.
☐ 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:
....
☐ Short Chips ☐ Long Chips

2.2 Hole Type

☐ Blind Hole ☐ Drilling into Pre-hole
☐ Angled Entry ☐ Drilling into Solid
☐ Boring ☐ Angled Exit
Drilling Depth mm Hole Tolerance

2.3 Application:

Workpiece: Stationary : Rotating
Tool: Stationary : Rotating

3. Machine

3.1 Technical Data

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.

Machine Type..
Power: .... kW ....

3.2 Cutting Data:

Cutting Speed Vc .... m/min ....
Revolutions Nmin .... **RPM**, Nmax .... **RPM**
Feed Fmin..................... mm/rev,
Fmax............. mm/rev..........
Feed Rate **VF** .... mm/min ....

Coolant:

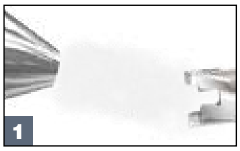
☐ Oil ☐ Soluble Oil Other
Coolant Pressure .... Bar ....

Specially Tailored SUMOGUN Code Key

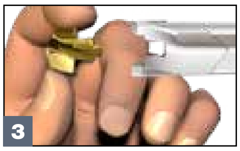
Machine Type	Designation	D Required	L Drilling Length	L_1 Total Length	Driver [(1)] Code
For GUNDRILL machines	**MNGDT 1500-1000-MF##X1-T2** **D L1 Driver Code** **D L1 Driver Code**	15.00	920	1000	23
For other machine tools	**MNCNT 1500- 920-MF##X1-T2** **D L Driver Code**	15.00	920	1000	23

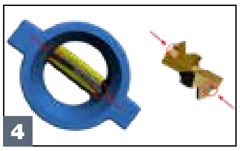
(1) see page 731

Drilling Head Mounting Procedure


1


2


3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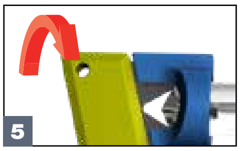
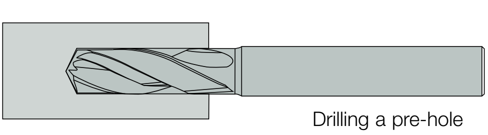
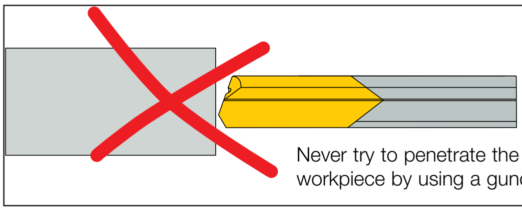

5

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

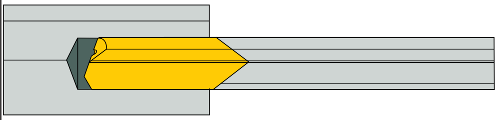


Drilling a pre-hole
(drill diameter +0.02 mm)

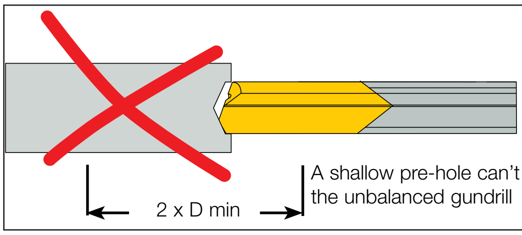


Never try to penetrate the workpiece by using a gundrill

2



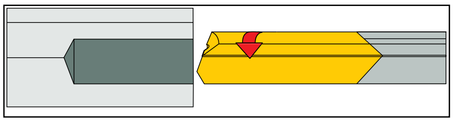
Gundrill penetration
through the pre-hole



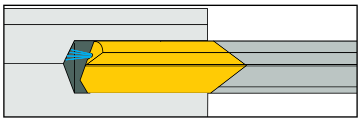
A shallow pre-hole can't lead the unbalanced gundrill

Drill Penetration Instructions

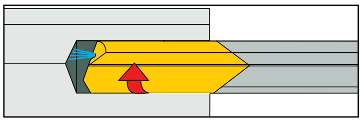
1 Rotate the drill counterclockwise prior to and during hole penetration



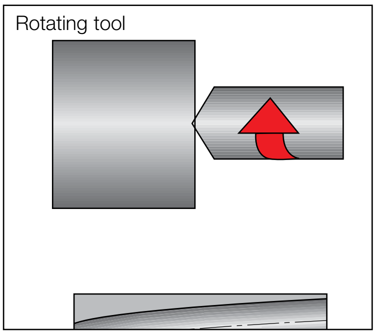
2 Stop the drill rotation and start the coolant



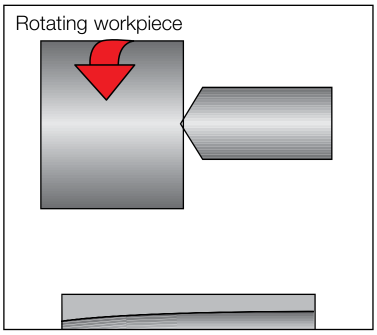
3 Rotate the drill clockwise prior to drilling operation



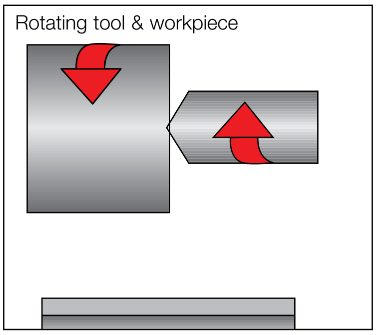
The Influence of Tool vs. Workpiece Rotation



Worst

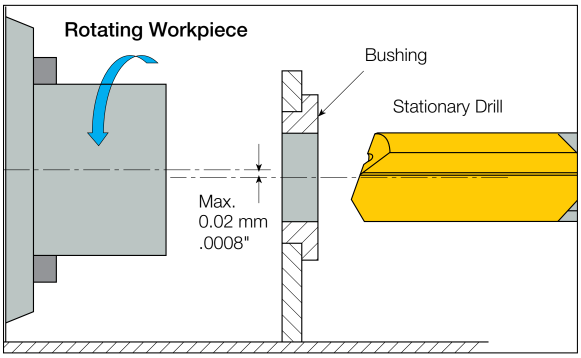


Medium



Best

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 739 for detailed driver information).

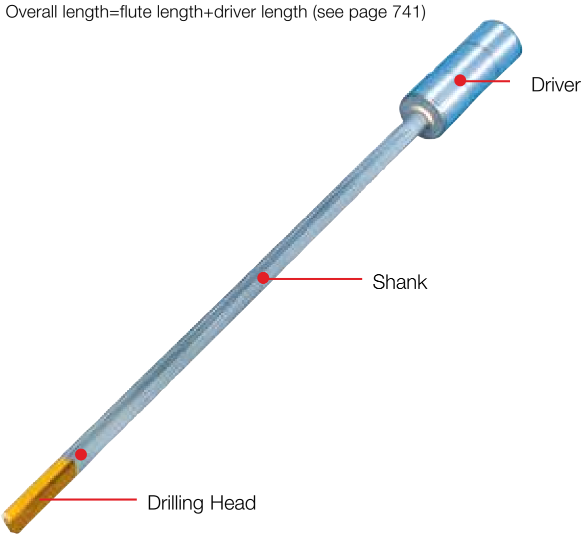
Advantages

- 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 741)



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 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.

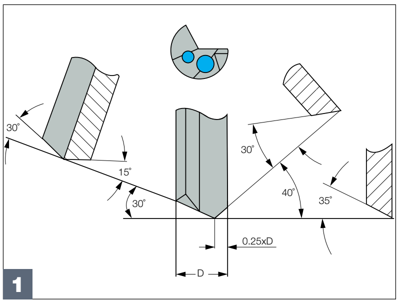
Solid Carbide Gundrill Range

(with or without brazed steel driver)

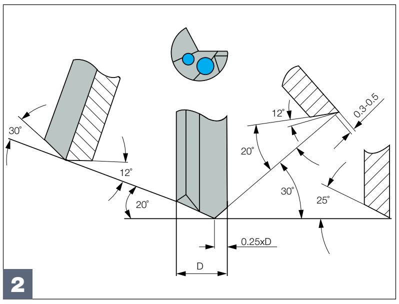
Drill Diameter	Max. Flute Length
0.9 to 16.00	300 mm

Standard Gundrill Head Sharpening Angles

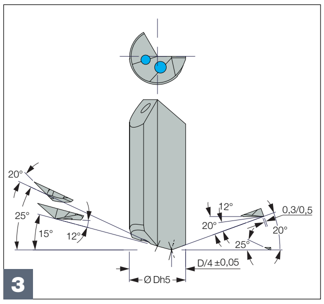
Subject to the required tolerance, cutting performance and desired chip shape, the following standard sharpening angles are recommended (shown in figures 1 and 2).



Standard sharpening for 0.9 to 4 mm drill diameters



Standard sharpening for 4 to 32 mm drill diameters



Standard sharpening for 32 to 40 mm drill diameters

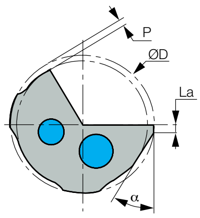
Note: For special or semi-standard gundrills, special geometries will be offered to match the application.

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.

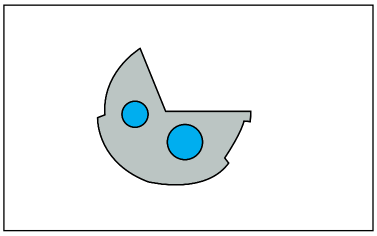
General Sketch

All cross section profile parameters such as: **P**, La and must be precisely matched to the workpiece material properties.



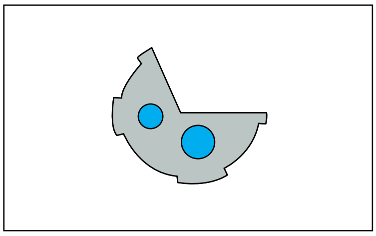
Profile G (Universal)

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.



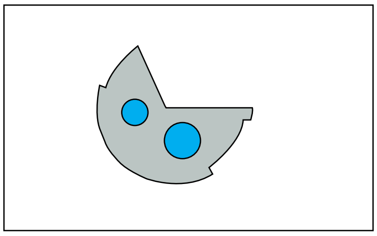
Profile A

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.



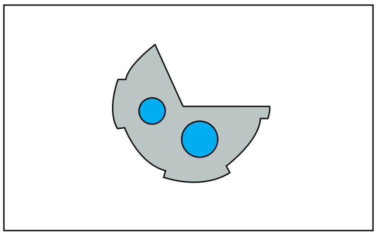
Profile B

Excellent size control, for high precision hole tolerance. Used for cast iron and aluminum alloys.



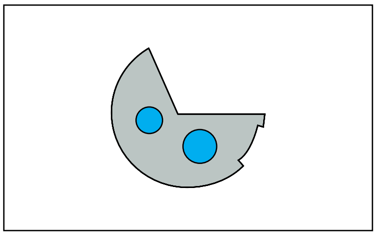
Profile C

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.



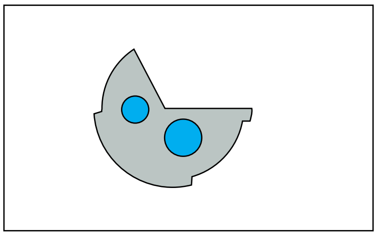
Profile D

Suitable for cast iron only. Very effective in grey cast iron (usually coated).



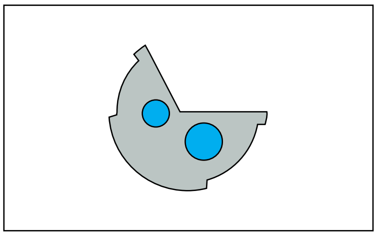
Profile E

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.



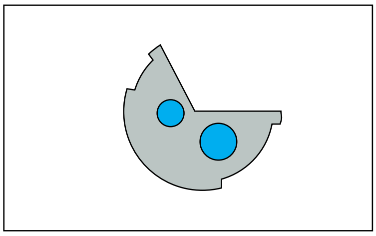
Profile H

Recommended for all nonferrous and cast iron materials up 5 mm diameter. Sometimes used for wood and plastic with larger back taper.

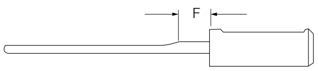
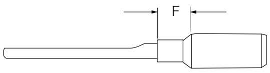
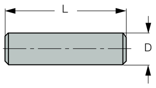
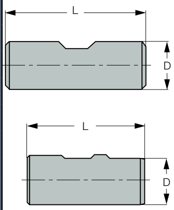
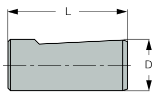
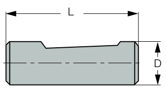


Profile I

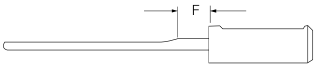
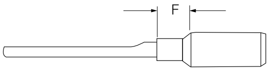
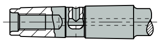
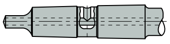
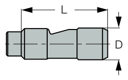
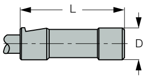
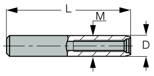
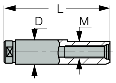
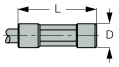
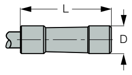
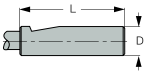
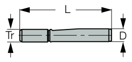
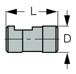
Used for aluminum and brass for best hole finish. For intersecting holes and interrupted cut or when extra outer diameter support and burnishing is required.



Standard Gundrill Drivers for Machining Centers, Lathes, etc.

Driver Type	Drawing	DXL	Driver code	 BRAZED GUNDRILL			 SOLID CARBIDE GUNDRILL
					F = CYLINDRICAL TUBE		
				Max. cutting diameter	Equal or less than max. cutting diameter	More than max. diameter	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

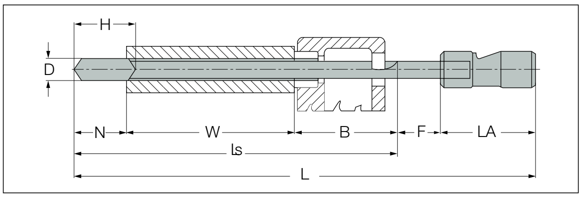
Standard Drivers for Gundrill Machines

Driver Type	Drawing	DXL	Driver code	 BRAZED GUNDRILL			 SOLID CARBIDE GUNDRILL
					F = CYLINDRICAL TUBE		
				Max. cutting diameter	Equal or less than max. cutting diameter	More than max. diameter	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	

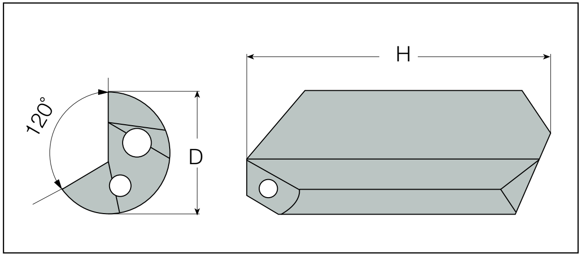
Drivers

Drivers are available for dedicated and **CNC** machines for any specified diameter and length. Below are the driver codes and technical data.

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

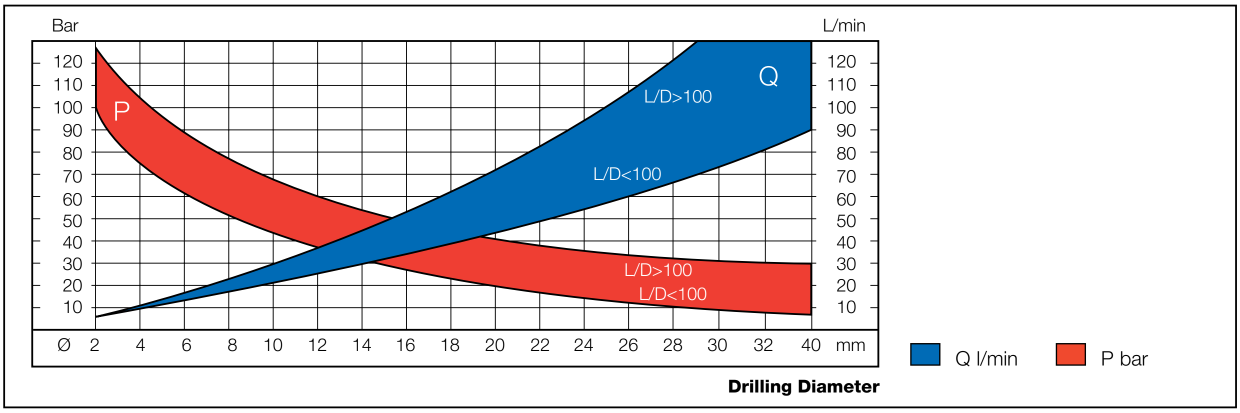
Example
Drilling of a ø10x500 depth hole on a gundrill machine with ø25x70 mm driver code No. 57 (See page 739)
D=10 **W**=500 **LA**=70 **B**=250 (or per experience)
L=**N+W+B+F+LA**
L=(35-10)**+**500**+**250**+**13**+**70=858 (**OAL**)
Ls=**N+W+B**=770 (flute length)

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



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 thetool and overloading the coolant pump and spindle seals
- Temperature of the coolant should be between 20 and 22° **C**

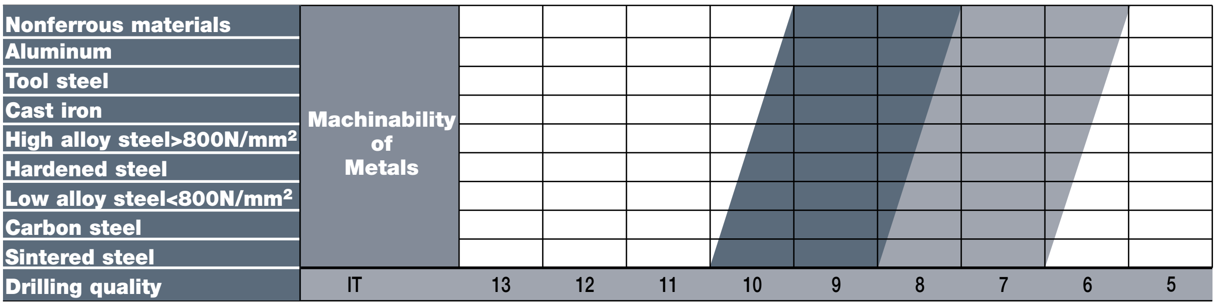
Note: Above 50° C the viscosity of the coolant is reduced by 50% and becomes ineffective.

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.

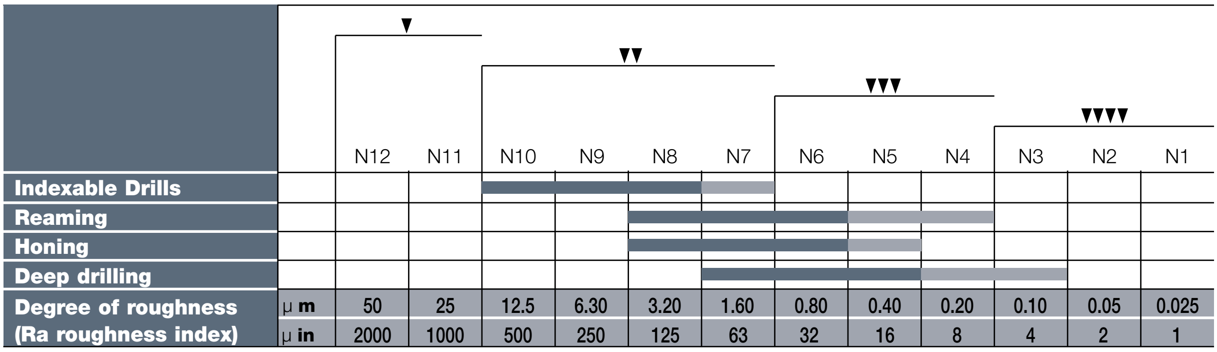


▇ Tolerance range under normal conditions

▒ Tolerance range under optimal conditions

Surface Quality

Surface quality of 0.2 Ra can be achieved when using gundrills under recommended conditions.



▇ Tolerance range under normal conditions

▒ Tolerance range under optimal conditions

Concentricity and Straightness

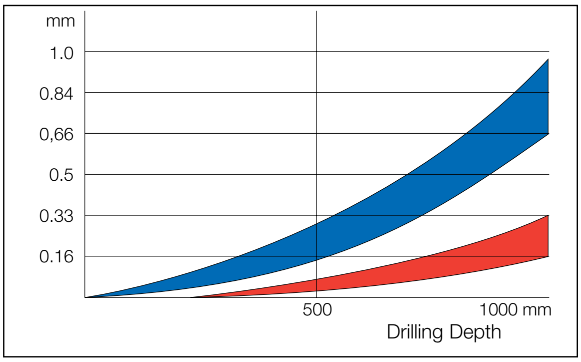
The resulting quality depends on different factors such as:

- Drilling depth and diameter
- Type of machining and cutting parameters
- Quality and uniformity of the workpiece material
- Machine tool conditions
- Gundrill support

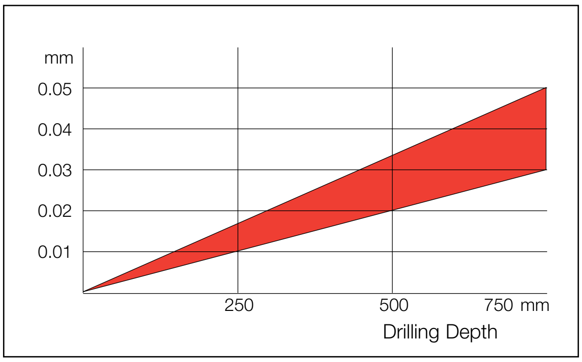
Circularity

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 4μm.

Concentricity



Straightness



▇ Stationary workpiece – rotating tool

🟥 Rotating workpiece – stationary tool

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**
(The only available carbide grade)	Drill Diameter	Overall Length	Driver Type	

Ø2.5 to Ø**20** each 0.1 mm and Ø**20** to Ø**32** each 1 mm
Standard geometry suitable in any material Standard driver from the table (page 739) 1-2 weeks delivery"

Semi-Standard(1) Brazed Drill (Carbide Tipped):

Ordering Example:

GD	**– 05520 –**	**0500 –**	**57 –**	**ER –**	**IC908**
(carbide grade)(2)	Drill Diameter	Overall Length	Driver Type	**E**=Head Profile **R**=Rough (**P**-Polished)	

Diameter out of standard range Standard geometry **AND/OR** head profile from page 738 **AND/OR** coating Standard driver from the table (page 739) 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**
(The only available carbide grade)	Drill Diameter	Overall Length	

Repair of Semi-Standard(1)

Ordering Example:

RGD	**- 05520 -**	**0500 -**	**GR -**	**IC508**
(carbide grade)(2)	Drill Diameter	Overall Length	**G**=Drill Profile **R**=Rough (**P**=Polished)	

Repair of Special(1) Drills

Ordering Example:

RSPGD	**- 05520 -**	**0500 -**	**02051**	**- 01**
	Drill Diameter	Overall Length	Offer No. or Drawing No.	Version No.

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**
	Dril 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.

(1) 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)

(2) Available carbide grades: **IC08 –** uncoated grade used as a substrate for the following coated grades: **IC908** (**TIAIN**); **IC508** (TiCN+TiN); **IC308** (TiCN); **IC208** (TiN)

Standard Geometry Resharpening of Carbide Tipped or Solid Gundrills

(See page 737)

Ordering Example:

stgrind	**- 05520**
	Drill Diameter

Special Geometry Resharpening

Ordering Example:

SPGRIND-	**05520**	**- 02051**	**- 01**
	Drill Diameter	Offer No.	Version No.

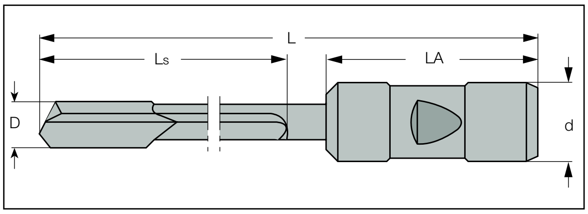
Gundrill Inquiry Form

1. Tool

Quantity..

Nominal diameter and tolerance ....

Please fill in dimensions on the sketch below.



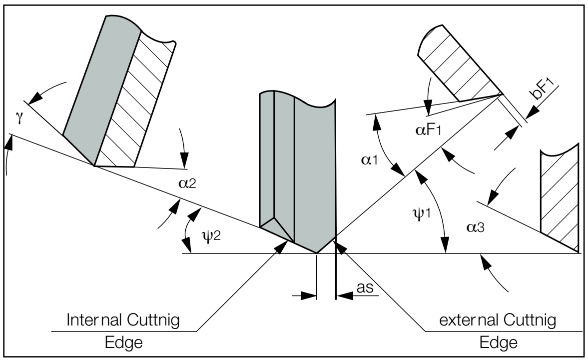
Driver

For standard drivers please use codes from page 739...

☐ Code No.

☐ Special, please attach sketch and specifications.

Grind: ☐ special (fill in the dimensions and angles below).



α_1= .... αF_1= .... Ψ_1= ....

α_2= .... bF_1= .... Ψ_2= ....

α_3= .... as= .... Υ= ....

☐ Standard (see page 737)

Coating:

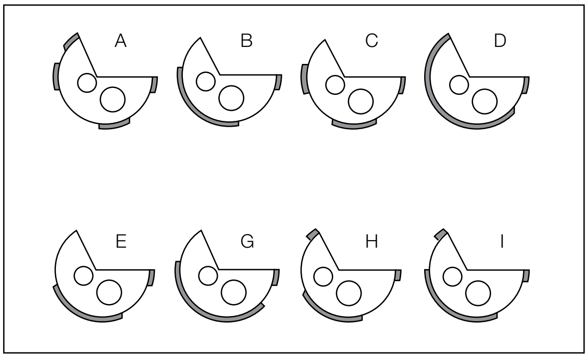
☐ TiN ☐ TiCN ☐ TiN+TiCN ☐ TiAIN ☐ Other

☐ **IC208** (TiN) ☐ **IC308** (TiCN) ☐ **IC508** (TiCN+TiN)

☐ **IC908** (TiAIN)

Type:

Please circle the required type. See page 738.



2. Workpiece

(If possible, please attach a drawing)

2.1 **Material**

Material description (**DIN** material number or any other standard):

....

Hardness and Properties:

....

☐ Short Chips ☐ Long Chips

2.2 **Hole Type**

☐ Blind Hole ☐ Drilling into Pre-hole

☐ Angled Entry

☐ Drilling into Solid ☐ Boring ☐ Angled Exit

Drilling Depth mm Hole Tolerance

2.3 **Application:**

Workpiece ☐ Stationary ☐ Rotating

Tool ☐ Stationary ☐ Rotating

3. Machine

3.1 **Technical Data**

Machine Type...

Power .... kW ....

3.2 **Cutting Data:**

Cutting Speed Vc .... m/min ....

Revolutions Nmin .... **RPM**, Nmax .... **RPM**

Feed Fmin.................... mm/rev,

Fmax............. mm/rev..........

Feed Rate **VF** .... mm/min ....

Coolant:

☐ Oil ☐ Soluble Oil ☐ Other

Coolant Pressure .... Bar ....

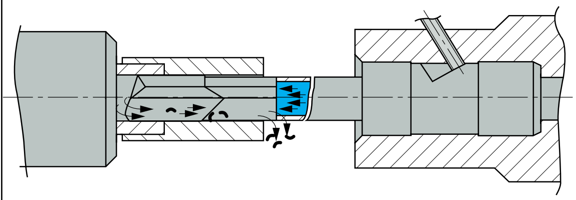
Sketch of drilling application

Note: It may be necessary to change several of the parameters that you indicated based on our experience with your application.

Typical Gundrill Applications

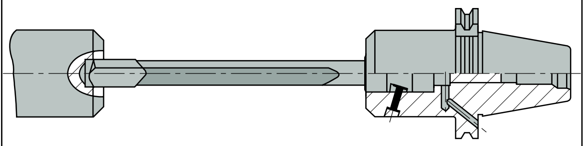
Main Drilling Methods

Figure 1



Guide Barrel

Figure 2



Pre-Drilled Guide Hole

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.

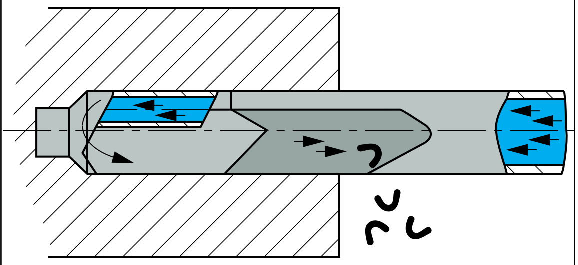
It is recommended that the machine tool be equipped with a means for guiding the gundrill, preferably during the entire drilling process.

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.

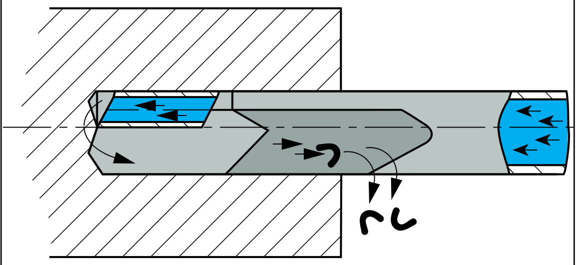
Typical Gundrill Applications - Chip Evacuation and Coolant Flow

Figure 3



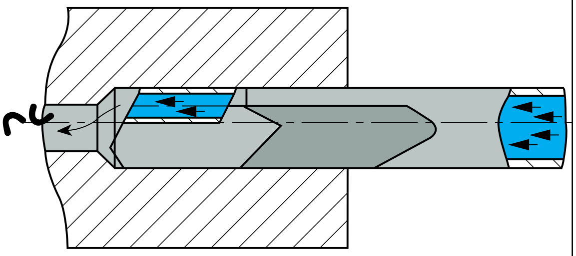
Boring with chip evacuation and coolant flowing opposite the boring direction

Figure 4



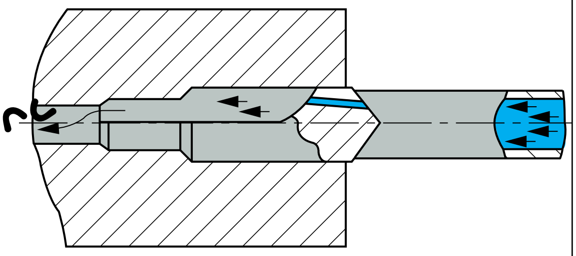
Drilling of solid material with chip evacuation and coolant flow opposite the drilling direction

Figure 5



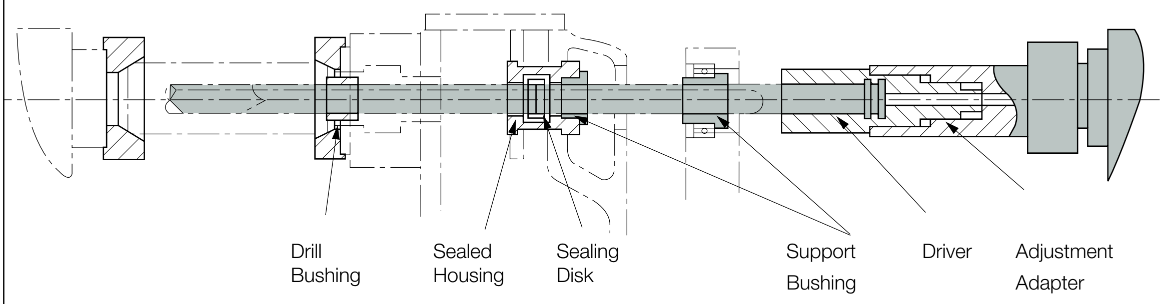
Boring with chip evacuation in the boring direction

Figure 6



Boring with a staged tool
Chip evacuation and coolant flow in the boring direction

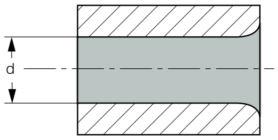
Deep Hole Machine Accessories



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

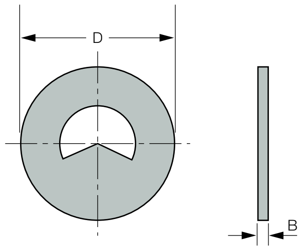


Guide Bushings

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.

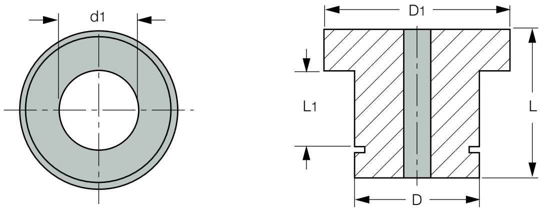


Sealing Disk		
Tool Ø “d”	Ext. Ø “D”	Thick. “ B”
2 to 6	20	3
3,1 to 15,559	32	4
15,6 to 25,999	40	4
26 to 40	90	4

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

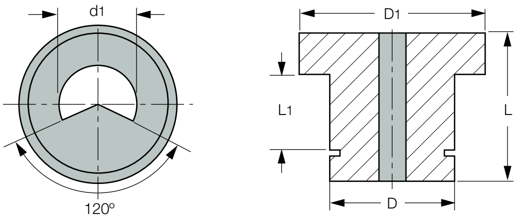
Indicate the “d” diameter of the drill



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

	Possible Causes																																	
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
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				+		+			+	+					+		+			+	+	+						+	+			+		+

ISO	Material		Condition	Tensile Strength [N/mm^2]	Hardness HB	Material 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 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
			Quenched and tempered	1100	325	11
	Stainless steel and cast steel		Ferritic/martensitic	680	200	12
			Martensitic	820	240	13
M	Stainless steel		Austenitic	600	180	14
K	Grey cast iron (GG)		Ferritic/pearlitic		180	15
			Pearlitic		260	16
	Nodular cast iron (GGG)		Ferritic		160	17
			Pearlitic		250	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum-wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			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
H	Hardened steel		Hardened		55 HRC	38
			Hardened		60 HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron		Hardened		55 HRC	41

[1] For workpiece materials list, see pages 1114-1149

Gundrill Recommended Machining Conditions

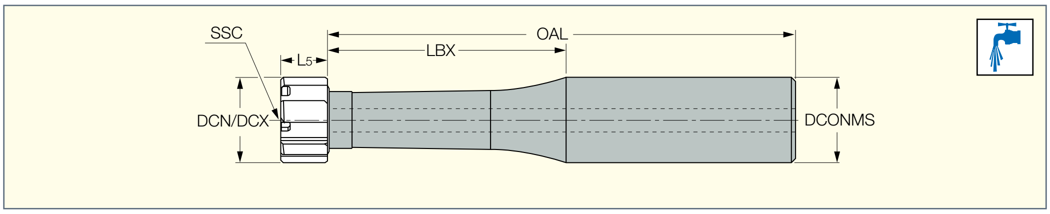
Mtl. No.	Cutting Speed vc m/min		Feed vs. mm/rev Drill Diameter mm			
		2.0-9.79	9.8-11.69	11.7-13.19	13.2-16.19	16.2-40
1	70-110	0.01-0.03	0.03-0.05	0.035-0.06	0.04-0.07	0.02-0.10
2	80-110					
3	70-100					
4	70-110					
5	70-90					
6	80-110	0.01-0.03	0.03-0.05	0.035-0.06	0.04-0.07	0.02-0.10
7	70-110					
8	60-90					
9	50-80					
10	50-70	0.01-0.03	0.025-0.04	0.03-0.045	0.035-0.05	0.12-0.10
11	40-70	0.01-0.03	0.025-0.04	0.03-0.045	0.035-0.05	0.12-0.10
12						
13						
14	40-80	0.01-0.03	0.025-0.04	0.03-0.045	0.035-0.05	0.02-0.10
15	70-100	0.01-0.40	0.04-0.1	0.05-0.12	0.06-0.14	0.05-0.20
16	70-100					
17	80-110					
18	80-110					
19	90-115					
20	90-115					
21	80-160	0.02-0.04	0.03-0.17	0.03-0.18	0.035-0.19	0.03-0.15
22						
23						
24						
25	80-120					
26	80-180	0.02-0.04	0.02-0.13	0.03-0.16	0.04-0.18	0.03-0.15
27						
28						
29						
30						
31	25-60	0.01-0.03	0.025-0.03	0.03-0.035	0.03-0.04	0.02-0.10
32						
33						
34						
35						
36						
37						
38	20-50	0.01-0.03	0.025-0.03	0.03-0.035	0.03-0.04	0.02-0.10
39						
40						
41						

HIGH PRECISION REAMING

BAYOT-REAM

RM-BNT (Shanks)

Shanks for BAYO T-REAM
Interchangeable Head Reamers



Designation	ULDR(1)	DCN(2)	DCX(3)	LBX	OAL	L_5	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

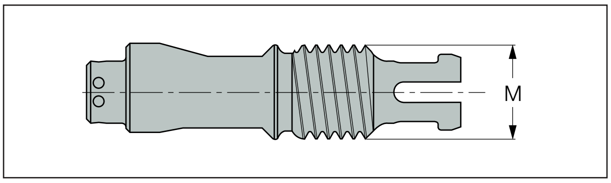
(1) Usable length diameter ratio
(2) Reamer min. diameter
(3) Reamer max. diameter
(4) Connection size

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

Bayonet Screw



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 Key

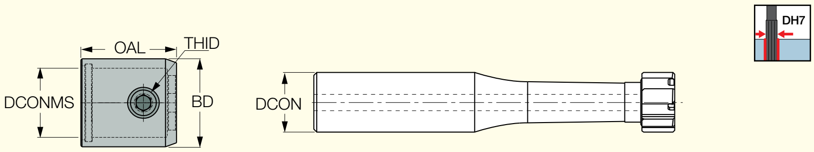
Designation	Head Diameter	Bayonet Size
RM-BN5-K	11.501-13.500	BN5
RM-BN6-K	13.501-16.000	BN6
RM-BN7-K	16.001-20.000	BN7
RM-BN8-K	20.001-25.400	BN8
RM-BN9-K	25.401-32.000	BN9

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

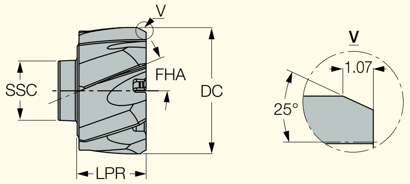
(1) Reamer bayonet size

(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	12.90	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 754-757

(1) The uncoated fine grain IC08 is available on request

(2) Seat size code

(3) Number of flutes

Complementary Grades (on request):

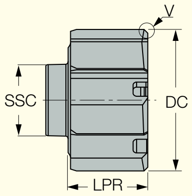
IC30N cermet tipped, recommended for reaming the following materials: non-alloyed (mild) steel, low alloyed steel (<5% of alloying elements), free cutting steel, tempered steel (tensile strength <1100 N/mm2) and nodular iron (GGG40, GGG60, etc.)

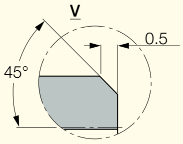
ID5 (PCD) recommended for high speed reaming of aluminum (special cases).
RN01 (DLC coating) recommended for reaming the following materials: aluminum alloys (cast, wrought, etc.), brass, bronze and other nonferrous materials.

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 (1)	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 754-757

(1) The uncoated fine grain IC08 is available on request

(2) Seat size code

(3) Number of flutes

Complementary Grades (on request):

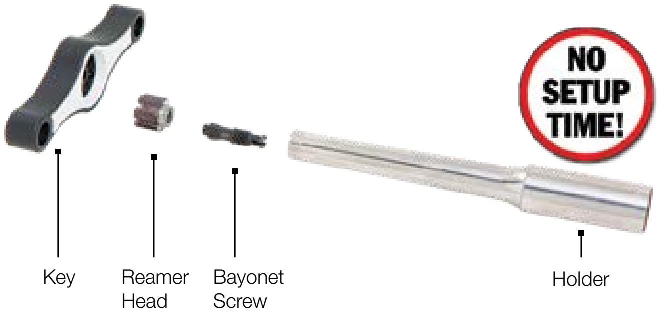
IC30N cermet tipped, recommended for reaming the following materials: non-alloyed (mild) steel, low alloyed steel (<5% of alloying elements), free cutting steel, tempered steel (tensile strength <1100 N/mm2) and nodular iron (GGG40, GGG60, etc.)

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 Ø1**6**.001**–**20.0 mm



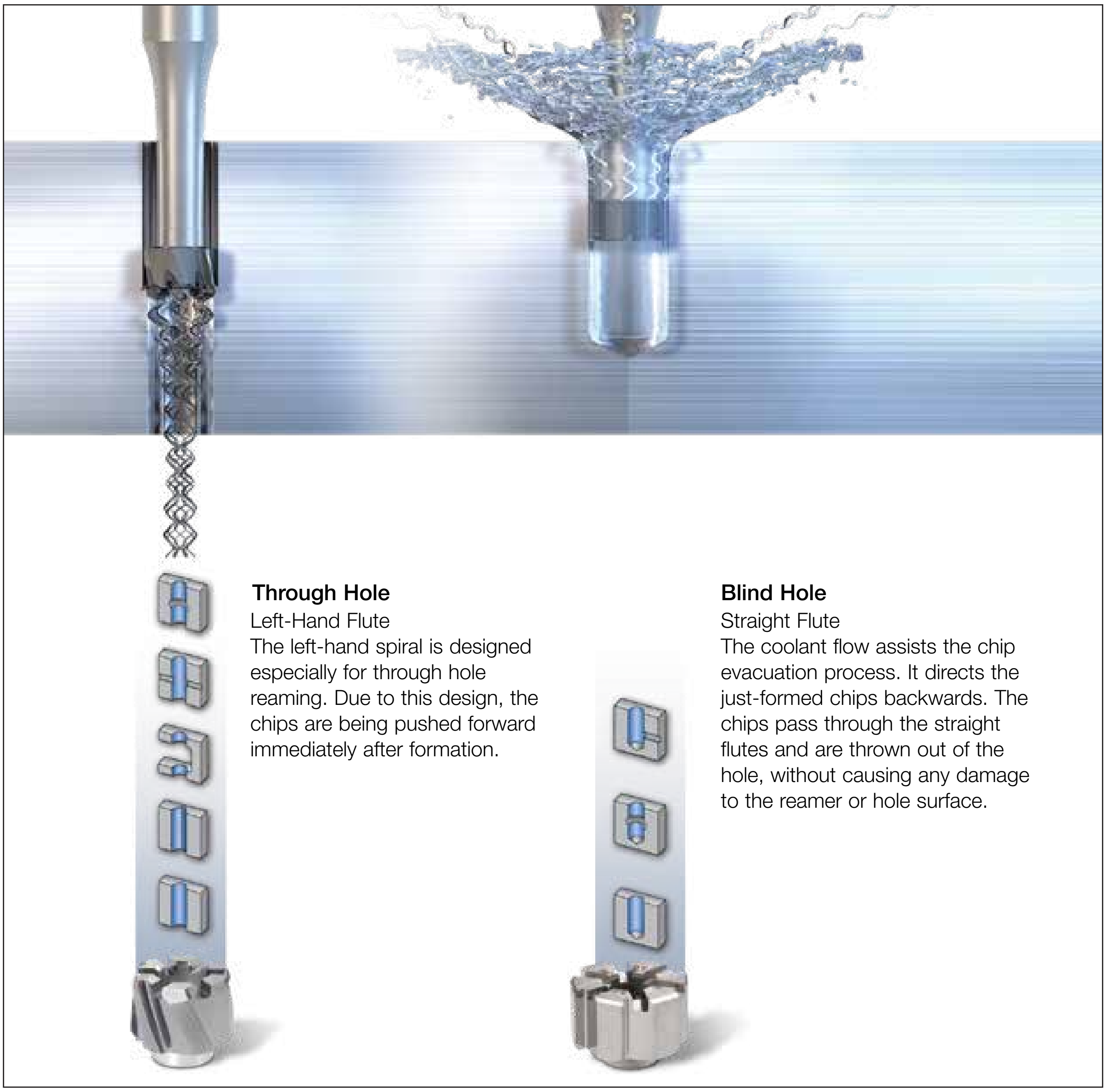
RM-BN9
Ø25.4-32.0 mm

RM-BN8
Ø20.0-25.4 mm

RM-BN7
Ø16.0-20.0 mm

RM-BN6
Ø13.5-16 mm

RM-BN5
Ø11.5-13.5 mm



Through 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.

Blind Hole

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.

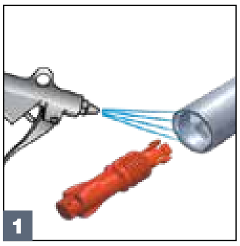
Assembly Instructions (BN5-BN9)

First Assembly

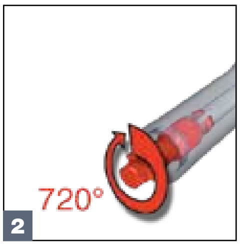
- Clean the toolholder pocket (Fig. 1)
- Clean the reamer head clamping cone
- Insert the clamping screw into the holder and rotate it 2-3 turns in a clockwise direction (Fig. 2)
- Clamp the reaming head on the screw; note, **BN8** and **BN9** can be assembled only in a specific position relative to 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

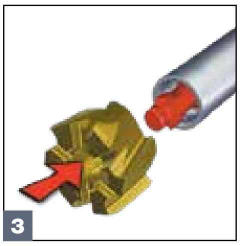
- Release the reaming head with the key, turning in a counterclockwise direction until it rotates freely
- Rotate another one turn by hand
- Remove the reamer head from the tool; the clamping screw should remain inside!!!
- Clean the pocket of the toolholder (Fig. 1)
- Clean the cone on the new reamer 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



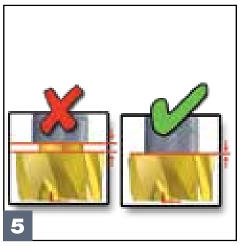
2



3

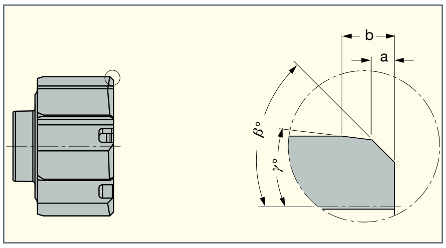
BN9: 21-23 N*m
BN8: 17-20 N*m
BN7: 13-15 N*m
BN6: 8-10 N*m
BN5: 7-8 N*m

4



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)			



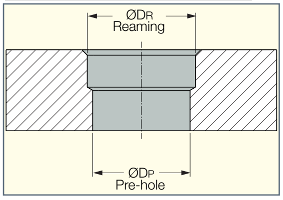
When choosing a reamer, it is important to select a lead geometry that covers the reaming allowance.

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.

Δ - Reaming allowance

Δ = ØDR - ØDP



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/**mm2) 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.

Hole Ø mm / Material	< 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

Recommeded Cutting Conditions for BAYO T-REAM High Speed Reaming Heads

				Through Hole				Interrupted Through Hole			
ISO	**Material**	**Condition**	**Material No.$^{(1)}$**	**First Choice**		**Second Choice**		**First Choice**		**Second Choice**	
P	Non-alloyed steel, cast steel, free cutting steel	Annealed	1	IC908	LB	IC30N	LA	IC908	LB	IC908	SA
		Annealed	2	Vc = 80 - 200		Vc = 90 - 240		Vc = 60 - 120		Vc = 60 - 120	
		Quenched & tempered	3	BN4 - BN6	fz = 0.08 - 0.21	BN4 - BN6	fz = 0.08 - 0.21	BN4 - BN6	fz = 0.06 - 0.18	BN4 - BN6	fz = 0.05 - 0.15
		Annealed	4								
		Quenched & tempered	5	BN7 - BN9	fz = 0.12 - 0.27	BN7 - BN9	fz = 0.12 - 0.27	BN7 - BN9	fz = 0.09 - 0.21	BN7 - BN9	fz = 0.07 - 0.16
	Low alloyed steel, cast steel (less than 5% alloying elements)	Annealed	6	IC908	LB	IC30N	LA	IC908	LB	IC908	SA
			7	Vc = 80 - 200		Vc = 90 - 240		Vc = 60 - 120		Vc = 60 - 120	
		Quenched & tempered	8	BN4 - BN6	fz = 0.08 - 0.21	BN4 - BN6	fz = 0.08 - 0.21	BN4 - BN6	fz = 0.06 - 0.18	BN4 - BN6	fz = 0.05 - 0.15
			9	BN7 - BN9	fz = 0.12 - 0.27	BN7 - BN9	fz = 0.12 - 0.27	BN7 - BN9	fz = 0.09 - 0.21	BN7 - BN9	fz = 0.07 - 0.16
	High alloyed steel, cast steel, and tool steel	Annealed	10	IC908	LB	IC908	SA	IC908	LB	IC908	SA
				Vc = 20 - 60		Vc = 20 - 60		Vc = 20 - 60		Vc = 20 - 60	
		Quenched & tempered	11	BN4 - BN6	fz = 0.05 - 0.13	BN4 - BN6	fz = 0.04 - 0.11	BN4 - BN6	fz = 0.04 - 0.11	BN4 - BN6	fz = 0.03 - 0.09
				BN7 - BN9	fz = 0.07 - 0.17	BN7 - BN9	fz = 0.06 - 0.14	BN7 - BN9	fz = 0.05 - 0.14	BN7 - BN9	fz = 0.04 - 0.11
	Stainless steel	Ferritic / martensitic	12	IC908	LB	IC908	SA	IC908	LB	IC908	SA
				Vc = 20 - 40		Vc = 20 - 40		Vc = 20 - 40		Vc = 20 - 40	
		Martensitic	13	BN4 - BN6	fz = 0.05 - 0.13	BN4 - BN6	fz = 0.04 - 0.11	BN4 - BN6	fz = 0.04 - 0.11	BN4 - BN6	fz = 0.03 - 0.09
M	Stainless steel	Austentic	14	BN7 - BN9	fz = 0.07 - 0.17	BN7 - BN9	fz = 0.06 - 0.14	BN7 - BN9	fz = 0.05 - 0.14	BN7 - BN9	fz = 0.04 - 0.11
K	Grey iron (GG)	Ferritic	15	IC908	LB	IC908	SA	IC908	LB	IC908	SA
				Vc = 120 - 220		Vc = 120 - 220		Vc = 80 - 200		Vc = 80 - 200	
		Pearlitic	16	BN4 - BN6	fz = 0.08 - 0.18	BN4 - BN6	fz = 0.08 - 0.16	BN4 - BN6	fz = 0.05 - 0.13	BN4 - BN6	fz = 0.05 - 0.13
				BN7 - BN9	fz = 0.10 - 0.24	BN7 - BN9	fz = 0.10 - 0.22	BN7 - BN9	fz = 0.07 - 0.17	BN7 - BN9	fz = 0.07 - 0.17
	Nodular iron (GGG)	Pearlitic / ferritic	17	IC908	SA or LB	IC30N	LA	IC908	LB	IC908	SA
				Vc = 160 - 280		Vc = 160 - 300		Vc = 150 - 250		Vc = 150 - 250	
		Pearlitic / martensitic	18	BN4 - BN6	fz = 0.11 - 0.20	BN4 - BN6	fz = 0.11 - 0.20	BN4 - BN6	fz = 0.06 - 0.15	BN4 - BN6	fz = 0.06 - 0.15
				BN7 - BN9	fz = 0.11 - 0.24	BN7 - BN9	fz = 0.11 - 0.24	BN7 - BN9	fz = 0.08 - 0.19	BN7 - BN9	fz = 0.08 - 0.19
	Malleable iron, Nodular iron ferritic / pearlitic	Ferritic	19	IC908	SA or LB	IC30N	LA or SA	IC908	LB	IC908	SA
				Vc = 100 - 220		Vc = 100 - 240		Vc = 100 - 220		Vc = 100 - 220	
		Pearlitic	20	BN4 - BN6	fz = 0.11 - 0.20	BN4 - BN6	fz = 0.11 - 0.20	BN4 - BN6	fz = 0.06 - 0.15	BN4 - BN6	fz = 0.06 - 0.15
				BN7 - BN9	fz = 0.11 - 0.24	BN7 - BN9	fz = 0.11 - 0.24	BN7 - BN9	fz = 0.08 - 0.20	BN7 - BN9	fz = 0.08 - 0.19
N	Aluminum wrought alloy	Not cureable	21	RN01	LB or SG	ID5	SG	RN01	LB	ID5	SG
		Cured	22	Vc = 150 - 400		Vc = 200 - 500		Vc = 150 - 350		Vc = 200 - 500	
	Aluminum - cast, alloyed	Not cureable	23								
		Cured	24	BN4 - BN6	fz = 0.08 - 0.16	BN4 - BN6	fz = 0.08 - 0.2	BN4 - BN6	fz = 0.08 - 0.16	BN4 - BN6	fz = 0.08 - 0.2
		High temperature	25	BN7 - BN9	fz = 0.10 - 0.20	BN7 - BN9	fz = 0.11 - 0.24	BN7 - BN9	fz = 0.10 - 0.20	BN7 - BN9	fz = 0.11 - 0.24
	Copper alloys Brass, bronze	Free cutting	26	IC30N	SA or SG	IC08	SG or SA	IC08	SG or SA		
				Vc = 180 - 240		Vc = 30 - 100		Vc = 30 - 100			
		Brass	27	BN4 - BN6	fz = 0.05 - 0.16	BN4 - BN6	fz = 0.04 - 0.13	BN4 - BN6	fz = 0.04 - 0.13		
		Electrolitic copper	28	BN7 - BN9	fz = 0.04 - 0.20	BN7 - BN9	fz = 0.05 - 0.16	BN7 - BN9	fz = 0.05 - 0.16		
	Non-metallic	Duroplastics, fiber plastics	29	IC908	SA	IC908	LB	IC908	SA	IC908	LB
				Vc = 25 - 80		Vc = 25 - 80		Vc = 25 - 80		Vc = 25 - 80	
		Hard rubber	30	BN4 - BN6	fz = 0.05 - 0.10	BN4 - BN6	fz = 0.05 - 0.12	BN4 - BN6	fz = 0.05 - 0.10	BN4 - BN6	fz = 0.05 - 0.12
				BN7 - BN9	fz = 0.10 - 0.20	BN7 - BN9	fz = 0.10 - 0.23	BN7 - BN9	fz = 0.10 - 0.20	BN7 - BN9	fz = 0.10 - 0.23
S	* High temp. alloys	Annealed	31	IC908	L *	IC908	S*	IC908	L*	IC908	S*
		Cured	32	Vc = 15 - 50		Vc = 15 - 50		Vc = 15 - 50		Vc = 15 - 50	
		Annealed	33								
		Cured	34	BN4 - BN6	fz = 0.04 - 0.10	BN4 - BN6	fz = 0.04 - 0.10	BN4 - BN6	fz = 0.03 - 0.08	BN4 - BN6	fz = 0.03 - 0.08
		Cast	35								
				BN7 - BN9	fz = 0.05 - 0.13	BN7 - BN9	fz = 0.05 - 0.13	BN7 - BN9	fz = 0.04 - 0.11	BN7 - BN9	fz = 0.04 - 0.11
H	Hardened steel	Hardened	38	IC908	LB	IC908	SA	IC908	LB	IC908	SA
		Hardened	39	Vc = 25 - 50		Vc = 25 - 50		Vc = 25 - 50		Vc = 25 - 50	
		Cast	40	BN4 - BN6	fz = 0.06 - 0.15	BN4 - BN6	fz = 0.05 - 0.13	BN4 - BN6	fz = 0.06 - 0.15	BN4 - BN6	fz = 0.05 - 0.13
		Hardened	41	BN7 - BN9	fz = 0.10 - 0.20	BN7 - BN9	fz = 0.10 - 0.20	BN7 - BN9	fz = 0.10 - 0.20	BN7 - BN9	fz = 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 1114-1149

	Blind Hole				Interrupted Blind Hole				IC08	
Material No.	First Choice		Second Choice		First Choice		Second Choice		Through Hole - LB Blind Hole - SA	
1	IC908	SA	IC30N	SA	IC908	SA			Vc = 6 - 10	
2	Vc = 60-160		Vc = 90 - 200		Vc = 60 - 120					
3 4	BN4 - BN6	fz = 0.06 - 0.18	BN4 - BN6	fz = 0.06 - 0.18	BN4 - BN6	fz = 0.05 - 0.15			BN4 - BN6	fz = 0.05 - 0.17
5	BN7 - BN9	fz = 0.08 - 0.20	BN7 - BN9	fz = 0.08 - 0.21	BN7 - BN9	fz = 0.07 - 0.16			BN7 - BN9	fz = 0.07 - 0.20
6	IC908	SA	IC30N	SA	IC908	SA			Vc = 6 - 10	
7	Vc = 60-160		Vc = 90 - 200		Vc = 60 - 120					
8	BN4 - BN6	fz = 0.06 - 0.18	BN4 - BN6	fz = 0.06 - 0.18	BN4 - BN6	fz = 0.05 - 0.15			BN4 - BN6	fz = 0.05 - 0.17
9	BN7 - BN9	fz = 0.08 - 0.20	BN7 - BN9	fz = 0.08 - 0.21	BN7 - BN9	fz = 0.07 - 0.16			BN7 - BN9	fz = 0.07 - 0.20
10	IC908	SA			IC908	SA			Vc = 6 - 10	
	Vc = 20 - 60				Vc = 20 - 60					
11	BN4 - BN6	fz = 0.04 - 0.10			BN4 - BN6	fz = 0.03 - 0.08			BN4 - BN6	fz = 0.03 - 0.08
	BN7 - BN9	fz = 0.05 - 0.13			BN7 - BN9	fz = 0.04 - 0.10			BN7 - BN9	fz = 0.05 - 0.10
12	IC908	SA			IC908	SA			Vc = 4 - 8	
	Vc = 20 - 40				Vc = 20 - 40					
13	BN4 - BN6	fz = 0.04 - 0.10			BN4 - BN6	fz = 0.03 - 0.08			BN4 - BN6	fz = 0.03 - 0.08
14	BN7 - BN9	fz = 0.05 - 0.13			BN7 - BN9	fz = 0.05 - 0.10			BN7 - BN9	fz = 0.05 - 0.10
15	IC908	SA			IC908	SA			Vc = 8 - 20	
	Vc = 80 - 200				Vc = 60 - 120					
16	BN4 - BN6	fz = 0.06 - 0.18			BN4 - BN6	fz = 0.05 - 0.13			BN4 - BN6	fz = 0.08 - 0.16
	BN7 - BN9	fz = 0.08 - 0.23			BN7 - BN9	fz = 0.08 - 0.18			BN7 - BN9	fz = 0.10 - 0.20
17	IC908	SA	IC30N	SA	IC908	SA			Vc = 9 - 20	
	Vc = 160 - 280		Vc = 160 - 280		Vc = 160 - 240					
18	BN4 - BN6	fz = 0.06 - 0.18	BN4 - BN6	fz = 0.06 - 0.18	BN4 - BN6	fz = 0.06 - 0.16			BN4 - BN6	fz = 0.06 - 0.16
	BN7 - BN9	fz = 0.08 - 0.23	BN7 - BN9	fz = 0.08 - 0.24	BN7 - BN9	fz = 0.08 - 0.18			BN7 - BN9	fz = 0.08 - 0.20
19	IC908	SA	IC30N	SA	IC908	SA			Vc = 10 - 20	
	Vc = 100 - 220		Vc = 100 - 240		Vc = 100 - 220					
20	BN4 - BN6	fz = 0.06 - 0.18	BN4 - BN6	fz = 0.06 - 0.18	BN4 - BN6	fz = 0.05 - 0.15			BN4 - BN6	fz = 0.05 - 0.15
	BN7 - BN9	fz = 0.08 - 0.23	BN7 - BN9	fz = 0.08 - 0.23	BN7 - BN9	fz = 0.08 - 0.20			BN7 - BN9	fz = 0.08 - 0.15
21	RN01	SG or SA	ID5	SG or SA	RN01	SG or SA	ID5	SG or SA	Vc = 10 - 30	
22 23	Vc = 150 - 400		Vc = 200 - 400		Vc = 150 - 300		Vc = 200 - 400			
24	BN4 - BN6	fz = 0.08 - 0.16	BN4 - BN6	fz = 0.08 - 0.16	BN4 - BN6	fz = 0.07 - 0.15	BN4 - BN6	fz = 0.08 - 0.16	BN4 - BN6	fz = 0.05 - 0.12
25	BN7 - BN9	fz = 0.11 - 0.20	BN7 - BN9	fz = 0.11 - 0.24	BN7 - BN9	fz = 0.11 - 0.20	BN7 - BN9	fz = 0.11- 0.24	BN7 - BN9	fz = 0.08 - 0.15
26	IC30N	SG or SA	IC08	SG or SA	IC08	SG or SA			Vc = 30 - 100	
	Vc = 180 - 240		Vc = 30 - 100		Vc = 30 - 100					
27	BN4 - BN6	fz = 0.05 - 0.16	BN4 - BN6	fz = 0.04 - 0.13	BN4 - BN6	fz = 0.04 - 0.13			BN4 - BN6	fz = 0.04 - 0.13
28	BN7 - BN9	fz = 0.05 - 0.21	BN7 - BN9	fz = 0.05 - 0.16	BN7 - BN9	fz = 0.05 - 0.16			BN7 - BN9	fz = 0.05 - 0.16
29	IC908	SA			IC908	SA			Vc = 10 - 20	
	Vc = 25 - 80				Vc = 25 - 80					
30	BN4 - BN6	fz = 0.05 - 0.10			BN4 - BN6	fz = 0.05 - 0.10			BN4 - BN6	fz = 0.05 - 0.12
	BN7 - BN9	fz = 0.10 - 0.20			BN7 - BN9	fz = 0.10 - 0.20			BN7 - BN9	fz = 0.08 - 0.16
31	IC908	S*			IC908	S*				
32 33	Vc = 15 - 50				Vc = 15 - 50					
34 35	BN4 - BN6	fz = 0.03 - 0.08			BN4 - BN6	fz = 0.03 - 0.08				
	BN7 - BN9	fz = 0.04 - 0.11			BN7 - BN9	fz = 0.04 - 0.11				
38	IC908	SA			IC908	SA				
39	Vc = 25 - 50				Vc = 25 - 50					
40	BN4 - BN6	fz = 0.05 - 0.13			BN4 - BN6	fz = 0.05 - 0.13				
41	BN7 - BN9	fz = 0.10 - 0.20			BN7 - BN9	fz = 0.10 - 0.20				

Legend:

Grade

Cutting speed [m/min]

BAYO T-REAM head size

IC908	LB
Vc = 10 - 20	
BN4-BN6	fz = 0.04 - 0.15
BN7-BN9	fz = 0.05 - 0.20

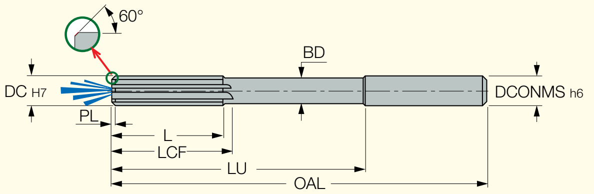
Cutting geometry

Feed [mm/tooth]

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



	Dimensions									
Designation	DC	L	PL	LCF	BD	LU	OAL	NOF[1]	DCONMS	EVO
RM-MTR-0100-H7S-CS-C	1.000	6.00	0.1	11.0	0.90	21.0	50.00	3	4.00	●
RM-MTR-0150-H7S-CS-C	1.500	9.00	0.15	15.0	1.10	21.0	50.00	3	4.00	●
RM-MTR-0200-H7S-CS-C	2.000	12.00	0.15	16.0	1.60	21.0	50.00	4	4.00	●
RM-MTR-0250-H7S-CS-C	2.500	12.00	0.2	19.0	2.10	31.0	60.00	4	4.00	●
RM-MTR-0300-H7S-CS-C	3.000	12.00	0.25	21.0	2.40	31.0	60.00	4	4.00	●
RM-MTR-0350-H7S-CS-C	3.500	12.00	0.25	21.0	2.90	40.0	68.00	4	4.00	●
RM-MTR-0400-H7S-CS-C	4.000	12.00	0.3	17.0	3.40	40.0	68.00	4	6.00	●
RM-MTR-0450-H7S-CS-C	4.500	12.00	0.3	17.0	3.90	40.0	76.00	4	6.00	●
RM-MTR-0500-H7S-CS-C	5.000	12.00	0.3	17.0	3.80	40.0	76.00	4	6.00	●
RM-MTR-0550-H7S-CS-C	5.500	12.00	0.3	17.0	4.10	40.0	76.00	4	6.00	●
RM-MTR-0600-H7S-CS-C	6.000	12.00	0.3	17.0	4.50	40.0	76.00	4	6.00	●
RM-MTR-0650-H7S-CS-C	6.500	15.00	0.4	20.0	5.20	65.0	101.00	6	8.00	●
RM-MTR-0700-H7S-CS-C	7.000	15.00	0.4	20.0	5.60	65.0	101.00	6	8.00	●
RM-MTR-0750-H7S-CS-C	7.500	15.00	0.4	20.0	6.00	65.0	101.00	6	8.00	●
RM-MTR-0800-H7S-CS-C	8.000	15.00	0.4	20.0	6.40	65.0	101.00	6	8.00	●
RM-MTR-0850-H7S-CS-C	8.500	18.00	0.4	23.0	6.80	61.0	101.00	6	10.00	●
RM-MTR-0900-H7S-CS-C	9.000	18.00	0.4	23.0	7.20	61.0	101.00	6	10.00	●
RM-MTR-0950-H7S-CS-C	9.500	18.00	0.4	23.0	7.60	61.0	101.00	6	10.00	●
RM-MTR-1000-H7S-CS-C	10.000	18.00	0.5	23.0	8.00	61.0	101.00	6	10.00	●
RM-MTR-1050-H7S-CS-C	10.500	18.00	0.5	23.0	8.40	85.0	130.00	6	12.00	●
RM-MTR-1100-H7S-CS-C	11.000	18.00	0.5	23.0	8.80	85.0	130.00	6	12.00	●
RM-MTR-1150-H7S-CS-C	11.500	18.00	0.5	23.0	9.20	85.0	130.00	6	12.00	●
RM-MTR-1200-H7S-CS-C	12.000	18.00	0.5	23.0	9.60	85.0	130.00	6	12.00	●

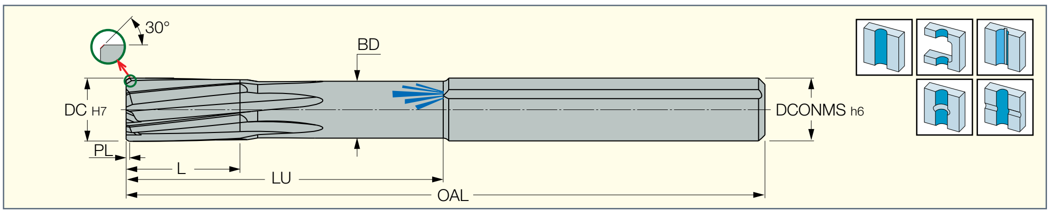
- EVO is a hard submicron IC07 carbide substrate with an ultra-thin silicon based PVD coating, obtained by High Density Plasma (HDP) technology
- Hole tolerance: H7 manufacturing tolerance according to DIN 1420

[1] Number of flutes

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



	Dimensions									
Designation	**DC**	**L**	**PL**	**BD**	**LU**	**OAL**	**NOF(1)**	**DCONMS**	💧	**EVO**
RM-MTR-0100-H7N-CS-C	1.000	6.00	0.2	0.80	21.0	50.00	3	4.00	N	●
RM-MTR-0150-H7N-CS-C	1.500	7.00	0.35	1.10	21.0	50.00	3	4.00	N	●
RM-MTR-0200-H7N-CS-C	2.000	9.00	0.45	1.50	21.0	50.00	4	4.00	N	●
RM-MTR-0250-H7N-CS-C	2.500	12.00	0.55	1.90	31.0	60.00	4	4.00	N	●
RM-MTR-0300-H7N-CS-C	3.000	12.00	0.70	2.20	31.0	60.00	4	4.00	N	●
RM-MTR-0350-H7N-CS-C	3.500	12.00	0.70	2.60	40.0	68.00	4	4.00	N	●
RM-MTR-0400-H7N-CS-C	4.000	12.00	0.70	3.00	40.0	68.00	4	6.00	Y	●
RM-MTR-0450-H7N-CS-C	4.500	12.00	0.90	3.40	40.0	76.00	4	6.00	Y	●
RM-MTR-0500-H7N-CS-C	5.000	12.00	0.90	3.80	40.0	76.00	4	6.00	Y	●
RM-MTR-0550-H7N-CS-C	5.500	12.00	0.90	4.10	40.0	76.00	4	6.00	Y	●
RM-MTR-0600-H7N-CS-C	6.000	12.00	0.90	4.50	40.0	76.00	4	6.00	Y	●
RM-MTR-0650-H7N-CS-C	6.500	15.00	0.90	5.20	65.0	101.00	6	8.00	Y	●
RM-MTR-0700-H7N-CS-C	7.000	15.00	0.90	5.60	65.0	101.00	6	8.00	Y	●
RM-MTR-0750-H7N-CS-C	7.500	15.00	0.90	6.00	65.0	101.00	6	8.00	Y	●
RM-MTR-0800-H7N-CS-C	8.000	15.00	0.90	6.40	65.0	101.00	6	8.00	Y	●
RM-MTR-0850-H7N-CS-C	8.500	18.00	0.95	6.80	61.0	101.00	6	10.00	Y	●
RM-MTR-0900-H7N-CS-C	9.000	18.00	0.95	7.20	61.0	101.00	6	10.00	Y	●
RM-MTR-0950-H7N-CS-C	9.500	18.00	0.95	7.60	61.0	101.00	6	10.00	Y	●
RM-MTR-1000-H7N-CS-C	10.000	18.00	0.95	8.00	61.0	101.00	6	10.00	Y	●
RM-MTR-1050-H7N-CS-C	10.500	18.00	1.05	8.40	85.0	130.00	6	12.00	Y	●
RM-MTR-1100-H7N-CS-C	11.000	18.00	1.05	8.80	85.0	130.00	6	12.00	Y	●
RM-MTR-1150-H7N-CS-C	11.500	18.00	1.05	9.20	85.0	130.00	6	12.00	Y	●
RM-MTR-1200-H7N-CS-C	12.000	18.00	1.05	9.60	85.0	130.00	6	12.00	Y	●

• 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

RM-MTR Cutting Conditions

Main Material Group	Material Type	ISCAR Material Groups	Vc (m/min)	Suitability
Steel	Low carbon content	1	120-250	◗
	Medium carbon content	2-3	120-250	
	Low alloyed	6-9	120-250	
	High alloyed	10-11	120-250	
	Die/tool steel		70-120	
Stainless steel - special alloys	AISI 304-416-420	12-14	60-120	●
	AISI 316-440	14	60-120	
	17-4 PH 15-5 PH	14	25-60	
	Cr - Co alloys	14	25-50	
	Duplex F51	14	20-40	
	Super duplex F55	14	20-40	
Cast iron	GERY / SPHEROIDAL	15-20	60-120	◗
Light alloys	Unalloyed aluminum	21-24	250-500	◗
HRSA	HRSA Hastelloy	33	25-50	●
	HRSA Inconel 625	33		
	HRSA Inconel 718	34		
	HRSA nimonic	33		
Ti	Titanio - titanium	36	30-80	
	Titanium alloys	37		
Hardened steels	≤ 54 HRC	38	25-60	◗

Feed Recommendations

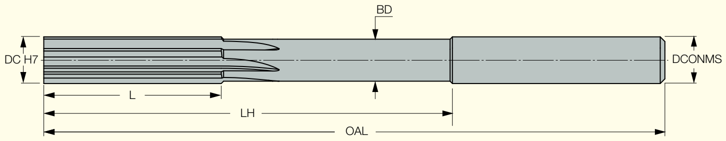
Reamer Diameter mm	Feed mm/rev
4.00-5.00	0.10-0.40
5.50-7.50	0.15-0.70
8.00-10.0	0.50-1.40
10.5-12.0	0.80-1.60

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



	Dimensions							
Designation	DC	L	LH	BD	OAL	NOF(1)	DCONMS	IC07
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	●

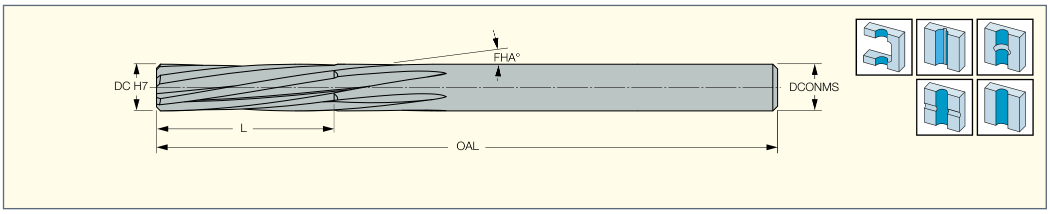
• Hole tolerance: H7 manufacturing tolerance according to DIN1420 • Available grades: IC07 - uncoated, optional: IC907 - TiAlN PVD coated • Special diameters are available on request • For user guide and cutting conditions, see pages 765-768

(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



	Dimensions						
Designation	DC	L	OAL	NOF(1)	FHA	DCONMS	IC07
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, see pages 765-768

(1) Number of flutes

RM-FCR Cutting Conditions

Material Type	**K (uncoated)** **Vc (m /min.)**
Low Carbon Content	10-15
Medium Carbon Content	10-15
Low Alloyed	8 - 10
High Alloyed	8 - 10
Die/Tool Steel	6 - 8
Ferritic Stainless Steel (serie Aisi 400)	-
Austenitic Stainless Steel (serie Aisi 300)	-
Martensitic Stainless Steel (serie Aisi 400)	-
Stainless Steel Duplex	-
Cast Iron	10-15
Unalloyed Aluminium	20 - 30
Aluminium Si<6%	20 - 30
Thermoplastic Materials	20 - 30
Copper / Brass	10 - 12
HRSA	-
Titanium Alloys	-

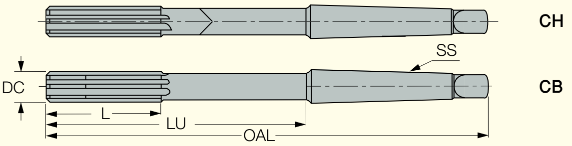
Feed Recommendations

Reamer Diameter mm	**Feed mm/rev**	**Reaming Allowance mm (on Diameter)**
1 - 2.9	0.07 - 0.1	0.02 - 0.08
3 - 3.9	0.08 - 0.12	0.08 - 0.12
4 - 4.9	0.09 - 0.15	0.1 - 0.15
5 - 5.9	0.1 - 0.18	0.15 - 0.2
6 - 7.9	0.14 - 0.2	0.15 - 0.2
8 - 9.9	0.16 - 0.22	0.15 - 0.2
10 - 11.5	0.18 - 0.25	0.15 - 0.25
12 - 16	0.2 - 0.3	0.2 - 0.3

SOLIDH-REAM

RM-SHR-H7S-MT

DIN 8094 Solid Carbide Reamers with Straight Flutes and a Morse Taper Shank for Blind Holes



	Dimensions						
Designation	DC	OAL	LU	L	NOF(1)	SS	IC07
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-1200-H7S-MT1-CH	12.000	182.00	116.5	44.00	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	●

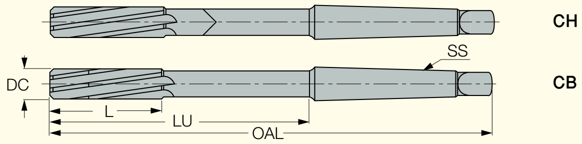
• Available only upon request • -CH: Brazed solid carbide head • -CB: Brazed solid carbide tips • Hole tolerance: H7 manufacturing tolerance according to DIN 1420
• Available grades: IC07 (uncoated), optional: IC907 (TiAlN PVD coated) • For user guide and cutting conditions, see pages 765-768

(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	DC	OAL	LU	L	NOF[1]	SS	IC07
	Dimensions						
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-2400-H7N-MT3-CB	24.000	268.00	169.0	68.00	8	MT3	●
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	●
RM-SHR-4000-H7N-MT4-CB	40.000	329.00	205.0	81.00	8	MT4	●

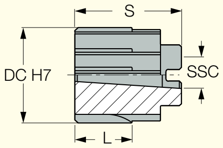
• Available only upon request • -CH: Brazed solid carbide head • -CB: Brazed solid carbide tips • Hole tolerance: H7 manufacturing tolerance according to DIN 1420 • Available grades: IC07 (uncoated), optional: IC907 (TiAlN PVD coated) • For user guide and cutting conditions, see pages 765-768

[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

	Dimensions					
Designation	**DC**	**S**	**L**	**SSC(1)**	**NOF(2)**	**IC07**
RM-SR25.000H7S-13	25.000	45.00	30.00	13	6	•
RM-SR30.000H7S-13	30.000	45.00	30.00	13	6	•
RM-SR34.000H7S-13	34.000	45.00	30.00	13	8	•
RM-SR35.000H7S-13	35.000	45.00	30.00	13	8	•
RM-SR36.000H7S-16	36.000	50.00	30.00	16	8	•
RM-SR37.000H7S-16	37.000	50.00	30.00	16	8	•
RM-SR38.000H7S-16	38.000	50.00	30.00	16	8	•
RM-SR40.000H7S-16	40.000	50.00	30.00	16	8	•
RM-SR42.000H7S-16	42.000	50.00	30.00	16	8	•
RM-SR44.000H7S-16	44.000	50.00	30.00	16	8	•
RM-SR45.000H7S-16	45.000	50.00	30.00	16	8	•
RM-SR48.000H7S-19	48.000	56.00	30.00	19	10	•
RM-SR50.000H7S-19	50.000	56.00	30.00	19	10	•
RM-SR55.000H7S-22	55.000	63.00	30.00	22	10	•
RM-SR58.000H7S-22	58.000	63.00	30.00	22	10	•
RM-SR60.000H7S-22	60.000	63.00	30.00	22	10	•
RM-SR70.000H7S-27	70.000	71.00	30.00	27	12	•

• Available only upon request • Right-hand, H7 manufacturing tolerance according to DIN 1420 • For user guide and cutting conditions, see pages 765-768

(1) Seat size code

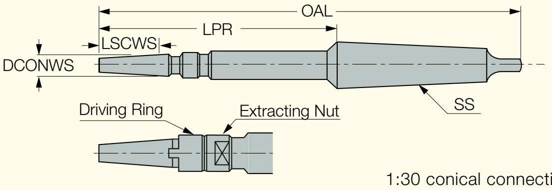
(2) Number of flutes

For tools, see pages: RM-SRH-Q-MT (764)

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**	**LPR**	**LSCWS**	**SS**
RM-SRH Q13-MT3	13	25.00	35.00	250.00	151.0	45.00	MT3
RM-SRH Q16-MT3	16	36.00	45.00	261.00	162.0	50.00	MT3
RM-SRH Q19-MT3	19	48.00	52.00	298.00	174.0	56.00	MT3
RM-SRH Q19-MT4	19	48.00	52.00	273.00	174.0	56.00	MT4
RM-SRH Q22-MT3	22	55.00	62.00	312.00	188.0	63.00	MT3
RM-SRH Q22-MT4	22	55.00	62.00	312.00	188.0	63.00	MT4
RM-SRH Q27-MT4	27	65.00	75.00	359.00	203.0	71.00	MT4
RM-SRH Q27-MT5	27	65.00	75.00	327.00	203.0	71.00	MT5

• Available only upon request

(1) Minimum insert diameter

(2) Maximum insert diameter

For inserts, see pages: RM-SR-H7S (764)

Machining Conditions for Solid Carbide Reamers

Material	Tensile Strength or Brinell Hardness N/mm^2 bzw. HB	Reamer Diameter mm	Reaming Allowance Relative to Diameter	Feed mm/rev	Cutting Speed m/min
Steel	up to 1000	up to 10	0.04-0.10	0.15-0.25	6-20
		10-25	0.10-0.25	0.20-0.35	
		25-40	0.25-0.40	0.30-0.50	
	1000-1400	up to 10	0.04-0.10	0.12-0.20	6-15
		10-25	0.10-0.25	0.15-0.30	
		25-40	0.25-0.40	0.20-0.40	
Cast steel	400-500	up to 10	0.05-0.10	0.15-0.25	10-20
		10-25	0.10-0.25	0.20-0.40	
		25-40	0.25-0.40	0.30-0.50	
	500-700	up to 10	0.04-0.10	0.12-0.20	6-15
		10-25	0.10-0.25	0.15-0.30	
		25-40	0.25-0.40	0.20-0.40	
Titanium Titanium alloy	500-1300	up to 10	0.06-0.12	0.12-0.20	6-15
		10-25	0.10-0.25	0.15-0.30	
		25-40	0.25-0.40	0.20-0.40	
Grey cast iron	up to 220 HB	up to 10	0.06-0.12	0.20-0.30	10-25
		10-25	0.10-0.30	0.30-0.45	
		25-40	0.30-0.50	0.40-0.70	
	over 220 HB	up to 10	0.06-0.12	0.15-0.25	10-20
		10-25	0.10-0.30	0.20-0.35	
		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	8-15
		10-25	0.10-0.25	0.20-0.40	
		25-40	0.25-0.40	0.30-0.60	
Aluminum alloy	over 80 HB	up to 10	0.06-0.12	0.20-0.30	Si<7% 10-30
		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	20-60
		10-25	0.20-0.40	0.40-0.80	
		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	15-50
		10-25	0.10-0.30	0.30-0.50	
		25-40	0.30-0.50	0.40-0.70	
Thermoset polymers		up to 10	0.10-0.25	0.30-0.60	15-30
		10-25	0.20-0.40	0.40-0.80	
		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	A_9	A_{11}	B_8	B_9	B_{10}	B_{11}	C_8	C_9	C_{10}	C_{11}
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	D_8	D_9	D_{10}	D_{11}	E_7	E_8	E_9	F_6	F_7	F_8	F_9	G_6	G_7
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	R_6	R_7	S_6	S_7	T_6	U_6	U_7	U_{10}	X_{10}	X_{11}	Z_{10}	Z_{11}
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	H_6	H_7	H_8	H_9	H_{10}	H_{11}	H_{12}	J_6	J_7	J_8	JS_6	JS_7	JS_8	JS_9
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	K_6	K_7	K_8	M_6	M_7	M_8	N_6	N_7	N_8	N_9	N_{10}	N_{11}	P_6	P_7
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 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 a material influence on 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 to 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 in 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

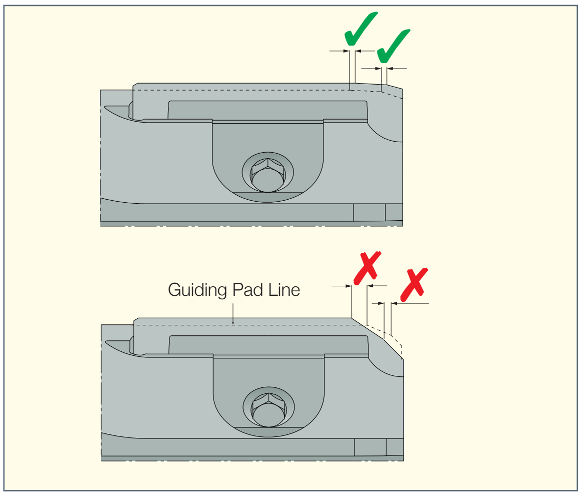
In order to achieve high tolerances for reaming applications, there are certain requirements that must be considered.

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.

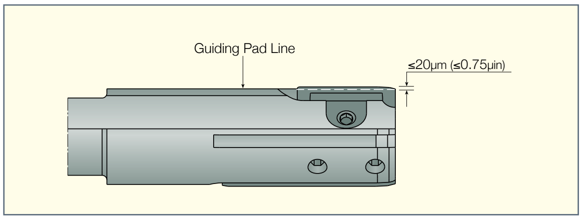
Important

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 775) Note: **A**, **C**, **D** - optional

Shank Type

C	Cylindrical
W	Weldon
F	Flat

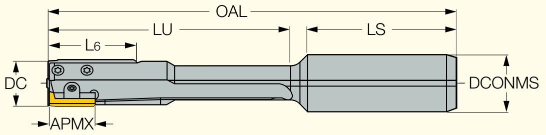
Reamer Length S-Short

[1] To be ordered for each specific diameter and tolerance

[2] Tool lead type - according to insert's lead type

RM-SET-T-B

Single-Edged Indexable
Reamers for Through Holes

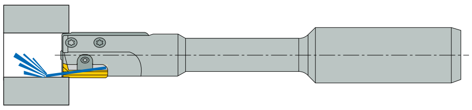


Designation	DC	APMX	L_6(1)	LU	LS	OAL	DCONMS	SSC(2)
RM-SET8.000H6T-B-C16S	8.000	15.50	30.00	75.0	45.0	123.50	16.00	1.0
RM-SET9.000H6T-B-C16S	9.000	15.50	30.00	75.0	45.0	123.50	16.00	1.0
RM-SET10.000H6T-B-C16S	10.000	15.50	30.00	75.0	45.0	123.50	16.00	2.0
RM-SET11.000H6T-B-C16S	11.000	15.50	30.00	75.0	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 772
- For user guide and cutting conditions, see pages 775-780

(1) Pad length
(2) Insert size

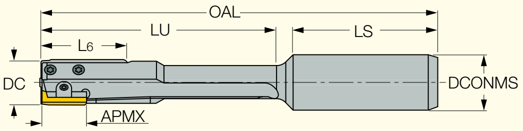
For inserts, see pages: RM-SEI-B (773)



INDEXH-REAM

RM-SET-B-B

Single-Edged Indexable
Reamers for Blind Holes



Designation	DC	APMX	OAL	LS	LU	L_6[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 775-780

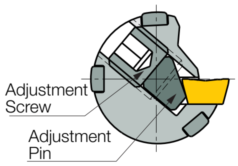
[1] Pad length

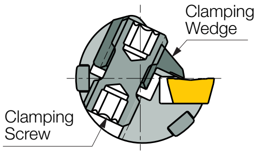
[2] Insert size

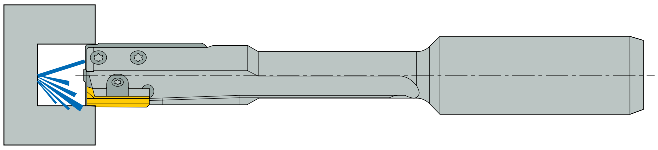
For inserts, see pages: RM-SEI-B (773)

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







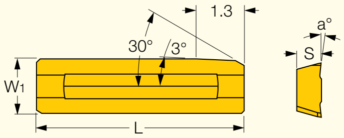
Insert Designation Code Key

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					Tough ↔ Hard			
	SSC(1)	a°	L	W_1	S	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-00	4.0	0	22.50	6.60	3.00				●
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

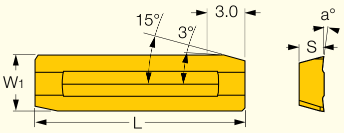
(1) Insert size

For tools, see pages: RM-SET-B-B (772) • RM-SET-T-B (771)

INDEXH-REAM

RM-SEI-A

Single-Edged Reaming Inserts for High Surface Quality at Low Cutting Conditions



Designation	Dimensions					Tough ↔ Hard	
	SSC(1)	a°	L	W_1	S	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	●	

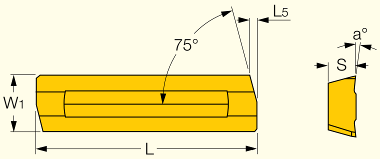
- Lead type of insert should be compatible with lead type of the tool • Available on request

(1) Insert size

INDEXH-REAM

RM-SEI-C

Single-Edged Reaming Inserts for Aluminum and Brass



Designation	SSC[1]	a°	L	W1	S	L5	IC07
	Dimensions						
RM-SEI-1C-12	1.0	12	15.50	2.80	1.50	0.55	●
RM-SEI-2C-12	2.0	12	15.50	3.60	1.50	0.55	●
RM-SEI-3C-12	3.0	12	17.00	4.40	2.00	0.55	●
RM-SEI-4C-12	4.0	12	22.50	6.60	3.00	0.55	●

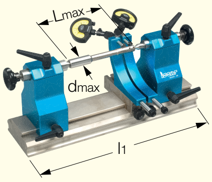
• Lead type of insert should be compatible with lead type of the tool • Available on request

(1) Insert size

Accessories

RM SETTING DEVICE

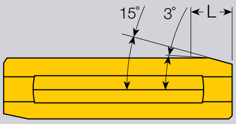
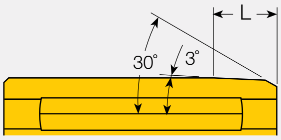
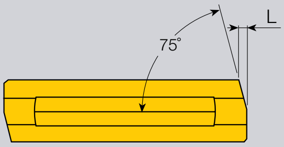
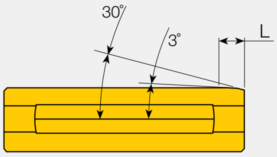
Reamer Setting Device



Designation	L max	l1	d max	kg
RM SETTING DEVICE	265.0	450.00	170.0	25.00

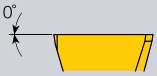
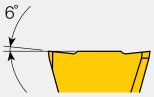
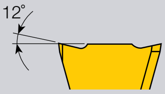
Front Angles and Cutting Geometries

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, 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 the 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

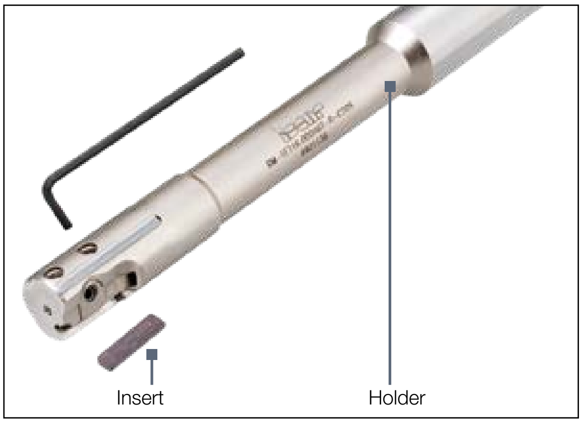
The following grades can be provided on request:

- **PCD** grade for machining aluminum
- **PCBN** grade for machining cast iron
- **IC30N** (cermet) for machining steel

Concept

The Index **H**-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	Ø10.00-11.99 mm	Ø12.00-25.99 mm	Ø26.00-32.00 mm
(Ø.315-.393")	(Ø.393-.472")	(Ø.472-1.024")	(Ø1.024-1.260")

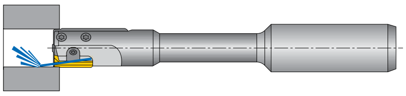


Applications

Through Hole

Short Flute Holder

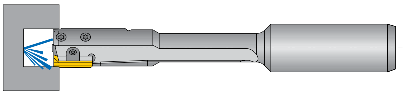
This holder has a lateral coolant outlet located right above the insert. The coolant is pointed directly to the cutting edge to lubricate it and divert the chips forward. Additional coolant outlets are located behind the guiding pads.
Their purpose is to reduce high friction that is created between the pads and the reamed surface during machining.



Blind Hole

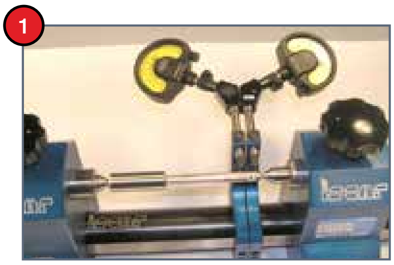
Long Flute Holder

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.

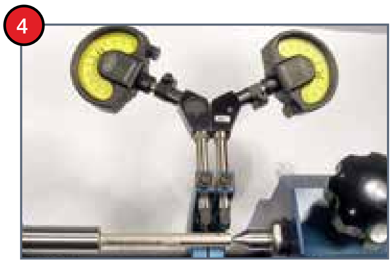
3

Rotate and place the inserts against indicators.

4

Tighten the adjustment screws in a clockwise direction.

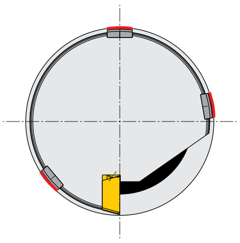
4



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

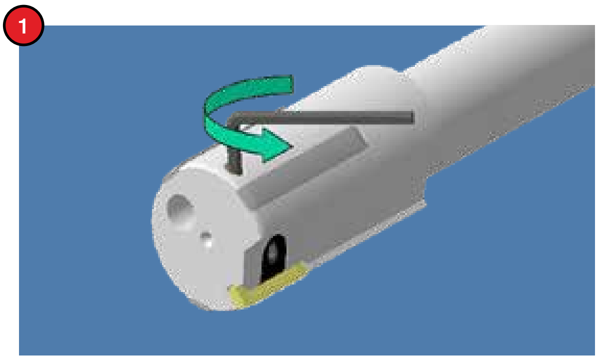
High Friction
Lubricated Zones



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.

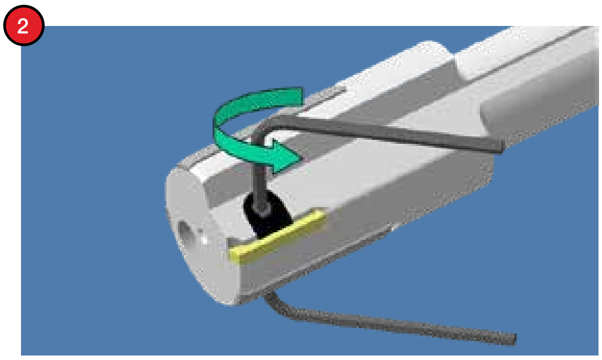
Insert Indexing

1



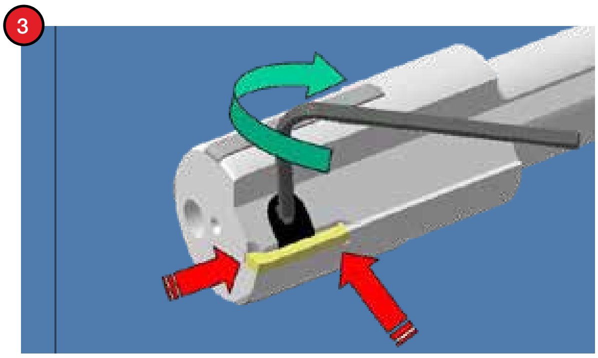
Rotate the adjustment screws one turn counterclockwise (**CCW**).

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.

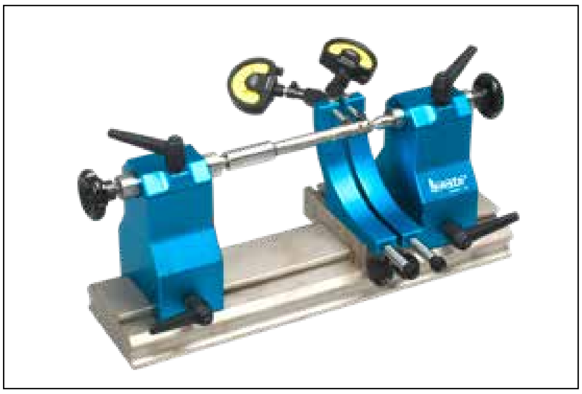
Setting Methods

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.

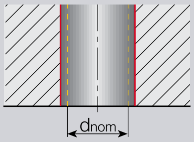
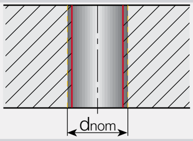
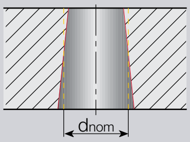
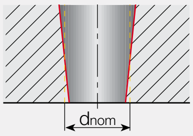
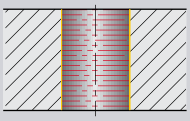
		Lead A=15°/3° L3 (reaming allowance = 0.1-0.3)						
		Feed [mm/rev]	Rake [°]	Cutting Speed Vc [m/min]				
Material No.	Material			Carbide	Coated Carbide	Cermet	PCD	CBN
1-5	Non-alloy steel, cast steel and free cutting steel	0.1-0.4	6	40-60	60-80	110-160		
6-9	Low alloy steel and cast steel (less than 5% of alloying elements)	0.1-0.4	6	20-40	40-60	110-160		
10-11	High alloyed steel, cast steel and tool steel	0.1-0.4	6	20-40	20-60	20-60		
12-13	Stainless steel and cast steel	0.1-0.3	12	20-40	40-60	40-60		
15-16	Grey cast iron (GG)	0.1-0.3	0 / 6	40-60	60-100			Please ask
17-18	Nodular cast iron (GGG)	0.1-0.3	0 / 6	40-60	60-100			
19-20	Malleable cast iron	0.1-0.3	0 / 6	40-60	60-100			
21-22	Aluminum wrought alloy						Please ask	
23-25	Aluminum -cast, alloyed							
26-28	Copper alloys							
29-30	Non-metallic							

		Lead B=30°/3° L1.3 (reaming allowance = 0.1-0.3)						
		Feed [mm/rev]	Rake [°]	Cutting Speed Vc [m/min]				
Material No.	Material			Carbide	Coated Carbide	Cermet	PCD	CBN
1-5	Non-alloy steel, cast steel and free cutting steel	0.1-0.3	6	60-80	80-120	110-160		
6-9	Low alloy steel and cast steel (less than 5% of alloying elements)	0.1-0.3	6	60-80	80-120	110-160		
10-11	High alloyed steel, cast steel and tool steel	0.1-0.3	6	40-60	40-80	40-80		
12-13	Stainless steel and cast steel	0.1-0.2	12	40-60	60-80	60-80		
15-16	Grey cast iron (GG)	0.1-0.3	0 / 6	60-80	80-120			Please ask
17-18	Nodular cast iron (GGG)	0.1-0.3	0 / 6	60-80	80-120			
19-20	Malleable cast iron	0.1-0.3	0 / 6	60-80	80-120			
21-22	Aluminum wrought alloy	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				

		Lead D=30°/3° L0.6 (reaming allowance = 0.1-0.2)						
		Feed [mm/rev]	Rake [°]	Cutting Speed Vc [m/min]				
Material No.	Material			Carbide	Coated Carbide	Cermet	PCD	CBN
1-5	Non-alloy steel, cast steel and free cutting steel	0.05-0.2	6	60-80	80-120	110-160		
6-9	Low alloy steel 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	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
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	
23-25	Aluminum -cast, alloyed	0.05-0.2	12	180-200				
26-28	Copper alloys	0.05-0.2	0	80-100				
29-30	Non-metallic							

		Lead C=75°/3° L0.55 (reaming allowance = 0.2-0.4)						
		Feed [mm/rev]	Rake [°]	Cutting Speed Vc [m/min]				
Material No.	Material			Carbide	Coated Carbide	Cermet	PCD	CBN
1-5	Non-alloy steel, cast steel and free cutting steel							
6-9	Low alloy steel and cast steel (less than 5% of alloying elements)							
10-11	High alloyed steel, cast steel and tool steel							
12-13	Stainless steel and cast steel							
15-16	Grey cast iron (GG)							Please ask
17-18	Nodular cast iron (GGG)							
19-20	Malleable cast iron							
21-22	Aluminum wrought alloy	0.15-0.3	12	150-250			Please ask	
23-25	Aluminum -cast, alloyed	0.15-0.3	12	150-250				
26-28	Copper alloys							
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

TAPS

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Metric Coarse “M” for Multi-Material Application

Metric Fine “M” for Multi-Material Application

Metric Fine “M” for Multi-Material Application

Unified Coarse “M” for Multi-Material Application

Unified Fine “M” for Multi-Material Application

Spiral Flute Taps for Blind Hole (TPS)..790

Metric Coarse “M” for Multi-Material Application

Metric Fine “M” for Multi-Material Application

Unified Coarse “M” for Multi-Material Application

Unified Fine “M” for Multi-Material Application

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Metric Coarse “S” for Stainless Steel

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Metric Coarse “S” for Low Alloyed Steel

Metric Coarse “H” for Hardened Steel and H.T.A

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Metric Coarse “G” for Short Chip Materials

Forming Taps (TPF) 797

Metric Coarse “F” for Any Material with 8~10% Elongation

Tap User Guide..798

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

Thread Standard

M- ISO Metric
Coars Thread DIN-13

MF- ISO Metric
Fine Thread DIN-13

UNF- Unfied Fine
Thread

UNC- Unfied Coarse
Thread

D- TPI
D- Pitch

Tap Color Codes[1]

M -Multi-Material Application
W -Steel with Good Machinability Rm<750 N/mm2
S -Stainless Steel
H -Hardened Steel and High Temp./Super Alloys Rm>750 N/mm2
G -Grey Cast Iron
N -Low Alloy Steel Rm<600 N/mm2
A -Aluminum and Aluminum Alloys
F -Any Material with at least 8~10% Elongation

B - Bore for Coolant

(on request)

Tap Materials

HS- H.S.S. (M2)
HE- H.S.S-E
5% Co. HSS (M35)
PM- Compacted Powder
HM- Solid Carbide

Coating Types*

Ni- Nitriding
Ti- TiN
TC- TiCN
TA- TiAlN
St- Black Oxide

* On request

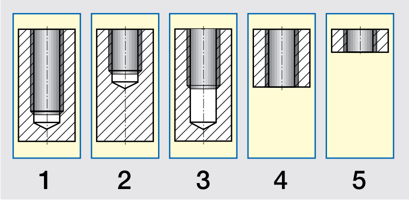
[1] The tools have a matching colored ring around the shank

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)

Tap Selection Guide and Cutting Speed Recommendations

Hole Type[4]



Tap Color Code[1]
Tool Material[1]
Surface Treatment/Coating[2]
Flute Hand and Angle
Lead According to DIN 2197[3]
Hole Type(4)

Material No.	Material		Condition	Tensile Strength [N/mm^2]	Hardness HB	Chip	Coolant
1	Non-alloy steel and cast steel, free cutting steel and cast steel (less than 5% all elements)	< 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	High alloyed steel, cast steel and tool 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			400		Med/Short	A
37			Alpha+beta alloys cured	1050		Med/Short	A

[1] See page 783
[2] See page 799
[3] See page 800
[4] See page 801

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		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	
	•	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

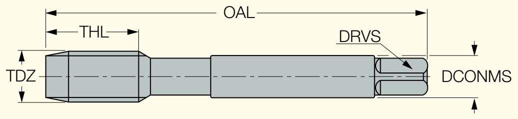
•• Suitable

[1] Hand Tap

HSSTAPS

TPH M-W (HSS)

DIN 13 HSS Hand Tap Set for ISO Metric Coarse Threads



W | HSS | 6H | 60° P | I/II/III

Designation	TDZ	TP	OAL	THL	DCONMS	NOF(2)	DRVS(3)	Pre-hole	Standard	HS
	Dimensions									
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-2.3X0.4-W (1)	M2.3	0.400	36.00	9.0	2.80	3	2.10	1.90	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 784-785, 798-820

(1) DIN profile

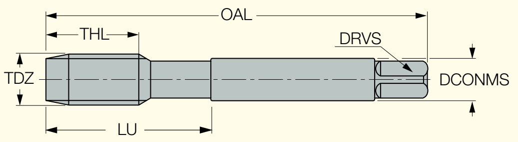
(2) Number of flutes

(3) Key flat size

ONETAP

TPG M (HSS)

DIN 13 HSS Machine Taps for ISO Metric Coarse Threads for a Wide Range of Materials



M

HSS-E

6H

	Dimensions										Tough ↔ Hard		
Designation	TDZ	TP	OAL	THL	LU	DCONMS	NOF(1)	DRVS(2)	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 784-785, 798-820

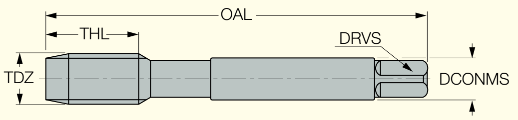
(1) Number of flutes

(2) Key flat size

ONETAP

TPG MF (HSS)

DIN 13 HSS Machine Taps for ISO Metric Fine Threads for a Wide Range of Materials



HSS-E | 6H | M

	Dimensions									Tough ↔ Hard		
Designation	TDZ	TP	OAL	THL	DCONMS	NOF(1)	DRVS(2)	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 784-785, 798-820

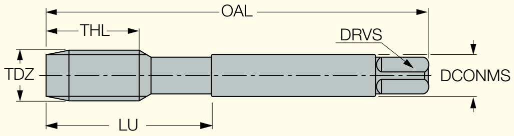
(1) Number of flutes

(2) Key flat size

ONETAP

TPG UNC (HSS)

HSS Machine Taps for Unified Coarse Threads for a Wide Range of Materials



HSS-E 2B M

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	●	●	●

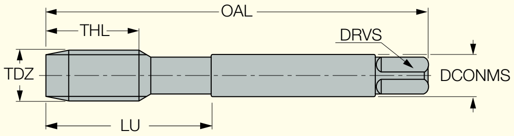
- For user guide and cutting conditions, see pages 784-785, 798-820

(1) Threads per inch
(2) Number of flutes
(3) Key flat size

ONETAP

TPG UNF (HSS)

HSS Machine Taps for Unified Fine Threads for a Wide Range of Materials



HSS-E 2B M

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	●	●	●

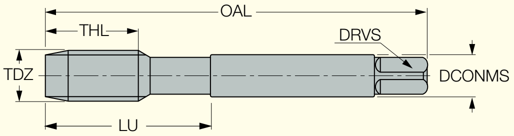
- For user guide and cutting conditions, see pages 784-785, 798-820

(1) Threads per inch
(2) Number of flutes
(3) Key flat size

ONETAP

TPS M (HSS)

DIN 13 HSS Spiral Flute Machine Taps for Metric Coarse Threads for a Wide Range of Materials



M | HSS-E | 6H

	Dimensions											Tough ↔ Hard		
Designation	TDZ	TP	OAL	THL	LU	DCONMS	NOF(1)	DRVS(2)	Pre-hole	Standard	💧	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	N	●	●	●
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	N	●	●	●
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	N	●	●	●
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	N	●	●	●
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	N	●	●	●
TPS M-3X0.5-M	M3	0.500	56.00	6.0	18.0	3.50	3	2.70	2.50	DIN 371	N	●	●	●
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	N	●	●	●
TPS M-4X0.7-M	M4	0.700	63.00	7.0	21.0	4.50	3	3.40	3.30	DIN 371	N	●	●	●
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	N	●	●	●
TPS M-5X0.8-M	M5	0.800	70.00	8.0	25.0	6.00	3	4.90	4.20	DIN 371	N	●	●	●
TPS M-6X1.0-M	M6	1.000	80.00	10.0	30.0	6.00	3	4.90	5.00	DIN 371	N	●	●	●
TPS M-7X1.0-M	M7	1.000	80.00	10.0	30.0	7.00	3	5.50	6.00	DIN 371	N	●	●	●
TPS M-8X1.25-M	M8	1.250	90.00	13.0	35.0	8.00	3	6.20	6.80	DIN 371	N	●	●	●
TPS M-9X1.25-M	M9	1.250	90.00	13.0	35.0	9.00	3	7.00	7.80	DIN 371	N	●	●	●
TPS M-10X1.5-M	M10	1.500	100.00	15.0	39.0	10.00	3	8.00	8.50	DIN 371	N	●	●	●
TPS M-11X1.5-M	M11	1.500	100.00	17.0	-	8.00	3	6.20	9.50	DIN 376	N	●	●	●
TPS M-12X1.75-M	M12	1.750	110.00	18.0	-	9.00	3	7.00	10.20	DIN 376	N	●	●	●
TPS M-14X2.0-M	M14	2.000	110.00	20.0	-	11.00	3	9.00	12.00	DIN 376	N	●	●	●
TPS M-16X2.0-M	M16	2.000	110.00	20.0	-	12.00	3	9.00	14.00	DIN 376	N	●	●	●
TPS M-16X2.0-M-B	M16	2.000	110.00	20.0	-	12.00	3	9.00	14.00	DIN 376	Y	●		
TPS M-18X2.5-M	M18	2.500	125.00	25.0	-	14.00	4	11.00	15.50	DIN 376	N	●	●	●
TPS M-18X2.5-M-B	M18	2.500	125.00	25.0	-	14.00	4	11.00	15.50	DIN 376	Y	●		
TPS M-20X2.5-M	M20	2.500	140.00	25.0	-	16.00	4	12.00	17.50	DIN 376	N	●	●	●
TPS M-20X2.5-M-B	M20	2.500	140.00	25.0	-	16.00	4	12.00	17.50	DIN 376	Y	●		
TPS M-22X2.5-M	M22	2.500	140.00	25.0	-	18.00	4	14.50	19.50	DIN 376	N	●	●	●
TPS M-22X2.5-M-B	M22	2.500	140.00	25.0	-	18.00	4	14.50	19.50	DIN 376	Y	●		
TPS M-24X3.0-M	M24	3.000	160.00	30.0	-	18.00	4	14.50	21.00	DIN 376	N	●	●	●
TPS M-24X3.0-M-B	M24	3.000	160.00	30.0	-	18.00	4	14.50	21.00	DIN 376	Y	●		
TPS M-27X3.0-M	M27	3.000	160.00	30.0	-	20.00	4	16.00	24.00	DIN 376	N	●	●	●
TPS M-30X3.5-M	M30	3.500	180.00	35.0	-	22.00	4	18.00	26.50	DIN 376	N	●	●	●
TPS M-30X3.5-M-B	M30	3.500	180.00	35.0	-	22.00	4	18.00	26.50	DIN 376	Y	●		

- For user guide and cutting conditions, see pages 784-785, 798-820

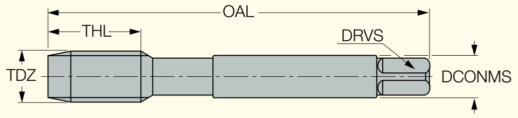
(1) Number of flutes

(2) Key flat size

ONETAP

TPS MF (HSS)

DIN 13 HSS Spiral Flute Machine Taps for Metric Fine Threads for a Wide Range of Materials



M | HSS-E | 6H

	Dimensions									Tough ↔ Hard		
Designation	TDZ	TP	OAL	THL	DCONMS	NOF[1]	DRVS[2]	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 784-785, 798-820

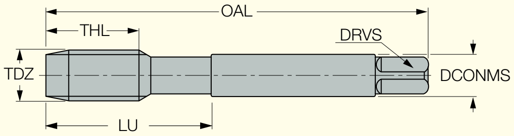
(1) Number of flutes

(2) Key flat size

ONETAP

TPS UNC (HSS)

HSS Spiral Flute Machine Taps for Unified Coarse Threads for a Wide Range of Materials



M
HSS-E
2B

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 784-785, 798-820

(1) Threads per inch

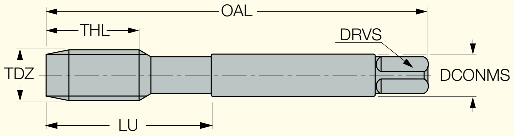
(2) Number of flutes

(3) Key flat size

ONETAP

TPS UNF (HSS)

HSS Spiral Flute Machine Taps for Unified Fine Threads for a Wide Range of Materials



M
HSS-E
2B

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 784-785, 798-820

(1) Threads per inch

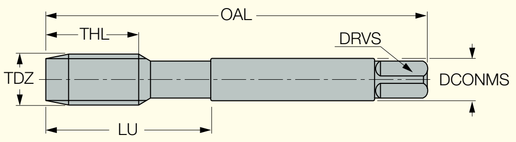
(2) Number of flutes

(3) Key flat size

HSSTAPS

TPG M-S (HSS)

HSS Gun Point Machine Taps According to DIN 13 for ISO Metric Coarse Threads on Steel with Good Machinability



HSS-E | 6HX | S | B

	Dimensions									
Designation	TDZ	TP	OAL	THL	LU	DCONMS	NOF(1)	DRVS(2)	Pre-hole	HEST
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-9X1.25-S	M9	1.250	90.00	20.0	35.0	9.00	3	7.00	7.80	●
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 784-785, 798-820

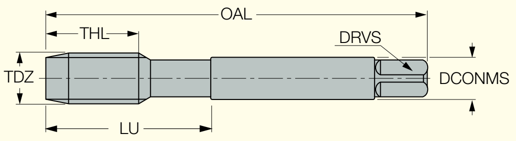
(1) Number of flutes

(2) Key flat size

HSSTAPS

TPG M-H (HSS)

DIN 13 HSS Gun Point Machine Taps for ISO Metric Coarse Threads for Hardened Steel and H.T.A.



HSS-E | 6H | H | B

	Dimensions									
Designation	TDZ	TP	OAL	THL	LU	DCONMS	NOF(1)	DRVS(2)	Pre-hole	HE
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-9X1.25-H	M9	1.250	90.00	20.0	35.0	9.00	3	7.00	7.80	●
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 784-785, 798-820

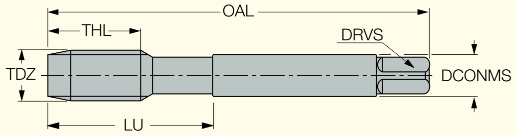
(1) Number of flutes

(2) Key flat size

HSSTAPS

TPS M-N (HSS)

DIN 13 HSS R.H. 40° Spiral Flute Machine Taps for ISO Metric Coarse Threads for Low Alloyed Steel



N | HSS-E | 6H

	Dimensions											
Designation	TDZ	TP	OAL	THL	LU	DCONMS	NOF(2)	DRVS(3)	Pre-hole	FHA	Standard	HEST
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-2.6X0.45-N (1)	M2.6	0.450	50.00	9.0	-	2.80	3	2.10	2.10	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 784-785, 798-820

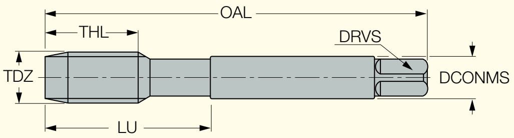
(1) DIN profile

(2) Number of flutes

(3) Key flat size

TPS M-H (HSS)

DIN 13 HSS Right-Hand 40° Spiral Flute Machine Taps for ISO Metric Coarse Threads for H.T.A.



H | HSS-E | 6H

Designation	Dimensions										
	TDZ	TP	OAL	THL	LU	DCONMS	NOF(2)	DRVS(3)	Pre-hole	FHA	HEST
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-2.3X0.4-H (1)	M2.3	0.400	45.00	8.0	-	2.80	3	2.10	1.90	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 784-785, 798-820

(1) DIN profile

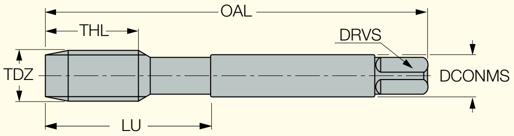
(2) Number of flutes

(3) Key flat size

HSSTAPS

TPST M-G (HSS)

DIN 13 HSS Straight Flute
Machine Taps for ISO Metric
Coarse Threads for Grey Cast Iron



G | HSS-E | 6HX

Designation	TDZ	TP	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	Pre-hole	HENI
	Dimensions									
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-7X1.0-G	M7	1.000	80.00	17.0	30.0	7.00	4	5.50	6.00	●
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	●

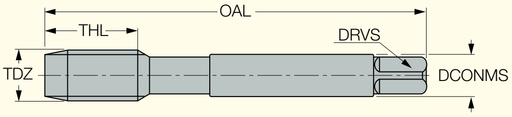
- For user guide and cutting conditions, see pages 784-785, 798-820

[1] DIN profile
[2] Number of flutes
[3] Key flat size

HSSTAPS

TPST MF-G (HSS)

DIN 13 HSS Straight Flute
Machine Taps for ISO Metric
Fine Threads for Grey Cast Iron



G | HSS-E | 6HX

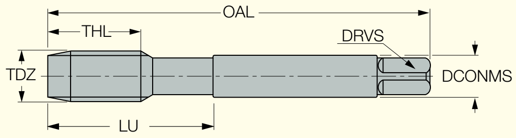
Designation	TDZ	TP	OAL	THL	DCONMS	NOF[1]	DRVS[2]	Pre-hole	HENI
	Dimensions								
TPST MF-10X1.0-G	M10	1.000	90.00	18.0	7.00	3	5.50	9.00	●
TPST MF-10X1.25-G	M10	1.250	100.00	22.0	7.00	3	5.50	8.80	●
TPST MF-12X1.25-G	M12	1.250	100.00	22.0	9.00	3	7.00	10.80	●
TPST MF-14X1.5-G	M14	1.500	100.00	22.0	11.00	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 784-785, 798-820

[1] Number of flutes
[2] Key flat size

TPF M-F (HSS)

DIN 13 HSS Cold Forming Machine Taps for ISO Metric Coarse Threads



F
HSS-E
6HX
60°
P
C
TI

Designation	Dimensions										HETI
	TDZ	TP	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	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-2.6X0.45-F (1)	M2.6	0.450	50.00	9.0	-	2.80	5	2.10	2.40	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 784-785, 798-820

(1) DIN profile

[2] Number of flutes

[3] Key flat size

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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 Fe_3O_4 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 ≥ **600**m/min. The 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.

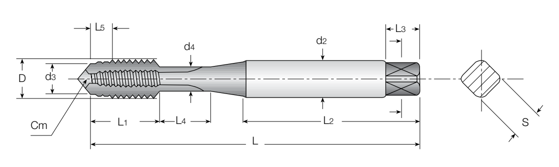
Application class for taps to DIN EN 22857		Tolerance class to withdrawn standard DIN 802 part 1	Allotment of the tolerance zones of the nut thread to be cut				
Class 1	ISO 1	4H	4H	5H	-	-	-
Class 2	ISO 2	6H	5G	5G	6H	-	-
Class 3	ISO 3	6G	-	-	6G	7H	8H
-	-	7G	-	-	-	7G	8G

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.

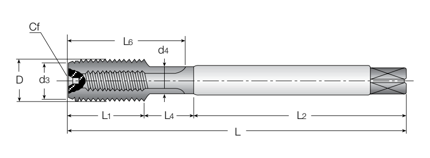
Tap Nomenclature and Standards

DIN 371



D	Major diameter
d2	Shank diameter
d3	Chamfer diameter
d4	Neck diameter

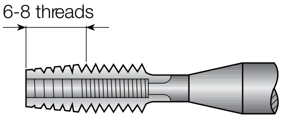
DIN 376



L	Total length
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

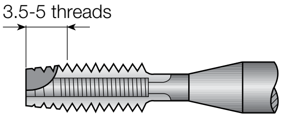
Chamfer Lead Forms According to DIN 2197

A



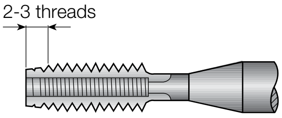
Form A
Long, 6-8 threads for short through holes.

B



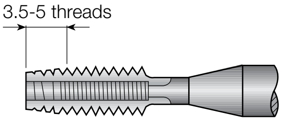
Form B
Medium, 3.5-5 threads, with spiral point for all through holes and deep tapping holes.

C



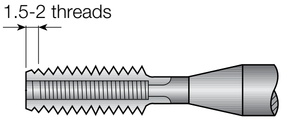
Form C
Long, 2-3 threads for blind holes and generally for aluminum grey cast iron and brass.

D



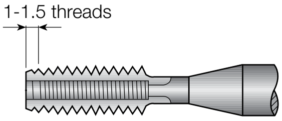
Form D
Medium, 3.5-5 threads for through and blind holes with sufficient runout.

E



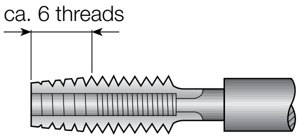
Form E
Extremely short, 1.5-2 threads for blind holes with little runout depth. Avoid use if possible.

F

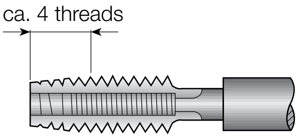


Form F
Extremely short, 1-1.5 threads for blind holes with little runout depth. Avoid use if possible.

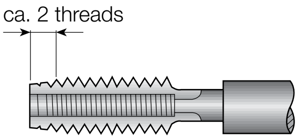
Chamfer Lead Length for Sets of 3 Hand Taps



First taper tap



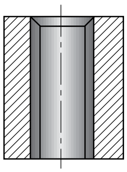
Second tap



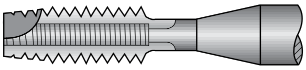
Bottoming tap

Tap Styles for Hole Types

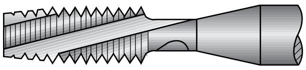
Recommendation of Application



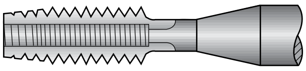
Through hole



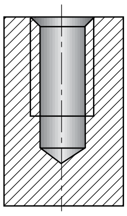
1. Straight fluted tap
   with spiral point



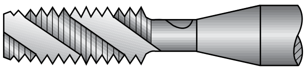
2. Left-hand spiral fluted tap



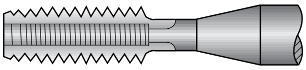
3. Straight fluted tap
   with long chamfer lead



Blind hole



1. Right-hand spiral fluted tap

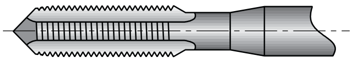


2. Straight fluted tap
   with short chamfer lead

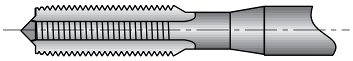
Front and End Configurations According to DIN2197

Front End

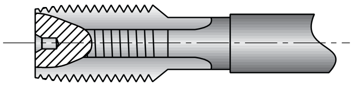
1 External Center



2 Stepped External Center

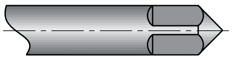


3 Internal Center

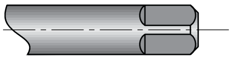


Shank End

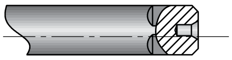
4 External Center



5 Chamfer



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

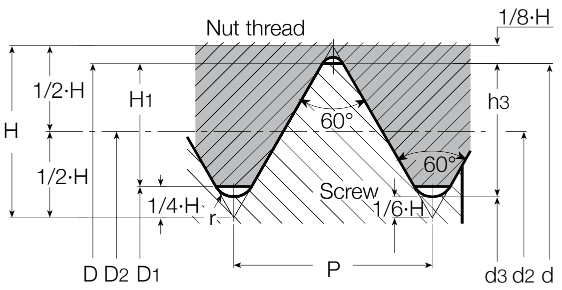
Pre-Tapping Hole Sizes - General Taps

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

$$H = 0.86603P$$

$$H_1 = \frac{5}{8}H = 0.54127P$$

$$h_3 = \frac{17}{24}H = 0.61343P$$

$$d_2 = D_2 = d\text{-}\frac{3}{4}H = d\text{-}0.64952P$$

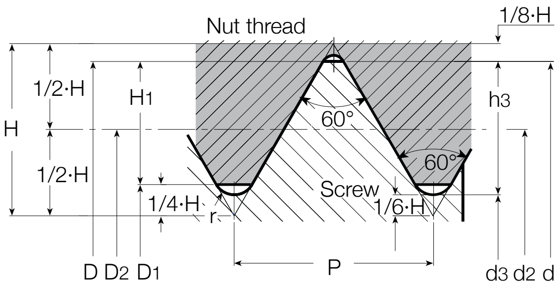
$$d_3 = d\text{-}2h_3 = d\text{-}1.22687P$$

$$r = \frac{H}{6} = 0.14434P$$

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

$H = 0.86603P$

$H_1 = \frac{5}{8}H = 0.54127P$

$h_3 = \frac{17}{24}H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4}H = d - 0.64952P$

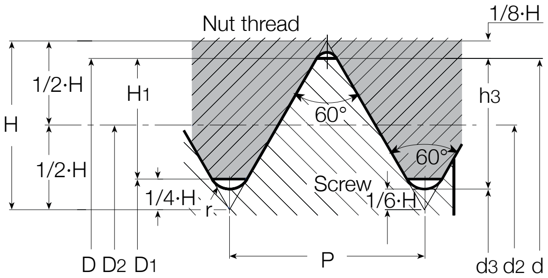
$d_3 = d - 2h_3 = d - 1.22687P$

$r = \frac{H}{6} = 0.14434P$

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

$H = 0.86603P$

$H_1 = \frac{5}{8}H = 0.54127P$

$h_3 = \frac{17}{24}H = 0.61343P$

$d_2 = D_2 = d-\frac{3}{4}H = d-0.64952P$

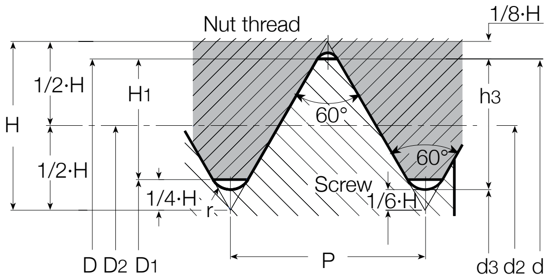
$d_3 = d-2h_3 = d-1.22687P$

$r = \frac{H}{6} = 0.14434P$

Nominal Dia. d=D	Pitch	Flank Dia. d2=D2	Minor Diameter		Thread Depth		Radius	Flank Dia. Tap Tolerance 6H d2		Flank Dia. Tap Tolerance 6H	
	P		Screw d3	Nut D1	Screw h3	Nut H1	r	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

$H = 0.86603P$

$H_1 = \frac{5}{8}H = 0.54127P$

$h_3 = \frac{17}{24}H = 0.61343P$

$d_2 = D_2 = d-\frac{3}{4}H = d-0.64952P$

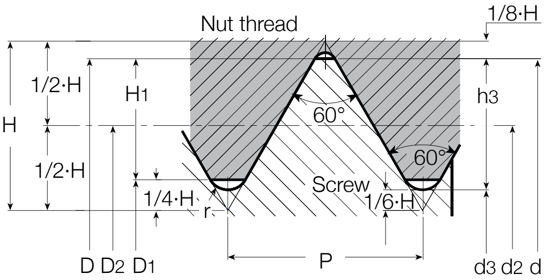
$d_3 = d-2h_3 = d-1.22687P$

$r = \frac{H}{6} = 0.14434P$

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

$H = 0.86603P$

$H_1 = \frac{5}{8}H = 0.54127P$

$h_3 = \frac{17}{24}H = 0.61343P$

$d_2 = D_2 = d-\frac{3}{4}H = d-0.64952P$

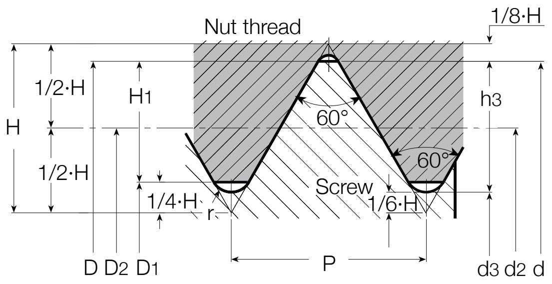
$d_3 = d-2h_3 = d-1.22687P$

$r = \frac{H}{6} = 0.14434P$

Nominal Dia.	T.P.I	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

$H = 0.86603P$

$H_1 = \frac{5}{8}H = 0.54127P$

$h_3 = \frac{17}{24}H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4}H = d - 0.64952P$

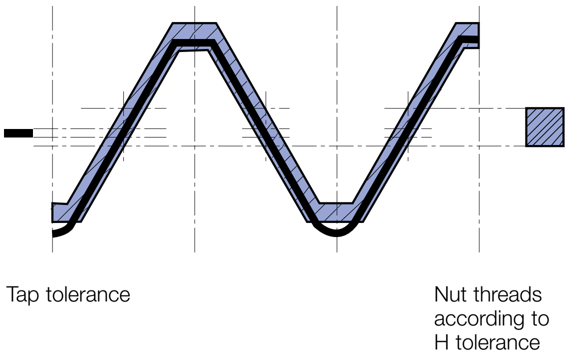
$d_3 = d - 2h_3 = d - 1.22687P$

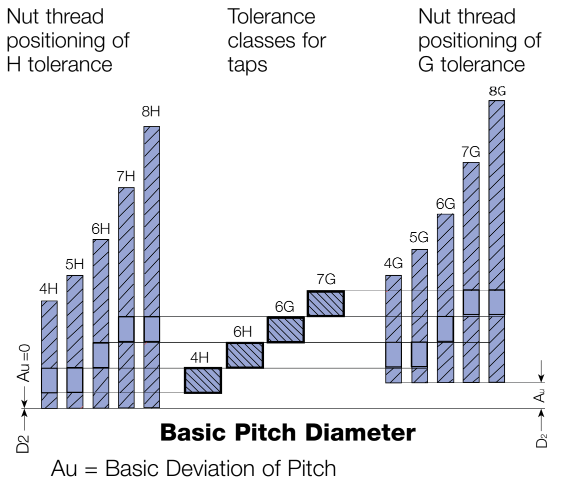
$r = \frac{H}{6} = 0.14434P$

Nominal Dia.	T.P.I	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.





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 784.

Pre-Tapping Holes

Check that the holes are within the prescribed size range depending on the application (see table on page 802) 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

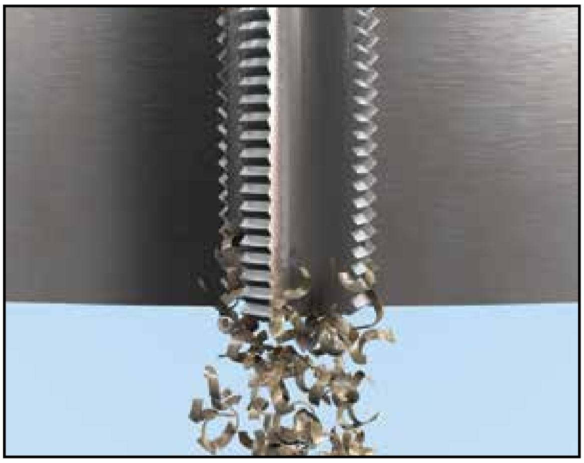
The tapping speed has a great influence on chip flow and the life of the tap.
It is worthwhile to establish the ideal speed by tapping trials.
For recommended initial values, see table on page 784. In addition, the following should be taken into consideration: characteristics of the material, machine and clamping method.

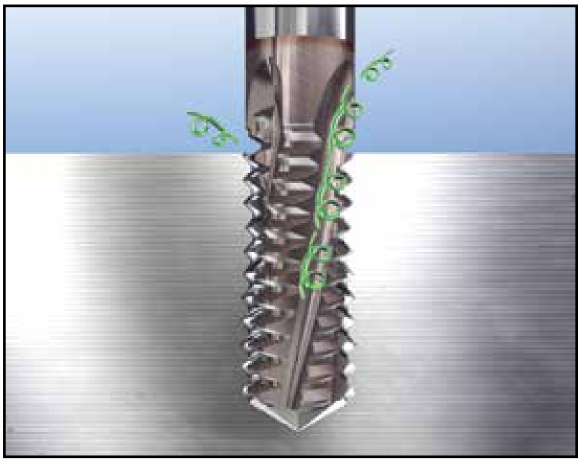
Effects of Unsuitable Tapping Speed

- 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 the use of a tapping spindle. (**ISCAR GTI**, **GTIN** collets, see pages 819-820)

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

Problem	Cause	Solution
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

Problem	Cause	Solution
Bell mouthed tapped hole	Incorrect starting pressure	Use a tapping spindle with axial float (GTI/GTIN)

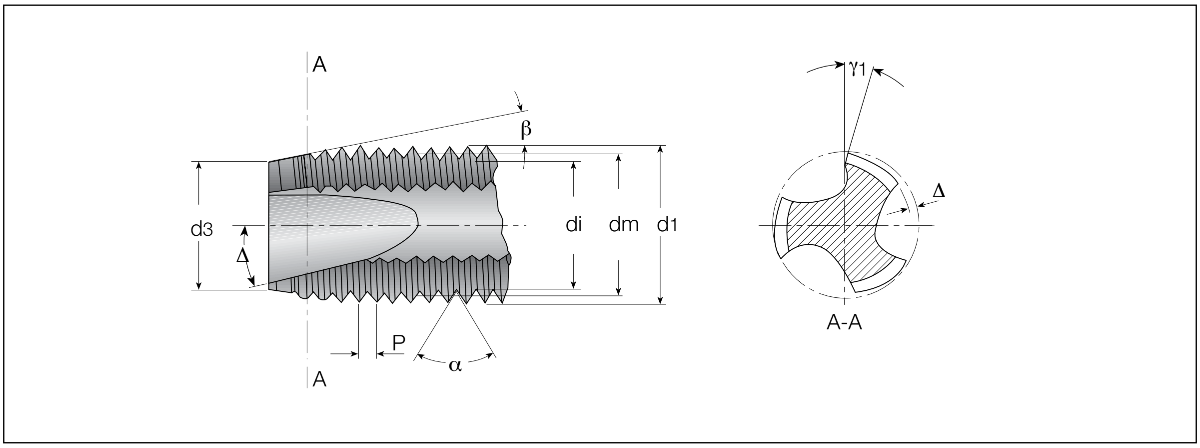
Problem	Cause	Solution
Unsatisfactory thread surface finish	Incorrect tap (cutting geometry unsuitable for application)	Select tap for the relevant material group
	The tap is blunt	Replace or regrind tap
	Tap badly re-ground	Regrind tap. Check that cutting geometry is suitable for material
	Incorrect lubricant, concentration or quantity	Ensure the use of a suitable coolant and an ample supply

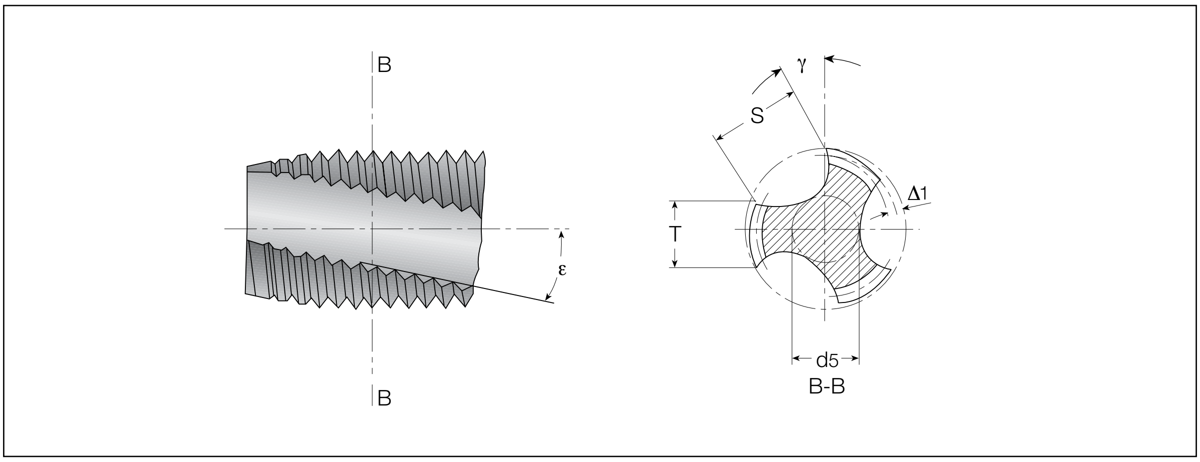
Problem	Cause	Solution
Partial chipping of tap	Swarf jamming	Check cutting speed. Use alternative tap
	Tap has jammed against bottom of pre-hole	Check hole and thread depths. Drill a deeper pre-hole
	Tap incorrectly reground (lead-in diameter too short, therefore too few cutting teeth)	Ensure that correct dimensions are maintained when regrinding
	Irregular workpiece material structure	Adjust cutting speed. Improve lubricant quality of coolant

Problem	Cause	Solution
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

Problem	Cause	Solution
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 802-803

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:
a) regrinding of relieved chamfer
b) regrinding of flutes (see picture 1)

Regrinding of Relieved Chamfer
It is recommended that the resharpening should 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 the 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)

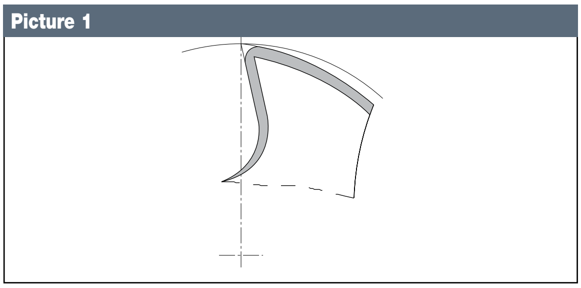
Example:
Tap 10 X 1,5 to cut on steel strength = 600 N/mm^2
d1 = 10 mm ; ϒ = 15° **;** sin (ϒ) = 0,25882**;**

$X = \frac{0.25885x10}{2}$; X=1.29 mm

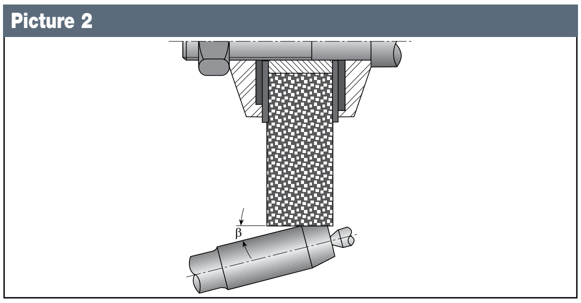
On all taps with spiral flutes, it is possible to find the pitch of the spiral in reference to the lead screw necessary for resharpening. In case of using taps equipped with a deburring tool, it is necessary to extend the flutes according to the supplier's recommendation. As the wear on a tap is mainly 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.

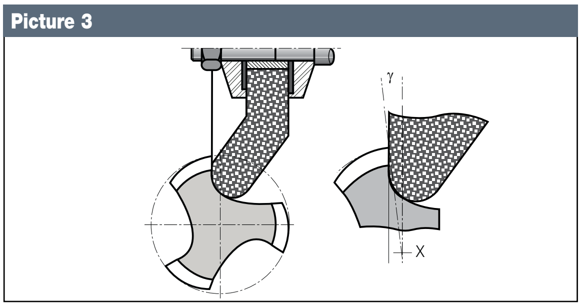
Picture 1



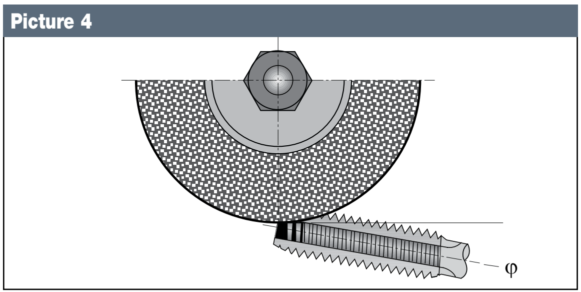
Picture 2



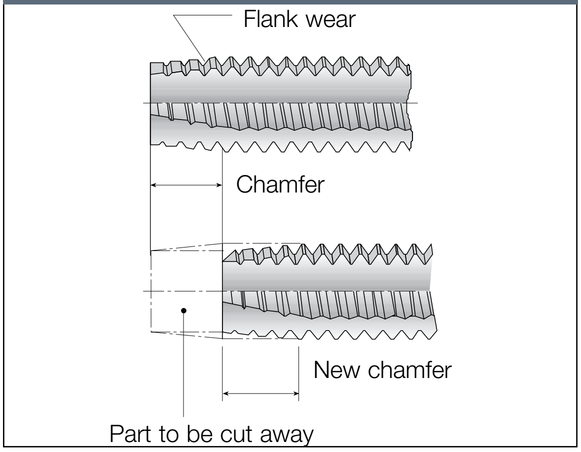
Picture 3



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 manner that it becomes grossly out of tolerance.

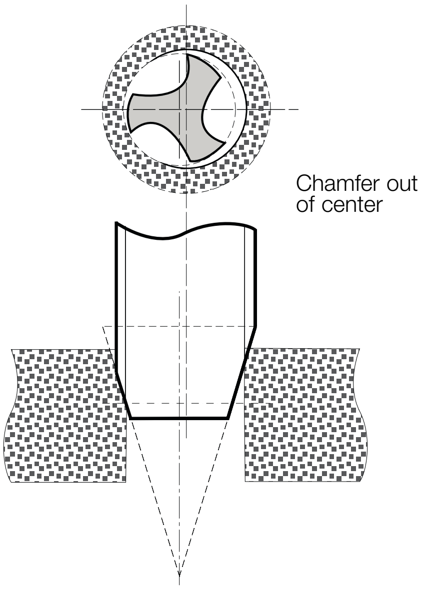
Taps for Aluminun
After regrinding it is advisable to remove the steel burrs with a wire brush.

Tap Inspection
It is important to inspect the tap after regrinding to ensure that all of the dimensions and angles have remained according to the specifications.

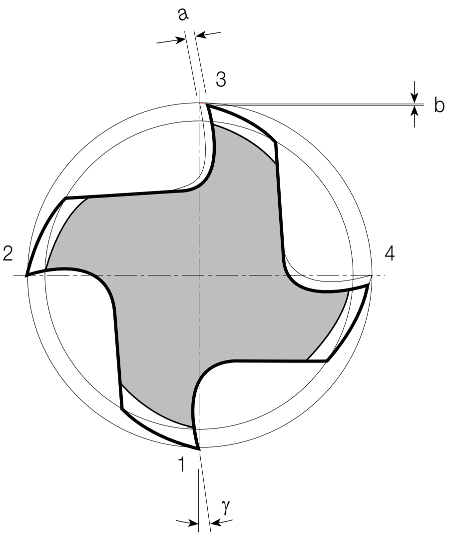
Controls (tests)
Once the tap is resharpened, it is always best to test it to correctly obtain the same threads as when the tap was new.

- 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 ____________________
Address ____________________
____

Department ____________________
Phone ____________________

Tool

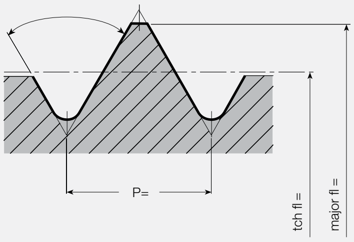
Description of the tap being used at present
Thread diameter and pitch __________
☐ Right-hand cutting
☐ Fluteless
☐ Straight flutes
☐ Spiral point

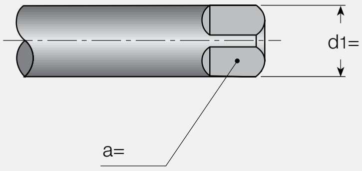
Make __________ Type __________
Class of tolerance
☐ Left-hand cutting __________
☐ Right-hand spiral flutes ______ degrees ______
☐ Left-hand spiral flutes ______ degrees ______
☐ Length of chamfer ______ mm ______

Additional information for special pitches or thread forms

Pitch diameter __________
Minor diameter __________

Major diameter __________
Flank angle __________ degrees ______





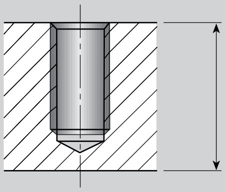
Overall Length __________ mm

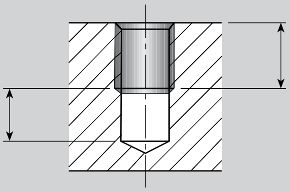
Hole

Tap drill diameter __________
☐ Through hold

Length of hole __________
Depth of full thread __________
☐ 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	☐ none ☐ Emulsion ______ % ☐ Cutting oil ☐ Other ______ ☐ Under pressure ☐ Vaporization ______
Machine	Type ______ ☐ Horizontal Tapping ☐ Vertical Tapping
Driving	☐ Tap revolvers Number of spindles ______ ☐ Workpiece revolvers
Feed	☐ Without ☐ Power ☐ CNC ______ %
Toolholder	☐ Rigid ☐ Floating ☐ 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 ☐ Short ☐ Long ☐ Annealed steel ☐ Hardened steel ☐ Heat treated steel

More details: ____________

____

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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.

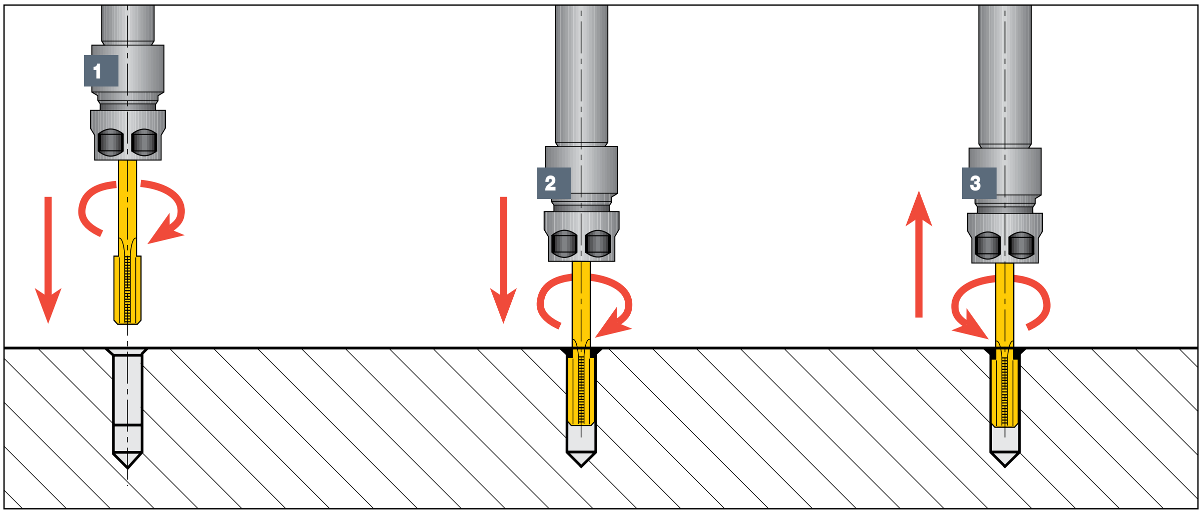
Advantages:

- 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.

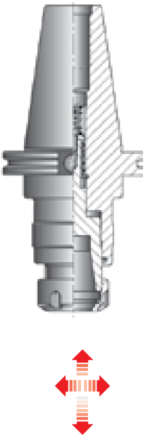
Application:
Axial float/tension/compression type for CNC milling machines and lathes with reversing motors and rigid tapping.

Features:

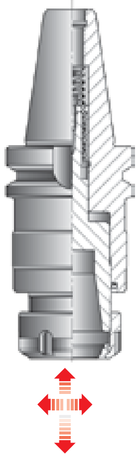
- Compensates for machine feed and tap pitch variance
- Floating mechanism compensates for misalignment between tap and workpiece
- Right- and left-hand tapping

Advantages:

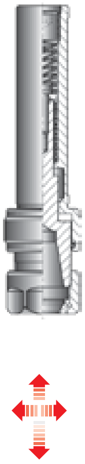
- Practical and efficient tap holding by the **ER** spring collet without using jaw drive
- Compact design for minimal clearance applications
- Heavy duty design for high torque drive ensures the same accuracy as the tap itself



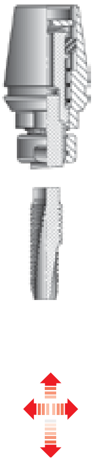
CAT ANSI B5.50



BT MAS-403



Straight Shank



GTIN

ITS BORE


ETM
RE MB63-MB50x40
ITS-BORE
ETM
BHE MB50-50x80
ø2.5-110
0.5 ø
0.01 ø
Non. 0.002 ø
LOCK
+△
ETM
BHEH 24x75
CW 32
ITS-BORE
ITS-BORE
ITS-BORE

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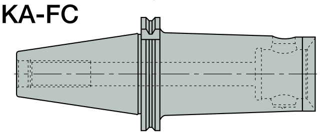
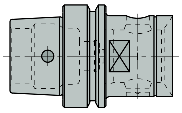
The ITS BORE System

Shanks

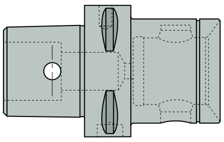
SKA/SKB
SKA-FC Page 829



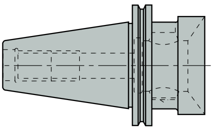
HSK Pages 830-831



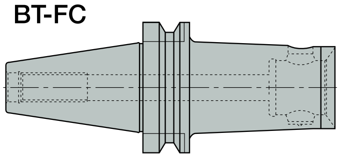
CAMFIX Page 831



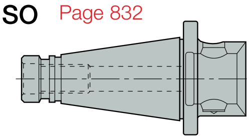
CATM Page 830



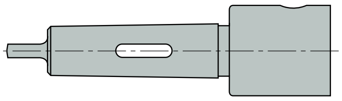
BT/BTB
BT-FC Pages 831-832



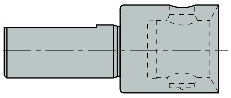
IS0M/ISO Page 832



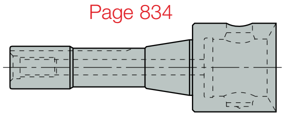
MTT/MTD Page 834



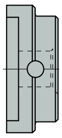
ST Pages 833-834



R-8 Page 834

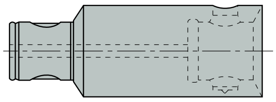


DIN2079 Page 835

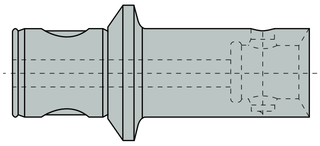


Extensions and Reducers

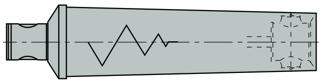
EX Page 835



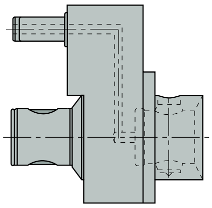
RE Page 836



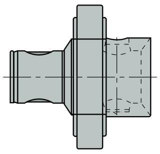
RE AVI Page 836



CHS Page 837

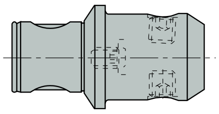


CHR Page 837

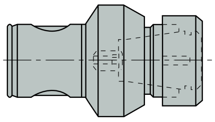


Toolholders

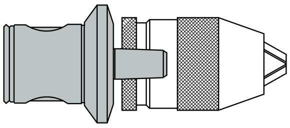
EMH Page 837



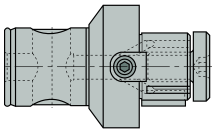
CC Page 838



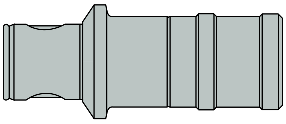
DC Page 838



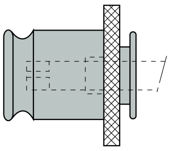
SMH /STUB Pages 839-840



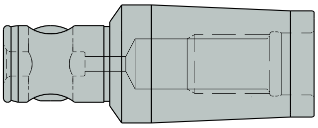
TP Page 840



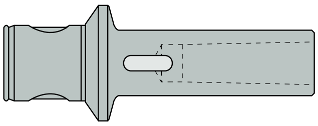
TCS/TCC Pages 840-841



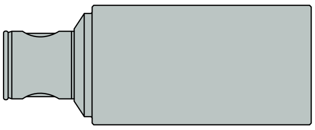
ODP Pages 957,986,1001, 1030,1048



AMT Page 841



BLANK Page 842

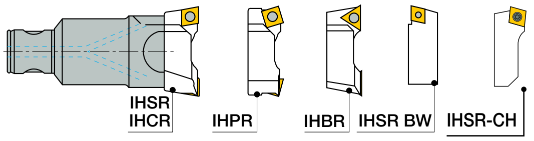


The ITS BORE System

Rough Boring Heads

BHR MB 16, 20, 25, 32, 40, 50, 63, 80

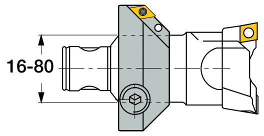
(Ø18-200)



Page 843

CHA 16,20,25,32,40,50,63,80

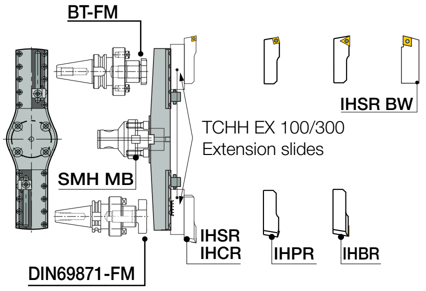
(Ø18-165)
45° Chamfering



Page 846

TCH AL 200,300,400,500,600,700,800

(Ø200-1200)

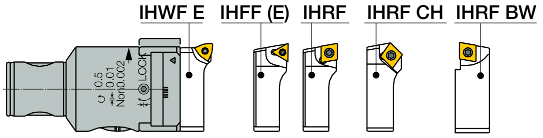


Page 847

Fine Boring Heads (10 μm)

BHE MB 14, 16, 20, 25, 32, 40

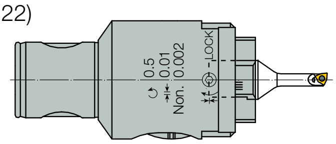
(Ø14.5-66)



Page 857

BHE MB-H 32, 50

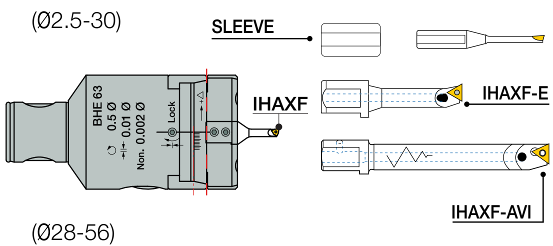
(Ø2.5-22)



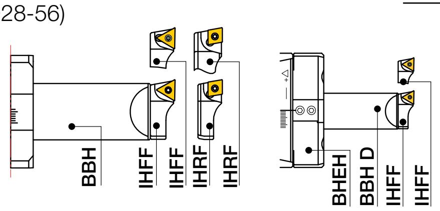
Page 857

BHE MB 50, 63, 80

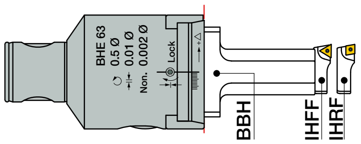
(Ø2.5-30)



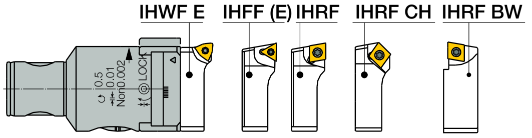
(Ø28-56)



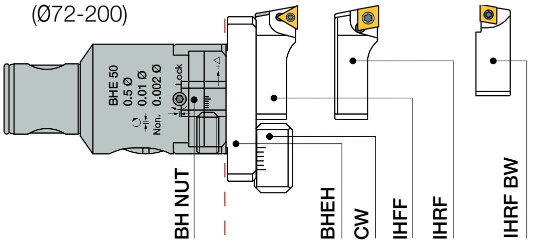
(Ø40-90)



(Ø54-132)



(Ø72-200)

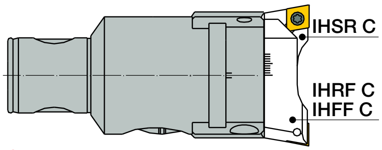


Pages 857-861

Rough & Fine Boring Heads

BHC MB 25, 32, 40, 50, 63, 80

(Ø28-120)



Page 850

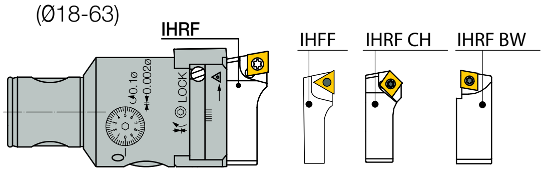
2 µm

The ITS BORE System

Fine Boring Heads (2 µm)

BHF MB 16, 20, 25, 32, 40

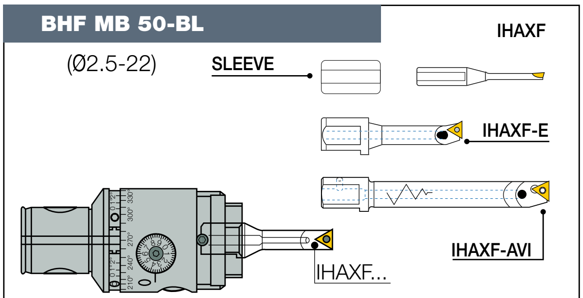
(Ø18-63)



Page 864

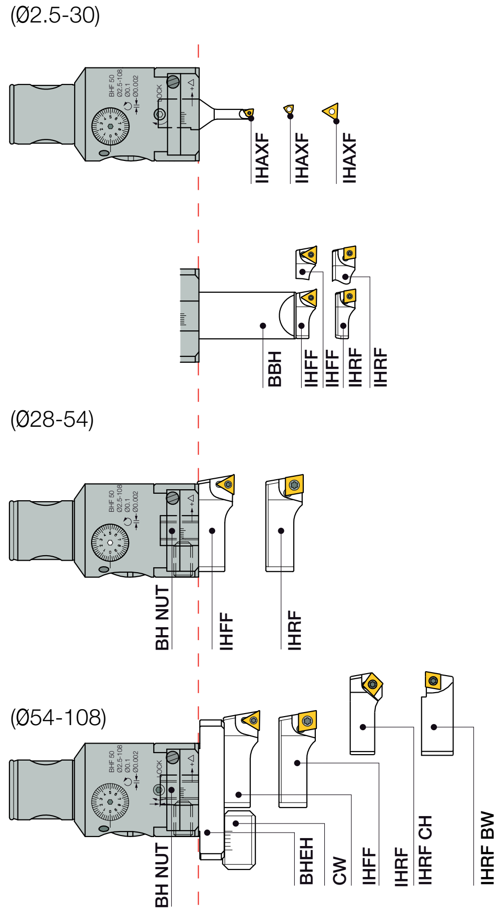
BHF MB 50-BL

(Ø2.5-22)



Pages 862-863, 866

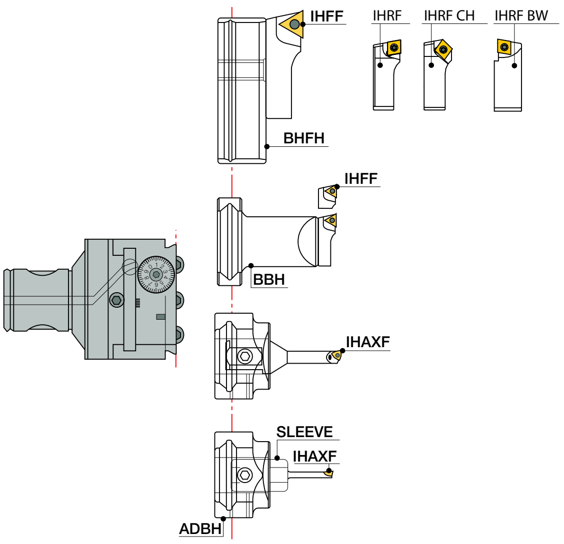
BHF MB 50-50X60



Pages 864, 867

BHF MB 50, 63, 80

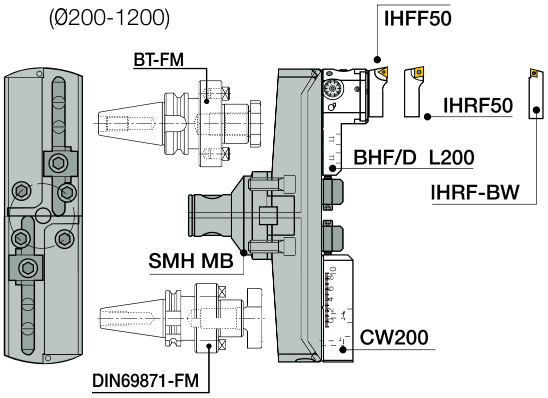
(Ø77-500)



Pages 868-870,871

TCH AL 200,300,400,500,600,700,800

(Ø200-1200)



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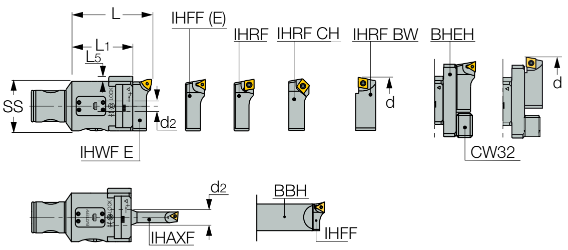
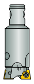
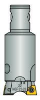
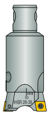
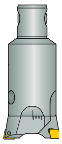
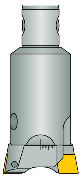
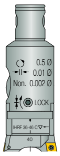
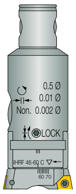
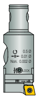
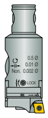
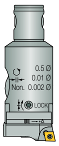
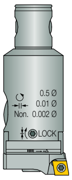
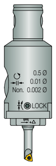
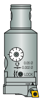
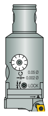
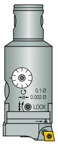
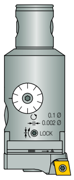
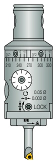
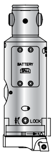
BHD 50,63,80

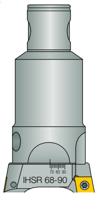
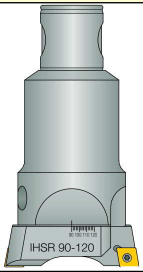
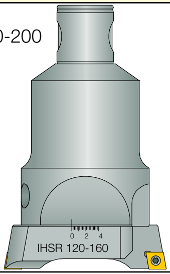
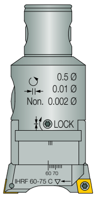
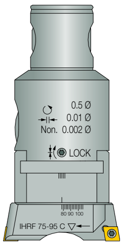
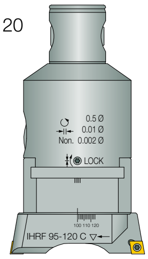
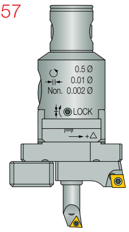
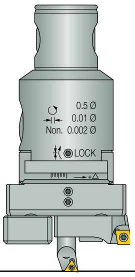
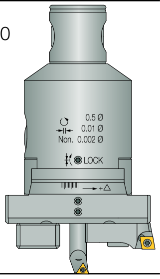
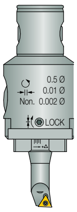
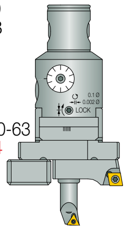
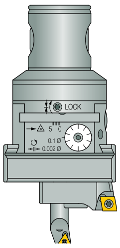
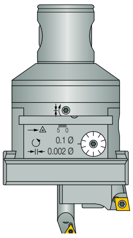
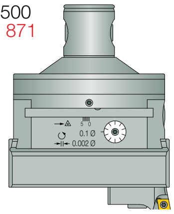
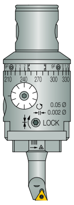
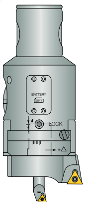
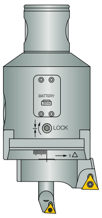
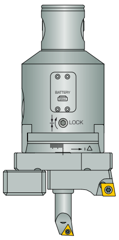


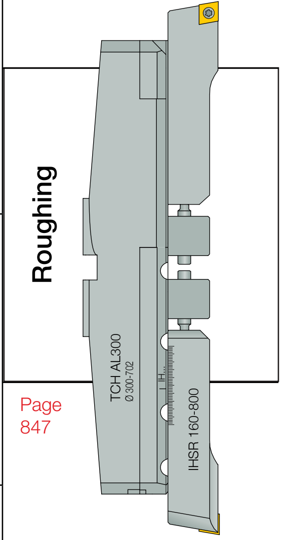
Pages 853-856

ITS BORE Boring Heads Selection Guide

MB Size		14	16	20	25	32	40
Rough	**BHR-TCH** **Ø18-1202**		BHR MB16-16 Ø18-22 Page 843 	BHR MB20-20 Ø22-28 Page 843 	BHR MB25-25 Ø28-38 Page 843 	BHR MB32-32Ø35.5-50 Page 843 	BHR MB40-40 Ø50-68 Page 843 
Rough + Finish	**BHC** **Ø28-120** **10 µm**				BHC MB25-25 Ø28-36 Page 850 	BHC MB32-32 Ø36-46 Page 850 	BHC MB40-40 Ø46-60 Page 850 
Finish	**BHE** **Ø6-200** **10 µm**	BHE MB14-14 Ø14.5-18 Page 857 	BHE MB16-16 Ø18-24 Page 857 	BHE MB20-20 Ø22-30 Page 857 	BHE MB25-25 Ø28-40 Page 857 	BHE MB32-32 Ø35-53 Page 857 	BHE MB40-40 Ø48-66 Page 857 
	BHE H **Ø2.5-22** **10 µm**					BHE MB32-32...H Ø2.5-18 Page 857 	
	BHF **Ø2.5-1202** **2 µm**		BHF MB16-16 Ø18-23 Page 864 	BHF MB20-20 Ø22-29 Page 864 	BHF MB25-25 Ø28-38 Page 864 	BHF MB32-32 Ø35.5-50 Page 864 	BHF MB40-40 Ø48-63 Page 864 
	BHF BL **Ø2.5-22** **2 µm**					BHF MB50-32...BL Ø2.5-12 Page 862 	
	BHD MB **Ø2-1202** **2 µm**					BHD MB32-32-83 Ø35-51 Page 853 	BHD MB40-40-90 Ø48-64 Page 853 

ITS BORE Boring Heads Selection Guide

50	63	80
BHR MB50-50 Ø68-90 BHR MB50-63 Page 843 	BHR MB63-63 Ø90-120 Page 843 	BHR MB80-80 Ø120-200 Page 843 
BHC MB50-50 Ø60-75 Page 850 	BHC MB63-63 Ø75-95 Page 850 	BHC MB80-80 Ø95-120 Page 850 
BHE MB50-50 Ø2.5-110 Page 857 	BHE MB63-63 Ø6-125 Page 857 	BHE MB80-80 Ø6-200 Page 857 
BHE MB50-50...H Ø2.5-22 Page 857 		
BHF MB50-50 Ø2.5-108 BHF MB50-80 Ø2.5-160 BHF MB50-63 Page 864 	BHF MB63-63 Ø2.5-125 Page 871 	BHF MB80-80 Page 871  BHF MB80-125 Ø36-500 Page 871 
BHF MB50-50...BL Ø6-22 Page 862 		
BHD MB50-50X60 Ø2.5-110 Page 853 	BHD MB63-63X89 Ø6-125 Page 853 	BHD MB80-80X104 Ø6-200 Page 853 



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TCH AL200 Ø200-602

TCH AL300 Ø300-702

TCH AL400 Ø400-802

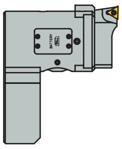
TCH AL500 Ø500-902

TCH AL600 Ø600-1002

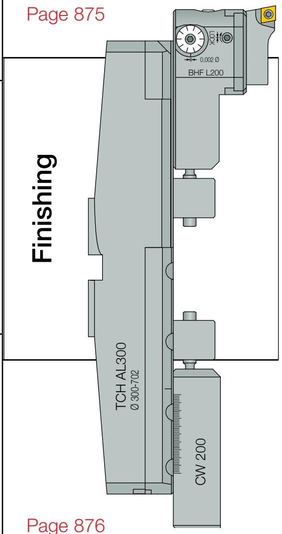
TCH AL700 Ø700-1102

TCH AL800 Ø800-1202

BHD50 L200
Ø200-1202
Page 875



BHF L200
Ø200 -1202
Page 875



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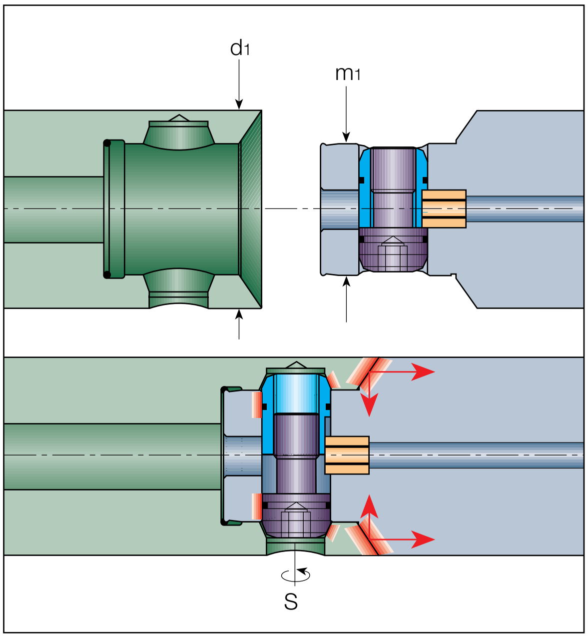
MB Connection



ITS BORE 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

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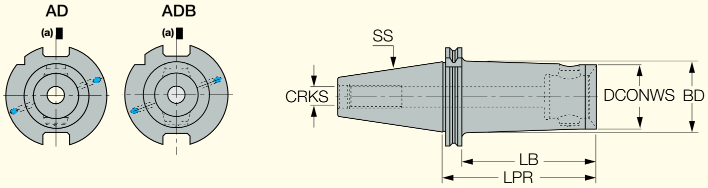
SKA-MB

MB Modular Connection System with DIN69871 Form AD/ADB / ISO7388/1 Taper Shanks



(a)Cutting edge position

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 45-MB63	45	63.00	60.00	41.0	-	M20	2.00	HW 8.0
SKA 45-MB80	45	80.00	66.00	47.0	-	M20	2.31	HW 8.0
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	2.97	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 50-MB110X150	50	110.00	150.00	131.0	-	M24	8.47	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
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

• 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).

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SKA-FC-MB

MB Modular Boring Connection System with DIN 69871 Face Contact ADB Tapered Shanks

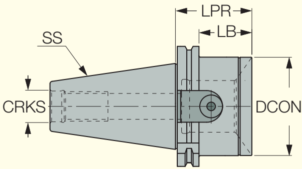


Fig. 1

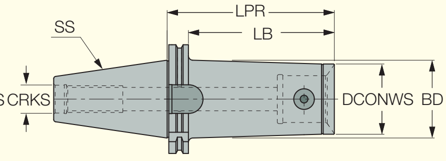
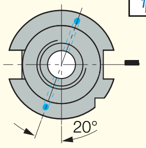


Fig. 2



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

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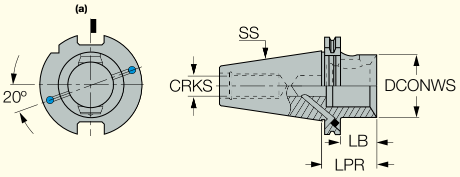
SKB-MB

MB Modular Connection System with DIN69871 Form B (coolant through flange) Taper Shanks



(a)Cutting edge position

Designation	SS	DCONWS	LB	LPR	CRKS	kg	
SKB 40-MB50	40	50.00	29.0	48.00	M16	1.03	HW 6.0
SKB 40-MB63	40	63.00	61.0	80.00	M16	1.56	HW 8.0
SKB 45-MB63	45	63.00	41.0	60.00	M20	2.03	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	3.63	HW 8.0

• Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

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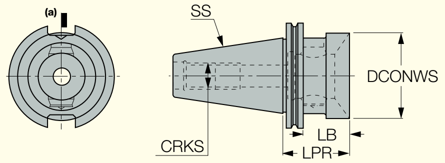
CATM-MB

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 45 MB63	45	63.00	56.0	75.00	M20	2.31	HW 8.0
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.

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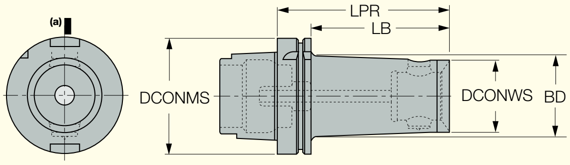
HSK A-MB

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

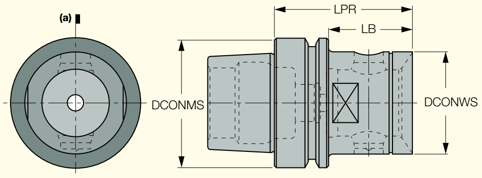
- A cooling tube must be used with all coolant through HSK spindles • Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

* 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.

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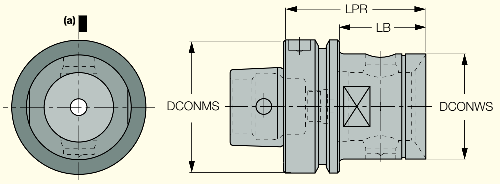
HSK F-MB

MB Modular Connection System with DIN 69893 F Taper Shanks



(a)Cutting edge position

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

Fig 1

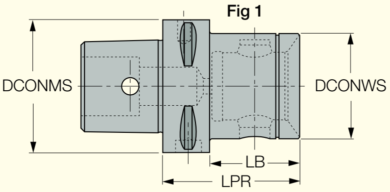
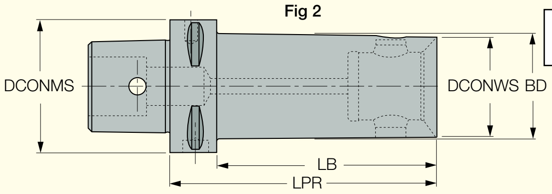


Fig 2



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

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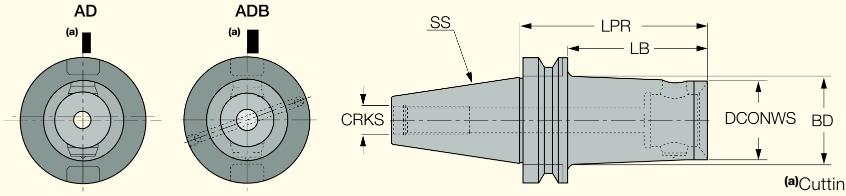
BT-MB

MB Modular Connection System with BT MAS-403 FORM AD/ADB Taper Shanks



(a)Cutting edge position

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	1.34	HW 8.0
BT45 MB50	45	50.00	29.0	62.00	-	M20	2.32	HW 6.0
BT45 MB63	45	63.00	37.0	70.00	-	M20	2.48	HW 8.0
BT45 MB80	45	80.00	37.0	70.00	-	M20	2.63	HW 8.0
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	4.24	HW 8.0
BT50 MB80X180 ADB	50	80.00	142.0	180.00	-	M24	8.19	HW 10.0
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.

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BT-FC-MB

MB Modular Boring System with BT MAS-403 Face Contact ADB Tapered Shanks

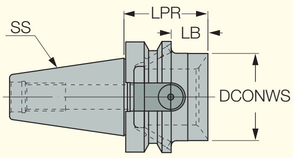

Fig. 1

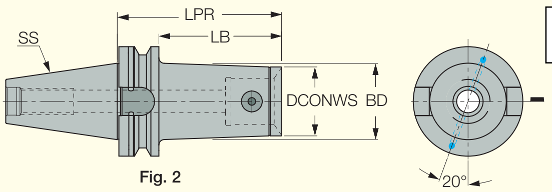

Fig. 2

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

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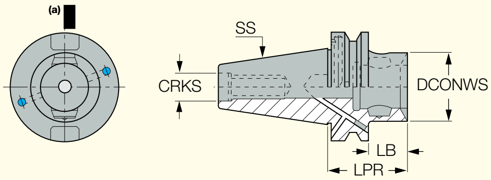
BTB-MB

MB Modular Connection System with BT MAS-403 Type B Taper Shanks



(a)Cutting edge position

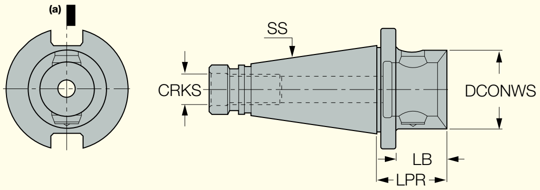
Designation	SS	DCONWS	LB	LPR	CRKS	kg	
BTB40 MB50	40	50	21.0	48.00	M16	0.96	HW 6.0
BTB40 MB63	40	63	-	66.00	M16	1.34	HW 8.0
BTB50 MB50X66	50	50	28.0	66.00	M24	3.89	HW 6.0
BTB50 MB63X75	50	63	37.0	75.00	M24	4.00	HW 8.0
BTB50 MB80	50	80	37.0	75.00	M24	4.30	HW 8.0

- 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

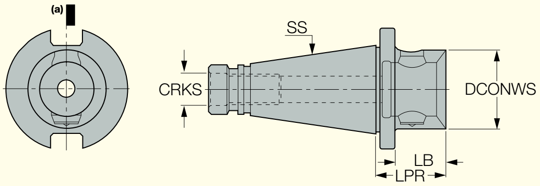
Designation	SS	DCONWS	LB	LPR	CRKS	kg	
ISOM 30-MB50	30	50.00	-	58.00	M12	0.78	HW 6.0
ISOM 40-MB50	40	50.00	36.0	48.00	M16	0.95	HW 6.0
ISOM 40-MB63	40	63.00	-	60.00	M16	1.34	HW 8.0
ISOM 45-MB50	45	50.00	33.0	48.00	M20	1.81	HW 6.0
ISOM 45-MB63	45	63.00	45.0	60.00	M20	1.99	HW 8.0
ISOM 45-MB80	45	80.00	-	66.00	M20	2.37	HW 8.0
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



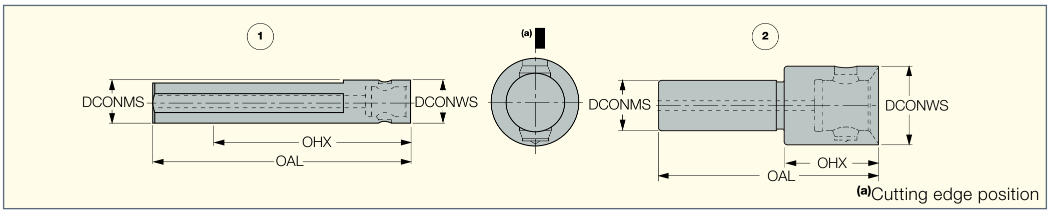
(a)Cutting edge position

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.

ST-MB

MB Modular Connection System
with Straight Cylindrical Shanks



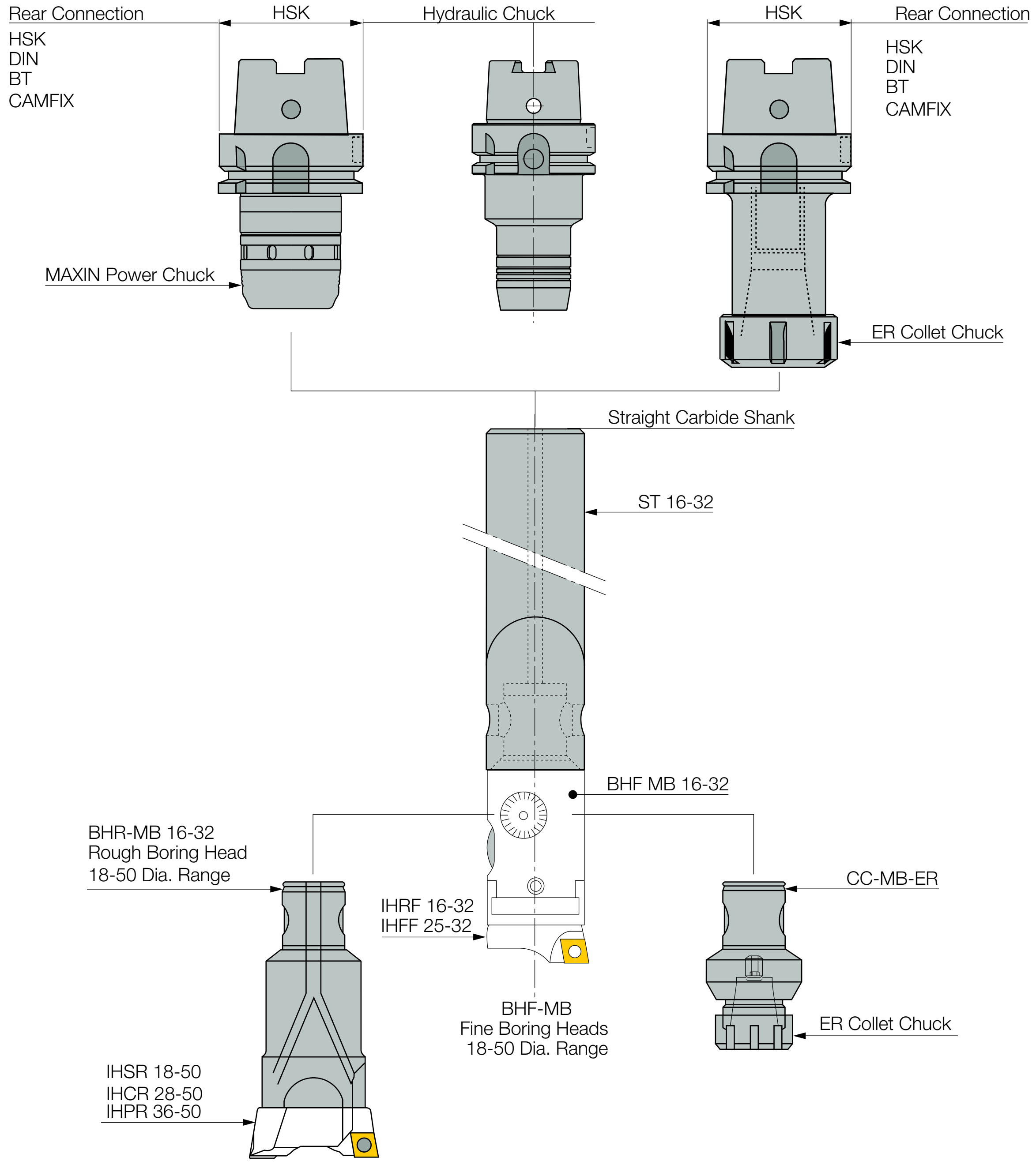
Designation	DCONMS	DCONWS	OAL	OHX(1)	CSP	kg	Fig.	
ST 16-MB16	16.00	16.00	100.00	66.0	1	0.15	1.	HW 2.5
ST 20-MB20	20.00	20.00	125.00	85.0	1	0.27	1.	HW 3.0
ST 25-MB32	25.00	32.00	100.00	35.0	0	0.41	2.	HW 4.0
ST 32-MB50	32.00	50.00	140.00	60.0	0	0.42	2.	HW 6.0

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

(1) Maximum overhang.

ST-MB Straight Carbide Shank with MB Connection Assembly Options

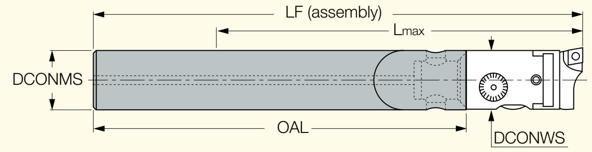
ST16-32 MB16-MB32 Diameter Range: 18-50 mm



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.

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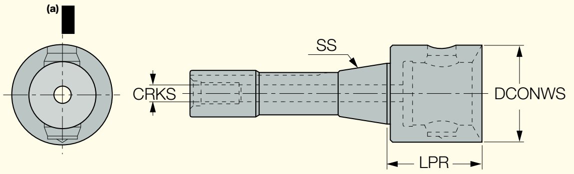
R8-MB

MB Modular Connection System with R-8 Bridgeport Shanks



[a]Cutting edge position

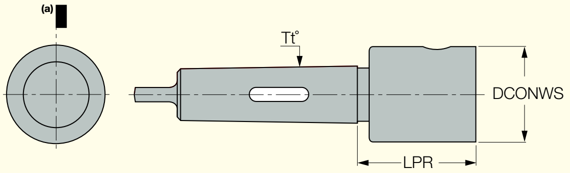
Designation	SS	DCONWS	LPR	CRKS	kg	
R8 MB50	R8	50.00	50.00	UNF 7/16-20	0.84	HW 6.0

- 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



[a]Cutting edge position

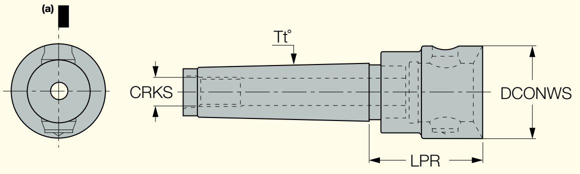
Designation	Tt°	DCONWS	LPR	kg	
MTT 5-MB63	MT5	63.00	65.00	2.16	HW 8.0

- 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



[a]Cutting edge position

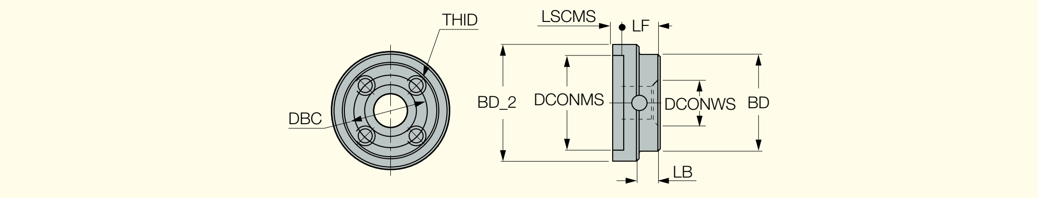
Designation	Tt°	DCONWS	LPR	CRKS	kg	
MTD 4-MB50	MT4	50.00	63.00	M16	0.93	HW 6.0
MTD 4-MB50 SIP	MT4	50.00	63.00	M14	0.98	HW 6.0

- 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



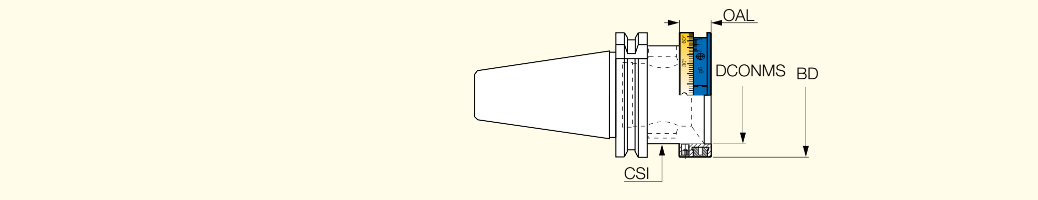
Designation	DCONWS	LF	LSCMS	LB	BD	BD_2	DCONMS	DBC	THID	kg	🔧
DIN2079 MB50 40	50	35.00	10.00	21.0	90.00	110.00	88.89	66.70	M12	1.96	HW 6.0
DIN2079 MB63 40	63	47.00	10.00	31.0	90.00	110.00	88.89	66.70	M12	2.06	HW 8.0
DIN2079 MB63 50	63	45.00	12.00	31.0	135.00	150.00	128.57	101.60	M16	4.60	HW 8.0
DIN2079 MB80 50	80	50.00	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.

Accessories

MB-BL-RING

Interchangeable Balancing Rings for MB Modular Boring Heads



Designation	CSI	BD	DCONMS	OAL	kg
MB 32 BL-RING	MB32	42.00	31.00	14.00	0.07
MB 40 BL-RING	MB40	50.00	39.00	15.00	0.07
MB 50 BL-RING	MB50	63.50	49.00	16.00	0.14
MB 63 BL-RING	MB63	80.00	62.00	18.00	0.12

The balancing rings enable a high degree of balance. This is achieved by setting the two counterweights to balance the toolholder on which it is mounted.
The result is a more economical and accurate mounting technique.
The use of the balancing rings provides the following advantages:

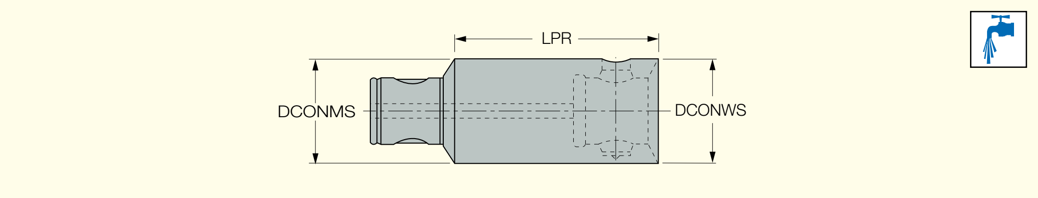
- Improved accuracy and surface finish
- Considerable extension of tool life
- Considerable extension of spindle bearing life
- Drastic reduction of vibrations and noise

The purpose of balancing a toolholder is to improve the distribution of the masses of the different elements in order to produce centrifugal forces within a prescribed limit, when spinning at a given spindle speed (RPM). The balancing operation for a toolholder has the aim of bringing the original unbalance within the maximum admissible level "G" prescribed by the ISO 1940/1 standards.

ITSBORE

EX-MB

Extensions for the MB Modular Connection System



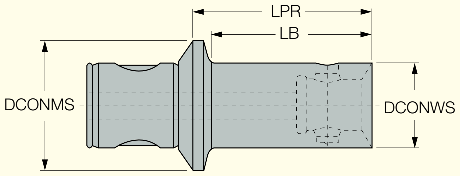
Designation	DCONMS	LPR	DCONWS	kg
EX 14X25-MB14	14.00	25.00	14.00	0.04
EX 16X25-MB16	16.00	25.00	16.00	0.06
EX 20X32-MB20	20.00	32.00	20.00	0.09
EX 25X25-MB25	25.00	25.00	25.00	0.10
EX 25X40-MB25	25.00	40.00	25.00	0.16
EX 32X32-MB32	32.00	32.00	32.00	0.20
EX 32X50-MB32	32.00	50.00	32.00	0.31
EX 40X40-MB40	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	1.21
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	4.50
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



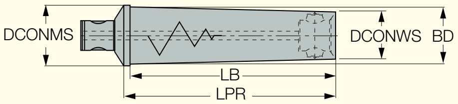
Designation	DCONMS	DCONWS	LPR	LB	kg
RE MB16-MB14X24	16.00	14.00	25.00	19.5	0.04
RE MB20-MB14X19	20.00	14.00	20.00	14.5	0.03
RE MB20-MB16X20	20.00	16.00	20.00	16.0	0.05
RE MB25-MB14X19	25.00	14.00	20.00	13.5	0.06
RE MB25-MB16X20	25.00	16.00	20.00	15.0	0.08
RE MB25-MB20X25	25.00	20.00	25.00	20.0	0.09
RE 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-MB14X23	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-MB14X23	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	1.36
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

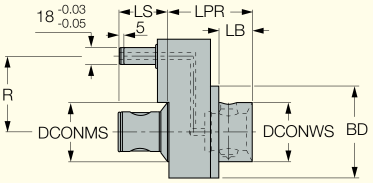


Designation	CSI	DCONMS	DCONWS	LPR	BD	LB	kg
RE MB50-MB16X74-AVI	MB16	50.00	16.00	74.00	17.50	65.0	0.51
RE MB50-MB20X93-AVI	MB20	50.00	20.00	93.00	21.50	85.0	0.65
RE MB50-MB25X117-AVI	MB25	50.00	25.00	117.00	27.00	110.0	0.92
RE MB50-MB32X144-AVI	MB32	50.00	32.00	144.00	35.00	138.0	1.47
RE MB50-MB40X176-AVI	MB40	50.00	40.00	176.00	47.00	170.0	2.66
RE MB63-MB50X220-AVI	MB50	63.00	50.00	220.00	60.00	214.0	5.00
RE MB80-MB63X280-AVI	MB63	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.

CHS MB-R

Coolant Supply Collar with a Stopper for the MB Modular Boring System



Designation	DCONMS	R	DCONWS	BD	LB	LPR	LS	RPMX(1)	CP(2)	kg
CHS MB50-R65	50.00	65	50.00	80.00	28.5	72.00	43.00	7000	10	3.06
CHS MB50-R80	50.00	80	50.00	80.00	28.5	72.00	43.00	7000	10	3.30
CHS MB63-R80	63.00	80	63.00	100.00	37.0	88.00	51.00	5600	10	5.16

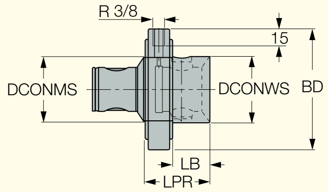
• Use with stop block • Important: coolant flow must be started prior to rotating the spindle to avoid damage of the O-rings • Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

(1) Maximum RPM

(2) Coolant pressure (Bar)

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	3.29

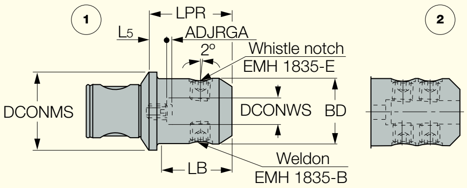
• Important: coolant flow must be started prior to rotating the spindle to avoid damage of the O-rings • Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

(1) Maximum RPM

(2) Coolant pressure (Bar)

EMH MB

Weldon and Whistle Notch Side-Lock Holders with the MB Modular Boring Connection System



Designation	DCONMS	DCONWS	BD	LB	LPR	L_5	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.

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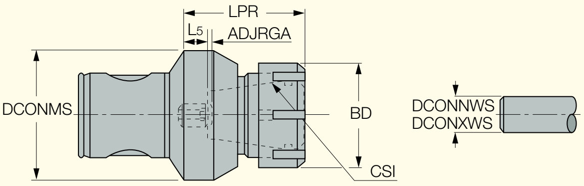
CC MB-ER

DIN 6499 ER Collet Chuck with the MB Modular Boring Connection System



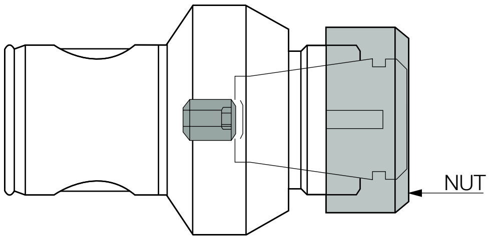
Designation	DCONMS	CSI	DCONNWS(1)	DCONXWS(2)	BD	LPR	L_5	ADJRGA	kg	⬡	🔧
CC MB16 ER11M	16.00	ER11	0.5	7.0	16.00	25.00	2.50	2.0	0.05	NUT ER11 MINI	WRENCH ER11 MINI*
CC MB20 ER16M	20.00	ER16	0.5	10.0	22.00	32.00	1.00	2.0	0.05	NUT ER16 MINI	WRENCH ER16 MINI*
CC MB25 ER20M	25.00	ER20	1.0	13.0	28.00	40.00	2.50	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

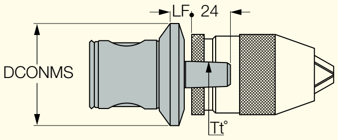
* Optional, should be ordered separately



ITSBORE

DC MB

DIN238 DC Drill Chuck Arbor with the MB Modular Connection System

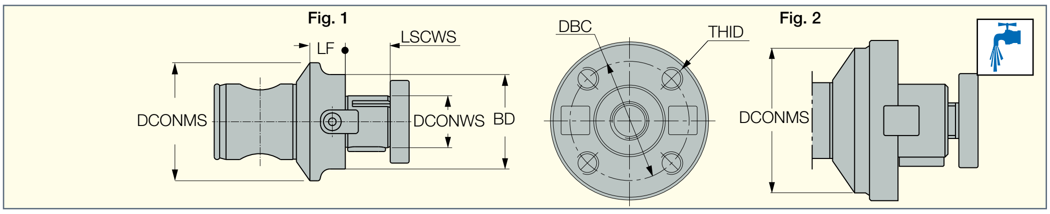


Designation	DCONMS	Tt°	LF	kg
DC MB50 B16	50.00	B16	10.00	0.40
DC MB63 B16	63.00	B16	13.50	0.41

- Without drill chuck.

SMH MB

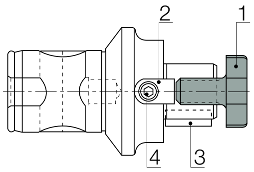
Shell Mill Holders with the MB Modular Boring Connection System



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.	7.64

• 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

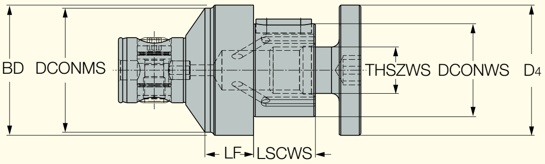
Spare Parts

Designation	
SMH MB40-16	BH MB40 COUPLING SET
SMH MB40-22	BH MB40 COUPLING SET
SMH MB50-16	BH MB50 COUPLING SET
SMH MB50-22	BH MB50 COUPLING SET
SMH MB50-27	BH MB50 COUPLING SET M5
SMH MB50-32	BH MB50 COUPLING SET
SMH MB63-27	BH MB63/80 COUPLING SET
SMH MB63-32	BH MB63/80 COUPLING SET
SMH MB80-32	BH MB63/80 COUPLING SET
SMH MB80-40	BH MB63/80 COUPLING SET

ITSBORE

STUB MB

STUB 60 Holder with an MB80 Connection for Disk Type Milling Cutters



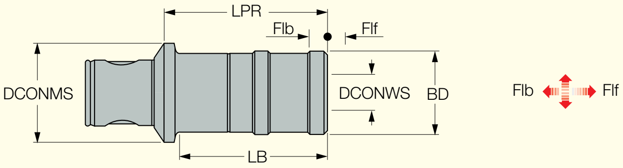
Designation	DCONMS	DCONWS	BD	LF	LSCWS	THSZWS	D_4	kg
STUB MB80-60	80.00	60.00	84.00	31.50	40.00	M30	84.00	3.60

- When mounting slitting cutters, use spacer rings.
- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

ITSBORE

TP MB-M

Tapping Chucks with the MB Modular Connection System



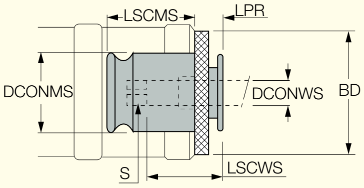
Designation	DCONMS	Tap min	Tap max	LB	LPR	BD	DCONWS	Flf	Flb	kg
TP MB50-M 3-12	50.00	M1	M14	65.0	76.00	36.00	19.00	7.5	7.5	0.78
TP MB50-M 8-20	50.00	M4.5	M20	-	106.00	53.00	31.00	12.5	12.5	1.60
TP MB63-M 3-12	63.00	M1	M14	57.2	70.00	36.00	19.00	7.5	7.5	1.14
TP MB63-M 8-20	63.00	M4.5	M20	93.0	104.00	53.00	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.

ITSBORE

TCS-DIN

Quick Change Tap Collets for Solid Taps



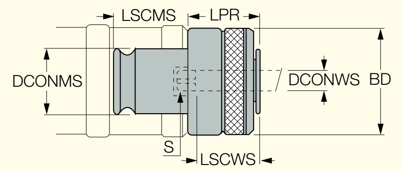
Designation	DCONWS(1)	S(2)	S_1(3)	S_2(4)	BD	DCONMS	LPR	LSCMS	LSCWS	kg
TCS #1 DIN 4-3	4.00	3.00	M4	-	30.00	19.00	7.0	21.50	17.0	0.48
TCS #1 DIN 3.5-2.7	3.50	2.70	M3	M4.5, M5	30.00	19.00	7.0	21.50	17.0	0.01
TCS #1 DIN 4.5-3.4	4.50	3.40	M3.5	M6	30.00	19.00	7.0	21.50	17.0	0.08
TCS #1 DIN 6-4.9	6.00	4.90	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

ITSBORE

TCC-DIN

Quick Change Tap Collets
with a Safety Clutch



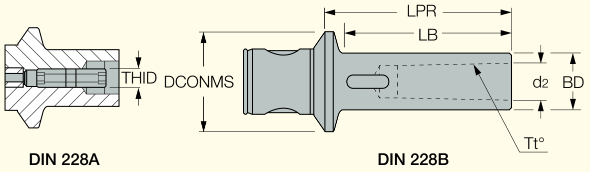
Designation	DCONWS(1)	S(2)	S_1(3)	S_2(4)	BD	DCONMS	LPR	LSCMS	LSCWS	kg
TCC #1 DIN 2.8-2.1	2.80	2.10	M2, M2.5	M4	32.00	19.00	25.0	21.50	17.0	0.17
TCC #1 DIN 4-3	4.00	3.00	M3.5	-	32.00	19.00	25.0	21.50	17.0	0.34
TCC #1 DIN 4.5-3.4	4.50	3.40	M4	M6	32.00	19.00	25.0	21.50	17.0	0.17
TCC #1 DIN 6-4.9	6.00	4.90	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

ITSBORE

AMT MB-MT

MB Modular Connection
System with Morse Taper
Tang DIN 228 A/B

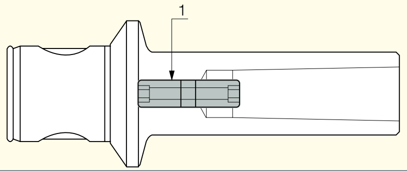


Designation	DCONMS	Tt°	d_2	BD	THID	LB	LPR	kg
AMT MB50-MT1	50	MT1	12.07	20.00	M6	68.0	80.00	0.52
AMT MB50-MT2	50	MT2	17.78	30.00	M10	86.0	100.00	0.78
AMT MB50-MT3	50	MT3	23.82	36.00	M12	110.0	120.00	1.02
AMT MB63-MT3	63	MT3	23.82	36.00	M12	108.0	120.00	1.40
AMT MB63-MT4	63	MT4	31.26	48.00	M16	133.0	150.00	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



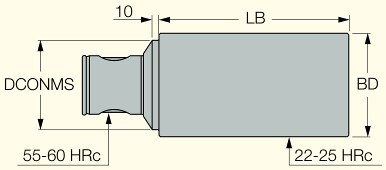
Spare Parts

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

ITSBORE

BLANK MB

Blanks with MB Modular Connection System

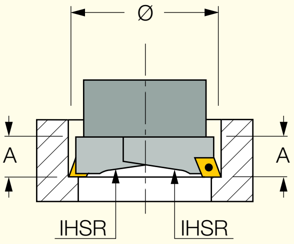


Designation	DCONMS	BD	LB	kg
BLANK MB50-63X160	50.00	63.00	160.00	4.44
BLANK MB63-80X200	63.00	80.00	200.00	8.77
BLANK MB80-100X250	80.00	100.00	250.00	16.62
BLANK MB110-130X250	110.00	130.00	250.00	18.00

- Material: 39NiCrMo3

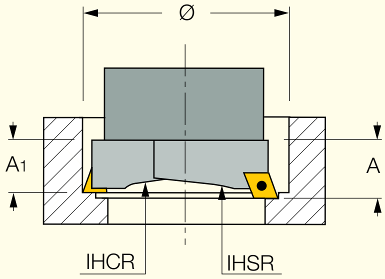
ITSBORE

Rough Boring Options



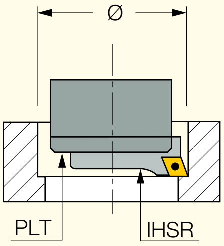
Roughing with
High Feed

Fig. a



Roughing with
High Cutting Depth

Fig. b



Light Roughing or
Semi-Finishing Applications

Fig. c

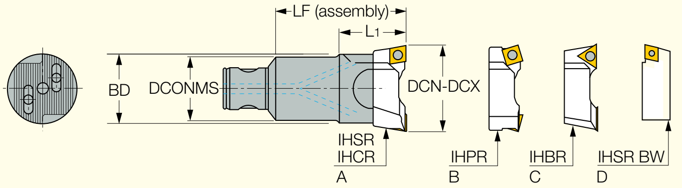
1. Radial setting of the cutting edges should be carried out with tool presetting equipment.
2. Boring bars fitted with two insert pockets are for roughing operations involving heavy chip removal.
   The double-insert boring bars include:
   - Two **IHSR** insert holders on the same plane with the two cutting edges set at 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	

BHR MB

Rough Boring Heads for
Diameter Range 18-200 mm



Designation	DCONMS	BD	LF	DCN(1)	DCX(2)	L1	IH	kg
BHR MB16-16X34	16	16.00	34.00	18.0	22.0	-	IH...18-22	0.06
BHR MB20-20X40	20	20.00	40.50	22.0	28.0	-	IH...22-28	0.11
BHR MB25-25X50	25	25.00	50.00	28.0	38.0	-	IH...28-38	0.18
BHR MB32-32X63	32	32.00	63.00	35.5	50.0	-	IH...36-50	0.36
BHR MB40-40X80	40	40.00	80.00	50.0	68.0	-	IH...50-68	0.70
BHR MB50-50X100	50	55.00	100.00	68.0	90.0	50.0	IH...68-90	1.49
BHR MB50-63X80	50	72.00	80.00	90.0	120.0	60.0	IH...90-120	1.50
BHR MB63-63X125	63	72.00	125.00	90.0	120.0	63.0	IH...90-120	3.09
BHR MB80-80X140	80	95.00	140.00	120.0	200.0	75.0	IH...120-800	5.38

- Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability.

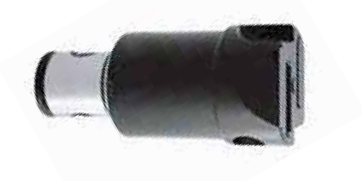
(1) Cutting diameter minimum
(2) Cutting diameter maximum

Spare Parts

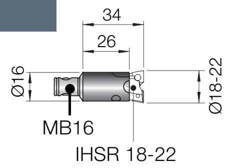
Designation				
BHR MB16-16X34	BH NUT BHR MB16	PLT 16*	SR M3X14 DIN912	SR M3X8 DIN913
BHR MB20-20X40	BH NUT BHR MB20	PLT 20*	SR M4X15DIN912	BH M3X5UNI5923
BHR MB25-25X50	BH NUT BHR MB25	PLT 25*	SR M4X20 DIN912	SR M3X8 DIN913
BHR MB32-32X63	BH NUT BHR MB32	PLT 32*	SR M5X25DIN912	SR M4X12 DIN913
BHR MB40-40X80	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

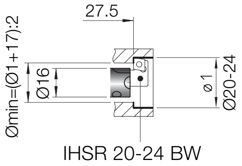
* Optional, should be ordered separately

BHR MB - Additional Information

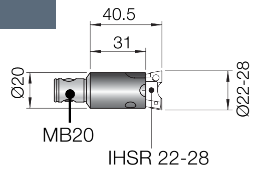


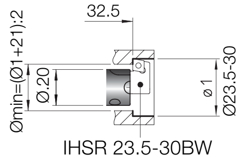
BHR MB16-16X34
Ø18 ~ .22



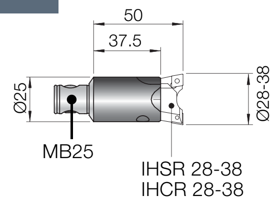


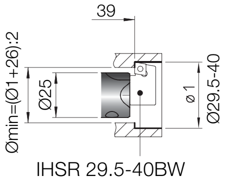
BHR MB20-20X40
Ø22 ~ 28

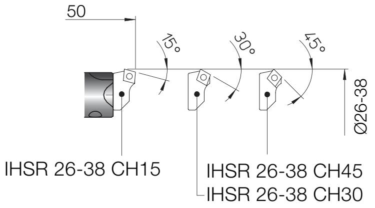




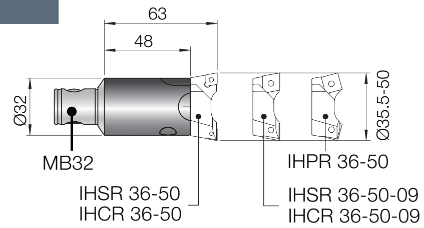
BHR MB25-25X50
Ø28 ~ 38

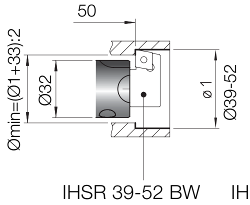


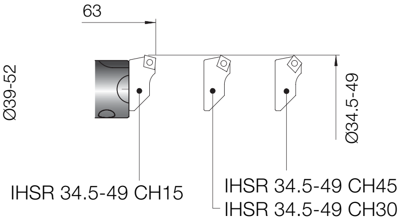




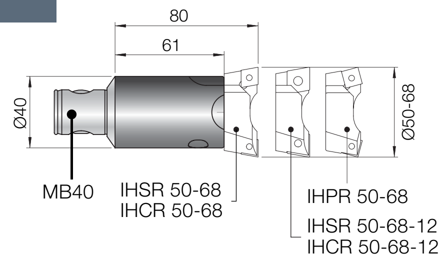
BHR MB32-32X63
Ø35.5 ~ 50

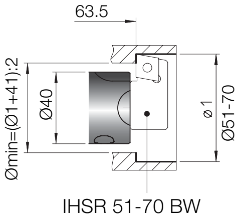


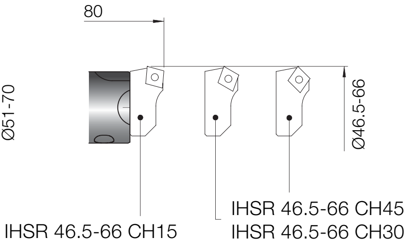




BHR MB40-40X80
Ø50 ~ 68

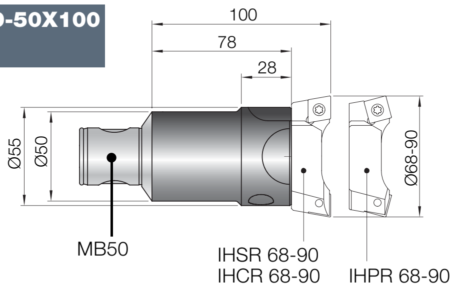


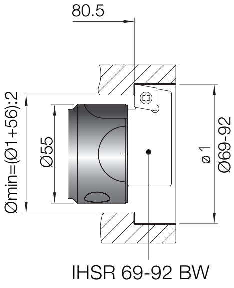


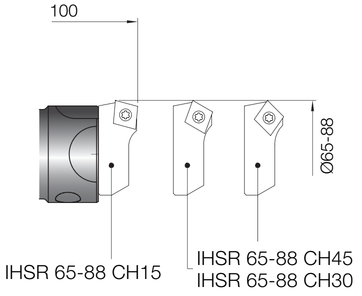


BHR MB - Additional Information

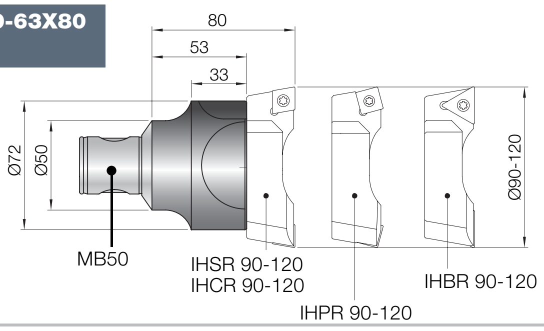
BHR MB50-50X100
Ø68 ~ 90

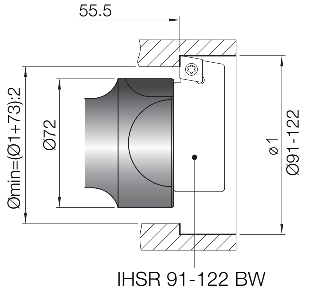




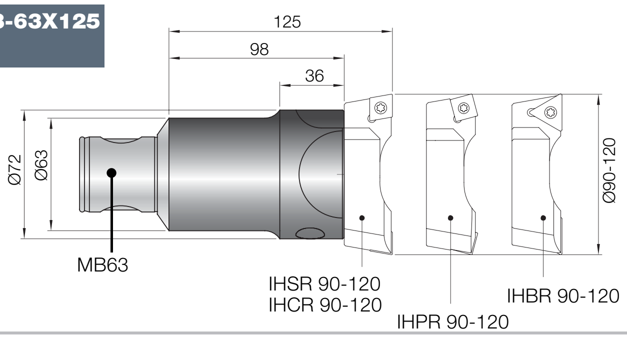


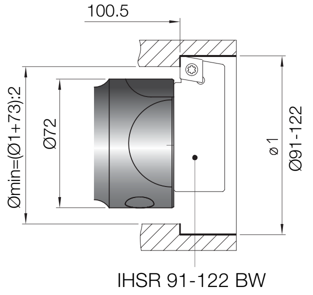
BHR MB50-63X80
Ø90 ~ 120



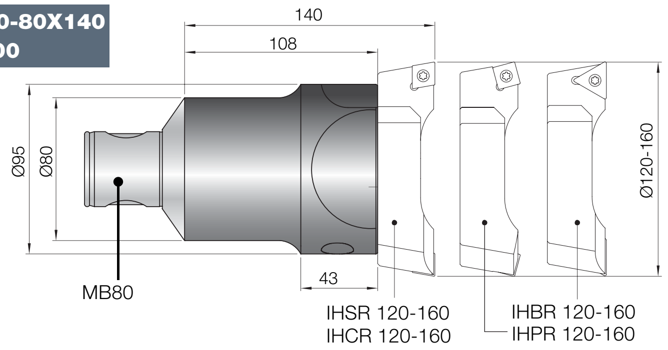


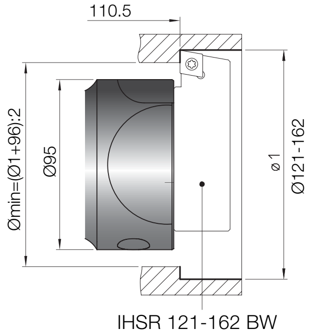
BHR MB63-63X125
Ø90 ~ 120

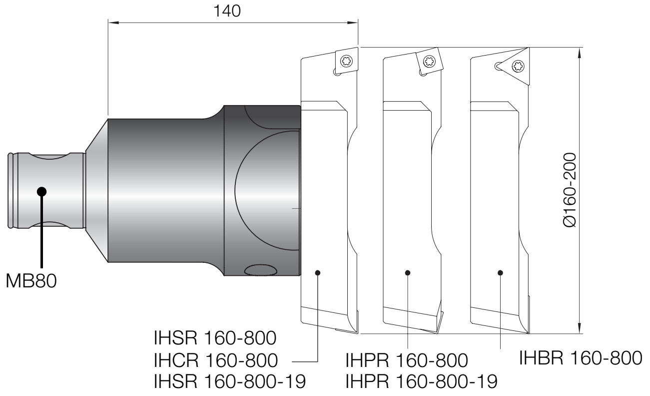


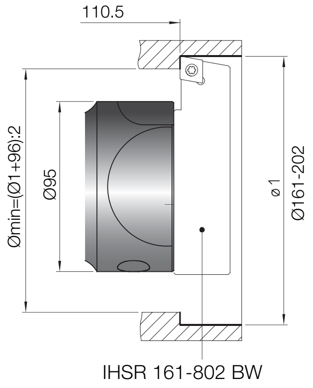


BHR MB80-80X140
Ø120 ~ 200





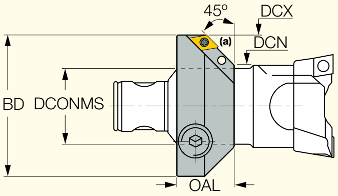




ITSBORE

CHA

45° Chamfering Holders



Designation	DCN(1)	DCX	DCONMS	OAL	Insert	kg	
CHA 16-45	18.0	28.0	16.00	13.00	DCMT 0702..	0.06	SR 14-548
CHA 20-45	23.0	32.0	20.00	15.00	DCMT 0702..	0.07	SR 14-548
CHA 25-45	28.0	43.0	25.00	18.00	DCMT 0702..	0.12	SR 14-548
CHA 32-45	35.0	54.0	32.00	22.00	DCMT 0702..	0.20	SR 14-548
CHA 40-45	46.0	72.0	40.00	30.00	DCMT 11T3..	0.53	SR 16-236 P
CHA 50-45	56.0	95.0	50.00	38.00	DCMT 11T3..	1.13	SR 16-236 P
CHA 63-45	75.0	125.0	63.00	46.00	DCMT 1504..	2.45	SR 16-212
CHA 80-45	95.0	165.0	80.00	58.00	DCMT 1504..	5.20	SR 16-212

• To minimize mismatch use insert radius 0.2 mm • (a) Only one insert can be mounted on either one of the two pockets.

(1) Cutting diameter minimum

For inserts, see pages: • DCGT-AS (894) • DCMT-14 (892) • DCMT-PF (893) • DCMT/DCGT (893) • DCMT/DCGT-SM (892)

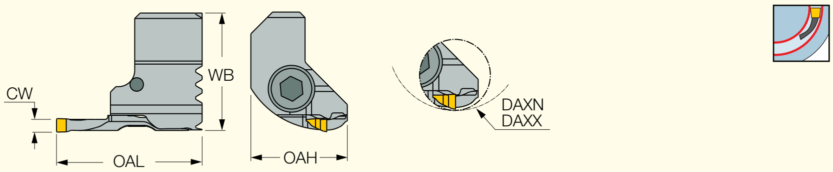
(For more inserts with other chip breakers, please refer to the Non-Rotating Catalog)

For holders, see pages: BHR MB (843)

MINCUT
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	17.5	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	17.8	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

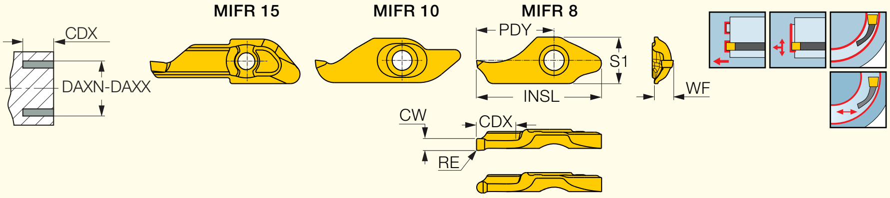
For inserts, see pages: MIFR (846)

For holders, see pages: BHR MB (843)

MINCUT
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	S_1	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
MIFR 15-2.50-0.20	30.00	2.50	0.02	0.20	0.020	5.55	9.0	15.0	60.0	15.00	19.30	●	0.03-0.05	0.03-0.04
MIFR 15-2.50-1.25	30.00	2.50	0.02	1.25	0.020	5.55	9.0	12.0	47.0	15.00	19.30	●	0.03-0.05	0.03-0.04
MIFR 15-3.00-0.20	30.00	3.00	0.02	0.20	0.020	5.85	9.0	15.0	60.0	15.00	19.30	●	0.03-0.05	0.03-0.04
MIFR 15-3.00-1.50	30.00	3.00	0.02	1.50	0.020	5.85	9.0	10.0	-	15.00	19.30	●	0.03-0.05	0.03-0.04
MIFR 15-3.50-0.20	30.00	3.50	0.02	0.20	0.020	6.00	9.0	10.0	-	15.00	19.30	●	0.03-0.05	0.03-0.04

• Recommended cutting speeds and feeds can increased by 20-30% for aluminum, and reduced by 20-30% for titanium and Inconel • For cutting speed recommendations, see pages

(1) Cutting width tolerance (+/-)

(2) Corner radius tolerance (+/-)

(3) Minimum axial grooving diameter

(4) Maximum axial grooving diameter

For tools, see pages: IHSR-MIFR (846)

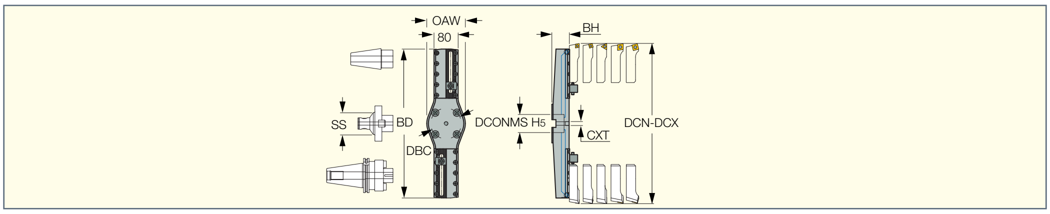

MIFR 8


MIFR 10


MIFR 15

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)	kg
TCH AL200	200.0	602.0	194.00	40.00	66.70	80	-	-	54.00	1	3.20
TCH AL300	300.0	702.0	288.00	40.00	66.70	80	-	-	54.00	1	3.90
TCH AL400	400.0	802.0	394.00	40.00	66.70	80	-	1/4GAS	61.00	0	6.90
TCH AL500	500.0	902.0	494.00	60.00	101.60	80,110	128.0	1/4GAS	69.00	0	8.70
TCH AL600	600.0	1002.0	594.00	60.00	101.60	80,110	128.0	1/4GAS	71.00	0	8.34
TCH AL700	700.0	1102.0	694.00	60.00	101.60	80,110	128.0	1/4GAS	74.00	0	8.34
TCH AL800	800.0	1202.0	794.00	60.00	101.60	80,110	128.0	-	80.00	0	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 875,904

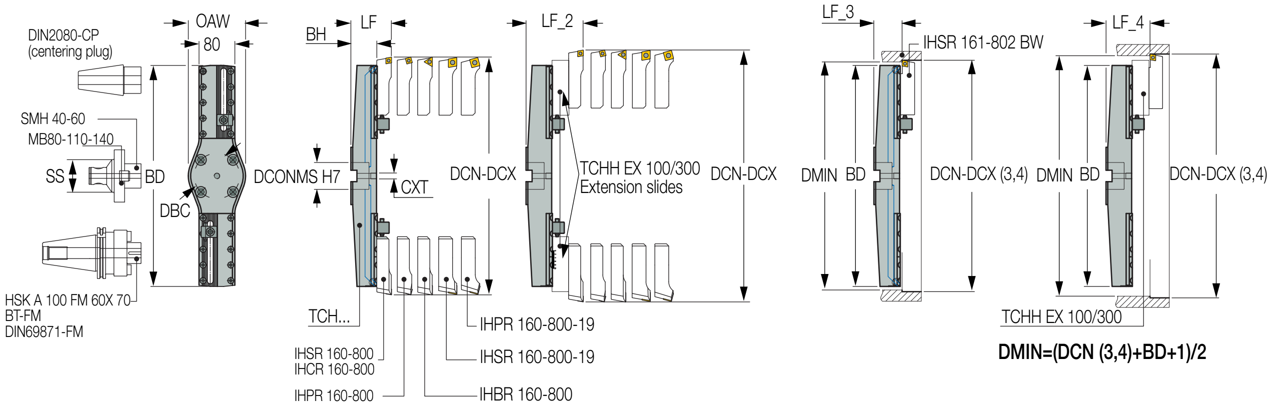
(1) Cutting diameter minimum

(2) Cutting diameter maximum

(3) Coolant presure

For tools, see pages: IHBR (849) • IHCR (848) • IHPR (849) • IHSR (848) • IHSR-BW (850)

Large Diameter Double Edge Rough Boring Options

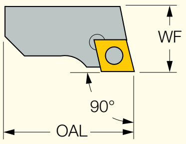


Boring Tools	Extension Slides	Dimensions	Aluminum Twin Cutter Heads						
			TCH 200	TCH 300	TCH 400	TCH 500	TCH 600	TCH 700	TCH 800
IH.R 160-800/-19		DCN-DCX	200-300	300-400	400-500	500-600	600-700	700-800	800-900
IH.R 160-800/-19	TCHH EX 100	DCN-DCX	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
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-25/3
IHSR 90-120	90.0	120.0	27.00	70.50	CCMT 1204...	SR 16-212	T-25/3
IHSR 120-160	120.0	160.0	32.00	94.50	CCMT 1204...	SR 16-212	T-25/3
IHSR 160-800	160.0	800.0	32.00	130.00	CCMT 1204...	SR 16-212	T-25/3
IHSR 160-800-19	160.0	800.0	40.00	130.00	CNMG 1906...	SR 16-212	T-25/3

- For user guide, see pages 842,907,910-916

[1] Cutting diameter minimum [2] Cutting diameter maximum

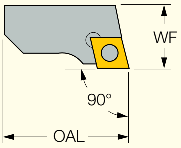
For inserts, see pages: CCET-WF (890) • CCGT-AF (892) • CCGT-AS (891) • CCGW/CCMT (CBN) (891) • CCMT (PCD) (891) • CCMT-14 (889) • CCMT-PF (889) • CCMT-WG (890) • CCMT/CCGT (890) • CCMT/CCGT-SM (889)

For holders, see pages: BHR MB (843) • TCH AL (847) • TCHH EX (877)

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...		
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 842,907,910-916

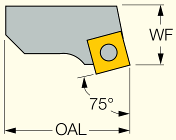
[1] Cutting diameter minimum [2] Cutting diameter maximum

For inserts, see pages: CCET-WF (890) • CCGT-AF (892) • CCGT-AS (891) • CCGW/CCMT (CBN) (891) • CCMT (PCD) (891) • CCMT-14 (889) • CCMT-PF (889) • CCMT-WG (890) • CCMT/CCGT (890) • CCMT/CCGT-SM (889)

For holders, see pages: BHR MB (843) • TCH AL (847) • TCHH EX (877)

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...		

- For user guide, see pages 842,907,910-916

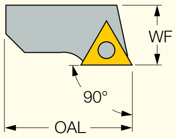
(1) Cutting diameter minimum (2) Cutting diameter maximum

For inserts, see pages: SCGT-AS (895) • SCMT-14 (894) • SCMT-19 (496)
• SCMT-SM (894)

For holders, see pages: BHR MB (843) • TCH AL (847) • TCHH EX (877)

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 842,907,910-916

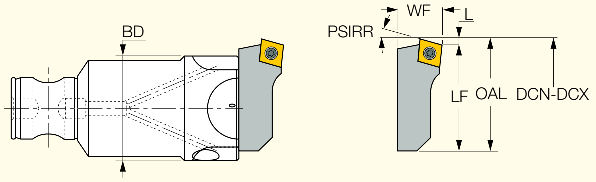
(1) Cutting diameter minimum (2) Cutting diameter maximum

For inserts, see pages: TCMT-19 (895) • TCMT-SM (896)

For holders, see pages: BHR MB (843) • TCH AL (847) • TCHH EX (877)

ITSBORE

IHSR-CH
Chamfering Tools for BHR Boring Heads



Designation	DCN[1]	DCX[2]	PSIRR	LF	OAL	WF	L	BD	Insert		
IHSR 26-38 CH15	26.0	38.0	15.0	21.40	23.00	12.50	1.60	25.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 26-38 CH30	26.0	38.0	30.0	20.00	23.00	12.50	3.00	25.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 26-38 CH45	26.0	38.0	45.0	18.70	23.00	12.50	4.30	25.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 34.5-49 CH15	34.5	49.0	15.0	29.40	31.00	15.00	1.60	32.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 34.5-49 CH30	34.5	49.0	30.0	28.00	31.00	15.00	3.00	32.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 34.5-49 CH45	34.5	49.0	45.0	26.70	31.00	15.00	4.30	32.00	CCMT 0602...	SR 14-548	T-7/5
IHSR 46.5-66 CH15	46.5	66.0	15.0	36.60	39.00	19.00	2.40	40.00	CCMT 09T3...	SR 16-236	T-15/5
IHSR 46.5-66 CH30	46.5	66.0	30.0	34.40	39.00	19.00	4.60	40.00	CCMT 09T3...	SR 16-236	T-15/5
IHSR 46.5-66 CH45	46.5	66.0	45.0	32.50	39.00	19.00	6.50	40.00	CCMT 09T3...	SR 16-236	T-15/5
IHSR 65-88 CH15	65.0	88.0	15.0	49.80	53.00	22.00	3.20	50.00	CCMT 1204...	SR 16-236	T-15/5
IHSR 65-88 CH30	65.0	88.0	30.0	46.80	53.00	22.00	6.20	50.00	CCMT 1204...	SR 16-236	T-15/5
IHSR 65-88 CH45	65.0	88.0	45.0	44.20	53.00	22.00	8.80	50.00	CCMT 1204...	SR 16-236	T-15/5

- For user guide, see pages 842,907,910-916

(1) Cutting diameter minimum (2) Cutting diameter maximum

For inserts, see pages: CCET-WF (890) • CCGT-AF (892) • CCGT-AS (891) • CCMT-14 (889) • CCMT-PF (889) • CCMT-WG (890) • CCMT/CCGT (890)
• CCMT/CCGT-SM (889)

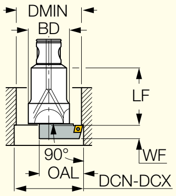
For holders, see pages: BHR MB (843)

ITSBORE

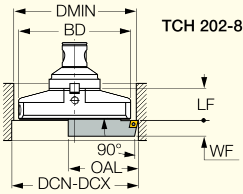
IHSR-BW

Back Face Turning Tools for BHR and TCH AL Rough Boring Heads

BHR 20-200



TCH 202-802



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	8.0	16.00	CCMT 0602...
IHSR 23.5-30BW	BHR MB20-20	20.0	23.5	32.5	30	9.5	19.50	CCMT 0602...
IHSR 29.5-40BW	BHR MB25-25	25.0	29.5	39.0	40	12.0	24.00	CCMT 0602...
IHSR 39-52 BW	BHR MB32-32	32.0	39	50.0	52	14.0	32.00	CCMT 09T3...
IHSR 51-70 BW	BHR MB40-40	40.0	51	63.5	70	17.5	42.00	CCMT 1204...
IHSR 69-92 BW	BHR MB50-50	55.0	69	80.5	92	21.0	57.00	CCMT 1204...
IHSR 91-122 BW	BHR MB63-63	72.0	91	100.5	122	25.0	76.00	CCMT 1204...
IHSR 121-162 BW	BHR MB80-80	95.0	121	110.5	162	28.0	101.00	CCMT 1204...
IHSR 161-802 BW	BHR MB80-80	95.0	161	110.5	202	28	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 842,907,910-916

(1) Suitable boring heads

(2) Cutting diameter minimum (3) Cutting diameter maximum

For inserts, see pages: CCET-WF (802) • CCGT-AF (804) • CCGT-AS (803) • CCGW/CCMT (CBN) (803) • CCMT (PCD) (803) • CCMT-14 (801) • CCMT-PF (801) • CCMT-WG (802) • CCMT/CCGT (802) • CCMT/CCGT-SM (801)

For holders, see pages: BHR MB (760) • TCH AL (762) • TCHH EX (789)

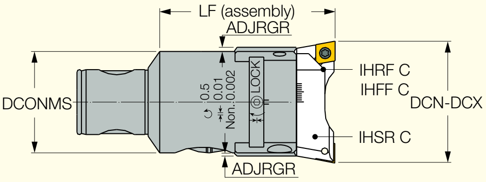
Spare Parts

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

BHC MB

Combi Rough and Fine Boring Heads with 10 µm Direct Diameter Adjustment and 2 µm by a Vernier Scale



10 µm
2 µm

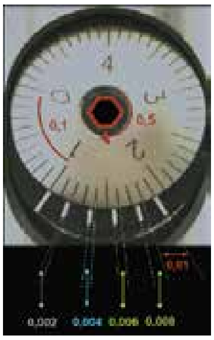
40 Bar Max

Designation	DCONMS	LF	DCN[(1)]	DCX[(2)]	ADJRGR	IH
BHC MB25-25-57	25.00	56.50	28.0	36.0	0.50	IH...-C
BHC MB32-32-71	32.00	71.00	36.0	46.0	0.50	IH...-C
BHC MB40-40-90	40.00	90.00	46.0	60.0	1.00	IH...-C
BHC MB50-50-87	50.00	87.00	60.0	75.0	1.00	IH...-C
BHC MB63-63-109	63.00	109.00	75.0	95.0	2.00	IH...-C
BHC MB80-80-130	80.00	130.00	95.0	120.0	2.00	IH...-C

• 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 pages 904

(1) Cutting diameter minimum (2) Cutting diameter maximum

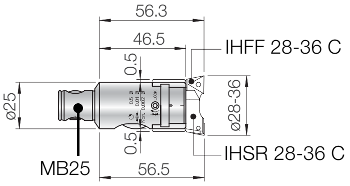
For tools, see pages: IHFF-C (852) • IHRF-C (852) • IHSR-C (852)

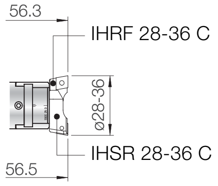


Graduated dial of 0.01 mm with circular vernier of 0.002 mm

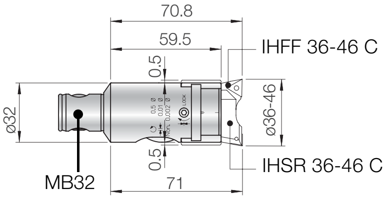
BHC MB - Additional Information

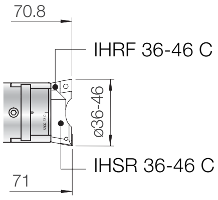
BHC MB25-25-57
Ø28 ~ 36



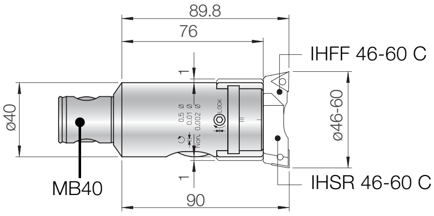


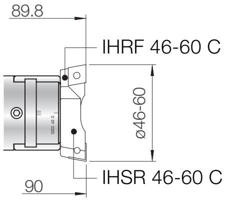
BHCI MB32-32-71
Ø36 ~ 46



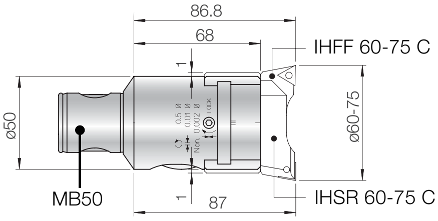


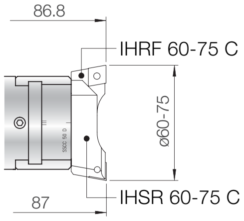
BHCI MB40-40-90
Ø46 ~ 60



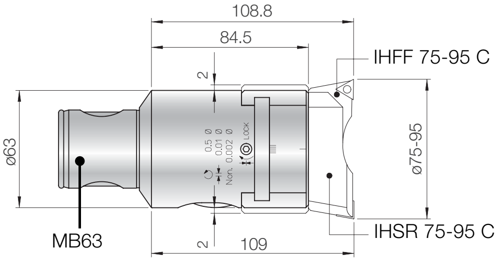


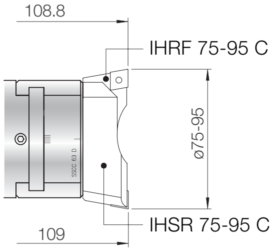
BHCI MB50-50-87
Ø60 ~ 75



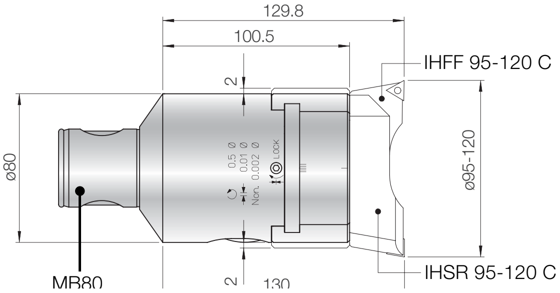


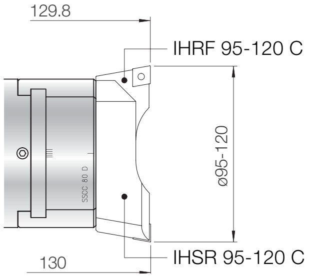
BHCI MB63-63-109
Ø75 ~ 95





BHCI MB80-80-130
Ø95~ 120

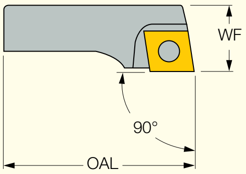




ITSBORE

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 916

(1) Cutting diameter minimum (2) Cutting diameter maximum

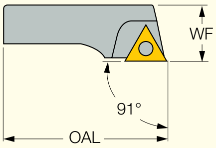
For inserts, see pages: CCGT-AS (891) • CCGW/CCMT (CBN) (891) • CCMT (PCD) (891) • CCMT-14 (889) • CCMT-PF (889) • CCMT-WG (890) • CCMT/CCGT (890) • CCMT/CCGT-SM (889)

For holders, see pages: BHC MB (850)

ITSBORE

IHFF-C

Triangular Finishing Insert Holders for BHC Combi Boring Heads



Designation	WF	OAL	Insert	DCN[1]	DCX[2]		
IHFF 28-36 C	9.80	24.00	TPGX 0902...	28.00	36.00	SR 14-298	T-8/5
IHFF 36-46 C	11.30	30.00	TPGX 0902...	36.00	46.00	SR 14-298	T-8/5
IHFF 46-60 C	13.80	40.00	TPGX 1103...	46.00	60.00	SR-17979 M3X8	T-8/5
IHFF 60-75 C	18.80	54.00	TPGX 1103...	60.00	75.00	SR-17979 M3X8	T-8/5
IHFF 75-95 C	25.30	68.00	TPGX 1103...	75.00	95.00	SR-17979 M3X8	T-8/5
IHFF 95-120 C	29.30	87.00	TPGX 1103...	95.00	120.00	SR-17979 M3X8	T-8/5

- For user guide, see page 916

(1) Cutting diameter minimum (2) Cutting diameter maximum

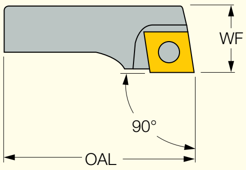
For inserts, see pages: TPGX (896) • TPGX (CBN) (897)

For holders, see pages: BHC MB (850)

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 pages 916

(1) Cutting diameter minimum (2) Cutting diameter maximum

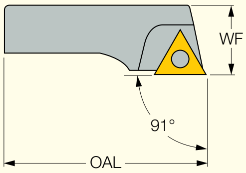
For inserts, see pages: CCET-WF (890) • CCGT-AF (892) • CCGT-AS (891) • CCGW/CCMT (CBN) (891) • CCMT (PCD) (891) • CCMT-14 (889) • CCMT-PF (889) • CCMT-WG (890) • CCMT/CCGT (890) • CCMT/CCGT-SM (889)

For holders, see pages: BHC MB (850)

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

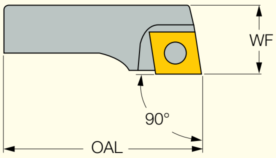
For inserts, see pages: TPGX (896) • TPGX (CBN) (897)

For holders, see pages: BBH 30/40 (873) • BBH 63 (874) • BBH D16 (872) • BHD 50 L200 (875) • BHD MB (853) • BHE MB (857) • BHEH (874) • BHF L200 (875) • BHF MB16-MB50 Dia. 2.5-108 (864) • BHFH (874)

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

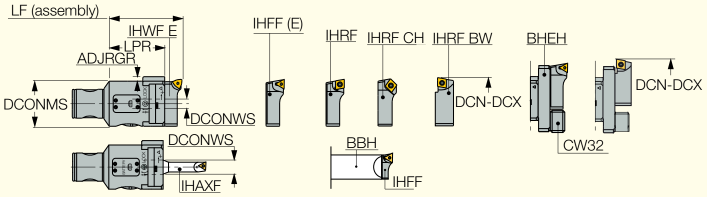
For inserts, see pages: CCET-WF (890) • CCGT-AF (892) • CCGT-AS (891) • CCGW/CCMT (CBN) (891) • CCMT (PCD) (891) • CCMT-14 (889) • CCMT-PF (889) • CCMT-WG (890) • CCMT/CCGT (890) • CCMT/CCGT-SM (889)

For holders, see pages: BBH 30/40 (873) • BBH 63 (874) • BBH D16 (872) • BHD 50 L200 (875) • BHD MB (853) • BHE MB (857) • BHEH (874) • BHF L200 (875) • BHF MB16-MB50 Dia. 2.5-108 (864) • BHFH (874)

ITSBORE

BHD MB

Fine Boring Heads with Digital 2 µm Direct Adjustment Diametric Display



2 µm

40 Bar Max

Designation	LF	DCONMS	DCN[1]	DCX[2]	LPR	ADJRGR	DCONWS	kg
BHD MB32-32-83	83.00	32.00	35.0	51.0	71.5	3.00	-	0.41
BHD MB40-40-90	90.00	40.00	48.0	64.0	76.0	4.00	-	0.73
BHD MB50-50-60	80.00	50.00	2.5	110.0	61.0	5.00	16.00	1.10
BHD MB63-63-89	88.50	63.00	6.0	125.0	69.5	5.00	16.00	2.20
BHD MB80-80-104	104.00	80.00	6.0	200.0	84.5	5.00	16.00	3.90

- For spare parts, see page 874-875

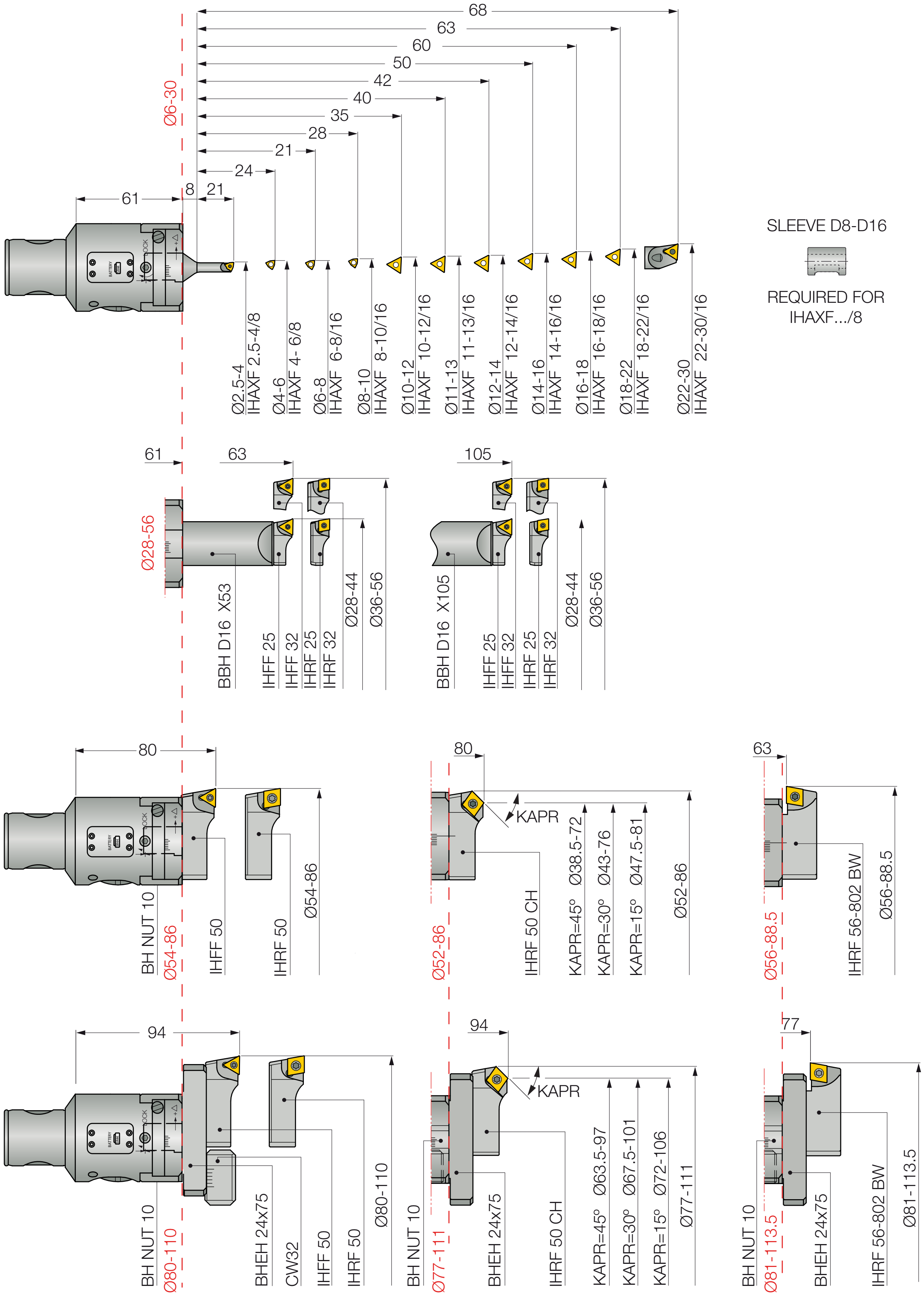
[1] Cutting diameter minimum [2] Cutting diameter maximum

For tools, see pages: IHAXF (871) • IHAXF-AVI (873) • IHAXF-E (873) • IHFF (853) • IHRF (853) • IHRF-BW (877) • IHRF-CH (878) • IHWF (875)

Fine Boring Head Range
2 μm Direct Diametric Adjustment

BHD MB50-50X60
ø2.5-110

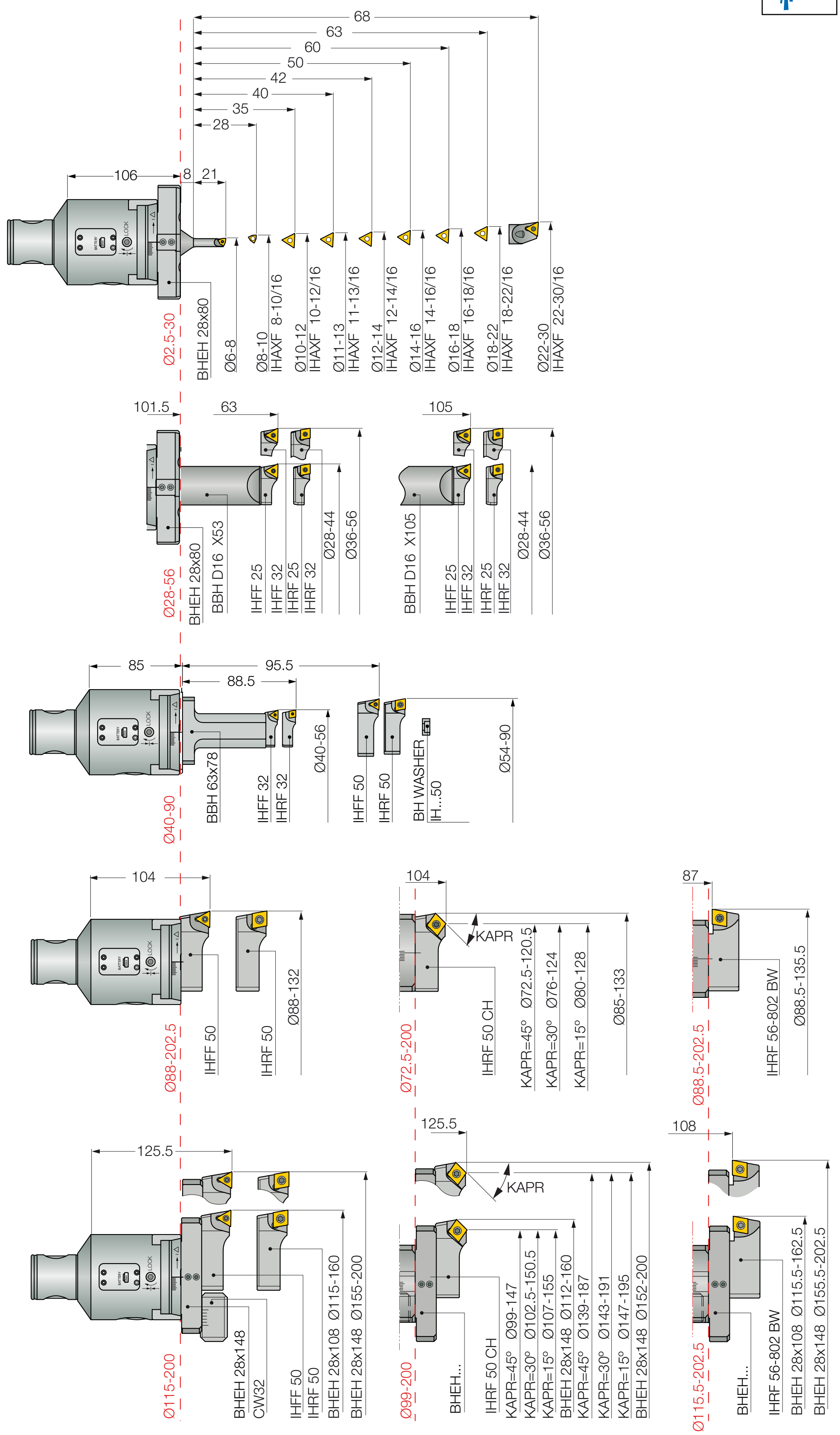
2 μm



Fine Boring Head Range
2 µm Direct Diametric Adjustment

BHD MB63-63X89
ø6-125

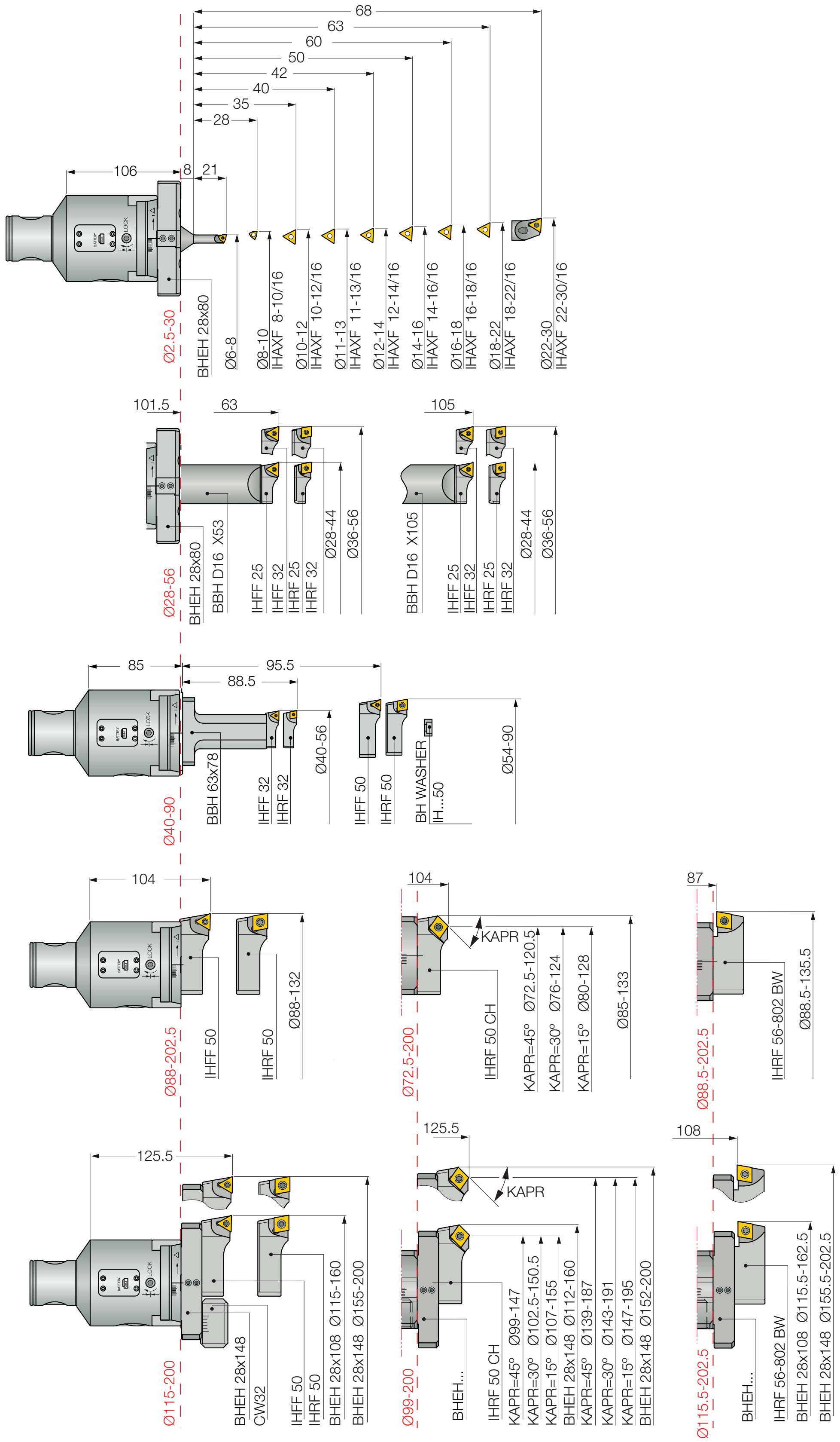
2 µm



Fine Boring Head Range
2 µm Direct Diametric Adjustment

BHD MB80-80X104
ø6-200

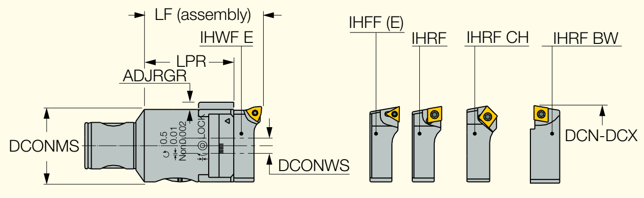
2 µm



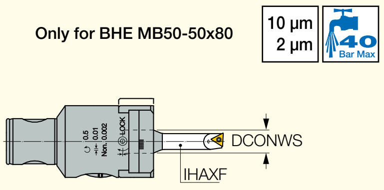
ITSBORE

BHE MB

Fine Boring Heads with the MB Connection, 10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale



Only for BHE MB50-50x80



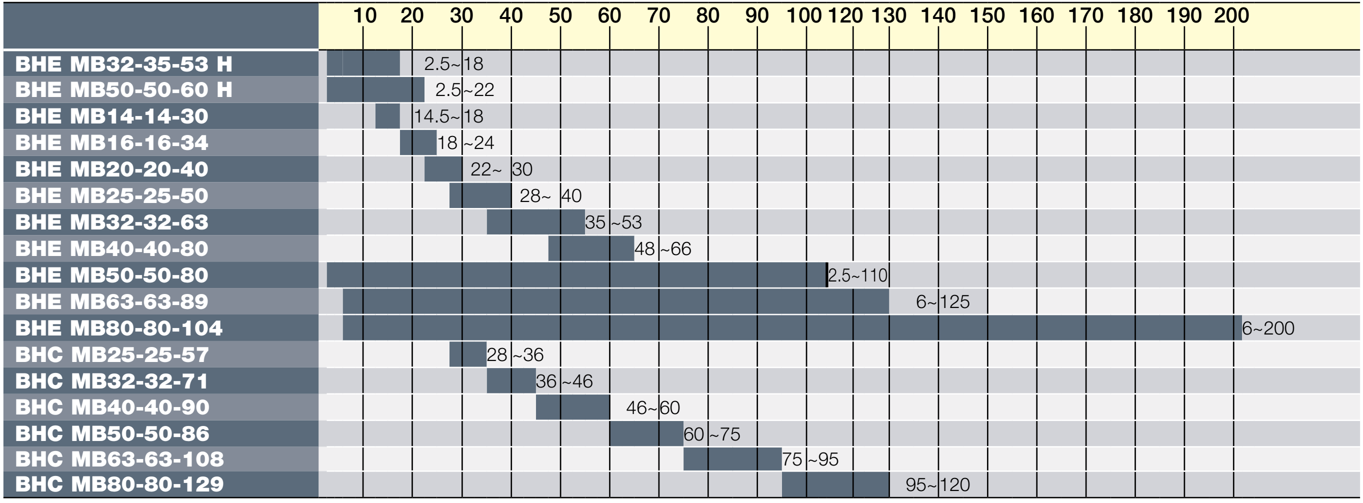
Designation	DCONMS	LF	DCN(1)	DCX(2)	LPR	ADJRGR	DCONWS	kg
BHE MB14-14-30	14.00	30.00	14.5	18.0	22.0	1.00	-	0.05
BHE MB16-16-34	16.00	34.00	18.0	24.0	26.0	2.00	-	0.05
BHE MB20-20-40	20.00	40.00	22.0	30.0	31.5	3.00	-	0.05
BHE MB25-25-50	25.00	50.00	28.0	40.0	40.0	3.00	-	0.20
BHE MB32-32-63	32.00	63.00	35.0	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	-	1.20

- For boring options, see pages 826-827,859-861 • For spare parts, see pages 874-875, 903

(1) Cutting diameter minimum (2) Cutting diameter maximum

For tools, see pages: IHAXF (871) • IHAXF-AVI (873) • IHAXF-E (873) • IHFF (853) • IHRF (853) • IHRF-BW (877) • IHRF-CH (878) • IHWF (875)

Boring Head Diameter Range



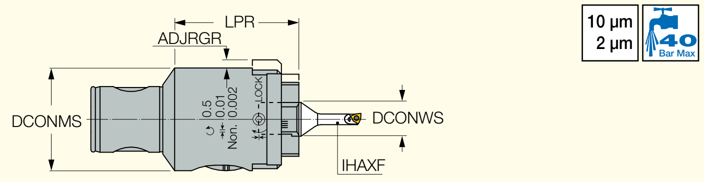
BHE MB50-50-80

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 10 Micrometer Direct Dia. Adjustment and 2 Micrometer by a Vernier Scale



Designation	DCONMS	LPR	DCN(1)	DCX(2)	DCONWS	ADJRGR	RPMX(2)	kg
BHE MB32-32-53 H	32.00	53.00	2.5	18.0	8.00	0.50	12000	0.35
BHE MB50-50-60 H	50.00	60.00	2.5	22.0	16.00	1.00	12000	1.00

- For spare parts, see pages 874-875, 903

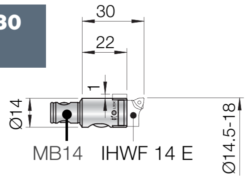
(1) Cutting diameter minimum

(2) Cutting diameter maximum

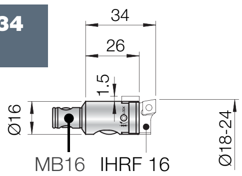
For tools, see pages: IHAXF (871) • IHAXF-AVI (873) • IHAXF-E (873)

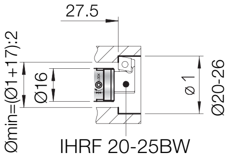
BHE MB - Additional Information

BHE MB14-14-30
Ø14.5 ~ 18

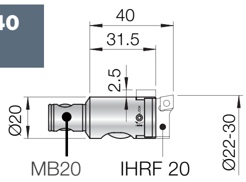


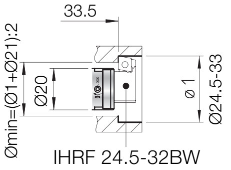
BHE MB16-16-34
Ø18 ~ 24



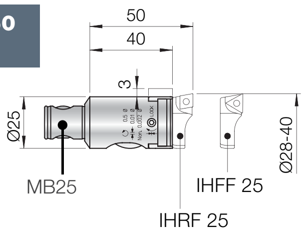


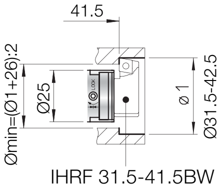
BHE MB20-20-40
Ø22 ~ 30

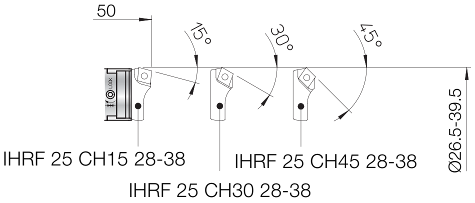




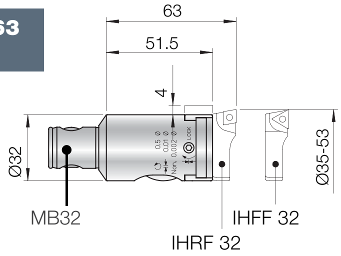
BHE MB25-25-50
Ø28 ~ 40

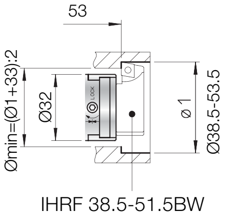


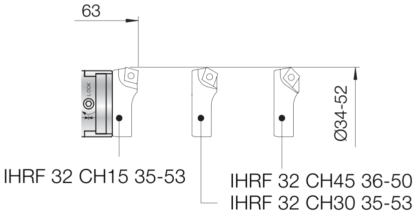




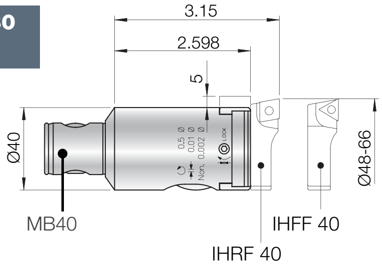
BHE MB32-32-63
Ø35 ~ 53

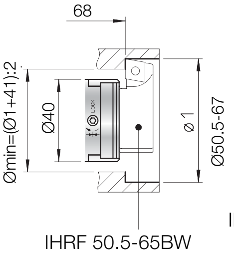


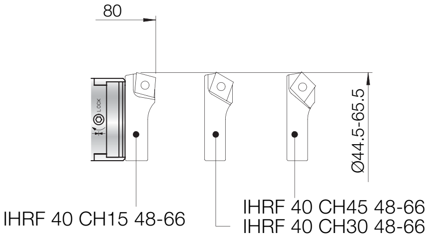




BHE MB40-40-80
Ø48 ~ 66

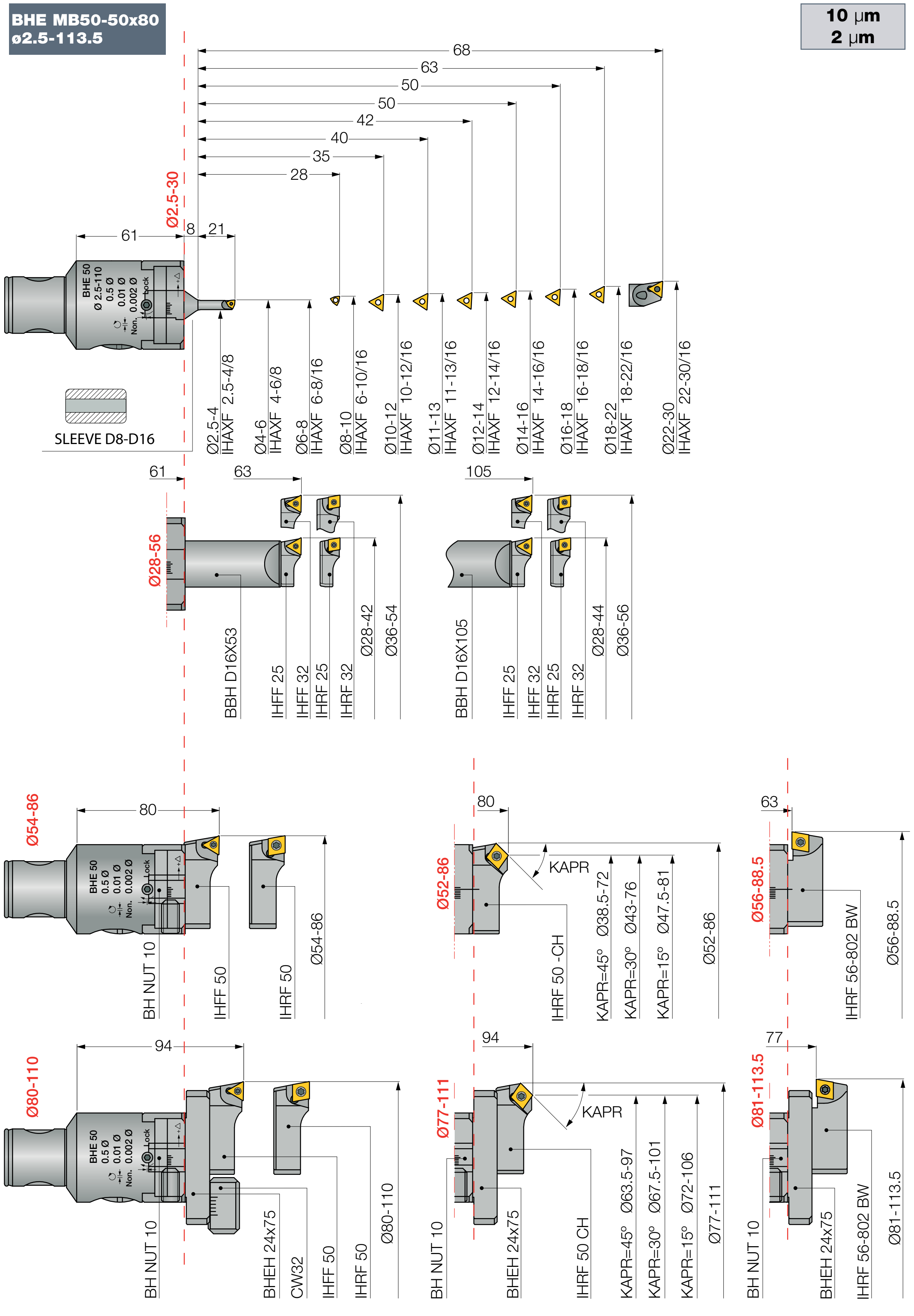






Fine Boring Head Range

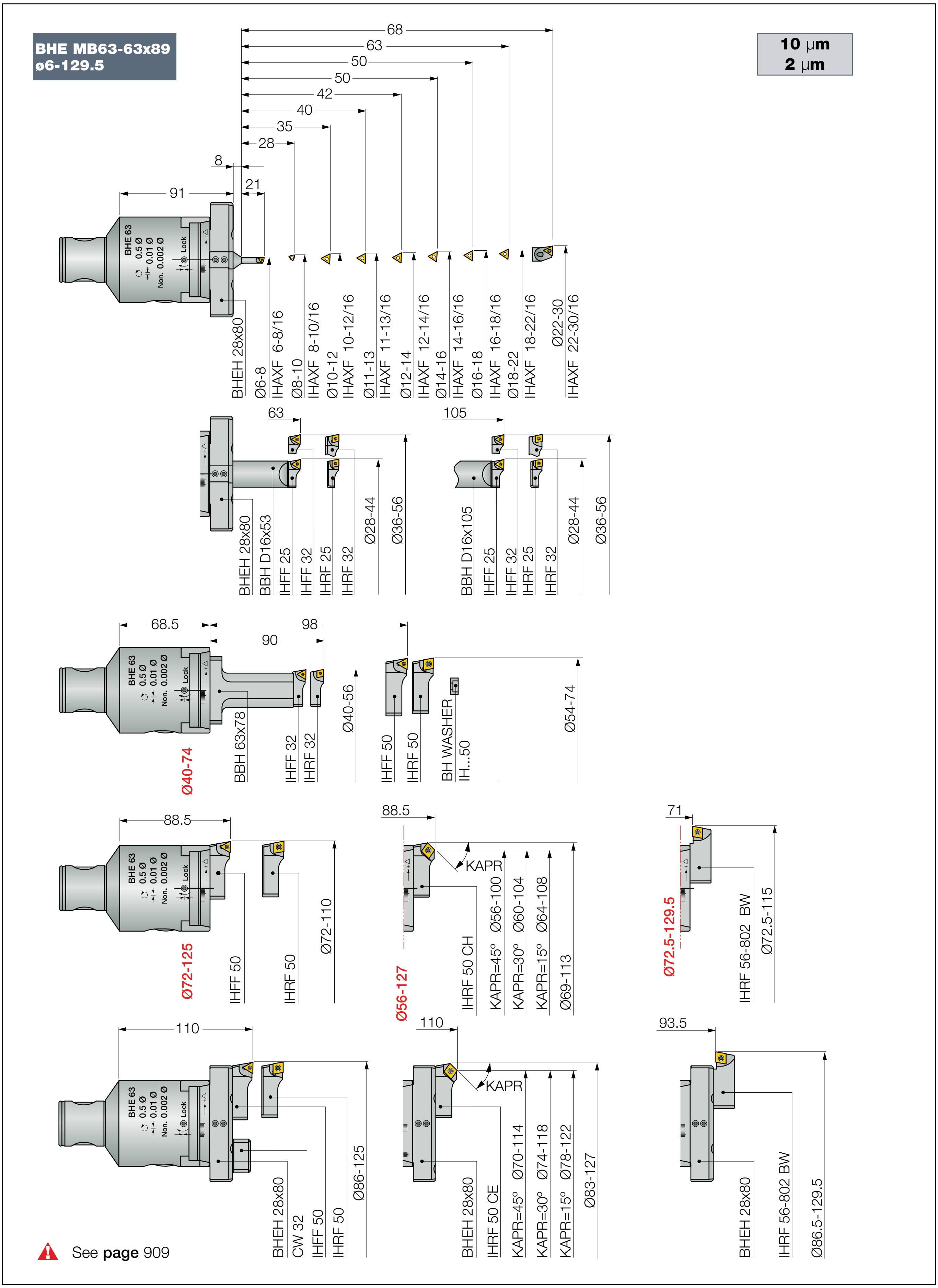
10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale



⚠ See **page** 908

Fine Boring Head Range

10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale



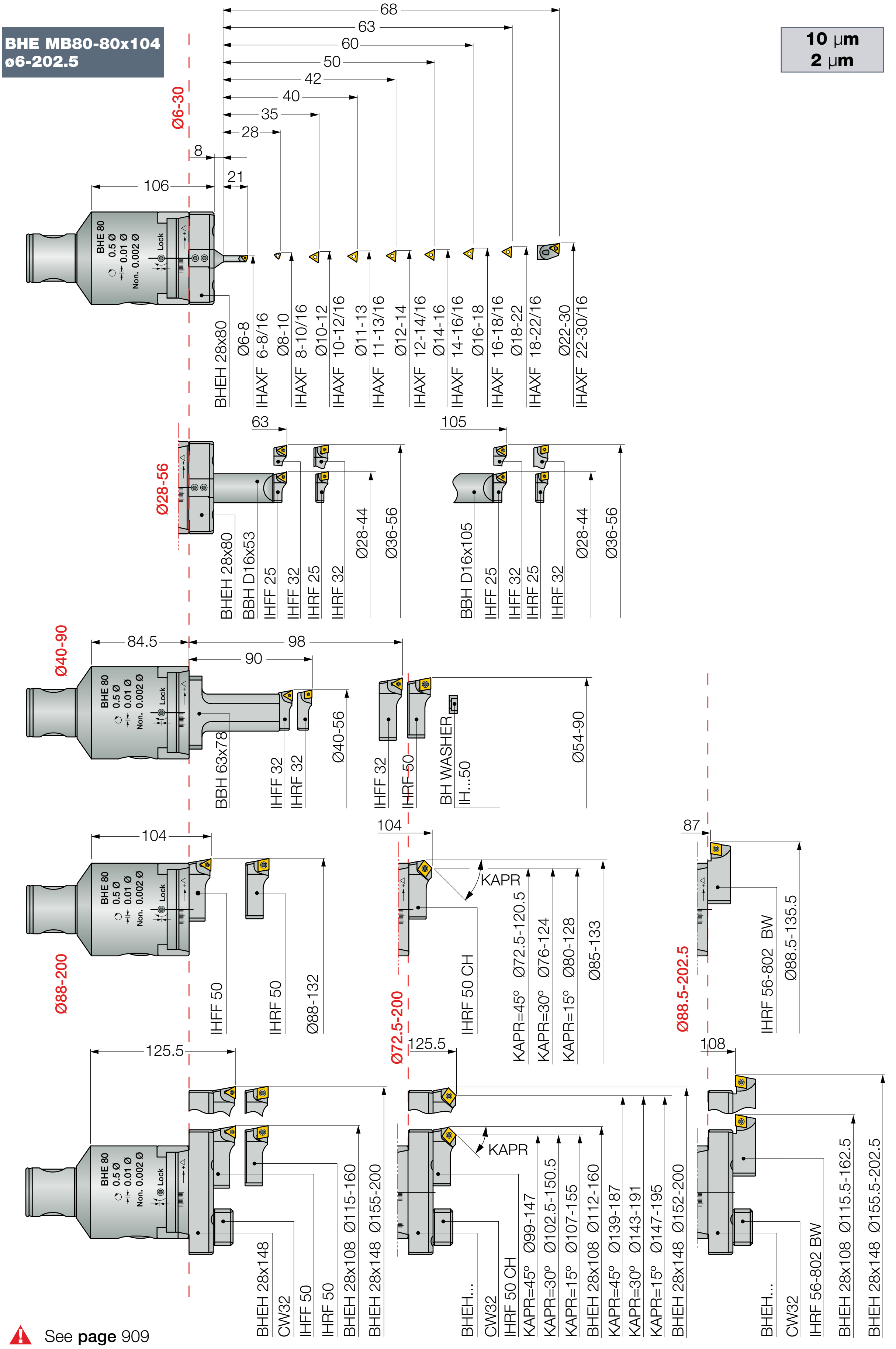
⚠ See **page** 909

Fine Boring Head Range

10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale

BHE MB80-80x104
ø6-202.5

10 µm
2 µm

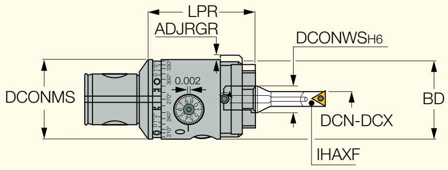


⚠ See **page** 909

ITSBORE

BHF MB-BL

Fine Boring Heads with a Balancing Mechanism and 2 Micrometer Direct Diametric Adjustment



2 µm

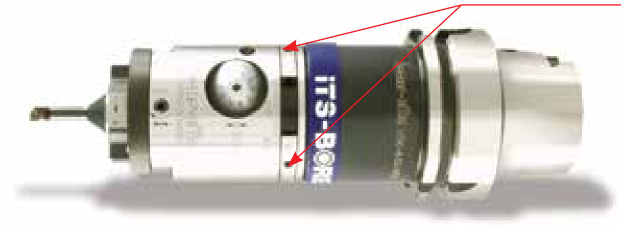
40 Bar Max

Designation	DCONMS	BD	LPR	DCN[1]	DCX[2]	DCONWS	ADJRGR	kg
BHF MB50-32X60 BL	50.00	32.00	60.00	2.5	12.0	8.00	3.00	0.80
BHF MB50-50X68 BL	50.00	50.00	68.50	6.0	22.0	16.00	4.00	1.12

- For boring options, see page 866
- For spare parts, see page 902-903
- For cutting conditions, see page 907

(1) Cutting diameter minimum (2) Cutting diameter maximum

For tools, see pages: IHAXF (871)



Balancing Weights **W1** & **W2**

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°

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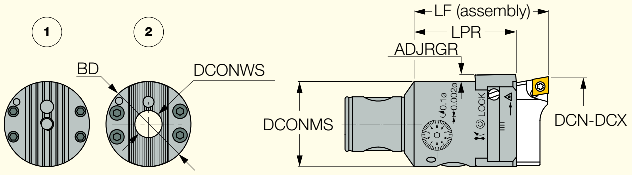
BHF MB16-MB50 Dia. 2.5-108

Fine Boring Heads with 2 µm Direct Diametric Adjustment for a Diameter Range of 2.5 up to 108 mm



2 µm

40 Bar Max

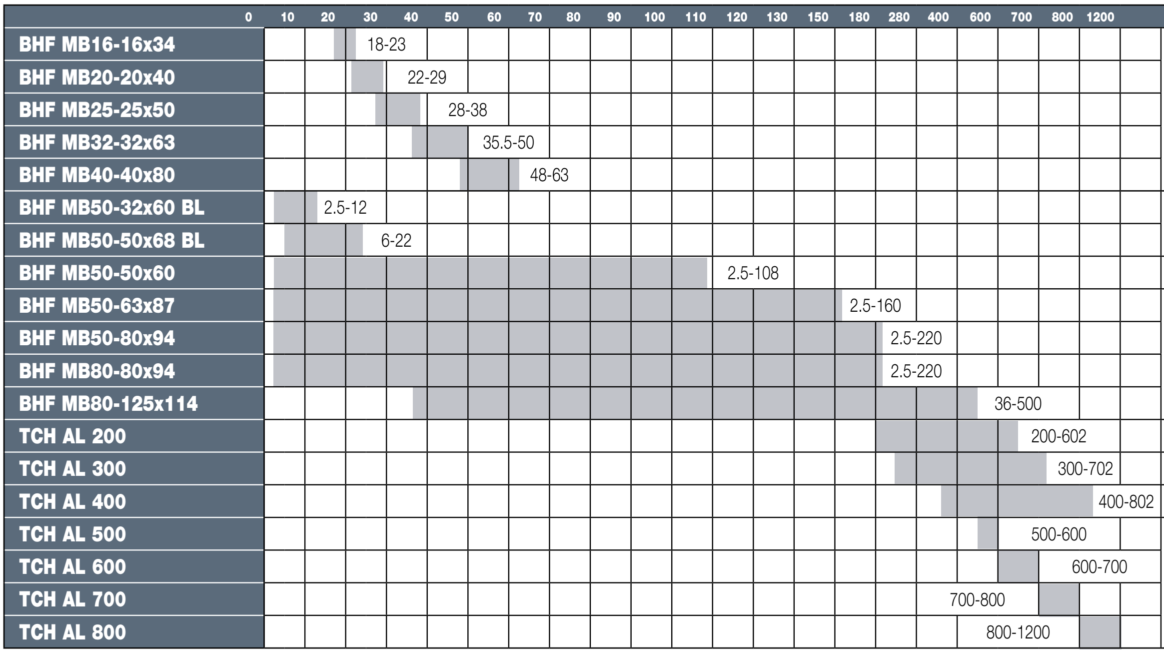
Designation	DCONMS	BD	LF	LPR	ADJRGR	DCN[1]	DCX[2]	DCONWS	Fig.	IH	kg		
BHF MB16-16X34 RV	16.00	16.00	34.0	26.00	1.00	18.0	23.0	-	1.	IH.. 16..	0.11	BH LOCK NUT 14/16	BH LOCK SR 14/16
BHF MB20-20X40 RV	20.00	20.00	40.0	32.60	2.00	22.0	29.0	-	1.	IH.. 20..	0.13	BH LOCK NUT 20	BH LOCK SR 20
BHF MB25-25X50	25.00	25.00	50.0	40.00	2.00	28.0	38.0	-	1.	IH.. 25..	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..	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..	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..	1.09	BH NUT 10	BH LOCK SR 50

- For user guide, see page 867, 908 • For spare parts, see page 902-903

[1] Cutting diameter minimum [2] Cutting diameter maximum

For tools, see pages: IHAXF (871) • IHAXF-AVI (873) • IHAXF-E (873) • IHFF (853) • IHRF (853) • IHRF-BW (877) • IHRF-CH (878)

Fine Boring Head Diameter Range

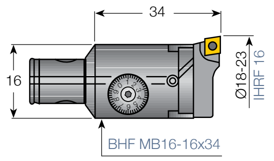


		Assembly Reference Page
BHF MB16-16x34	18-23	864
BHF MB20-20x40	22-29	
BHF MB25-25x50	28-38	
BHF MB32-32x63	35.5-50	
BHF MB40-40x80	48-63	
BHF MB50-32x60 BL	2.5-12	862
BHF MB50-50x68 BL	6-22	
BHF MB50-50x60	2.5-108	864
BHF MB50-63x87	2.5-160	871
BHF MB50-80x94	2.5-220	
BHF MB80-80x94	2.5-220	
BHF MB80-125x114	36-500	
TCH AL 200	200-602	
TCH AL 300	300-702	
TCH AL 400	400-802	
TCH AL 500	500-600	876
TCH AL 600	600-700	
TCH AL 700	700-800	
TCH AL 800	800-1200	

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.

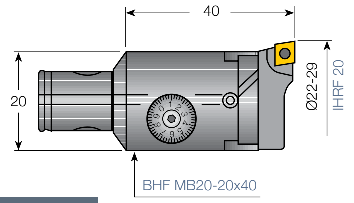
BHF MB16-MB40
Diameter Range: 18-63

ø18-23



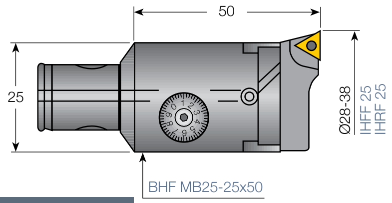
BHF MB16-16x34

ø22-29



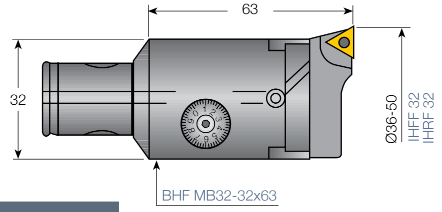
BHF MB20-20x40

ø28-38



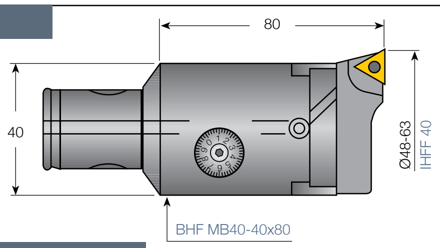
BHF MB25-25x50

ø36-50



BHF MB32-32x63

ø48-63



BHF MB40-40x80

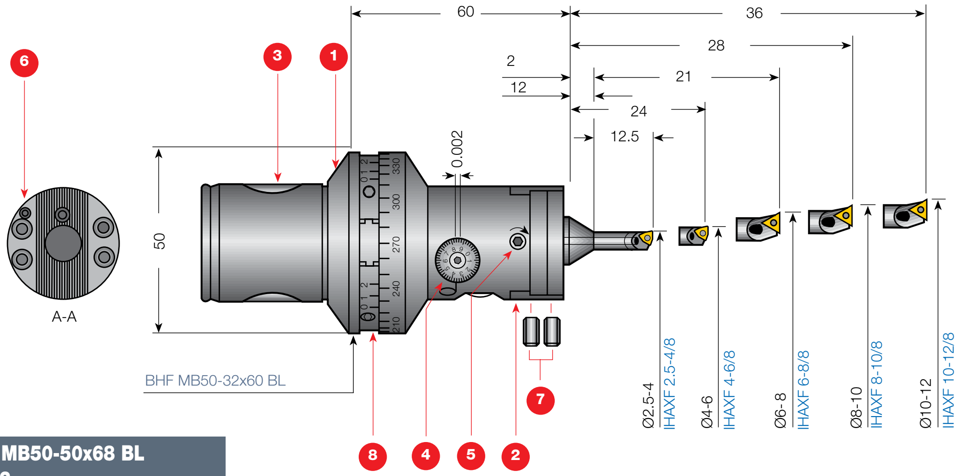
Fine Boring Heads with Balancing Rings

2 μm Direct Diametric Adjustment

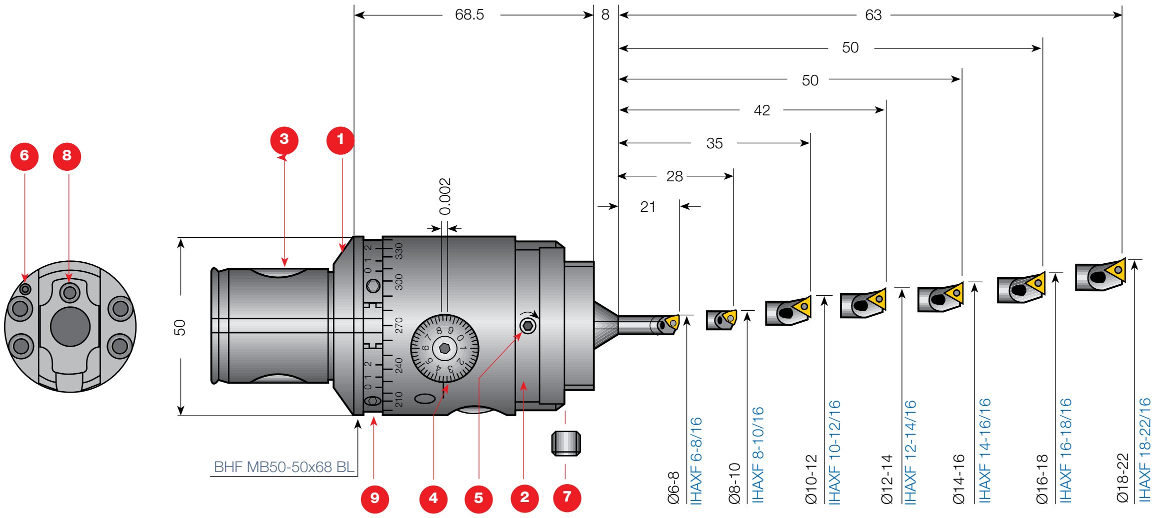
2 μm

BHF MB50-32x60 BL
ø2.5-12

① Body
② Tool Slide
③ Expansion Pin
⚠ ④ Graduated Dial
⑤ Slide Locking Screw
⑥ Coolant Nozzle
⑦ Boring Bar Locking
⑧ Screws
Balancing Rings



BHF MB50-50x68 BL
ø6-22



① Body
② Tool Slide
③ Expansion Pin
⚠ ④ Graduated Dial
⑤ Slide Locking Screw
⑥ Coolant Nozzle
⑦ Boring Bar Locking
⑧ Screws
⑨ Oiling Nipple
Balancing Rings

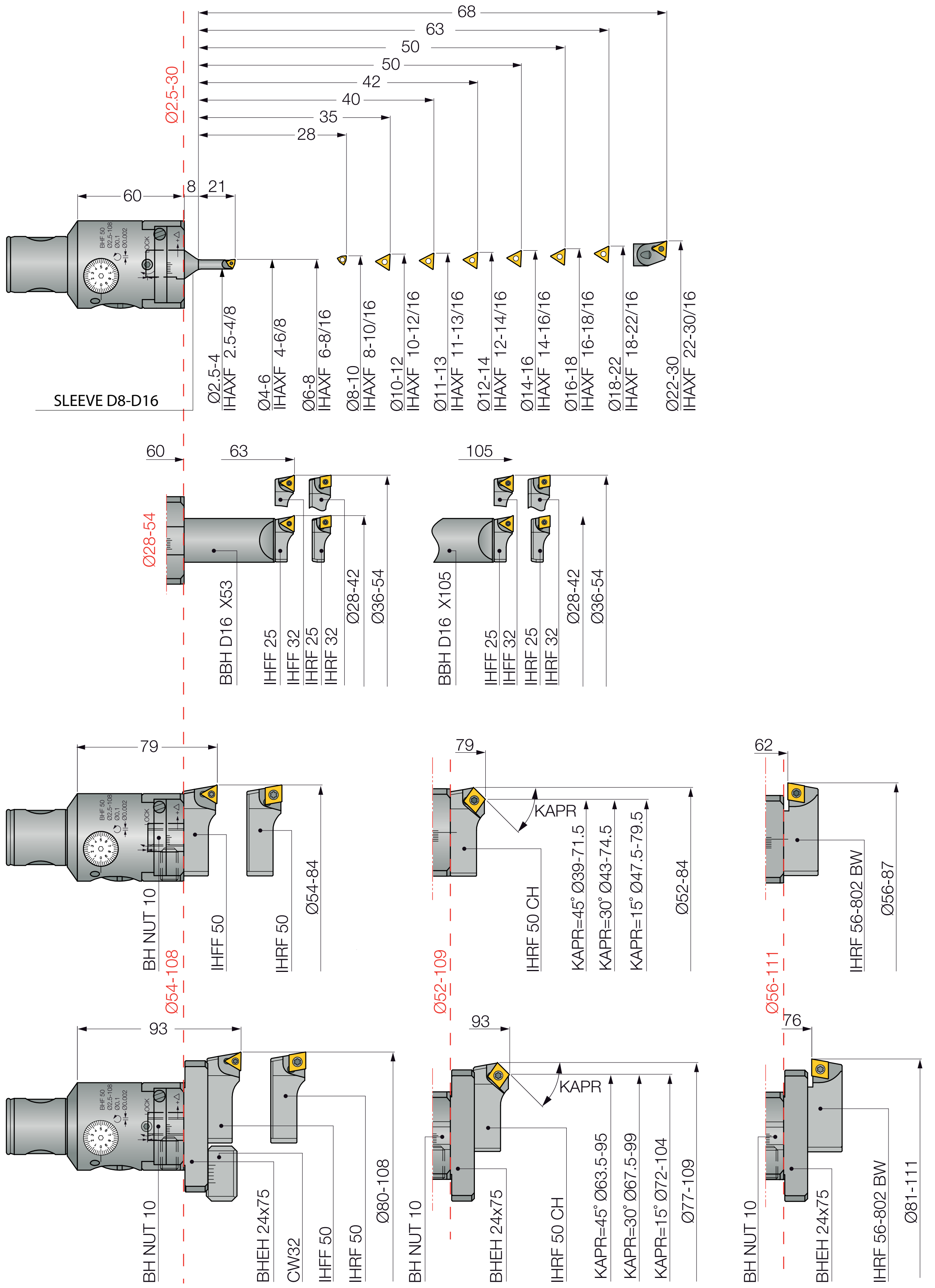
⚠ See **page** 908

Fine Boring Head Range

2 µm Direct Diametric Adjustment

2 µm

BHF MB50-50x60 ø2.5-108



⚠ See **page** 908

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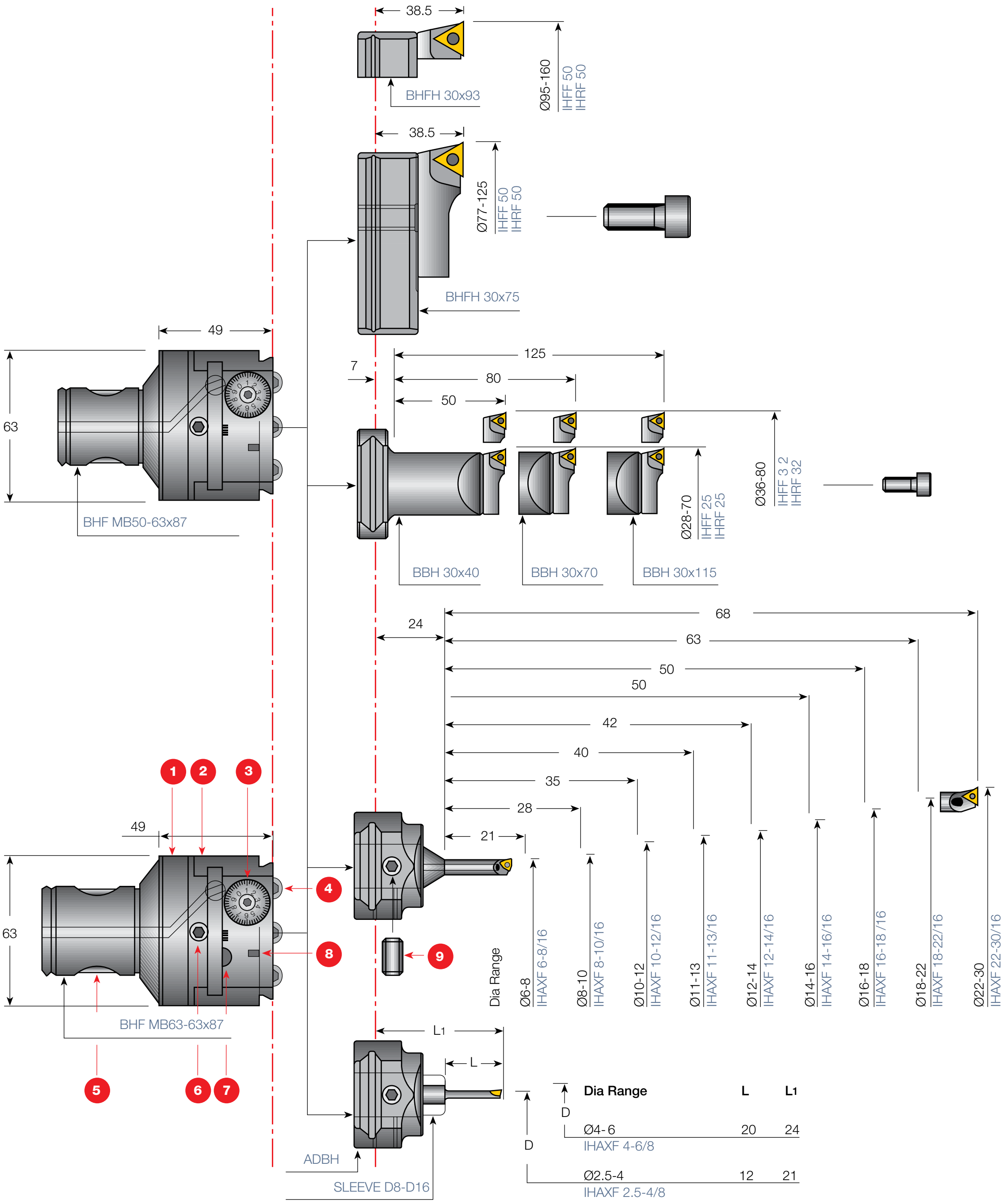
Fine Boring Head Range

2 µm Direct Diametric Adjustment

2 µm

BHF MB50-63x87
BHF MB63-63x87
ø2.5-160

- ❶ Body
- ❷ Tool Slide
- ⚠ ❸ Graduated Dial
- ❹ Toolholder Locking Screw
- ❺ Expansion Pin
- ❻ Slide Locking Screw
- ❼ Coolant Nozzle
- ❽ Oiling Nipple
- ❾ Toolholder Locking Screw



Dia Range	L	L1
Ø4-6 IHAXF 4-6/8	20	24
Ø2.5-4 IHAXF 2.5-4/8	12	21

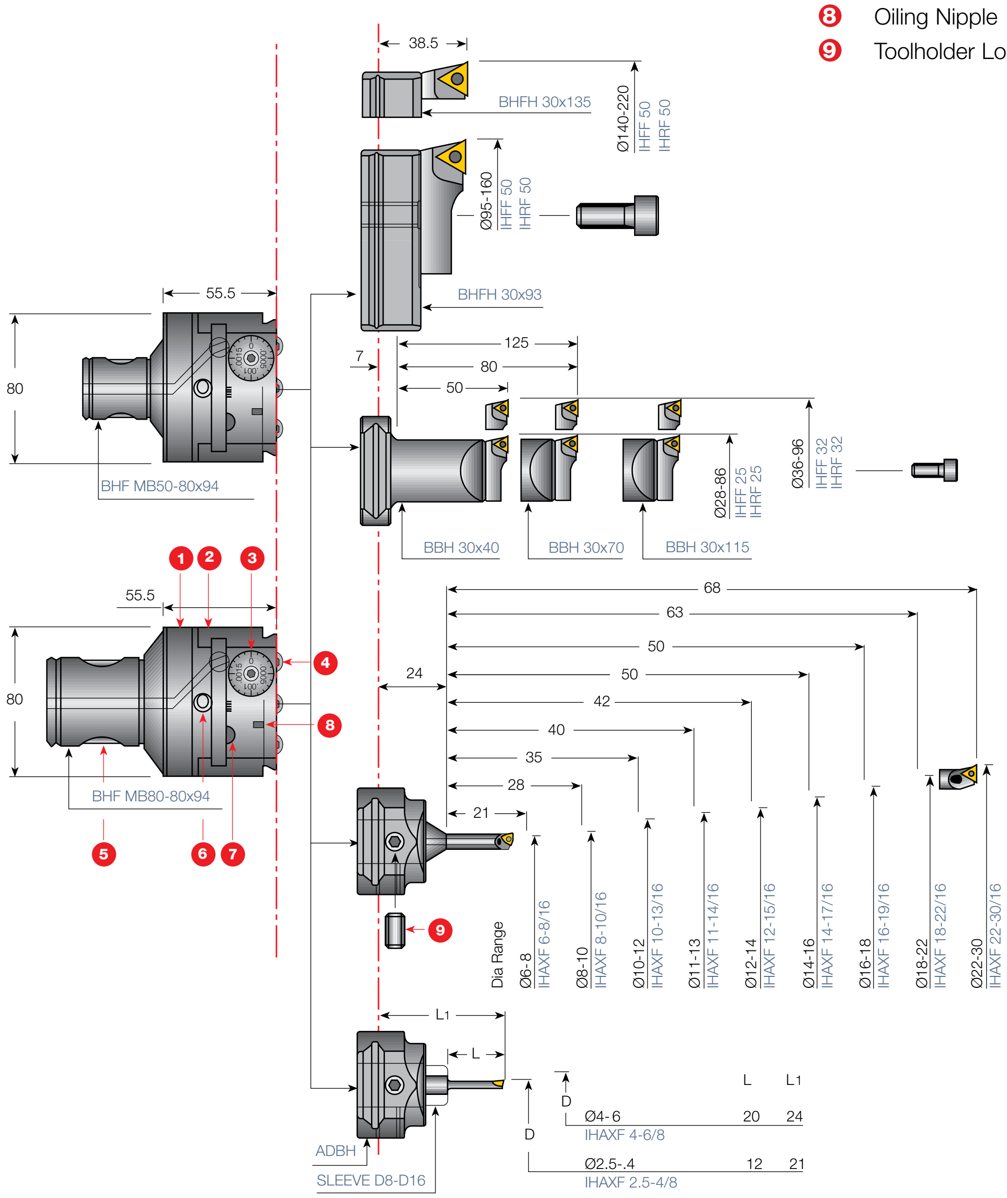
⚠ See **pages** 908-909

Fine Boring Head Range

2 µm Direct Diametric Adjustment

BHF MB50-80x94
BHF MB80-80x94
ø2.5-220

① Body
② Tool Slide
⚠ ③ Graduated Dial
④ Toolholder Locking Screw
⑤ Expansion Pin
⑥ Slide Locking Screw
⑦ Coolant Nozzle
⑧ Oiling Nipple
⑨ Toolholder Locking Screw



⚠ See **pags** 908-909

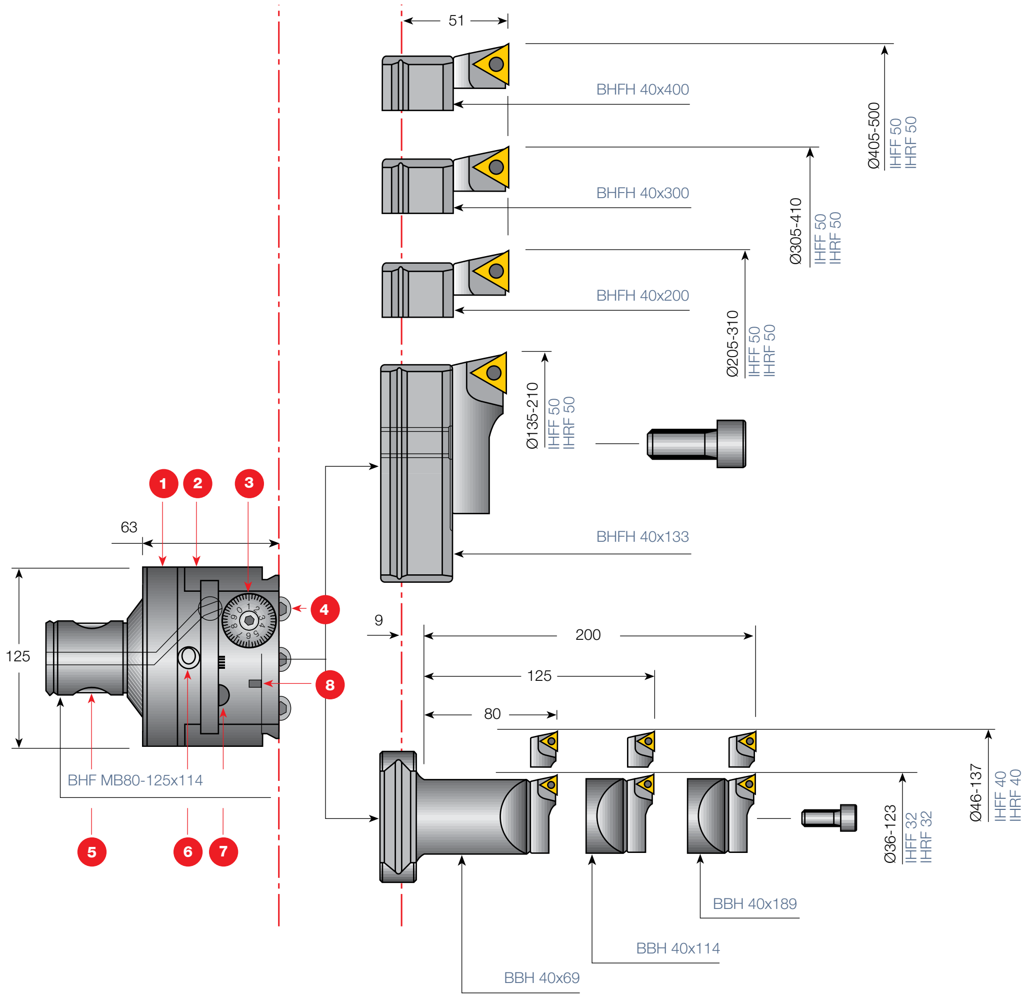
Fine Boring Head Range

2 µm Direct Diametric Adjustment

2 µm

BHF MB80-125x114
ø36-500

- ① Body
- ② Tool Slide
- ⚠ ③ Graduated Dial
- ④ Toolholder Locking Screw
- ⑤ Expansion Pin
- ⑥ Slide Locking Screw
- ⑦ Coolant Nozzle
- ⑧ Oiling Nipple

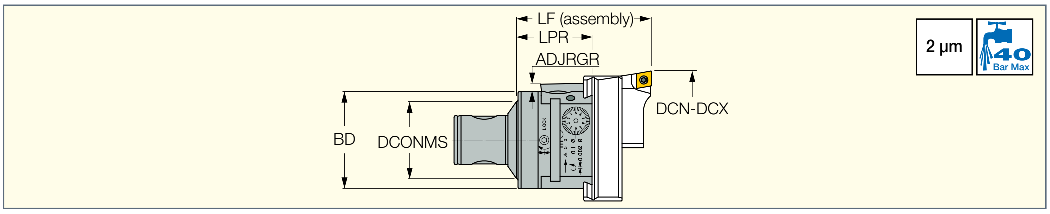


⚠ See **page** 909

ITSBORE

BHF MB50-MB80 Dia. 77-500

Fine Boring Heads with 2 µm Direct Diametric Adjustment for a Diameter Range of 77 up to 500 mm



Designation	DCONMS	BD	LF	DCN(4)	DCX(5)	LPR	ADJRGR	kg
BHF MB50-63X87 (1)	50.00	63.00	87.0	2.5	125.0	49.00	5.00	1.28
BHF MB50-80X94 (2)	50.00	80.00	94.0	2.5	160.0	58.00	5.00	2.22
BHF MB63-63X87 (1)	63.00	63.00	87.0	2.5	125.0	49.00	5.00	1.57
BHF MB80-80X94 (2)	80.00	80.00	94.0	2.5	160.0	58.00	5.00	2.63
BHF MB80-125X114 (3)	80.00	125.00	114.0	135.0	500.0	63.00	5.00	5.72

- For user guide, see pages 868-870
- For spare parts, see pages 872, 902, 905

(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

ITSBORE

IHAXF

Brazed and Indexable Boring Bars for the MB Modular Boring System

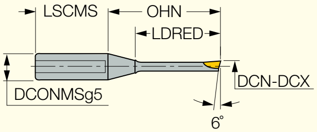


Fig. 1

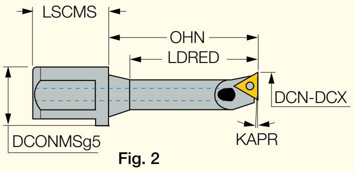


Fig. 2

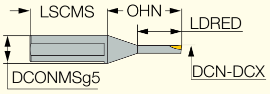


Fig. 3

Designation	DCN(2)	DCX(3)	LDRED	OHN(4)	LSCMS	DCONMS(5)	Fig.	KAPR	Insert	CSP		
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.

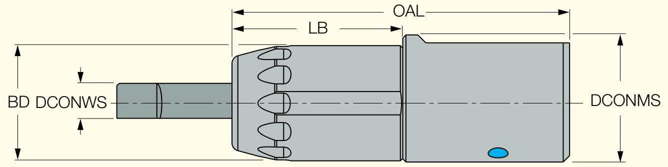
For inserts, see pages: TPGX (896) • TPGX (CBN) (897) • TPGX (PCD) (897) • WCGT (896)

For holders, see pages: ADBH (874) • BHD MB (853) • BHE MB (857) • BHE MB-H (857) • BHF MB-BL (862) • BHF MB16-MB50 Dia. 2.5-108 (864) • SLEEVE (872)

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

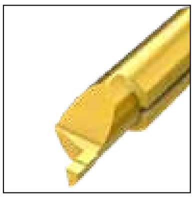

PICCO 051


PICCO 050 IB50 (CBN)


PICCO 520


PICCO 060


PICCO MF

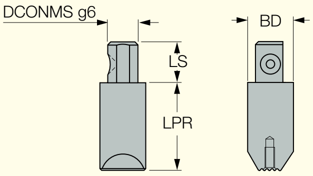

PICCO 010


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 (853) • IHRF (853)

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SLEEVE

Reduction Sleeves for Boring Bars on the MB Modular Boring System

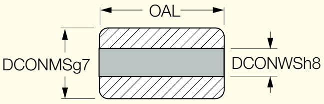


Fig.1

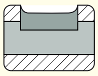


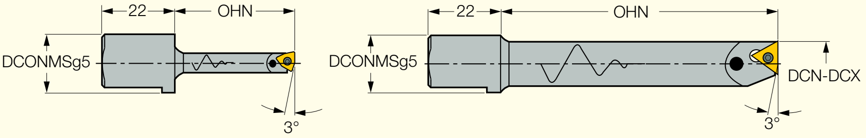
Fig.2

Designation	DCONMS	DCONWS	OAL	Fig.
SLEEVE D 4-D16	16.00	4.00	23.00	1.
SLEEVE D 8-D16	16.00	8.00	23.00	2.
SLEEVE D10-D16	16.00	10.00	23.00	1.
SLEEVE D12-D16	16.00	12.00	23.00	1.

For tools, see pages: IHAXF (871)

ITSBORE

IHAXF-AVI
Heavy Metal Vibration
Damping Boring Bars



Designation	DCN(1)	DCX(2)	OHN	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

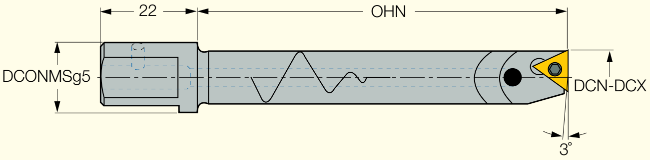
(2) Cutting diameter maximum

For inserts, see pages: TPGX (896) • TPGX (CBN) (897) • WCGT (896)

For holders, see pages: ADBH (874) • BHD MB (853) • BHE MB (857) • BHE MB-H (857) • BHF MB16-MB50 Dia. 2.5-108 (864)

ITSBORE

IHAXF-E
Carbide Vibration
Dampening Boring Bars



Designation	DCN(1)	DCX(2)	OHN	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

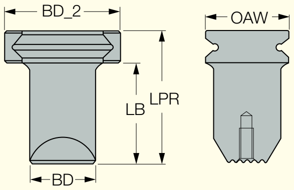
(2) Cutting diameter maximum

For inserts, see pages: TPGX (896) • TPGX (CBN) (897) • WCGT (896)

For holders, see pages: ADBH (874) • BHD MB (853) • BHE MB (857) • BHE MB-H (857) • BHF MB16-MB50 Dia. 2.5-108 (864)

ITSBORE

BBH 30/40
Extension Slides for MB
Modular Fine Boring Holders

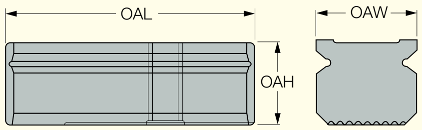


Designation	OAW	LB	BD	LPR	BD_2	kg
BBH 30X40	30.5	40.0	25.00	52.50	43.00	0.26
BBH 30X70	30.5	70.0	25.00	82.50	43.00	0.38
BBH 30X115	30.5	115.0	27.00	127.50	43.00	0.64
BBH 40X69	40.0	69.0	32.00	86.00	56.00	0.69
BBH 40X114	40.0	114.0	32.00	131.00	56.00	0.98
BBH 40X189	40.0	189.0	38.00	206.00	56.00	1.94

For tools, see pages: IHFF (853) • IHRF (853)

ITSBORE

BHFH
Counter Weight Slides for MB Modular Fine Boring Holders

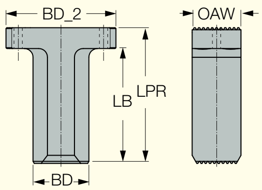


Designation	OAW	OAL	OAH	kg	
BHFH 30X75	30.5	75.00	25.0	0.44	SR M10X25 DIN912
BHFH 30X93	30.5	93.00	25.0	0.54	SR M10X25 DIN912
BHFH 30X135	30.5	135.00	25.0	0.76	SR M10X25 DIN912
BHFH 40X133	40.0	133.00	40.0	1.52	SR M10X25 DIN912
BHFH 40X200	40.0	200.00	40.0	2.30	SR M10X25 DIN912
BHFH 40X300	40.0	300.00	40.0	3.47	SR M10X25 DIN912
BHFH 40X400	40.0	400.00	40.0	4.56	SR M10X25 DIN912

For tools, see pages: IHFF (853) • IHRF (853) • IHRF-BW (877) • IHRF-CH (878)

ITSBORE

BBH 63
Extension Slides for MB Modular BHE Fine Boring Holders

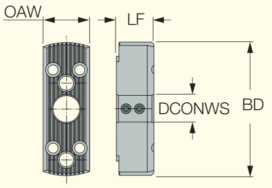


Designation	BD_2	LPR	BD	LB	OAW	kg
BBH 63X78	63.00	78.00	32.00	66.0	28.0	0.52

For tools, see pages: IHFF (853) • IHRF (853)

ITSBORE

BHEH
Slides for MB Modular BHE Fine Boring Holders

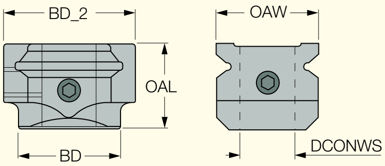


Designation	OAW	BD	LF	DCONWS	kg				
BHEH 24X75	24.0	75.00	14.5	-	0.20				
BHEH 28X80	28.0	80.00	22.5	16.00	0.33	SR M6X6 DIN913*	SR M5X25DIN912*	HW 4.0*	HW 3.0*
BHEH 28X108	28.0	108.00	22.5	-	0.53				
BHEH 28X148	28.0	148.00	22.5	-	0.69				

For tools, see pages: IHFF (853) • IHRF (853) • IHRF-BW (877) • IHRF-CH (878)

ITSBORE

ADBH
Sleeve for MB Modular Fine Boring Holders



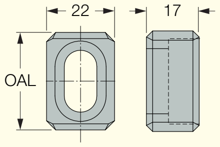
Designation	BD	DCONWS	OAL	BD_2	OAW	kg
ADBH 30XD16	30.00	16.00	25.00	39.00	30.5	0.15

For tools, see pages: IHAXF (871) • IHAXF-AVI (873) • IHAXF-E (873)

ITSBORE

CW32

Counter Balancing Weight Used on BHEH Slide for Fine Boring Holders

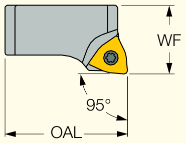


Designation	OAL	kg
CW32	31.50	0.05

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

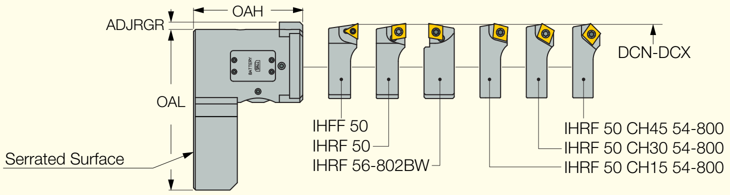
For inserts, see pages: WCGT (896)

For holders, see pages: BHD MB (853) • BHE MB (857)

ITSBORE

BHD 50 L200

Digital Fine Boring Slide Head for TCH AL Large Diameter Holders



Designation	DCN[1]	DCX[2]	OAL	OAH	ADJRGR	kg
BHD 50 L200	200.0	1202.0	110.00	74.0	5.00	1.70

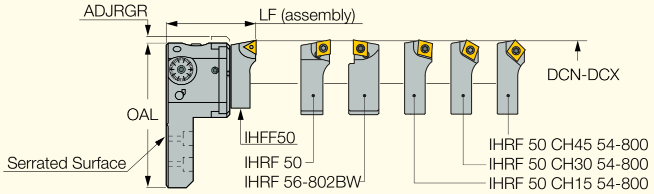
[1] Cutting diameter minimum [2] Cutting diameter maximum

For tools, see pages: IHFF (853) • IHRF (853) • IHRF-BW (877) • IHRF-CH (878)

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

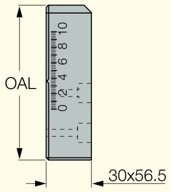
[1] Cutting diameter minimum [2] Cutting diameter maximum

For tools, see pages: IHFF (853) • IHRF (853) • IHRF-BW (877) • IHRF-CH (878)

ITSBORE

CW200

Counter Balancing Weight for TCH AL Rough and Fine Boring Holders

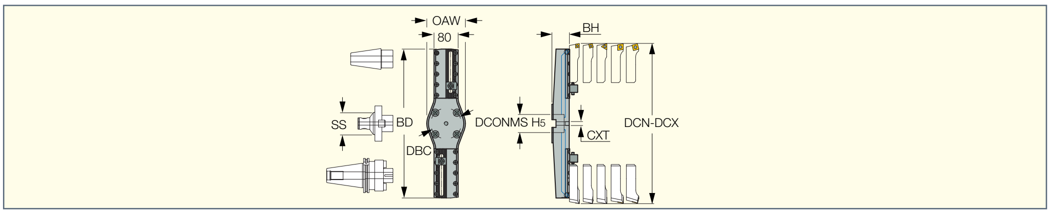


Designation	OAL	kg
CW200	105.00	1.12

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	kg
TCH AL200	200.0	602.0	194.00	40.00	66.70	80	-	-	54.00	1	3.20
TCH AL300	300.0	702.0	288.00	40.00	66.70	80	-	-	54.00	1	3.90
TCH AL400	400.0	802.0	394.00	40.00	66.70	80	-	1/4GAS	61.00	0	6.90
TCH AL500	500.0	902.0	494.00	60.00	101.60	80,110	128.0	1/4GAS	69.00	0	8.70
TCH AL600	600.0	1002.0	594.00	60.00	101.60	80,110	128.0	1/4GAS	71.00	0	8.34
TCH AL700	700.0	1102.0	694.00	60.00	101.60	80,110	128.0	1/4GAS	74.00	0	8.34
TCH AL800	800.0	1202.0	794.00	60.00	101.60	80,110	128.0	-	80.00	0	15.20

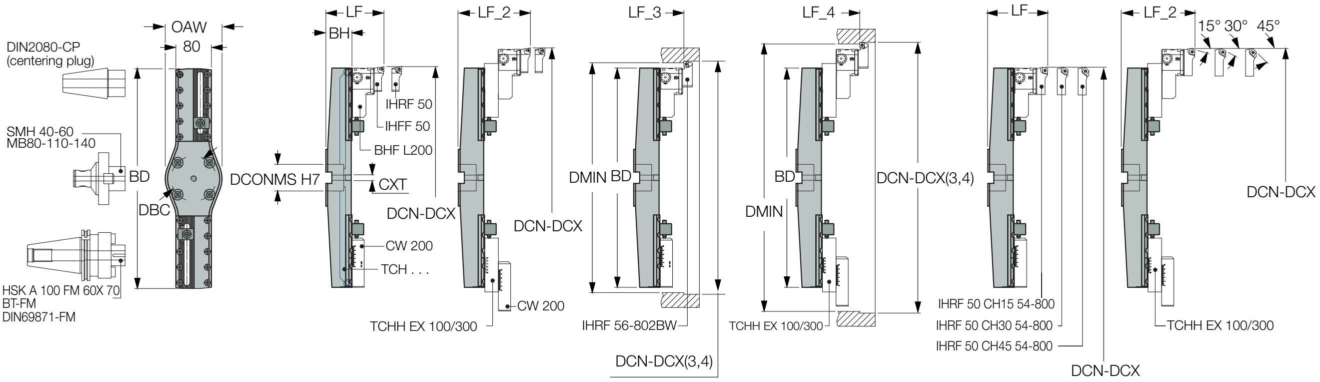
• Aluminum body, with steel serrated seats • The "O" position on the counterweight balances the BHF boring head for 200 mm boring diameter position. For every 10 mm change in boring diameter, move the counterweight by 1 measurement mark • Verify that the weight of the entire tool assembly does not exceed the machine spindle's carrying capability • For spare parts, see page 875, 905

[1] Cutting diameter minimum

[2] Cutting diameter maximum

For tools, see pages: IHBR (849) • IHCR (848) • IHPR (849) • IHSR (848) • IHSR-BW (850)

Large Diameter Double Edge Fine Boring Options

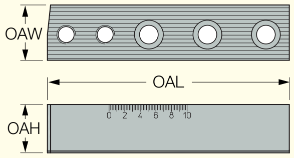


				Aluminum Twin Cutter Heads						
Boring Tools	**Fine Boring Slide Head**	**Extension Slides**	**Dimensions**	**TCH 200**	**TCH 300**	**TCH 400**	**TCH 500**	**TCH 600**	**TCH 700**	**TCH 800**
IH.F 50	BHF L200 / BHD MB50 L200		d	200-300	300-400	400-500	500-600	600-700	700-800	800-900
IH.F 50	BHF L200 / BHD MB50 L200	TCHH EX 100	d	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
IH.F 50	BHF L200 / BHD MB50 L200	TCHH EX 300	d	400-600	500-700	600-800	700-900	800-1000	900-1100	1000-1200
IHRF 56-802BW	BHF L200 / BHD MB50 L200		d1	202-302	302-402	402-502	502-602	602-702	702-802	802-902
IHRF 56-802BW	BHF L200 / BHD MB50 L200	TCHH EX 100	d1	302-402	402-502	502-602	602-702	702-802	802-902	902-1002
IHRF 56-802BW	BHF L200 / BHD MB50 L200	TCHH EX 300	d1	402-602	502-702	602-802	702-902	802-1002	902-1102	1002-1202
IH.F 50	BHF L200		L1	120	120	127	135	137	140	146
IH.F 50	BHF L200	TCHH EX 100	L2	150	150	157	165	167	170	176
IH.F 50	BHF L200	TCHH EX 300	L2	160	160	167	175	177	180	186
IHRF 56-802BW	BHF L200		L3	103	103	110	118	120	123	129
IHRF 56-802BW	BHF L200	TCHH EX 100	L4	133	133	140	148	150	153	159
IHRF 56-802BW	BHF L200	TCHH EX 300	L4	143	143	150	158	160	163	169
IH.F 50	BHD MB50 L200		L5	147	147	154	162	164	167	173
IH.F 50	BHD MB50 L200	TCHH EX 100	L6	177	177	184	192	194	197	203
IH.F 50	BHD MB50 L200	TCHH EX 300	L6	187	187	194	202	204	207	213
IHRF 56-802BW	BHD MB50 L200		L7	130	130	137	145	147	150	156
IHRF 56-802BW	BHD MB50 L200	TCHH EX 100	L8	160	160	167	175	177	180	186
IHRF 56-802BW	BHD MB50 L200	TCHH EX 300	L8	170	170	177	185	187	190	196

ITSBORE

TCHH EX

Boring Tools Extension Slides
for TCH AL Boring Heads



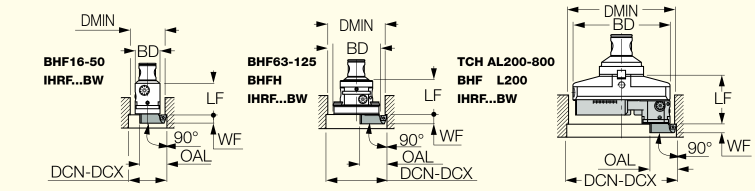
Designation	OAH	OAW	OAL	kg
TCHH EX100	31.0	35.5	155.00	1.50
TCHH EX300	41.0	35.5	255.00	2.80

For tools, see pages: IHBR (849) • IHCR (848) • IHPR (849) • IHSR (848) • IHSR-BW (850)

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...

- DMIN=(min bore diameter)=(DCN+BD+1)/2
- BD=Size of the boring head being used

(1) Suitable boring heads

(2) Cutting diameter minimum

(3) Cutting diameter maximum

For inserts, see pages: CCGT-AS (803) • CCGW/CCMT (CBN) (803) • CCMT (PCD) (803) • CCMT-14 (801) • CCMT-PF (801) • CCMT-WG (802) • CCMT/CCGT (802) • CCMT/CCGT-SM (801)

For holders, see pages: BHD 50 L200 (787) • BHD MB (766) • BHE MB (770) • BHEH (786) • BHF L200 (787) • BHF MB16-MB50 Dia. 2.5-108 (774) • BHFH (785)

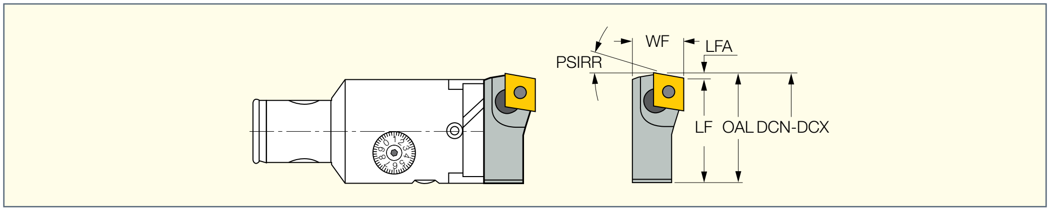
Spare Parts

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	18.0	23.0	17.80	20.00	11.00	2.20	20.0	CCGT 0602...
IHRF 16 CH30 18-23	18.0	23.0	16.80	20.00	9.00	3.20	30.0	CCGT 0602...
IHRF 16 CH45 18-23	18.0	23.0	15.54	20.10	9.50	4.60	45.0	CCGT 0602...
IHRF 16 CH60 18-23	18.0	23.0	14.50	20.00	9.50	5.60	60.0	CCGT 0602...
IHRF 20 CH15 22-29	22.0	29.0	22.30	24.00	11.00	1.70	15.0	CCGT 0602...
IHRF 20 CH20 22-29	22.0	29.0	21.70	24.00	11.00	2.20	20.0	CCGT 0602...
IHRF 20 CH30 22-29	22.0	29.0	20.80	24.00	9.00	3.20	30.0	CCGT 0602...
IHRF 20 CH45 22-29	22.0	29.0	19.40	24.00	9.50	4.60	45.0	CCGT 0602...
IHRF 20 CH60 22-29	22.0	29.0	18.40	24.00	9.50	5.60	60.0	CCGT 0602...
IHRF 25 CH15 28-38	28.0	38.0	24.00	25.70	10.40	1.70	15.0	CCGT 0602...
IHRF 25 CH30 28-38	28.0	38.0	22.60	25.60	10.40	3.20	30.0	CCGT 0602...
IHRF 25 CH45 28-38	28.0	38.0	21.40	25.90	10.40	4.40	45.0	CCGT 0602...
IHRF 32 CH15 35-53	35.0	53.0	32.00	33.70	12.60	1.70	15.0	CCGT 0602...
IHRF 32 CH30 35-53	35.0	53.0	30.50	33.70	12.10	3.20	30.0	CCGT 0602...
IHRF 32 CH20 36-50	36.0	50.0	32.50	34.80	13.50	2.20	20.0	CCGT 0602...
IHRF 32 CH45 36-50	36.0	50.0	29.20	33.70	12.10	4.60	45.0	CCGT 0602...
IHRF 32 CH60 36-50	36.0	50.0	29.30	34.80	12.00	5.60	60.0	CCGT 0602...
IHRF 40 CH60 48-63	48.0	63.0	39.10	47.50	16.50	8.40	60.0	CCGT 09T3...
IHRF 40 CH15 48-66	48.0	66.0	44.90	47.40	17.50	2.50	15.0	CCGT 09T3...
IHRF 40 CH30 48-66	48.0	66.0	38.20	42.90	14.40	4.70	30.0	CCGT 09T3...
IHRF 40 CH45 48-66	48.0	66.0	36.40	43.00	14.40	6.70	45.0	CCGT 09T3...
IHRF 50 CH15 54-800	54.0	800.0	48.10	50.60	19.00	2.50	15.0	CCGT 09T3...
IHRF 50 CH20 54-800	54.0	800.0	52.20	55.50	18.00	3.30	20.0	CCGT 09T3...
IHRF 50 CH30 54-800	54.0	800.0	49.95	50.80	19.00	4.70	30.0	CCGT 09T3...
IHRF 50 CH45 54-800	54.0	800.0	44.00	50.60	19.00	6.70	45.0	CCGT 09T3...
IHRF 50 CH60 54-800	54.0	800.0	47.10	55.50	16.50	8.40	60.0	CCGT 09T3...

[1] Cutting diameter minimum [2] Cutting diameter maximum

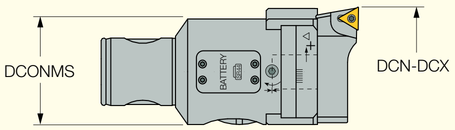
For inserts, see pages: CCGT-AS (891) • CCGW/CCMT (CBN) (891) • CCMT (PCD) (891) • CCMT-PF (889) • CCMT-WG (890) • CCMT/CCGT (890) • CCMT/CCGT-SM (889)

For holders, see pages: BHD 50 L200 (875) • BHD MB (853) • BHE MB (857) • BHEH (874) • BHF L200 (875) • BHF MB16-MB50 Dia. 2.5-108 (864) • BHFH (874)

ITSBORE

KIT BHD-MB

Contains a Digital Display
Fine Boring Head and Various
Boring Tools and Inserts

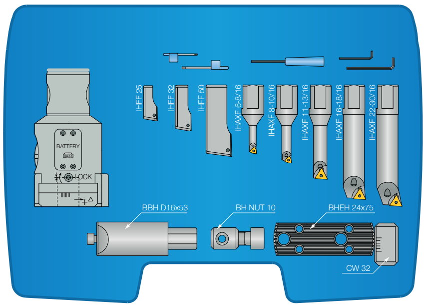


Designation	DCN[1]	DCONMS	DCX[2]
KIT BHD MB50-50 6-110	6.00	50.00	110.00
KIT BHD MB63-63 6-125	6.00	63.00	125.00
KIT BHD MB80-80 6-200	6.00	80.00	200.00

[1] Cutting diameter minimum [2] Cutting diameter maximum

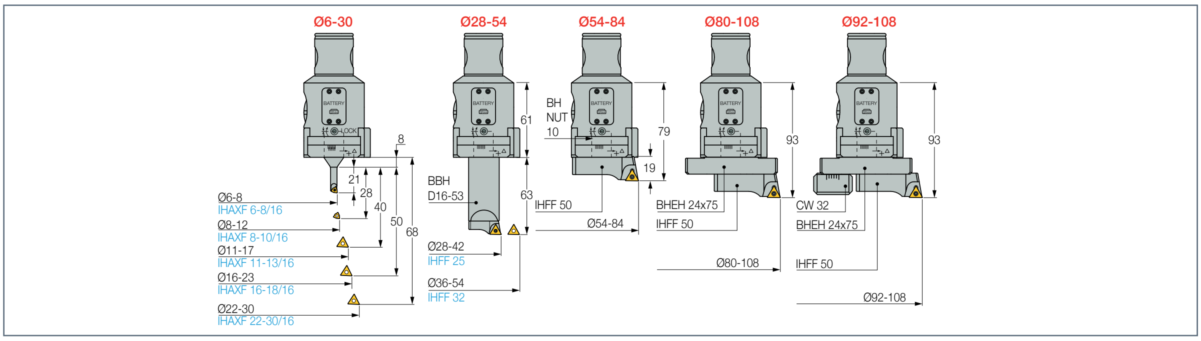
Boring Kit BHD MB50-50 metric/inch (ø6-110 mm) Fine Boring Head with 2 µm Direct Diametric Adjustment Resolution and a Built-in Digital Display

2 µm

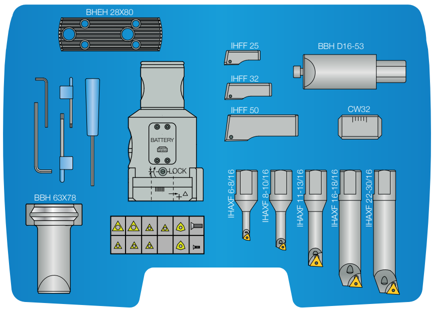


1 BHD MB50-50x60
1 IHFF 25
1 IHFF 32
1 IHFF 50
1 IHAXF 6-8/16
1 IHAXF 8-10/16
1 IHAXF 11-13/16
1 IHAXF 16-18/16
1 IHAXF 22-30/16
1 BBH D16-53
1 BHEH 24x75
1 BH NUT 10
1 CW 32
2 WCGT 020102L
5 TPGX 730-L
1 TPGX 220-L

Designation	MB	Boring Range
KIT BHD MB50-50 6-110	50	6-110

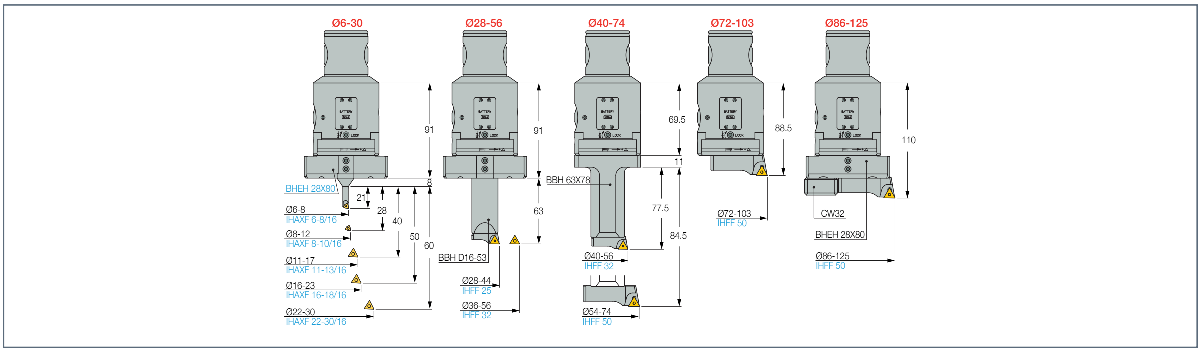


Boring Kit BHD MB63-63-89 metric/inch (ø6-125 mm) Fine Boring Head with 2 µm Direct Diametric Adjustment Resolution and a Built-in Digital Display

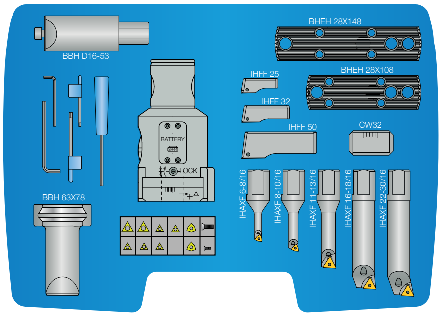


1 BHD MB63-63-89
1 BBH 63X78
1 BHEH 28X80
1 BBH 16-53
1 CW32
1 IHAXF 6- 8/16
1 IHAXF 8-10/16
1 IHAXF 11-13/16
1 IHAXF 16-18/16
1 IHAXF 22-30/16
1 IHFF 25
1 IHFF 32
1 IHFF 50
2 WCGT 020102L
5 TPGX 730-L
1 TPGX 220-L

Designation	MB d_1	Boring Range
KIT BHD MB63-63-89	63	2.5-125

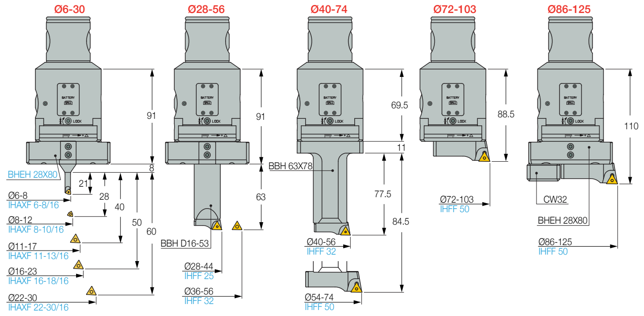


Boring Kit BHD MB80-80-104 metric/inch (ø6-200 mm) Fine Boring Head with 2 µm Direct Diametric Adjustment Resolution and a Built-in Digital Display



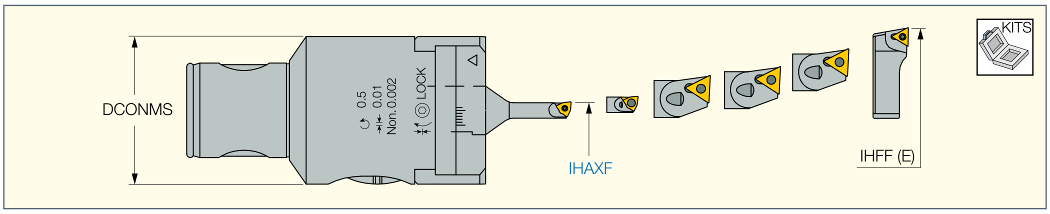
1 BHD MB80-80-104
1 BBH D16-53
1 BBH 63X78
1 BHEH 28X108
1 BHEH 28X148
1 CW32
1 IHAXF 6- 8/16
1 IHAXF 8-10/16
1 IHAXF 11-13/16
1 IHAXF 16-18/16
1 IHAXF 22-30/16
1 IHFF 25
1 IHFF 32
1 IHFF 50
2 WCGT 020102L
5 TPGX 730-L
1 TPGX 220-L

Designation	MB	Boring Range
KIT BHD MB80-80-104	63	6-200



KIT BHE MB

Contains a Fine Boring Head and Various Boring Tools and Inserts



Designation	DCONMS	DCN[2]	DCX[3]
KIT BHE MB32-32-53 H [1]	32	2.5	12
KIT BHE MB50-50-60 H [1]	50	6	22
KIT BHE MB50-50-80	50	6	110
KIT BHE MB63-63-89	63	6	125
KIT BHE MB80-80-104	80	6	200

- 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

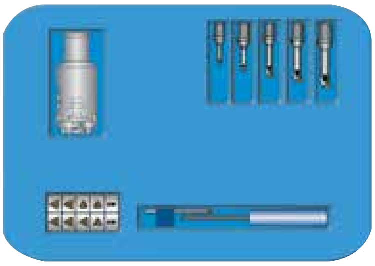
[2] Cutting diameter minimum

[3] Cutting diameter maximum

Boring Kit BHE MB32-32x53 H (ø2.5-12 mm) Fine Boring Head 10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale

10 µm
2 µm

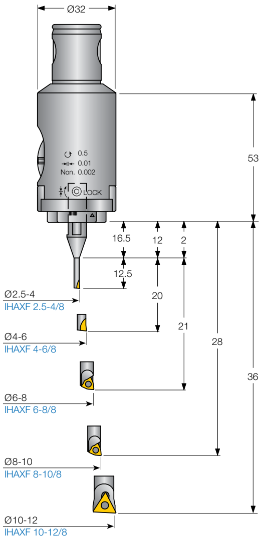
G2.5
12,000 RPM



Boring Tools:
1 BHE MB32-32X53 H
1 IHAXF 2.5-4/8
1 IHAXF 4-6/8
1 IHAXF 6-8/8
1 IHAXF 8-10/8
1 IHAXF 10-12/8

Inserts:
5 TPGX 090202L
2 WCGT 020102L

Designation	MB	Boring Range
KIT BHE MB32-32X53 H	32	2.5-12



Boring Kit BHE MB50-50x60 H (ø6-22 mm)
Fine Boring Head 10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale

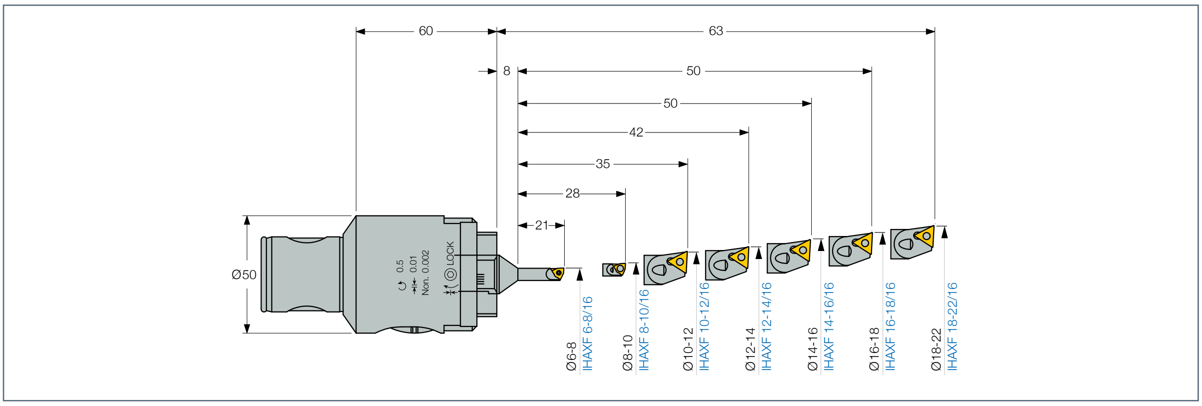
10 µm
2 µm

G2.5
12,000 RPM

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	

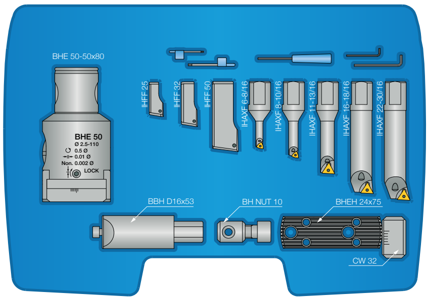
Designation	MB	Boring Range
KIT BHE MB50-50X60 H	50	6-22

10 µm direct diametric adjustment and 2 µm by a Vernier scale



Boring Kit BHE MB50-50 x 80 (ø6-110 mm)
Fine Boring Head 10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale

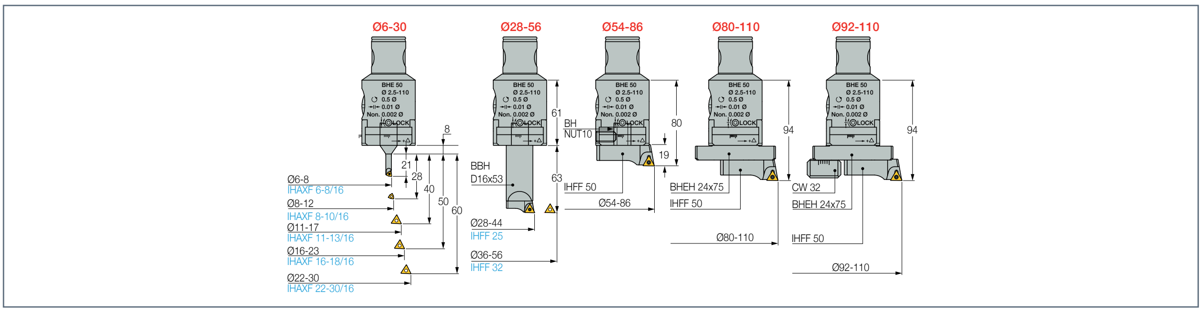
10 µm
2 µm



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

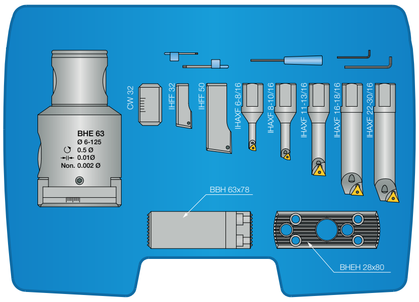
Designation	MB	Boring Range
KIT BHE MB50-50X80	50	6-110

10 µm direct diametric adjustment and 2 µm by a Vernier scale



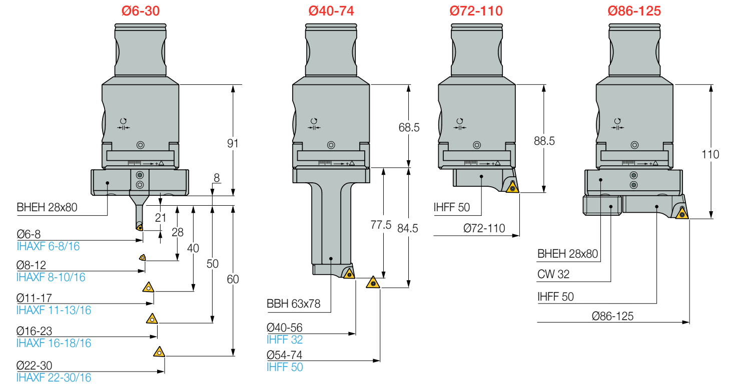
Boring Kit BHE MB63-63 x 89 (ø6-125 mm) Fine Boring Head 10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale

10 µm
2 µm

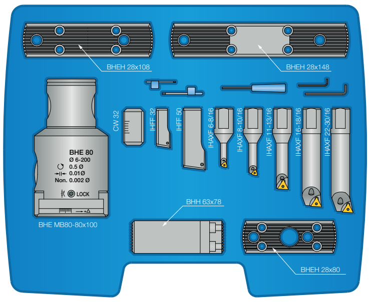


- 1 BHE MB63-63x89
- 1 IHFF 32
- 1 IHFF 50
- 1 IHFF 6-8/16
- 1 IHAXF 8-10/16
- 1 IHAXF 11-13/16
- 1 IHAXF 16-18/16
- 1 IHAXF 22-30/16
- 1 BBH 63x78
- 1 BHEH 28x80
- 1 BH WASHER IH..50
- 1 CW 32

Designation	MB	Boring Range
KIT BHE MB63-63X89	63	6-125

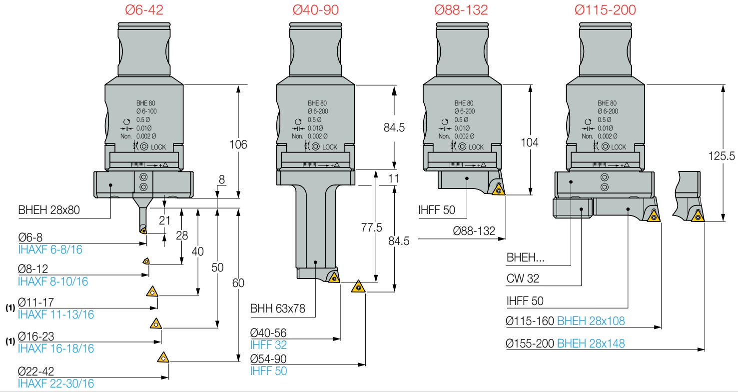


Boring Kit BHE MB80-80 x104 (ø6-200 mm) Fine Boring Head 10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale



- 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 MB80-80X104	80	6-200

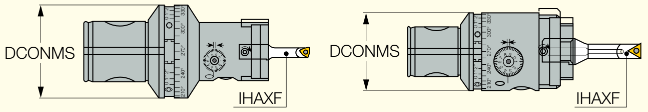


(1) The specified boring range differs from the one specified for the boring bar.
The extra range is not recommended for high rotational speeds.

ITSBORE

KIT BHF MB-BL

Contains a Balanceable Fine Boring Head and Various Boring Tools and Inserts



KITS

Designation	DCONMS	DCN[2]	DCX[3]
KIT BHF MB50-50 BL [1]	50.00	6.00	22.00

[1] Balanced to G2.5/20,000 RPM.

[2] Cutting diameter minimum

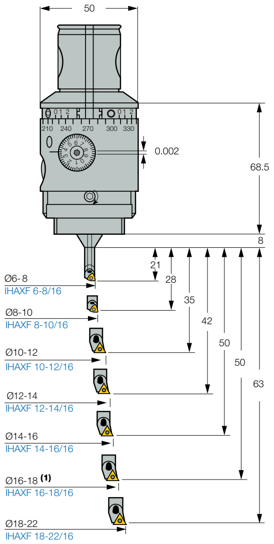
[3] Cutting diameter maximum

Boring Kit BL BHF MB50-50 (ø6-22 mm) with BHF BL Fine Boring Balanceable Head

2 µm

G2.5
20,000 RPM

- 1 BHF MB50-50X68 BL
- 1 IHAXF 6-8/16
- 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
- 5 TPGX 090202L
- 2 WCGT 020102L

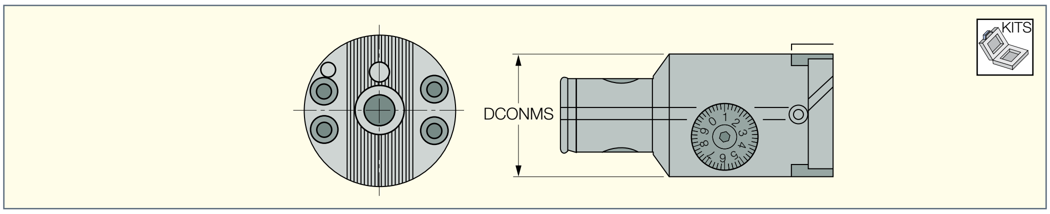


(1) On BHF BL max. balanceable dia. is 20 mm.

Designation	MB	Boring Range
KIT BL BHF MB50-50	50	6-22

KIT BHF-MB

Contains a Fine Boring Head and Various Boring Tools and Inserts

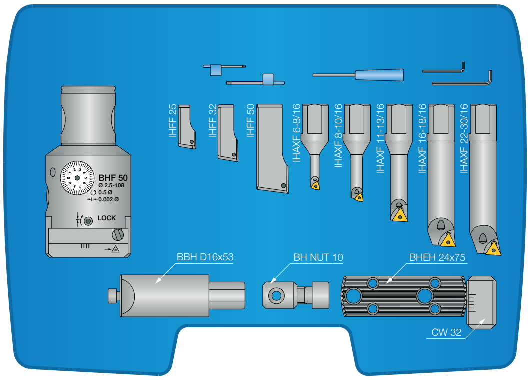


Designation	DCN[1]	DCX	DCONMS
KIT BHF MB50-50 6-108	6.00	108.00	50.00
KIT BHF MB50-63	6.00	125.00	50.00
KIT BHF MB50-80	6.00	220.00	50.00
KIT BHF MB63-63	6.00	125.00	63.00
KIT BHF MB80-80	6.00	200.00	80.00

[1] Cutting diameter minimum

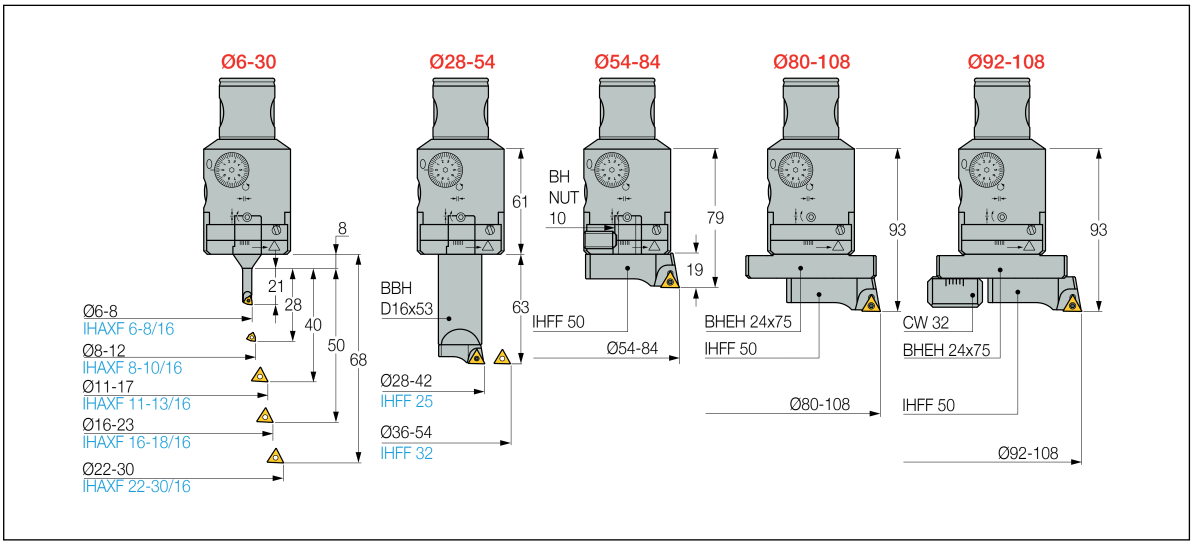
Boring Kit BHF MB50-50 (ø6-108 mm) Fine Boring Head 10 µm Direct Diametric Adjustment and 2 µm by a Vernier Scale

2 µm



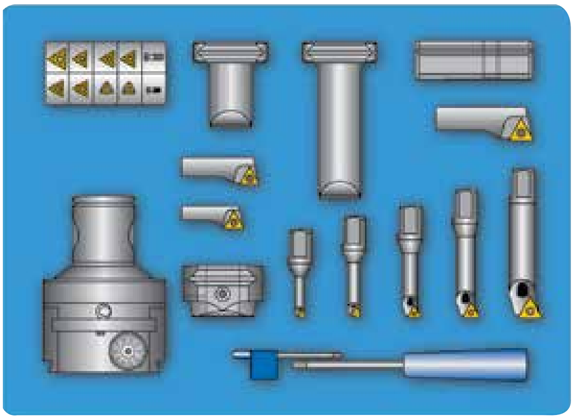
- 1 BHF MB50-50x60
- 1 IHFF 25
- 1 IHFF 32
- 1 IHFF 50
- 1 IHAXF 6-8/16
- 1 IHAXF 8-10/16
- 1 IHAXF 11-13/16
- 1 IHAXF 16-18/16
- 1 IHAXF 22-30/16
- 1 BBH D16x53
- 1 BHEH 24x75
- 1 BH NUT 10
- 1 CW 32
- 2 WCGT 020102L
- 5 TPGX 730-L
- 1 TPGX 220-L

Designation	MB	Boring Range
KIT BHF MB50-50 6-108	50	6-108



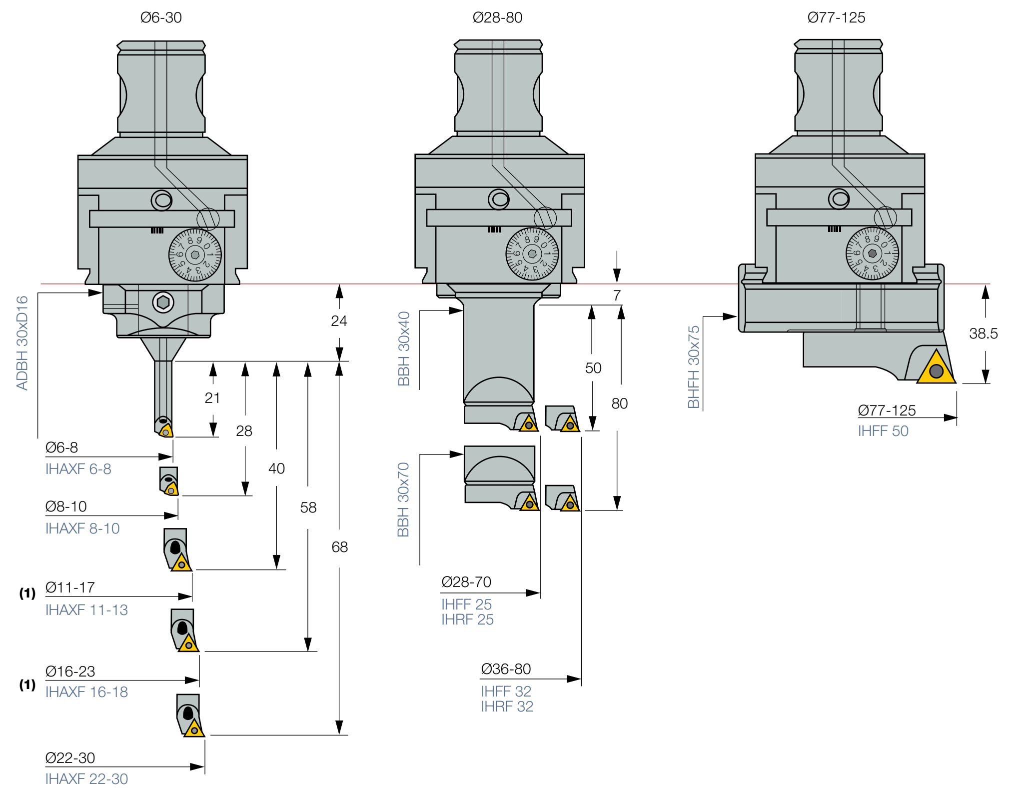
Boring Kit BHF MB50-63 /
Boring Kit BHF MB63-63 (ø6-125 mm)

2 µm



1 BHF MB...-63x87
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 ADBH 30xD16
1 BBH 30x40
1 BBH 30x70
1 BHFH 30x75
1 IHFF 25
1 IHFF 32
1 IHFF 50
5 TPGX 090202L
1 TPGX 110302L
2 WCGT 020102L

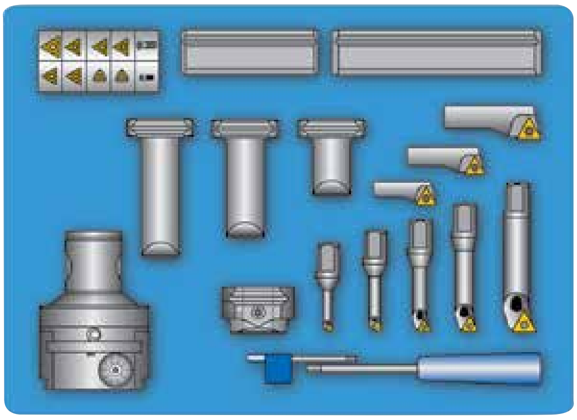
Designation	MB	Boring Range
KIT BHF MB50-63	50	6-125
KIT BHF MB63-63	63	6-125



[1] The specified boring range differs from the one specified for the boring bar. The extra range is not recommended for high rotational speeds.

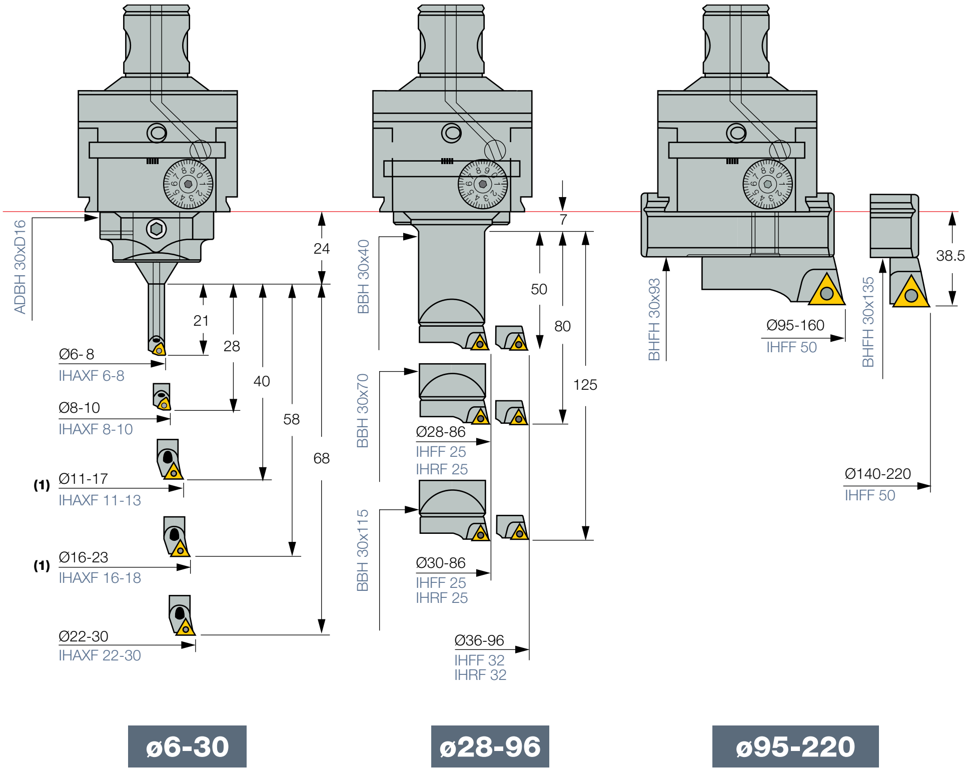
Boring Kit BHF MB50-80 /
Boring Kit BHF MB80-80 (ø6-220 mm)

2 µm



1 BHF MB..-80x94
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 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
5 TPGX 090202L
1 TPGX 110302L
2 WCGT 020102L

Designation	MB	Boring Range
KIT BHF MB50-80	50	6-220
KIT BHF MB80-80	80	6-220

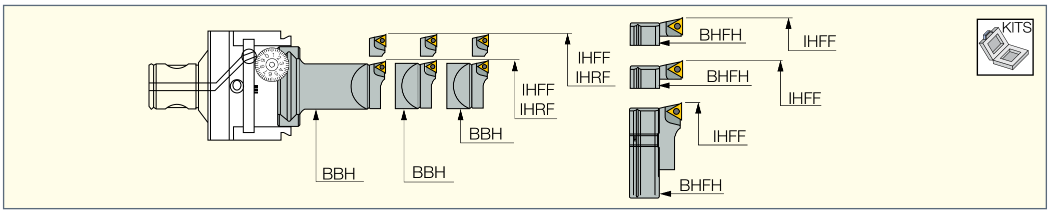


[1] The specified boring range differs from the one specified for the boring bar. The extra range is not recommended for high rotational speeds.

ITSBORE

KIT BHFH-MB

Contains Adapters, Extensions and Boring Bars for 36 to 400 mm Boring Range

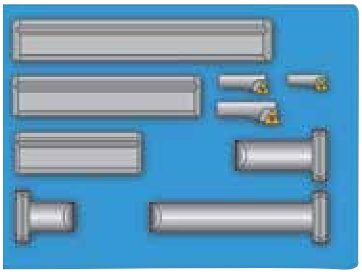


Designation	DCONMS	DCN(1)	DCX
KIT BHFH MB80-125	80.00	36.00	400.00

(1) Cutting diameter minimum

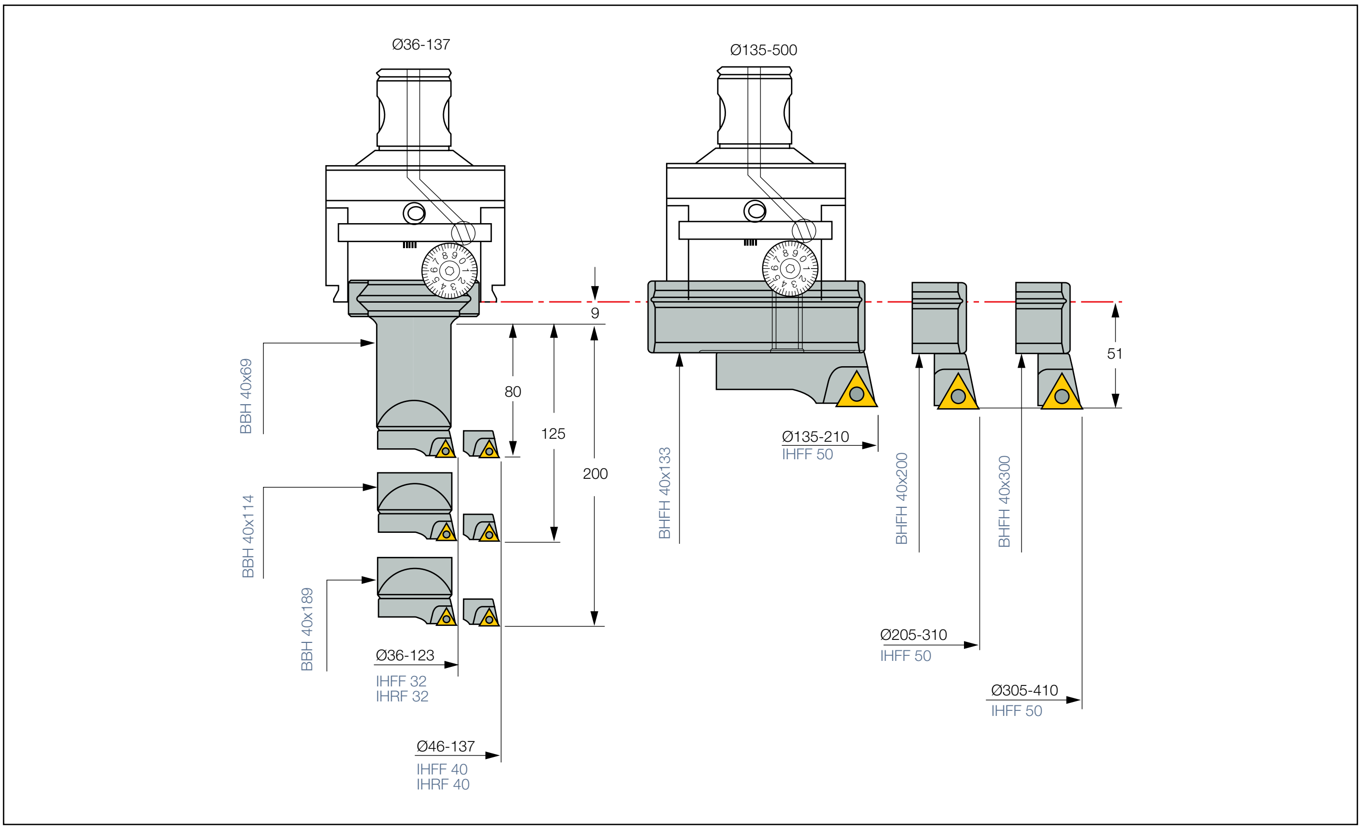
Kit BHFH MB80-125 Holder for BHF MB80-125x114 ø36-410

2 µm



- 1 BBH 40x69
- 1 BBH 40x114
- 1 BBH 40x189
- 1 BHFH 40x133
- 1 BHFH 40x200
- 1 BHFH 40x300
- 1 IHFF 25
- 1 IHFF 40
- 1 IHFF 50

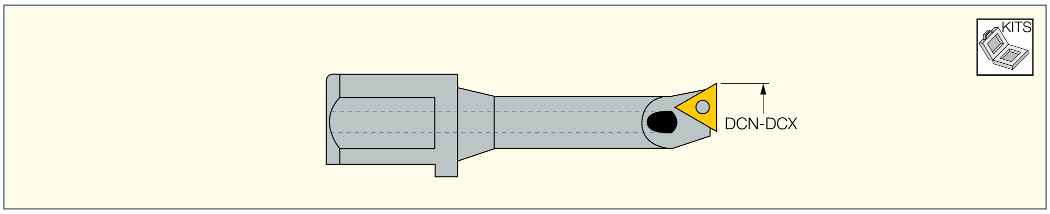
Designation	MB	Boring Range
KIT BHFH MB80-125	80	36-410



ITSBORE

KIT IHAXF

The Kit Contains Five Boring Bars and Suitable Inserts



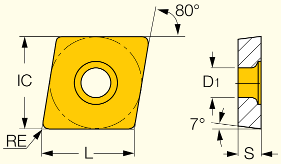
Designation	DCN(1)	DCX
KIT IHAXF 6-30	6.00	30.00

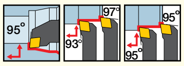
(1) Cutting diameter minimum

ISOTURN

CCMT/CCGT-SM

Single-Sided Turning Inserts for Semi-Finishing and Finishing on Soft Materials and Exotic Alloys





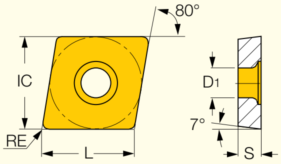
Designation	Dimensions					Tough ↔ Hard												Recommended Machining Data	
	L	IC	S	RE	D1	IC830	IC6025	IC8250	IC6015	IC8150	IC20	IC5010	IC428	IC5005	IC806	IC807	IC907	ap (mm)	f (mm/ rev)
CCGT 060201-SM	6.45	6.35	2.38	0.10	2.80												●	0.25-2.00	0.05-0.20
CCGT 060202-SM	6.45	6.35	2.38	0.20	2.80												●	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

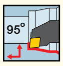
For tools, see pages: • IHCR (848) • IHRF (853) • IHRF-BW (877) • IHRF-C (852) • IHRF-CH (878) • IHSR (848) • IHSR-BW (850) • IHSR-C (852) • IHSR-CH (849)

ISOTURN

CCMT-PF

80° Rhombic Inserts with a Positive Flank for Semi-Finishing and Finishing on Soft Materials and Exotic Alloys





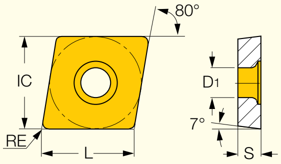
Designation	Dimensions					Tough ↔ Hard							Recommended Machining Data	
	L	IC	S	RE	D1	IC830	IC6025	IC6015	IC806	IC807	IC907	IC804	ap (mm)	f (mm/rev)
CCMT 060202-PF	6.30	6.35	2.38	0.20	2.80	●	●	●		●	●	●	0.20-2.50	0.04-0.25
CCMT 060204-PF	6.30	6.35	2.38	0.40	2.80	●	●	●	●	●	●		0.40-2.50	0.04-0.30
CCMT 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

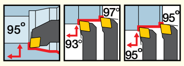
For tools, see pages: IHCR (848) • IHRF (853) • IHRF-BW (877) • IHRF-C (852) • IHRF-CH (878) • IHSR (848) • IHSR-BW (850) • IHSR-C (852) • IHSR-CH (849)

ISOTURN

CCMT-14

80° Rhombic Inserts with a 7° Positive Flank for Semi-Finishing and Finish Turning





Designation	Dimensions					Tough ↔ Hard							Recommended Machining Data	
	L	IC	S	RE	D1	IC830	IC8250	IC20	IC428	IC5005	IC807	IC907	ap (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

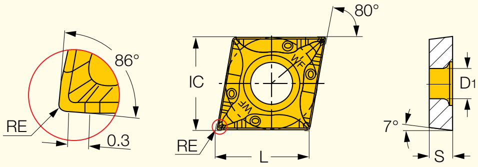
• Grooving depth (CDX) varies in conformance with blade's overhang (WFN-WFX and OHN-OHX) and depends on the bore diameter (D) • CGHN 26...-M can be modified from external double-sided CGHN blades • When TIP inserts are used the seat needs to be modified to ensure clearance

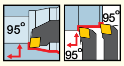
For tools, see pages: • IHCR (848) • IHRF (853) • IHRF-BW (877) • IHRF-C (852) • IHRF-CH (878) • IHSR (848) • IHSR-BW (850) • IHSR-C (852) • IHSR-CH (849)

ISOTURN

CCET-WF

80° Rhombic Inserts with a 7° Positive Flank and a Wiper Near the Corner for High Feed Finishing





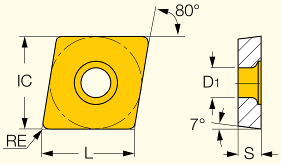
Designation	Dimensions					IC907	Recommended Machining Data	
	L	IC	S	RE	D1		ap (mm)	f (mm/rev)
CCET 0602005-WF	6.30	6.35	2.38	0.05	2.80	●	0.05-2.00	0.01-0.20
CCET 09T3005-WF	9.50	9.52	3.97	0.05	4.40	●	0.05-2.00	0.01-0.20

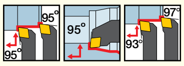
For tools, see pages: IHCR (848) • IHRF (853) • IHSR (848) • IHSR-BW (850) • IHSR-C (852) • IHSR-CH (849)

ISOTURN

CCMT/CCGT

80° Rhombic Inserts with a 7° Positive Flank for Semi-Finishing and Finish Turning





Designation	Dimensions					Tough ↔ Hard					Recommended Machining Data	
	L	IC	S	RE	D1	IC8250	IC30N	IC20	IC20N	IC520N	ap (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

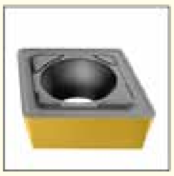
(1) Left-hand insert

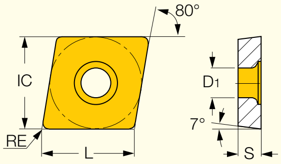
For tools, see pages: IHCR (848) • IHRF (853) • IHRF-BW (877) • IHRF-C (852) • IHRF-CH (878) • IHSR (848) • IHSR-BW (850) • IHSR-C (852) • IHSR-CH (849)

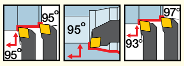
ISOTURN

CCMT-WG

80° Rhombic Inserts with a 7° Positive Flank and a Wiper Near the Corner for High Feed Finishing







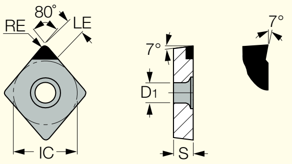
Designation	Dimensions					Tough ↔ Hard			Recommended Machining Data	
	L	IC	S	RE	D1	IC8250	IC807	IC907	ap (mm)	f (mm/rev)
CCMT 060204-WG	6.30	6.35	2.38	0.40	2.80		●	●	0.40-2.00	0.10-0.35
CCMT 09T304-WG	9.70	9.52	3.97	0.40	4.40	●			0.40-2.00	0.14-0.30
CCMT 09T308-WG	9.70	9.52	3.97	0.80	4.40	●			0.50-2.50	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

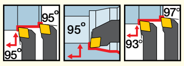
For tools, see pages: IHCR (848) • IHRF (853) • IHRF-BW (877) • IHRF-C (852) • IHRF-CH (878) • IHSR (848) • IHSR-BW (850) • IHSR-C (852) • IHSR-CH (849)

ISOTURN

CCMT (PCD)

Inserts with a Single PCD Top Corner Tip, 7° Clearance and Positive Rake Angle for Finishing Aluminum





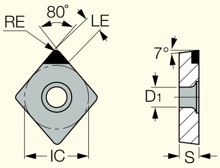
	Dimensions							Recommended Machining Data	
Designation	**L**	**IC**	**S**	**RE**	**LE**	**D1**	**ID5**	**ap (mm)**	**f (mm/rev)**
CCMT 060202D	6.30	6.35	2.38	0.20	3.1	2.80	●	0.08-3.00	0.05-0.30
CCMT 060204D	6.30	6.35	2.38	0.40	3.0	2.80	●	0.10-3.00	0.05-0.30
CCMT 09T304D	9.70	9.52	3.97	0.40	3.9	4.40	●	0.10-3.00	0.05-0.30

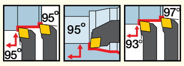
For tools, see pages: IHCR (848) • IHRF (853) • IHRF-BW (877) • IHRF-C (852) • IHRF-CH (878) • IHSR (848) • IHSR-BW (850) • IHSR-C (852)

ISOTURN

CCGW/CCMT (CBN)

80° Rhombic Inserts with a Single CBN Top Corner Tip and 7° Clearance for Machining Hardened Steel





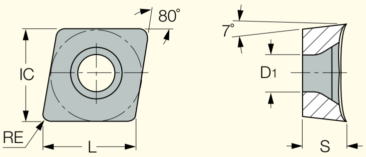
	Dimensions						Tough ↔ Hard			Recommended Machining Data	
Designation	**L**	**IC**	**S**	**RE**	**LE**	**D1**	**IB05H**	**IB55**	**IB10H**	**ap (mm)**	**f (mm/rev)**
CCGW 03X102T01015-1	3.63	3.57	1.39	0.20	2.0	1.90	●		●	0.05-0.50	0.05-0.20
CCGW 03X104T01015-1	3.63	3.57	1.39	0.40	2.3	1.90	●		●	0.05-0.50	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

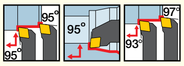
For tools, see pages: IHCR (848) • IHRF (853) • IHRF-BW (877) • IHRF-C (852) • IHRF-CH (878) • IHSR (848) • IHSR-BW (850) • IHSR-C (852)

ISOTURN

CCGT-AS

80° Rhombic Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum





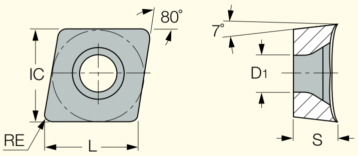
	Dimensions						Recommended Machining Data	
Designation	**L**	**IC**	**S**	**RE**	**D1**	**IC20**	**ap (mm)**	**f (mm/rev)**
CCGT 060201-AS	6.40	6.35	2.38	0.10	2.80	●	0.50-2.00	0.10-0.20
CCGT 060202-AS	6.40	6.35	2.38	0.20	2.80	●	0.50-2.00	0.10-0.20
CCGT 060204-AS	6.40	6.35	2.38	0.40	2.80	●	0.50-2.00	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

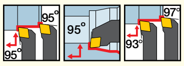
For tools, see pages: IHCR (848) • IHRF (853) • IHRF-BW (877) • IHRF-C (852) • IHRF-CH (878) • IHSR (848) • IHSR-BW (850) • IHSR-C (852) • IHSR-CH (849)

ISOTURN

CCGT-AF

80° Rhombic Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum





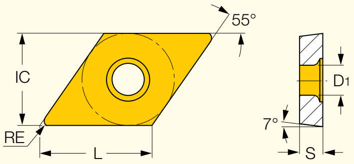
Designation	Dimensions					IC20	Recommended Machining Data	
	L	IC	S	RE	D1		ap (mm)	f (mm/rev)
CCGT 09T308-AF	9.70	9.52	3.97	0.80	4.40	●	0.80-3.00	0.15-0.25
CCGT 120408-AF	12.90	12.70	4.76	0.80	5.50	●	1.00-3.50	0.15-0.30

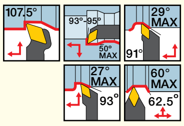
For tools, see pages: IHCR (848) • IHRF (853) • IHSR (848) • IHSR-BW (850) • IHSR-C (852) • IHSR-CH (849)

ISOTURN

DCMT/DCGT-SM

55° Rhombic Inserts with a 7° Positive Flank for Semi-Finishing and Finish Turning on Soft Materials and Exotic Alloys





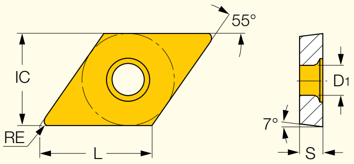
Designation	Dimensions					Tough ↔ Hard										Recommended Machining Data	
	L	IC	S	RE	D1	IC8350	IC6025	IC8250	IC530N	IC6015	IC8150	IC520N	IC806	IC807	IC907	ap (mm)	f (mm/rev)
DCMT 070202-SM	7.70	6.35	2.38	0.20	2.80		●			●				●	●	0.50-2.00	0.04-0.20
DCMT 070204-SM	7.70	6.35	2.38	0.40	2.80		●	●		●	●		●	●	●	0.50-2.50	0.05-0.25
DCMT 070208-SM	7.70	6.35	2.38	0.80	2.80			●								0.50-3.00	0.07-0.25
DCGT 11T302-SM	11.60	9.52	3.97	0.20	4.40										●	0.50-2.50	0.05-0.25
DCGT 11T304-SM	11.60	9.52	3.97	0.40	4.40										●	0.50-2.50	0.05-0.25
DCMT 11T302-SM	11.60	9.52	3.97	0.20	4.40		●	●	●	●				●	●	0.50-2.50	0.05-0.25
DCMT 11T304-SM	11.60	9.52	3.97	0.40	4.40	●	●	●	●		●		●	●	●	0.50-2.50	0.07-0.25
DCMT 11T308-SM	11.60	9.52	3.97	0.80	4.40	●	●	●		●	●			●	●	1.00-3.00	0.07-0.25
DCMT 11T312-SM	11.60	9.52	3.97	1.20	4.40							●				1.00-3.50	0.10-0.28

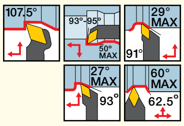
For tool, see page: CHA (846)

ISOTURN

DCMT-14

55° Rhombic Inserts with a Positive Flank for Semi-Finishing and Finish Turning on Soft Materials and Exotic Alloys





Designation	Dimensions					Tough ↔ Hard					Recommended Machining Data	
	L	IC	S	RE	D1	IC830	IC8150	IC20	IC428	IC5005	ap (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

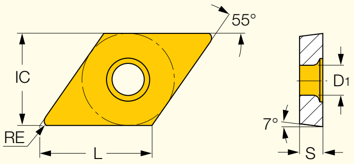
• Grooving depth (CDX) varies in conformance with blade's overhang (WFN-WFX and OHN-OHX) and depends on the bore diameter (D) • CGHN 26...-M can be modified from external double-sided CGHN blades • When TIP inserts are used the seat needs to be modified to ensure clearance

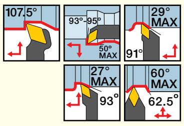
For tools, see pages: CHA (846)

ISOTURN

DCMT/DCGT

55° Rhombic Inserts with a 7° Positive Clearance for Finishing Applications





Designation	Dimensions					Tough ↔ Hard								Recommended Machining Data	
	L	IC	S	RE	D_1	IC830	IC8250	IC908	IC30N	IC530N	IC8150	IC20N	IC520N	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

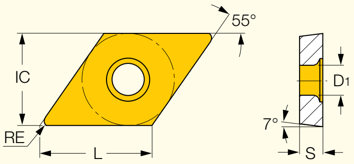
(1) Right-hand insert

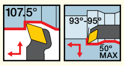
For tool, see page: CHA (846)

ISOTURN

DCMT-PF

55° Rhombic Inserts with a Positive Flank for Semi-Finishing and Finishing on Soft Materials and Exotic Alloys





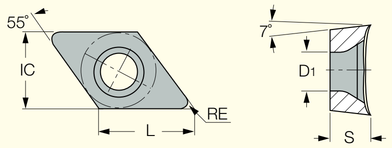
Designation	Dimensions					Tough ↔ Hard								Recommended Machining Data	
	L	IC	S	RE	D_1	IC830	IC6025	IC8250	IC6015	IC806	IC807	IC907	IC804	a_p (mm)	f (mm/rev)
DCMT 070201-PF	7.70	6.35	2.38	0.10	2.80						●	●		0.30-3.00	0.02-0.25
DCMT 070202-PF	7.70	6.35	2.38	0.20	2.80	●								0.40-3.00	0.03-0.25
DCMT 070204-PF	7.70	6.35	2.38	0.40	2.80	●								0.50-3.50	0.05-0.30
DCMT 070208-PF	7.70	6.35	2.38	0.80	2.80						●	●		0.70-3.00	0.08-0.30
DCMT 11T302-PF	11.60	9.52	3.97	0.20	4.40	●				●	●	●	●	0.30-2.50	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

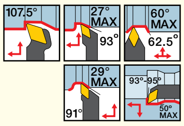
For tool, see page: CHA (846)

ISOTURN

DCGT-AS

55° Rhombic Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum





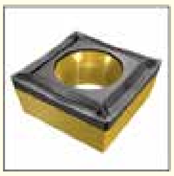
Designation	Dimensions					Tough ↔ Hard			Recommended Machining Data	
	L	IC	S	RE	D1	IC920	IC20	IC907	ap (mm)	f (mm/rev)
DCGT 070201-AS	7.75	6.35	2.38	0.10	2.80		●		0.50-2.00	0.03-0.20
DCGT 070202-AS	7.75	6.35	2.38	0.20	2.80	●	●		0.50-2.00	0.05-0.20
DCGT 070204-AS	7.75	6.35	2.38	0.40	2.80		●		0.50-2.50	0.05-0.25
DCGT 11T301-AS	11.60	9.52	3.97	0.10	4.40		●		0.50-2.50	0.05-0.25
DCGT 11T302-AS	11.60	9.52	3.97	0.20	4.40		●	●	0.50-2.50	0.05-0.26
DCGT 11T304-AS	11.60	9.52	3.97	0.40	4.40		●	●	0.50-2.50	0.05-0.25
DCGT 11T308-AS	11.60	9.52	3.97	0.80	4.40		●		0.80-3.00	0.08-0.30

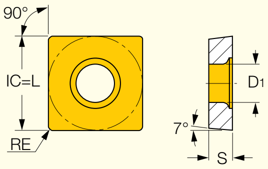
For tool, see page: CHA (846)

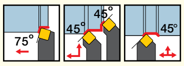
ISOTURN

SCMT-SM

Square Inserts with a 7° Positive Flank for Semi-Finishing and Finish Turning on Soft Materials and Exotic Alloys







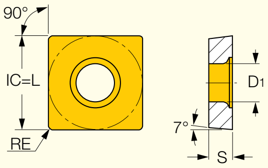
Designation	Dimensions				Tough ↔ Hard							Recommended Machining Data	
	L	S	RE	D1	IC830	IC6025	IC8250	IC8150	IC5005	IC807	IC907	ap (mm)	f (mm/rev)
SCMT 09T304-SM	9.52	3.97	0.40	4.40			●	●		●	●	0.50-3.00	0.07-0.25
SCMT 09T308-SM	9.52	3.97	0.80	4.40	●	●	●	●	●	●	●	0.50-3.00	0.10-0.30
SCMT 120404-SM	12.70	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

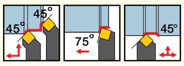
For tool, see page: IHPR (849)

ISOTURN

SCMT-14

Square Inserts with a 7° Positive Flank for Semi-Finishing and Finish Turning on Soft Materials and Exotic Alloys





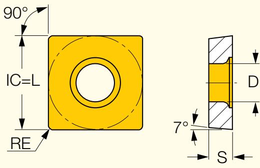
Designation	Dimensions				Tough ↔ Hard			Recommended Machining Data	
	L	S	RE	D1	IC8250	IC807	IC907	ap (mm)	f (mm/rev)
SCMT 09T304-14	9.52	3.97	0.40	4.40		●	●	1.00-3.50	0.12-0.30
SCMT 120404-14	12.70	4.76	0.40	5.50	●			1.00-4.00	0.12-0.30

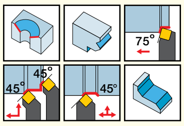
For tool, see page: IHPR (849)

ISOTURN

SCMT-19

Square Inserts with a 7° Positive Flank for Semi-Roughing at Medium to High Feeds





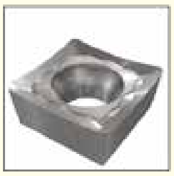
	Dimensions				Tough ↔ Hard					Recommended Machining Data	
Designation	L	S	RE	D_1	IC830	IC20	IC5005	IC807	IC907	a_p (mm)	f_z (mm/rev)
SCMT 120408-19	12.70	4.76	0.80	5.50	●	●	●	●	●	3.00-8.00	0.08-0.15
SCMT 120412-19	12.70	4.76	1.20	5.50		●				3.00-8.00	0.08-0.15

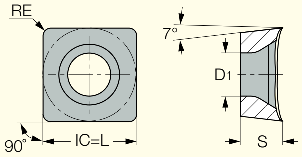
For tools, see pages: E45 / T245 (34) • IHPR (849)

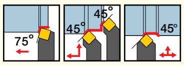
ISOTURN

SCGT-AS

Square Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum







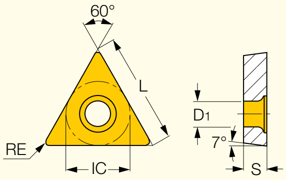
	Dimensions						Recommended Machining Data	
Designation	L	IC	S	RE	D_1	IC20	a_p (mm)	f (mm/rev)
SCGT 09T308-AS	9.52	9.52	3.97	0.80	4.40	●	0.50-3.00	0.10-0.30
SCGT 120404-AS	12.70	12.70	4.76	0.40	5.50	●	1.00-4.00	0.10-0.30
SCGT 120408-AS	12.70	12.70	4.76	0.80	5.50	●	1.00-4.00	0.10-0.30

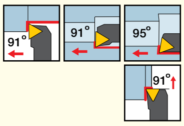
For tool, see page: IHPR (849)

ISOTURN

TCMT-19

Triangular Inserts with a 7° Positive Flat Rake for Semi-Roughing Applications at Medium to High Feeds





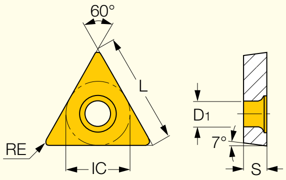
	Dimensions					Tough ↔ Hard				Recommended Machining Data	
Designation	L	IC	S	RE	D_1	IC830	IC50M	IC8150	IC20	a_p (mm)	f (mm/rev)
TCMT 110204-19	11.00	6.35	2.38	0.40	2.80		●	●	●	0.50-3.00	0.10-0.30
TCMT 16T308-19	16.50	9.52	3.97	0.80	4.40	●	●		●	1.00-4.00	0.20-0.35
TCMT 220508-19	22.00	12.70	5.00	0.80	5.50		●			1.00-4.00	0.20-0.35

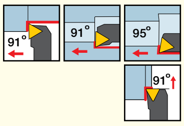
For tools, see pages: IHBR (849)

ISOTURN

TCMT-SM

Triangular Inserts with a 7° Positive Flank for Semi-Finishing and Finish Turning on Soft Materials and Exotic Alloys





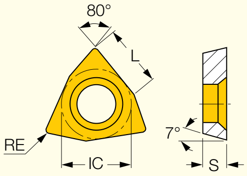
Designation	Dimensions					Tough ↔ Hard										Recommended Machining Data	
	L	IC	S	RE	D_1	IC830	IC8350	IC8250	IC908	IC8150	IC5010	IC428	IC5005	IC807	IC907	a_p (mm)	f (mm/rev)
TCMT 110204-SM	11.00	6.35	2.38	0.40	2.80		●	●	●	●	●		●	●	●	0.20-3.00	0.05-0.25
TCMT 110208-SM	11.00	6.35	2.38	0.80	2.80			●						●	●	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

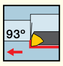
For tools, see pages: IHBR (849)

ISOTURN

WCGT

Trigon Inserts with a 7° Positive Flank and Chipformer for Finish Turning





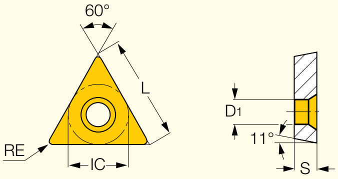
Designation	Dimensions				Tough ↔ Hard		Recommended Machining Data	
	L	IC	S	RE	IC908	IC30N	a_p (mm)	f (mm/rev)
WCGT 020102L	2.18	3.97	1.59	0.20	●	●	0.40-2.00	0.05-0.10
WCGT 020104L	2.18	3.97	1.59	0.40	●	●	0.40-2.00	0.10-0.15

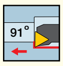
For tools, see pages: IHAXF (871) • IHAXF-AVI (873) • IHAXF-E (873) • IHWF (875)

ISOTURN

TPGX

Triangular Inserts with an 11° Positive Flank and Ground Chipformer for Finish Turning





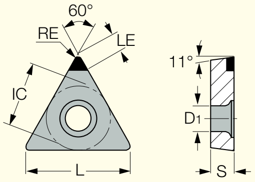
Designation	Dimensions					Tough ↔ Hard				Recommended Machining Data	
	L	IC	S	RE	D_1	IC908	IC20	IC20N	IC520N	a_p (mm)	f (mm/rev)
TPGX 090202-L	9.52	5.56	2.38	0.20	3.00	●	●	●	●	1.00-2.00	0.10-0.20
TPGX 090204-L	9.52	5.56	2.38	0.40	3.00	●	●	●	●	1.00-2.50	0.15-0.20
TPGX 110302-L	11.00	6.35	3.18	0.20	3.50	●	●	●	●	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 (871) • IHAXF-AVI (873) • IHAXF-E (873) • IHFF (853) • IHFF-C (852)

ISOTURN

TPGX (CBN)

Triangular Inserts with a Single CBN Top Corner Tip, 11° Clearance for Machining Cast Iron and Hardened Steel



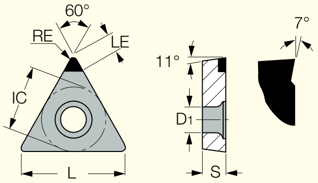
	Dimensions						Tough ↔ Hard		Recommended Machining Data	
Designation	L	IC	S	RE	LE	D1	IB90	IB50	ap (mm)	f (mm/rev)
TPGX 090202T	9.52	5.56	2.38	0.20	2.5	2.50	●	●	0.05-0.05	0.03-0.20
TPGX 090204T	9.52	5.56	2.38	0.40	2.6	2.50	●	●	0.05-0.05	0.03-0.20
TPGX 110302T	11.00	6.35	3.18	0.20	3.3	3.50	●	●	0.05-0.05	0.03-0.20
TPGX 110304T	11.00	6.35	3.18	0.40	3.0	3.50	●	●	0.05-0.05	0.03-0.20

For tools, see pages: IHAXF (871) • IHAXF-AVI (873) • IHAXF-E (873) • IHFF (853) • IHFF-C (852)

ISOTURN

TPGX (PCD)

Triangular Inserts with a Single PCD Top Corner Tip, 11° Clearance and Positive Rake Angle for Finishing Aluminum



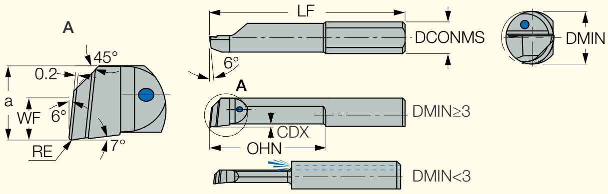
	Dimensions							Recommended Machining Data	
Designation	L	IC	S	RE	LE	D1	ID5	ap (mm)	f (mm/rev)
TPGX 090202	9.52	5.56	2.38	0.20	3.0	2.50	●	0.10-3.00	0.05-0.30
TPGX 090204	9.52	5.56	2.38	0.40	3.0	2.50	●	0.10-3.00	0.05-0.30
TPGX 110302	11.00	6.35	3.18	0.20	3.4	3.50	●	0.10-3.00	0.05-0.30
TPGX 110304	11.00	6.35	3.18	0.40	3.8	3.50	●	0.10-3.00	0.05-0.30

For tool, see page: • IHAXF (871)

PICCOCUT

PICCO R/LX050

Reinforced Boring Inserts with Internal Coolant Holes



	Dimensions								
Designation	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	●

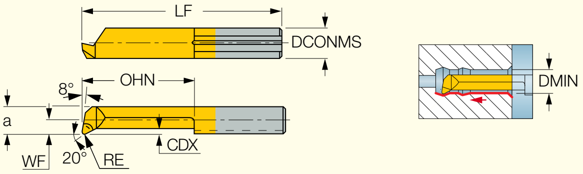
- Left-hand inserts on request

(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	0.05	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 R/L 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	0.05	0.15	2.50		●
PICCO R 050.25-16	4.00	0.20	2.20	30.00	16.0	0.05	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		●
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	●	●

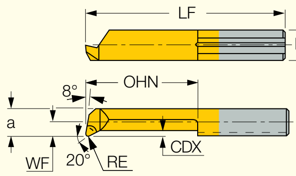
- Specify right- or left-hand bars

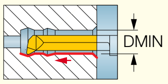
(1) Maximum D.O.C.=0.01-0.03 mm, maximum feed=0.01 mm/rev.
(2) Minimum overhang
(3) Cutting depth maximum

PICCOCUT

PICCO R/L 050, 053, 055 (continued)

Inserts for Internal Turning and Chamfering





Right-hand shown

	Dimensions								Tough ↔ Hard	
Designation	DCONMS	WF	a	LF	OHN(2)	RE	CDX(3)	DMIN	IC228	IC908
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.

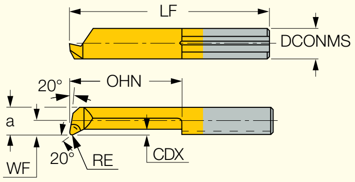
(2) Minimum overhang

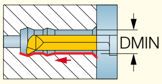
(3) Cutting depth maximum

PICCOCUT

PICCO R 050.20

Inserts for Internal Turning and Chamfering Next to the Bottom of Blind Holes





Right-hand shown

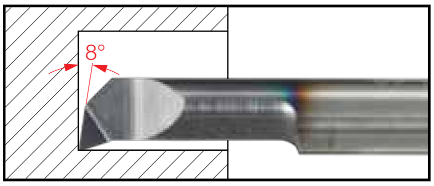
	Dimensions								
Designation	DCONMS	WF	a	LF	OHN(1)	RE	CDX(2)	DMIN	IC908
PICCO R 050.20.2-10	4.00	-	1.70	24.00	10.0	0.05	0.10	2.00	●
PICCO R 050.20.3-10	4.00	0.60	2.60	24.00	10.0	0.10	0.20	2.80	●
PICCO R 050.20.4-16	4.00	1.50	3.50	30.00	16.0	0.10	0.30	4.00	●
PICCO R 050.20.5-20	5.00	1.90	4.40	35.00	19.0	0.15	0.50	5.00	●

- Specify right- or left-hand bars

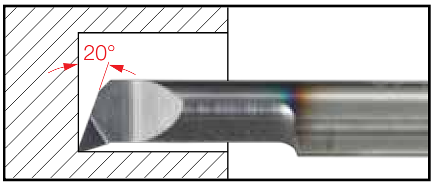
(1) Minimum overhang

(2) Cutting depth maximum

PICCO 050...



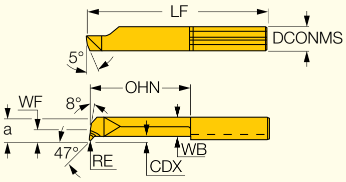
PICCO 050.20...



PICCOCUT

PICCO R/L 047

Inserts for Internal Deep Profiling



Right-hand shown

	Dimensions									
Designation	DCONMS	WF	a	LF	OHN(1)	WB	CDX(2)	DMIN	RE	IC908
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

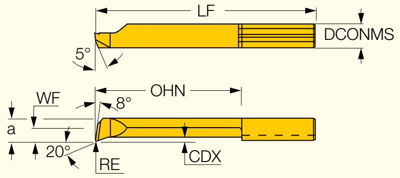
(1) Minimum overhang

(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	0.20	●
PICCO R/L 050.4-20C	4.00	1.50	3.50	34.00	20.0	0.30	4.00	0.20	●
PICCO R/L 050.4-24C	4.00	1.50	3.50	38.00	24.0	0.30	4.00	0.20	●
PICCO R/L 050.4-28C	4.00	1.50	3.50	42.00	28.0	0.30	4.00	0.20	●
PICCO R 050.4-16C	4.00	1.50	3.50	30.00	16.0	0.30	4.00	0.20	●
PICCO R/L 050.5-10C	5.00	1.90	4.40	25.00	10.0	0.50	5.00	0.20	●
PICCO R/L 050.5-15C	5.00	1.90	4.40	30.00	15.0	0.50	5.00	0.20	●
PICCO R/L 050.5-20C	5.00	1.90	4.40	35.00	20.0	0.50	5.00	0.20	●
PICCO R/L 050.5-25C	5.00	1.90	4.40	40.00	25.0	0.50	5.00	0.20	●
PICCO R/L 050.5-30C	5.00	1.90	4.40	45.00	30.0	0.50	5.00	0.20	●
PICCO R/L 050.5-35C	5.00	1.90	4.40	50.00	35.0	0.50	5.00	0.20	●
PICCO R/L 050.6-15C	6.00	2.30	5.30	30.00	15.0	0.50	6.00	0.20	●
PICCO R/L 050.6-22C	6.00	2.30	5.30	37.00	22.0	0.50	6.00	0.20	●
PICCO R/L 050.6-25C	6.00	2.30	5.30	40.00	25.0	0.50	6.00	0.20	●
PICCO R/L 050.6-30C	6.00	2.30	5.30	45.00	30.0	0.50	6.00	0.20	●
PICCO R/L 050.6-35C	6.00	2.30	5.30	50.00	35.0	0.50	6.00	0.20	●
PICCO R/L 050.6-42C	6.00	2.30	5.30	57.00	42.0	0.50	6.00	0.20	●
PICCO R/L 050.7-20C	7.00	2.80	6.30	35.00	20.0	0.60	6.80	0.20	●
PICCO R/L 050.7-25C	7.00	2.80	6.30	40.00	25.0	0.60	6.80	0.20	●
PICCO R/L 050.7-30C	7.00	2.80	6.30	45.00	30.0	0.60	6.80	0.20	●
PICCO R/L 050.7-35C	7.00	2.80	6.30	50.00	35.0	0.60	6.80	0.20	●
PICCO R/L 050.7-40C	7.00	2.80	6.30	55.00	40.0	0.60	6.80	0.20	●
PICCO L 050.7-50C	7.00	2.80	6.30	65.00	50.0	0.60	6.80	0.20	●

- All left-hand inserts on request

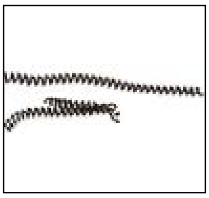
(1) Minimum overhang

(2) Cutting depth maximum

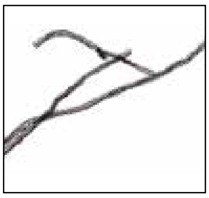
Stainless Steel 316L

PICCO R 050.6-35C with Chipbreaker

f= 0.03 mm/rev



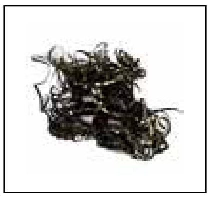
f= 0.05 mm/rev



PICCO R 050.6-35 Standard

f= 0.03 mm/rev

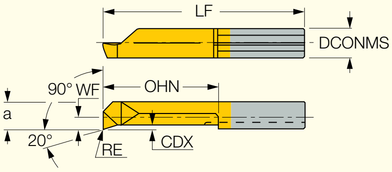
f= 0.05 mm/rev

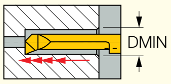


PICCOCUT

PICCO R/L 090

Inserts for Internal Turning and Profiling





Right-hand shown

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

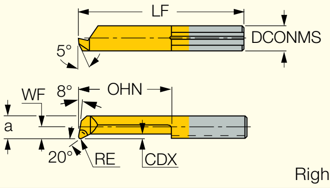
(1) Minimum overhang

(2) Cutting depth maximum

PICCOCUT

PICCO R 050 (CBN)

CBN Tipped Inserts for Internal Turning, Profiling and Chamfering of Hard Steel



Right-hand shown • **HARD MATERIALS**

	Dimensions								
Designation	DCONMS	WF	a	LF	OHN(1)	CDX(2)	DMIN	RE	IB55
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

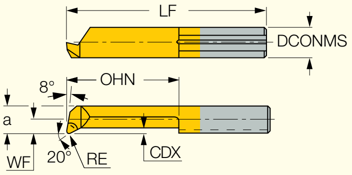
(1) Minimum overhang

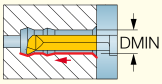
(2) Cutting depth maximum

PICCOCUT

PICCO R/LHD 050

Inserts for Internal Turning and Chamfering of Hard Steel - Up to 65 HRC





	Dimensions								
Designation	DCONMS	WF	a	LF	OHN(1)	RE	CDX(2)	DMIN	IC902
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

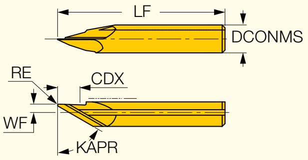
(1) Minimum overhang

(2) Cutting depth maximum

PICCOCUT

PICCO R/L 520

Inserts for Internal Chamfering



Right-hand shown

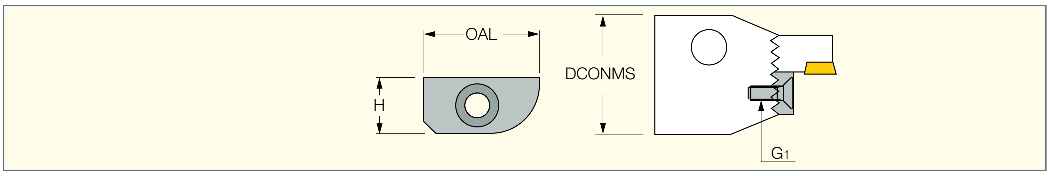
	Dimensions							
Designation	DCONMS	WF	KAPR	LF	RE	CDX	DMIN	IC908
PICCO R/L 520.0045-15	5.00	1.50	45.0	30.00	0.20	3.50	1.00	●
PICCO R/L 520.0060-15	5.00	1.50	60.0	30.00	0.20	4.00	1.00	●

- Left hand inserts on request

Accessories

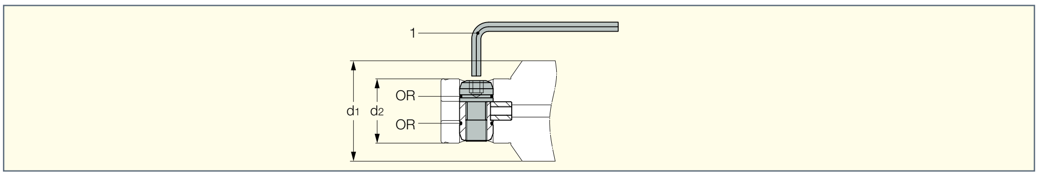
PLT

Cover Plate Protects the Serrated Faces When a Single Toolholder is Used



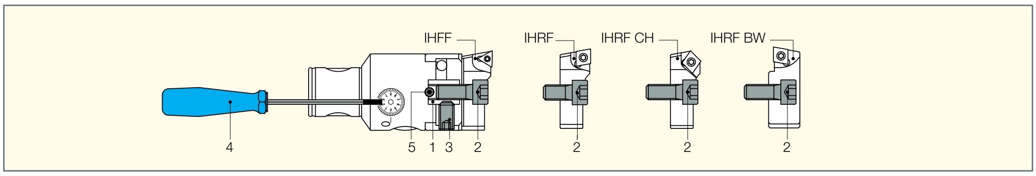
Designation	DCONMS	H	OAL	G_1
PLT 16	16.00	7.0	14.00	SR M3x12 DIN912
PLT 20	20.00	8.5	17.00	SR M4x14 DIN912
PLT 25	25.00	10.2	21.00	SR M4x16 DIN7991
PLT 32	32.00	13.9	28.00	SR M5x20 DIN7991
PLT 40	40.00	17.4	35.00	SR M6x25 DIN7991
PLT 50	50.00	21.4	47.50	SR M8x25 DIN7991
PLT 63	63.00	26.4	62.00	SR M10x30 DIN7991
PLT 80	80.00	33.9	82.50	SR M12x35 DIN7991

BH MB COUPLING SET



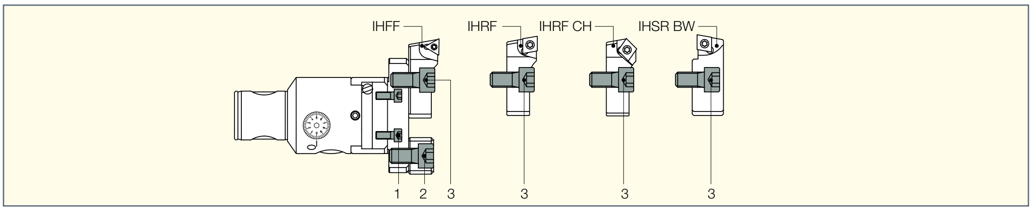
Designation	d_1	d_2	1	OR
BH MB14 COUPLING SET	14	10	2.5	-
BH MB16 COUPLING SET	16	10	2.5	-
BH MB20 COUPLING SET	20	13	3	-
BH MB25 COUPLING SET	25	16	3	-
BH MB32 COUPLING SET	32	20	4	ORM 0075-10
BH MB40 COUPLING SET	40	25	5	ORM 0100-10
BH MB50 COUPLING SET/M5	50	32	6	ORM 0130-10
BH MB63-80 COUPLING SET	63 - 80	42	8	OR 2075
BH MB110 COUPLING SET	110	76	14	OR 3112

BHF - SPARE PARTS



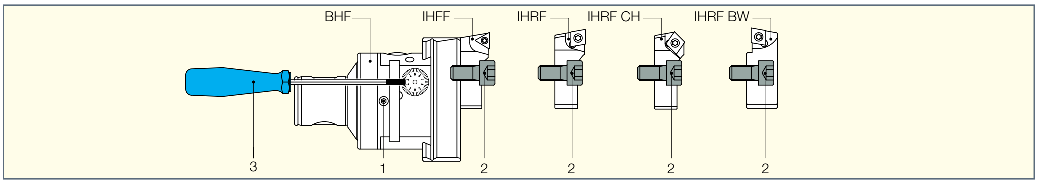
Designation	1	2	3	4	5
BHF...-16...	-	SR M3X6 DIN 912	-	BH HW 1.5 HANDLE	SR M3X4.5 DIN 913
BHF...-20...	-	SR M4X8 DIN 912	-	BH HW 1.5 HANDLE	SR M3X4.5 DIN 913
BHF...-25...	-	SR M5X1O DIN 912	-	BH HW 2.0 HANDLE	SR M4X4 DIN 913
BHF...-32...	-	SR M6X12 DIN 912	-	BH HW 2.0 HANDLE	SR M4X5 DIN 913
BHF...-40...	-	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



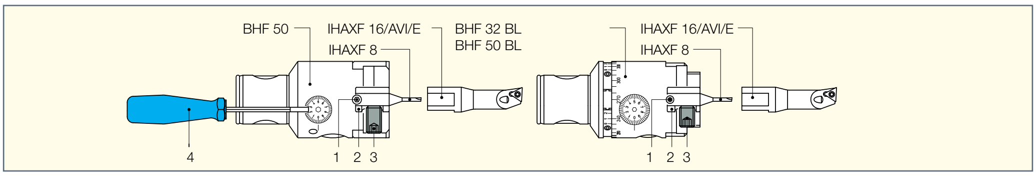
Designation	1	2	3
BHF...-50...	SR M5X12 DIN 912	SR M1OX20 DIN 912	SR M1OX25 DIN 912

BHF - SPARE PARTS



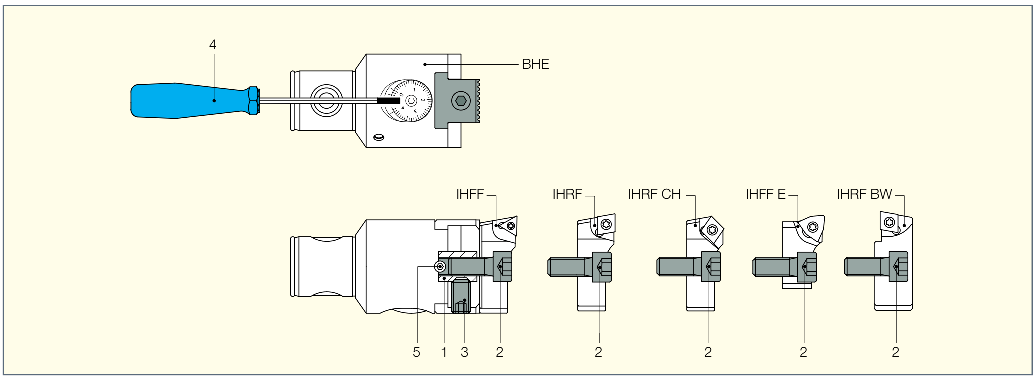
Designation	1	2	3
BHF...-63...	SR M6X10 DIN 915	SR M1OX25 DIN 912	BH HW 3.0 HANDLE
BHF...-80...	SR M6X14 DIN 915		
BHF...-125...	SR M6X22 DIN 915		

BHF - SPARE PARTS



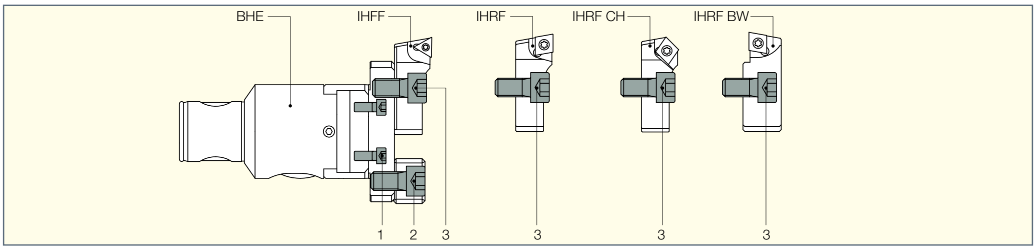
Designation	1	2	3	4
BHF...-50...	SR M5X8 DIN 913	SLEEVE D 8-D16	SR M10X10 DIN 913	BH HW 2.5 HANDLE
BHF...-32... BL	SR M4X5 DIN 913	-	SR M5X8 DIN 913 SR M5X12 DIN 913	BH HW 2.0 HANDLE
BHF...-50... BL	SR M5X8 DIN 913	SLEEVE D 8-D16	SR M10X10 DIN 913	BH HW 2.5 HANDLE

BHE MB - SPARE PARTS



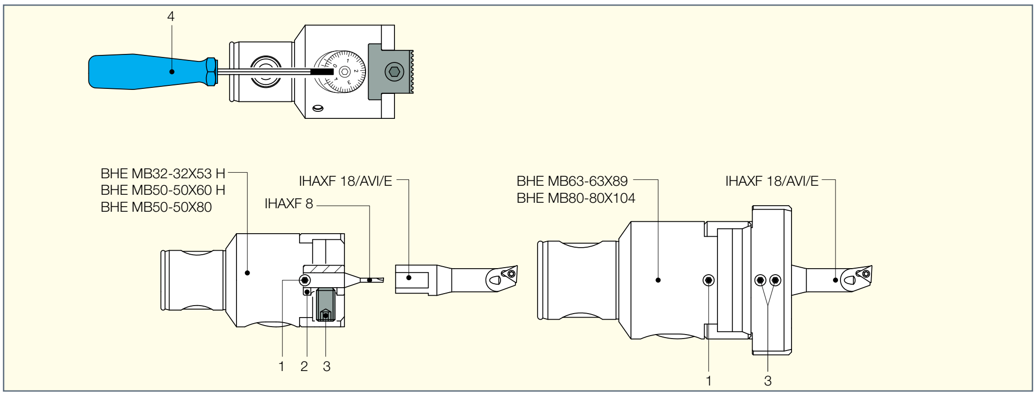
Designation	1	2	3	4	5
BHE MB14-14X30	-	SR M3X6 DIN 912	-	BH HW 1.5 HANDLE	SR M3X3.5 DIN 913
BHE MB16-16X34	-	SR M3X6 DIN 912	-	BH HW 1.5 HANDLE	SR M3X4.5 DIN 913
BHE MB20-20X40	-	SR M4X8 DIN 912	-	BH HW 1.5 HANDLE	SR M3X4.5 DIN 913
BHE MB25-25X50	-	SR M5X1O DIN 912	-	BH HW 1.5 HANDLE	SR M4X4 DIN 913
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



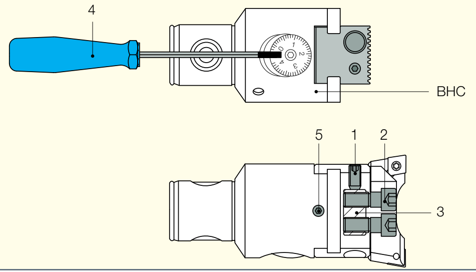
Designation	1	2	3
BHE MB50-50X80	SR M5X12 DIN 912	SR M1OX20 DIN 912	SR M1OX25 DIN 912
BHE MB63-63X89	SR M5X25 DIN 912		
BHE MB80-80X104			

BHE - SPARE PARTS



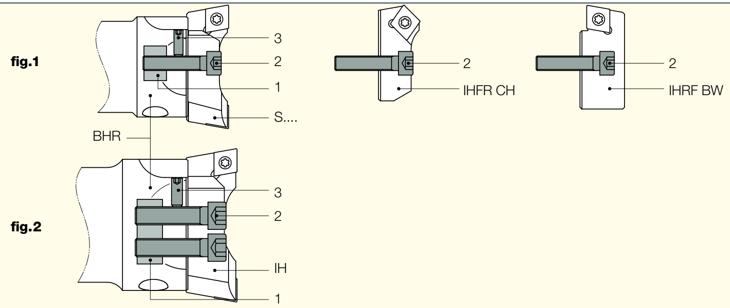
Designation	1	2	3	4
BHE MB32-32X53 H	SR M5X5 DIN 913	-	SR M5X8 DIN 913	BH HW 2.5 HANDLE
	SR M5X5 DIN 913	-	SR M5X12 DIN 913	
BHE MB50-50X60 H	SR M6X8 DIN 913	SLEEVE D 8-D16	SR M10X10 DIN 913	BH HW 3.0 HANDLE
BHE MB50-50X80	SR M6X8 DIN 913	SLEEVE D 8-D16	SR M10X10 DIN 913	
BHE MB63-63X89	SR M6X8 DIN 913	-	SR M6X6 DIN 913	
BHE MB80-80X104	SR M6X12 DIN 913	-	SR M6X6 DIN 913	

BHC - SPARE PARTS



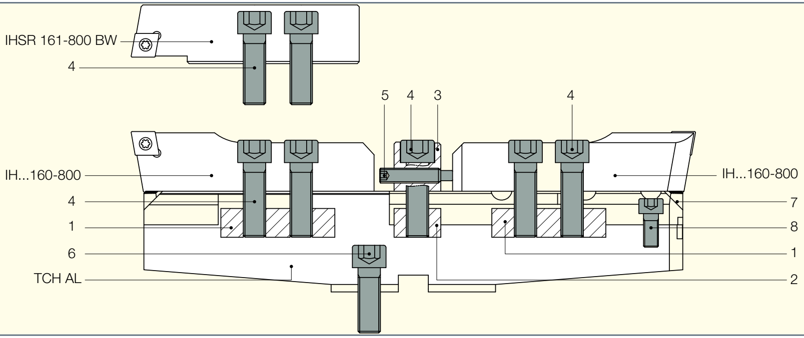
Designation	1	2	3	4	5
BHC MB25-25X57	SR M4X8 DIN 913	BH SR M4X11 DIN 912 PT	BH NUT-BHC MB25	BH HW 2.0 HANDLE	SR M4X5 DIN 913
BHC MB32-32X71	SR M5X10 DIN 913	BH SR M5X12.5 DIN 912 PT	BH NUT-BHC MB32	BH HW 2.5 HANDLE	SR M5X5 DIN 913
BHC MB40-40X90	SR M6X12 DIN 913	BH SR M6X16 DIN 912 PT	BH NUT-BHC MB40	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

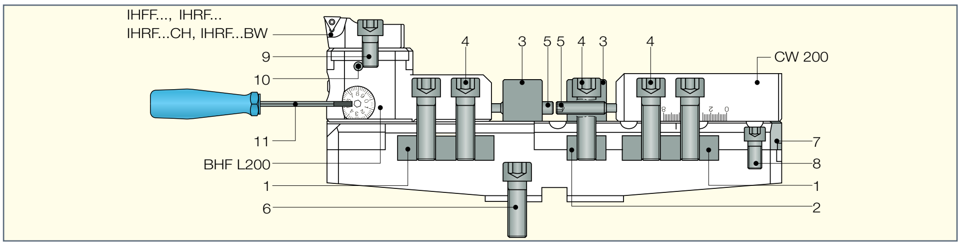
TCH AL - SPARE PARTS (Rough Boring)



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

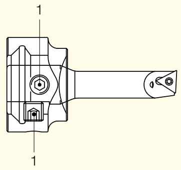
TCH AL - SPARE PARTS (Fine Boring)



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

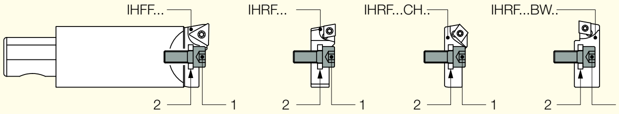
Designation	6	7	8	9	10	11
TCH AL 200	SR M12X35 DIN 912	BH SERRATED PLATE 200	SR M8X25 DIN 912	SR M1OX20 DIN 912	SR M6X8 DIN 915	BH HW 3.0 HANDLE
TCH AL 300	SR M12X35 DIN 912	BH SERRATED PLATE 300	SR M8X25 DIN 912	SR M1OX20 DIN 912	SR M6X8 DIN 915	BH HW 3.0 HANDLE
TCH AL 400	SR M12X35 DIN 912	BH SERRATED 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



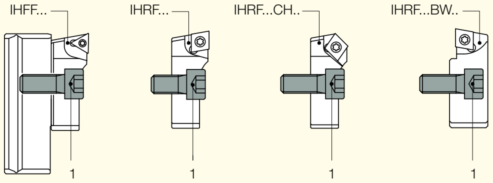
Designation	1
ADBH 30XD16	TSR M8X8 DIN 915

BBH-D - SPARE PARTS



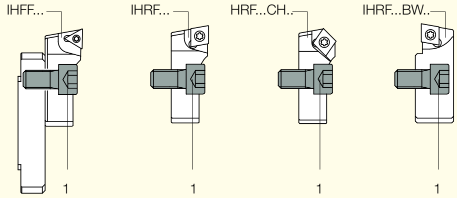
Designation	1	2
BBH D16-53	SR M5X12 DIN 912	WASHER DIN 125A M5
BBH D16-105	SR M5X12 DIN 912	WASHER DIN 125A M5

BHFH - SPARE PARTS



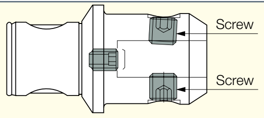
Designation	1
BHFH 30X75	SR M1OX18 DIN 912
BHFH 40X133	
BHFH 30X93	
BHFH 40X200	SR M1OX25 DIN 912
BHFH 30X135	
BHFH 40X300	
BHFH 40X400	

BHEH - SPARE PARTS



Designation	1
BHEH 24x75	SR M1OX20 DIN 912
BHEH 28x80	SR M1OX25 DIN 912
BHEH 28x108	
BHEH 28x148	

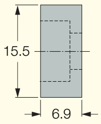
EMH - SPARE PARTS



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

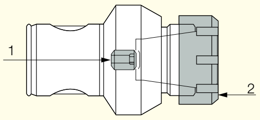
For Kit BHE



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

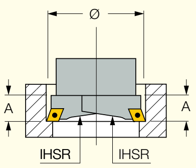
Components for CC MB



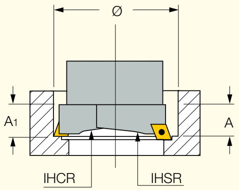
Designation	1	2	Wrench
CC MB16-ER11M	CC MB16 SCREW	NUT ER11 MINI	WRENCH ER11 MINI
CC MB20-ER16M	CC MB20 SCREW	NUT ER16 MINI	WRENCH ER16 MINI
CC MB25-ER20M	CC MB25 SCREW	NUT ER20 MINI	WRENCH ER20 MINI
CC MB32-ER25M	CC MB32 SCREW	NUT ER25 MINI	WRENCH ER25 MINI
CC MB40-ER25	CC MB40 SCREW	NUT ER25 TOP	WRENCH 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

Cutting Depth

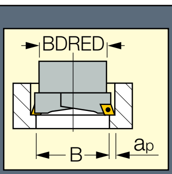
Cutting Conditions for **BHR** Rough Boring Heads



Twin boring cutters
with the same cutting diameter



Twin boring cutters
with different cutting diameters and heights (Z=1)

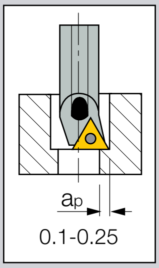


It's advisable to start with B hole ≥ boring bar diameter d

B Working Range	ap Steel	ap Cast Iron, Aluminum
18-28	ap - 1.5-2	ap - 2-2.5
28-50	ap - 2-3	ap - 2.5-3.5
50-68	ap - 3-4	ap - 3.5-5
68-200	ap - 4-5	ap - 5-7
200-500	ap - 5-6	ap - 6-8

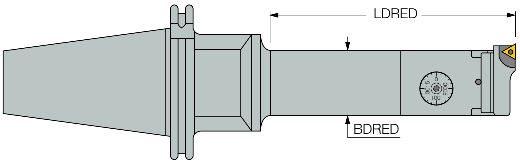
Cutting Conditions for BHF Fine Boring Heads

Material	LDRED/BDRED	Stability	Cutting Speed Vc=m/min	Feed f=mm/rev		Insert Grade
				Insert Radius		
				RE=0.2	RE=0.4	
Carbon Steel HB≤200	LDRED/BDRED=2.5 LDRED/BDRED=4 LDRED/BDRED=6.3	••• •• •	200-300 160-250 70-100	0.05-0.08 0.05-0.08 0.05-0.08	0.08-0.10 0.08-0.10 -	IC20N IC30N IC54
Carbon Steel HB>200	LDRED/BDRED=2.5 LDRED/BDRED=4 LDRED/BDRED=6.3	••• •• •	160-250 150-200 70-100	0.05-0.08 0.05-0.08 0.05-0.08	0.08-0.10 0.08-0.10 -	IC20N IC30N
Stainless Steel	LDRED/BDRED LDRED/BDRED LDRED/BDRED	••• •• •	150-200 120-160 70-80	0.05-0.08 0.05-0.08 0.05-0.08	0.08-0.10 0.08-0.10 0.08-0.10	IC20N/30N IC54 IC908
Alloyed Steel (1) HB 480-550	LDRED/BDRED=2.5 LDRED/BDRED=4 LDRED/BDRED=6.3	••• •• •	120-160 100-140 70-100	0.05-0.08 0.05-0.08 0.05-0.08	0.08-0.10 0.08-0.10 -	IC54
Cast Iron	LDRED/BDRED=2.5 LDRED/BDRED=4 LDRED/BDRED=6.3	••• •• •	120-160 100-140 70-100	0.05-0.08 0.05-0.08 0.05-0.08	0.08-0.10 0.08-0.10 -	IC20
Aluminum	LDRED/BDRED=2.5 LDRED/BDRED=4 LDRED/BDRED=6.3	••• •• •	300-400 250-350 100-150	0.05-0.08 0.05-0.08 0.05-0.08	0.08-0.10 0.08-0.10 -	IC20



Stability
- ••• – Good
- •• – Normal
- • – Poor

(1) ap=0.1 min

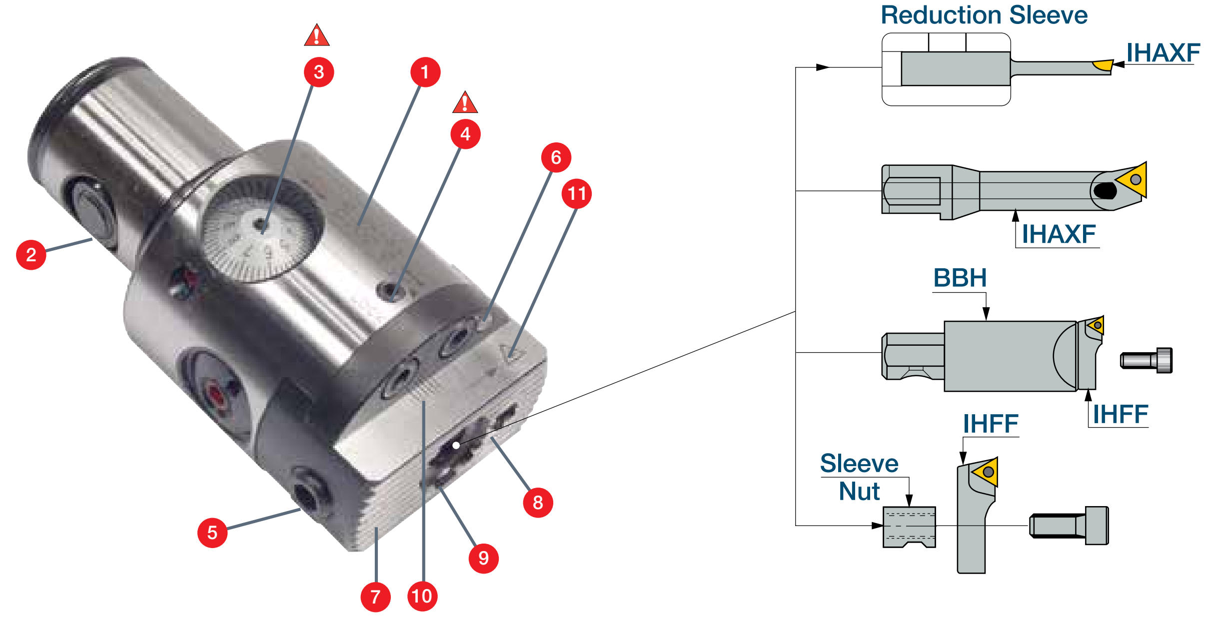


In case of a single or a stepped boring cutter configuration, only half the feed should be applied.

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
- ⑥ locking screw
- 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 that 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 screw (4).
- **Loosen screw (4) before making any slide adjustment.**

Maintenance

Weekly:

- Lubricate through the nipple (8) with **ISO UN G220** oil.

Periodically:

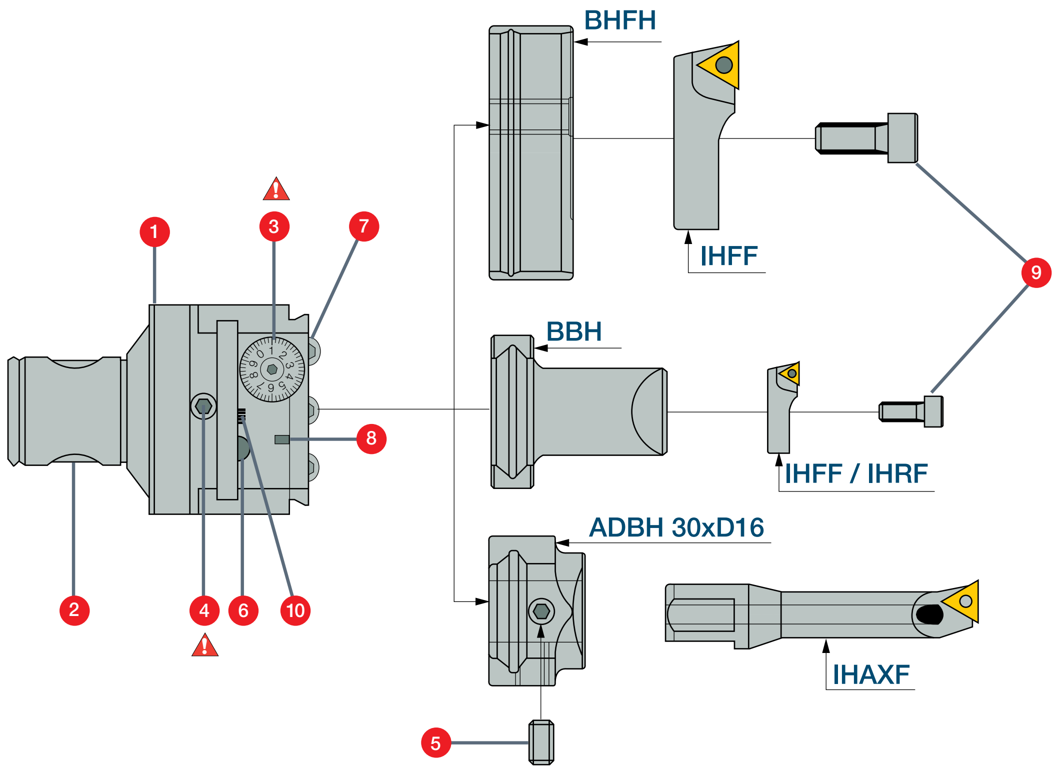
- Clean and lubricate the conical and cylindrical matching surfaces.
- Treat expanding pin (2) with an anti-friction lubricant.
- Clean and lubricate the tool slide guideway.

Important Note:

Toolholder should be firmly affixed to the slide.

Fine Boring Head BHF 63-125

Operating Instructions



① Body
② Expansion 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 that expansion 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 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.

BHR Rough Boring Cutting Data

ISO	Workpiece Material	Hardness HB	Overhang LDRED/ BDRED	ap (mm) RE (Radius)	Boring Range 18-28		Boring Range 28-50		Boring Range 50-68	
					0.5-1.2 0.2	1.2-2.5 0.4	0.8-1.5 0.2-0.4	1.5-2.5 0.4	0.8-1.5 0.2-0.4	1.5-3.0 0.4-0.8
P	Carbon Steel	**HB**<200	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	150-180 0.1-0.2	120-150 0.08-0.2	160-200 0.15-0.2	140-170 0.15-0.2	160-200 0.15-0.25	140-180 0.08-0.2
			4 ●●	**Vc** (m/min) **f** (mm/rev)	140-160 0.1-0.18	100-140 0.08-0.15	160-180 0.1-0.12	120-150 0.08-0.1	160-180 0.1-0.12	120-150 0.08-0.1
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	60-80 0.06-0.12	40-60 0.06-0.1	60-90 0.06-0.12	50-60 0.06-0.1	70-90 0.06-0.1	50-70 0.06-0.1
	Carbon Steel	**HB**>200	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	130-160 0.08-0.15	100-130 0.08-0.12	140-180 0.08-0.2	120-160 0.06-0.12	140-180 0.08-0.25	120-160 0.08-0.18
			4 ●●	**Vc** (m/min) **f** (mm/rev)	110-140 0.08-0.12	80-110 0.08-0.1	100-140 0.08-0.15	80-120 0.06-0.15	100-140 0.08-0.2	80-120 0.06-0.15
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	70-90 0.08-0.1	60-70 0.06-0.08	80-100 0.06-0.1	60-80 0.06-0.08	80-100 0.08-0.15	60-80 0.06-0.1

ISO	Workpiece Material	Hardness HB	Overhang LDRED/ BDRED	ap (mm) RE (Radius)	Boring Range 68-120		Boring Range 120-200		Boring Range 200-500	
					0.8-1.5 0.2-0.4	1.5-3.5 0.4-0.8	0.8-2.0 0.2-0.4	2.0-3.5 R=0.4-0.8	0.8-2.0 R=0.2-0.4	2.0-4.0 R=0.4-0.8
P	Carbon Steel	**HB**<200	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	160-220 0.15-0.25	150-180 0.08-0.2	180-250 0.15-0.3	160-200 0.1-0.2	220-280 0.15-0.3	200-220 0.1-0.15
			4 ●●	**Vc** (m/min) **f** (mm/rev)	140-180 0.08-0.2	120-150 0.08-0.15	160-200 0.1-0.2	140-180 0.08-0.15	N.R.	N.R.
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	70-100 0.06-0.1	50-70 0.06-0.1	N.R.	N.R.	N.R.	N.R.
	Carbon Steel	**HB**<200	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	140-180 0.15-0.3	120-160 0.12-0.2	150-170 0.15-0.25	100-140 0.1-0.2	100-140 0.15-0.3	80-120 0.1-0.2
			4 ●●	**Vc** (m/min) **f** (mm/rev)	120-150 0.1-0.2	100-140 0.1-0.18	100-130 0.08-0.2	80-110 0.08-0.12	N.R.	N.R.
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	80-100 0.08-0.12	60-80 0.08-0.12	N.R.	N.R.	N.R.	N.R.

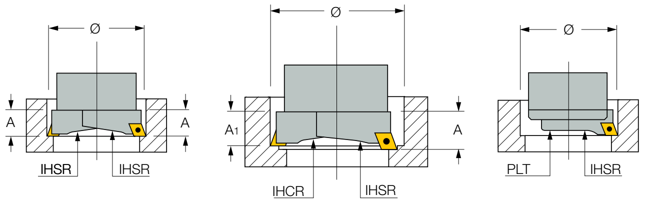
N.R. = Not Recommended

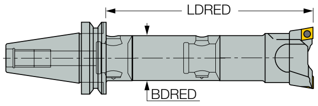
Stability

●●● – 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	ap (mm) RE (Radius)	Boring Range 18-28		Boring Range 28-50		Boring Range 50-68	
					0.5-1.0 0.2	1.0-1.8 0.4	0.5-1.0 0.2-0.4	1.0-1.8 0.4	0.5-1.2 0.2-0.4	1.2-2.0 0.4-0.8
P	Alloyed Steel	**HB<**200	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	140-160 0.08-0.18	90-120 0.08-0.15	150-180 0.08-0.2	100-130 0.08-0.18	160-200 0.1-0.25	140-180 0.1-0.15
			4 ●●	**Vc** (m/min) **f** (mm/rev)	100-130 0.08-0.15	70-100 0.06-0.12	110-150 0.08-0.18	90-120 0.08-0.15	140-180 0.8-0.18	100-130 0.08-0.12
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	80-100 0.08-0.15	60-90 0.06-0.1	80-100 0.06-0.12	70-90 0.06-0.12	100-140 0.6-0.15	80-120 0.08-0.1
	Alloyed Steel	**HB>**200	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	130-150 0.08-0.18	120-140 0.06-0.15	130-150 0.08-0.18	120-140 0.06-0.15	140-170 0.08-0.2	120-150 0.08-0.18
			4 ●●	**Vc** (m/min) **f** (mm/rev)	100-130 0.08-0.15	100-120 0.06-0.13	100-130 0.08-0.15	100-120 0.06-0.13	120-150 0.08-0.18	100-120 0.08-0.15
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	80-100 0.08-0.12	70-90 0.06-0.11	80-100 0.08-0.12	70-90 0.06-0.11	100-120 0.08-0.12	70-90 0.06-0.11

ISO	Workpiece Material	Hardness HB	Overhang LDRED/ BDRED	ap (mm) RE (Radius)	Boring Range 68-120		Boring Range 120-200		Boring Range 200-500	
					1.8 0.2-0.4	2.5 0.4-0.8	0.8-2.0 0.2-0.4	2.0-3.5 0.4-0.8	0.8-2.0 0.2-0.4	2.0-4.0 0.4-0.8
P	Alloyed Steel	**HB<**200	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	160-220 0.1-0.3	140-180 0.1-0.25	160-220 0.1-0.3	140-180 0.1-0.25	160-220 0.1-0.35	140-180 0.1-0.3
			4 ●●	**Vc** (m/min) **f** (mm/rev)	150-200 0.1-0.2	120-160 0.08-0.18	120-160 0.1-0.2	120-160 0.08-0.18	N.R	N.R
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	100-140 0.08-0.18	100-140 0.08-0.15	N.R	N.R	N.R	N.R
	Alloyed Steel	**HB>**200	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	160-200 0.1-0.3	140-180 0.01-0.25	140-200 0.01-0.35	140-180 0.01-0.3	140-200 0.01-0.35	140-180 0.01-0.3
			4 ●●	**Vc** (m/min) **f** (mm/rev)	140-160 0.08-0.2	120-140 0.08-0.15	150-180 0.08-0.12	120-140 0.08-0.12	N.R	N.R
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	100-120 0.08-0.16	70-90 0.08-0.12	N.R	N.R	N.R	N.R

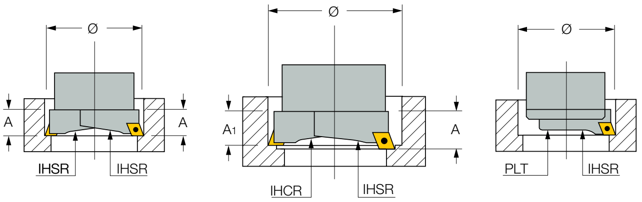
N.R. = Not Recommended

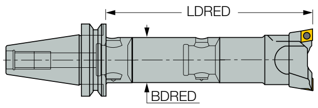
Stability

●●● – Good

●● – Normal

● – Poor



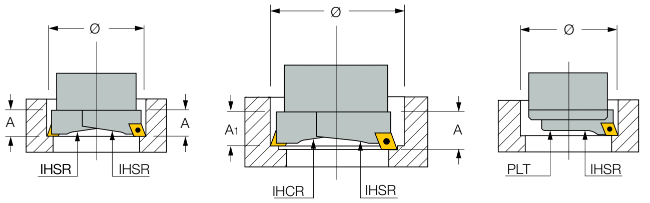


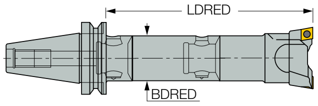
In case of a single or a stepped boring cutter configuration, only half the feed should be applied.

BHR Rough Boring Cutting Data

ISO	Workpiece Material	Hardness HB	Overhang LDRED/ BDRED	ap (mm) RE (Radius)	Boring Range 18-28		Boring Range 28-50		Boring Range 50-68	
					0.5-1.0 0.2	1.0-1.8 0.4	0.5-1.0 0.2-0.4	1.0-1.8 0.4	0.5-1.2 0.2-0.4	1.2-2.0 0.4-0.8
M	Stainless Steel	Ferritic & Martensitic	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	100-150 0.08-0.15	110-130 0.06-0.12	120-160 0.08-0.18	100-150 0.06-0.12	120-160 0.08-0.25	110-160 0.08-0.18
			4 ●●	**Vc** (m/min) **f** (mm/rev)	90-130 0.08-0.12	90-120 0.06-0.1	100-140 0.08-0.12	90-140 0.06-0.1	100-150 0.08-0.18	80-120 0.08-0.12
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	60-90 0.06-0.1	50-70 0.06-0.1	60-90 0.06-0.12	50-70 0.06-0.1	70-100 0.06-0.15	50-70 0.08-0.1
	Stainless Steel	Austenitic	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	110-130 0.08-0.15	100-130 0.06-0.12	120-150 0.08-0.18	110-140 0.06-0.12	110-160 0.08-0.25	100-150 0.06-0.12
			4 ●●	**Vc** (m/min) **f** (mm/rev)	80-110 0.08-0.12	80-110 0.06-0.1	90-130 0.08-0.12	90-120 0.06-0.1	100-150 0.08-0.18	90-130 0.06-0.1
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	60-90 0.06-0.1	50-70 0.06-0.1	60-90 0.06-0.12	50-70 0.06-0.1	70-100 0.06-0.15	50-70 0.06-0.1
	Cast Stainless Steel	Ferritic & Martensitic	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	90-130 0.08-0.15	100-130 0.06-0.12	120-150 0.08-0.18	110-140 0.06-0.12	120-160 0.08-0.25	100-150 0.06-0.12
			4 ●●	**Vc** (m/min) **f** (mm/rev)	70-110 0.08-0.12	80-110 0.06-0.1	90-130 0.08-0.12	90-120 0.06-0.1	100-150 0.08-0.18	90-130 0.06-0.1
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	60-90 0.06-0.1	50-70 0.06-0.1	60-90 0.06-0.12	50-70 0.06-0.1	70-100 0.06-0.15	50-70 0.06-0.1
	Cast Stainless Steel	Austenitic	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	80-120 0.08-0.15	70-110 0.06-0.12	100-150 0.08-0.18	90-140 0.06-0.1	110-150 0.08-0.25	100-150 0.06-0.12
			4 ●●	**Vc** (m/min) **f** (mm/rev)	70-100 0.08-0.12	70-100 0.06-0.1	80-130 0.08-0.12	70-120 0.06-0.1	90-140 0.08-0.18	90-130 0.06-0.1
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	60-90 0.06-0.1	50-70 0.06-0.1	60-90 0.06-0.12	50-70 0.06-0.1	70-100 0.06-0.15	50-70 0.06-0.1

Stability
- ●●● – Good
- ●● – Normal
- ● – Poor





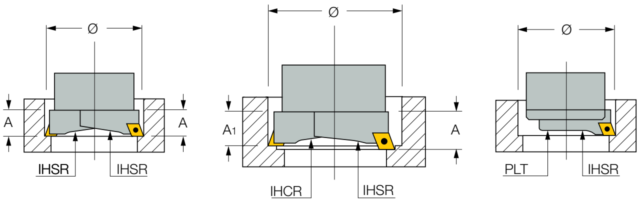
In case of a single or a stepped boring cutter configuration, only half the feed should be applied.

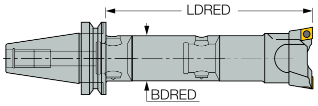
BHR Rough Boring Cutting Data

ISO	Workpiece Material	Hardness HB	Overhang LDRED/ BDRED	ap (mm) RE (Radius)	Boring Range 68-120		Boring Range 120-200		Boring Range 200-500	
					0.8-1.8 0.2-0.4	1.8-2.5 0.4-0.8	0.8-2.0 0.2-0.4	2.0-3.0 0.4-0.8	0.8-2.0 0.2-0.4	2.0-3.5 0.4-0.8
M	Stainless Steel	Ferritic & Martensitic	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	130-220 0.08-0.3	120-200 0.08-0.25	140-220 0.08-0.3	120-180 0.08-0.25	150-220 0.08-0.3	120-20 0.08-0.25
			4 ●●	**Vc** (m/min) **f** (mm/rev)	100-160 0.08-0.25	90-140 0.08-0.18	120-180 0.08-0.25	90-140 0.08-0.18	N.R	N.R
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	70-100 0.08-0.2	50-70 0.08-0.15	N.R	N.R	N.R	N.R
	Stainless Steel	Austenitic	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	120-200 0.08-0.3	100-160 0.08-0.25	120-200 0.08-0.3	100-160 0.08-0.25	120-200 0.08-0.3	100-180 0.08-0.25
			4 ●●	**Vc** (m/min) **f** (mm/rev)	100-150 0.08-0.25	90-140 0.08-0.18	100-160 0.08-0.25	90-140 0.08-0.18	N.R	N.R
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	70-100 0.08-0.2	50-70 0.08-0.15	N.R	N.R	N.R	N.R
	Cast Stainless Steel	Ferritic & Martensitic	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	130-200 0.08-0.3	120-180 0.08-0.25	140-200 0.08-0.3	120-160 0.08-0.25	140-200 0.08-0.3	120-180 0.08-0.25
			4 ●●	**Vc** (m/min) **f** (mm/rev)	110-150 0.08-0.25	90-150 0.08-0.18	100-160 0.08-0.25	90-140 0.08-0.18	N.R	N.R
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	70-100 0.08-0.2	50-70 0.08-0.15	N.R	N.R	N.R	N.R
	Cast Stainless Steel	Austenitic	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	130-180 0.08-0.3	120-180 0.08-0.25	120-200 0.08-0.3	100-160 0.08-0.25	120-200 0.08-0.3	100-180 0.08-0.25
			4 ●●	**Vc** (m/min) **f** (mm/rev)	100-140 0.08-0.25	90-140 0.08-0.18	100-160 0.08-0.25	90-140 0.08-0.18	N.R	N.R
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	70-190 0.08-0.2	50-70 0.08-0.15	N.R	N.R	N.R	N.R

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	ap (mm) RE (Radius)	Boring Range 18-28		Boring Range 28-50		Boring Range 50-68	
					0.5-1.0 0.2-0.4	1.0-1.8 0.4	0.5-1.0 0.2-0.4	1.0-1.8 0.4	0.5-1.2 0.2-0.4	1.2-2.0 0.4-0.8
K	**Grey Cast Iron GG 10-25**	HB<200	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	120-160 0.06-0.15	100-140 0.06-0.18	120-180 0.06-0.15	110-150 0.06-0.12	120-180 0.08-0.2	110-150 0.08-0.12
			4 ●●	**Vc** (m/min) **f** (mm/rev)	100-140 0.06-0.12	80-120 0.06-0.1	100-150 0.06-0.12	80-120 0.06-0.1	100-150 0.08-0.12	80-120 0.08-0.1
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	70-100 0.06-0.1	60-90 0.06-0.1	70-100 0.06-0.1	60-90 0.06-0.1	70-100 0.08-0.1	60-90 0.08-0.1
	Grey Cast Iron GG 25-40		2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	140-200 0.06-0.15	140-200 0.06-0.18	140-220 0.06-0.15	160-250 0.06-0.18	180-220 0.08-0.2	200-280 0.1-0.25
			4 ●●	**Vc** (m/min) **f** (mm/rev)	120-160 0.06-0.12	120-160 0.06-0.14	120-180 0.06-0.12	140-200 0.06-0.14	140-180 0.08-0.12	180-220 0.08-0.2
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	70-100 0.06-0.1	60-90 0.06-0.1	70-100 0.06-0.1	60-90 0.06-0.1	60-100 0.08-0.1	60-120 0.08-0.1
	Cast Iron GGG	Spheroidal & Graphite	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	120-180 0.06-0.15	120-180 0.06-0.18	120-200 0.06-0.15	140-220 0.06-0.18	180-220 0.08-0.18	180-240 0.1-0.2
			4 ●●	**Vc** (m/min) **f** (mm/rev)	120-160 0.06-0.12	120-160 0.06-0.14	120-180 0.06-0.12	140-200 0.06-0.14	140-200 0.08-0.12	160-220 0.08-0.18
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	60-100 0.06-0.1	60-90 0.06-0.1	60-100 0.06-0.1	60-90 0.06-0.1	60-90 0.08-0.1	60-100 0.08-0.1

ISO	Workpiece Material	Hardness HB	Overhang LDRED/ BDRED	ap (mm) RE (Radius)	Boring Range 68-120		Boring Range 120-200		Boring Range 50-68	
					0.8-1.8 0.2-0.4	1.8-2.5 0.4-0.8	0.8-2.0 0.2-0.4	2.0-3.0 0.4-0.8	0.8-2.0 0.2-0.4	2.0-3.5 0.4-0.8
K	**Grey Cast Iron GG 10-25**	HB<200	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	120-200 0.08-0.25	110-150 0.08-0.3	150-250 0.08-0.25	180-280 0.08-0.35	150-250 0.08-0.25	180-280 0.08-0.35
			4 ●●	**Vc** (m/min) **f** (mm/rev)	100-150 0.08-0.18	80-120 0.08-0.2	120-170 0.08-0.18	120-170 0.08-0.25	N.R	N.R
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	70-100 0.08-0.15	60-90 0.08-0.12	N.R	N.R	N.R	N.R
	Grey Cast Iron GG 25-40	4	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	250-300 0.12-0.35	250-350 0.12-0.35	250-350 0.15-0.3	250-350 0.15-0.4	250-350 0.15-0.3	250-350 0.15-0.4
			4 ●●	**Vc** (m/min) **f** (mm/rev)	200-270 0.1-0.25	230-300 0.12-0.3	200-300 0.15-0.3	200-270 0.15-0.35	N.R	N.R
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	70-150 0.1-0.15	60-120 0.12-0.25	N.R	N.R	N.R	N.R
	Cast Iron GGG	Spheroidal & Graphite	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	200-240 0.12-0.3	200-280 0.12-0.3	200-280 0.15-0.3	220-300 0.15-0.35	220-300 0.15-0.3	220-300 0.15-0.35
			4 ●●	**Vc** (m/min) **f** (mm/rev)	160-220 0.1-0.2	180-240 0.12-0.25	180-250 0.12-0.2	200-270 0.15-0.35	N.R	N.R
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	60-100 0.1-0.15	60-100 0.12-0.2	N.R	N.R	N.R	N.R

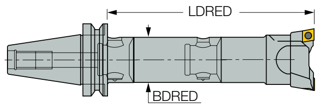
N.R. = Not Recommended

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	ap (mm) RE (Radius)	Boring Range 18-28		Boring Range 28-50		Boring Range 50-68	
					0.5-1.5 0.2-0.4	1.5-2.5 0.4	0.5-1.5 0.2-0.4	1.5-2.5 0.4	0.5-2.0 0.2-0.4	1.2-3.0 0.4-0.8
N	**Aluminum / Cast**	>12si	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	200-300 0.06-0.2	240-350 0.06-0.25	200-300 0.06-0.2	240-350 0.06-0.25	200-300 0.06-0.25	240-35 0.06-0.3
			4 ●●	**Vc** (m/min) **f** (mm/rev)	150-220 0.06-0.2	150-220 0.06-0.2	150-220 0.06-0.2	150-220 0.06-0.2	150-220 0.06-0.2	150-220 0.06-0.2
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	60-100 0.06-0.1	60-100 0.06-0.1	60-100 0.06-0.1	60-100 0.06-0.1	60-100 0.06-0.1	60-100 0.06-0.1
	Aluminum / Cast	<12si	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	180-250 0.06-0.2	220-280 0.06-0.25	180-250 0.06-0.25	220-280 0.06-0.25	180-250 0.06-0.25	220-280 0.06-0.3
			4 ●●	**Vc** (m/min) **f** (mm/rev)	120-220 0.06-0.2	120-220 0.06-0.2	120-220 0.06-0.2	120-220 0.06-0.2	120-220 0.06-0.2	120-220 0.06-0.25
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	60-100 0.06-0.1	60-100 0.06-0.1	60-100 0.06-0.1	60-100 0.06-0.1	60-100 0.06-0.1	60-100 0.06-0.1

ISO	Workpiece Material	Hardness HB	Overhang LDRED/ BDRED	ap (mm) RE (Radius)	Boring Range 68-120		Boring Range 120-200		Boring Range 200-500	
					0.8-3.0 0.2-0.4	1.8-4.0 0.4-0.8	0.8-3.0 0.2-0.4	2.0-4.0 0.4-0.8	0.8-3.0 0.2-0.4	2.0-4.5 0.4-0.8
N	**Aluminum / Cast**	>12si	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	200-300 0.06-0.25	240-350 0.06-0.3	200-300 0.06-0.25	240-350 0.06-0.4	200-300 0.06-0.25	240-350 0.06-0.4
			4 ●●	**Vc** (m/min) **f** (mm/rev)	150-220 0.06-0.2	150-220 0.06-0.2	150-220 0.06-0.2	150-220 0.06-0.2	N.R	N.R
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	60-100 0.06-0.1	60-100 0.06-0.1	N.R	N.R	N.R	N.R
	Aluminum / Cast	<12si	2.5 ●●●	**Vc** (m/min) **f** (mm/rev)	180-250 0.06-0.25	220-280 0.06-0.3	180-250 0.06-0.3	220-280 0.06-0.4	180-250 0.06-0.3	220-280 0.06-0.4
			4 ●●	**Vc** (m/min) **f** (mm/rev)	120-220 0.06-0.2	120-220 0.06-0.2	120-220 0.06-0.2	120-220 0.06-0.2	N.R	N.R
			6.3 ●	**Vc** (m/min) **f** (mm/rev)	60-100 0.06-0.1	60-100 0.06-0.1	N.R	N.R	N.R	N.R

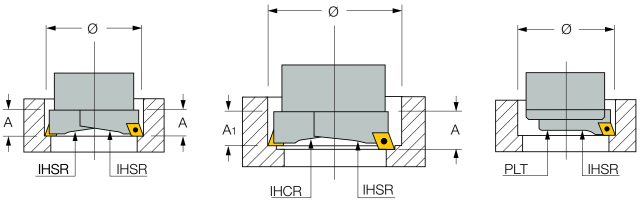
N.R. = Not Recommended

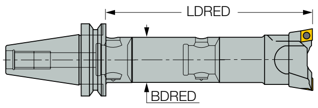
Stability

●●● – Good

●● – Normal

● – Poor





In case of a single or a stepped boring cutter configuration, only half the feed should be applied.

Recommended Cutting Conditions for Boring Operations with BHC Combi Rough and Fine

Material	Boring Depth to Diameter Ratio	Working Conditions	Cutting Speed Vc=m/min	Feed fn=mm/rev		Carbide Grade	Cutting Depth mm			
				RE=0.2	RE=0.4					
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					
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					
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					
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.

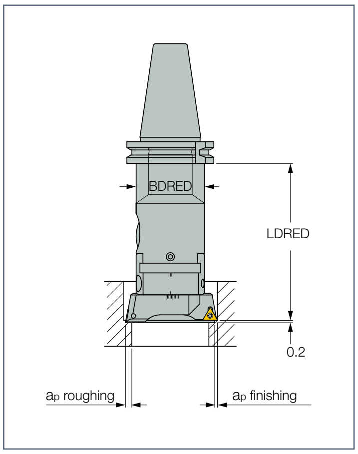
** Use inserts with the same corner radii for both roughing and finishing inserts.

Vc	Cutting speed (m/min)
D	Diameter of workpiece (mm)
n	Number of revolutions / min' (rev./min)
Vf	Feed rate (mm/min.)
fn	Feed / rev/ (mm/rev)
∏	3.14

$$Vc = \frac{\Pi \cdot D \cdot n}{1000}$$

$$n = \frac{Vc\ 1000}{\Pi \cdot D}$$

$$Vf = n \cdot fn$$

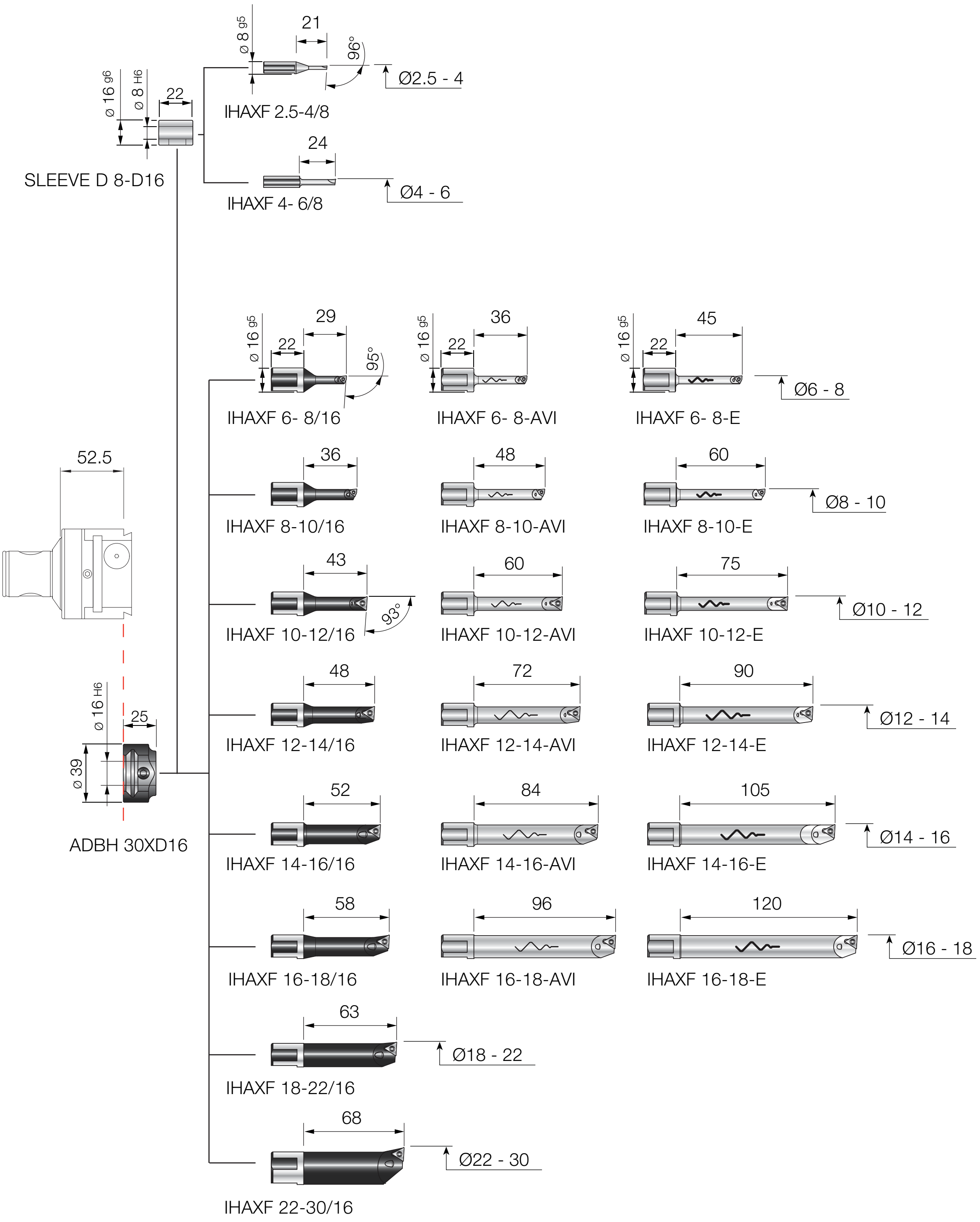


Fine Boring Head Range

2 µm Direct Diametric Adjustment

2 µm

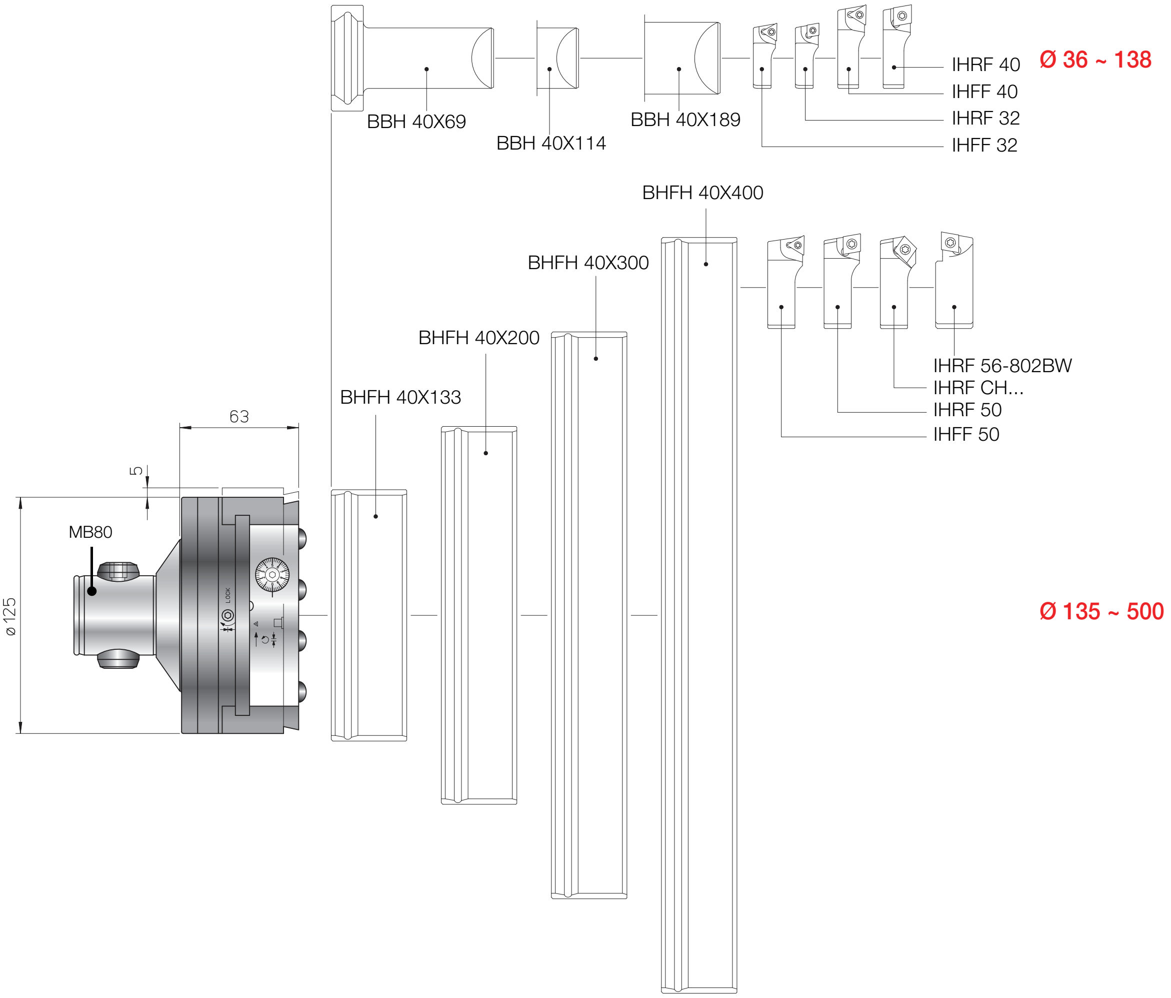
BHF MB50-80x94
BHF MB80-80x94
ø2.5-160



Fine Boring Head Range

2 µm Direct Diametric Adjustment

BHF MB80-125x114
ø36-500

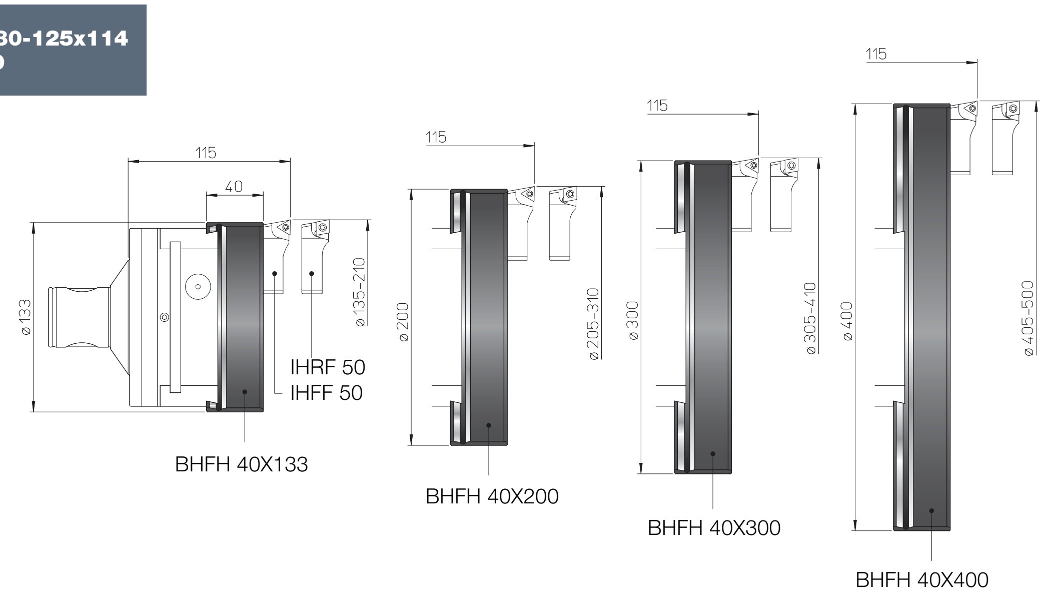


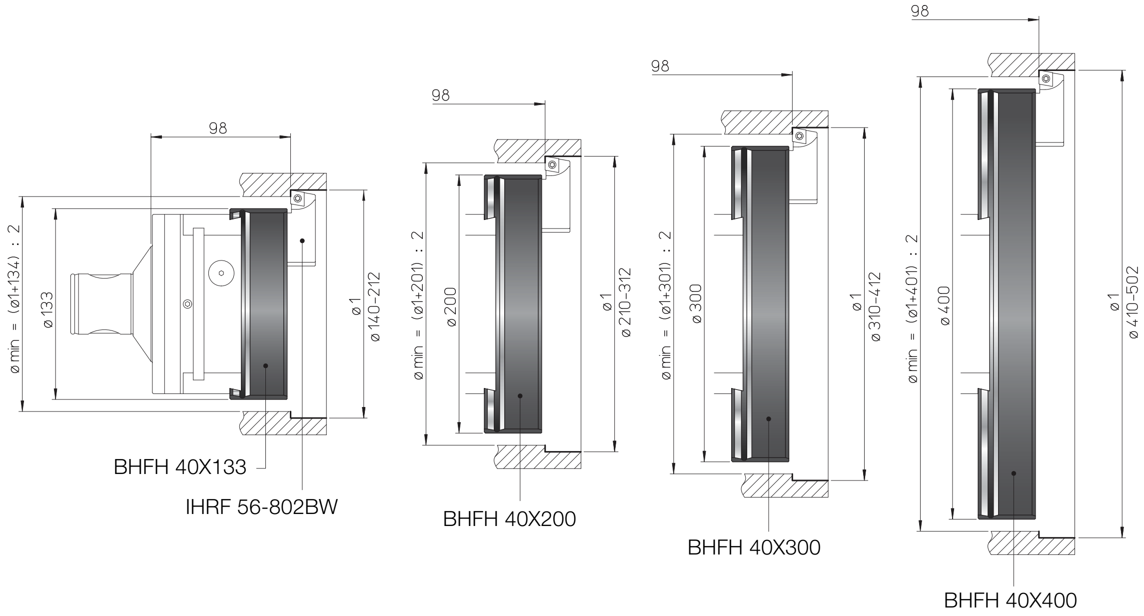
Fine Boring Head Range

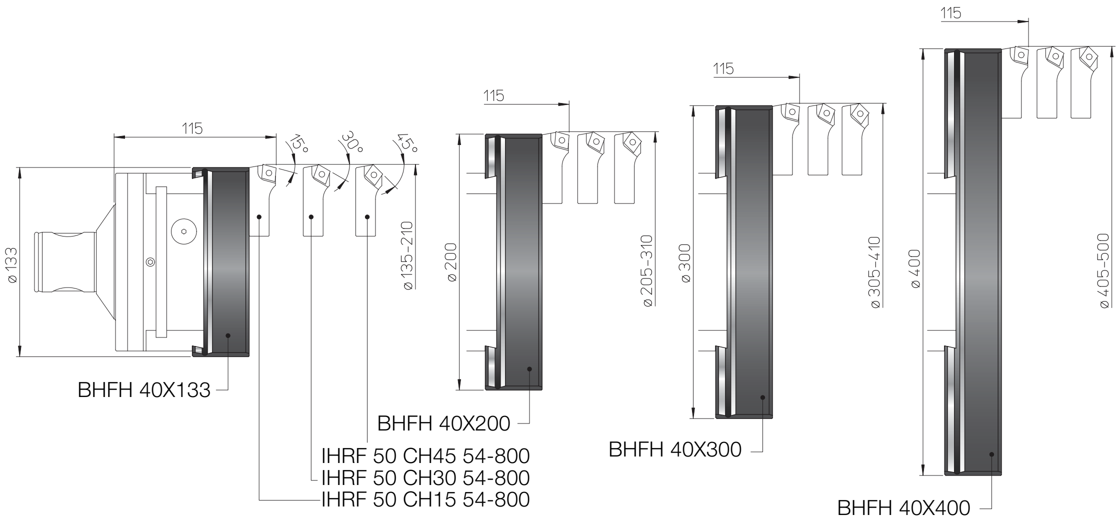
2 µm Direct Diametric Adjustment

2 µm

BHF MB80-125x114 ø2.5-160

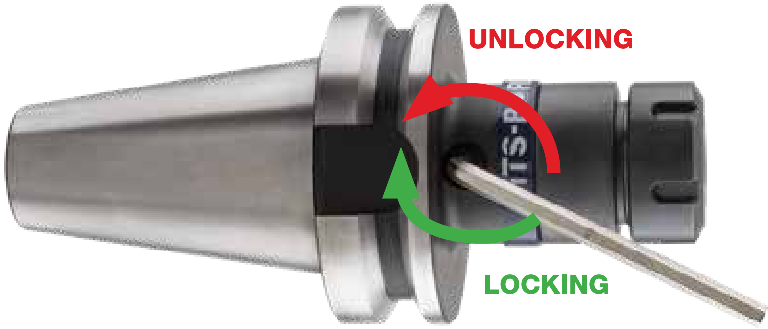






Operation and Maintenance

MB Connection
To LOCK, rotate the radial pin clockwise
To UNLOCK, rotate the radial pin counter-clockwise
Table shows the recommended tightening torques:



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

Before assembling MB connection elemants, make sure radial pin is not projected from the cylindrical parts.


CORRECT


WRONG

Stages for adjusting boring heads with dial:
1- **Loosen** slide adjustment screw
2- **Adjust** the dial screw
3- **Tighten** slide adjustment screw

Cartridge should be mounting according to the insert symbol direction

CORRECT

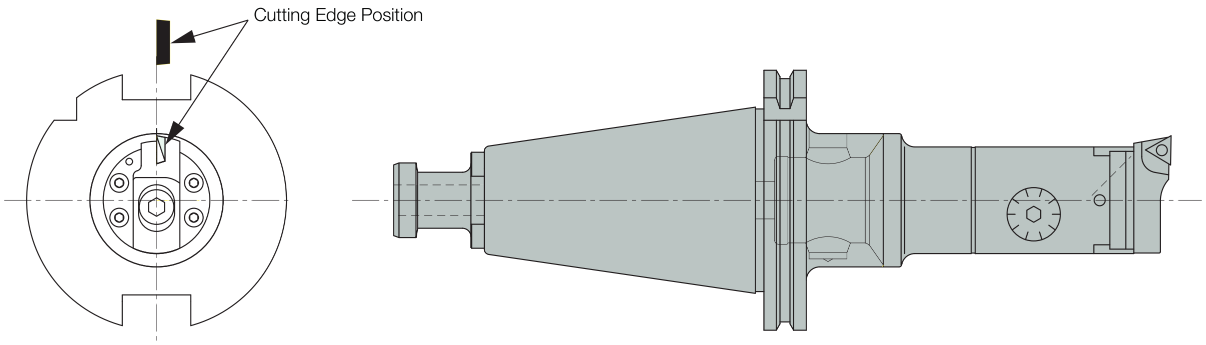
WRONG

CORRECT

WRONG

Warning: slide position must be adjusted within the indicated limits. Excess movements damage internal kinematics

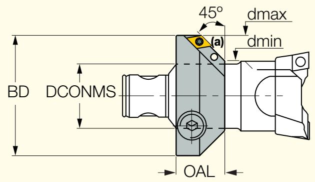
When BHF is assembled the cutting edge should be positioned in relation to the arbor key slots.



ITSBORE

CHA

45° Chamfering Holders



Designation	dmin	dmax	DCONMS	BD	OAL	Insert	kg	
CHA 16-45	18.0	28.0	16.00	28.00	13.00	DCMT 0702..	0.06	SR 14-548
CHA 20-45	23.0	32.0	20.00	32.00	15.00	DCMT 0702..	0.07	SR 14-548
CHA 25-45	28.0	43.0	25.00	43.00	18.00	DCMT 0702..	0.12	SR 14-548
CHA 32-45	35.0	54.0	32.00	54.00	22.00	DCMT 0702..	0.20	SR 14-548
CHA 40-45	46.0	72.0	40.00	72.00	30.00	DCMT 11T3..	0.53	SR 16-236 P
CHA 50-45	56.0	95.0	50.00	95.00	38.00	DCMT 11T3..	1.13	SR 16-236 P
CHA 63-45	75.0	125.0	63.00	125.00	46.00	DCMT 1504..	2.45	SR 16-212
CHA 80-45	95.0	165.0	80.00	165.00	58.00	DCMT 1504..	5.20	SR 16-212

Maintenance

Boring heads should be lubricated with ISO UN G220 oil weekly