SPHINX TOOLS

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DRILLING AND REAMING 362
MILLING 396
APPLICATION TECHNOLOGY 410

SPHINX TOOLS

Innovation
for quality.

Driling and reaming

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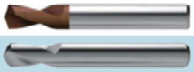
Drilling and reaming

✓outstanding(우수함)
• suitable(적절함)

	Article	Diameter range	Increments	Cutting length	Point angle	Helix angle		Material	Workpiece material * P M K N S H O	Application *
NC spotting drill										
	50806	0.50–6.00	0.10		60°	20°		VHM/MD/SC	✓ ✓ ✓ ✓ • ✓	
	50809	0.50–3.00	0.10		90°	20°		VHM/MD/SC	✓ ✓ ✓ ✓ • ✓	
	50808	0.50–3.00	0.10		90°	20°		VHM/MD/SC, TiAlSiN	✓ ✓ ✓ ✓ ✓ ✓ ✓	
	50810	2.00–20.00	1.00		90°	20°		VHM/MD/SC	✓ ✓ ✓ ✓ • ✓	
	50811	2.00–12.00	1.00		90°	20°		VHM/MD/SC; TiAlSiN	✓ ✓ ✓ ✓ • ✓ ✓	
	50812	2.00–20.00	1.00		123°	20°		VHM/MD/SC	✓ ✓ ✓ ✓ • ✓	
	50813	2.00–10.00	1.00		123°	20°		VHM/MD/SC; TiAlSiN	✓ ✓ ✓ ✓ • ✓ ✓	
	50814	2.00–20.00	1.00		142°	20°		VHM/MD/SC	✓ ✓ ✓ ✓ • ✓	
	50815	2.00–10.00	1.00		142°	20°		VHM/MD/SC; TiAlSiN	✓ ✓ ✓ ✓ • ✓ ✓	
	50818	1.60–12.00	0.20		142°/90°	20°		VHM/MD/SC	✓ ✓ ✓ ✓ • ✓	
Pilot drill										
	56005	0.10–1.50	0.01	2–4×ø	130°	20°		VHM/MD/SC	✓ • ✓ ✓ ✓ ✓	
	56033	0.03–2.99	0.01	2×ø	130°	30°		VHM/MD/SC	✓ ✓ ✓ ✓ ✓ ✓	
	56036	0.30–6.00	0.05	2×ø	140°/90°	30°		VHM/MD/SC; AlCrN	✓ ✓ ✓ ✓ ✓ • •	
	16004	0.10–1.50	0.05	2–3×ø	130°	20°		HSS-E	✓ • ✓ • •	
Micro drill										
	50695	0.20–1.50	0.01	6×ø	118°	30°		VHM/MD/SC	✓ • ✓ ✓ •	
	50699	0.05–2.00	0.01	6×ø	118°	30°		VHM/MD/SC	✓ • ✓ ✓ •	

✓ outstanding(우수함)
• suitable(적절함)

	Article	Diameter range	Increments	Cutting length	Point angle	Helix angle		Material	Workpiece material * P	M	K	N	S	H	O	Application *
	51200	0.03–3.00	0.01	6×ø	130°	35°		VHM/MD/SC	✓	✓	✓	✓	✓		•	
	51201	0.20–3.00	0.01	6×ø	130°	35°		VHM/MD/SC; TiAlN	✓	✓	✓	✓	✓	•	•	
	50621	0.15–3.00	0.01	12×ø	130°	25°		VHM/MD/SC	✓	•	✓	✓			•	
	50622	0.20–3.00	0.01	12×ø	130°	25°		VHM/MD/SC; TiAlN	✓	•	✓	✓	•	•	•	
	12604	0.05–3.175	0.01	DIN 1899-A	118°	25°		HSS-E	✓	•	✓	•			•	
Micro deep hole drill																
	50720	0.20–2.00	0.05	20×ø	129°	30°		VHM/MD/SC; Mi-Nova	✓	•	✓	✓	•	•	✓	
	50740	0.40–1.50	0.05	40×ø	126°	30°		VHM/MD/SC; Mi-Nova	✓	•	✓	✓	•	•	✓	
	50760	0.40–1.50	0.05	60×ø	126°	30°		VHM/MD/SC; Mi-Nova	✓	•	✓	✓	•	•	✓	
	50780	0.40–1.50	0.05	80×ø	126°	30°		VHM/MD/SC; Mi-Nova	✓	•	✓	✓	•	•	✓	
High performance drill Nirox																
	51609	0.30–3.00	0.05	9×ø	140°	28°		VHM/MD/SC; TiAlSiN	✓	✓	•	•	✓	•	✓	
High performance drill Phoenix TC2																
	52903	1.00–10.00	0.05	3×ø	140°	30°		VHM/MD/SC; AlTiCrN+S	✓	✓	✓	✓	✓	•	•	
	52906	1.00–10.00	0.05	6×ø	140°	30°		VHM/MD/SC; AlTiCrN+S	✓	✓	✓	✓	✓	•	•	
	52909	1.00–10.00	0.10	9×ø	140°	30°		VHM/MD/SC; AlTiCrN+S	✓	✓	✓	✓	✓	•	•	
	52912	1.00–10.00	0.10	12×ø	137°	30°		VHM/MD/SC; AlCrTiN	✓	✓	✓	✓	✓	•	•	
	52916	1.00–10.00	0.10	16×ø	137°	30°		VHM/MD/SC; AlCrTiN	✓	✓	•	✓	✓	•	•	
	52920	3.00–10.00	1.00	20×ø	137°	30°		VHM/MD/SC; AlCrTiN	•	✓	•	✓	✓	•	•	
	52930	3.00–10.00	1.00	30×ø	137°	30°		VHM/MD/SC; AlCrTiN	•	✓	•	✓	✓	•	•	

✓ outstanding(우수함)
• suitable(적절함)

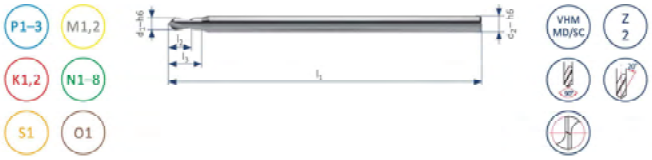
	Article	Diameter range	Increments	Cutting length	Point angle	Helix angle		Material	Workpiece material * P M K N S H O	Application *
High performance drill Phoenix										
	50938	1.00–12.70	0.10	3×ø	140°	30°		VHM/MD/SC; AlCrN	✓ ✓ ✓ • • •	
	50940	1.00–12.70	0.05	6×ø	140°	30°		VHM/MD/SC; TiAlN	✓ ✓ ✓ • • •	
	50941	0.50–3.00	0.10	6×ø	140°	30°		VHM/MD/SC; TiAlN	✓ ✓ ✓ • • •	
High performance drill Quadro										
	52100	3.00–19.50	0.50	6×ø	140°	0°		VHM/MD/SC	✓ ✓ •	
	52200	3.00–20.00	0.50	12×ø	140°	0°		VHM/MD/SC	✓ ✓ •	
	52150	4.00–20.00	0.50	6×ø	140°	15°		VHM/MD/SC; TiAlN	✓ ✓ ✓ •	
Twist drill										
	50950	3.00–20.00	0.10	DIN 6537	140°	30°		VHM/MD/SC; TiAlN	✓ • ✓ • • • •	
	50830	0.30–20.00	0.10	DIN 6539	118°	35°		VHM/MD/SC	✓ ✓ • ✓ • ✓	
	50838	0.30–6.00	0.05	3–8×ø	118°	30°		VHM/MD/SC	✓ ✓ • ✓ • ✓	
	50820	0.70–14.00	0.10	DIN 338	130°	35°–15°		VHM/MD/SC	✓ ✓ •	
Drill reamer										
	50840	2.00–14.00	0.10	DIN 6539	118°	35°		VHM/MD/SC	• • • ✓ •	
	55654	1.00–14.00	0.10	DIN 6539	140°	35°		VHM/MD/SC	✓ • ✓ • •	
	55338	1.00–14.00	0.10	DIN 338	140°	35°		VHM/MD/SC	✓ • ✓ • •	
	55652	0.20–2.99	0.01	5×ø	140°	35°		VHM/MD/SC	✓ • ✓ • • •	
Reamer										
	58000	0.987–6.018	0.01	–8×ø		10°		VHM/MD/SC	✓ ✓ ✓ ✓ •	
	58500	0.987–6.018	0.01	–8×ø		10°		VHM/MD/SC	✓ ✓ ✓ ✓ •	

NC spotting drill

Art. 50806

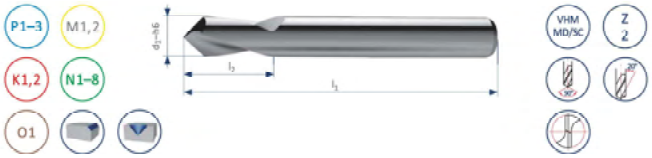
d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.50	1.50	2.00	38	3.00
0.60	1.50	2.00	38	3.00
0.70	1.50	2.00	38	3.00
0.80	2.00	2.50	38	3.00
0.90	2.00	2.50	38	3.00
1.00	2.00	2.50	38	3.00
1.10	2.50	3.50	38	3.00
1.20	2.50	3.50	38	3.00
1.30	2.50	3.50	38	3.00
1.40	3.00	4.00	38	3.00
1.50	3.00	4.00	38	3.00
1.60	3.00	4.00	38	3.00
1.70	4.00	5.00	38	3.00
1.80	4.00	5.00	38	3.00
1.90	4.00	5.00	38	3.00
2.00	5.00	6.00	38	3.00
2.10	5.00	6.00	38	3.00
2.20	5.00	6.00	38	3.00
2.30	6.00	7.00	38	3.00
2.40	6.00	7.00	38	3.00
2.50	6.00	7.00	38	3.00
2.60	7.00	8.00	38	3.00
2.70	7.00	8.00	38	3.00
2.80	7.00	8.00	38	3.00
2.90	7.00	8.00	38	3.00
3.00	9.50	9.50	38	3.00
4.00	10.50	10.50	40	4.00
5.00	16.00	16.00	50	5.00
6.00	16.00	16.00	50	6.00

Art. 50809



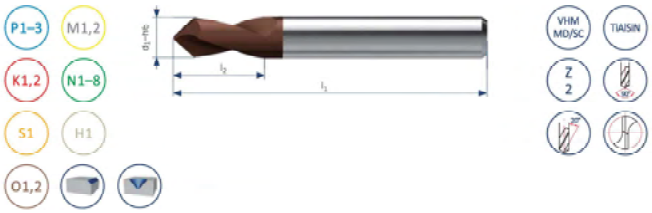
d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.50	1.00	1.60	38	2.00
0.60	1.20	1.80	38	2.00
0.70	1.40	2.00	38	2.00
0.80	1.60	2.20	38	2.00
0.90	1.80	2.40	38	2.00
1.00	2.00	2.60	38	2.00
1.10	2.20	2.80	38	2.00
1.20	2.40	3.00	38	2.00
1.30	2.60	3.20	38	2.00
1.40	2.80	3.40	38	2.00
1.50	3.00	3.80	38	2.00
1.60	3.20	4.20	38	2.00
1.70	3.40	4.40	38	2.00
1.80	3.60	4.60	38	2.00
1.90	3.80	4.80	38	2.00
2.00	5.00	6.00	38	3.00
2.50	6.50	8.00	38	3.00
3.00	7.50	7.50	38	3.00

Art. 50810



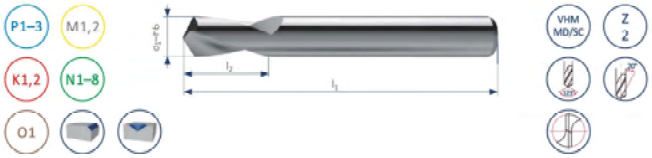
d_1 mm	l_2 mm	l_1 mm
2.00	8.50	25
3.00	9.50	32
4.00	10.50	40
5.00	16.00	50
6.00	16.00	50
8.00	20.00	60
10.00	22.00	70
12.00	22.00	70
14.00	25.00	75
16.00	25.00	75
20.00	35.00	75

Art. 50811



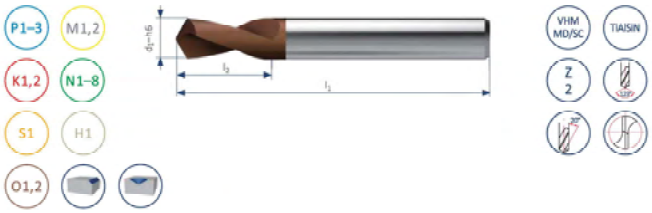
d_1 mm	l_2 mm	l_1 mm
2.00	8.50	25
3.00	9.50	32
4.00	10.50	40
5.00	16.00	50
6.00	16.00	50
8.00	20.00	60
10.00	22.00	70
12.00	22.00	70

Art. 50812



d_1 mm	l_2 mm	l_1 mm
2.00	8.50	25
3.00	9.50	32
4.00	10.50	40
5.00	16.00	50
6.00	16.00	50
8.00	20.00	60
10.00	22.00	70
12.00	22.00	70
14.00	25.00	75
16.00	25.00	75
20.00	35.00	75

Art. 50813



d_1 mm	l_2 mm	l_1 mm
2.00	8.50	25
3.00	9.50	32
4.00	10.50	40
5.00	16.00	50
6.00	16.00	50
8.00	20.00	60
10.00	22.00	70

Spotting and chamfering drill

Art. 50818

d_1 mm	l_2 mm	l_1 mm	d_2 mm
1.60	9.50	32	3.00
2.00	9.50	32	3.00
2.50	10.50	40	4.00
3.00	10.50	40	4.00
3.30	16.00	50	5.00
4.00	16.00	50	5.00
4.20	16.00	50	6.00
5.00	20.00	60	8.00
6.00	20.00	60	8.00
6.80	22.00	70	10.00
7.00	22.00	70	10.00
8.00	22.00	70	10.00
8.50	22.00	70	12.00
9.00	22.00	70	12.00
10.00	22.00	70	12.00
10.20	25.00	75	14.00
11.00	25.00	75	14.00
12.00	25.00	75	16.00

Pilot drill

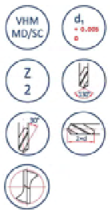
Art. 56005

d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.10	0.40	0.60	25	1.50
0.15	0.40	0.60	25	1.50
0.20	0.60	0.90	25	1.50
0.25	0.60	0.90	25	1.50
0.30	0.90	1.20	25	1.50
0.35	0.90	1.20	25	1.50
0.40	0.90	1.60	25	1.50
0.45	0.90	1.60	25	1.50
0.50	1.00	1.80	25	1.50
0.55	1.00	1.80	25	1.50
0.60	1.20	2.00	25	1.50
0.65	1.20	2.00	25	1.50
0.70	1.50	2.50	25	1.50
0.75	1.50	2.50	25	1.50
0.80	1.50	2.50	25	1.50
0.85	1.50	2.50	25	1.50
0.90	1.60	2.60	25	1.50
0.95	1.60	2.60	25	1.50
1.00	2.00	3.20	25	1.50
1.05	2.00	3.20	25	1.50
1.10	2.30	3.50	25	1.50
1.15	2.30	3.50	25	1.50
1.20	2.30	3.50	25	1.50
1.25	2.30	3.50	25	1.50
1.30	2.70	4.20	25	1.50
1.35	2.70	4.20	25	1.50
1.40	2.70	4.20	25	1.50
1.45	2.70	4.20	25	1.50
1.50	3.00	4.20	25	1.50

Pilot drill

Art. 56033

P1–3 M1,2 K1,2 N1–8 S1 O1



d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.03	0.15	0.30	38	3.00
0.04	0.15	0.30	38	3.00
0.05	0.20	0.40	38	3.00
0.06	0.20	0.40	38	3.00
0.07	0.25	0.45	38	3.00
0.08	0.25	0.45	38	3.00
0.09	0.30	0.50	38	3.00
0.10	0.35	0.55	38	3.00
0.11	0.35	0.55	38	3.00
0.12	0.35	0.55	38	3.00
0.13	0.40	0.60	38	3.00
0.14	0.40	0.60	38	3.00
0.15	0.40	0.60	38	3.00
0.16	0.40	0.60	38	3.00
0.17	0.50	0.70	38	3.00
0.18	0.50	0.70	38	3.00
0.19	0.50	0.70	38	3.00
0.20	0.55	0.75	38	3.00
0.21	0.55	0.75	38	3.00
0.22	0.60	0.80	38	3.00
0.23	0.60	0.80	38	3.00
0.24	0.60	0.80	38	3.00
0.25	0.70	0.90	38	3.00
0.26	0.70	0.90	38	3.00
0.27	0.70	0.90	38	3.00
0.28	0.80	1.00	38	3.00
0.29	0.80	1.00	38	3.00
0.30	0.90	1.20	38	3.00
0.31	0.90	1.20	38	3.00
0.32	0.90	1.20	38	3.00
0.33	0.90	1.20	38	3.00
0.34	0.90	1.35	38	3.00
0.35	0.90	1.35	38	3.00
0.36	0.95	1.35	38	3.00
0.37	0.95	1.35	38	3.00
0.38	0.95	1.50	38	3.00
0.39	0.95	1.50	38	3.00
0.40	0.80	1.60	38	3.00

d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.41	0.82	1.60	38	3.00
0.42	0.84	1.60	38	3.00
0.43	0.86	1.60	38	3.00
0.44	0.88	1.60	38	3.00
0.45	0.90	1.60	38	3.00
0.46	0.92	1.70	38	3.00
0.47	0.94	1.70	38	3.00
0.48	0.96	1.70	38	3.00
0.49	0.98	1.70	38	3.00
0.50	1.00	1.70	38	3.00
0.51	1.02	1.80	38	3.00
0.52	1.04	1.80	38	3.00
0.53	1.06	1.80	38	3.00
0.54	1.08	1.80	38	3.00
0.55	1.10	1.80	38	3.00
0.56	1.12	1.90	38	3.00
0.57	1.14	1.90	38	3.00
0.58	1.16	1.90	38	3.00
0.59	1.18	1.90	38	3.00
0.60	1.20	1.90	38	3.00
0.61	1.22	2.00	38	3.00
0.62	1.24	2.00	38	3.00
0.63	1.26	2.00	38	3.00
0.64	1.28	2.00	38	3.00
0.65	1.30	2.00	38	3.00
0.66	1.32	2.10	38	3.00
0.67	1.34	2.10	38	3.00
0.68	1.36	2.10	38	3.00
0.69	1.38	2.10	38	3.00
0.70	1.40	2.10	38	3.00
0.71	1.42	2.20	38	3.00
0.72	1.44	2.20	38	3.00
0.73	1.46	2.20	38	3.00
0.74	1.48	2.20	38	3.00
0.75	1.50	2.20	38	3.00
0.76	1.52	2.30	38	3.00
0.77	1.54	2.30	38	3.00
0.78	1.56	2.30	38	3.00

d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.79	1.58	2.30	38	3.00
0.80	1.60	2.30	38	3.00
0.81	1.62	2.40	38	3.00
0.82	1.64	2.40	38	3.00
0.83	1.66	2.40	38	3.00
0.84	1.68	2.40	38	3.00
0.85	1.70	2.40	38	3.00
0.86	1.72	2.50	38	3.00
0.87	1.74	2.50	38	3.00
0.88	1.76	2.50	38	3.00
0.89	1.78	2.50	38	3.00
0.90	1.80	2.50	38	3.00
0.91	1.82	2.60	38	3.00
0.92	1.84	2.60	38	3.00
0.93	1.86	2.60	38	3.00
0.94	1.88	2.60	38	3.00
0.95	1.90	2.60	38	3.00
0.96	1.92	2.70	38	3.00
0.97	1.94	2.70	38	3.00
0.98	1.96	2.70	38	3.00
0.99	1.98	2.70	38	3.00
1.00	2.00	2.70	38	3.00
1.01	2.02	3.50	38	3.00
1.02	2.04	3.50	38	3.00
1.03	2.06	3.50	38	3.00
1.04	2.08	3.50	38	3.00
1.05	2.10	3.50	38	3.00
1.06	2.12	3.60	38	3.00
1.07	2.14	3.60	38	3.00
1.08	2.16	3.60	38	3.00
1.09	2.18	3.60	38	3.00
1.10	2.20	3.60	38	3.00
1.11	2.22	3.70	38	3.00
1.12	2.24	3.70	38	3.00
1.13	2.26	3.70	38	3.00
1.14	2.28	3.70	38	3.00
1.15	2.30	3.70	38	3.00
1.16	2.32	3.80	38	3.00

d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
1.17	2.34	3.80	38	3.00
1.18	2.36	3.80	38	3.00
1.19	2.38	3.80	38	3.00
1.20	2.40	3.80	38	3.00
1.21	2.42	4.20	38	3.00
1.22	2.44	4.20	38	3.00
1.23	2.46	4.20	38	3.00
1.24	2.48	4.20	38	3.00
1.25	2.50	4.20	38	3.00
1.26	2.52	4.30	38	3.00
1.27	2.54	4.30	38	3.00
1.28	2.56	4.30	38	3.00
1.29	2.58	4.30	38	3.00
1.30	2.60	4.30	38	3.00
1.31	2.62	4.40	38	3.00
1.32	2.64	4.40	38	3.00
1.33	2.66	4.40	38	3.00
1.34	2.68	4.40	38	3.00
1.35	2.70	4.40	38	3.00
1.36	2.72	4.50	38	3.00
1.37	2.74	4.50	38	3.00
1.38	2.76	4.50	38	3.00
1.39	2.78	4.50	38	3.00
1.40	2.80	4.50	38	3.00
1.41	2.82	4.60	38	3.00
1.42	2.84	4.60	38	3.00
1.43	2.86	4.60	38	3.00
1.44	2.88	4.60	38	3.00
1.45	2.90	4.60	38	3.00
1.46	2.92	4.70	38	3.00
1.47	2.94	4.70	38	3.00
1.48	2.96	4.70	38	3.00
1.49	2.98	4.70	38	3.00
1.50	3.00	4.70	38	3.00
1.51	3.02	5.10	38	3.00
1.52	3.04	5.10	38	3.00
1.53	3.06	5.10	38	3.00
1.54	3.08	5.10	38	3.00

d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
1.55	3.10	5.10	38	3.00
1.56	3.12	5.20	38	3.00
1.57	3.14	5.20	38	3.00
1.58	3.16	5.20	38	3.00
1.59	3.18	5.20	38	3.00
1.60	3.20	5.20	38	3.00
1.61	3.22	5.30	38	3.00
1.62	3.24	5.30	38	3.00
1.63	3.26	5.30	38	3.00
1.64	3.28	5.30	38	3.00
1.65	3.30	5.30	38	3.00
1.66	3.32	5.40	38	3.00
1.67	3.34	5.40	38	3.00
1.68	3.36	5.40	38	3.00
1.69	3.38	5.40	38	3.00
1.70	3.40	5.40	38	3.00
1.71	3.42	5.50	38	3.00
1.72	3.44	5.50	38	3.00
1.73	3.46	5.50	38	3.00
1.74	3.48	5.50	38	3.00
1.75	3.50	5.50	38	3.00
1.76	3.52	5.60	38	3.00
1.77	3.54	5.60	38	3.00
1.78	3.56	5.60	38	3.00
1.79	3.58	5.60	38	3.00
1.80	3.60	5.60	38	3.00
1.81	3.62	5.70	38	3.00
1.82	3.64	5.70	38	3.00
1.83	3.66	5.70	38	3.00
1.84	3.68	5.70	38	3.00
1.85	3.70	5.70	38	3.00
1.86	3.72	5.80	38	3.00
1.87	3.74	5.80	38	3.00
1.88	3.76	5.80	38	3.00
1.89	3.78	5.80	38	3.00
1.90	3.80	5.80	38	3.00
1.91	3.82	5.90	38	3.00
1.92	3.84	5.90	38	3.00

d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
1.93	3.86	5.90	38	3.00
1.94	3.88	5.90	38	3.00
1.95	3.90	5.90	38	3.00
1.96	3.92	6.00	38	3.00
1.97	3.94	6.00	38	3.00
1.98	3.96	6.00	38	3.00
1.99	3.98	6.00	38	3.00
2.00	4.00	6.00	38	3.00
2.01	4.02	6.10	38	3.00
2.02	4.04	6.10	38	3.00
2.03	4.06	6.10	38	3.00
2.04	4.08	6.10	38	3.00
2.05	4.10	6.10	38	3.00
2.06	4.12	6.20	38	3.00
2.07	4.14	6.20	38	3.00
2.08	4.16	6.20	38	3.00
2.09	4.18	6.20	38	3.00
2.10	4.20	6.20	38	3.00
2.11	4.22	6.30	38	3.00
2.12	4.24	6.30	38	3.00
2.13	4.26	6.30	38	3.00
2.14	4.28	6.30	38	3.00
2.15	4.30	6.30	38	3.00
2.16	4.32	6.40	38	3.00
2.17	4.34	6.40	38	3.00
2.18	4.36	6.40	38	3.00
2.19	4.38	6.40	38	3.00
2.20	4.40	6.40	38	3.00
2.21	4.42	6.50	38	3.00
2.22	4.44	6.50	38	3.00
2.23	4.46	6.50	38	3.00
2.24	4.48	6.50	38	3.00
2.25	4.50	6.50	38	3.00
2.26	4.52	6.60	38	3.00
2.27	4.54	6.60	38	3.00
2.28	4.56	6.60	38	3.00
2.29	4.58	6.60	38	3.00
2.30	4.60	6.60	38	3.00

d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
2.31	4.62	6.70	38	3.00
2.32	4.64	6.70	38	3.00
2.33	4.66	6.70	38	3.00
2.34	4.68	6.70	38	3.00
2.35	4.70	6.70	38	3.00
2.36	4.72	6.80	38	3.00
2.37	4.74	6.80	38	3.00
2.38	4.76	6.80	38	3.00
2.39	4.78	6.80	38	3.00
2.40	4.80	6.80	38	3.00
2.41	4.82	6.90	38	3.00
2.42	4.84	6.90	38	3.00
2.43	4.86	6.90	38	3.00
2.44	4.88	6.90	38	3.00
2.45	4.90	6.90	38	3.00
2.46	4.92	7.00	38	3.00
2.47	4.94	7.00	38	3.00
2.48	4.96	7.00	38	3.00
2.49	4.98	7.00	38	3.00
2.50	5.00	7.00	38	3.00
2.51	5.02	7.10	38	3.00
2.52	5.04	7.10	38	3.00
2.53	5.06	7.10	38	3.00
2.54	5.08	7.10	38	3.00
2.55	5.10	7.10	38	3.00
2.56	5.12	7.20	38	3.00
2.57	5.14	7.20	38	3.00
2.58	5.16	7.20	38	3.00
2.59	5.18	7.20	38	3.00
2.60	5.20	7.20	38	3.00
2.61	5.22	7.30	38	3.00
2.62	5.24	7.30	38	3.00
2.63	5.26	7.30	38	3.00
2.64	5.28	7.30	38	3.00
2.65	5.30	7.30	38	3.00
2.66	5.32	7.40	38	3.00
2.67	5.34	7.40	38	3.00
2.68	5.36	7.40	38	3.00

d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
2.69	5.38	7.40	38	3.00
2.70	5.40	7.40	38	3.00
2.71	5.42	7.50	38	3.00
2.72	5.44	7.50	38	3.00
2.73	5.46	7.50	38	3.00
2.74	5.48	7.50	38	3.00
2.75	5.50	7.50	38	3.00
2.76	5.52	7.60	38	3.00
2.77	5.54	7.60	38	3.00
2.78	5.56	7.60	38	3.00
2.79	5.58	7.60	38	3.00
2.80	5.60	7.60	38	3.00
2.81	5.62	7.70	38	3.00
2.82	5.64	7.70	38	3.00
2.83	5.66	7.70	38	3.00
2.84	5.68	7.70	38	3.00
2.85	5.70	7.70	38	3.00
2.86	5.72	7.80	38	3.00
2.87	5.74	7.80	38	3.00
2.88	5.76	7.80	38	3.00
2.89	5.78	7.80	38	3.00
2.90	5.80	7.80	38	3.00
2.91	5.82	7.90	38	3.00
2.92	5.84	7.90	38	3.00
2.93	5.86	7.90	38	3.00
2.94	5.88	7.90	38	3.00
2.95	5.90	7.90	38	3.00
2.96	5.92	8.00	38	3.00
2.97	5.94	8.00	38	3.00
2.98	5.96	8.00	38	3.00
2.99	5.98	8.00	38	3.00

Micro drill Spirec

Art. 50699

P1–3 M1 K1,2 N2–5 N7,8

VHM MD/SC | DIN 1899-A | Z 2 | <180° | 140° | 10°

d1 mm	l2 mm	l3 mm	l1 mm	d2 mm
0.05	0.40	0.60	25	1.00
0.06	0.40	0.60	25	1.00
0.07	0.50	0.70	25	1.00
0.08	0.50	0.70	25	1.00
0.09	0.50	0.70	25	1.00
0.10	0.50	0.70	25	1.00
0.11	0.50	0.70	25	1.00
0.12	0.50	0.70	25	1.00
0.13	0.80	1.00	25	1.00
0.14	0.80	1.00	25	1.00
0.15	0.80	1.00	25	1.00
0.16	1.10	1.40	25	1.00
0.17	1.10	1.40	25	1.00
0.18	1.10	1.40	25	1.00
0.19	1.10	1.40	25	1.00
0.20	1.50	1.80	25	1.00
0.21	1.50	1.80	25	1.00
0.22	1.50	1.80	25	1.00
0.23	1.50	1.80	25	1.00
0.24	1.50	1.80	25	1.00
0.25	1.90	2.20	25	1.00
0.26	1.90	2.20	25	1.00
0.27	1.90	2.20	25	1.00
0.28	1.90	2.20	25	1.00
0.29	1.90	2.20	25	1.00
0.30	1.90	2.20	25	1.00
0.31	2.40	2.80	25	1.00
0.32	2.40	2.80	25	1.00
0.33	2.40	2.80	25	1.00
0.34	2.40	2.80	25	1.00
0.35	2.40	2.80	25	1.00
0.36	2.40	2.80	25	1.00
0.37	2.40	2.80	25	1.00
0.38	2.40	2.80	25	1.00
0.39	2.70	3.60	25	1.00
0.40	2.70	3.60	25	1.00
0.41	2.70	3.60	25	1.00
0.42	2.70	3.60	25	1.00
0.43	2.70	3.60	25	1.00
0.44	2.70	3.60	25	1.00
0.45	2.70	3.60	25	1.00
0.46	2.70	3.60	25	1.00
0.47	2.70	3.60	25	1.00
0.48	2.70	3.60	25	1.00
0.49	3.20	4.00	25	1.00
0.50	3.20	4.00	25	1.00
0.51	3.20	4.00	25	1.00
0.52	3.20	4.00	25	1.00
0.53	3.20	4.00	25	1.00
0.54	3.60	4.50	25	1.00
0.55	3.60	4.50	25	1.00
0.56	3.60	4.50	25	1.00
0.57	3.60	4.50	25	1.00
0.58	3.60	4.50	25	1.00
0.59	3.60	4.50	25	1.00
0.60	3.60	4.50	25	1.00
0.61	3.90	5.00	25	1.00
0.62	3.90	5.00	25	1.00
0.63	3.90	5.00	25	1.00
0.64	3.90	5.00	25	1.00
0.65	3.90	5.00	25	1.00
0.66	3.90	5.00	25	1.00
0.67	3.90	5.00	25	1.00
0.68	4.50	5.60	25	1.00
0.69	4.50	5.60	25	1.00
0.70	4.50	5.60	25	1.00
0.71	4.50	5.60	25	1.00
0.72	4.50	5.60	25	1.00
0.73	4.50	5.60	25	1.00
0.74	4.50	5.60	25	1.00
0.75	4.50	5.60	25	1.00
0.76	5.00	6.30	25	1.00
0.77	5.00	6.30	25	1.00
0.78	5.00	6.30	25	1.00
0.79	5.00	6.30	25	1.00
0.80	5.00	6.30	25	1.50
0.81	5.00	6.30	25	1.50
0.82	5.00	6.30	25	1.50
0.83	5.00	6.30	25	1.50
0.84	5.00	6.30	25	1.50
0.85	5.00	6.30	25	1.50
0.86	5.70	7.10	25	1.50
0.87	5.70	7.10	25	1.50
0.88	5.70	7.10	25	1.50
0.89	5.70	7.10	25	1.50
0.90	5.70	7.10	25	1.50
0.91	5.70	7.10	25	1.50
0.92	5.70	7.10	25	1.50
0.93	5.70	7.10	25	1.50
0.94	5.70	7.10	25	1.50
0.95	5.70	7.10	25	1.50
0.96	6.50	8.00	25	1.50
0.97	6.50	8.00	25	1.50
0.98	6.50	8.00	25	1.50
0.99	6.50	8.00	25	1.50
1.00	6.50	8.00	25	1.50
1.01	6.50	8.00	25	1.50
1.02	6.50	8.00	25	1.50
1.03	6.50	8.00	25	1.50
1.04	6.50	8.00	25	1.50
1.05	6.50	8.00	25	1.50
1.06	7.30	9.00	25	1.50
1.07	7.30	9.00	25	1.50
1.08	7.30	9.00	25	1.50
1.09	7.30	9.00	25	1.50
1.10	7.30	9.00	25	1.50
1.11	7.30	9.00	25	1.50
1.12	7.30	9.00	25	1.50
1.13	7.30	9.00	25	1.50
1.14	7.30	9.00	25	1.50
1.15	7.30	9.00	25	1.50
1.16	8.20	10.00	25	1.50
1.17	8.20	10.00	25	1.50
1.18	8.20	10.00	25	1.50
1.19	8.20	10.00	25	1.50
1.20	8.20	10.00	25	1.50
1.21	8.20	10.00	25	1.50
1.22	8.20	10.00	25	1.50
1.23	8.20	10.00	25	1.50
1.24	8.20	10.00	25	1.50
1.25	8.20	10.00	25	1.50
1.26	8.20	10.00	25	1.50
1.27	8.20	10.00	25	1.50
1.28	8.20	10.00	25	1.50
1.29	8.20	10.00	25	1.50
1.30	8.20	10.00	25	1.50
1.31	9.20	11.20	25	1.50
1.32	9.20	11.20	25	1.50
1.33	9.20	11.20	25	1.50
1.34	9.20	11.20	25	1.50
1.35	9.20	11.20	25	1.50
1.36	9.20	11.20	25	1.50
1.37	9.20	11.20	25	1.50
1.38	9.20	11.20	25	1.50
1.39	9.20	11.20	25	1.50
1.40	9.20	11.20	25	1.50
1.41	9.20	11.20	25	1.50
1.42	9.20	11.20	25	1.50
1.43	9.20	11.20	25	1.50
1.44	9.20	11.20	25	1.50
1.45	9.20	11.20	25	1.50
1.46	9.20	11.20	25	1.50
1.47	9.20	11.20	25	1.50
1.48	9.20	11.20	25	1.50
1.49	9.20	11.20	25	1.50
1.50	9.20	11.20	25	1.50
1.51	11.20	13.40	38	2.00
1.52	11.20	13.40	38	2.00
1.53	11.20	13.40	38	2.00
1.54	11.20	13.40	38	2.00
1.55	11.20	13.40	38	2.00
1.56	11.20	13.40	38	2.00
1.57	11.20	13.40	38	2.00
1.58	11.20	13.40	38	2.00
1.59	11.20	13.40	38	2.00
1.60	11.20	13.40	38	2.00
1.61	11.20	13.40	38	2.00
1.62	11.20	13.40	38	2.00
1.63	11.20	13.40	38	2.00
1.64	11.20	13.40	38	2.00
1.65	11.20	13.40	38	2.00
1.66	11.20	13.40	38	2.00
1.67	11.20	13.40	38	2.00
1.68	11.20	13.40	38	2.00
1.69	11.20	13.40	38	2.00
1.70	11.20	13.40	38	2.00
1.71	11.20	13.40	38	2.00
1.72	11.20	13.40	38	2.00
1.73	11.20	13.40	38	2.00
1.74	11.20	13.40	38	2.00
1.75	11.20	13.40	38	2.00
1.76	11.20	13.40	38	2.00
1.77	11.20	13.40	38	2.00
1.78	11.20	13.40	38	2.00
1.79	11.20	13.40	38	2.00
1.80	11.20	13.40	38	2.00
1.81	11.20	13.40	38	2.00
1.82	11.20	13.40	38	2.00
1.83	11.20	13.40	38	2.00
1.84	11.20	13.40	38	2.00
1.85	11.20	13.40	38	2.00
1.86	11.20	13.40	38	2.00
1.87	11.20	13.40	38	2.00
1.88	11.20	13.40	38	2.00
1.89	11.20	13.40	38	2.00
1.90	11.20	13.40	38	2.00
1.91	11.20	13.40	38	2.00
1.92	11.20	13.40	38	2.00
1.93	11.20	13.40	38	2.00
1.94	11.20	13.40	38	2.00
1.95	11.20	13.40	38	2.00
1.96	11.20	13.40	38	2.00
1.97	11.20	13.40	38	2.00
1.98	11.20	13.40	38	2.00
1.99	11.20	13.40	38	2.00
2.00	11.20	13.40	38	2.00

Micro drill

Art. 51200

P1–3 M1,2 K1,2 N1–8 S1 O1

d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.03	0.25	0.35	38	3.00
0.04	0.30	0.40	38	3.00
0.05	0.35	0.45	38	3.00
0.06	0.40	0.50	38	3.00
0.07	0.45	0.60	38	3.00
0.08	0.50	0.70	38	3.00
0.09	0.50	0.70	38	3.00
0.10	0.50	0.70	38	3.00
0.11	0.50	0.70	38	3.00
0.12	0.50	0.70	38	3.00
0.13	0.80	1.00	38	3.00
0.14	0.80	1.00	38	3.00
0.15	0.80	1.00	38	3.00
0.16	1.10	1.40	38	3.00
0.17	1.10	1.40	38	3.00
0.18	1.10	1.40	38	3.00
0.19	1.10	1.40	38	3.00
0.20	1.50	1.80	38	3.00
0.21	1.50	1.80	38	3.00
0.22	1.50	1.80	38	3.00
0.23	1.50	1.80	38	3.00
0.24	1.50	1.80	38	3.00
0.25	1.90	2.20	38	3.00
0.26	1.90	2.20	38	3.00
0.27	1.90	2.20	38	3.00
0.28	1.90	2.20	38	3.00
0.29	1.90	2.20	38	3.00
0.30	1.80	2.40	38	3.00
0.31	1.80	2.40	38	3.00
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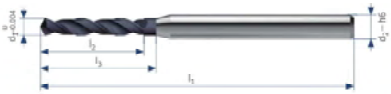
2.96	14.00	17.00	38	3.00
2.97	14.00	17.00	38	3.00
2.98	14.00	17.00	38	3.00
2.99	14.00	17.00	38	3.00
3.00	14.00	17.00	38	3.00

Micro drill

Art. 51201

P1~3 M1,2 K1,2 N1~8 S1 H1 O1,2



VHM MD/SC · TiAlN · Z 2 · 130° · 118°

d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
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0.21	1.50	1.80	38	3.00
0.22	1.50	1.80	38	3.00
0.23	1.50	1.80	38	3.00
0.24	1.50	1.80	38	3.00
0.25	1.90	2.20	38	3.00
0.26	1.90	2.20	38	3.00
0.27	1.90	2.20	38	3.00
0.28	1.90	2.20	38	3.00
0.29	1.90	2.20	38	3.00
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0.31	1.80	2.40	38	3.00
0.32	1.80	2.40	38	3.00
0.33	1.80	2.40	38	3.00
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0.35	2.20	2.80	38	3.00
0.36	2.20	2.80	38	3.00
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0.40	2.70	3.60	38	3.00
0.41	2.70	3.60	38	3.00
0.42	2.70	3.60	38	3.00
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0.46	2.70	3.60	38	3.00
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0.96	6.50	8.00	38	3.00
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1.67	11.20	13.40	38	3.00
1.68	11.20	13.40	38	3.00
1.69	11.20	13.40	38	3.00
1.70	11.20	13.40	38	3.00
1.71	11.20	13.40	38	3.00
1.72	11.20	13.40	38	3.00
1.73	11.20	13.40	38	3.00
1.74	11.20	13.40	38	3.00
1.75	11.20	13.40	38	3.00
1.76	11.20	13.40	38	3.00
1.77	11.20	13.40	38	3.00
1.78	11.20	13.40	38	3.00
1.79	11.20	13.40	38	3.00
1.80	11.20	13.40	38	3.00
1.81	11.20	13.40	38	3.00
1.82	11.20	13.40	38	3.00
1.83	11.20	13.40	38	3.00
1.84	11.20	13.40	38	3.00
1.85	11.20	13.40	38	3.00
1.86	11.20	13.40	38	3.00
1.87	11.20	13.40	38	3.00
1.88	11.20	13.40	38	3.00
1.89	11.20	13.40	38	3.00
1.90	11.20	13.40	38	3.00
1.91	11.20	13.40	38	3.00
1.92	11.20	13.40	38	3.00
1.93	11.20	13.40	38	3.00
1.94	11.20	13.40	38	3.00
1.95	11.20	13.40	38	3.00
1.96	11.20	13.40	38	3.00
1.97	11.20	13.40	38	3.00
1.98	11.20	13.40	38	3.00
1.99	11.20	13.40	38	3.00
2.00	11.20	13.40	38	3.00
2.01	12.50	14.00	38	3.00
2.02	12.50	14.00	38	3.00
2.03	12.50	14.00	38	3.00
2.04	12.50	14.00	38	3.00
2.05	12.50	14.00	38	3.00
2.06	12.50	14.00	38	3.00
2.07	12.50	14.00	38	3.00
2.08	12.50	14.00	38	3.00
2.09	12.50	14.00	38	3.00
2.10	12.50	14.00	38	3.00
2.11	12.50	14.00	38	3.00
2.12	12.50	14.00	38	3.00
2.13	12.50	14.00	38	3.00
2.14	12.50	14.00	38	3.00
2.15	12.50	14.00	38	3.00
2.16	12.50	14.00	38	3.00
2.17	12.50	14.00	38	3.00
2.18	12.50	14.00	38	3.00
2.19	12.50	14.00	38	3.00
2.20	12.50	14.00	38	3.00
2.21	12.50	14.00	38	3.00
2.22	12.50	14.00	38	3.00
2.23	12.50	14.00	38	3.00
2.24	12.50	14.00	38	3.00
2.25	12.50	14.00	38	3.00
2.26	12.50	14.00	38	3.00
2.27	12.50	14.00	38	3.00
2.28	12.50	14.00	38	3.00
2.29	12.50	14.00	38	3.00
2.30	12.50	14.00	38	3.00
2.31	12.50	14.00	38	3.00
2.32	12.50	14.00	38	3.00
2.33	12.50	14.00	38	3.00
2.34	12.50	14.00	38	3.00
2.35	12.50	14.00	38	3.00
2.36	12.50	14.00	38	3.00
2.37	12.50	14.00	38	3.00
2.38	12.50	14.00	38	3.00
2.39	12.50	14.00	38	3.00
2.40	12.50	14.00	38	3.00
2.41	12.50	14.00	38	3.00
2.42	12.50	14.00	38	3.00
2.43	12.50	14.00	38	3.00
2.44	12.50	14.00	38	3.00
2.45	12.50	14.00	38	3.00
2.46	12.50	14.00	38	3.00
2.47	12.50	14.00	38	3.00
2.48	12.50	14.00	38	3.00
2.49	12.50	14.00	38	3.00
2.50	14.00	17.00	38	3.00
2.51	14.00	17.00	38	3.00
2.52	14.00	17.00	38	3.00
2.53	14.00	17.00	38	3.00
2.54	14.00	17.00	38	3.00
2.55	14.00	17.00	38	3.00
2.56	14.00	17.00	38	3.00
2.57	14.00	17.00	38	3.00
2.58	14.00	17.00	38	3.00
2.59	14.00	17.00	38	3.00
2.60	14.00	17.00	38	3.00
2.61	14.00	17.00	38	3.00
2.62	14.00	17.00	38	3.00
2.63	14.00	17.00	38	3.00
2.64	14.00	17.00	38	3.00
2.65	14.00	17.00	38	3.00
2.66	14.00	17.00	38	3.00
2.67	14.00	17.00	38	3.00
2.68	14.00	17.00	38	3.00
2.69	14.00	17.00	38	3.00
2.70	14.00	17.00	38	3.00
2.71	14.00	17.00	38	3.00
2.72	14.00	17.00	38	3.00
2.73	14.00	17.00	38	3.00
2.74	14.00	17.00	38	3.00
2.75	14.00	17.00	38	3.00
2.76	14.00	17.00	38	3.00
2.77	14.00	17.00	38	3.00
2.78	14.00	17.00	38	3.00
2.79	14.00	17.00	38	3.00
2.80	14.00	17.00	38	3.00
2.81	14.00	17.00	38	3.00
2.82	14.00	17.00	38	3.00
2.83	14.00	17.00	38	3.00
2.84	14.00	17.00	38	3.00
2.85	14.00	17.00	38	3.00
2.86	14.00	17.00	38	3.00
2.87	14.00	17.00	38	3.00
2.88	14.00	17.00	38	3.00
2.89	14.00	17.00	38	3.00
2.90	14.00	17.00	38	3.00
2.91	14.00	17.00	38	3.00
2.92	14.00	17.00	38	3.00
2.93	14.00	17.00	38	3.00
2.94	14.00	17.00	38	3.00
2.95	14.00	17.00	38	3.00
2.96	14.00	17.00	38	3.00
2.97	14.00	17.00	38	3.00
2.98	14.00	17.00	38	3.00
2.99	14.00	17.00	38	3.00
3.00	14.00	17.00	38	3.00

Micro drill

Art. 50621

P1–3 M1 K1,2 N2,3,5

VHM MD/SC · Z 2 · 140° · 130°

d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.15	2.50	3.50	38	3.00
0.16	2.50	3.50	38	3.00
0.17	2.60	3.50	38	3.00
0.18	2.60	3.50	38	3.00
0.19	2.60	3.50	38	3.00
0.20	2.40	3.50	38	3.00
0.21	2.50	3.50	38	3.00
0.22	2.70	3.50	38	3.00
0.23	2.80	3.50	38	3.00
0.24	2.90	4.00	38	3.00
0.25	3.00	4.00	38	3.00
0.26	3.10	4.00	38	3.00
0.27	3.30	4.00	38	3.00
0.28	3.40	4.50	38	3.00
0.29	3.50	4.50	38	3.00
0.30	3.60	4.50	38	3.00
0.31	3.70	4.50	38	3.00
0.32	3.90	5.00	38	3.00
0.33	4.00	5.00	38	3.00
0.34	4.10	5.00	38	3.00
0.35	4.20	5.00	38	3.00
0.36	4.30	5.50	38	3.00
0.37	4.50	5.50	38	3.00
0.38	4.60	5.50	38	3.00
0.39	4.70	5.50	38	3.00
0.40	4.80	6.00	38	3.00
0.41	4.90	6.00	38	3.00
0.42	5.10	6.00	38	3.00
0.43	5.20	6.00	38	3.00
0.44	5.30	6.50	38	3.00
0.45	5.40	6.50	38	3.00
0.46	5.50	6.50	38	3.00
0.47	5.70	6.50	38	3.00
0.48	5.80	7.00	38	3.00
0.49	5.90	7.00	38	3.00
0.50	6.00	7.00	38	3.00
0.51	6.10	7.00	38	3.00
0.52	6.30	7.50	38	3.00
0.53	6.40	7.50	38	3.00
0.54	6.50	7.50	38	3.00
0.55	6.60	7.50	38	3.00
0.56	6.70	8.00	38	3.00
0.57	6.90	8.00	38	3.00
0.58	7.00	8.00	38	3.00
0.59	7.10	8.00	38	3.00
0.60	7.20	9.00	38	3.00
0.61	7.30	9.00	38	3.00
0.62	7.50	9.00	38	3.00
0.63	7.60	9.00	38	3.00
0.64	7.70	9.50	38	3.00
0.65	7.80	9.50	38	3.00
0.66	7.90	9.50	38	3.00
0.67	8.10	9.50	38	3.00
0.68	8.20	10.00	38	3.00
0.69	8.30	10.00	38	3.00
0.70	8.40	10.00	38	3.00
0.71	8.50	10.00	38	3.00
0.72	8.70	10.50	38	3.00
0.73	8.80	10.50	38	3.00
0.74	8.90	10.50	38	3.00
0.75	9.00	10.50	38	3.00
0.76	9.10	11.00	38	3.00
0.77	9.30	11.00	38	3.00
0.78	9.40	11.00	38	3.00
0.79	9.50	11.00	38	3.00
0.80	9.60	11.50	38	3.00
0.81	9.70	11.50	38	3.00
0.82	9.90	11.50	38	3.00
0.83	10.00	11.50	38	3.00
0.84	10.10	12.00	38	3.00
0.85	10.20	12.00	38	3.00
0.86	10.30	12.00	38	3.00
0.87	10.50	12.00	38	3.00
0.88	10.60	12.50	38	3.00
0.89	10.70	12.50	38	3.00
0.90	10.80	12.50	38	3.00
0.91	10.90	12.50	38	3.00
0.92	11.10	13.00	38	3.00
0.93	11.20	13.00	38	3.00
0.94	11.30	13.00	38	3.00
0.95	11.40	13.00	38	3.00
0.96	11.50	13.50	38	3.00
0.97	11.70	13.50	38	3.00
0.98	11.80	13.50	38	3.00
0.99	11.90	13.50	38	3.00
1.00	12.00	14.50	38	3.00
1.01	12.10	14.50	38	3.00
1.02	12.30	14.50	38	3.00
1.03	12.40	14.50	38	3.00
1.04	12.50	15.00	38	3.00
1.05	12.60	15.00	38	3.00
1.06	12.70	15.00	38	3.00
1.07	12.90	15.00	38	3.00
1.08	13.00	15.50	38	3.00
1.09	13.10	15.50	38	3.00
1.10	13.20	15.50	38	3.00
1.11	13.30	15.50	38	3.00
1.12	13.50	16.00	38	3.00
1.13	13.60	16.00	38	3.00
1.14	13.70	16.00	38	3.00
1.15	13.80	16.00	38	3.00
1.16	13.90	16.50	38	3.00
1.17	14.10	16.50	38	3.00
1.18	14.20	16.50	38	3.00
1.19	14.30	16.50	38	3.00
1.20	14.40	17.00	38	3.00
1.21	14.50	17.00	38	3.00
1.22	14.70	17.00	38	3.00
1.23	14.80	17.00	38	3.00
1.24	14.90	17.50	38	3.00
1.25	15.00	17.50	38	3.00
1.26	15.10	17.50	50	3.00
1.27	15.30	17.50	50	3.00
1.28	15.40	18.00	50	3.00
1.29	15.50	18.00	50	3.00
1.30	15.60	18.00	50	3.00
1.31	15.70	18.00	50	3.00
1.32	15.90	18.50	50	3.00
1.33	16.00	18.50	50	3.00
1.34	16.10	18.50	50	3.00
1.35	16.20	18.50	50	3.00
1.36	16.30	19.00	50	3.00
1.37	16.50	19.00	50	3.00
1.38	16.60	19.00	50	3.00
1.39	16.70	19.00	50	3.00
1.40	16.80	19.50	50	3.00
1.41	16.90	19.50	50	3.00
1.42	17.10	19.50	50	3.00
1.43	17.20	19.50	50	3.00
1.44	17.30	20.00	50	3.00
1.45	17.40	20.00	50	3.00
1.46	17.50	20.00	50	3.00
1.47	17.70	20.00	50	3.00
1.48	17.80	20.50	50	3.00
1.49	17.90	20.50	50	3.00
1.50	18.00	21.00	50	3.00
1.51	18.10	21.00	50	3.00
1.52	18.30	21.00	50	3.00
1.53	18.40	21.00	50	3.00
1.54	18.50	21.50	50	3.00
1.55	18.60	21.50	50	3.00
1.56	18.70	21.50	50	3.00
1.57	18.90	21.50	50	3.00
1.58	19.00	22.00	50	3.00
1.59	19.10	22.00	50	3.00
1.60	19.20	22.00	50	3.00
1.61	19.30	22.00	50	3.00
1.62	19.40	22.50	50	3.00
1.63	19.60	22.50	50	3.00
1.64	19.70	22.50	50	3.00
1.65	19.80	22.50	50	3.00
1.66	19.90	23.00	50	3.00
1.67	20.10	23.00	50	3.00
1.68	20.20	23.00	50	3.00
1.69	20.30	23.00	50	3.00
1.70	20.40	23.50	50	3.00
1.71	20.50	23.50	50	3.00
1.72	20.70	23.50	50	3.00
1.73	20.80	23.50	50	3.00
1.74	20.90	24.00	50	3.00
1.75	21.00	24.00	50	3.00
1.76	21.10	24.00	50	3.00
1.77	21.30	24.00	50	3.00
1.78	21.40	24.50	50	3.00
1.79	21.50	24.50	50	3.00
1.80	21.60	25.00	50	3.00
1.81	21.70	25.00	50	3.00
1.82	21.90	25.00	50	3.00
1.83	22.00	25.00	50	3.00
1.84	22.10	25.50	50	3.00
1.85	22.20	25.50	50	3.00
1.86	22.30	25.50	50	3.00
1.87	22.50	25.50	50	3.00
1.88	22.60	26.00	50	3.00
1.89	22.70	26.00	50	3.00
1.90	22.80	26.00	50	3.00
1.91	22.90	26.00	50	3.00
1.92	23.10	26.50	50	3.00
1.93	23.20	26.50	50	3.00
1.94	23.30	26.50	50	3.00
1.95	23.40	26.50	50	3.00
1.96	23.50	27.00	50	3.00
1.97	23.70	27.00	50	3.00
1.98	23.80	27.00	50	3.00
1.99	23.90	27.00	50	3.00
2.00	24.00	27.00	50	3.00
2.01	24.10	27.50	60	3.00
2.02	24.20	27.50	60	3.00
2.03	24.40	27.50	60	3.00
2.04	24.50	27.50	60	3.00
2.05	24.60	28.00	60	3.00
2.06	24.70	28.00	60	3.00
2.07	24.80	28.00	60	3.00
2.08	25.00	28.00	60	3.00
2.09	25.10	28.50	60	3.00
2.10	25.20	28.50	60	3.00
2.11	25.30	28.50	60	3.00
2.12	25.40	28.50	60	3.00
2.13	25.60	29.00	60	3.00
2.14	25.70	29.00	60	3.00
2.15	25.80	29.00	60	3.00
2.16	25.90	29.00	60	3.00
2.17	26.10	29.50	60	3.00
2.18	26.20	29.50	60	3.00
2.19	26.30	29.50	60	3.00
2.20	26.40	29.50	60	3.00
2.21	26.50	30.00	60	3.00
2.22	26.70	30.00	60	3.00
2.23	26.80	30.00	60	3.00
2.24	26.90	30.00	60	3.00
2.25	27.00	30.50	60	3.00
2.26	27.10	30.50	60	3.00
2.27	27.20	30.50	60	3.00
2.28	27.40	30.50	60	3.00
2.29	27.50	31.00	60	3.00
2.30	27.60	31.00	60	3.00
2.31	27.70	31.00	65	3.00
2.32	27.80	31.00	65	3.00
2.33	28.00	31.50	65	3.00
2.34	28.10	31.50	65	3.00
2.35	28.20	31.50	65	3.00
2.36	28.30	31.50	65	3.00
2.37	28.40	32.00	65	3.00
2.38	28.60	32.00	65	3.00
2.39	28.70	32.00	65	3.00
2.40	28.80	32.00	65	3.00
2.41	28.90	33.00	65	3.00
2.42	29.00	33.00	65	3.00
2.43	29.20	33.00	65	3.00
2.44	29.30	33.00	65	3.00
2.45	29.40	33.00	65	3.00
2.46	29.50	33.50	65	3.00
2.47	29.60	33.50	65	3.00
2.48	29.80	33.50	65	3.00
2.49	29.90	33.50	65	3.00
2.50	30.00	34.00	65	3.00
2.51	30.10	34.00	65	3.00
2.52	30.20	34.00	65	3.00
2.53	30.40	34.00	65	3.00
2.54	30.50	34.50	65	3.00
2.55	30.60	34.50	65	3.00
2.56	30.70	34.50	65	3.00
2.57	30.80	34.50	65	3.00
2.58	31.00	35.00	65	3.00
2.59	31.10	35.00	65	3.00
2.60	31.20	35.00	65	3.00
2.61	31.30	35.00	65	3.00
2.62	31.40	35.50	65	3.00
2.63	31.60	35.50	65	3.00
2.64	31.70	35.50	65	3.00
2.65	31.80	35.50	65	3.00
2.66	31.90	36.00	65	3.00
2.67	32.00	36.00	65	3.00
2.68	32.20	36.00	65	3.00
2.69	32.30	36.00	65	3.00
2.70	32.40	36.50	65	3.00
2.71	32.50	36.50	65	3.00
2.72	32.60	36.50	65	3.00
2.73	32.80	36.50	65	3.00
2.74	32.90	37.00	65	3.00
2.75	33.00	37.00	65	3.00
2.76	33.10	37.00	65	3.00
2.77	33.20	37.00	65	3.00
2.78	33.40	37.50	65	3.00
2.79	33.50	37.50	65	3.00
2.80	33.60	37.50	65	3.00
2.81	33.70	37.50	65	3.00
2.82	33.80	38.00	65	3.00
2.83	34.00	38.00	65	3.00
2.84	34.10	38.00	65	3.00
2.85	34.20	38.00	65	3.00
2.86	34.30	38.50	65	3.00
2.87	34.40	38.50	65	3.00
2.88	34.60	38.50	65	3.00
2.89	34.70	38.50	65	3.00
2.90	34.80	39.00	65	3.00
2.91	34.90	39.00	65	3.00
2.92	35.00	39.00	65	3.00
2.93	35.20	39.00	65	3.00
2.94	35.30	39.50	65	3.00
2.95	35.40	39.50	65	3.00
2.96	35.50	39.50	65	3.00
2.97	35.60	39.50	65	3.00
2.98	35.80	40.00	65	3.00
2.99	35.90	40.00	65	3.00
3.00	36.00	40.00	65	3.00

Micro drill

Art. 50622

P1–3 M1 K1,2 N2,3,5 H1

VHM MD/SC TiAlN Z 2 DIN 6537 K

d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.20	2.40	3.50	38	3.00
0.21	2.50	3.50	38	3.00
0.22	2.70	3.50	38	3.00
0.23	2.80	3.50	38	3.00
0.24	2.90	4.00	38	3.00
0.25	3.00	4.00	38	3.00
0.26	3.10	4.00	38	3.00
0.27	3.30	4.00	38	3.00
0.28	3.40	4.50	38	3.00
0.29	3.50	4.50	38	3.00
0.30	3.60	4.50	38	3.00
0.31	3.70	4.50	38	3.00
0.32	3.90	5.00	38	3.00
0.33	4.00	5.00	38	3.00
0.34	4.10	5.00	38	3.00
0.35	4.20	5.00	38	3.00
0.36	4.30	5.50	38	3.00
0.37	4.50	5.50	38	3.00
0.38	4.60	5.50	38	3.00
0.39	4.70	5.50	38	3.00
0.40	4.80	6.00	38	3.00
0.41	4.90	6.00	38	3.00
0.42	5.10	6.00	38	3.00
0.43	5.20	6.00	38	3.00
0.44	5.30	6.50	38	3.00
0.45	5.40	6.50	38	3.00
0.46	5.50	6.50	38	3.00
0.47	5.70	6.50	38	3.00
0.48	5.80	7.00	38	3.00
0.49	5.90	7.00	38	3.00
0.50	6.00	7.00	38	3.00
0.51	6.10	7.00	38	3.00
0.52	6.30	7.50	38	3.00
0.53	6.40	7.50	38	3.00
0.54	6.50	7.50	38	3.00
0.55	6.60	7.50	38	3.00
0.56	6.70	8.00	38	3.00
0.57	6.90	8.00	38	3.00
0.58	7.00	8.00	38	3.00
0.59	7.10	8.00	38	3.00
0.60	7.20	9.00	38	3.00
0.61	7.30	9.00	38	3.00
0.62	7.50	9.00	38	3.00
0.63	7.60	9.00	38	3.00
0.64	7.70	9.50	38	3.00
0.65	7.80	9.50	38	3.00
0.66	7.90	9.50	38	3.00
0.67	8.10	9.50	38	3.00
0.68	8.20	10.00	38	3.00
0.69	8.30	10.00	38	3.00
0.70	8.40	10.00	38	3.00
0.71	8.50	10.00	38	3.00
0.72	8.70	10.50	38	3.00
0.73	8.80	10.50	38	3.00
0.74	8.90	10.50	38	3.00
0.75	9.00	10.50	38	3.00
0.76	9.10	11.00	38	3.00
0.77	9.30	11.00	38	3.00
0.78	9.40	11.00	38	3.00
0.79	9.50	11.00	38	3.00
0.80	9.60	11.50	38	3.00
0.81	9.70	11.50	38	3.00
0.82	9.90	11.50	38	3.00
0.83	10.00	11.50	38	3.00
0.84	10.10	12.00	38	3.00
0.85	10.20	12.00	38	3.00
0.86	10.30	12.00	38	3.00
0.87	10.50	12.00	38	3.00
0.88	10.60	12.50	38	3.00
0.89	10.70	12.50	38	3.00
0.90	10.80	12.50	38	3.00
0.91	10.90	12.50	38	3.00
0.92	11.10	13.00	38	3.00
0.93	11.20	13.00	38	3.00
0.94	11.30	13.00	38	3.00
0.95	11.40	13.00	38	3.00
0.96	11.50	13.50	38	3.00
0.97	11.70	13.50	38	3.00
0.98	11.80	13.50	38	3.00
0.99	11.90	13.50	38	3.00
1.00	12.00	14.50	38	3.00
1.01	12.10	14.50	38	3.00
1.02	12.30	14.50	38	3.00
1.03	12.40	14.50	38	3.00
1.04	12.50	15.00	38	3.00
1.05	12.60	15.00	38	3.00
1.06	12.70	15.00	38	3.00
1.07	12.90	15.00	38	3.00
1.08	13.00	15.50	38	3.00
1.09	13.10	15.50	38	3.00
1.10	13.20	15.50	38	3.00
1.11	13.30	15.50	38	3.00
1.12	13.50	16.00	38	3.00
1.13	13.60	16.00	38	3.00
1.14	13.70	16.00	38	3.00
1.15	13.80	16.00	38	3.00
1.16	13.90	16.50	38	3.00
1.17	14.10	16.50	38	3.00
1.18	14.20	16.50	38	3.00
1.19	14.30	16.50	38	3.00
1.20	14.40	17.00	38	3.00
1.21	14.50	17.00	38	3.00
1.22	14.70	17.00	38	3.00
1.23	14.80	17.00	38	3.00
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1.31	15.70	18.00	50	3.00
1.32	15.90	18.50	50	3.00
1.33	16.00	18.50	50	3.00
1.34	16.10	18.50	50	3.00
1.35	16.20	18.50	50	3.00
1.36	16.30	19.00	50	3.00
1.37	16.50	19.00	50	3.00
1.38	16.60	19.00	50	3.00
1.39	16.70	19.00	50	3.00
1.40	16.80	19.50	50	3.00
1.41	16.90	19.50	50	3.00
1.42	17.10	19.50	50	3.00
1.43	17.20	19.50	50	3.00
1.44	17.30	20.00	50	3.00
1.45	17.40	20.00	50	3.00
1.46	17.50	20.00	50	3.00
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1.57	18.90	21.50	50	3.00
1.58	19.00	22.00	50	3.00
1.59	19.10	22.00	50	3.00
1.60	19.20	22.00	50	3.00
1.61	19.30	22.00	50	3.00
1.62	19.40	22.50	50	3.00
1.63	19.60	22.50	50	3.00
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1.65	19.80	22.50	50	3.00
1.66	19.90	23.00	50	3.00
1.67	20.10	23.00	50	3.00
1.68	20.20	23.00	50	3.00
1.69	20.30	23.00	50	3.00
1.70	20.40	23.50	50	3.00
1.71	20.50	23.50	50	3.00
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1.74	20.90	24.00	50	3.00
1.75	21.00	24.00	50	3.00
1.76	21.10	24.00	50	3.00
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1.78	21.40	24.50	50	3.00
1.79	21.50	24.50	50	3.00
1.80	21.60	25.00	50	3.00
1.81	21.70	25.00	50	3.00
1.82	21.90	25.00	50	3.00
1.83	22.00	25.00	50	3.00
1.84	22.10	25.50	50	3.00
1.85	22.20	25.50	50	3.00
1.86	22.30	25.50	50	3.00
1.87	22.50	25.50	50	3.00
1.88	22.60	26.00	50	3.00
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1.90	22.80	26.00	50	3.00
1.91	22.90	26.00	50	3.00
1.92	23.10	26.50	50	3.00
1.93	23.20	26.50	50	3.00
1.94	23.30	26.50	50	3.00
1.95	23.40	26.50	50	3.00
1.96	23.50	27.00	50	3.00
1.97	23.70	27.00	50	3.00
1.98	23.80	27.00	50	3.00
1.99	23.90	27.00	50	3.00
2.00	24.00	27.00	50	3.00
2.01	24.10	27.50	60	3.00
2.02	24.20	27.50	60	3.00
2.03	24.40	27.50	60	3.00
2.04	24.50	27.50	60	3.00
2.05	24.60	28.00	60	3.00
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2.07	24.80	28.00	60	3.00
2.08	25.00	28.00	60	3.00
2.09	25.10	28.50	60	3.00
2.10	25.20	28.50	60	3.00
2.11	24.40	28.50	60	3.00
2.12	25.40	28.50	60	3.00
2.13	25.60	29.00	60	3.00
2.14	25.70	29.00	60	3.00
2.15	25.80	29.00	60	3.00
2.16	25.90	29.00	60	3.00
2.17	26.10	29.50	60	3.00
2.18	26.20	29.50	60	3.00
2.19	26.30	29.50	60	3.00
2.20	26.40	29.50	60	3.00
2.21	26.50	30.00	60	3.00
2.22	26.70	30.00	60	3.00
2.23	26.80	30.00	60	3.00
2.24	26.90	30.00	60	3.00
2.25	27.00	30.50	60	3.00
2.26	27.10	30.50	60	3.00
2.27	27.20	30.50	60	3.00
2.28	27.40	30.50	60	3.00
2.29	27.50	31.00	60	3.00
2.30	27.60	31.00	60	3.00
2.31	27.70	31.00	65	3.00
2.32	27.80	31.00	65	3.00
2.33	28.00	31.50	65	3.00
2.34	28.10	31.50	65	3.00
2.35	28.20	31.50	65	3.00
2.36	28.30	31.50	65	3.00
2.37	28.40	32.00	65	3.00
2.38	28.60	32.00	65	3.00
2.39	28.70	32.00	65	3.00
2.40	28.80	32.00	65	3.00
2.41	28.90	33.00	65	3.00
2.42	29.00	33.00	65	3.00
2.43	29.20	33.00	65	3.00
2.44	29.30	33.00	65	3.00
2.45	29.40	33.00	65	3.00
2.46	29.50	33.50	65	3.00
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2.49	29.90	33.50	65	3.00
2.50	30.00	34.00	65	3.00
2.51	30.10	34.00	65	3.00
2.52	30.20	34.00	65	3.00
2.53	30.40	34.00	65	3.00
2.54	30.50	34.50	65	3.00
2.55	30.60	34.50	65	3.00
2.56	30.70	34.50	65	3.00
2.57	30.80	34.50	65	3.00
2.58	31.00	35.00	65	3.00
2.59	31.10	35.00	65	3.00
2.60	31.20	35.00	65	3.00
2.61	31.30	35.00	65	3.00
2.62	31.40	35.50	65	3.00
2.63	31.60	35.50	65	3.00
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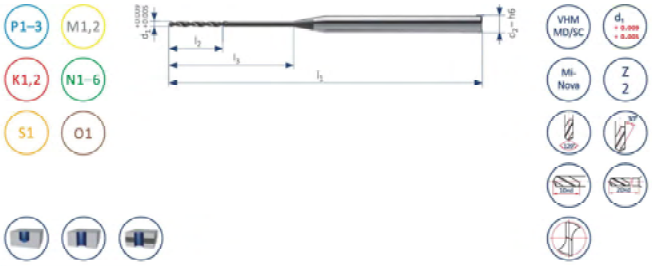
2.65	31.80	35.50	65	3.00
2.66	31.90	36.00	65	3.00
2.67	32.00	36.00	65	3.00
2.68	32.20	36.00	65	3.00
2.69	32.30	36.00	65	3.00
2.70	32.40	36.50	65	3.00
2.71	32.50	36.50	65	3.00
2.72	32.60	36.50	65	3.00
2.73	32.80	36.50	65	3.00
2.74	32.90	37.00	65	3.00
2.75	33.00	37.00	65	3.00
2.76	33.10	37.00	65	3.00
2.77	33.20	37.00	65	3.00
2.78	33.40	37.50	65	3.00
2.79	33.50	37.50	65	3.00
2.80	33.60	37.50	65	3.00
2.81	33.70	37.50	65	3.00
2.82	33.80	38.00	65	3.00
2.83	34.00	38.00	65	3.00
2.84	34.10	38.00	65	3.00
2.85	34.20	38.00	65	3.00
2.86	34.30	38.50	65	3.00
2.87	34.40	38.50	65	3.00
2.88	34.60	38.50	65	3.00
2.89	34.70	38.50	65	3.00
2.90	34.80	39.00	65	3.00
2.91	34.90	39.00	65	3.00
2.92	35.00	39.00	65	3.00
2.93	35.20	39.00	65	3.00
2.94	35.30	39.50	65	3.00
2.95	35.40	39.50	65	3.00
2.96	35.50	39.50	65	3.00
2.97	35.60	39.50	65	3.00
2.98	35.80	40.00	65	3.00
2.99	35.90	40.00	65	3.00
3.00	36.00	40.00	65	3.00

SPHINX

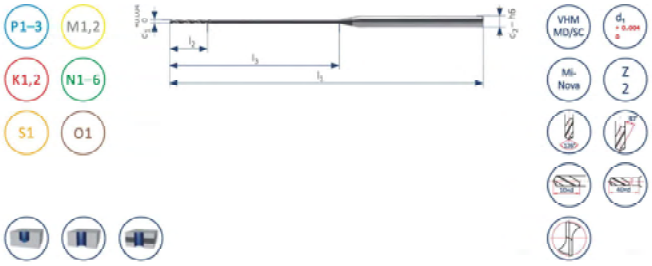
Micro deep hole drill

Art. 50720



d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.20	2.50	4.00	38	3.00
0.25	3.00	5.00	38	3.00
0.30	3.50	6.00	38	3.00
0.35	4.00	7.00	38	3.00
0.40	4.50	8.00	38	3.00
0.45	5.00	9.00	38	3.00
0.50	5.50	10.00	50	3.00
0.55	6.00	11.00	50	3.00
0.60	6.50	12.00	50	3.00
0.65	7.00	13.00	50	3.00
0.70	7.50	14.00	50	3.00
0.75	8.00	15.00	50	3.00
0.80	8.50	16.00	55	3.00
0.85	9.00	17.00	55	3.00
0.90	9.50	18.00	55	3.00
0.95	10.00	19.00	55	3.00
1.00	10.50	20.00	55	3.00
1.05	11.00	21.00	60	3.00
1.10	11.50	22.00	60	3.00
1.15	12.00	23.00	60	3.00
1.20	12.50	24.00	60	3.00
1.25	13.00	25.00	60	3.00
1.30	13.50	26.00	65	3.00
1.35	14.00	27.00	65	3.00
1.40	14.50	28.00	65	3.00
1.45	15.00	29.00	65	3.00
1.50	15.50	30.00	65	3.00
1.55	16.00	31.00	72	3.00
1.60	16.50	32.00	72	3.00
1.65	17.00	33.00	72	3.00
1.70	17.50	34.00	72	3.00
1.75	18.00	35.00	78	3.00
1.80	18.50	36.00	78	3.00
1.85	19.00	37.00	78	3.00
1.90	19.50	38.00	78	3.00
1.95	20.00	39.00	78	3.00
2.00	20.50	40.00	78	3.00

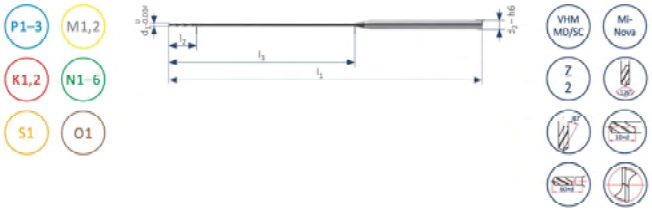
Art. 50740



d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.40	4.50	16.00	50	3.00
0.45	5.00	18.00	50	3.00
0.50	5.50	20.00	70	3.00
0.55	6.00	22.00	70	3.00
0.60	6.50	24.00	70	3.00
0.65	7.00	26.00	70	3.00
0.70	7.50	28.00	70	3.00
0.75	8.00	30.00	70	3.00
0.80	8.50	32.00	78	3.00
0.85	9.00	34.00	78	3.00
0.90	9.50	36.00	78	3.00
0.95	10.00	38.00	78	3.00
1.00	10.50	40.00	78	3.00
1.05	11.00	42.00	88	3.00
1.10	11.50	44.00	88	3.00
1.15	12.00	46.00	88	3.00
1.20	12.50	48.00	88	3.00
1.25	13.00	50.00	88	3.00
1.30	13.50	52.00	98	3.00
1.35	14.00	54.00	98	3.00
1.40	14.50	56.00	98	3.00
1.45	15.00	58.00	98	3.00
1.50	15.50	60.00	98	3.00

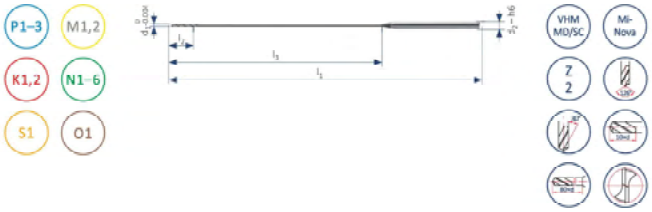
Micro deep hole drill

Art. 50760



d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.40	4.50	24.00	60	3.00
0.45	5.00	27.00	60	3.00
0.50	5.50	30.00	85	3.00
0.55	6.00	33.00	85	3.00
0.60	6.50	36.00	85	3.00
0.65	7.00	39.00	85	3.00
0.70	7.50	42.00	85	3.00
0.75	8.00	45.00	85	3.00
0.80	8.50	48.00	100	3.00
0.85	9.00	51.00	100	3.00
0.90	9.50	54.00	100	3.00
0.95	10.00	57.00	100	3.00
1.00	10.50	60.00	100	3.00
1.05	11.00	63.00	115	3.00
1.10	11.50	66.00	115	3.00
1.15	12.00	69.00	115	3.00
1.20	12.50	72.00	115	3.00
1.25	13.00	75.00	115	3.00
1.30	13.50	78.00	130	3.00
1.35	14.00	81.00	130	3.00
1.40	14.50	84.00	130	3.00
1.45	15.00	87.00	130	3.00
1.50	15.50	90.00	130	3.00

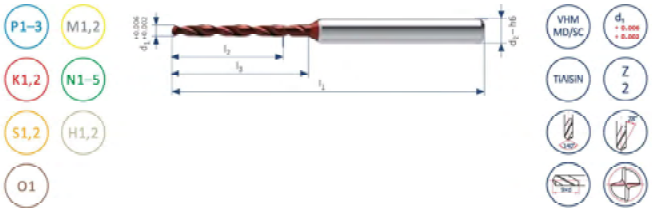
Art. 50780



d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.40	4.50	32.00	70	3.00
0.45	5.00	36.00	70	3.00
0.50	5.50	40.00	100	3.00
0.55	6.00	44.00	100	3.00
0.60	6.50	48.00	100	3.00
0.65	7.00	52.00	100	3.00
0.70	7.50	56.00	100	3.00
0.75	8.00	60.00	100	3.00
0.80	8.50	64.00	120	3.00
0.85	9.00	68.00	120	3.00
0.90	9.50	72.00	120	3.00
0.95	10.00	76.00	120	3.00
1.00	10.50	80.00	120	3.00
1.05	11.00	84.00	140	3.00
1.10	11.50	88.00	140	3.00
1.15	12.00	92.00	140	3.00
1.20	12.50	96.00	140	3.00
1.25	13.00	100.00	140	3.00
1.30	13.50	104.00	160	3.00
1.35	14.00	108.00	160	3.00
1.40	14.50	112.00	160	3.00
1.45	15.00	116.00	160	3.00
1.50	15.50	120.00	160	3.00

High performance drill Nirox

Art. 51609

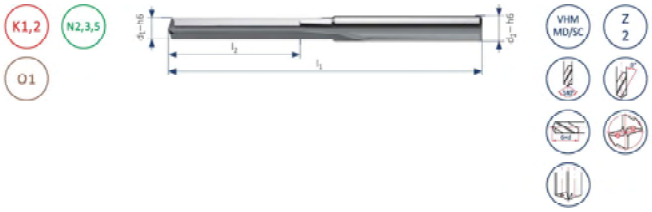


d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
0.30	2.70	3.30	38	3.00
0.35	3.20	3.90	38	3.00
0.40	3.60	4.40	38	3.00
0.45	4.10	5.00	38	3.00
0.50	4.50	5.50	38	3.00
0.55	5.00	6.10	38	3.00
0.60	5.40	6.60	38	3.00
0.65	5.90	7.20	38	3.00
0.70	6.30	7.70	38	3.00
0.75	6.80	8.30	38	3.00
0.80	7.20	8.80	38	3.00
0.85	7.70	9.40	38	3.00
0.90	8.10	9.90	38	3.00
0.95	8.60	10.50	38	3.00
1.00	9.00	11.00	38	3.00
1.05	9.50	11.60	38	3.00
1.10	9.90	12.10	38	3.00
1.15	10.40	12.70	38	3.00
1.20	10.80	13.20	38	3.00
1.25	11.30	13.80	38	3.00
1.30	11.70	14.30	38	3.00
1.35	12.20	14.90	38	3.00
1.40	12.60	15.40	38	3.00
1.45	13.10	16.00	38	3.00
1.50	13.50	16.50	38	3.00
1.55	14.00	17.10	50	3.00
1.60	14.40	17.60	50	3.00
1.65	14.90	18.20	50	3.00
1.70	15.30	18.70	50	3.00
1.75	15.80	19.30	50	3.00
1.80	16.20	19.80	50	3.00
1.85	16.70	20.40	50	3.00
1.90	17.10	20.90	50	3.00
1.95	17.60	21.50	50	3.00
2.00	18.00	22.00	50	3.00
2.05	18.50	22.60	50	3.00
2.10	18.90	23.10	50	3.00
2.15	19.40	23.70	50	3.00

d_1 mm	l_2 mm	l_3 mm	l_1 mm	d_2 mm
2.20	19.80	24.20	50	3.00
2.25	20.30	24.80	50	3.00
2.30	20.70	25.30	50	3.00
2.35	21.20	25.90	50	3.00
2.40	21.60	26.40	50	3.00
2.45	22.10	27.00	50	3.00
2.50	22.50	27.50	55	3.00
2.55	23.00	28.10	55	3.00
2.60	23.40	28.60	55	3.00
2.65	23.90	29.20	55	3.00
2.70	24.30	29.70	55	3.00
2.75	24.80	30.30	55	3.00
2.80	25.20	30.80	55	3.00
2.85	25.70	31.40	55	3.00
2.90	26.10	31.90	55	3.00
2.95	26.60	32.50	55	3.00
3.00	27.00	33.00	55	3.00

High performance drill Quadro Plus

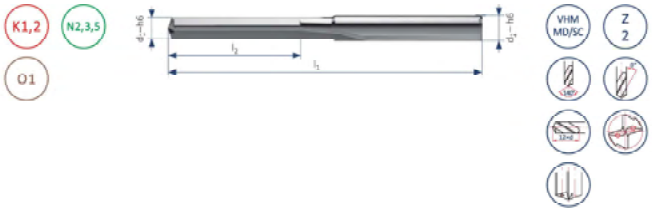
Art. 52100



d_1 mm	l_2 mm	l_1 mm	d_2 mm
3.00	18.00	82	6.00
3.30	20.00	82	6.00
3.50	21.00	82	6.00
4.00	24.00	82	6.00
4.20	26.00	88	6.00
4.50	27.00	88	6.00
5.00	30.00	88	6.00
5.50	33.00	94	6.00
6.00	36.00	94	6.00
6.50	39.00	102	8.00
6.80	41.00	102	8.00
7.00	42.00	102	8.00
7.50	45.00	108	8.00
8.00	48.00	108	8.00
8.50	51.00	121	10.00
9.00	54.00	121	10.00
9.50	57.00	127	10.00
10.00	60.00	127	10.00
10.20	62.00	141	12.00
10.50	63.00	141	12.00
11.00	66.00	141	12.00
11.50	69.00	147	12.00
12.00	72.00	147	12.00
12.50	75.00	155	14.00
13.00	78.00	155	14.00
13.50	81.00	162	14.00
14.00	84.00	162	14.00
14.50	87.00	172	16.00
15.00	90.00	172	16.00
15.50	93.00	178	16.00
16.00	96.00	178	16.00
16.50	99.00	192	18.00
17.00	102.00	192	18.00
17.50	105.00	192	18.00
18.00	108.00	192	18.00
18.50	111.00	207	20.00
19.00	114.00	207	20.00
19.50	117.00	207	20.00

High performance drill Quadro Plus

Art. 52200

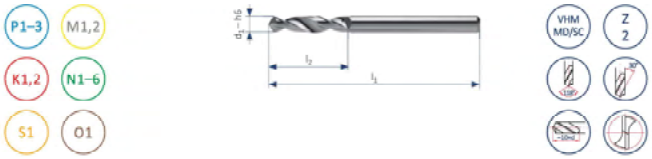


d_1 mm	l_2 mm	l_1 mm	d_2 mm
3.00	36.00	106	6.00
3.20	39.00	106	6.00
3.40	40.00	106	6.00
3.50	42.00	106	6.00
4.00	48.00	106	6.00
4.20	51.00	118	6.00
4.50	54.00	118	6.00
4.80	58.00	118	6.00
5.00	60.00	118	6.00
5.50	66.00	130	6.00
6.00	72.00	130	6.00
6.40	78.00	144	8.00
6.50	78.00	144	8.00
6.80	82.00	144	8.00
7.00	84.00	144	8.00
7.50	90.00	156	8.00
7.60	92.00	156	8.00
8.00	96.00	156	8.00
8.50	102.00	175	10.00
9.00	108.00	175	10.00
9.50	114.00	187	10.00
10.00	120.00	187	10.00
10.20	123.00	207	12.00
10.50	126.00	207	12.00
11.00	132.00	207	12.00
11.50	138.00	219	12.00
12.00	144.00	219	12.00
12.50	150.00	233	14.00
12.70	153.00	233	14.00
13.00	156.00	233	14.00
13.50	162.00	245	14.00
14.00	168.00	245	14.00
14.50	174.00	262	16.00
15.00	180.00	262	16.00
15.50	186.00	274	16.00
15.90	191.00	274	16.00
16.00	192.00	274	16.00
16.50	198.00	300	18.00

d_1 mm	l_2 mm	l_1 mm	d_2 mm
17.00	204.00	300	18.00
17.50	210.00	300	18.00
18.00	216.00	300	18.00
18.50	222.00	327	20.00
19.00	228.00	327	20.00
19.50	234.00	327	20.00
20.00	240.00	327	20.00

Twist drill Spirec

Art. 50838



d_1 mm	l_2 mm	l_1 mm
0.30	3.70	38
0.35	3.70	38
0.40	4.70	38
0.45	4.70	38
0.50	5.70	38
0.55	5.70	38
0.60	7.70	38
0.65	7.70	38
0.70	9.70	38
0.75	9.70	38
0.80	11.70	38
0.85	11.70	38
0.90	14.70	38
0.95	14.70	38
1.00	14.70	38
1.05	14.70	38
1.10	14.70	38
1.15	14.70	38
1.20	14.70	38
1.25	14.70	38
1.30	14.70	38
1.35	14.70	38
1.40	14.70	38
1.45	14.70	38
1.50	14.70	38
1.55	14.70	38
1.60	14.70	38
1.65	14.70	38
1.70	14.70	38
1.75	14.70	38
1.80	14.70	38
1.85	14.70	38
1.90	14.70	38
1.95	14.70	38
2.00	14.70	38
2.05	14.70	38
2.10	14.70	38
2.15	14.70	38

d_1 mm	l_2 mm	l_1 mm
2.20	14.70	38
2.25	14.70	38
2.30	14.70	38
2.35	14.70	38
2.40	14.70	38
2.45	14.70	38
2.50	14.70	38
2.55	14.70	38
2.60	14.70	38
2.65	14.70	38
2.70	14.70	38
2.75	14.70	38
2.80	14.70	38
2.85	14.70	38
2.90	14.70	38
2.95	14.70	38
3.00	14.70	38
3.05	14.70	38
3.10	14.70	38
3.15	14.70	38
3.175	14.70	38
3.20	19.70	50
3.30	19.70	50
3.40	19.70	50
3.50	19.70	50
3.60	19.70	50
3.70	19.70	50
3.80	19.70	50
3.90	19.70	50
4.00	19.70	50
4.10	24.70	50
4.20	24.70	50
4.30	24.70	50
4.40	24.70	50
4.50	24.70	50
4.60	24.70	50
4.70	24.70	50
4.80	24.70	50

d_1 mm	l_2 mm	l_1 mm
4.90	24.70	50
5.00	24.70	50
5.10	24.70	50
5.20	24.70	50
5.30	24.70	50
5.40	24.70	50
5.50	24.70	50
5.60	24.70	50
5.70	24.70	50
5.80	24.70	50
5.90	24.70	50
6.00	24.70	50

SPHINX TOOLS

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Milling

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Milling

✓outstanding(우수함)
• suitable(적합함)

	Article	Diameter range	Incre-ments	Cutting length	Point angle	Helix angle	Number of teeth		Material	Workpiece material * P M K N S H O	Application *
Engraving mill											
	70030	0.02–0.15	0.01		30°	0°	1		VHM/MD/SC	✓ ✓ ✓ ✓ ✓ ✓	
	70040	0.02–0.15	0.01		40°	0°	1		VHM/MD/SC	✓ ✓ ✓ ✓ ✓ ✓	
	70050	0.02–0.15	0.01		50°	0°	1		VHM/MD/SC	✓ ✓ ✓ ✓ ✓ ✓	
	70060	0.02–0.15	0.01		60°	0°	1		VHM/MD/SC	✓ ✓ ✓ ✓ ✓ ✓	
	70090	0.02–0.15	0.01		90°	0°	1		VHM/MD/SC	✓ ✓ ✓ ✓ ✓ ✓	
	70130	0.04–0.10	0.01		30°	0°	1		VHM/MD/SC	✓ ✓ ✓ ✓ ✓ ✓	
	70140	0.04–0.10	0.01		40°	0°	1		VHM/MD/SC	✓ ✓ ✓ ✓ ✓ ✓	
	70150	0.04–0.10	0.01		50°	0°	1		VHM/MD/SC	✓ ✓ ✓ ✓ ✓ ✓	
	70160	0.04–0.10	0.01		60°	0°	1		VHM/MD/SC	✓ ✓ ✓ ✓ ✓ ✓	
	70190	0.04–0.10	0.01		90°	0°	1		VHM/MD/SC	✓ ✓ ✓ ✓ ✓ ✓	
Micro endmill											
	72075	0.20–2.00	0.10	0.75×ø		30°	2		VHM/MD/SC	✓ • ✓ ✓ • •	
	72150	0.10–2.00	0.10	1.5×ø		30°	2		VHM/MD/SC	✓ • ✓ ✓ • •	
	42000	0.10–3.00	0.05	3×ø		30°	2		VHM/MD/SC	✓ • ✓ ✓ • •	
	72500	0.30–2.50	0.10	5×ø		30°	2		VHM/MD/SC	✓ • ✓ ✓ • •	
	72800	0.40–2.50	0.10	8×ø		30°	2		VHM/MD/SC	✓ • ✓ ✓ • •	
	73130	0.30–3.00	0.10	1.3×ø		30°	3		VHM/MD/SC	✓ • ✓ • •	
	73200	0.30–2.90	0.10	2×ø		30°	3		VHM/MD/SC	✓ • ✓ • •	

✓outstanding(우수함)
• suitable(적합함)

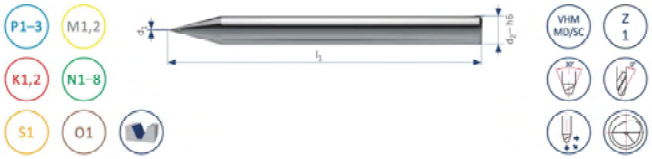
	Article	Diameter range	Incre-ments	Cutting length	Point angle	Helix angle	Number of teeth		Material	Workpiece material * P	M	K	N	S	H	O	Application *
	73300	0.30–2.90	0.10	3×ø		30°	3		VHM/MD/SC	✓	•	✓	•	•			
	73800	0.50–2.50	0.10	8×ø		30°	3		VHM/MD/SC	✓	•	✓	✓	•			
	73725	0.30–2.90	0.10	2.5×ø		45°	3		VHM/MD/SC	✓	✓	✓	•	✓			
	43105	0.30–3.00	0.10	1×ø		35°	3		VHM/MD/SC; Cro-Nova	✓	✓	•	✓	✓	•	•	
	43305	0.30–3.00	0.10	3×ø		35°	3		VHM/MD/SC; Cro-Nova	✓	✓	•	✓	✓	•	•	
	74720	0.30–2.90	0.10	2×ø		40°	4		VHM/MD/SC	✓	✓	✓	•	•			
	74740	0.40–2.90	0.10	4×ø		40°	4		VHM/MD/SC	✓	✓	✓	•	•			
Ball nose Endmill																	
	74075	0.20–2.00	0.10	0.75×ø		30°	2		VHM/MD/SC	✓	•	✓	✓	•		•	
	74150	0.20–2.00	0.10	1.5×ø		30°	2		VHM/MD/SC	✓	•	✓	✓	•		•	
	74300	0.20–2.80	0.10	3×ø		30°	2		VHM/MD/SC	✓	•	✓	✓	•		•	
Endmill																	
	40000	2.00–12.00	0.50	DIN 6528		30°	2		VHM/MD/SC	•		•	✓			•	
	40002	2.00–12.00	0.50	DIN 6528		30°	3		VHM/MD/SC	✓	•	✓	✓				
	40004	2.00–12.00	0.50	DIN 6528		30°	4		VHM/MD/SC	✓	•	✓					
	47000	3.00–20.00	1.00	1.5–4×ø		55°	2		VHM/MD/SC				✓			•	
	47500	6.00–20.00	2.00	4–8×ø		55°	2		VHM/MD/SC				✓			•	
	76300	1.50–6.00	0.50	1.5–4×ø		30°	3		VHM/MD/SC	✓	•	✓					

✓outstanding(우수함)
• suitable(적합함)

	Article	Diameter range	Increments	Cutting length	Point angle	Helix angle	Number of teeth		Material	Workpiece material * P M K N S H O	Application *
Chamfering tool											
	73000	0.50–8.00	0.50		90°		3–4		VHM/MD/SC	✓ • ✓ ✓ •	
	43400	1.00–6.00	0.50	4×ø		12°	3		VHM/MD/SC; AlTiCrN+S	✓ ✓ ✓ ✓ ✓ • ✓	
Endmill 1 tooth											
	71330	0.20–3.00	0.10				1		VHM/MD/SC	• • • ✓ • •	

Engraving mill

Art. 70030

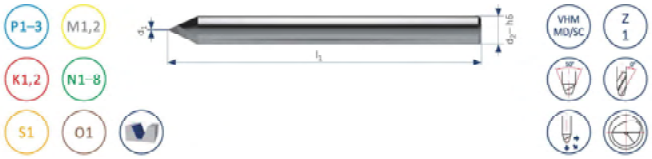


d_1 mm	α °	l_1 mm	d_2 mm
0.02	30	33	3.00
0.03	30	33	3.00
0.04	30	33	3.00
0.05	30	33	3.00
0.06	30	33	3.00
0.07	30	33	3.00
0.08	30	33	3.00
0.09	30	33	3.00
0.10	30	33	3.00
0.12	30	33	3.00
0.15	30	33	3.00

Art. 70040

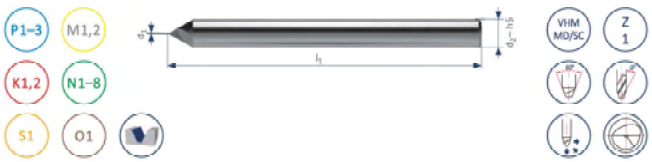
d_1 mm	α °	l_1 mm	d_2 mm
0.02	40	33	3.00
0.03	40	33	3.00
0.04	40	33	3.00
0.05	40	33	3.00
0.06	40	33	3.00
0.07	40	33	3.00
0.08	40	33	3.00
0.09	40	33	3.00
0.10	40	33	3.00
0.12	40	33	3.00
0.15	40	33	3.00

Art. 70050



d_1 mm	α °	l_1 mm	d_2 mm
0.02	50	33	3.00
0.03	50	33	3.00
0.04	50	33	3.00
0.05	50	33	3.00
0.06	50	33	3.00
0.07	50	33	3.00
0.08	50	33	3.00
0.09	50	33	3.00
0.10	50	33	3.00
0.12	50	33	3.00
0.15	50	33	3.00

Art. 70060



d_1 mm	α °	l_1 mm	d_2 mm
0.02	60	33	3.00
0.03	60	33	3.00
0.04	60	33	3.00
0.05	60	33	3.00
0.06	60	33	3.00
0.07	60	33	3.00
0.08	60	33	3.00
0.09	60	33	3.00
0.10	60	33	3.00
0.12	60	33	3.00
0.15	60	33	3.00

Engraving mill

Art. 70140

r mm	α °	l_1 mm	d_2 mm
0.04	40	33	3.00
0.05	40	33	3.00
0.06	40	33	3.00
0.07	40	33	3.00
0.08	40	33	3.00
0.09	40	33	3.00
0.10	40	33	3.00

Art. 70150

r mm	α °	l_1 mm	d_2 mm
0.04	50	33	3.00
0.05	50	33	3.00
0.06	50	33	3.00
0.07	50	33	3.00
0.08	50	33	3.00
0.09	50	33	3.00
0.10	50	33	3.00

Art. 70160

r mm	α °	l_1 mm	d_2 mm
0.04	60	33	3.00
0.05	60	33	3.00
0.06	60	33	3.00
0.07	60	33	3.00
0.08	60	33	3.00
0.09	60	33	3.00
0.10	60	33	3.00

Art. 70190

r mm	α °	l_1 mm	d_2 mm
0.04	90	33	3.00
0.05	90	33	3.00
0.06	90	33	3.00
0.07	90	33	3.00
0.08	90	33	3.00
0.09	90	33	3.00
0.10	90	33	3.00

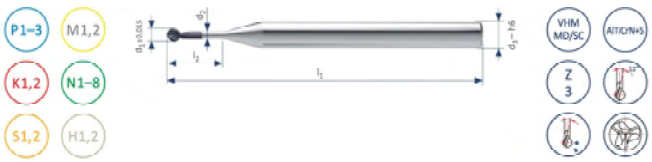
Chamfering tool

Art. 73000

d_1 mm	d_2 mm	l_2 mm	l_1 mm	d_3 mm	z
0.10	0.50	3.00	39	3.00	3
0.10	1.00	3.00	39	3.00	3
0.10	1.50	4.50	39	3.00	3
0.10	2.00	6.00	39	3.00	3
0.10	2.50	7.50	39	3.00	3
0.10	3.00	7.50	39	3.00	3
0.70	6.00		50	6.00	4
1.20	8.00		60	8.00	4

Chamfering tool Lollipop

Art. 43400



d_1 mm	d_2 mm	l_2 mm	l_1 mm	d_3 mm
1.00	0.60	4.00	60	4.00
1.50	0.90	6.00	60	4.00
2.00	1.20	8.00	60	4.00
2.50	1.35	10.00	70	6.00
3.00	1.50	12.00	70	6.00
4.00	2.00	16.00	70	6.00
5.00	2.50	20.00	80	8.00
6.00	3.00	24.00	80	8.00

Endmill 1 tooth

Art. 71330

d_1 mm	l_2 mm	l_1 mm	d_2 mm
0.20	0.40	39	3.00
0.30	0.60	39	3.00
0.40	0.80	39	3.00
0.50	1.00	39	3.00
0.60	1.20	39	3.00
0.70	1.40	39	3.00
0.80	1.60	39	3.00
0.90	1.80	39	3.00
1.00	2.00	39	3.00
1.10	2.20	39	3.00
1.20	2.40	39	3.00
1.30	2.60	39	3.00
1.40	2.80	39	3.00
1.50	3.00	39	3.00
1.60	3.20	39	3.00
1.70	3.40	39	3.00
1.80	3.60	39	3.00
1.90	3.80	39	3.00
2.00	4.00	39	3.00
2.10	4.20	39	3.00
2.20	4.40	39	3.00
2.30	4.60	39	3.00
2.40	4.80	39	3.00
2.50	5.00	39	3.00
2.60	5.20	39	3.00
2.70	5.40	39	3.00
2.80	5.60	39	3.00
2.90	5.80	39	3.00
3.00	6.00	40	4.00

Application technology

Formulas(공식)

Formula cutting speed v:

$$v = \frac{d \times \prod \times n}{1000}$$

Formula spindle speed n:

$$n = \frac{v \times 1000}{d \times \prod}$$

Drill, reamer

V_c = Cutting speed in m/min

f = Cutting feed in mm/rev

Endmill

V_c = Cutting speed in m/min

f_z = Cutting speed in mm/tooth

V_f = Cutting speed in mm/min $\quad f_z \times t \times n$

a_p = Cutting depth

a_e = Cutting width

추천 절삭 조건

Art. 50806 / 50809

Mat.		ø 0.50–1.00	ø 1.10–2.90	ø 3.00–6.00
P1	V_c	15–25	25–40	25–40
	f	0.020–0.080	0.060–0.140	0.120–0.250
P2	V_c	12–20	20–35	20–35
	f	0.010–0.060	0.040–0.120	0.100–0.220
P3	V_c	8–18	12–30	12–30
	f	0.010–0.040	0.030–0.090	0.080–0.200
M1	V_c	6–12	10–20	10–20
	f	0.020–0.050	0.050–0.070	0.050–0.150
M2	V_c	5–10	8–16	8–16
	f	0.010–0.040	0.030–0.060	0.040–0.080
K1	V_c	15–25	25–40	25–40
	f	0.010–0.050	0.030–0.080	0.070–0.150
K2	V_c	12–20	20–35	20–35
	f	0.010–0.040	0.030–0.060	0.050–0.100
N1	V_c	30–45	45–60	45–60
	f	0.030–0.080	0.060–0.120	0.100–0.250
N2	V_c	20–35	30–45	30–45
	f	0.040 0.080	0.070 0.150	0.130 0.300
N3	V_c	15–30	25–40	25–40
	f	0.020–0.070	0.060–0.120	0.100–0.250
N4	V_c	15–25	25–40	25–40
	f	0.010–0.050	0.030–0.080	0.060–0.150
N5	V_c	30–45	45–60	45–60
	f	0.040–0.080	0.070–0.130	0.100–0.250
N6	V_c	15–30	25–40	25–40
	f	0.010–0.040	0.038–0.065	0.060–0.090
N7	V_c	15–25	25–40	25–40
	f	0.010–0.040	0.030–0.080	0.050–0.130
N8	V_c	8–18	12–30	12–30
	f	0.010–0.040	0.020–0.050	0.030–0.100
S1	V_c	20–35	30–45	30–45
	f	0.010–0.040	0.020–0.056	0.040–0.100
S2	V_c			
	f			
H1	V_c			
	f			
H2	V_c			
	f			
H3	V_c			
	f			
O1	V_c	20–35	30–45	30–45
	f	0.020–0.060	0.050–0.120	0.100–0.250
O2	V_c			
	f			
O3	V_c			
	f			

Art. 50808

Mat.		ø 0.50–1.00	ø 1.10–2.00	ø 2.10–3.00
P1	V_c	20–35	35–50	35–50
	f	0.010–0.030	0.030–0.050	0.050–0.070
P2	V_c	15–30	30–45	30–45
	f	0.010–0.025	0.025–0.045	0.045–0.065
P3	V_c	12–25	25–40	25–40
	f	0.010–0.020	0.020–0.040	0.040–0.060
M1	V_c	10–20	20–35	20–35
	f	0.010–0.020	0.020–0.035	0.033–0.045
M2	V_c	8–16	16–30	16–30
	f	0.010–0.020	0.020–0.030	0.030–0.040
K1	V_c	20–35	35–50	35–50
	f	0.010–0.035	0.035–0.055	0.055–0.075
K2	V_c	15–30	30–45	30–45
	f	0.010–0.030	0.030–0.050	0.050–0.070
N1	V_c	35–50	50–65	50–65
	f	0.020–0.040	0.040–0.060	0.060–0.080
N2	V_c	25–40	40–55	40–55
	f	0.020 0.050	0.050 0.070	0.070 0.090
N3	V_c	20–35	35–50	35–50
	f	0.020–0.040	0.040–0.060	0.060–0.080
N4	V_c	15–30	30–45	30–45
	f	0.010–0.030	0.030–0.050	0.050–0.070
N5	V_c	35–50	50–65	50–65
	f	0.020–0.050	0.050–0.070	0.070–0.090
N6	V_c	20–35	35–50	35–50
	f	0.010–0.030	0.040–0.060	0.060–0.070
N7	V_c	15–30	30–45	30–45
	f	0.010–0.025	0.025–0.045	0.045–0.065
N8	V_c	10–20	20–35	20–35
	f	0.010–0.020	0.020–0.030	0.030–0.040
S1	V_c	25–35	35–50	35–50
	f	0.010–0.030	0.030–0.050	0.050–0.070
S2	V_c	10–15	15–25	15–25
	f	0.010–0.020	0.020–0.035	0.035–0.050
H1	V_c	10–15	15–25	15–25
	f	0.010–0.020	0.020–0.030	0.030–0.040
H2	V_c			
	f			
H3	V_c			
	f			
O1	V_c	20–35	30–45	30–45
	f	0.020–0.050	0.050–0.075	0.075–0.100
O2	V_c	20–35	30–45	30–45
	f	0.015–0.035	0.035–0.055	0.055–0.080
O3	V_c			
	f			

These are recommended values that depend on the condition of the machine, fixture, coolant etc., and they may have to be adapted yet.

Art. 50810 / 50812 / 50814 / 50818

Mat.		ø 3.00~6.00	ø 6.00~12.00	ø 12.00~20.00
P1	v_c	25~40	25~40	25~40
	f	0.120~0.250	0.250~0.300	0.300~0.400
P2	v_c	20~35	20~35	20~35
	f	0.100~0.200	0.200~0.250	0.250~0.300
P3	v_c	10~30	10~30	10~30
	f	0.008~0.150	0.150~0.220	0.220~0.300
M1	v_c	10~20	10~20	10~20
	f	0.050~0.150	0.150~0.200	0.200~0.250
M2	v_c	8~16	8~16	8~16
	f	0.040~0.080	0.080~0.140	0.140~0.200
K1	v_c	25~40	25~40	25~40
	f	0.070~0.150	0.150~0.200	0.200~0.350
K2	v_c	20~35	20~35	20~35
	f	0.050~0.100	0.100~0.150	0.150~0.250
N1	v_c	45~60	45~60	45~60
	f	0.100~0.250	0.250~0.350	0.350~0.400
N2	v_c	30~45	30~45	30~45
	f	0.150~0.300	0.300~0.400	0.400~0.600
N3	v_c	25~40	25~40	25~40
	f	0.100~0.250	0.250~0.350	0.350~0.550
N4	v_c	25~40	25~40	25~40
	f	0.060~0.150	0.150~0.250	0.250~0.400
N5	v_c	45~60	45~60	45~60
	f	0.100~0.250	0.250~0.350	0.350~0.450
N6	v_c	25~40	25~40	25~40
	f	0.060~0.100	0.100~0.150	0.150~0.250
N7	v_c	25~40	25~40	25~40
	f	0.050~0.150	0.150~0.250	0.250~0.350
N8	v_c	12~30	12~30	12~30
	f	0.030~0.100	0.100~0.150	0.150~0.200
S1	v_c	10~45	10~45	10~45
	f	0.040~0.150	0.150~0.200	0.200~0.300
S2	v_c			
	f			
H1	v_c			
	f			
H2	v_c			
	f			
H3	v_c			
	f			
O1	v_c	30~45	30~45	30~45
	f	0.100~0.250	0.250~0.400	0.400~0.800
O2	v_c			
	f			
O3	v_c			
	f			

Art. 50811 / 50813 / 50815

Mat.		ø 2.00~4.00	ø 4.00~6.00	ø 6.00~12.00
P1	v_c	40~60	40~60	40~60
	f	0.120~0.250	0.250~0.300	0.300~0.400
P2	v_c	35~55	35~55	35~55
	f	0.100~0.200	0.200~0.250	0.250~0.300
P3	v_c	30~45	30~45	30~45
	f	0.008~0.150	0.150~0.220	0.220~0.300
M1	v_c	25~40	25~40	25~40
	f	0.050~0.150	0.150~0.200	0.200~0.250
M2	v_c	20~35	20~35	20~35
	f	0.040~0.080	0.080~0.140	0.140~0.200
K1	v_c	35~50	35~50	35~50
	f	0.070~0.150	0.150~0.200	0.200~0.350
K2	v_c	30~45	30~45	30~45
	f	0.050~0.100	0.100~0.150	0.150~0.250
N1	v_c	60~70	60~70	60~70
	f	0.100~0.250	0.250~0.350	0.350~0.400
N2	v_c	50~60	50~60	50~60
	f	0.150~0.300	0.300~0.400	0.400~0.600
N3	v_c	40~55	40~55	40~55
	f	0.100~0.250	0.250~0.350	0.350~0.550
N4	v_c	35~50	35~50	35~50
	f	0.060~0.150	0.150~0.250	0.250~0.400
N5	v_c	60~70	60~70	60~70
	f	0.100~0.250	0.250~0.350	0.350~0.450
N6	v_c	40~55	40~55	40~55
	f	0.060~0.100	0.100~0.150	0.150~0.250
N7	v_c	35~50	35~50	35~50
	f	0.050~0.150	0.150~0.250	0.250~0.350
N8	v_c	25~40	25~40	25~40
	f	0.030~0.100	0.100~0.150	0.150~0.200
S1	v_c	35~50	35~50	35~50
	f	0.040~0.150	0.150~0.200	0.200~0.300
S2	v_c	15~25	15~25	15~25
	f	0.030~0.100	0.100~0.150	0.150~0.200
H1	v_c	15~25	15~25	15~25
	f	0.040~0.060	0.060~0.080	0.080~0.120
H2	v_c			
	f			
H3	v_c			
	f			
O1	v_c	30~45	30~45	30~45
	f	0.100~0.250	0.250~0.400	0.400~0.800
O2	v_c	30~45	30~45	30~45
	f	0.080~0.200	0.200~0.350	0.350~0.600
O3	v_c			
	f			

These are recommended values that depend on the condition of the machine, fixture, coolant etc., and they may have to be adapted yet.

Art. 56005

Mat.		ø 0.10~0.30	ø 0.33~0.80	ø 0.83~1.50
P1	v_c	8~18	15~30	30~60
	f	0.001~0.003	0.002~0.010	0.010~0.020
P2	v_c	6~16	12~25	20~40
	f	0.001~0.002	0.002~0.008	0.006~0.015
P3	v_c	6~13	10~20	18~35
	f	0.001~0.002	0.002~0.005	0.004~0.012
M1	v_c	5~12	10~18	15~30
	f	0.001~0.002	0.002~0.005	0.004~0.010
M2	v_c	5~10	8~15	13~25
	f	0.001~0.002	0.002~0.004	0.003~0.009
K1	v_c	8~18	15~30	30~60
	f	0.003~0.008	0.006~0.010	0.008~0.025
K2	v_c	6~16	12~25	20~40
	f	0.002~0.004	0.005~0.008	0.007~0.020
N1	v_c	12~20	18~35	35~65
	f	0.001~0.004	0.003~0.008	0.006~0.015
N2	v_c	10~18	15~30	25~50
	f	0.002~0.005	0.004~0.010	0.008~0.025
N3	v_c	8~18	15~30	30~60
	f	0.002~0.005	0.004~0.008	0.006~0.020
N4	v_c	8~18	15~30	30~60
	f	0.001~0.004	0.003~0.006	0.005~0.015
N5	v_c	12~20	18~35	35~65
	f	0.002~0.005	0.004~0.010	0.009~0.025
N6	v_c	8~18	15~30	30~60
	f	0.002~0.005	0.004~0.008	0.007~0.020
N7	v_c	8~18	15~30	30~60
	f	0.002~0.005	0.004~0.008	0.007~0.020
N8	v_c	6~13	10~20	18~35
	f	0.001~0.004	0.002~0.007	0.005~0.015
S1	v_c	15~30	28~45	30~45
	f	0.002~0.006	0.005~0.010	0.008~0.020
S2	v_c			
	f			
H1	v_c			
	f			
H2	v_c			
	f			
H3	v_c			
	f			
O1	v_c	8~18	15~30	30~60
	f	0.005~0.010	0.008~0.015	0.013~0.035
O2	v_c			
	f			
O3	v_c			
	f			

Art. 56033

Mat.		ø 0.03~0.10	ø 0.11~0.50	ø 0.51~1.00	ø 1.01~2.00	ø 2.01~3.00
P1	v_c	1.5~5	4~10	10~30	30~60	30~60
	f	0.001~0.003	0.002~0.010	0.010~0.018	0.018~0.028	0.028~0.045
P2	v_c	1.2~4	3.5~8	8~25	25~50	25~50
	f	0.001~0.002	0.002~0.008	0.008~0.016	0.016~0.026	0.026~0.040
P3	v_c	1~3	3~6	6~20	20~45	20~45
	f	0.001~0.002	0.002~0.007	0.007~0.013	0.013~0.024	0.024~0.035
M1	v_c	1.2~4	3.5~8	8~20	20~45	20~45
	f	0.001~0.002	0.002~0.007	0.007~0.013	0.013~0.023	0.023~0.033
M2	v_c	1~3	3~6	5~15	15~30	15~30
	f	0.001~0.002	0.002~0.005	0.005~0.010	0.010~0.020	0.020~0.030
K1	v_c	1.5~5	4~10	10~30	30~60	30~60
	f	0.001~0.004	0.004~0.008	0.008~0.015	0.015~0.030	0.030~0.045
K2	v_c	1.2~4	3.5~8	8~25	25~50	25~50
	f	0.001~0.003	0.003~0.007	0.007~0.013	0.013~0.025	0.025~0.040
N1	v_c	2~6	5~15	15~40	40~70	40~70
	f	0.001~0.003	0.003~0.006	0.006~0.012	0.012~0.023	0.023~0.035
N2	v_c	1.8~5.5	5~15	15~40	40~65	40~65
	f	0.001~0.003	0.003~0.007	0.007~0.013	0.013~0.025	0.025~0.040
N3	v_c	1.5~5	4~12	12~30	30~60	30~60
	f	0.001~0.002	0.002~0.006	0.006~0.011	0.011~0.022	0.022~0.035
N4	v_c	1.5~5	4~12	12~30	30~60	30~60
	f	0.001~0.002	0.002~0.005	0.005~0.010	0.010~0.020	0.020~0.030
N5	v_c	2~6	5~15	15~35	35~65	35~65
	f	0.001~0.003	0.003~0.006	0.006~0.013	0.013~0.025	0.025~0.040
N6	v_c	1.5~5	4~12	12~30	30~60	30~60
	f	0.001~0.002	0.002~0.004	0.004~0.010	0.010~0.022	0.022~0.035
N7	v_c	1.5~5	4~12	12~30	30~60	30~60
	f	0.001~0.002	0.002~0.004	0.004~0.009	0.009~0.020	0.020~0.031
N8	v_c	1~3	3~6	6~20	20~45	20~45
	f	0.001~0.002	0.002~0.004	0.004~0.008	0.008~0.016	0.016~0.027
S1	v_c	0.8~5	4~7	7~15	15~30	15~30
	f	0.001~0.002	0.002~0.004	0.004~0.009	0.009~0.018	0.018~0.030
S2	v_c					
	f					
H1	v_c					
	f					
H2	v_c					
	f					
H3	v_c					
	f					
O1	v_c	1.5~5	4~10	10~25	20~35	30~60
	f	0.001~0.003	0.003~0.008	0.008~0.014	0.014~0.035	0.035~0.060
O2	v_c					
	f					
O3	v_c					
	f					

These are recommended values that depend on the condition of the machine, fixture, coolant etc., and they may have to be adapted yet.

SPHINX

Art. 56036

Mat.		ø0.30~0.55	ø1.00~1.95	ø2.00~2.95	ø3.00~3.95	ø4.00~6.00
P1	v_c	60~60	60~90	60~90	60~90	60~90
	f	0.010~0.025	0.025~0.040	0.040~0.055	0.055~0.070	0.070~0.100
P2	v_c	30~50	50~70	50~70	50~70	50~70
	f	0.009~0.023	0.023~0.036	0.036~0.050	0.050~0.065	0.065~0.080
P3	v_c	20~40	40~60	40~60	40~60	40~60
	f	0.006~0.015	0.015~0.025	0.025~0.040	0.040~0.055	0.055~0.070
M1	v_c	20~35	35~50	35~50	35~50	35~50
	f	0.005~0.013	0.013~0.023	0.023~0.035	0.035~0.050	0.050~0.065
M2	v_c	20~30	30~45	30~45	30~45	30~45
	f	0.004~0.010	0.010~0.020	0.020~0.032	0.032~0.046	0.046~0.060
K1	v_c	60~100	100~150	100~150	100~150	100~150
	f	0.015~0.025	0.025~0.038	0.038~0.055	0.055~0.075	0.075~0.130
K2	v_c	40~80	80~130	80~130	80~130	80~130
	f	0.012~0.022	0.022~0.035	0.035~0.050	0.050~0.070	0.070~0.090
N1	v_c	60~90	90~120	90~120	90~120	90~120
	f	0.015~0.025	0.025~0.035	0.035~0.050	0.050~0.070	0.070~0.085
N2	v_c	70~120	120~150	120~150	120~150	120~150
	f	0.016~0.027	0.027~0.042	0.042~0.060	0.060~0.080	0.080~0.110
N3	v_c	70~120	120~150	120~150	120~150	120~150
	f	0.015~0.025	0.025~0.035	0.035~0.050	0.050~0.070	0.070~0.085
N4	v_c	40~70	70~100	70~100	70~100	70~100
	f	0.013~0.023	0.023~0.033	0.033~0.045	0.045~0.060	0.060~0.080
N5	v_c	70~120	120~150	120~150	120~150	120~150
	f	0.015~0.025	0.025~0.035	0.035~0.050	0.050~0.070	0.070~0.100
N6	v_c					
	f					
N7	v_c					
	f					
N8	v_c					
	f					
S1	v_c	30~40	40~70	40~70	40~70	40~70
	f	0.010~0.022	0.022~0.035	0.035~0.050	0.050~0.070	0.070~0.090
S2	v_c					
	f					
H1	v_c	15~25	20~35	20~35	20~35	20~35
	f	0.005~0.010	0.010~0.020	0.020~0.030	0.030~0.040	0.040~0.055
H2	v_c					
	f					
H3	v_c					
	f					
O1	v_c					
	f					
O2	v_c					
	f					
O3	v_c					
	f					

Art. 16004

Mat.		ø0.10~0.30	ø0.35~0.50	ø0.55~0.80	ø0.85~1.50
P1	v_c	1.0~2.0	2.0~5.5	3.5~11	9.0~15
	f	0.001~0.005	0.004~0.007	0.006~0.011	0.010~0.015
P2	v_c	0.8~1.5	1.2~4.0	3.5~8.0	7.0~12
	f	0.001~0.003	0.002~0.006	0.005~0.007	0.006~0.010
P3	v_c				
	f				
M1	v_c	0.8~1.5	1.2~4.0	3.5~8.0	7.0~12
	f	0.001~0.002	0.002~0.004	0.003~0.006	0.005~0.010
M2	v_c	0.5~1.2	1.0~3.5	2.0~5.0	3.0~7.5
	f	0.001~0.002	0.002~0.004	0.003~0.005	0.004~0.008
K1	v_c	1.0~2.0	2.0~5.5	3.5~11	9.0~15
	f	0.001~0.005	0.004~0.008	0.007~0.011	0.010~0.015
K2	v_c	0.8~1.5	1.2~4.0	3.5~8.0	7.0~12
	f	0.001~0.003	0.002~0.006	0.005~0.007	0.006~0.010
N1	v_c	1.0~2.0	2.0~5.5	3.5~11	9.0~15
	f	0.001~0.006	0.005~0.010	0.008~0.015	0.013~0.025
N2	v_c	0.8~1.5	1.2~4.0	3.5~8.0	7.0~12
	f	0.002~0.006	0.005~0.010	0.008~0.015	0.013~0.025
N3	v_c				
	f				
N4	v_c				
	f				
N5	v_c	1.0~2.0	2.0~5.5	3.5~11	9.0~15
	f	0.002~0.006	0.005~0.010	0.008~0.015	0.013~0.020
N6	v_c				
	f				
N7	v_c				
	f				
N8	v_c				
	f				
S1	v_c				
	f				
S2	v_c				
	f				
H1	v_c				
	f				
H2	v_c				
	f				
H3	v_c				
	f				
O1	v_c				
	f				
O2	v_c				
	f				
O3	v_c				
	f				

These are recommended values that depend on the condition of the machine, fixture, coolant etc., and they may have to be adapted yet.

Art. 50695 / 50699

Mat.		ø0.05~0.30	ø0.31~0.50	ø0.51~0.80	ø0.81~1.20	ø1.21~2.00
P1	v_c	1.0~6.0	6.0~15	10~23	23~60	23~60
	f	0.001~0.004	0.003~0.008	0.007~0.013	0.012~0.018	0.016~0.025
P2	v_c	1.0~6.0	2.0~10	3.5~16	7.0~30	7.0~30
	f	0.001~0.003	0.002~0.007	0.006~0.012	0.010~0.016	0.014~0.022
P3	v_c	0.5~3.0	1.0~8.0	2.5~18	5.0~25	5.0~25
	f	0.001~0.002	0.002~0.006	0.005~0.010	0.008~0.014	0.012~0.020
M1	v_c	0.5~3.0	1.0~6.0	4.0~10	8.0~18	8.0~18
	f	0.001~0.002	0.002~0.005	0.004~0.008	0.007~0.012	0.010~0.016
M2	v_c					
	f					
K1	v_c	2.0~8.0	6.0~15	10~23	23~60	23~60
	f	0.001~0.004	0.003~0.008	0.007~0.013	0.012~0.018	0.016~0.025
K2	v_c	1.0~6.0	2.0~10	3.5~16	7.0~30	7.0~30
	f	0.001~0.003	0.002~0.007	0.006~0.012	0.010~0.016	0.014~0.022
N1	v_c					
	f					
N2	v_c	3.0~16	8.0~26	13~55	30~100	30~100
	f	0.001~0.004	0.004~0.007	0.007~0.011	0.010~0.016	0.015~0.022
N3	v_c	2.5~13	6.0~22	10~40	20~80	20~80
	f	0.001~0.004	0.004~0.006	0.005~0.010	0.009~0.015	0.014~0.020
N4	v_c	2.0~8.0	6.0~15	10~23	23~60	23~60
	f	0.001~0.002	0.002~0.005	0.004~0.008	0.007~0.017	0.010~0.016
N5	v_c	3.0~16	8.0~26	13~55	30~100	30~100
	f	0.001~0.004	0.004~0.006	0.005~0.010	0.009~0.015	0.014~0.020
N6	v_c					
	f					
N7	v_c	2.0~8.0	6.0~15	10~23	23~60	23~60
	f	0.001~0.004	0.004~0.006	0.005~0.010	0.009~0.015	0.014~0.020
N8	v_c	1.0~6.0	2.0~10	3.5~16	7.0~30	7.0~30
	f	0.001~0.002	0.002~0.005	0.004~0.008	0.007~0.010	0.008~0.013
S1	v_c					
	f					
S2	v_c					
	f					
H1	v_c					
	f					
H2	v_c					
	f					
H3	v_c					
	f					
O1	v_c					
	f					
O2	v_c					
	f					
O3	v_c					
	f					

Art. 51200

Mat.		ø0.03~0.30	ø0.31~0.50	ø0.51~1.00	ø1.01~2.00	ø2.01~3.00
P1	v_c	1.5~5	4~10	10~30	30~60	30~60
	f	0.001~0.004	0.003~0.008	0.007~0.015	0.014~0.025	0.023~0.035
P2	v_c	1.2~4	3.5~8	8~25	25~50	25~50
	f	0.001~0.003	0.002~0.007	0.006~0.014	0.012~0.023	0.021~0.032
P3	v_c	1~3	3~6	6~20	20~45	20~45
	f	0.001~0.002	0.002~0.006	0.005~0.013	0.011~0.020	0.018~0.030
M1	v_c	1.2~4	3.5~8	8~20	20~45	20~45
	f	0.001~0.002	0.002~0.005	0.004~0.011	0.010~0.018	0.016~0.028
M2	v_c	1~3	3~6	5~15	15~30	15~30
	f	0.001~0.002	0.002~0.004	0.003~0.009	0.008~0.016	0.016~0.028
K1	v_c	1.5~5	4~10	10~30	30~60	30~60
	f	0.001~0.004	0.003~0.008	0.007~0.015	0.014~0.025	0.023~0.035
K2	v_c	1.2~4	3.5~8	8~25	25~50	25~50
	f	0.001~0.003	0.002~0.007	0.006~0.014	0.012~0.022	0.020~0.032
N1	v_c	2~6	5~15	15~40	40~70	40~70
	f	0.001~0.003	0.002~0.006	0.005~0.013	0.012~0.020	0.018~0.030
N2	v_c	1.8~5.5	5.0~15	15~40	40~65	40~65
	f	0.001~0.004	0.003~0.007	0.006~0.015	0.014~0.022	0.020~0.035
N3	v_c	1.5~5	4~12	12~30	30~60	30~60
	f	0.001~0.004	0.003~0.006	0.006~0.013	0.012~0.020	0.018~0.032
N4	v_c	1.5~5	4~12	12~30	30~60	30~60
	f	0.001~0.002	0.002~0.005	0.004~0.010	0.009~0.016	0.015~0.025
N5	v_c	2~6	5~15	15~35	35~65	35~65
	f	0.001~0.004	0.003~0.006	0.005~0.013	0.012~0.020	0.018~0.032
N6	v_c	1.5~5	4~12	12~30	30~60	30~60
	f	0.001~0.002	0.002~0.005	0.004~0.010	0.009~0.016	0.015~0.020
N7	v_c	1.5~5	4~12	12~30	30~60	30~60
	f	0.001~0.004	0.003~0.006	0.005~0.012	0.011~0.018	0.016~0.025
N8	v_c	1~3	2.5~6	6~20	20~45	20~45
	f	0.001~0.002	0.002~0.005	0.004~0.009	0.008~0.013	0.012~0.018
S1	v_c	0.8~5	4~7	7~15	15~30	15~30
	f	0.001~0.003	0.002~0.006	0.005~0.013	0.012~0.020	0.018~0.030
S2	v_c					
	f					
H1	v_c					
	f					
H2	v_c					
	f					
H3	v_c					
	f					
O1	v_c	1.5~5	4~10	10~25	20~35	30~60
	f	0.001~0.004	0.003~0.010	0.009~0.018	0.016~0.028	0.026~0.040
O2	v_c					
	f					
O3	v_c					
	f					

These are recommended values that depend on the condition of the machine, fixture, coolant etc., and they may have to be adapted yet.

Art. 51201

Mat.		ø 0.50~0.50	ø 0.51~1.00	ø 1.01~2.00	ø 2.01~3.00
P1	v_c	5~12	12~35	35~65	35~60
	f	0.003~0.008	0.007~0.015	0.014~0.025	0.023~0.035
P2	v_c	4~9	9~28	28~55	28~55
	f	0.002~0.007	0.006~0.014	0.012~0.023	0.021~0.032
P3	v_c	3.3~7	7~23	23~50	23~50
	f	0.002~0.006	0.005~0.013	0.011~0.020	0.018~0.030
M1	v_c	4~9	9~28	28~55	28~55
	f	0.002~0.005	0.004~0.011	0.010~0.018	0.016~0.028
M2	v_c	3~8	8~20	18~35	18~35
	f	0.002~0.004	0.003~0.009	0.008~0.016	0.016~0.028
K1	v_c	5~12	12~35	35~65	35~60
	f	0.003~0.008	0.007~0.015	0.014~0.025	0.023~0.035
K2	v_c	4~10	10~30	30~55	30~50
	f	0.002~0.007	0.006~0.014	0.012~0.022	0.020~0.032
N1	v_c	6~19	19~45	45~80	45~80
	f	0.002~0.006	0.005~0.013	0.012~0.020	0.018~0.030
N2	v_c	5.5~17	17~45	45~70	45~70
	f	0.003~0.007	0.006~0.015	0.014~0.022	0.020~0.035
N3	v_c	5.5~15	15~35	35~65	35~65
	f	0.003~0.006	0.006~0.013	0.012~0.020	0.018~0.032
N4	v_c	5.5~15	15~35	35~65	35~65
	f	0.002~0.005	0.004~0.010	0.009~0.016	0.015~0.025
N5	v_c	6.5~18	18~40	40~70	40~70
	f	0.003~0.006	0.005~0.013	0.012~0.020	0.018~0.032
N6	v_c	5.5~15	15~35	35~65	35~65
	f	0.002~0.005	0.004~0.010	0.009~0.016	0.015~0.020
N7	v_c	5.5~15	15~35	35~65	35~65
	f	0.003~0.006	0.005~0.012	0.011~0.018	0.016~0.025
N8	v_c	3~7	7~23	23~50	23~50
	f	0.002~0.005	0.004~0.009	0.008~0.013	0.012~0.018
S1	v_c	5~8	8.0~18	18~35	18~35
	f	0.002~0.006	0.005~0.013	0.012~0.020	0.018~0.030
S2	v_c	2.5~7	6~12	11~20	11~20
	f	0.002~0.004	0.003~0.007	0.006~0.011	0.010~0.018
H1	v_c	2.5~7	6~12	11~20	11~20
	f	0.002~0.004	0.003~0.007	0.006~0.011	0.010~0.018
H2	v_c				
	f				
H3	v_c				
	f				
O1	v_c	5~12	12~35	35~65	35~60
	f	0.003~0.010	0.009~0.018	0.016~0.028	0.026~0.040
O2	v_c	2.5~6	6~20	20~45	20~45
	f	0.002~0.009	0.008~0.016	0.015~0.025	0.022~0.035
O3	v_c				
	f				

Art. 50621

Mat.		ø 0.20~0.50	ø 0.51~1.00	ø 1.01~2.00	ø 2.01~3.00
P1	v_c	6~15	15~35	15~35	15~35
	f	0.001~0.010	0.010~0.020	0.020~0.030	0.030~0.045
P2	v_c	5~13	13~30	13~30	13~30
	f	0.001~0.008	0.008~0.018	0.018~0.028	0.028~0.042
P3	v_c	4~12	12~25	12~25	12~25
	f	0.001~0.007	0.007~0.016	0.016~0.025	0.025~0.038
M1	v_c	4~12	12~25	12~25	12~25
	f	0.001~0.007	0.007~0.016	0.016~0.025	0.025~0.038
M2	v_c				
	f				
K1	v_c	6~15	15~35	15~35	15~35
	f	0.001~0.010	0.010~0.020	0.020~0.030	0.030~0.045
K2	v_c	5~13	13~30	13~30	13~30
	f	0.001~0.008	0.008~0.018	0.018~0.028	0.028~0.042
N1	v_c				
	f				
N2	v_c	8~20	20~45	20~45	20~45
	f	0.001~0.010	0.010~0.020	0.020~0.030	0.030~0.045
N3	v_c	6~18	18~40	18~40	18~40
	f	0.001~0.008	0.008~0.018	0.018~0.028	0.028~0.042
N4	v_c				
	f				
N5	v_c	6~18	18~40	18~40	18~40
	f	0.001~0.010	0.010~0.020	0.020~0.035	0.035~0.060
N6	v_c				
	f				
N7	v_c				
	f				
N8	v_c				
	f				
S1	v_c				
	f				
S2	v_c				
	f				
H1	v_c				
	f				
H2	v_c				
	f				
H3	v_c				
	f				
O1	v_c				
	f				
O2	v_c				
	f				
O3	v_c				
	f				

Art. 50622

Mat.		ø 0.20~0.50	ø 0.51~1.00	ø 1.01~2.00	ø 2.01~3.00
P1	v_c	8~20	20~40	20~40	20~40
	f	0.001~0.010	0.010~0.020	0.020~0.030	0.030~0.045
P2	v_c	6~18	18~38	18~38	18~38
	f	0.001~0.008	0.008~0.018	0.018~0.028	0.028~0.042
P3	v_c	5~14	14~30	14~30	14~30
	f	0.001~0.007	0.007~0.016	0.016~0.025	0.025~0.038
M1	v_c	5~14	14~30	14~30	14~30
	f	0.001~0.007	0.007~0.016	0.016~0.025	0.025~0.038
M2	v_c				
	f				
K1	v_c	8~20	20~40	20~40	20~40
	f	0.001~0.010	0.010~0.020	0.020~0.030	0.030~0.045
K2	v_c	6~18	18~38	18~38	18~38
	f	0.001~0.008	0.008~0.018	0.018~0.028	0.028~0.042
N1	v_c				
	f				
N2	v_c	10~25	25~55	25~55	25~55
	f	0.001~0.010	0.010~0.020	0.020~0.030	0.030~0.045
N3	v_c	8~22	22~50	22~50	22~50
	f	0.001~0.008	0.008~0.018	0.018~0.028	0.028~0.042
N4	v_c				
	f				
N5	v_c	8~22	22~50	22~50	22~50
	f	0.001~0.010	0.010~0.020	0.020~0.035	0.035~0.060
N6	v_c				
	f				
N7	v_c				
	f				
N8	v_c				
	f				
S1	v_c				
	f				
S2	v_c				
	f				
H1	v_c	2~5	5~12	5~12	5~12
	f	0.001~0.004	0.004~0.008	0.008~0.015	0.015~0.025
H2	v_c				
	f				
H3	v_c				
	f				
O1	v_c				
	f				
O2	v_c				
	f				
O3	v_c				
	f				

Art. 12604

Mat.		ø 0.05~0.30	ø 0.31~0.80	ø 0.81~1.30	ø 1.35~3.17
P1	v_c	1.0~2.0	2.0~8.0	8.0~20	8.0~20
	f	0.001~0.005	0.005~0.011	0.010~0.015	0.014~0.021
P2	v_c	0.5~1.5	1.5~7.0	7.0~16	7.0~16
	f	0.001~0.002	0.002~0.006	0.005~0.009	0.008~0.012
P3	v_c				
	f				
M1	v_c	0.5~1.5	1.5~7.0	7.0~16	7.0~16
	f	0.001~0.002	0.002~0.006	0.005~0.009	0.008~0.015
M2	v_c	0.5~1.2	1.2~6.0	6.0~15	6.0~15
	f	0.001~0.002	0.002~0.005	0.004~0.007	0.006~0.012
K1	v_c	1.0~5.0	5.0~10	10~20	10~20
	f	0.001~0.005	0.004~0.011	0.010~0.015	0.014~0.020
K2	v_c	0.8~4.0	4.0~8.0	8.0~18	8.0~18
	f	0.001~0.004	0.003~0.008	0.007~0.011	0.010~0.016
N1	v_c	2.0~7.0	7.0~13	13~25	13~25
	f	0.001~0.004	0.003~0.010	0.009~0.016	0.015~0.022
N2	v_c	1.5~6.0	6.0~12	12~22	12~22
	f	0.001~0.005	0.004~0.011	0.010~0.020	0.018~0.035
N3	v_c				
	f				
N4	v_c				
	f				
N5	v_c	2.0~7.0	7.0~13	13~25	13~25
	f	0.001~0.004	0.003~0.010	0.009~0.018	0.017~0.030
N6	v_c				
	f				
N7	v_c				
	f				
N8	v_c				
	f				
S1	v_c				
	f				
S2	v_c				
	f				
H1	v_c				
	f				
H2	v_c				
	f				
H3	v_c				
	f				
O1	v_c				
	f				
O2	v_c				
	f				
O3	v_c				
	f				

These are recommended values that depend on the condition of the machine, fixture, coolant etc., and they may have to be adapted yet.

These are recommended values that depend on the condition of the machine, fixture, coolant etc., and they may have to be adapted yet.

Art. 50720

Mat.		ø 0.20~0.50	ø 0.35~0.80	ø 0.85~1.20	ø 1.25~2.00
P1	v_c	8~20	20~40	20~40	20~40
	f	0.001~0.010	0.010~0.018	0.018~0.025	0.025~0.035
P2	v_c	6~18	18~38	18~38	18~38
	f	0.001~0.008	0.008~0.016	0.016~0.023	0.023~0.033
P3	v_c	5~14	14~30	14~30	14~30
	f	0.001~0.007	0.007~0.015	0.015~0.020	0.020~0.030
M1	v_c	5~14	14~30	14~30	14~30
	f	0.001~0.008	0.008~0.016	0.016~0.023	0.023~0.033
M2	v_c	3~12	12~25	12~25	12~25
	f	0.001~0.005	0.005~0.010	0.010~0.016	0.016~0.020
K1	v_c	8~20	20~40	20~40	20~40
	f	0.001~0.010	0.010~0.018	0.018~0.025	0.025~0.035
K2	v_c	6~18	6~18	6~18	6~18
	f	0.001~0.008	0.008~0.016	0.016~0.023	0.023~0.033
N1	v_c	6~18	18~38	18~38	18~38
	f	0.001~0.007	0.007~0.015	0.015~0.020	0.020~0.030
N2	v_c	10~25	25~55	25~55	25~55
	f	0.001~0.010	0.010~0.018	0.018~0.025	0.025~0.035
N3	v_c	8~22	22~50	22~50	22~50
	f	0.001~0.008	0.008~0.016	0.016~0.023	0.023~0.033
N4	v_c	5~14	14~30	14~30	14~30
	f	0.001~0.005	0.005~0.010	0.010~0.016	0.016~0.020
N5	v_c	10~25	25~55	25~55	25~55
	f	0.001~0.010	0.010~0.018	0.018~0.025	0.025~0.035
N6	v_c	5~15	15~30	15~30	15~30
	f	0.001~0.005	0.005~0.010	0.010~0.016	0.016~0.020
N7	v_c				
	f				
N8	v_c				
	f				
S1	v_c	6~10	10~20	10~20	10~20
	f	0.001~0.005	0.005~0.010	0.010~0.016	0.016~0.020
S2	v_c				
	f				
H1	v_c				
	f				
H2	v_c				
	f				
H3	v_c				
	f				
O1	v_c	15~30	15~30	15~30	15~30
	f	0.005~0.015	0.015~0.030	0.030~0.045	0.045~0.060
O2	v_c				
	f				
O3	v_c				
	f				

Art. 50740 / 50760 / 50780

Mat.		ø 0.20~0.50	ø 0.35~0.80	ø 0.85~1.20	ø 1.25~2.00
P1	v_c	6~10	10~25	10~25	10~25
	f	0.001~0.006	0.006~0.010	0.010~0.022	0.022~0.030
P2	v_c	5~8	8~20	8~20	8~20
	f	0.001~0.005	0.005~0.008	0.008~0.015	0.015~0.020
P3	v_c	4~7	7~18	7~18	7~18
	f	0.001~0.004	0.004~0.007	0.007~0.012	0.012~0.015
M1	v_c	4~5	5~15	5~15	5~15
	f	0.001~0.003	0.003~0.006	0.006~0.012	0.012~0.018
M2	v_c	2~4	4~12	4~12	4~12
	f	0.001~0.003	0.003~0.005	0.005~0.010	0.010~0.015
K1	v_c	6~10	10~25	10~25	10~25
	f	0.001~0.006	0.006~0.010	0.010~0.022	0.022~0.030
K2	v_c	5~8	8~20	8~20	8~20
	f	0.001~0.005	0.005~0.008	0.008~0.015	0.015~0.020
N1	v_c	4~6	6~18	6~18	6~18
	f	0.001~0.004	0.004~0.007	0.007~0.012	0.012~0.015
N2	v_c	6~10	10~25	10~25	10~25
	f	0.001~0.006	0.006~0.010	0.010~0.022	0.022~0.030
N3	v_c	5~8	8~20	8~20	8~20
	f	0.001~0.005	0.005~0.008	0.008~0.015	0.015~0.020
N4	v_c	3~5	5~15	5~15	5~15
	f	0.001~0.004	0.004~0.007	0.007~0.012	0.012~0.015
N5	v_c	6~10	10~25	10~25	10~25
	f	0.001~0.006	0.006~0.010	0.010~0.022	0.022~0.030
N6	v_c	4~6	6~18	6~18	6~18
	f	0.001~0.003	0.003~0.005	0.005~0.010	0.010~0.015
N7	v_c				
	f				
N8	v_c				
	f				
S1	v_c	3~5	5~12	5~12	5~12
	f	0.001~0.003	0.003~0.005	0.005~0.010	0.010~0.015
S2	v_c				
	f				
H1	v_c				
	f				
H2	v_c				
	f				
H3	v_c				
	f				
O1	v_c	10~20	10~20	10~20	10~20
	f	0.005~0.010	0.010~0.015	0.015~0.020	0.020~0.025
O2	v_c				
	f				
O3	v_c				
	f				

These are recommended values that depend on the condition of the machine, fixture, coolant etc., and they may have to be adapted yet.

Art. 50830

Mat.		ø 0.30~1.00	ø 1.10~3.00	ø 3.10~10.00	ø 10.10~15.00	ø 15.10~20.00
P1	v_c	30~60	50~90	50~90	50~90	50~90
	f	0.010~0.040	0.038~0.080	0.076~0.110	0.100~0.180	0.170~0.260
P2	v_c	20~35	30~60	30~60	30~60	30~60
	f	0.010~0.030	0.028~0.070	0.065~0.090	0.085~0.160	0.150~0.230
P3	v_c	15~30	25~50	25~50	25~50	25~50
	f	0.005~0.020	0.018~0.060	0.057~0.085	0.080~0.130	0.125~0.200
M1	v_c	15~30	25~50	25~50	25~50	25~50
	f	0.005~0.020	0.018~0.060	0.057~0.085	0.080~0.130	0.125~0.200
M2	v_c	10~20	15~40	15~40	15~40	15~40
	f	0.004~0.018	0.016~0.050	0.048~0.090	0.085~0.120	0.110~0.160
K1	v_c	40~80	70~120	70~120	70~120	70~120
	f	0.010~0.060	0.055~0.090	0.085~0.110	0.100~0.280	0.260~0.500
K2	v_c	30~50	40~80	40~80	40~80	40~80
	f	0.010~0.030	0.028~0.070	0.067~0.100	0.095~0.180	0.170~0.300
N1	v_c	30~60	50~90	50~90	50~90	50~90
	f	0.012~0.045	0.042~0.085	0.080~0.140	0.135~0.250	0.230~0.300
N2	v_c	40~80	70~120	70~120	70~120	70~120
	f	0.015~0.050	0.480~0.100	0.095~0.180	0.170~0.280	0.260~0.450
N3	v_c	30~70	60~110	60~110	60~110	60~110
	f	0.010~0.045	0.040~0.085	0.080~0.160	0.150~0.260	0.240~0.400
N4	v_c	20~40	30~70	30~70	30~70	30~70
	f	0.005~0.030	0.028~0.070	0.065~0.090	0.085~0.160	0.150~0.230
N5	v_c					
	f					
N6	v_c	15~30	25~50	25~50	25~50	25~50
	f	0.012~0.045	0.042~0.085	0.080~0.140	0.135~0.250	0.230~0.300
N7	v_c	15~30	25~50	25~50	25~50	25~50
	f	0.012~0.045	0.042~0.085	0.080~0.140	0.135~0.250	0.230~0.300
N8	v_c	10~20	15~35	15~35	15~35	15~35
	f	0.004~0.018	0.016~0.050	0.048~0.090	0.085~0.120	0.110~0.180
S1	v_c	20~30	25~50	25~50	25~50	25~50
	f	0.020~0.040	0.038~0.070	0.065~0.100	0.095~0.150	0.145~0.200
S2	v_c	10~20	15~35	15~35	15~35	15~35
	f	0.004~0.018	0.016~0.050	0.048~0.090	0.085~0.120	0.110~0.180
H1	v_c					
	f					
H2	v_c					
	f					
H3	v_c					
	f					
O1	v_c	20~40	30~70	30~70	30~70	30~70
	f	0.015~0.050	0.048~0.100	0.095~0.180	0.170~0.280	0.260~0.450
O2	v_c					
	f					
O3	v_c					
	f					

Art. 50838

Mat.		ø 0.30~1.00	ø 1.05~3.00	ø 3.105~6.00
P1	v_c	30~60	50~90	50~90
	f	0.010~0.040	0.038~0.050	0.045~0.060
P2	v_c	20~35	30~60	30~60
	f	0.010~0.030	0.028~0.045	0.040~0.055
P3	v_c	15~30	25~50	25~50
	f	0.005~0.020	0.018~0.035	0.030~0.050
M1	v_c	15~30	25~50	25~50
	f	0.005~0.020	0.018~0.035	0.030~0.050
M2	v_c	10~20	15~40	15~40
	f	0.004~0.018	0.016~0.030	0.028~0.040
K1	v_c	40~80	70~120	70~120
	f	0.010~0.060	0.055~0.070	0.065~0.100
K2	v_c	30~50	40~80	40~80
	f	0.010~0.030	0.028~0.055	0.050~0.080
N1	v_c	30~60	50~90	50~90
	f	0.012~0.045	0.042~0.060	0.055~0.090
N2	v_c	40~80	70~120	70~120
	f	0.015~0.050	0.048~0.070	0.065~0.110
N3	v_c	30~70	60~110	60~110
	f	0.010~0.045	0.040~0.065	0.060~0.100
N4	v_c	20~40	30~70	30~70
	f	0.005~0.030	0.028~0.050	0.048~0.075
N5	v_c	30~60	50~90	50~90
	f	0.015~0.050	0.048~0.070	0.065~0.110
N6	v_c	15~30	25~50	25~50
	f	0.012~0.045	0.040~0.065	0.060~0.100
N7	v_c			
	f			
N8	v_c			
	f			
S1	v_c	20~30	30~60	30~60
	f	0.010~0.030	0.028~0.045	0.040~0.055
S2	v_c			
	f			
H1	v_c			
	f			
H2	v_c			
	f			
H3	v_c			
	f			
O1	v_c	20~40	30~70	30~70
	f	0.015~0.050	0.048~0.070	0.065~0.120
O2	v_c			
	f			
O3	v_c			
	f			

These are recommended values that depend on the condition of the machine, fixture, coolant etc., and they may have to be adapted yet.

Art. 70030 – 70090 / 70130 – 70190

Mat.			
P1	v_c	180–280	
	f_z	80–180	mm/min
P2	v_c	180–280	
	f_z	70–160	mm/min
P3	v_c	180–280	
	f_z	70–150	mm/min
M1	v_c	180–280	
	f_z	70–150	mm/min
M2	v_c	180–280	
	f_z	70–150	mm/min
K1	v_c	180–280	
	f_z	80–180	mm/min
K2	v_c	180–280	
	f_z	70–160	mm/min
N1	v_c	180–280	
	f_z	60–140	mm/min
N2	v_c	180–280	
	f_z	80–180	mm/min
N3	v_c	180–280	
	f_z	70–160	mm/min
N4	v_c	180–280	
	f_z	60–120	mm/min
N5	v_c	180–280	
	f_z	80–200	mm/min
N6	v_c	180–280	
	f_z	60–150	mm/min
N7	v_c	180–280	
	f_z	80–200	mm/min
N8	v_c	180–280	
	f_z	80–200	mm/min
S1	v_c	180–280	
	f_z	50–120	mm/min
S2	v_c		
	f_z		
H1	v_c		
	f_z		
H2	v_c		
	f_z		
H3	v_c		
	f_z		
O1	v_c	180–280	
	f_z	80–200	mm/min
O2	v_c		
	f_z		
O3	v_c		
	f_z		

Art. 73000

Mat.		ø 0.30–1.50	ø 2.00–3.00	ø 6.00–8.00
P1	v_c	70–120	70–120	70–120
	f_z	0.004–0.015	0.015–0.030	0.050–0.120
P2	v_c	60–100	60–100	60–100
	f_z	0.003–0.013	0.013–0.025	0.045–0.100
P3	v_c	40–80	40–80	40–80
	f_z	0.002–0.012	0.012–0.023	0.040–0.090
M1	v_c	40–80	40–80	40–80
	f_z	0.002–0.012	0.008–0.020	0.030–0.080
M2	v_c	30–70	30–70	30–70
	f_z	0.001–0.010	0.010–0.016	0.025–0.070
K1	v_c	120–150	100–150	100–150
	f_z	0.004–0.015	0.015–0.030	0.050–0.120
K2	v_c	100–130	100–130	100–130
	f_z	0.003–0.013	0.013–0.025	0.045–0.100
N1	v_c	150–200	150–200	150–200
	f_z	0.005–0.018	0.018–0.035	0.060–0.150
N2	v_c	150–200	150–200	150–200
	f_z	0.005–0.018	0.018–0.035	0.060–0.150
N3	v_c	150–200	150–200	150–200
	f_z	0.004–0.015	0.015–0.030	0.050–0.120
N4	v_c	150–200	150–200	150–200
	f_z	0.005–0.018	0.018–0.035	0.060–0.150
N5	v_c	150–200	150–200	150–200
	f_z	0.005–0.018	0.018–0.035	0.060–0.150
N6	v_c			
	f_z			
N7	v_c	80–120	80–120	80–120
	f_z	0.005–0.018	0.018–0.035	0.060–0.150
N8	v_c	80–120	80–120	80–120
	f_z	0.005–0.018	0.018–0.035	0.060–0.150
S1	v_c	40–70	40–70	40–70
	f_z	0.002–0.012	0.012–0.023	0.040–0.090
S2	v_c			
	f_z			
H1	v_c			
	f_z			
H2	v_c			
	f_z			
H3	v_c			
	f_z			
O1	v_c			
	f_z			
O2	v_c			
	f_z			
O3	v_c			
	f_z			

These are recommended values that depend on the condition of the machine, fixture, coolant etc., and they may have to be adapted yet.

Art. 43400

Mat.		ø 1.00–2.00	ø 3.00–4.00	ø 5.00–6.00
P1	v_c	80–120	80–120	80–120
	f_z	0.020–0.080	0.080–0.040	0.040–0.090
P2	v_c	80–100	80–100	80–100
	f_z	0.010–0.020	0.020–0.030	0.030–0.040
P3	v_c	50–80	50–80	50–80
	f_z	0.005–0.015	0.015–0.025	0.025–0.035
M1	v_c	60–100	60–100	60–100
	f_z	0.010–0.015	0.015–0.025	0.025–0.035
M2	v_c	40–70	40–70	40–70
	f_z	0.015–0.025	0.025–0.035	0.035–0.045
K1	v_c	100–150	100–150	100–150
	f_z	0.010–0.020	0.020–0.030	0.030–0.040
K2	v_c	60–100	60–100	60–100
	f_z	0.005–0.015	0.015–0.025	0.025–0.035
N1	v_c	150–200	150–200	150–200
	f_z	0.020–0.030	0.030–0.040	0.040–0.050
N2	v_c	150–200	150–200	150–200
	f_z	0.020–0.030	0.030–0.050	0.050–0.060
N3	v_c	130–200	130–200	130–200
	f_z	0.020–0.030	0.030–0.050	0.050–0.060
N4	v_c	60–150	60–150	60–150
	f_z	0.015–0.025	0.025–0.035	0.035–0.045
N5	v_c	100–200	100–200	100–200
	f_z	0.015–0.025	0.025–0.035	0.035–0.045
N6	v_c	80–150	80–150	80–150
	f_z	0.010–0.020	0.020–0.030	0.030–0.040
N7	v_c	80–150	80–150	80–150
	f_z	0.010–0.020	0.020–0.030	0.030–0.040
N8	v_c	80–150	80–150	80–150
	f_z	0.010–0.020	0.020–0.030	0.030–0.040
S1	v_c	40–70	40–70	40–70
	f_z	0.010–0.025	0.020–0.035	0.030–0.045
S2	v_c	20–40	20–40	20–40
	f_z	0.005–0.015	0.015–0.025	0.020–0.035
H1	v_c	20–45	25–40	25–40
	f_z	0.005–0.015	0.015–0.025	0.025–0.035
H2	v_c	20–30	15–25	15–25
	f_z	0.005–0.010	0.010–0.015	0.015–0.020
H3	v_c			
	f_z			
O1	v_c	100–150	70–110	70–110
	f_z	0.010–0.020	0.020–0.030	0.030–0.040
O2	v_c			
	f_z			
O3	v_c			
	f_z			

Art. 71330

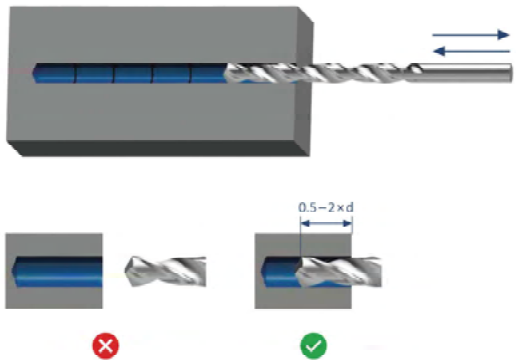
Mat.		ø 0.20–1.00	ø 1.00–2.00	ø 2.00–3.00	d_0	d_1
P1	v_c	40–60	40–60	40–60		
	f_z	0.002–0.013	0.013–0.020	0.020–0.040	1×d	0.2×d
P2	v_c	30–50	30–50	30–50		
	f_z	0.002–0.012	0.012–0.018	0.018–0.025	1×d	0.2×d
P3	v_c					
	f_z					
M1	v_c	25–40	25–40	24–40		
	f_z	0.002–0.011	0.011–0.016	0.016–0.022	1×d	0.1×d
M2	v_c	20–35	20–35	20–35		
	f_z	0.002–0.010	0.010–0.015	0.015–0.020	1×d	0.1×d
K1	v_c	40–60	40–60	40–60		
	f_z	0.002–0.013	0.013–0.020	0.020–0.030	1×d	0.2×d
K2	v_c	35–55	35–55	35–55		
	f_z	0.002–0.012	0.012–0.018	0.018–0.025	1×d	0.2×d
N1	v_c					
	f_z					
N2	v_c	150–200	150–200	150–200		
	f_z	0.003–0.015	0.015–0.030	0.030–0.050	1×d	0.2×d
N3	v_c	150–200	150–200	150–200		
	f_z	0.002–0.013	0.013–0.020	0.020–0.030	1×d	0.1×d
N4	v_c					
	f_z					
N5	v_c	100–130	100–130	100–130		
	f_z	0.003–0.015	0.015–0.030	0.030–0.050	1×d	0.2×d
N6	v_c					
	f_z					
N7	v_c	120–150	120–150	120–150		
	f_z	0.003–0.015	0.015–0.030	0.030–0.050	1×d	0.2×d
N8	v_c	120–150	120–150	120–150		
	f_z	0.002–0.013	0.013–0.020	0.020–0.030	1×d	0.1×d
S1	v_c	80–90	80–90	80–90		
	f_z	0.002–0.012	0.012–0.018	0.018–0.025	1×d	0.2×d
S2	v_c					
	f_z					
H1	v_c					
	f_z					
H2	v_c					
	f_z					
H3	v_c					
	f_z					
O1	v_c	150–200	150–200	150–200		
	f_z	0.003–0.015	0.015–0.030	0.030–0.050	1×d	0.2×d
O2	v_c					
	f_z					
O3	v_c					
	f_z					

These are recommended values that depend on the condition of the machine, fixture, coolant etc., and they may have to be adapted yet.

일반적인 가공 공정법

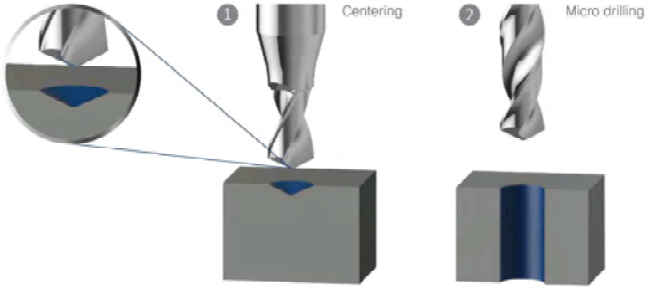
기초 작업 후 드릴링

드릴 사이클 깊이

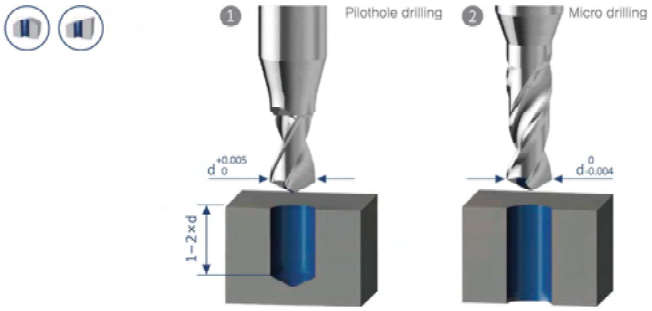


소구경 드릴 가공법

Centering ≤ 6 × d

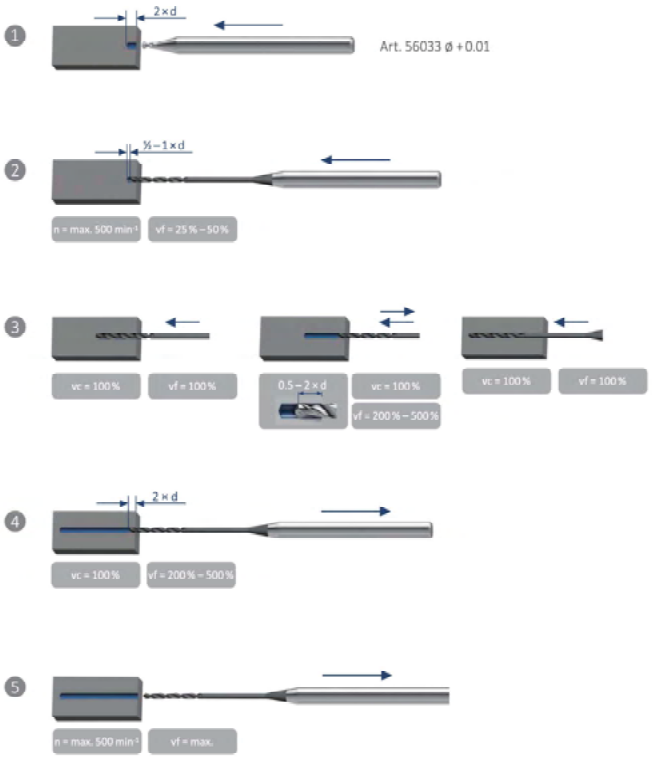


Pilothole drilling ≥ 6 × d

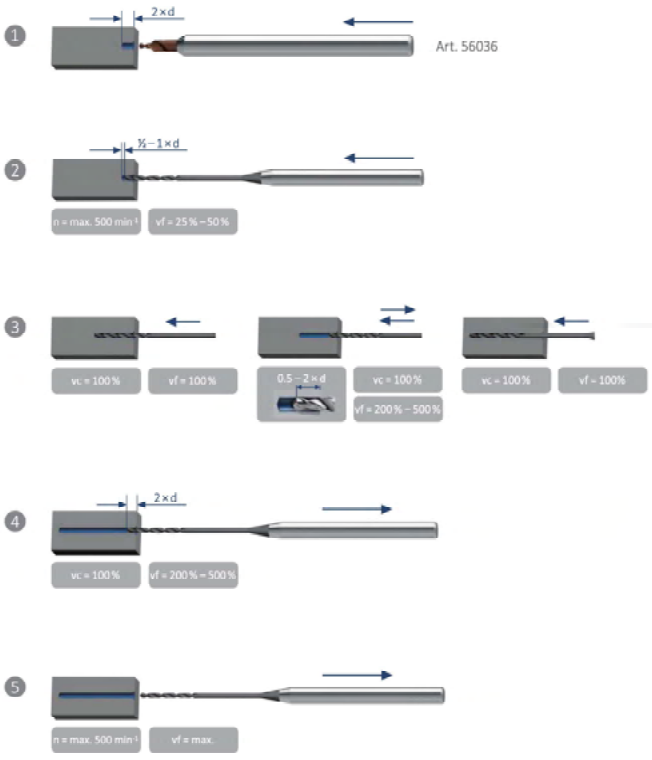


소구경 드릴 가공법

Micro deep hole drilling Art. 50720

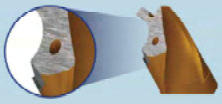
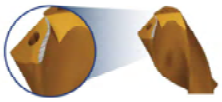


Micro deep hole drilling Art. 50740 / 50760 / 50780



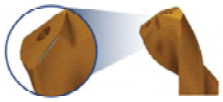
공구 마모에 따른 대책

▲ increase (증가) ▼ reduce (감소) ⚠ verify (확인필요) ● not relevant (관련없음)

Type of wear (마모 상태)	Cutting conditions(가공 조건)						Coolant(절삭유)			Machine and fitting of the tool(설비와 공구 고환 상태)			
	Cutting speed (회전수)	Feed rate (이송 속도)	Entry feed rate (진입시 이송속도)	Exit feed rate (탈출시 이송속도)	Pre-machining (Centering, Pilot hole drilling) 기초가공 체크 (센터, 기초홀 깊이)	Pecking cycle (드릴 사이클 깊이 체크)	Concentration of coolant (절삭유 조합)	Rate of coolant (절삭유 유량)	Coolant pressure (절삭유 압력)	Concentricty (센터링)	Shorter projecting length (드릴의 돌출 단길이)	Workpiece clamping (소재 클램핑 상태)	Stability of the machine (설비의 안정성)
Drill breakage 	⚠	▼	▼	▼	⚠	⚠	●	▲	▲	⚠	⚠	⚠	⚠
Flank wear 	▼	▲	▲	⚠	●	●	▲	▲	▲	⚠	⚠	⚠	⚠
Wear on margin 	▼	●	●	●	⚠	⚠	▲	▲	▲	⚠	●	⚠	⚠
Chipping on chisel edge 	⚠	▲	▲	▼	⚠	●	●	▲	▲	⚠	⚠	⚠	⚠
Chipping on corner 	⚠	▼	▼	▼	⚠	⚠	●	▲	▲	⚠	⚠	⚠	⚠
Wear on main cutting edge 	▲	▲	⚠	⚠	⚠	●	▲	▲	▲	⚠	⚠	⚠	⚠

공구 마모에 따른 대책

increase (증가) ⚠ verify (확인필요)
reduce (감소) ● not relevant (관련없음)

Type of wear (마모 상태)	Cutting conditions(가공 조건)						Coolant(절삭유)			Machine and fitting of the tool(설비와 공구 고환 상태)			
	Cutting speed (회전수)	Feed rate (이송 속도)	Entry feed rate (진입시 이송속도)	Exit feed rate (탈출시 이송속도)	Pre-machining (Centering, Pilot hole drilling) 기초가공 체크 (센터, 기초홀 깊이)	Pecking cycle (드릴 사이클 깊이 체크)	Concentration of coolant (절삭유 조접)	Rate of coolant (절삭유 유량)	Coolant pressure (절삭유 압력)	Concentricty (센터링)	Shorter projecting length (드릴의 돌출 단길이)	Workpiece clamping (소재 클램핑 상태)	Stability of the machine (설비의 안정성)
Chipping main cutti ng edge 	⚠	⬇	⬇	⬇	⚠	⚠	●	●	●	⚠	⚠	⚠	⚠
Chipping on step transiti on 	⚠	⬇	⬇	⬇	⚠	⚠	●	●	●	⚠	⚠	⚠	⚠
Chipping on margin 	●	⚠	⚠	⚠	⚠	⚠	●	●	●	●	●	⚠	⚠
Built-up edge 	⬆	⚠	●	⚠	●	●	⬆	⬆	⬆	⚠	●	●	●

드릴 가공시 가공물 이슈에 따른 대책

increase (증가) ⬆ | reduce (감소) ⬇ | verify (확인필요) ⚠ | not relevant (관련없음) ●

Type of wear (마모 상태)	Cutting conditions(가공 조건)						Coolant(절삭유)			Machine and fitting of the tool(설비와 공구 고정 상태)			
	Cutting speed (회전수)	Feed rate (이송 속도)	Entry feed rate (진입시 이송속도)	Exit feed rate (탈출시 이송속도)	Pre-machining (Centering, Pilot hole drilling) 기초가공 체크 (센터, 기초홀 깊이)	Pecking cycle (드릴 사이클 깊이 체크)	Concentration of coolant (절삭유 조합)	Rate of coolant (절삭유 유량)	Coolant pressure (절삭유 압력)	Concentricty (센터링)	Shorter projecting length (드릴의 돌출 단길이)	Workpiece clamping (소재 클램핑 상태)	Stability of the machine (설비의 안정성)
Diameter too large 	⬇	⬆	⬆	⚠	⚠	⚠	⬇	⚠	⚠	⚠	⚠	⚠	⚠
Misalignment from the center 	●	⬇	⬇	⚠	⚠	●	●	●	●	⚠	⚠	⚠	●
Poor surface quality 	⬆	⬇	●	●	⚠	⚠	⬆	⬆	⬆	⚠	⚠	⚠	⚠
Burr formati on at bore exit 	⚠	●	●	⬇	●	●	●	●	●	●	●	⚠	●
Bore runout 	⚠	⬆	⚠	●	⚠	⚠	●	⚠	⚠	●	⚠	⚠	⚠