SPHINX TOOLS



SPHINX HIGH PRECISION CUTTING TOOLS

VOL. 3



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SPHINX TOOLS the Partner for Maximum Success

SPHINX is not just a leading company in the production and sale of precision cutting tools, but also a trusted partner. Our strong international position today is the result of continuous growth, consistent reinvestment in our production plants, and the personal dedication of our employees. We don't just view customer needs as the motivation for all our innovations, we prioritize them. This is why renowned industrial and medical companies rely on our quality and experience. What sets us apart is our ability to provide unique solutions to complex tasks, contributing significantly to the market success of well-known companies. As the market becomes increasingly demanding, we rise to the challenge, ensuring our customers' needs are always met.

The Highest Quality for the Highest Precision

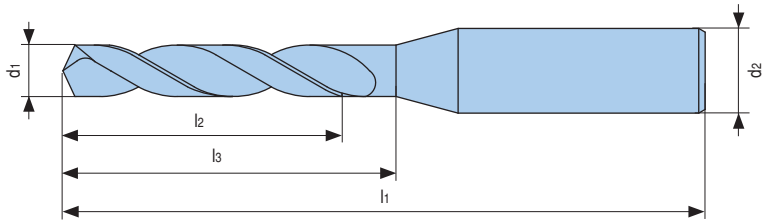
Our quality management system is multi-certified to ISO 9001:2015, EN ISO 13485:2016, and FDA registration: 3010871687. Therefore, SPHINX stands for the highest quality and worldwide service. Thanks to repeatable quality, clear specifications, distinct procedures, and total traceability, we fully meet customers' requirements.

Our procedures are secured through various process stages, including:

- Initial Sample Test Report (ISTR)
- Potential Failure Mode and Effects Analysis (P-FMEA)
- Customer-specific tests and specifications

For medical technology, we perform cleaning and packaging in accordance with Good Manufacturing Practices (GMP) in an approved clean room of category 8, ISO 14644-1.

Drill Dimensions



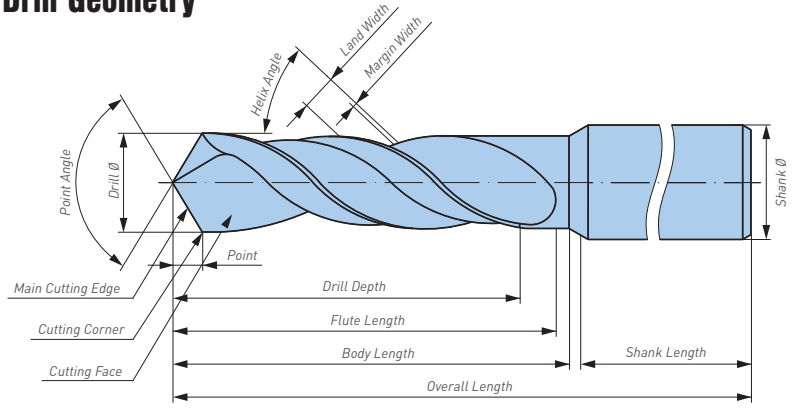
d_1 = Drill Diameter
d_2 = Shank Diameter

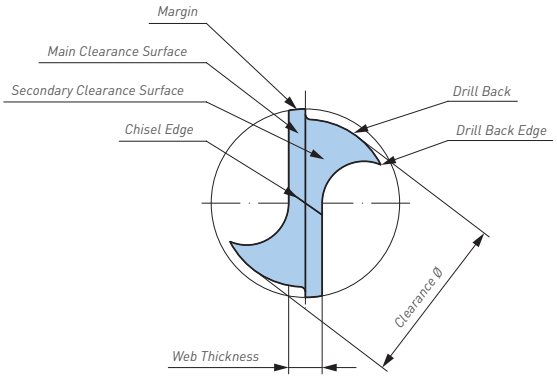
l_1 = Overall Length
l_2 = Drill Depth
l_3 = Body Length

Drill Material

HSS	Carbide
High Speed Steel w/ 8% Cobalt	Solid Carbide

Drill Geometry

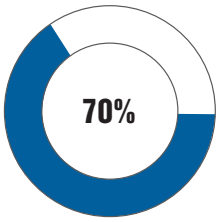




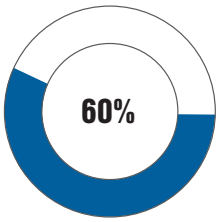
130°	20°	2xd	H7-H9
Drill Point Angle	Helix Angle	Length-to-Dia. Ratio	Achievable Hole Tolerance

RECOMMENDATION FOR COATING

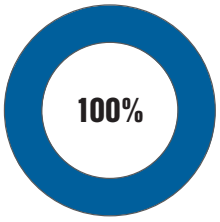
All the non-coated tools can also be offered with coating.
Consult BIG DAISHOWA engineering to recommend the optimum coat for your application.



... representing the choice of the coat in relation to your application!



... cost saving as a result of a longer tool-life!



Up to 100 % higher performance!



Material Grade		Strength/Hardness (N/mm2)	Material
P	P1	≤700	**Mild, Low-Carbon Steel, Steel Casting** 1018, 1020, 1551, A36
	P2	≤1000	**Low- to Medium-Carbon Alloy Steel** 4140, 4340, 8620
	P3	≤1400	**High-Carbon Alloy Steel, Tool Steel** 1060, 52100, M2, A2, H13, O1
M	M1	–	**Ferritic / Martensitic Stainless Steel** 403, 410, 416, 430, 440C
	M2	–	**Austenitic Stainless Steel** 201, 202, 304, 316, 17-4 PH
K	K1	–	**Grey Cast Iron** Class 20, 30
	K2	–	**Ductile Cast Iron** Ductile/Nodular/Chilled
N	N1	≤350	**Malleable / Wrought Aluminum Alloy** 2024, 6061, 7075
	N2	≤300	**Cast Aluminum Alloy (< 10% Silicon)** 2024, 6061, 7075
	N3	≤450	**Cast Aluminum Alloy (≥ 10% Silicon)** A356.2, A390, A4032
	N4	–	**Magnesium, Magnesium Alloy** AE44, AJ62A, WE43, AZ31B, AZ91, Magnox
	N5	–	**Copper Nickel Alloy, Brass, Bronze** C26000, C36000, C70600, C95400
	N6	–	**Copper Forging Alloy** C18150, C18200, C15000, C17200
	N7	–	**Silver**
	N8	–	**Gold**
S	S1	>450	**Titanium, Titanium Alloy**
	S2	–	**Nickel / Copper-Based Super Alloy** Inconel, Monel
H	H1	1700–2000	**Hardened Steels (50 – 55 HRC)** Pre-Hardened / Heat-Treated Steel, Tool Steel
	H2	2000–2250	**Hardened Steels (55 – 60 HRC)** Pre-Hardened / Heat-Treated Steel, Tool Steel
	H3	>2250	**Hardened Steels (> 60 HRC)** Pre-Hardened / Heat-Treated Steel, Tool Steel
O	O1	–	**Thermoplastic, Thermosetting Plastic** Acrylic, ABS, Nylon, Polycarbonate
	O2	–	**Fiber-Reinforced Plastic** Fiberglass, Carbon Fiber
	O3	–	**Graphite**

Drilling and Reaming

	Article	Diameter Range	Increments	Cutting Length	Point Angle	Helix Angle	
NC Spotting Drill							
	50806	.50–6.00	.10		60°	20°	
	50809	.50–3.00	.10		90°	20°	
	50808	.50–3.00	.10		90°	20°	
	50810	2.00–20.00	1.00		90°	20°	
	50811	2.00–12.00	1.00		90°	20°	
	50812	2.00–20.00	1.00		123°	20°	
	50813	2.00–10.00	1.00		123°	20°	
	50814	2.00–20.00	1.00		142°	20°	
	50815	2.00–10.00	1.00		142°	20°	
	50818	1.60–12.00	.20		142°/90°	20°	
Pilot Drill							
	56005	.10–1.50	.01	2–4 × Ø	130°	20°	
	56033	.03–2.99	.01	2 × Ø	130°	30°	
	56036	.30–6.00	.05	2 × Ø	140°/90°	30°	
	16004	.10–1.50	.05	2–3 × Ø	130°	20°	
Micro Drill							
	50695	.20–1.50	.01	6 × Ø	118°	30°	
	50699	.05–2.00	.01	6 × Ø	118°	30°	

	Material	Workpiece Material *							Application *	Page
		P	M	K	N	S	H	O		
	Carbide	✓	✓	✓	✓	•		✓		14
	Carbide	✓	✓	✓	✓	•		✓		16
	Carbide, TiAlSiN	✓	✓	✓	✓	✓	✓	✓		15
	Carbide	✓	✓	✓	✓	•		✓		17
	Carbide; TiAlSiN	✓	✓	✓	✓	•	✓	✓		18
	Carbide	✓	✓	✓	✓	•		✓		19
	Carbide; TiAlSiN	✓	✓	✓	✓	•	✓	✓		20
	Carbide	✓	✓	✓	✓	•		✓		21
	Carbide; TiAlSiN	✓	✓	✓	✓	•	✓	✓		22
	Carbide	✓	✓	✓	✓	•		✓		23
	Carbide	✓	•	✓	✓	✓		✓		24
	Carbide	✓	✓	✓	✓	✓		✓		26
	Carbide; AlCrN	✓	✓	✓	✓	✓	•	•		30
	HSS	✓	•	✓	•			•		32
	Carbide	✓	•	✓	✓			•		34
	Carbide	✓	•	✓	✓			•		36

* S. 142+143
p. 142+143

✓ outstanding • suitable

Drilling and Reaming

	Article	Diameter Range	Increments	Cutting Length	Point Angle	Helix Angle	
Micro Drill							
	51200	.03–3.00	.01	6×Ø	130°	35°	
	51201	.20–3.00	.01	6×Ø	130°	35°	
	50621	.15–3.00	.01	12×Ø	130°	25°	
	50622	.20–3.00	.01	12×Ø	130°	25°	
	12604	.05–3.175	.01	DIN 1899-A	118°	25°	
Micro Deep Hole Drill							
	50720	.20–2.00	.05	20×Ø	129°	30°	
	50740	.40–1.50	.05	40×Ø	126°	30°	
	50760	.40–1.50	.05	60×Ø	126°	30°	
	50780	.40–1.50	.05	80×Ø	126°	30°	
High-Performance Drill Nirox							
	51609	.30–3.00	.05	9×Ø	140°	28°	
High-Performance Drill Phoenix TC2							
	52903	1.00–10.00	.05	3×Ø	140°	30°	
	52906	1.00–10.00	.05	6×Ø	140°	30°	
	52909	1.00–10.00	.10	9×Ø	140°	30°	
	52912	1.00–10.00	.10	12×Ø	137°	30°	
	52916	1.00–10.00	.10	16×Ø	137°	30°	
	52920	3.00–10.00	1.00	20×Ø	137°	30°	
	52930	3.00–10.00	1.00	30×Ø	137°	30°	

Material	Workpiece Material *							Application *	Page
	P	M	K	N	S	H	O		
Carbide	✓	✓	✓	✓	✓		•		40
Carbide; TiAlN	✓	✓	✓	✓	✓	•	•		40
Carbide	✓	•	✓	✓			•		48
Carbide; TiAlN	✓	•	✓	✓	•	•	•		48
HSS	✓	•	✓	•			•		56
Carbide; Mi-Nova	✓	•	✓	✓	•	•	✓		58
Carbide; Mi-Nova	✓	•	✓	✓	•	•	✓		60
Carbide; Mi-Nova	✓	•	✓	✓	•	•	✓		61
Carbide; Mi-Nova	✓	•	✓	✓	•	•	✓		61
Carbide; TiAlSiN	✓	✓	•	•	✓	•	✓		62
Carbide; AlTiCrN+S	✓	✓	✓	✓	✓	•	•		64
Carbide; AlTiCrN+S	✓	✓	✓	✓	✓	•	•		64
Carbide; AlTiCrN+S	✓	✓	✓	✓	✓	•	•		64
Carbide; AlCrTiN	✓	✓	✓	✓	✓	•	•		68
Carbide; AlCrTiN	✓	✓	•	✓	✓	•	•		68
Carbide; AlCrTiN	•	✓	•	✓	✓	•	•		71
Carbide; AlCrTiN	•	✓	•	✓	✓	•	•		71

* S. 142+143
p. 142+143

✓ outstanding

• suitable

Drilling and Reaming

	Article	Diameter Range	Increments	Cutting Length	Point Angle	Helix Angle	
High-Performance Drill Phoenix							
	50938	1.00–12.70	.10	3×Ø	140°	30°	
	50940	1.00–12.70	.05	6×Ø	140°	30°	
	50941	.50–3.00	.10	6×Ø	140°	30°	
High-Performance Drill Quadro							
	52100	3.00–19.50	.50	6×Ø	140°	0°	
	52200	3.00–20.00	.50	12×Ø	140°	0°	
	52150	4.00–20.00	.50	6×Ø	140°	15°	
Twist Drill							
	50950	3.00–20.00	.10	DIN 6537	140°	30°	
	50830	.30–20.00	.10	DIN 6539	118°	35°	
	50838	.30–6.00	.05	3–8×Ø	118°	30°	
	50820	.70–14.00	.10	DIN 338	130°	35°–15°	
Drill Reamer							
	50840	2.00–14.00	.10	DIN 6539	118°	35°	
	55654	1.00–14.00	.10	DIN 6539	140°	35°	
	55338	1.00–14.00	.10	DIN 338	140°	35°	
	55652	.20–2.99	.01	5×Ø	140°	35°	
Reamer							
	58000	.987–6.018	.01	–8×Ø		10°	
	58500	.987–6.018	.01	–8×Ø		10°	

	Material	Workpiece Material *							Application *	Page
		P	M	K	N	S	H	O		
	Carbide; AlCrN	✓	✓	✓	•	•	•			72
	Carbide; TiAlN	✓	✓	✓	•	•	•			76
	Carbide; TiAlN	✓	✓	✓	•	•	•			79
	Carbide			✓	✓			•		80
	Carbide			✓	✓			•		80
	Carbide; TiAlN	✓		✓	✓		•			82
	Carbide; TiAlN	✓	•	✓	•	•	•	•		84
	Carbide	✓	✓	•	✓	•		✓		86
	Carbide	✓	✓	•	✓	•		✓		88
	Carbide	✓		✓	•					90
	Carbide	•	•	•	✓	•				92
	Carbide	✓	•	✓	•	•				94
	Carbide	✓	•	✓	•	•				94
	Carbide	✓	•	✓	•	•		•		98
	Carbide	✓	✓	✓	✓	•				102
	Carbide	✓	✓	✓	✓	•				103

* S. 142+143
p. 142+143

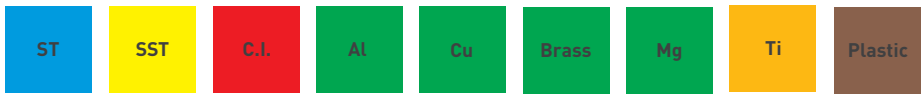
✓ outstanding • suitable

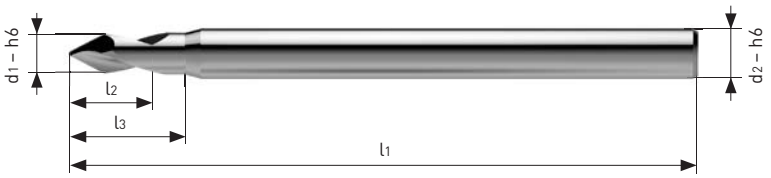
NC Spotting

Art. 50806









Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
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50806-0060	.60	.0236	1.50	2.00	38	3.00
50806-0070	.70	.0276	1.50	2.00	38	3.00
50806-0080	.80	.0315	2.00	2.50	38	3.00
50806-0090	.90	.0354	2.00	2.50	38	3.00
50806-0100	1.00	.0394	2.00	2.50	38	3.00
50806-0110	1.10	.0433	2.50	3.50	38	3.00
50806-0120	1.20	.0472	2.50	3.50	38	3.00
50806-0130	1.30	.0512	2.50	3.50	38	3.00
50806-0140	1.40	.0551	3.00	4.00	38	3.00
50806-0150	1.50	.0591	3.00	4.00	38	3.00
50806-0160	1.60	.0630	3.00	4.00	38	3.00
50806-0170	1.70	.0670	4.00	5.00	38	3.00
50806-0180	1.80	.0709	4.00	5.00	38	3.00
50806-0190	1.90	.0748	4.00	5.00	38	3.00
50806-0200	2.00	.0787	5.00	6.00	38	3.00
50806-0210	2.10	.0827	5.00	6.00	38	3.00
50806-0220	2.20	.0866	5.00	6.00	38	3.00
50806-0230	2.30	.0906	6.00	7.00	38	3.00
50806-0240	2.40	.0945	6.00	7.00	38	3.00
50806-0250	2.50	.0984	6.00	7.00	38	3.00
50806-0260	2.60	.1024	7.00	8.00	38	3.00
50806-0270	2.70	.1063	7.00	8.00	38	3.00
50806-0280	2.80	.1102	7.00	8.00	38	3.00
50806-0290	2.90	.1142	7.00	8.00	38	3.00
50806-0300	3.00	.1181	9.50	9.50	38	3.00
50806-0400	4.00	.1575	10.50	10.50	40	4.00
50806-0500	5.00	.1969	16.00	16.00	50	5.00
50806-0600	6.00	.2362	16.00	16.00	50	6.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 140

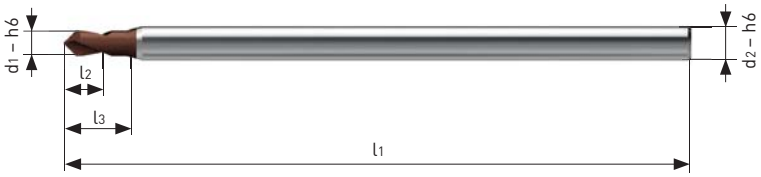
NC Spotting

Art. 50808









Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
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50808-0060	.60	.0236	1.20	1.80	38	2.00
50808-0070	.70	.0276	1.40	2.00	38	2.00
50808-0080	.80	.0315	1.60	2.20	38	2.00
50808-0090	.90	.0354	1.80	2.40	38	2.00
50808-0100	1.00	.0394	2.00	2.60	38	2.00
50808-0110	1.10	.0433	2.20	2.80	38	2.00
50808-0120	1.20	.0472	2.40	3.00	38	2.00
50808-0130	1.30	.0512	2.60	3.20	38	2.00
50808-0140	1.40	.0551	2.80	3.40	38	2.00
50808-0150	1.50	.0591	3.00	3.80	38	2.00
50808-0160	1.60	.0630	3.20	4.20	38	2.00
50808-0170	1.70	.0670	3.40	4.40	38	2.00
50808-0180	1.80	.0709	3.60	4.60	38	2.00
50808-0190	1.90	.0748	3.80	4.80	38	2.00
50808-0200	2.00	.0787	5.00	6.00	38	3.00
50808-0250	2.50	.0984	6.50	8.00	38	3.00
50808-0300	3.00	.1181	7.50	7.50	38	3.00

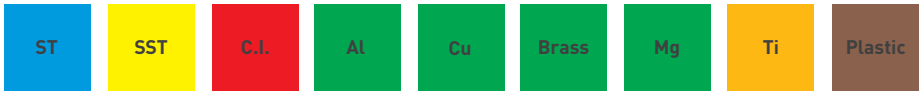
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 140

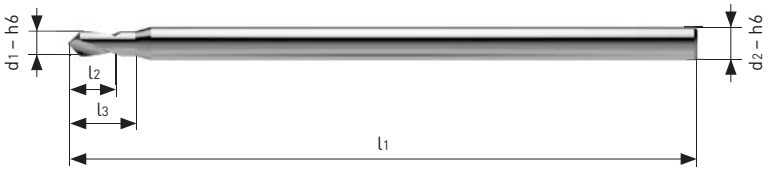
NC Spotting

Art. 50809









Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
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50809-0060	.60	.0236	1.20	1.80	38	2.00
50809-0070	.70	.0276	1.40	2.00	38	2.00
50809-0080	.80	.0315	1.60	2.20	38	2.00
50809-0090	.90	.0354	1.80	2.40	38	2.00
50809-0100	1.00	.0394	2.00	2.60	38	2.00
50809-0110	1.10	.0433	2.20	2.80	38	2.00
50809-0120	1.20	.0472	2.40	3.00	38	2.00
50809-0130	1.30	.0512	2.60	3.20	38	2.00
50809-0140	1.40	.0551	2.80	3.40	38	2.00
50809-0150	1.50	.0591	3.00	3.80	38	2.00
50809-0160	1.60	.0630	3.20	4.20	38	2.00
50809-0170	1.70	.0670	3.40	4.40	38	2.00
50809-0180	1.80	.0709	3.60	4.60	38	2.00
50809-0190	1.90	.0748	3.80	4.80	38	2.00
50809-0200	2.00	.0787	5.00	6.00	38	3.00
50809-0250	2.50	.0984	6.50	8.00	38	3.00
50809-0300	3.00	.1181	7.50	7.50	38	3.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 140

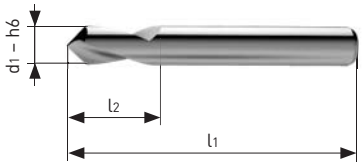
NC Spotting

Art. 50810







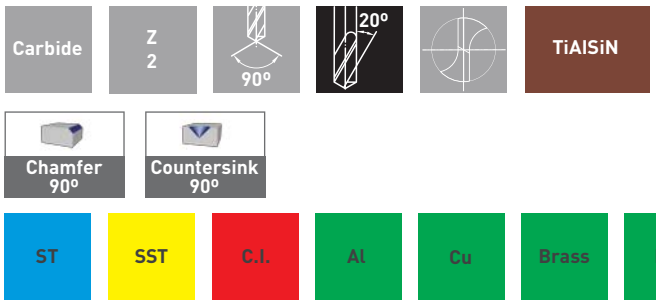


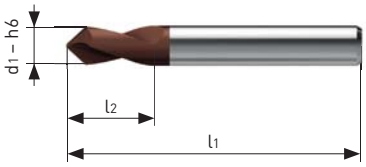
Catalog Number	d_1	d_1 (in.)	l_2	l_1
50810-0020	2.00	.0787	8.50	25
50810-0030	3.00	.1181	9.50	32
50810-0040	4.00	.1575	10.50	40
50810-0050	5.00	.1969	16.00	50
50810-0060	6.00	.2362	16.00	50
50810-0080	8.00	.3150	20.00	60
50810-0100	10.00	.3937	22.00	70
50810-0120	12.00	.4724	22.00	70
50810-0140	14.00	.5512	25.00	75
50810-0160	16.00	.6299	25.00	75
50810-0200	20.00	.7874	35.00	75

- All dimensions are millimeters unless otherwise noted
- TiAlSiN coated equivalent, Art. 50811; see pg. 18
- For cutting data see pg. 141

NC Spotting

Art. 50811





Catalog Number	d_1	d_1 (in.)	l_2	l_1
50811-0200	2.00	.0787	8.50	25
50811-0300	3.00	.1181	9.50	32
50811-0400	4.00	.1575	10.50	40
50811-0500	5.00	.1969	16.00	50
50811-0600	6.00	.2362	16.00	50
50811-0800	8.00	.3150	20.00	60
50811-1000	10.00	.3937	22.00	70
50811-1200	12.00	.4724	22.00	70

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 141

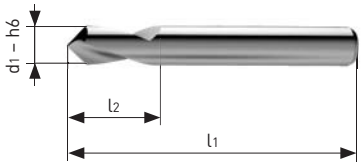
NC Spotting

Art. 50812









Catalog Number	d_1	d_1 (in.)	l_2	l_1
50812-0020	2.00	.0787	8.50	25
50812-0030	3.00	.1181	9.50	32
50812-0040	4.00	.1575	10.50	40
50812-0050	5.00	.1969	16.00	50
50812-0060	6.00	.2362	16.00	50
50812-0080	8.00	.3150	20.00	60
50812-0100	10.00	.3937	22.00	70
50812-0120	12.00	.4724	22.00	70
50812-0140	14.00	.5512	25.00	75
50812-0160	16.00	.6299	25.00	75
50812-0200	20.00	.7874	35.00	75

- All dimensions are millimeters unless otherwise noted
- TiAlSiN coated equivalent, Art. 50813; see pg. 20
- For cutting data see pg. 141

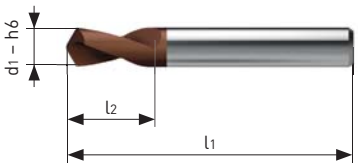
NC Spotting

Art. 50813









Catalog Number	d_1	d_1 (in.)	l_2	l_1
50813-0200	2.00	.0787	8.50	25
50813-0300	3.00	.1181	9.50	32
50813-0400	4.00	.1575	10.50	40
50813-0500	5.00	.1969	16.00	50
50813-0600	6.00	.2362	16.00	50
50813-0800	8.00	.3150	20.00	60
50813-1000	10.00	.3937	22.00	70

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 141

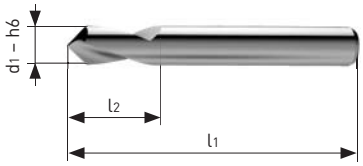
NC Spotting

Art. 50814









Catalog Number	d_1	d_1 (in.)	l_2	l_1
50814-0020	2.00	.0787	8.50	25
50814-0030	3.00	.1181	9.50	32
50814-0040	4.00	.1575	10.50	40
50814-0050	5.00	.1969	16.00	50
50814-0060	6.00	.2362	16.00	50
50814-0080	8.00	.3150	20.00	60
50814-0100	10.00	.3937	22.00	70
50814-0120	12.00	.4724	22.00	70
50814-0140	14.00	.5512	25.00	75
50814-0160	16.00	.6299	25.00	75
50814-0200	20.00	.7874	35.00	75

- All dimensions are millimeters unless otherwise noted
- TiAlSiN coated equivalent, Art. 50815; see pg. 22
- For cutting data see pg. 141

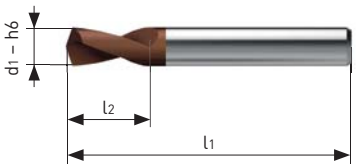
NC Spotting

Art. 50815









Catalog Number	d_1	d_1 (in.)	l_1
50815-0020	2.00	.0787	25
50815-0030	3.00	.1181	32
50815-0040	4.00	.1575	40
50815-0050	5.00	.1969	50
50815-0060	6.00	.2362	50
50815-0080	8.00	.3150	60
50815-0100	10.00	.3937	70

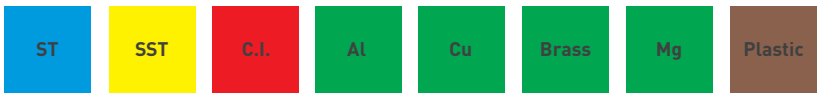
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 141

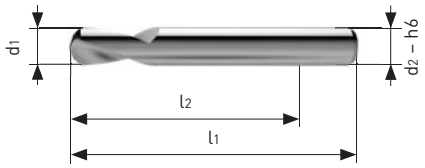
Spotting & Chamfering

Art. 50818









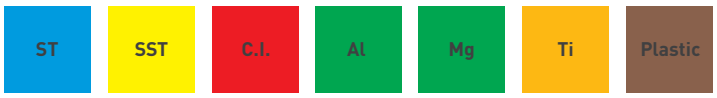
Catalog Number	d_1	d_1 (in.)	l_2	l_1	d_2
50818-0160	1.60	.0630	9.50	32	3.00
50818-0200	2.00	.0787	9.50	32	3.00
50818-0250	2.50	.0984	10.50	40	4.00
50818-0300	3.00	.1181	10.50	40	4.00
50818-0330	3.30	.1299	16.00	50	5.00
50818-0400	4.00	.1575	16.00	50	5.00
50818-0420	4.20	.1654	16.00	50	6.00
50818-0500	5.00	.1969	20.00	60	8.00
50818-0600	6.00	.2362	20.00	60	8.00
50818-0680	6.80	.2677	22.00	70	10.00
50818-0700	7.00	.2756	22.00	70	10.00
50818-0800	8.00	.3150	22.00	70	10.00
50818-0850	8.50	.3346	22.00	70	12.00
50818-0900	9.00	.3543	22.00	70	12.00
50818-1000	10.00	.3937	22.00	70	12.00
50818-1020	10.20	.4016	25.00	75	14.00
50818-1100	11.00	.4331	25.00	75	14.00
50818-1200	12.00	.4724	25.00	75	16.00

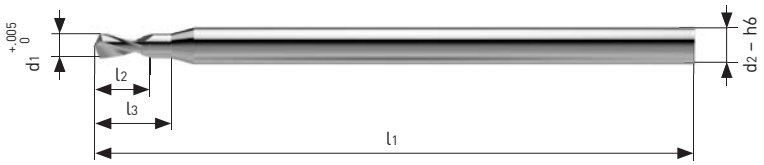
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 141

Art. 56005







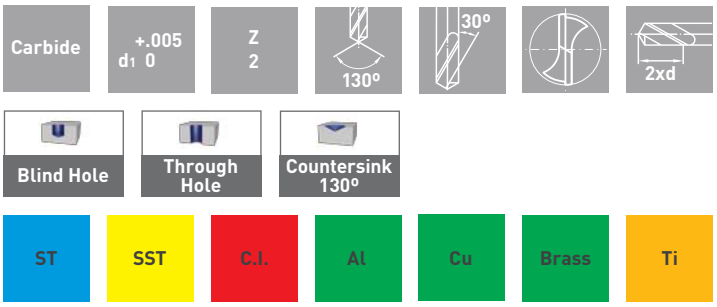


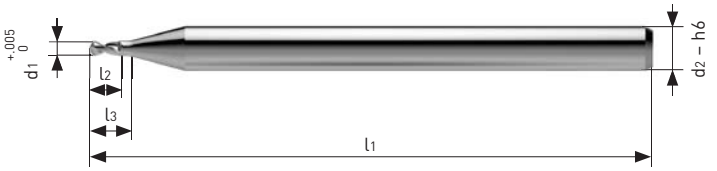
Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
56005-0010	.10	.0039	.40	.60	25	1.50
56005-0015	.15	.0059	.40	.60	25	1.50
56005-0020	.20	.0079	.60	.90	25	1.50
56005-0025	.25	.0098	.60	.90	25	1.50
56005-0030	.30	.0118	.90	1.20	25	1.50
56005-0035	.35	.0138	.90	1.20	25	1.50
56005-0040	.40	.0157	.90	1.60	25	1.50
56005-0045	.45	.0177	.90	1.60	25	1.50
56005-0050	.50	.0197	1.00	1.80	25	1.50
56005-0055	.55	.0217	1.00	1.80	25	1.50
56005-0060	.60	.0236	1.20	2.00	25	1.50
56005-0065	.65	.0256	1.20	2.00	25	1.50
56005-0070	.70	.0276	1.50	2.50	25	1.50
56005-0075	.75	.0295	1.50	2.50	25	1.50
56005-0080	.80	.0315	1.50	2.50	25	1.50
56005-0085	.85	.0335	1.50	2.50	25	1.50
56005-0090	.90	.0354	1.60	2.60	25	1.50
56005-0095	.95	.0374	1.60	2.60	25	1.50
56005-0100	1.00	.0394	2.00	3.20	25	1.50
56005-0105	1.05	.0413	2.00	3.20	25	1.50
56005-0110	1.10	.0433	2.30	3.50	25	1.50
56005-0115	1.15	.0453	2.30	3.50	25	1.50
56005-0120	1.20	.0472	2.30	3.50	25	1.50
56005-0125	1.25	.0492	2.30	3.50	25	1.50
56005-0130	1.30	.0512	2.70	4.20	25	1.50
56005-0135	1.35	.0531	2.70	4.20	25	1.50
56005-0140	1.40	.0551	2.70	4.20	25	1.50
56005-0145	1.45	.0571	2.70	4.20	25	1.50
56005-0150	1.50	.0591	3.00	4.20	25	1.50

- All dimensions are millimeters unless otherwise noted
- Packaged in quantities of 10 pieces
- For cutting data see pg. 142



Art. 56033





Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
56033-0003	.03	.0012	.15	.30	38	3.00
56033-0004	.04	.0016	.15	.30	38	3.00
56033-0005	.05	.0020	.20	.40	38	3.00
56033-0006	.06	.0024	.20	.40	38	3.00
56033-0007	.07	.0028	.25	.45	38	3.00
56033-0008	.08	.0031	.25	.45	38	3.00
56033-0009	.09	.0035	.30	.50	38	3.00
56033-0010	.10	.0039	.35	.55	38	3.00
56033-0011	.11	.0043	.35	.55	38	3.00
56033-0012	.12	.0047	.35	.55	38	3.00
56033-0013	.13	.0051	.40	.60	38	3.00
56033-0014	.14	.0055	.40	.60	38	3.00
56033-0015	.15	.0059	.40	.60	38	3.00
56033-0016	.16	.0063	.40	.60	38	3.00
56033-0017	.17	.0067	.50	.70	38	3.00
56033-0018	.18	.0071	.50	.70	38	3.00
56033-0019	.19	.0075	.50	.70	38	3.00
56033-0020	.20	.0079	.55	.75	38	3.00
56033-0021	.21	.0083	.55	.75	38	3.00
56033-0022	.22	.0087	.60	.80	38	3.00
56033-0023	.23	.0091	.60	.80	38	3.00
56033-0024	.24	.0094	.60	.80	38	3.00
56033-0025	.25	.0098	.70	.90	38	3.00
56033-0026	.26	.0102	.70	.90	38	3.00
56033-0027	.27	.0106	.70	.90	38	3.00
56033-0028	.28	.0110	.80	1.00	38	3.00
56033-0029	.29	.0114	.80	1.00	38	3.00
56033-0030	.30	.0118	.90	1.20	38	3.00
56033-0031	.31	.0122	.90	1.20	38	3.00
56033-0032	.32	.0126	.90	1.20	38	3.00

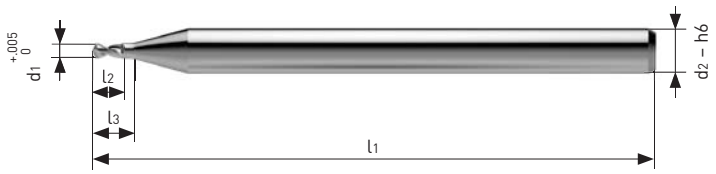
Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
56033-0033	.33	.0130	.90	1.20	38	3.00
56033-0034	.34	.0134	.90	1.35	38	3.00
56033-0035	.35	.0138	.90	1.35	38	3.00
56033-0036	.36	.0142	.95	1.35	38	3.00
56033-0037	.37	.0146	.95	1.35	38	3.00
56033-0038	.38	.0150	.95	1.50	38	3.00
56033-0039	.39	.0154	.95	1.50	38	3.00
56033-0040	.40	.0157	.80	1.60	38	3.00
56033-0041	.41	.0161	.82	1.60	38	3.00
56033-0042	.42	.0165	.84	1.60	38	3.00
56033-0043	.43	.0169	.86	1.60	38	3.00
56033-0044	.44	.0173	.88	1.60	38	3.00
56033-0045	.45	.0177	.90	1.60	38	3.00
56033-0046	.46	.0181	.92	1.70	38	3.00
56033-0047	.47	.0185	.94	1.70	38	3.00
56033-0048	.48	.0189	.96	1.70	38	3.00
56033-0049	.49	.0193	.98	1.70	38	3.00
56033-0050	.50	.0197	1.00	1.70	38	3.00
56033-0051	.51	.0201	1.02	1.80	38	3.00
56033-0052	.52	.0205	1.04	1.80	38	3.00
56033-0053	.53	.0209	1.06	1.80	38	3.00
56033-0054	.54	.0213	1.08	1.80	38	3.00
56033-0055	.55	.0217	1.10	1.80	38	3.00
56033-0056	.56	.0220	1.12	1.90	38	3.00
56033-0057	.57	.0224	1.14	1.90	38	3.00
56033-0058	.58	.0228	1.16	1.90	38	3.00
56033-0059	.59	.0232	1.18	1.90	38	3.00
56033-0060	.60	.0236	1.20	1.90	38	3.00
56033-0061	.61	.0240	1.22	2.00	38	3.00
56033-0062	.62	.0244	1.24	2.00	38	3.00

Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
56033-0063	.63	.0248	1.26	2.00	38	3.00
56033-0064	.64	.0252	1.28	2.00	38	3.00
56033-0065	.65	.0256	1.30	2.00	38	3.00
56033-0066	.66	.0260	1.32	2.10	38	3.00
56033-0067	.67	.0264	1.34	2.10	38	3.00
56033-0068	.68	.0268	1.36	2.10	38	3.00
56033-0069	.69	.0272	1.38	2.10	38	3.00
56033-0070	.70	.0276	1.40	2.10	38	3.00
56033-0071	.71	.0280	1.42	2.20	38	3.00
56033-0072	.72	.0283	1.44	2.20	38	3.00
56033-0073	.73	.0287	1.46	2.20	38	3.00
56033-0074	.74	.0291	1.48	2.20	38	3.00
56033-0075	.75	.0295	1.50	2.20	38	3.00
56033-0076	.76	.0299	1.52	2.30	38	3.00
56033-0077	.77	.0303	1.54	2.30	38	3.00
56033-0078	.78	.0307	1.56	2.30	38	3.00
56033-0079	.79	.0311	1.58	2.30	38	3.00
56033-0080	.80	.0315	1.60	2.30	38	3.00
56033-0081	.81	.0319	1.62	2.40	38	3.00
56033-0082	.82	.0323	1.64	2.40	38	3.00
56033-0083	.83	.0327	1.66	2.40	38	3.00
56033-0084	.84	.0331	1.68	2.40	38	3.00
56033-0085	.85	.0335	1.70	2.40	38	3.00
56033-0086	.86	.0339	1.72	2.50	38	3.00
56033-0087	.87	.0343	1.74	2.50	38	3.00
56033-0088	.88	.0346	1.76	2.50	38	3.00
56033-0089	.89	.0350	1.78	2.50	38	3.00
56033-0090	.90	.0354	1.80	2.50	38	3.00
56033-0091	.91	.0358	1.82	2.60	38	3.00
56033-0092	.92	.0362	1.84	2.60	38	3.00
56033-0093	.93	.0366	1.86	2.60	38	3.00
56033-0094	.94	.0370	1.88	2.60	38	3.00
56033-0095	.95	.0374	1.90	2.60	38	3.00
56033-0096	.96	.0378	1.92	2.70	38	3.00
56033-0097	.97	.0382	1.94	2.70	38	3.00
56033-0098	.98	.0386	1.96	2.70	38	3.00
56033-0099	.99	.0390	1.98	2.70	38	3.00
56033-0100	1.00	.0394	2.00	2.70	38	3.00
56033-0101	1.01	.0398	2.02	3.50	38	3.00
56033-0102	1.02	.0402	2.04	3.50	38	3.00
56033-0103	1.03	.0406	2.06	3.50	38	3.00
56033-0104	1.04	.0409	2.08	3.50	38	3.00
56033-0105	1.05	.0413	2.10	3.50	38	3.00
56033-0106	1.06	.0417	2.12	3.60	38	3.00
56033-0107	1.07	.0421	2.14	3.60	38	3.00

Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
56033-0108	1.08	.0425	2.16	3.60	38	3.00
56033-0109	1.09	.0429	2.18	3.60	38	3.00
56033-0110	1.10	.0433	2.20	3.60	38	3.00
56033-0111	1.11	.0437	2.22	3.70	38	3.00
56033-0112	1.12	.0441	2.24	3.70	38	3.00
56033-0113	1.13	.0445	2.26	3.70	38	3.00
56033-0114	1.14	.0449	2.28	3.70	38	3.00
56033-0115	1.15	.0453	2.30	3.70	38	3.00
56033-0116	1.16	.0457	2.32	3.80	38	3.00
56033-0117	1.17	.0461	2.34	3.80	38	3.00
56033-0118	1.18	.0465	2.36	3.80	38	3.00
56033-0119	1.19	.0469	2.38	3.80	38	3.00
56033-0120	1.20	.0472	2.40	3.80	38	3.00
56033-0121	1.21	.0476	2.42	4.20	38	3.00
56033-0122	1.22	.0480	2.44	4.20	38	3.00
56033-0123	1.23	.0484	2.46	4.20	38	3.00
56033-0124	1.24	.0488	2.48	4.20	38	3.00
56033-0125	1.25	.0492	2.50	4.20	38	3.00
56033-0126	1.26	.0496	2.52	4.30	38	3.00
56033-0127	1.27	.0500	2.54	4.30	38	3.00
56033-0128	1.28	.0504	2.56	4.30	38	3.00
56033-0129	1.29	.0508	2.58	4.30	38	3.00
56033-0130	1.30	.0512	2.60	4.30	38	3.00
56033-0131	1.31	.0516	2.62	4.40	38	3.00
56033-0132	1.32	.0520	2.64	4.40	38	3.00
56033-0133	1.33	.0524	2.66	4.40	38	3.00
56033-0134	1.34	.0528	2.68	4.40	38	3.00
56033-0135	1.35	.0531	2.70	4.40	38	3.00
56033-0136	1.36	.0535	2.72	4.50	38	3.00
56033-0137	1.37	.0539	2.74	4.50	38	3.00
56033-0138	1.38	.0543	2.76	4.50	38	3.00
56033-0139	1.39	.0547	2.78	4.50	38	3.00
56033-0140	1.40	.0551	2.80	4.50	38	3.00
56033-0141	1.41	.0555	2.82	4.60	38	3.00
56033-0142	1.42	.0559	2.84	4.60	38	3.00
56033-0143	1.43	.0563	2.86	4.60	38	3.00
56033-0144	1.44	.0567	2.88	4.60	38	3.00
56033-0145	1.45	.0571	2.90	4.60	38	3.00
56033-0146	1.46	.0575	2.92	4.70	38	3.00
56033-0147	1.47	.0579	2.94	4.70	38	3.00
56033-0148	1.48	.0583	2.96	4.70	38	3.00
56033-0149	1.49	.0587	2.98	4.70	38	3.00
56033-0150	1.50	.0591	3.00	4.70	38	3.00
56033-0151	1.51	.0594	3.02	5.10	38	3.00
56033-0152	1.52	.0598	3.04	5.10	38	3.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 142

Art. 56033 Cont.



Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
56033-0153	1.53	.0602	3.06	5.10	38	3.00
56033-0154	1.54	.0606	3.08	5.10	38	3.00
56033-0155	1.55	.0610	3.10	5.10	38	3.00
56033-0156	1.56	.0614	3.12	5.20	38	3.00
56033-0157	1.57	.0618	3.14	5.20	38	3.00
56033-0158	1.58	.0622	3.16	5.20	38	3.00
56033-0159	1.59	.0626	3.18	5.20	38	3.00
56033-0160	1.60	.0630	3.20	5.20	38	3.00
56033-0161	1.61	.0634	3.22	5.30	38	3.00
56033-0162	1.62	.0638	3.24	5.30	38	3.00
56033-0163	1.63	.0642	3.26	5.30	38	3.00
56033-0164	1.64	.0646	3.28	5.30	38	3.00
56033-0165	1.65	.0650	3.30	5.30	38	3.00
56033-0166	1.66	.0654	3.32	5.40	38	3.00
56033-0167	1.67	.0657	3.34	5.40	38	3.00
56033-0168	1.68	.0661	3.36	5.40	38	3.00
56033-0169	1.69	.0665	3.38	5.40	38	3.00
56033-0170	1.70	.0669	3.40	5.40	38	3.00
56033-0171	1.71	.0673	3.42	5.50	38	3.00
56033-0172	1.72	.0677	3.44	5.50	38	3.00
56033-0173	1.73	.0681	3.46	5.50	38	3.00
56033-0174	1.74	.0685	3.48	5.50	38	3.00
56033-0175	1.75	.0689	3.50	5.50	38	3.00
56033-0176	1.76	.0693	3.52	5.60	38	3.00
56033-0177	1.77	.0697	3.54	5.60	38	3.00
56033-0178	1.78	.0701	3.56	5.60	38	3.00
56033-0179	1.79	.0705	3.58	5.60	38	3.00
56033-0180	1.80	.0709	3.60	5.60	38	3.00
56033-0181	1.81	.0713	3.62	5.70	38	3.00
56033-0182	1.82	.0717	3.64	5.70	38	3.00
56033-0183	1.83	.0720	3.66	5.70	38	3.00
56033-0184	1.84	.0724	3.68	5.70	38	3.00
56033-0185	1.85	.0728	3.70	5.70	38	3.00
56033-0186	1.86	.0732	3.72	5.80	38	3.00
56033-0187	1.87	.0736	3.74	5.80	38	3.00
56033-0188	1.88	.0740	3.76	5.80	38	3.00
56033-0189	1.89	.0744	3.78	5.80	38	3.00
56033-0190	1.90	.0748	3.80	5.80	38	3.00
56033-0191	1.91	.0752	3.82	5.90	38	3.00
56033-0192	1.92	.0756	3.84	5.90	38	3.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
56033-0193	1.93	.0760	3.86	5.90	38	3.00
56033-0194	1.94	.0764	3.88	5.90	38	3.00
56033-0195	1.95	.0768	3.90	5.90	38	3.00
56033-0196	1.96	.0772	3.92	6.00	38	3.00
56033-0197	1.97	.0776	3.94	6.00	38	3.00
56033-0198	1.98	.0780	3.96	6.00	38	3.00
56033-0199	1.99	.0783	3.98	6.00	38	3.00
56033-0200	2.00	.0787	4.00	6.00	38	3.00
56033-0201	2.01	.0791	4.02	6.10	38	3.00
56033-0202	2.02	.0795	4.04	6.10	38	3.00
56033-0203	2.03	.0799	4.06	6.10	38	3.00
56033-0204	2.04	.0803	4.08	6.10	38	3.00
56033-0205	2.05	.0807	4.10	6.10	38	3.00
56033-0206	2.06	.0811	4.12	6.20	38	3.00
56033-0207	2.07	.0815	4.14	6.20	38	3.00
56033-0208	2.08	.0819	4.16	6.20	38	3.00
56033-0209	2.09	.0823	4.18	6.20	38	3.00
56033-0210	2.10	.0827	4.20	6.20	38	3.00
56033-0211	2.11	.0831	4.22	6.30	38	3.00
56033-0212	2.12	.0835	4.24	6.30	38	3.00
56033-0213	2.13	.0839	4.26	6.30	38	3.00
56033-0214	2.14	.0843	4.28	6.30	38	3.00
56033-0215	2.15	.0846	4.30	6.30	38	3.00
56033-0216	2.16	.0850	4.32	6.40	38	3.00
56033-0217	2.17	.0854	4.34	6.40	38	3.00
56033-0218	2.18	.0858	4.36	6.40	38	3.00
56033-0219	2.19	.0862	4.38	6.40	38	3.00
56033-0220	2.20	.0866	4.40	6.40	38	3.00
56033-0221	2.21	.0870	4.42	6.50	38	3.00
56033-0222	2.22	.0874	4.44	6.50	38	3.00
56033-0223	2.23	.0878	4.46	6.50	38	3.00
56033-0224	2.24	.0882	4.48	6.50	38	3.00
56033-0225	2.25	.0886	4.50	6.50	38	3.00
56033-0226	2.26	.0890	4.52	6.60	38	3.00
56033-0227	2.27	.0894	4.54	6.60	38	3.00
56033-0228	2.28	.0898	4.56	6.60	38	3.00
56033-0229	2.29	.0902	4.58	6.60	38	3.00
56033-0230	2.30	.0906	4.60	6.60	38	3.00
56033-0231	2.31	.0909	4.62	6.70	38	3.00
56033-0232	2.32	.0913	4.64	6.70	38	3.00

Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
56033-0233	2.33	.0917	4.66	6.70	38	3.00
56033-0234	2.34	.0921	4.68	6.70	38	3.00
56033-0235	2.35	.0925	4.70	6.70	38	3.00
56033-0236	2.36	.0929	4.72	6.80	38	3.00
56033-0237	2.37	.0933	4.74	6.80	38	3.00
56033-0238	2.38	.0937	4.76	6.80	38	3.00
56033-0239	2.39	.0941	4.78	6.80	38	3.00
56033-0240	2.40	.0945	4.80	6.80	38	3.00
56033-0241	2.41	.0949	4.82	6.90	38	3.00
56033-0242	2.42	.0953	4.84	6.90	38	3.00
56033-0243	2.43	.0957	4.86	6.90	38	3.00
56033-0244	2.44	.0961	4.88	6.90	38	3.00
56033-0245	2.45	.0965	4.90	6.90	38	3.00
56033-0246	2.46	.0969	4.92	7.00	38	3.00
56033-0247	2.47	.0972	4.94	7.00	38	3.00
56033-0248	2.48	.0976	4.96	7.00	38	3.00
56033-0249	2.49	.0980	4.98	7.00	38	3.00
56033-0250	2.50	.0984	5.00	7.00	38	3.00
56033-0251	2.51	.0988	5.02	7.10	38	3.00
56033-0252	2.52	.0992	5.04	7.10	38	3.00
56033-0253	2.53	.0996	5.06	7.10	38	3.00
56033-0254	2.54	.1000	5.08	7.10	38	3.00
56033-0255	2.55	.1004	5.10	7.10	38	3.00
56033-0256	2.56	.1008	5.12	7.20	38	3.00
56033-0257	2.57	.1012	5.14	7.20	38	3.00
56033-0258	2.58	.1016	5.16	7.20	38	3.00
56033-0259	2.59	.1020	5.18	7.20	38	3.00
56033-0260	2.60	.1024	5.20	7.20	38	3.00
56033-0261	2.61	.1028	5.22	7.30	38	3.00
56033-0262	2.62	.1031	5.24	7.30	38	3.00
56033-0263	2.63	.1035	5.26	7.30	38	3.00
56033-0264	2.64	.1039	5.28	7.30	38	3.00
56033-0265	2.65	.1043	5.30	7.30	38	3.00
56033-0266	2.66	.1047	5.32	7.40	38	3.00

Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
56033-0267	2.67	.1051	5.34	7.40	38	3.00
56033-0268	2.68	.1055	5.36	7.40	38	3.00
56033-0269	2.69	.1059	5.38	7.40	38	3.00
56033-0270	2.70	.1063	5.40	7.40	38	3.00
56033-0271	2.71	.1067	5.42	7.50	38	3.00
56033-0272	2.72	.1071	5.44	7.50	38	3.00
56033-0273	2.73	.1075	5.46	7.50	38	3.00
56033-0274	2.74	.1079	5.48	7.50	38	3.00
56033-0275	2.75	.1083	5.50	7.50	38	3.00
56033-0276	2.76	.1087	5.52	7.60	38	3.00
56033-0277	2.77	.1091	5.54	7.60	38	3.00
56033-0278	2.78	.1094	5.56	7.60	38	3.00
56033-0279	2.79	.1098	5.58	7.60	38	3.00
56033-0280	2.80	.1102	5.60	7.60	38	3.00
56033-0281	2.81	.1106	5.62	7.70	38	3.00
56033-0282	2.82	.1110	5.64	7.70	38	3.00
56033-0283	2.83	.1114	5.66	7.70	38	3.00
56033-0284	2.84	.1118	5.68	7.70	38	3.00
56033-0285	2.85	.1122	5.70	7.70	38	3.00
56033-0286	2.86	.1126	5.72	7.80	38	3.00
56033-0287	2.87	.1130	5.74	7.80	38	3.00
56033-0288	2.88	.1134	5.76	7.80	38	3.00
56033-0289	2.89	.1138	5.78	7.80	38	3.00
56033-0290	2.90	.1142	5.80	7.80	38	3.00
56033-0291	2.91	.1146	5.82	7.90	38	3.00
56033-0292	2.92	.1150	5.84	7.90	38	3.00
56033-0293	2.93	.1154	5.86	7.90	38	3.00
56033-0294	2.94	.1157	5.88	7.90	38	3.00
56033-0295	2.95	.1161	5.90	7.90	38	3.00
56033-0296	2.96	.1165	5.92	8.00	38	3.00
56033-0297	2.97	.1169	5.94	8.00	38	3.00
56033-0298	2.98	.1173	5.96	8.00	38	3.00
56033-0299	2.99	.1177	5.98	8.00	38	3.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 142

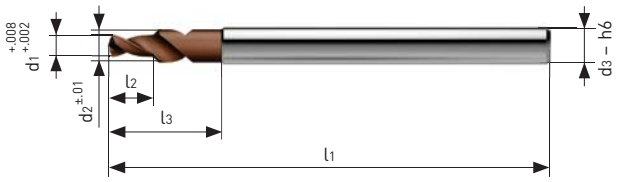
Step

Art. 56036

Carbide | +.008 d1 +.002 | Z 2 | 90° 140° | 30° | AlCrN

Blind Hole | Through Hole Countersink

ST | SST | C.I. | Al | Brass | Mg | Ti | HST



Catalog Number	d1	d1 (in.)	d2	l2	l3	l1	d3
56036-0030	.30	.0118	.70	.60	2.50	50	4.00
56036-0035	.35	.0138	.70	.70	2.50	50	4.00
56036-0040	.40	.0157	1.00	.80	3.00	50	4.00
56036-0050	.50	.0197	1.20	1.00	3.50	50	4.00
56036-0055	.55	.0217	1.30	1.10	3.50	50	4.00
56036-0060	.60	.0236	1.40	1.20	4.30	50	4.00
56036-0065	.65	.0256	1.50	1.30	4.30	50	4.00
56036-0070	.70	.0276	1.80	1.40	5.30	50	4.00
56036-0075	.75	.0295	1.80	1.50	5.30	50	4.00
56036-0080	.80	.0315	2.00	1.60	6.00	50	4.00
56036-0085	.85	.0335	2.00	1.70	6.00	50	4.00
56036-0090	.90	.0354	2.00	1.80	6.00	50	4.00
56036-0095	.95	.0374	2.00	1.90	6.00	50	4.00
56036-0100	1.00	.0394	2.20	2.00	7.00	50	4.00
56036-0105	1.05	.0413	2.20	2.10	7.00	50	4.00
56036-0110	1.10	.0433	2.20	2.20	7.00	50	4.00
56036-0115	1.15	.0453	2.20	2.30	7.00	50	4.00
56036-0120	1.20	.0472	2.20	2.40	7.00	50	4.00
56036-0125	1.25	.0492	2.50	2.50	8.00	50	4.00
56036-0130	1.30	.0512	2.50	2.60	8.00	50	4.00
56036-0135	1.35	.0531	2.50	2.70	8.00	50	4.00
56036-0140	1.40	.0551	2.50	2.80	8.00	50	4.00
56036-0145	1.45	.0571	2.70	2.90	9.00	50	4.00
56036-0150	1.50	.0591	2.70	3.00	9.00	50	4.00
56036-0155	1.55	.061	2.70	3.10	9.00	50	4.00
56036-0160	1.60	.063	2.70	3.20	9.00	50	4.00
56036-0165	1.65	.065	2.80	3.30	9.50	50	4.00
56036-0170	1.70	.0669	2.80	3.40	9.50	50	4.00
56036-0175	1.75	.0689	2.80	3.50	9.50	50	4.00
56036-0180	1.80	.0709	2.80	3.60	9.50	50	4.00

Catalog Number	d1	d1 (in.)	d2	l2	l3	l1	d3
56036-0185	1.85	.0728	3.00	3.70	10.20	50	4.00
56036-0190	1.90	.0748	3.00	3.80	10.20	50	4.00
56036-0195	1.95	.0768	3.00	3.90	10.20	50	4.00
56036-0200	2.00	.0787	3.00	4.00	10.20	50	4.00
56036-0205	2.05	.0807	3.20	4.10	11.00	50	4.00
56036-0210	2.10	.0827	3.20	4.20	11.00	50	4.00
56036-0215	2.15	.0846	3.20	4.30	11.00	50	4.00
56036-0220	2.20	.0866	3.20	4.40	11.00	50	4.00
56036-0225	2.25	.0886	3.40	4.50	12.00	50	4.00
56036-0230	2.30	.0906	3.40	4.60	12.00	50	4.00
56036-0235	2.35	.0925	3.40	4.70	12.00	50	4.00
56036-0240	2.40	.0945	3.40	4.80	12.00	50	4.00
56036-0245	2.45	.0965	3.60	4.90	12.70	50	4.00
56036-0250	2.50	.0984	3.60	5.00	12.70	50	4.00
56036-0255	2.55	.1004	3.60	5.10	12.70	50	4.00
56036-0260	2.60	.1024	3.60	5.20	12.70	50	4.00
56036-0265	2.65	.1043	3.80	5.30	13.50	50	4.00
56036-0270	2.70	.1063	3.80	5.40	13.50	50	4.00
56036-0275	2.75	.1083	3.80	5.50	13.50	50	4.00
56036-0280	2.80	.1102	3.80	5.60	13.50	50	4.00
56036-0285	2.85	.1122	4.00	5.70	14.10	50	4.00
56036-0290	2.90	.1142	4.00	5.80	14.10	50	4.00
56036-0295	2.95	.1161	4.00	5.90	14.10	50	4.00
56036-0300	3.00	.1181	4.00	6.00	14.10	50	4.00
56036-0305	3.05	.1201	4.60	6.10	14.00	55	6.00
56036-0310	3.10	.122	4.60	6.20	14.50	55	6.00
56036-0315	3.15	.124	4.60	6.30	14.50	55	6.00
56036-0320	3.20	.126	4.60	6.40	14.50	55	6.00
56036-0325	3.25	.128	4.80	6.50	14.50	55	6.00
56036-0330	3.30	.1299	4.80	6.60	14.50	55	6.00

Catalog Number	d_1	d_1 (in.)	d_2	l_2	l_3	l_1	d_3
56036-0335	3.35	.1319	4.80	6.70	15.00	55	6.00
56036-0340	3.40	.1339	4.80	6.80	15.00	55	6.00
56036-0345	3.45	.1358	5.00	6.90	15.00	55	6.00
56036-0350	3.50	.1378	5.00	7.00	15.00	55	6.00
56036-0355	3.55	.1398	5.00	7.10	15.50	55	6.00
56036-0360	3.60	.1417	5.00	7.20	15.50	55	6.00
56036-0365	3.65	.1437	5.20	7.30	15.50	55	6.00
56036-0370	3.70	.1457	5.20	7.40	15.50	55	6.00
56036-0375	3.75	.1476	5.20	7.50	16.00	55	6.00
56036-0380	3.80	.1496	5.20	7.60	16.00	55	6.00
56036-0385	3.85	.1516	5.40	7.70	16.00	55	6.00
56036-0390	3.90	.1535	5.40	7.80	16.00	55	6.00
56036-0395	3.95	.1555	5.40	7.90	16.50	55	6.00
56036-0400	4.00	.1575	5.40	8.00	16.50	55	6.00
56036-0405	4.05	.1594	5.60	8.10	16.50	55	6.00
56036-0410	4.10	.1614	5.60	8.20	16.50	55	6.00
56036-0415	4.15	.1634	5.60	8.30	17.00	55	6.00
56036-0420	4.20	.1654	5.60	8.40	17.00	55	6.00
56036-0425	4.25	.1673	5.80	8.50	17.00	64	8.00
56036-0430	4.30	.1693	5.80	8.60	17.00	64	8.00
56036-0435	4.35	.1713	5.80	8.70	17.50	64	8.00
56036-0440	4.40	.1732	5.80	8.80	17.50	64	8.00
56036-0445	4.45	.1752	6.00	8.90	17.50	64	8.00
56036-0450	4.50	.1772	6.00	9.00	18.00	64	8.00
56036-0455	4.55	.1791	6.00	9.10	18.00	64	8.00
56036-0460	4.60	.1811	6.00	9.20	18.00	64	8.00
56036-0465	4.65	.1831	6.20	9.30	18.50	64	8.00

Catalog Number	d_1	d_1 (in.)	d_2	l_2	l_3	l_1	d_3
56036-0470	4.70	.185	6.20	9.40	18.50	64	8.00
56036-0475	4.75	.187	6.20	9.50	18.50	64	8.00
56036-0480	4.80	.189	6.20	9.60	19.00	64	8.00
56036-0485	4.85	.1909	6.40	9.70	19.00	64	8.00
56036-0490	4.90	.1929	6.40	9.80	19.00	64	8.00
56036-0495	4.95	.1949	6.40	9.90	19.50	64	8.00
56036-0500	5.00	.1969	6.40	10.00	19.50	64	8.00
56036-0505	5.05	.1988	6.60	10.10	19.50	64	8.00
56036-0510	5.10	.2008	6.60	10.20	20.00	64	8.00
56036-0515	5.15	.2028	6.60	10.30	20.00	64	8.00
56036-0520	5.20	.2047	6.60	10.40	20.00	64	8.00
56036-0525	5.25	.2067	6.80	10.50	20.50	64	8.00
56036-0530	5.30	.2087	6.80	10.60	20.50	64	8.00
56036-0535	5.35	.2106	6.80	10.70	20.50	64	8.00
56036-0540	5.40	.2126	6.80	10.80	21.00	64	8.00
56036-0545	5.45	.2146	7.00	10.90	21.00	64	8.00
56036-0550	5.50	.2165	7.00	11.00	21.00	64	8.00
56036-0555	5.55	.2185	7.00	11.10	21.50	64	8.00
56036-0560	5.60	.2205	7.00	11.20	21.50	64	8.00
56036-0565	5.65	.2224	7.20	11.30	21.50	64	8.00
56036-0570	5.70	.2244	7.20	11.40	22.00	64	8.00
56036-0575	5.75	.2264	7.20	11.50	22.00	64	8.00
56036-0580	5.80	.2283	7.20	11.60	22.00	64	8.00
56036-0585	5.85	.2303	7.40	11.70	22.50	64	8.00
56036-0590	5.90	.2323	7.40	11.80	22.50	64	8.00
56036-0595	5.95	.2343	7.40	11.90	22.50	64	8.00
56036-0600	6.00	.2362	7.40	12.00	23.00	64	8.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 143

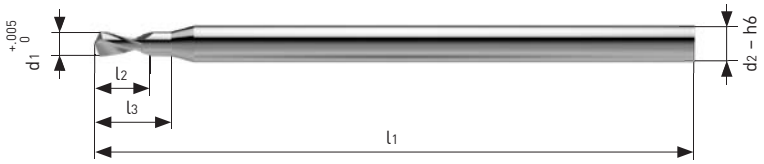
Spirec

Art. 16004





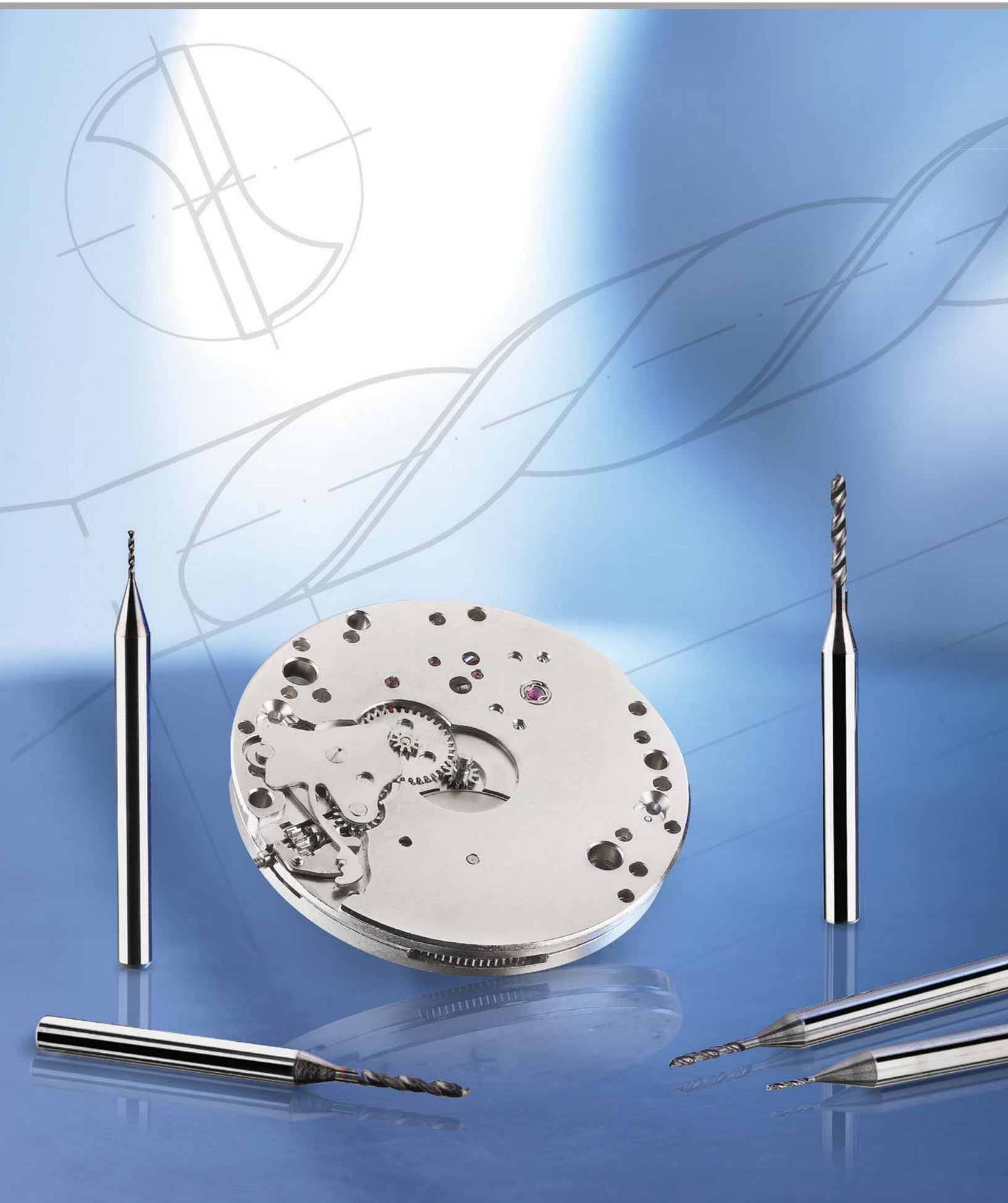




Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
16004-0010	.10	.0039	.40	.60	25	1.50
16004-0015	.15	.0059	.40	.60	25	1.50
16004-0020	.20	.0079	.60	.90	25	1.50
16004-0025	.25	.0098	.60	.90	25	1.50
16004-0030	.30	.0118	.90	1.20	25	1.50
16004-0035	.35	.0138	.90	1.20	25	1.50
16004-0040	.40	.0157	.90	1.60	25	1.50
16004-0045	.45	.0177	.90	1.60	25	1.50
16004-0050	.50	.0197	1.00	1.80	25	1.50
16004-0055	.55	.0217	1.00	1.80	25	1.50
16004-0060	.60	.0236	1.20	2.00	25	1.50
16004-0065	.65	.0256	1.20	2.00	25	1.50
16004-0070	.70	.0276	1.50	2.50	25	1.50
16004-0075	.75	.0295	1.50	2.50	25	1.50
16004-0080	.80	.0315	1.50	2.50	25	1.50
16004-0085	.85	.0335	1.50	2.50	25	1.50
16004-0090	.90	.0354	1.60	2.60	25	1.50
16004-0095	.95	.0374	1.60	2.60	25	1.50
16004-0100	1.00	.0394	2.00	3.20	25	1.50
16004-0105	1.05	.0413	2.00	3.20	25	1.50
16004-0110	1.10	.0433	2.30	3.50	25	1.50
16004-0115	1.15	.0453	2.30	3.50	25	1.50
16004-0120	1.20	.0472	2.30	3.50	25	1.50
16004-0125	1.25	.0492	2.30	3.50	25	1.50
16004-0130	1.30	.0512	2.70	4.20	25	1.50
16004-0135	1.35	.0531	2.70	4.20	25	1.50
16004-0140	1.40	.0551	2.70	4.20	25	1.50
16004-0145	1.45	.0571	2.70	4.20	25	1.50
16004-0150	1.50	.0591	3.00	4.20	25	1.50

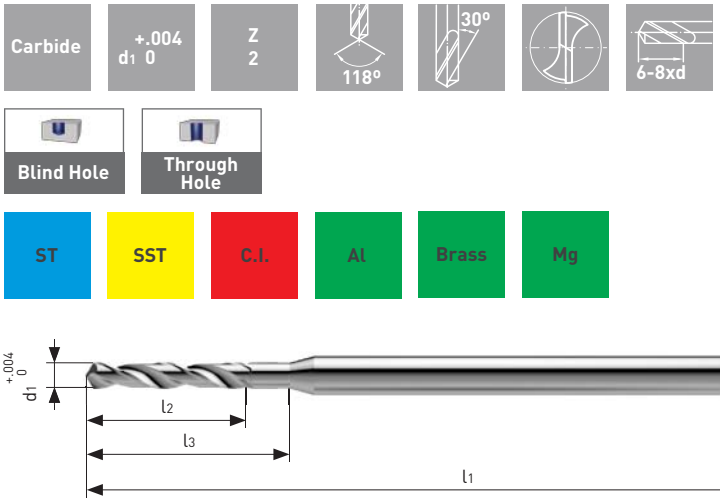
- All dimensions are millimeters unless otherwise noted
- Packaged in quantities of 10 pieces
- For cutting data see pg. 143

SPHINX TOOLS



Spirec-Plus

Art. 50695



Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50695-0020	.20	.0079	1.50	1.80	30	1.00
50695-0021	.21	.0083	1.50	1.80	30	1.00
50695-0022	.22	.0087	1.50	1.80	30	1.00
50695-0023	.23	.0091	1.50	1.80	30	1.00
50695-0024	.24	.0094	1.50	1.80	30	1.00
50695-0025	.25	.0098	1.90	2.20	30	1.00
50695-0026	.26	.0102	1.90	2.20	30	1.00
50695-0027	.27	.0106	1.90	2.20	30	1.00
50695-0028	.28	.0110	1.90	2.20	30	1.00
50695-0029	.29	.0114	1.90	2.20	30	1.00
50695-0030	.30	.0118	1.90	2.20	30	1.00
50695-0031	.31	.0122	2.40	2.80	30	1.00
50695-0032	.32	.0126	2.40	2.80	30	1.00
50695-0033	.33	.0130	2.40	2.80	30	1.00
50695-0034	.34	.0134	2.40	2.80	30	1.00
50695-0035	.35	.0138	2.40	2.80	30	1.00
50695-0036	.36	.0142	2.40	2.80	30	1.00
50695-0037	.37	.0146	2.40	2.80	30	1.00
50695-0038	.38	.0150	2.40	2.80	30	1.00
50695-0039	.39	.0154	2.70	3.60	30	1.00
50695-0040	.40	.0157	2.70	3.60	30	1.00
50695-0041	.41	.0161	2.70	3.60	30	1.00
50695-0042	.42	.0165	2.70	3.60	30	1.00
50695-0043	.43	.0169	2.70	3.60	30	1.00
50695-0044	.44	.0173	2.70	3.60	30	1.00
50695-0045	.45	.0177	2.70	3.60	30	1.00
50695-0046	.46	.0181	2.70	3.60	30	1.00
50695-0047	.47	.0185	2.70	3.60	30	1.00
50695-0048	.48	.0189	2.70	3.60	30	1.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50695-0049	.49	.0193	3.20	4.00	30	1.00
50695-0050	.50	.0197	3.20	4.00	30	1.00
50695-0051	.51	.0201	3.20	4.00	30	1.00
50695-0052	.52	.0205	3.20	4.00	30	1.00
50695-0053	.53	.0209	3.20	4.00	30	1.00
50695-0054	.54	.0213	3.60	4.50	30	1.00
50695-0055	.55	.0217	3.60	4.50	30	1.00
50695-0056	.56	.0220	3.60	4.50	30	1.00
50695-0057	.57	.0224	3.60	4.50	30	1.00
50695-0058	.58	.0228	3.60	4.50	30	1.00
50695-0059	.59	.0232	3.60	4.50	30	1.00
50695-0060	.60	.0236	3.60	4.50	30	1.00
50695-0061	.61	.0240	3.90	5.00	30	1.00
50695-0062	.62	.0244	3.90	5.00	30	1.00
50695-0063	.63	.0248	3.90	5.00	30	1.00
50695-0064	.64	.0252	3.90	5.00	30	1.00
50695-0065	.65	.0256	3.90	5.00	30	1.00
50695-0066	.66	.0260	3.90	5.00	30	1.00
50695-0067	.67	.0264	3.90	5.00	30	1.00
50695-0068	.68	.0268	4.50	5.60	30	1.00
50695-0069	.69	.0272	4.50	5.60	30	1.00
50695-0070	.70	.0276	4.50	5.60	30	1.00
50695-0071	.71	.0280	4.50	5.60	30	1.00
50695-0072	.72	.0283	4.50	5.60	30	1.00
50695-0073	.73	.0287	4.50	5.60	30	1.00
50695-0074	.74	.0291	4.50	5.60	30	1.00
50695-0075	.75	.0295	4.50	5.60	30	1.00
50695-0076	.76	.0299	5.00	6.30	30	1.00
50695-0077	.77	.0303	5.00	6.30	30	1.00

Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
50695-0078	.78	.0307	5.00	6.30	30	1.00
50695-0079	.79	.0311	5.00	6.30	30	1.00
50695-0080	.80	.0315	5.00	6.30	30	1.50
50695-0081	.81	.0319	5.00	6.30	30	1.50
50695-0082	.82	.0323	5.00	6.30	30	1.50
50695-0083	.83	.0327	5.00	6.30	30	1.50
50695-0084	.84	.0331	5.00	6.30	30	1.50
50695-0085	.85	.0335	5.00	6.30	30	1.50
50695-0086	.86	.0339	5.70	7.10	30	1.50
50695-0087	.87	.0343	5.70	7.10	30	1.50
50695-0088	.88	.0346	5.70	7.10	30	1.50
50695-0089	.89	.0350	5.70	7.10	30	1.50
50695-0090	.90	.0354	5.70	7.10	30	1.50
50695-0091	.91	.0358	5.70	7.10	30	1.50
50695-0092	.92	.0362	5.70	7.10	30	1.50
50695-0093	.93	.0366	5.70	7.10	30	1.50
50695-0094	.94	.0370	5.70	7.10	30	1.50
50695-0095	.95	.0374	5.70	7.10	30	1.50
50695-0096	.96	.0378	6.50	8.00	30	1.50
50695-0097	.97	.0382	6.50	8.00	30	1.50
50695-0098	.98	.0386	6.50	8.00	30	1.50
50695-0099	.99	.0390	6.50	8.00	30	1.50
50695-0100	1.00	.0394	6.50	8.00	30	1.50
50695-0101	1.01	.0398	6.50	8.00	30	1.50
50695-0102	1.02	.0402	6.50	8.00	30	1.50
50695-0103	1.03	.0406	6.50	8.00	30	1.50
50695-0104	1.04	.0409	6.50	8.00	30	1.50
50695-0105	1.05	.0413	6.50	8.00	30	1.50
50695-0106	1.06	.0417	7.30	9.00	30	1.50
50695-0107	1.07	.0421	7.30	9.00	30	1.50
50695-0108	1.08	.0425	7.30	9.00	30	1.50
50695-0109	1.09	.0429	7.30	9.00	30	1.50
50695-0110	1.10	.0433	7.30	9.00	30	1.50
50695-0111	1.11	.0437	7.30	9.00	30	1.50
50695-0112	1.12	.0441	7.30	9.00	30	1.50
50695-0113	1.13	.0445	7.30	9.00	30	1.50
50695-0114	1.14	.0449	7.30	9.00	30	1.50

Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
50695-0115	1.15	.0453	7.30	9.00	30	1.50
50695-0116	1.16	.0457	8.20	10.00	30	1.50
50695-0117	1.17	.0461	8.20	10.00	30	1.50
50695-0118	1.18	.0465	8.20	10.00	30	1.50
50695-0119	1.19	.0469	8.20	10.00	30	1.50
50695-0120	1.20	.0472	8.20	10.00	30	1.50
50695-0121	1.21	.0476	8.20	10.00	30	1.50
50695-0122	1.22	.0480	8.20	10.00	30	1.50
50695-0123	1.23	.0484	8.20	10.00	30	1.50
50695-0124	1.24	.0488	8.20	10.00	30	1.50
50695-0125	1.25	.0492	8.20	10.00	30	1.50
50695-0126	1.26	.0496	8.20	10.00	30	1.50
50695-0127	1.27	.0500	8.20	10.00	30	1.50
50695-0128	1.28	.0504	8.20	10.00	30	1.50
50695-0129	1.29	.0508	8.20	10.00	30	1.50
50695-0130	1.30	.0512	8.20	10.00	30	1.50
50695-0131	1.31	.0516	9.20	11.20	30	1.50
50695-0132	1.32	.0520	9.20	11.20	30	1.50
50695-0133	1.33	.0524	9.20	11.20	30	1.50
50695-0134	1.34	.0528	9.20	11.20	30	1.50
50695-0135	1.35	.0531	9.20	11.20	30	1.50
50695-0136	1.36	.0535	9.20	11.20	30	1.50
50695-0137	1.37	.0539	9.20	11.20	30	1.50
50695-0138	1.38	.0543	9.20	11.20	30	1.50
50695-0139	1.39	.0547	9.20	11.20	30	1.50
50695-0140	1.40	.0551	9.20	11.20	30	1.50
50695-0141	1.41	.0555	9.20	11.20	30	1.50
50695-0142	1.42	.0559	9.20	11.20	30	1.50
50695-0143	1.43	.0563	9.20	11.20	30	1.50
50695-0144	1.44	.0567	9.20	11.20	30	1.50
50695-0145	1.45	.0571	9.20	11.20	30	1.50
50695-0146	1.46	.0575	9.20	11.20	30	1.50
50695-0147	1.47	.0579	9.20	11.20	30	1.50
50695-0148	1.48	.0583	9.20	11.20	30	1.50
50695-0149	1.49	.0587	9.20	11.20	30	1.50
50695-0150	1.50	.0591	9.20	—	30	1.50

- All dimensions are millimeters unless otherwise noted
- Packaged in quantities of 10 pieces
- For cutting data see pg. 144

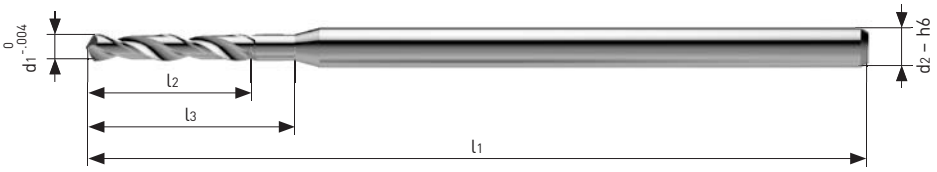
Spirec

Art. 50699









Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50699-0005	.05	.0020	.40	.60	25	1.00
50699-0006	.06	.0024	.40	.60	25	1.00
50699-0007	.07	.0028	.50	.70	25	1.00
50699-0008	.08	.0031	.50	.70	25	1.00
50699-0009	.09	.0035	.50	.70	25	1.00
50699-0010	.10	.0039	.50	.70	25	1.00
50699-0011	.11	.0043	.50	.70	25	1.00
50699-0012	.12	.0047	.50	.70	25	1.00
50699-0013	.13	.0051	.80	1.00	25	1.00
50699-0014	.14	.0055	.80	1.00	25	1.00
50699-0015	.15	.0059	.80	1.00	25	1.00
50699-0016	.16	.0063	1.10	1.40	25	1.00
50699-0017	.17	.0067	1.10	1.40	25	1.00
50699-0018	.18	.0071	1.10	1.40	25	1.00
50699-0019	.19	.0075	1.10	1.40	25	1.00
50699-0020	.20	.0079	1.50	1.80	25	1.00
50699-0021	.21	.0083	1.50	1.80	25	1.00
50699-0022	.22	.0087	1.50	1.80	25	1.00
50699-0023	.23	.0091	1.50	1.80	25	1.00
50699-0024	.24	.0094	1.50	1.80	25	1.00
50699-0025	.25	.0098	1.90	2.20	25	1.00
50699-0026	.26	.0102	1.90	2.20	25	1.00
50699-0027	.27	.0106	1.90	2.20	25	1.00
50699-0028	.28	.0110	1.90	2.20	25	1.00
50699-0029	.29	.0114	1.90	2.20	25	1.00
50699-0030	.30	.0118	1.90	2.20	25	1.00
50699-0031	.31	.0122	2.40	2.80	25	1.00
50699-0032	.32	.0126	2.40	2.80	25	1.00
50699-0033	.33	.0130	2.40	2.80	25	1.00
50699-0034	.34	.0134	2.40	2.80	25	1.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50699-0035	.35	.0138	2.40	2.80	25	1.00
50699-0036	.36	.0142	2.40	2.80	25	1.00
50699-0037	.37	.0146	2.40	2.80	25	1.00
50699-0038	.38	.0150	2.40	2.80	25	1.00
50699-0039	.39	.0154	2.70	3.60	25	1.00
50699-0040	.40	.0157	2.70	3.60	25	1.00
50699-0041	.41	.0161	2.70	3.60	25	1.00
50699-0042	.42	.0165	2.70	3.60	25	1.00
50699-0043	.43	.0169	2.70	3.60	25	1.00
50699-0044	.44	.0173	2.70	3.60	25	1.00
50699-0045	.45	.0177	2.70	3.60	25	1.00
50699-0046	.46	.0181	2.70	3.60	25	1.00
50699-0047	.47	.0185	2.70	3.60	25	1.00
50699-0048	.48	.0189	2.70	3.60	25	1.00
50699-0049	.49	.0193	3.20	4.00	25	1.00
50699-0050	.50	.0197	3.20	4.00	25	1.00
50699-0051	.51	.0201	3.20	4.00	25	1.00
50699-0052	.52	.0205	3.20	4.00	25	1.00
50699-0053	.53	.0209	3.20	4.00	25	1.00
50699-0054	.54	.0213	3.60	4.50	25	1.00
50699-0055	.55	.0217	3.60	4.50	25	1.00
50699-0056	.56	.0220	3.60	4.50	25	1.00
50699-0057	.57	.0224	3.60	4.50	25	1.00
50699-0058	.58	.0228	3.60	4.50	25	1.00
50699-0059	.59	.0232	3.60	4.50	25	1.00
50699-0060	.60	.0236	3.60	4.50	25	1.00
50699-0061	.61	.0240	3.90	5.00	25	1.00
50699-0062	.62	.0244	3.90	5.00	25	1.00
50699-0063	.63	.0248	3.90	5.00	25	1.00
50699-0064	.64	.0252	3.90	5.00	25	1.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50699-0065	.65	.0256	3.90	5.00	25	1.00
50699-0066	.66	.0260	3.90	5.00	25	1.00
50699-0067	.67	.0264	3.90	5.00	25	1.00
50699-0068	.68	.0268	4.50	5.60	25	1.00
50699-0069	.69	.0272	4.50	5.60	25	1.00
50699-0070	.70	.0276	4.50	5.60	25	1.00
50699-0071	.71	.0280	4.50	5.60	25	1.00
50699-0072	.72	.0283	4.50	5.60	25	1.00
50699-0073	.73	.0287	4.50	5.60	25	1.00
50699-0074	.74	.0291	4.50	5.60	25	1.00
50699-0075	.75	.0295	4.50	5.60	25	1.00
50699-0076	.76	.0299	5.00	6.30	25	1.00
50699-0077	.77	.0303	5.00	6.30	25	1.00
50699-0078	.78	.0307	5.00	6.30	25	1.00
50699-0079	.79	.0311	5.00	6.30	25	1.00
50699-0080	.80	.0315	5.00	6.30	25	1.50
50699-0081	.81	.0319	5.00	6.30	25	1.50
50699-0082	.82	.0323	5.00	6.30	25	1.50
50699-0083	.83	.0327	5.00	6.30	25	1.50
50699-0084	.84	.0331	5.00	6.30	25	1.50
50699-0085	.85	.0335	5.00	6.30	25	1.50
50699-0086	.86	.0339	5.70	7.10	25	1.50
50699-0087	.87	.0343	5.70	7.10	25	1.50
50699-0088	.88	.0346	5.70	7.10	25	1.50
50699-0089	.89	.0350	5.70	7.10	25	1.50
50699-0090	.90	.0354	5.70	7.10	25	1.50
50699-0091	.91	.0358	5.70	7.10	25	1.50
50699-0092	.92	.0362	5.70	7.10	25	1.50
50699-0093	.93	.0366	5.70	7.10	25	1.50
50699-0094	.94	.0370	5.70	7.10	25	1.50
50699-0095	.95	.0374	5.70	7.10	25	1.50
50699-0096	.96	.0378	6.50	8.00	25	1.50
50699-0097	.97	.0382	6.50	8.00	25	1.50
50699-0098	.98	.0386	6.50	8.00	25	1.50
50699-0099	.99	.0390	6.50	8.00	25	1.50
50699-0100	1.00	.0394	6.50	8.00	25	1.50
50699-0101	1.01	.0398	6.50	8.00	25	1.50
50699-0102	1.02	.0402	6.50	8.00	25	1.50
50699-0103	1.03	.0406	6.50	8.00	25	1.50
50699-0104	1.04	.0409	6.50	8.00	25	1.50
50699-0105	1.05	.0413	6.50	8.00	25	1.50
50699-0106	1.06	.0417	7.30	9.00	25	1.50
50699-0107	1.07	.0421	7.30	9.00	25	1.50
50699-0108	1.08	.0425	7.30	9.00	25	1.50
50699-0109	1.09	.0429	7.30	9.00	25	1.50

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50699-0110	1.10	.0433	7.30	9.00	25	1.50
50699-0111	1.11	.0437	7.30	9.00	25	1.50
50699-0112	1.12	.0441	7.30	9.00	25	1.50
50699-0113	1.13	.0445	7.30	9.00	25	1.50
50699-0114	1.14	.0449	7.30	9.00	25	1.50
50699-0115	1.15	.0453	7.30	9.00	25	1.50
50699-0116	1.16	.0457	8.20	10.00	25	1.50
50699-0117	1.17	.0461	8.20	10.00	25	1.50
50699-0118	1.18	.0465	8.20	10.00	25	1.50
50699-0119	1.19	.0469	8.20	10.00	25	1.50
50699-0120	1.20	.0472	8.20	10.00	25	1.50
50699-0121	1.21	.0476	8.20	10.00	25	1.50
50699-0122	1.22	.0480	8.20	10.00	25	1.50
50699-0123	1.23	.0484	8.20	10.00	25	1.50
50699-0124	1.24	.0488	8.20	10.00	25	1.50
50699-0125	1.25	.0492	8.20	10.00	25	1.50
50699-0126	1.26	.0496	8.20	10.00	25	1.50
50699-0127	1.27	.0500	8.20	10.00	25	1.50
50699-0128	1.28	.0504	8.20	10.00	25	1.50
50699-0129	1.29	.0508	8.20	10.00	25	1.50
50699-0130	1.30	.0512	8.20	10.00	25	1.50
50699-0131	1.31	.0516	9.20	11.20	25	1.50
50699-0132	1.32	.0520	9.20	11.20	25	1.50
50699-0133	1.33	.0524	9.20	11.20	25	1.50
50699-0134	1.34	.0528	9.20	11.20	25	1.50
50699-0135	1.35	.0531	9.20	11.20	25	1.50
50699-0136	1.36	.0535	9.20	11.20	25	1.50
50699-0137	1.37	.0539	9.20	11.20	25	1.50
50699-0138	1.38	.0543	9.20	11.20	25	1.50
50699-0139	1.39	.0547	9.20	11.20	25	1.50
50699-0140	1.40	.0551	9.20	11.20	25	1.50
50699-0141	1.41	.0555	9.20	11.20	25	1.50
50699-0142	1.42	.0559	9.20	11.20	25	1.50
50699-0143	1.43	.0563	9.20	11.20	25	1.50
50699-0144	1.44	.0567	9.20	11.20	25	1.50
50699-0145	1.45	.0571	9.20	11.20	25	1.50
50699-0146	1.46	.0575	9.20	11.20	25	1.50
50699-0147	1.47	.0579	9.20	11.20	25	1.50
50699-0148	1.48	.0583	9.20	11.20	25	1.50
50699-0149	1.49	.0587	9.20	11.20	25	1.50
50699-0150	1.50	.0591	9.20	—	25	1.50
50699-0151	1.51	.0594	11.20	13.40	38	2.00
50699-0152	1.52	.0598	11.20	13.40	38	2.00
50699-0153	1.53	.0602	11.20	13.40	38	2.00
50699-0154	1.54	.0606	11.20	13.40	38	2.00

- All dimensions are millimeters unless otherwise noted
- Packaged in quantities of 10 pieces
- For cutting data see pg. 144

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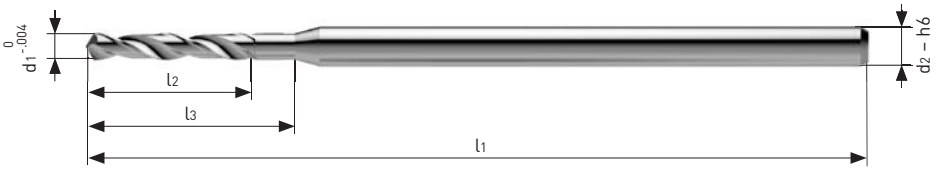
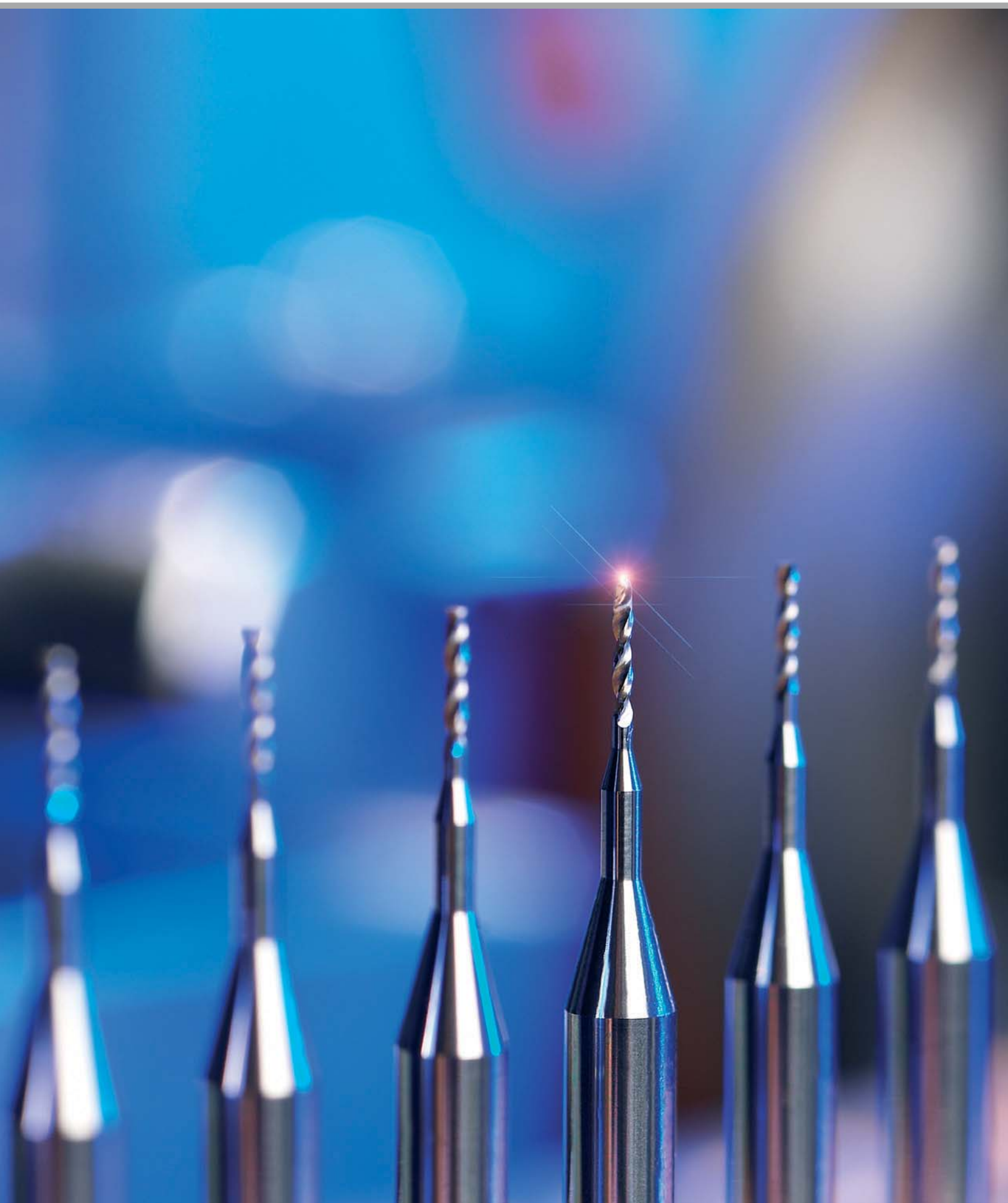
Art. 50699 Cont.



Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50699-0155	1.55	.0610	11.20	13.40	38	2.00
50699-0156	1.56	.0614	11.20	13.40	38	2.00
50699-0157	1.57	.0618	11.20	13.40	38	2.00
50699-0158	1.58	.0622	11.20	13.40	38	2.00
50699-0159	1.59	.0626	11.20	13.40	38	2.00
50699-0160	1.60	.0630	11.20	13.40	38	2.00
50699-0161	1.61	.0634	11.20	13.40	38	2.00
50699-0162	1.62	.0638	11.20	13.40	38	2.00
50699-0163	1.63	.0642	11.20	13.40	38	2.00
50699-0164	1.64	.0646	11.20	13.40	38	2.00
50699-0165	1.65	.0650	11.20	13.40	38	2.00
50699-0166	1.66	.0654	11.20	13.40	38	2.00
50699-0167	1.67	.0657	11.20	13.40	38	2.00
50699-0168	1.68	.0661	11.20	13.40	38	2.00
50699-0169	1.69	.0665	11.20	13.40	38	2.00
50699-0170	1.70	.0669	11.20	13.40	38	2.00
50699-0171	1.71	.0673	11.20	13.40	38	2.00
50699-0172	1.72	.0677	11.20	13.40	38	2.00
50699-0173	1.73	.0681	11.20	13.40	38	2.00
50699-0174	1.74	.0685	11.20	13.40	38	2.00
50699-0175	1.75	.0689	11.20	13.40	38	2.00
50699-0176	1.76	.0693	11.20	13.40	38	2.00
50699-0177	1.77	.0697	11.20	13.40	38	2.00

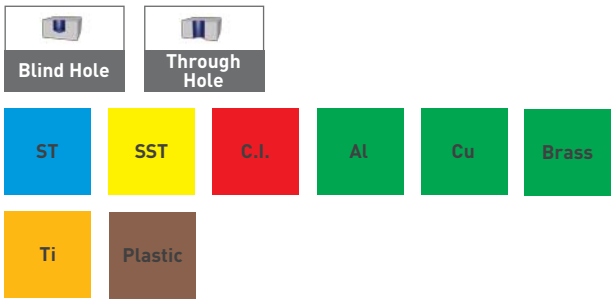
Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50699-0178	1.78	.0701	11.20	13.40	38	2.00
50699-0179	1.79	.0705	11.20	13.40	38	2.00
50699-0180	1.80	.0709	11.20	13.40	38	2.00
50699-0181	1.81	.0713	11.20	13.40	38	2.00
50699-0182	1.82	.0717	11.20	13.40	38	2.00
50699-0183	1.83	.0720	11.20	13.40	38	2.00
50699-0184	1.84	.0724	11.20	13.40	38	2.00
50699-0185	1.85	.0728	11.20	13.40	38	2.00
50699-0186	1.86	.0732	11.20	13.40	38	2.00
50699-0187	1.87	.0736	11.20	13.40	38	2.00
50699-0188	1.88	.0740	11.20	13.40	38	2.00
50699-0189	1.89	.0744	11.20	13.40	38	2.00
50699-0190	1.90	.0748	11.20	13.40	38	2.00
50699-0191	1.91	.0752	11.20	13.40	38	2.00
50699-0192	1.92	.0756	11.20	13.40	38	2.00
50699-0193	1.93	.0760	11.20	13.40	38	2.00
50699-0194	1.94	.0764	11.20	13.40	38	2.00
50699-0195	1.95	.0768	11.20	13.40	38	2.00
50699-0196	1.96	.0772	11.20	13.40	38	2.00
50699-0197	1.97	.0776	11.20	13.40	38	2.00
50699-0198	1.98	.0780	11.20	13.40	38	2.00
50699-0199	1.99	.0783	11.20	13.40	38	2.00
50699-0200	2.00	.0787	11.20	—	38	2.00

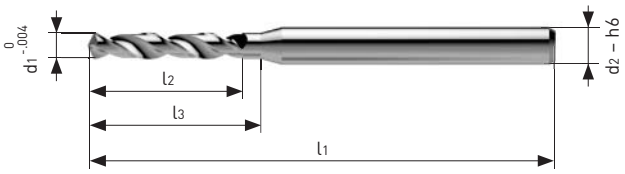
- All dimensions are millimeters unless otherwise noted
- Packaged in quantities of 10 pieces
- For cutting data see pg. 144



Art. 51200

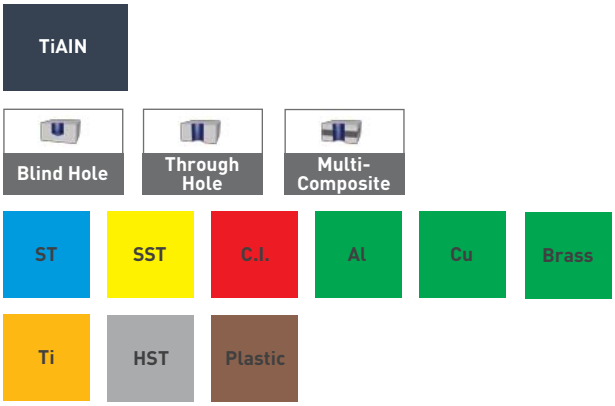


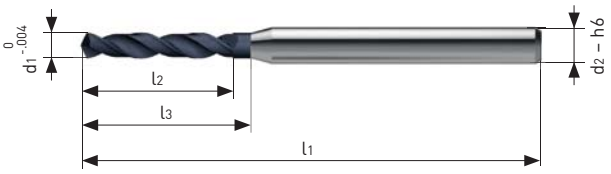




Art. 51201





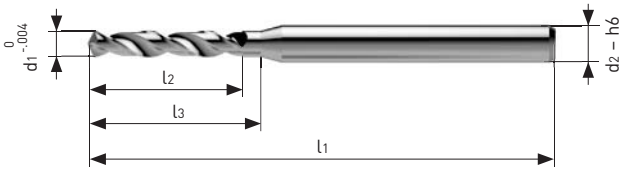


Art. 51200 Catalog Number	Art. 51201 Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
51200-0003	—	.03	.0012	.25	.35	38	3.00
51200-0004	—	.04	.0016	.30	.40	38	3.00
51200-0005	—	.05	.0020	.35	.45	38	3.00
51200-0006	—	.06	.0024	.40	.50	38	3.00
51200-0007	—	.07	.0028	.45	.60	38	3.00
51200-0008	—	.08	.0031	.50	.70	38	3.00
51200-0009	—	.09	.0035	.50	.70	38	3.00
51200-0010	—	.10	.0039	.50	.70	38	3.00
51200-0011	—	.11	.0043	.50	.70	38	3.00
51200-0012	—	.12	.0047	.50	.70	38	3.00
51200-0013	—	.13	.0051	.80	1.00	38	3.00
51200-0014	—	.14	.0055	.80	1.00	38	3.00
51200-0015	—	.15	.0059	.80	1.00	38	3.00
51200-0016	—	.16	.0063	1.10	1.40	38	3.00
51200-0017	—	.17	.0067	1.10	1.40	38	3.00
51200-0018	—	.18	.0071	1.10	1.40	38	3.00
51200-0019	—	.19	.0075	1.10	1.40	38	3.00
51200-0020	51201-0020	.20	.0079	1.50	1.80	38	3.00
51200-0021	51201-0021	.21	.0083	1.50	1.80	38	3.00
51200-0022	51201-0022	.22	.0087	1.50	1.80	38	3.00
51200-0023	51201-0023	.23	.0091	1.50	1.80	38	3.00
51200-0024	51201-0024	.24	.0094	1.50	1.80	38	3.00
51200-0025	51201-0025	.25	.0098	1.90	2.20	38	3.00
51200-0026	51201-0026	.26	.0102	1.90	2.20	38	3.00

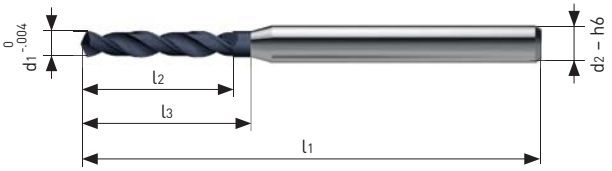
Art. 51200 Catalog Number	Art. 51201 Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
51200-0027	51201-0027	.27	.0106	1.90	2.20	38	3.00
51200-0028	51201-0028	.28	.0110	1.90	2.20	38	3.00
51200-0029	51201-0029	.29	.0114	1.90	2.20	38	3.00
51200-0030	51201-0030	.30	.0118	1.80	2.40	38	3.00
51200-0031	51201-0031	.31	.0122	1.80	2.40	38	3.00
51200-0032	51201-0032	.32	.0126	1.80	2.40	38	3.00
51200-0033	51201-0033	.33	.0130	1.80	2.40	38	3.00
51200-0034	51201-0034	.34	.0134	1.80	2.40	38	3.00
51200-0035	51201-0035	.35	.0138	2.20	2.80	38	3.00
51200-0036	51201-0036	.36	.0142	2.20	2.80	38	3.00
51200-0037	51201-0037	.37	.0146	2.20	2.80	38	3.00
51200-0038	51201-0038	.38	.0150	2.20	2.80	38	3.00
51200-0039	51201-0039	.39	.0154	2.70	3.60	38	3.00
51200-0040	51201-0040	.40	.0157	2.70	3.60	38	3.00
51200-0041	51201-0041	.41	.0161	2.70	3.60	38	3.00
51200-0042	51201-0042	.42	.0165	2.70	3.60	38	3.00
51200-0043	51201-0043	.43	.0169	2.70	3.60	38	3.00
51200-0044	51201-0044	.44	.0173	2.70	3.60	38	3.00
51200-0045	51201-0045	.45	.0177	2.70	3.60	38	3.00
51200-0046	51201-0046	.46	.0181	2.70	3.60	38	3.00
51200-0047	51201-0047	.47	.0185	2.70	3.60	38	3.00
51200-0048	51201-0048	.48	.0189	2.70	3.60	38	3.00
51200-0049	51201-0049	.49	.0193	3.20	4.00	38	3.00
51200-0050	51201-0050	.50	.0197	3.20	4.00	38	3.00
51200-0051	51201-0051	.51	.0201	3.20	4.00	38	3.00
51200-0052	51201-0052	.52	.0205	3.20	4.00	38	3.00
51200-0053	51201-0053	.53	.0209	3.20	4.00	38	3.00
51200-0054	51201-0054	.54	.0213	3.60	4.50	38	3.00
51200-0055	51201-0055	.55	.0217	3.60	4.50	38	3.00
51200-0056	51201-0056	.56	.0220	3.60	4.50	38	3.00
51200-0057	51201-0057	.57	.0224	3.60	4.50	38	3.00
51200-0058	51201-0058	.58	.0228	3.60	4.50	38	3.00
51200-0059	51201-0059	.59	.0232	3.60	4.50	38	3.00
51200-0060	51201-0060	.60	.0236	3.60	4.50	38	3.00
51200-0061	51201-0061	.61	.0240	3.90	5.00	38	3.00
51200-0062	51201-0062	.62	.0244	3.90	5.00	38	3.00
51200-0063	51201-0063	.63	.0248	3.90	5.00	38	3.00
51200-0064	51201-0064	.64	.0252	3.90	5.00	38	3.00
51200-0065	51201-0065	.65	.0256	3.90	5.00	38	3.00
51200-0066	51201-0066	.66	.0260	3.90	5.00	38	3.00
51200-0067	51201-0067	.67	.0264	3.90	5.00	38	3.00
51200-0068	51201-0068	.68	.0268	4.50	5.60	38	3.00
51200-0069	51201-0069	.69	.0272	4.50	5.60	38	3.00
51200-0070	51201-0070	.70	.0276	4.50	5.60	38	3.00
51200-0071	51201-0071	.71	.0280	4.50	5.60	38	3.00
51200-0072	51201-0072	.72	.0283	4.50	5.60	38	3.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 144-145

Art. 51200 Cont.



Art. 51201 Cont.

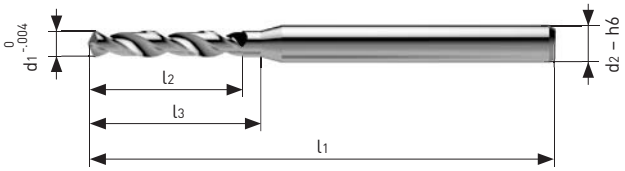


Art. 51200 Catalog Number	Art. 51201 Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
51200-0073	51201-0073	.73	.0287	4.50	5.60	38	3.00
51200-0074	51201-0074	.74	.0291	4.50	5.60	38	3.00
51200-0075	51201-0075	.75	.0295	4.50	5.60	38	3.00
51200-0076	51201-0076	.76	.0299	5.00	6.30	38	3.00
51200-0077	51201-0077	.77	.0303	5.00	6.30	38	3.00
51200-0078	51201-0078	.78	.0307	5.00	6.30	38	3.00
51200-0079	51201-0079	.79	.0311	5.00	6.30	38	3.00
51200-0080	51201-0080	.80	.0315	5.00	6.30	38	3.00
51200-0081	51201-0081	.81	.0319	5.00	6.30	38	3.00
51200-0082	51201-0082	.82	.0323	5.00	6.30	38	3.00
51200-0083	51201-0083	.83	.0327	5.00	6.30	38	3.00
51200-0084	51201-0084	.84	.0331	5.00	6.30	38	3.00
51200-0085	51201-0085	.85	.0335	5.00	6.30	38	3.00
51200-0086	51201-0086	.86	.0339	5.70	7.10	38	3.00
51200-0087	51201-0087	.87	.0343	5.70	7.10	38	3.00
51200-0088	51201-0088	.88	.0346	5.70	7.10	38	3.00
51200-0089	51201-0089	.89	.0350	5.70	7.10	38	3.00
51200-0090	51201-0090	.90	.0354	5.70	7.10	38	3.00
51200-0091	51201-0091	.91	.0358	5.70	7.10	38	3.00
51200-0092	51201-0092	.92	.0362	5.70	7.10	38	3.00
51200-0093	51201-0093	.93	.0366	5.70	7.10	38	3.00
51200-0094	51201-0094	.94	.0370	5.70	7.10	38	3.00
51200-0095	51201-0095	.95	.0374	5.70	7.10	38	3.00
51200-0096	51201-0096	.96	.0378	6.50	8.00	38	3.00
51200-0097	51201-0097	.97	.0382	6.50	8.00	38	3.00
51200-0098	51201-0098	.98	.0386	6.50	8.00	38	3.00
51200-0099	51201-0099	.99	.0390	6.50	8.00	38	3.00
51200-0100	51201-0100	1.00	.0394	6.50	8.00	38	3.00
51200-0101	51201-0101	1.01	.0398	6.50	8.00	38	3.00
51200-0102	51201-0102	1.02	.0402	6.50	8.00	38	3.00
51200-0103	51201-0103	1.03	.0406	6.50	8.00	38	3.00
51200-0104	51201-0104	1.04	.0409	6.50	8.00	38	3.00
51200-0105	51201-0105	1.05	.0413	6.50	8.00	38	3.00
51200-0106	51201-0106	1.06	.0417	7.30	9.00	38	3.00
51200-0107	51201-0107	1.07	.0421	7.30	9.00	38	3.00
51200-0108	51201-0108	1.08	.0425	7.30	9.00	38	3.00
51200-0109	51201-0109	1.09	.0429	7.30	9.00	38	3.00
51200-0110	51201-0110	1.10	.0433	7.30	9.00	38	3.00
51200-0111	51201-0111	1.11	.0437	7.30	9.00	38	3.00
51200-0112	51201-0112	1.12	.0441	7.30	9.00	38	3.00

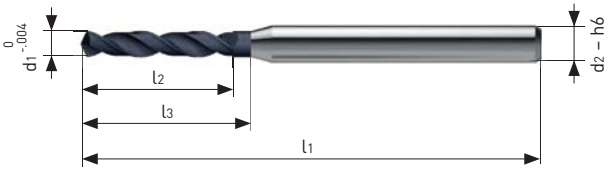
Art. 51200 Catalog Number	Art. 51201 Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
51200-0113	51201-0113	1.13	.0445	7.30	9.00	38	3.00
51200-0114	51201-0114	1.14	.0449	7.30	9.00	38	3.00
51200-0115	51201-0115	1.15	.0453	7.30	9.00	38	3.00
51200-0116	51201-0116	1.16	.0457	8.20	10.00	38	3.00
51200-0117	51201-0117	1.17	.0461	8.20	10.00	38	3.00
51200-0118	51201-0118	1.18	.0465	8.20	10.00	38	3.00
51200-0119	51201-0119	1.19	.0469	8.20	10.00	38	3.00
51200-0120	51201-0120	1.20	.0472	8.20	10.00	38	3.00
51200-0121	51201-0121	1.21	.0476	8.20	10.00	38	3.00
51200-0122	51201-0122	1.22	.0480	8.20	10.00	38	3.00
51200-0123	51201-0123	1.23	.0484	8.20	10.00	38	3.00
51200-0124	51201-0124	1.24	.0488	8.20	10.00	38	3.00
51200-0125	51201-0125	1.25	.0492	8.20	10.00	38	3.00
51200-0126	51201-0126	1.26	.0496	8.20	10.00	38	3.00
51200-0127	51201-0127	1.27	.0500	8.20	10.00	38	3.00
51200-0128	51201-0128	1.28	.0504	8.20	10.00	38	3.00
51200-0129	51201-0129	1.29	.0508	8.20	10.00	38	3.00
51200-0130	51201-0130	1.30	.0512	8.20	10.00	38	3.00
51200-0131	51201-0131	1.31	.0516	9.20	11.20	38	3.00
51200-0132	51201-0132	1.32	.0520	9.20	11.20	38	3.00
51200-0133	51201-0133	1.33	.0524	9.20	11.20	38	3.00
51200-0134	51201-0134	1.34	.0528	9.20	11.20	38	3.00
51200-0135	51201-0135	1.35	.0531	9.20	11.20	38	3.00
51200-0136	51201-0136	1.36	.0535	9.20	11.20	38	3.00
51200-0137	51201-0137	1.37	.0539	9.20	11.20	38	3.00
51200-0138	51201-0138	1.38	.0543	9.20	11.20	38	3.00
51200-0139	51201-0139	1.39	.0547	9.20	11.20	38	3.00
51200-0140	51201-0140	1.40	.0551	9.20	11.20	38	3.00
51200-0141	51201-0141	1.41	.0555	9.20	11.20	38	3.00
51200-0142	51201-0142	1.42	.0559	9.20	11.20	38	3.00
51200-0143	51201-0143	1.43	.0563	9.20	11.20	38	3.00
51200-0144	51201-0144	1.44	.0567	9.20	11.20	38	3.00
51200-0145	51201-0145	1.45	.0571	9.20	11.20	38	3.00
51200-0146	51201-0146	1.46	.0575	9.20	11.20	38	3.00
51200-0147	51201-0147	1.47	.0579	9.20	11.20	38	3.00
51200-0148	51201-0148	1.48	.0583	9.20	11.20	38	3.00
51200-0149	51201-0149	1.49	.0587	9.20	11.20	38	3.00
51200-0150	51201-0150	1.50	.0591	9.20	11.20	38	3.00
51200-0151	51201-0151	1.51	.0594	11.20	13.40	38	3.00
51200-0152	51201-0152	1.52	.0598	11.20	13.40	38	3.00
51200-0153	51201-0153	1.53	.0602	11.20	13.40	38	3.00
51200-0154	51201-0154	1.54	.0606	11.20	13.40	38	3.00
51200-0155	51201-0155	1.55	.0610	11.20	13.40	38	3.00
51200-0156	51201-0156	1.56	.0614	11.20	13.40	38	3.00
51200-0157	51201-0157	1.57	.0618	11.20	13.40	38	3.00
51200-0158	51201-0158	1.58	.0622	11.20	13.40	38	3.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 144-145

Art. 51200 Cont.



Art. 51201 Cont.

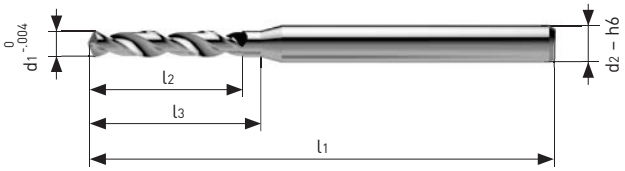


Art. 51200 Catalog Number	Art. 51201 Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
51200-0159	51201-0159	1.59	.0626	11.20	13.40	38	3.00
51200-0160	51201-0160	1.60	.0630	11.20	13.40	38	3.00
51200-0161	51201-0161	1.61	.0634	11.20	13.40	38	3.00
51200-0162	51201-0162	1.62	.0638	11.20	13.40	38	3.00
51200-0163	51201-0163	1.63	.0642	11.20	13.40	38	3.00
51200-0164	51201-0164	1.64	.0646	11.20	13.40	38	3.00
51200-0165	51201-0165	1.65	.0650	11.20	13.40	38	3.00
51200-0166	51201-0166	1.66	.0654	11.20	13.40	38	3.00
51200-0167	51201-0167	1.67	.0657	11.20	13.40	38	3.00
51200-0168	51201-0168	1.68	.0661	11.20	13.40	38	3.00
51200-0169	51201-0169	1.69	.0665	11.20	13.40	38	3.00
51200-0170	51201-0170	1.70	.0669	11.20	13.40	38	3.00
51200-0171	51201-0171	1.71	.0673	11.20	13.40	38	3.00
51200-0172	51201-0172	1.72	.0677	11.20	13.40	38	3.00
51200-0173	51201-0173	1.73	.0681	11.20	13.40	38	3.00
51200-0174	51201-0174	1.74	.0685	11.20	13.40	38	3.00
51200-0175	51201-0175	1.75	.0689	11.20	13.40	38	3.00
51200-0176	51201-0176	1.76	.0693	11.20	13.40	38	3.00
51200-0177	51201-0177	1.77	.0697	11.20	13.40	38	3.00
51200-0178	51201-0178	1.78	.0701	11.20	13.40	38	3.00
51200-0179	51201-0179	1.79	.0705	11.20	13.40	38	3.00
51200-0180	51201-0180	1.80	.0709	11.20	13.40	38	3.00
51200-0181	51201-0181	1.81	.0713	11.20	13.40	38	3.00
51200-0182	51201-0182	1.82	.0717	11.20	13.40	38	3.00
51200-0183	51201-0183	1.83	.0720	11.20	13.40	38	3.00
51200-0184	51201-0184	1.84	.0724	11.20	13.40	38	3.00
51200-0185	51201-0185	1.85	.0728	11.20	13.40	38	3.00
51200-0186	51201-0186	1.86	.0732	11.20	13.40	38	3.00
51200-0187	51201-0187	1.87	.0736	11.20	13.40	38	3.00
51200-0188	51201-0188	1.88	.0740	11.20	13.40	38	3.00
51200-0189	51201-0189	1.89	.0744	11.20	13.40	38	3.00
51200-0190	51201-0190	1.90	.0748	11.20	13.40	38	3.00
51200-0191	51201-0191	1.91	.0752	11.20	13.40	38	3.00
51200-0192	51201-0192	1.92	.0756	11.20	13.40	38	3.00
51200-0193	51201-0193	1.93	.0760	11.20	13.40	38	3.00
51200-0194	51201-0194	1.94	.0764	11.20	13.40	38	3.00
51200-0195	51201-0195	1.95	.0768	11.20	13.40	38	3.00
51200-0196	51201-0196	1.96	.0772	11.20	13.40	38	3.00
51200-0197	51201-0197	1.97	.0776	11.20	13.40	38	3.00
51200-0198	51201-0198	1.98	.0780	11.20	13.40	38	3.00

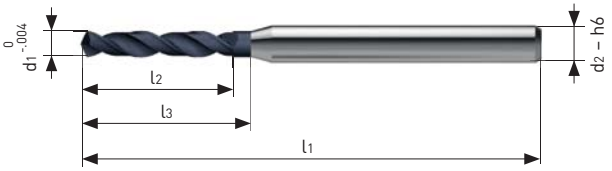
Art. 51200 Catalog Number	Art. 51201 Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
51200-0199	51201-0199	1.99	.0783	11.20	13.40	38	3.00
51200-0200	51201-0200	2.00	.0787	11.20	13.40	38	3.00
51200-0201	51201-0201	2.01	.0791	12.50	14.00	38	3.00
51200-0202	51201-0202	2.02	.0795	12.50	14.00	38	3.00
51200-0203	51201-0203	2.03	.0799	12.50	14.00	38	3.00
51200-0204	51201-0204	2.04	.0803	12.50	14.00	38	3.00
51200-0205	51201-0205	2.05	.0807	12.50	14.00	38	3.00
51200-0206	51201-0206	2.06	.0811	12.50	14.00	38	3.00
51200-0207	51201-0207	2.07	.0815	12.50	14.00	38	3.00
51200-0208	51201-0208	2.08	.0819	12.50	14.00	38	3.00
51200-0209	51201-0209	2.09	.0823	12.50	14.00	38	3.00
51200-0210	51201-0210	2.10	.0827	12.50	14.00	38	3.00
51200-0211	51201-0211	2.11	.0831	12.50	14.00	38	3.00
51200-0212	51201-0212	2.12	.0835	12.50	14.00	38	3.00
51200-0213	51201-0213	2.13	.0839	12.50	14.00	38	3.00
51200-0214	51201-0214	2.14	.0843	12.50	14.00	38	3.00
51200-0215	51201-0215	2.15	.0846	12.50	14.00	38	3.00
51200-0216	51201-0216	2.16	.0850	12.50	14.00	38	3.00
51200-0217	51201-0217	2.17	.0854	12.50	14.00	38	3.00
51200-0218	51201-0218	2.18	.0858	12.50	14.00	38	3.00
51200-0219	51201-0219	2.19	.0862	12.50	14.00	38	3.00
51200-0220	51201-0220	2.20	.0866	12.50	14.00	38	3.00
51200-0221	51201-0221	2.21	.0870	12.50	14.00	38	3.00
51200-0222	51201-0222	2.22	.0874	12.50	14.00	38	3.00
51200-0223	51201-0223	2.23	.0878	12.50	14.00	38	3.00
51200-0224	51201-0224	2.24	.0882	12.50	14.00	38	3.00
51200-0225	51201-0225	2.25	.0886	12.50	14.00	38	3.00
51200-0226	51201-0226	2.26	.0890	12.50	14.00	38	3.00
51200-0227	51201-0227	2.27	.0894	12.50	14.00	38	3.00
51200-0228	51201-0228	2.28	.0898	12.50	14.00	38	3.00
51200-0229	51201-0229	2.29	.0902	12.50	14.00	38	3.00
51200-0230	51201-0230	2.30	.0906	12.50	14.00	38	3.00
51200-0231	51201-0231	2.31	.0909	12.50	14.00	38	3.00
51200-0232	51201-0232	2.32	.0913	12.50	14.00	38	3.00
51200-0233	51201-0233	2.33	.0917	12.50	14.00	38	3.00
51200-0234	51201-0234	2.34	.0921	12.50	14.00	38	3.00
51200-0235	51201-0235	2.35	.0925	12.50	14.00	38	3.00
51200-0236	51201-0236	2.36	.0929	12.50	14.00	38	3.00
51200-0237	51201-0237	2.37	.0933	12.50	14.00	38	3.00
51200-0238	51201-0238	2.38	.0937	12.50	14.00	38	3.00
51200-0239	51201-0239	2.39	.0941	12.50	14.00	38	3.00
51200-0240	51201-0240	2.40	.0945	12.50	14.00	38	3.00
51200-0241	51201-0241	2.41	.0949	12.50	14.00	38	3.00
51200-0242	51201-0242	2.42	.0953	12.50	14.00	38	3.00
51200-0243	51201-0243	2.43	.0957	12.50	14.00	38	3.00
51200-0244	51201-0244	2.44	.0961	12.50	14.00	38	3.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 144-145

Art. 51200 Cont.



Art. 51201 Cont.



Art. 51200 Catalog Number	Art. 51201 Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
51200-0245	51201-0245	2.45	.0965	12.50	14.00	38	3.00
51200-0246	51201-0246	2.46	.0969	12.50	14.00	38	3.00
51200-0247	51201-0247	2.47	.0972	12.50	14.00	38	3.00
51200-0248	51201-0248	2.48	.0976	12.50	14.00	38	3.00
51200-0249	51201-0249	2.49	.0980	12.50	14.00	38	3.00
51200-0250	51201-0250	2.50	.0984	14.00	17.00	38	3.00
51200-0251	51201-0251	2.51	.0988	14.00	17.00	38	3.00
51200-0252	51201-0252	2.52	.0992	14.00	17.00	38	3.00
51200-0253	51201-0253	2.53	.0996	14.00	17.00	38	3.00
51200-0254	51201-0254	2.54	.1000	14.00	17.00	38	3.00
51200-0255	51201-0255	2.55	.1004	14.00	17.00	38	3.00
51200-0256	51201-0256	2.56	.1008	14.00	17.00	38	3.00
51200-0257	51201-0257	2.57	.1012	14.00	17.00	38	3.00
51200-0258	51201-0258	2.58	.1016	14.00	17.00	38	3.00
51200-0259	51201-0259	2.59	.1020	14.00	17.00	38	3.00
51200-0260	51201-0260	2.60	.1024	14.00	17.00	38	3.00
51200-0261	51201-0261	2.61	.1028	14.00	17.00	38	3.00
51200-0262	51201-0262	2.62	.1031	14.00	17.00	38	3.00
51200-0263	51201-0263	2.63	.1035	14.00	17.00	38	3.00
51200-0264	51201-0264	2.64	.1039	14.00	17.00	38	3.00
51200-0265	51201-0265	2.65	.1043	14.00	17.00	38	3.00
51200-0266	51201-0266	2.66	.1047	14.00	17.00	38	3.00
51200-0267	51201-0267	2.67	.1051	14.00	17.00	38	3.00
51200-0268	51201-0268	2.68	.1055	14.00	17.00	38	3.00
40.5120.0269	51201-0269	2.69	.1059	14.00	17.00	38	3.00
51200-0270	51201-0270	2.70	.1063	14.00	17.00	38	3.00
40.5120.0271	51201-0271	2.71	.1067	14.00	17.00	38	3.00
51200-0272	51201-0272	2.72	.1071	14.00	17.00	38	3.00
51200-0273	51201-0273	2.73	.1075	14.00	17.00	38	3.00
51200-0274	51201-0274	2.74	.1079	14.00	17.00	38	3.00
51200-0275	51201-0275	2.75	.1083	14.00	17.00	38	3.00
51200-0276	51201-0276	2.76	.1087	14.00	17.00	38	3.00
51200-0277	51201-0277	2.77	.1091	14.00	17.00	38	3.00
51200-0278	51201-0278	2.78	.1094	14.00	17.00	38	3.00
51200-0279	51201-0279	2.79	.1098	14.00	17.00	38	3.00
51200-0280	51201-0280	2.80	.1102	14.00	17.00	38	3.00
51200-0281	51201-0281	2.81	.1106	14.00	17.00	38	3.00
51200-0282	51201-0282	2.82	.1110	14.00	17.00	38	3.00
51200-0283	51201-0283	2.83	.1114	14.00	17.00	38	3.00
51200-0284	51201-0284	2.84	.1118	14.00	17.00	38	3.00

Art. 51200 Catalog Number	Art. 51201 Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
51200-0285	51201-0285	2.85	.1122	14.00	17.00	38	3.00
51200-0286	51201-0286	2.86	.1126	14.00	17.00	38	3.00
51200-0287	51201-0287	2.87	.1130	14.00	17.00	38	3.00
51200-0288	51201-0288	2.88	.1134	14.00	17.00	38	3.00
51200-0289	51201-0289	2.89	.1138	14.00	17.00	38	3.00
51200-0290	51201-0290	2.90	.1142	14.00	17.00	38	3.00
51200-0291	51201-0291	2.91	.1146	14.00	17.00	38	3.00
51200-0292	51201-0292	2.92	.1150	14.00	17.00	38	3.00
51200-0293	51201-0293	2.93	.1154	14.00	17.00	38	3.00
51200-0294	51201-0294	2.94	.1157	14.00	17.00	38	3.00
51200-0295	51201-0295	2.95	.1161	14.00	17.00	38	3.00
51200-0296	51201-0296	2.96	.1165	14.00	17.00	38	3.00
51200-0297	51201-0297	2.97	.1169	14.00	17.00	38	3.00
40.5120.0298	51201-0298	2.98	.1173	14.00	17.00	38	3.00
51200-0299	51201-0299	2.99	.1177	14.00	17.00	38	3.00
51200-0300	51201-0300	3.00	.1181	14.00	17.00	38	3.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 144-145

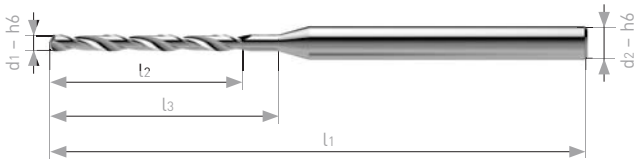


Art. 50621









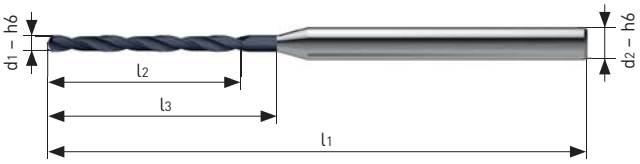
Art. 50622









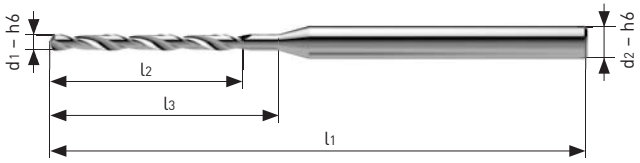


Art. 50621 Catalog Number	Art. 50622 Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50621-0015	—	.15	.0059	2.50	3.50	38	3.00
50621-0016	—	.16	.0063	2.50	3.50	38	3.00
50621-0017	—	.17	.0067	2.60	3.50	38	3.00
50621-0018	—	.18	.0071	2.60	3.50	38	3.00
50621-0019	—	.19	.0075	2.60	3.50	38	3.00
50621-0020	50622-0020	.20	.0079	2.40	3.50	38	3.00
50621-0021	50622-0021	.21	.0083	2.50	3.50	38	3.00
50621-0022	50622-0022	.22	.0087	2.70	3.50	38	3.00
50621-0023	50622-0023	.23	.0091	2.80	3.50	38	3.00
50621-0024	50622-0024	.24	.0094	2.90	4.00	38	3.00
50621-0025	50622-0025	.25	.0098	3.00	4.00	38	3.00
50621-0026	50622-0026	.26	.0102	3.10	4.00	38	3.00
50621-0027	50622-0027	.27	.0106	3.30	4.00	38	3.00
50621-0028	50622-0028	.28	.0110	3.40	4.50	38	3.00
50621-0029	50622-0029	.29	.0114	3.50	4.50	38	3.00
50621-0030	50622-0030	.30	.0118	3.60	4.50	38	3.00
50621-0031	50622-0031	.31	.0122	3.70	4.50	38	3.00
50621-0032	50622-0032	.32	.0126	3.90	5.00	38	3.00
50621-0033	50622-0033	.33	.0130	4.00	5.00	38	3.00
50621-0034	50622-0034	.34	.0134	4.10	5.00	38	3.00
50621-0035	50622-0035	.35	.0138	4.20	5.00	38	3.00
50621-0036	50622-0036	.36	.0142	4.30	5.50	38	3.00
50621-0037	50622-0037	.37	.0146	4.50	5.50	38	3.00
50621-0038	50622-0038	.38	.0150	4.60	5.50	38	3.00
50621-0039	50622-0039	.39	.0154	4.70	5.50	38	3.00
50621-0040	50622-0040	.40	.0157	4.80	6.00	38	3.00

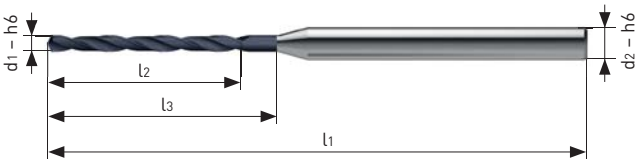
Art. 50621 Catalog Number	Art. 50622 Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50621-0041	50622-0041	.41	.0161	4.90	6.00	38	3.00
50621-0042	50622-0042	.42	.0165	5.10	6.00	38	3.00
50621-0043	50622-0043	.43	.0169	5.20	6.00	38	3.00
50621-0044	50622-0044	.44	.0173	5.30	6.50	38	3.00
50621-0045	50622-0045	.45	.0177	5.40	6.50	38	3.00
50621-0046	50622-0046	.46	.0181	5.50	6.50	38	3.00
50621-0047	50622-0047	.47	.0185	5.70	6.50	38	3.00
50621-0048	50622-0048	.48	.0189	5.80	7.00	38	3.00
50621-0049	50622-0049	.49	.0193	5.90	7.00	38	3.00
50621-0050	50622-0050	.50	.0197	6.00	7.00	38	3.00
50621-0051	50622-0051	.51	.0201	6.10	7.00	38	3.00
50621-0052	50622-0052	.52	.0205	6.30	7.50	38	3.00
50621-0053	50622-0053	.53	.0209	6.40	7.50	38	3.00
50621-0054	50622-0054	.54	.0213	6.50	7.50	38	3.00
50621-0055	50622-0055	.55	.0217	6.60	7.50	38	3.00
50621-0056	50622-0056	.56	.0220	6.70	8.00	38	3.00
50621-0057	50622-0057	.57	.0224	6.90	8.00	38	3.00
50621-0058	50622-0058	.58	.0228	7.00	8.00	38	3.00
50621-0059	50622-0059	.59	.0232	7.10	8.00	38	3.00
50621-0060	50622-0060	.60	.0236	7.20	9.00	38	3.00
50621-0061	50622-0061	.61	.0240	7.30	9.00	38	3.00
50621-0062	50622-0062	.62	.0244	7.50	9.00	38	3.00
50621-0063	50622-0063	.63	.0248	7.60	9.00	38	3.00
50621-0064	50622-0064	.64	.0252	7.70	9.50	38	3.00
50621-0065	50622-0065	.65	.0256	7.80	9.50	38	3.00
50621-0066	50622-0066	.66	.0260	7.90	9.50	38	3.00
50621-0067	50622-0067	.67	.0264	8.10	9.50	38	3.00
50621-0068	50622-0068	.68	.0268	8.20	10.00	38	3.00
50621-0069	50622-0069	.69	.0272	8.30	10.00	38	3.00
50621-0070	50622-0070	.70	.0276	8.40	10.00	38	3.00
50621-0071	50622-0071	.71	.0280	8.50	10.00	38	3.00
50621-0072	50622-0072	.72	.0283	8.70	10.50	38	3.00
50621-0073	50622-0073	.73	.0287	8.80	10.50	38	3.00
50621-0074	50622-0074	.74	.0291	8.90	10.50	38	3.00
50621-0075	50622-0075	.75	.0295	9.00	10.50	38	3.00
50621-0076	50622-0076	.76	.0299	9.10	11.00	38	3.00
50621-0077	50622-0077	.77	.0303	9.30	11.00	38	3.00
50621-0078	50622-0078	.78	.0307	9.40	11.00	38	3.00
50621-0079	50622-0079	.79	.0311	9.50	11.00	38	3.00
50621-0080	50622-0080	.80	.0315	9.60	11.50	38	3.00
50621-0081	50622-0081	.81	.0319	9.70	11.50	38	3.00
50621-0082	50622-0082	.82	.0323	9.90	11.50	38	3.00
50621-0083	50622-0083	.83	.0327	10.00	11.50	38	3.00
50621-0084	50622-0084	.84	.0331	10.10	12.00	38	3.00
50621-0085	50622-0085	.85	.0335	10.20	12.00	38	3.00

- All dimensions are millimeters unless otherwise noted
- Pilot drill recommended
- For cutting data see pg. 145-146

Art. 50621 Cont.



Art. 50622 Cont.

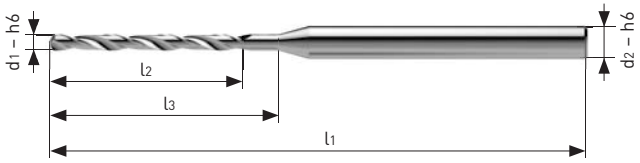


Art. 50621 Catalog Number	Art. 50622 Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50621-0086	50622-0086	.86	.0339	10.30	12.00	38	3.00
50621-0087	50622-0087	.87	.0343	10.50	12.00	38	3.00
50621-0088	50622-0088	.88	.0346	10.60	12.50	38	3.00
50621-0089	50622-0089	.89	.0350	10.70	12.50	38	3.00
50621-0090	50622-0090	.90	.0354	10.80	12.50	38	3.00
50621-0091	50622-0091	.91	.0358	10.90	12.50	38	3.00
50621-0092	50622-0092	.92	.0362	11.10	13.00	38	3.00
50621-0093	50622-0093	.93	.0366	11.20	13.00	38	3.00
50621-0094	50622-0094	.94	.0370	11.30	13.00	38	3.00
50621-0095	50622-0095	.95	.0374	11.40	13.00	38	3.00
50621-0096	50622-0096	.96	.0378	11.50	13.50	38	3.00
50621-0097	50622-0097	.97	.0382	11.70	13.50	38	3.00
50621-0098	50622-0098	.98	.0386	11.80	13.50	38	3.00
50621-0099	50622-0099	.99	.0390	11.90	13.50	38	3.00
50621-0100	50622-0100	1.00	.0394	12.00	14.50	38	3.00
50621-0101	50622-0101	1.01	.0398	12.10	14.50	38	3.00
50621-0102	50622-0102	1.02	.0402	12.30	14.50	38	3.00
50621-0103	50622-0103	1.03	.0406	12.40	14.50	38	3.00
50621-0104	50622-0104	1.04	.0409	12.50	15.00	38	3.00
50621-0105	50622-0105	1.05	.0413	12.60	15.00	38	3.00
50621-0106	50622-0106	1.06	.0417	12.70	15.00	38	3.00
50621-0107	50622-0107	1.07	.0421	12.90	15.00	38	3.00
50621-0108	50622-0108	1.08	.0425	13.00	15.50	38	3.00
50621-0109	50622-0109	1.09	.0429	13.10	15.50	38	3.00
50621-0110	50622-0110	1.10	.0433	13.20	15.50	38	3.00
50621-0111	50622-0111	1.11	.0437	13.30	15.50	38	3.00
50621-0112	50622-0112	1.12	.0441	13.50	16.00	38	3.00
50621-0113	50622-0113	1.13	.0445	13.60	16.00	38	3.00
50621-0114	50622-0114	1.14	.0449	13.70	16.00	38	3.00
50621-0115	50622-0115	1.15	.0453	13.80	16.00	38	3.00
50621-0116	50622-0116	1.16	.0457	13.90	16.50	38	3.00
50621-0117	50622-0117	1.17	.0461	14.10	16.50	38	3.00
50621-0118	50622-0118	1.18	.0465	14.20	16.50	38	3.00
50621-0119	50622-0119	1.19	.0469	14.30	16.50	38	3.00
50621-0120	50622-0120	1.20	.0472	14.40	17.00	38	3.00
50621-0121	50622-0121	1.21	.0476	14.50	17.00	38	3.00
50621-0122	50622-0122	1.22	.0480	14.70	17.00	38	3.00
50621-0123	50622-0123	1.23	.0484	14.80	17.00	38	3.00
50621-0124	50622-0124	1.24	.0488	14.90	17.50	38	3.00

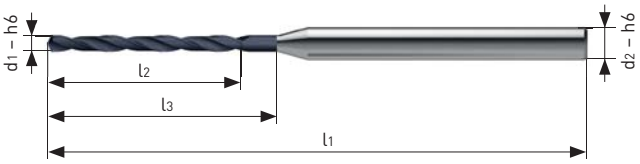
Art. 50621 Catalog Number	Art. 50622 Catalog Number	d1	d1 (in.)	l_2	l_3	l_1	d_2
50621-0125	50622-0125	1.25	.0492	15.00	17.50	38	3.00
50621-0126	50622-0126	1.26	.0496	15.10	17.50	50	3.00
50621-0127	50622-0127	1.27	.0500	15.30	17.50	50	3.00
50621-0128	50622-0128	1.28	.0504	15.40	18.00	50	3.00
50621-0129	50622-0129	1.29	.0508	15.50	18.00	50	3.00
50621-0130	50622-0130	1.30	.0512	15.60	18.00	50	3.00
50621-0131	50622-0131	1.31	.0516	15.70	18.00	50	3.00
50621-0132	50622-0132	1.32	.0520	15.90	18.50	50	3.00
50621-0133	50622-0133	1.33	.0524	16.00	18.50	50	3.00
50621-0134	50622-0134	1.34	.0528	16.10	18.50	50	3.00
50621-0135	50622-0135	1.35	.0531	16.20	18.50	50	3.00
50621-0136	50622-0136	1.36	.0535	16.30	19.00	50	3.00
50621-0137	50622-0137	1.37	.0539	16.50	19.00	50	3.00
50621-0138	50622-0138	1.38	.0543	16.60	19.00	50	3.00
50621-0139	50622-0139	1.39	.0547	16.70	19.00	50	3.00
50621-0140	50622-0140	1.40	.0551	16.80	19.50	50	3.00
50621-0141	50622-0141	1.41	.0555	16.90	19.50	50	3.00
50621-0142	50622-0142	1.42	.0559	17.10	19.50	50	3.00
50621-0143	50622-0143	1.43	.0563	17.20	19.50	50	3.00
50621-0144	50622-0144	1.44	.0567	17.30	20.00	50	3.00
50621-0145	50622-0145	1.45	.0571	17.40	20.00	50	3.00
50621-0146	50622-0146	1.46	.0575	17.50	20.00	50	3.00
50621-0147	50622-0147	1.47	.0579	17.70	20.00	50	3.00
50621-0148	50622-0148	1.48	.0583	17.80	20.50	50	3.00
50621-0149	50622-0149	1.49	.0587	17.90	20.50	50	3.00
50621-0150	50622-0150	1.50	.0591	18.00	21.00	50	3.00
50621-0151	50622-0151	1.51	.0594	18.10	21.00	50	3.00
50621-0152	50622-0152	1.52	.0598	18.30	21.00	50	3.00
50621-0153	50622-0153	1.53	.0602	18.40	21.00	50	3.00
50621-0154	50622-0154	1.54	.0606	18.50	21.50	50	3.00
50621-0155	50622-0155	1.55	.0610	18.60	21.50	50	3.00
50621-0156	50622-0156	1.56	.0614	18.70	21.50	50	3.00
50621-0157	50622-0157	1.57	.0618	18.90	21.50	50	3.00
50621-0158	50622-0158	1.58	.0622	19.00	22.00	50	3.00
50621-0159	50622-0159	1.59	.0626	19.10	22.00	50	3.00
50621-0160	50622-0160	1.60	.0630	19.20	22.00	50	3.00
50621-0161	50622-0161	1.61	.0634	19.30	22.00	50	3.00
50621-0162	50622-0162	1.62	.0638	19.40	22.50	50	3.00
50621-0163	50622-0163	1.63	.0642	19.60	22.50	50	3.00
50621-0164	50622-0164	1.64	.0646	19.70	22.50	50	3.00
50621-0165	50622-0165	1.65	.0650	19.80	22.50	50	3.00
50621-0166	50622-0166	1.66	.0654	19.90	23.00	50	3.00
50621-0167	50622-0167	1.67	.0657	20.10	23.00	50	3.00
50621-0168	50622-0168	1.68	.0661	20.20	23.00	50	3.00
50621-0169	50622-0169	1.69	.0665	20.30	23.00	50	3.00

- All dimensions are millimeters unless otherwise noted
- Pilot drill recommended
- For cutting data see pg. 145-146

Art. 50621 Cont.



Art. 50622 Cont.

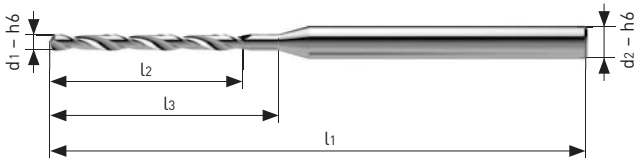


Art. 50621 Catalog Number	Art. 50622 Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50621-0170	50622-0170	1.70	.0669	20.40	23.50	50	3.00
50621-0171	50622-0171	1.71	.0673	20.50	23.50	50	3.00
50621-0172	50622-0172	1.72	.0677	20.70	23.50	50	3.00
50621-0173	50622-0173	1.73	.0681	20.80	23.50	50	3.00
50621-0174	50622-0174	1.74	.0685	20.90	24.00	50	3.00
50621-0175	50622-0175	1.75	.0689	21.00	24.00	50	3.00
50621-0176	50622-0176	1.76	.0693	21.10	24.00	50	3.00
50621-0177	50622-0177	1.77	.0697	21.30	24.00	50	3.00
50621-0178	50622-0178	1.78	.0701	21.40	24.50	50	3.00
50621-0179	50622-0179	1.79	.0705	21.50	24.50	50	3.00
50621-0180	50622-0180	1.80	.0709	21.60	25.00	50	3.00
50621-0181	50622-0181	1.81	.0713	21.70	25.00	50	3.00
50621-0182	50622-0182	1.82	.0717	21.90	25.00	50	3.00
50621-0183	50622-0183	1.83	.0720	22.00	25.00	50	3.00
50621-0184	50622-0184	1.84	.0724	22.10	25.50	50	3.00
50621-0185	50622-0185	1.85	.0728	22.20	25.50	50	3.00
50621-0186	50622-0186	1.86	.0732	22.30	25.50	50	3.00
50621-0187	50622-0187	1.87	.0736	22.50	25.50	50	3.00
50621-0188	50622-0188	1.88	.0740	22.60	26.00	50	3.00
50621-0189	50622-0189	1.89	.0744	22.70	26.00	50	3.00
50621-0190	50622-0190	1.90	.0748	22.80	26.00	50	3.00
50621-0191	50622-0191	1.91	.0752	22.90	26.00	50	3.00
50621-0192	50622-0192	1.92	.0756	23.10	26.50	50	3.00
50621-0193	50622-0193	1.93	.0760	23.20	26.50	50	3.00
50621-0194	50622-0194	1.94	.0764	23.30	26.50	50	3.00
50621-0195	50622-0195	1.95	.0768	23.40	26.50	50	3.00
50621-0196	50622-0196	1.96	.0772	23.50	27.00	50	3.00
50621-0197	50622-0197	1.97	.0776	23.70	27.00	50	3.00
50621-0198	50622-0198	1.98	.0780	23.80	27.00	50	3.00
50621-0199	50622-0199	1.99	.0783	23.90	27.00	50	3.00
50621-0200	50622-0200	2.00	.0787	24.00	27.00	50	3.00
50621-0201	50622-0201	2.01	.0791	24.10	27.50	60	3.00
50621-0202	50622-0202	2.02	.0795	24.20	27.50	60	3.00
50621-0203	50622-0203	2.03	.0799	24.40	27.50	60	3.00
50621-0204	50622-0204	2.04	.0803	24.50	27.50	60	3.00
50621-0205	50622-0205	2.05	.0807	24.60	28.00	60	3.00
50621-0206	50622-0206	2.06	.0811	24.70	28.00	60	3.00
50621-0207	50622-0207	2.07	.0815	24.80	28.00	60	3.00
50621-0208	50622-0208	2.08	.0819	25.00	28.00	60	3.00

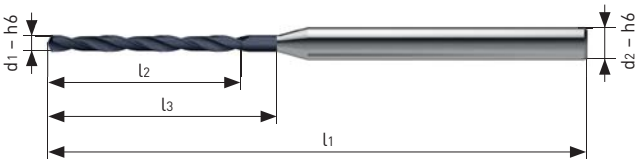
Art. 50621 Catalog Number	Art. 50622 Catalog Number	d1	d1 (in.)	l_2	l_3	l_1	d_2
50621-0209	50622-0209	2.09	.0823	25.10	28.50	60	3.00
50621-0210	50622-0210	2.10	.0827	25.20	28.50	60	3.00
50621-0211	50622-0211	2.11	.0831	25.40	28.50	60	3.00
50621-0212	50622-0212	2.12	.0835	25.50	28.50	60	3.00
50621-0213	50622-0213	2.13	.0839	25.60	29.00	60	3.00
50621-0214	50622-0214	2.14	.0843	25.70	29.00	60	3.00
50621-0215	50622-0215	2.15	.0846	25.80	29.00	60	3.00
50621-0216	50622-0216	2.16	.0850	25.90	29.00	60	3.00
50621-0217	50622-0217	2.17	.0854	26.10	29.50	60	3.00
50621-0218	50622-0218	2.18	.0858	26.20	29.50	60	3.00
50621-0219	50622-0219	2.19	.0862	26.30	29.50	60	3.00
50621-0220	50622-0220	2.20	.0866	26.40	29.50	60	3.00
50621-0221	50622-0221	2.21	.0870	26.50	30.00	60	3.00
50621-0222	50622-0222	2.22	.0874	26.70	30.00	60	3.00
50621-0223	50622-0223	2.23	.0878	26.80	30.00	60	3.00
50621-0224	50622-0224	2.24	.0882	26.90	30.00	60	3.00
50621-0225	50622-0225	2.25	.0886	27.00	30.50	60	3.00
50621-0226	50622-0226	2.26	.0890	27.10	30.50	60	3.00
50621-0227	50622-0227	2.27	.0894	27.20	30.50	60	3.00
50621-0228	50622-0228	2.28	.0898	27.40	30.50	60	3.00
50621-0229	50622-0229	2.29	.0902	27.50	31.00	60	3.00
50621-0230	50622-0230	2.30	.0906	27.60	31.00	60	3.00
50621-0231	50622-0231	2.31	.0909	27.70	31.00	65	3.00
50621-0232	50622-0232	2.32	.0913	27.80	31.00	65	3.00
50621-0233	50622-0233	2.33	.0917	28.00	31.50	65	3.00
50621-0234	50622-0234	2.34	.0921	28.10	31.50	65	3.00
50621-0235	50622-0235	2.35	.0925	28.20	31.50	65	3.00
50621-0236	50622-0236	2.36	.0929	28.30	31.50	65	3.00
50621-0237	50622-0237	2.37	.0933	28.40	32.00	65	3.00
50621-0238	50622-0238	2.38	.0937	28.60	32.00	65	3.00
50621-0239	50622-0239	2.39	.0941	28.70	32.00	65	3.00
50621-0240	50622-0240	2.40	.0945	28.80	32.00	65	3.00
50621-0241	50622-0241	2.41	.0949	28.90	33.00	65	3.00
50621-0242	50622-0242	2.42	.0953	29.00	33.00	65	3.00
50621-0243	50622-0243	2.43	.0957	29.20	33.00	65	3.00
50621-0244	50622-0244	2.44	.0961	29.30	33.00	65	3.00
50621-0245	50622-0245	2.45	.0965	29.40	33.00	65	3.00
50621-0246	50622-0246	2.46	.0969	29.50	33.50	65	3.00
50621-0247	50622-0247	2.47	.0972	29.60	33.50	65	3.00
50621-0248	50622-0248	2.48	.0976	29.80	33.50	65	3.00
50621-0249	50622-0249	2.49	.0980	29.90	33.50	65	3.00
50621-0250	50622-0250	2.50	.0984	30.00	34.00	65	3.00
50621-0251	50622-0251	2.51	.0988	30.10	34.00	65	3.00
50621-0252	50622-0252	2.52	.0992	30.20	34.00	65	3.00
50621-0253	50622-0253	2.53	.0996	30.40	34.00	65	3.00

- All dimensions are millimeters unless otherwise noted
- Pilot drill recommended
- For cutting data see pg. 145-146

Art. 50621 Cont.



Art. 50622 Cont.



Art. 50621 Catalog Number	Art. 50622 Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50621-0254	50622-0254	2.54	.1000	30.50	34.50	65	3.00
50621-0255	50622-0255	2.55	.1004	30.60	34.50	65	3.00
50621-0256	50622-0256	2.56	.1008	30.70	34.50	65	3.00
50621-0257	50622-0257	2.57	.1012	30.80	34.50	65	3.00
50621-0258	50622-0258	2.58	.1016	31.00	35.00	65	3.00
50621-0259	50622-0259	2.59	.1020	31.10	35.00	65	3.00
50621-0260	50622-0260	2.60	.1024	31.20	35.00	65	3.00
50621-0261	50622-0261	2.61	.1028	31.30	35.00	65	3.00
50621-0262	50622-0262	2.62	.1031	31.40	35.50	65	3.00
50621-0263	50622-0263	2.63	.1035	31.60	35.50	65	3.00
50621-0264	50622-0264	2.64	.1039	31.70	35.50	65	3.00
50621-0265	50622-0265	2.65	.1043	31.80	35.50	65	3.00
50621-0266	50622-0266	2.66	.1047	31.90	36.00	65	3.00
50621-0267	50622-0267	2.67	.1051	32.00	36.00	65	3.00
50621-0268	50622-0268	2.68	.1055	32.20	36.00	65	3.00
50621-0269	50622-0269	2.69	.1059	32.30	36.00	65	3.00
50621-0270	50622-0270	2.70	.1063	32.40	36.50	65	3.00
50621-0271	50622-0271	2.71	.1067	32.50	36.50	65	3.00
50621-0272	50622-0272	2.72	.1071	32.60	36.50	65	3.00
50621-0273	50622-0273	2.73	.1075	32.80	36.50	65	3.00
50621-0274	50622-0274	2.74	.1079	32.90	37.00	65	3.00
50621-0275	50622-0275	2.75	.1083	33.00	37.00	65	3.00
50621-0276	50622-0276	2.76	.1087	33.10	37.00	65	3.00
50621-0277	50622-0277	2.77	.1091	33.20	37.00	65	3.00
50621-0278	50622-0278	2.78	.1094	33.40	37.50	65	3.00
50621-0279	50622-0279	2.79	.1098	33.50	37.50	65	3.00
50621-0280	50622-0280	2.80	.1102	33.60	37.50	65	3.00
50621-0281	50622-0281	2.81	.1106	33.70	37.50	65	3.00
50621-0282	50622-0282	2.82	.1110	33.80	38.00	65	3.00
50621-0283	50622-0283	2.83	.1114	34.00	38.00	65	3.00
50621-0284	50622-0284	2.84	.1118	34.10	38.00	65	3.00
50621-0285	50622-0285	2.85	.1122	34.20	38.00	65	3.00
50621-0286	50622-0286	2.86	.1126	34.30	38.50	65	3.00
50621-0287	50622-0287	2.87	.1130	34.40	38.50	65	3.00
50621-0288	50622-0288	2.88	.1134	34.60	38.50	65	3.00
50621-0289	50622-0289	2.89	.1138	34.70	38.50	65	3.00
50621-0290	50622-0290	2.90	.1142	34.80	39.00	65	3.00
50621-0291	50622-0291	2.91	.1146	34.90	39.00	65	3.00
50621-0292	50622-0292	2.92	.1150	35.00	39.00	65	3.00

Art. 50621 Catalog Number	Art. 50622 Catalog Number	d1	d1 (in.)	l_2	l_3	l_1	d_2
50621-0293	50622-0293	2.93	.1154	35.20	39.00	65	3.00
50621-0294	50622-0294	2.94	.1157	35.30	39.50	65	3.00
50621-0295	50622-0295	2.95	.1161	35.40	39.50	65	3.00
50621-0296	50622-0296	2.96	.1165	35.50	39.50	65	3.00
50621-0297	50622-0297	2.97	.1169	35.60	39.50	65	3.00
50621-0298	50622-0298	2.98	.1173	35.80	40.00	65	3.00
50621-0299	50622-0299	2.99	.1177	35.90	40.00	65	3.00
50621-0300	50622-0300	3.00	.1181	36.00	40.00	65	3.00

- All dimensions are millimeters unless otherwise noted
- Pilot drill recommended
- For cutting data see pg. 145-146



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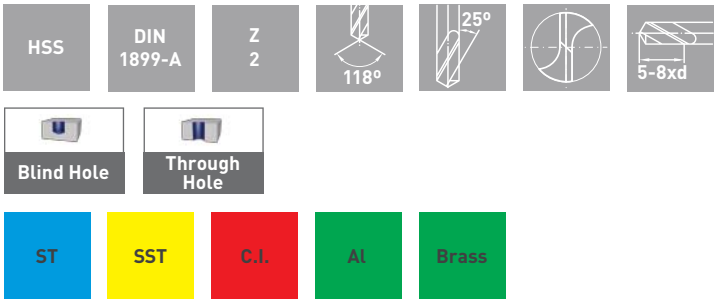
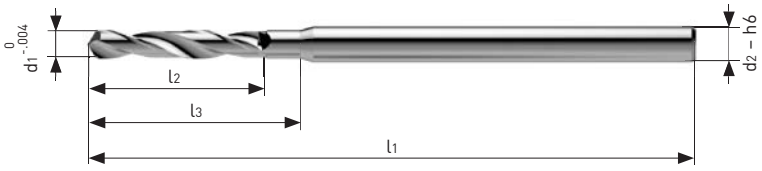
Art. 12604





Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
12604-0005	.05	.0020	.40	.60	25	1.00
12604-0006	.06	.0024	.40	.60	25	1.00
12604-0007	.07	.0028	.50	.70	25	1.00
12604-0008	.08	.0031	.50	.70	25	1.00
12604-0009	.09	.0035	.50	.70	25	1.00
12604-0010	.10	.0039	.50	.70	25	1.00
12604-0011	.11	.0043	.50	.70	25	1.00
12604-0012	.12	.0047	.50	.70	25	1.00
12604-0013	.13	.0051	.80	1.00	25	1.00
12604-0014	.14	.0055	.80	1.00	25	1.00
12604-0015	.15	.0059	.80	1.00	25	1.00
12604-0016	.16	.0063	1.10	1.40	25	1.00
12604-0017	.17	.0067	1.10	1.40	25	1.00
12604-0018	.18	.0071	1.10	1.40	25	1.00
12604-0019	.19	.0075	1.10	1.40	25	1.00
12604-0020	.20	.0079	1.50	1.80	25	1.00
12604-0021	.21	.0083	1.50	1.80	25	1.00
12604-0022	.22	.0087	1.50	1.80	25	1.00
12604-0023	.23	.0091	1.50	1.80	25	1.00
12604-0024	.24	.0094	1.50	1.80	25	1.00
12604-0025	.25	.0098	1.90	2.20	25	1.00
12604-0026	.26	.0102	1.90	2.20	25	1.00
12604-0027	.27	.0106	1.90	2.20	25	1.00
12604-0028	.28	.0110	1.90	2.20	25	1.00
12604-0029	.29	.0114	1.90	2.20	25	1.00
12604-0030	.30	.0118	1.90	2.20	25	1.00
12604-0031	.31	.0122	2.40	2.80	25	1.00
12604-0032	.32	.0126	2.40	2.80	25	1.00
12604-0033	.33	.0130	2.40	2.80	25	1.00
12604-0034	.34	.0134	2.40	2.80	25	1.00

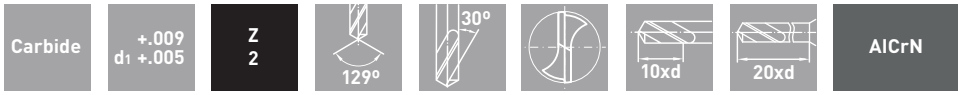
Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
12604-0035	.35	.0138	2.40	2.80	25	1.00
12604-0036	.36	.0142	2.40	2.80	25	1.00
12604-0037	.37	.0146	2.40	2.80	25	1.00
12604-0038	.38	.0150	2.40	2.80	25	1.00
12604-0039	.39	.0154	2.70	3.60	25	1.00
12604-0040	.40	.0157	2.70	3.60	25	1.00
12604-0041	.41	.0161	2.70	3.60	25	1.00
12604-0042	.42	.0165	2.70	3.60	25	1.00
12604-0043	.43	.0169	2.70	3.60	25	1.00
12604-0044	.44	.0173	2.70	3.60	25	1.00
12604-0045	.45	.0177	2.70	3.60	25	1.00
12604-0046	.46	.0181	2.70	3.60	25	1.00
12604-0047	.47	.0185	2.70	3.60	25	1.00
12604-0048	.48	.0189	2.70	3.60	25	1.00
12604-0049	.49	.0193	3.20	4.00	25	1.00
12604-0050	.50	.0197	3.20	4.00	25	1.00
12604-0051	.51	.0201	3.20	4.00	25	1.00
12604-0052	.52	.0205	3.20	4.00	25	1.00
12604-0053	.53	.0209	3.20	4.00	25	1.00
12604-0054	.54	.0213	3.60	4.50	25	1.00
12604-0055	.55	.0217	3.60	4.50	25	1.00
12604-0056	.56	.0220	3.60	4.50	25	1.00
12604-0057	.57	.0224	3.60	4.50	25	1.00
12604-0058	.58	.0228	3.60	4.50	25	1.00
12604-0059	.59	.0232	3.60	4.50	25	1.00
12604-0060	.60	.0236	3.60	4.50	25	1.00
12604-0061	.61	.0240	3.90	5.00	25	1.00
12604-0062	.62	.0244	3.90	5.00	25	1.00
12604-0063	.63	.0248	3.90	5.00	25	1.00
12604-0064	.64	.0252	3.90	5.00	25	1.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
12604-0065	.65	.0256	3.90	5.00	25	1.00
12604-0066	.66	.0260	3.90	5.00	25	1.00
12604-0067	.67	.0264	3.90	5.00	25	1.00
12604-0068	.68	.0268	4.50	5.60	25	1.00
12604-0069	.69	.0272	4.50	5.60	25	1.00
12604-0070	.70	.0276	4.50	5.60	25	1.00
12604-0071	.71	.0280	4.50	5.60	25	1.00
12604-0072	.72	.0283	4.50	5.60	25	1.00
12604-0073	.73	.0287	4.50	5.60	25	1.00
12604-0074	.74	.0291	4.50	5.60	25	1.00
12604-0075	.75	.0295	4.50	5.60	25	1.00
12604-0076	.76	.0299	5.00	6.30	25	1.00
12604-0077	.77	.0303	5.00	6.30	25	1.00
12604-0078	.78	.0307	5.00	6.30	25	1.00
12604-0079	.79	.0311	5.00	6.30	25	1.00
12604-0080	.80	.0315	5.00	6.30	25	1.50
12604-0081	.81	.0319	5.00	6.30	25	1.50
12604-0082	.82	.0323	5.00	6.30	25	1.50
12604-0083	.83	.0327	5.00	6.30	25	1.50
12604-0084	.84	.0331	5.00	6.30	25	1.50
12604-0085	.85	.0335	5.00	6.30	25	1.50
12604-0086	.86	.0339	5.70	7.10	25	1.50
12604-0087	.87	.0343	5.70	7.10	25	1.50
12604-0088	.88	.0346	5.70	7.10	25	1.50
12604-0089	.89	.0350	5.70	7.10	25	1.50
12604-0090	.90	.0354	5.70	7.10	25	1.50
12604-0091	.91	.0358	5.70	7.10	25	1.50
12604-0092	.92	.0362	5.70	7.10	25	1.50
12604-0093	.93	.0366	5.70	7.10	25	1.50
12604-0094	.94	.0370	5.70	7.10	25	1.50
12604-0095	.95	.0374	5.70	7.10	25	1.50
12604-0096	.96	.0378	6.50	8.00	25	1.50
12604-0097	.97	.0382	6.50	8.00	25	1.50
12604-0098	.98	.0386	6.50	8.00	25	1.50
12604-0099	.99	.0390	6.50	8.00	25	1.50
12604-0100	1.00	.0394	6.50	8.00	25	1.50
12604-0105	1.05	.0413	6.50	8.00	25	1.50
12604-0110	1.10	.0433	7.30	9.00	25	1.50
12604-0115	1.15	.0453	7.30	9.00	25	1.50
12604-0120	1.20	.0472	8.20	10.00	25	1.50
12604-0125	1.25	.0492	8.20	10.00	25	1.50

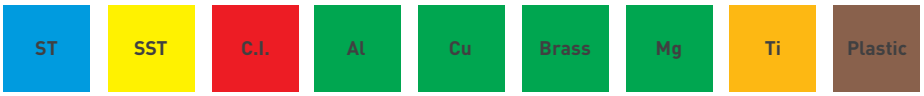
Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
12604-0130	1.30	.0512	8.20	10.00	25	1.50
12604-0135	1.35	.0531	9.20	11.20	25	1.50
12604-0140	1.40	.0551	9.20	11.20	25	1.50
12604-0145	1.45	.0571	9.20	11.20	25	1.50
12604-0150	1.50	.0591	10.90	12.90	38	2.00
12604-0155	1.55	.0610	11.20	13.40	38	2.00
12604-0158	1.587	.0625 (1/16)	11.20	13.40	38	2.00
12604-0160	1.60	.0630	11.20	13.40	38	2.00
12604-0165	1.65	.0650	11.20	13.40	38	2.00
12604-0170	1.70	.0669	11.20	13.40	38	2.00
12604-0175	1.75	.0689	11.20	13.40	38	2.00
12604-0180	1.80	.0709	11.20	13.40	38	2.00
12604-0185	1.85	.0728	11.20	13.40	38	2.00
12604-0190	1.90	.0748	11.70	14.00	38	2.00
12604-0195	1.95	.0768	11.70	14.00	38	2.00
12604-0198	1.984	.0781 (5/64)	11.70	14.00	38	2.00
12604-0200	2.00	.0787	12.70	15.00	43	2.50
12604-0205	2.05	.0807	12.70	15.00	43	2.50
12604-0210	2.10	.0827	12.70	15.00	43	2.50
12604-0215	2.15	.0846	12.70	15.00	43	2.50
12604-0220	2.20	.0866	13.70	17.00	43	2.50
12604-0225	2.25	.0886	13.70	17.00	43	2.50
12604-0230	2.30	.0906	13.70	17.00	43	2.50
12604-0235	2.35	.0925	13.70	17.00	43	2.50
12604-0238	2.381	.0938 (3/32)	13.70	17.00	43	2.50
12604-0240	2.40	.0945	14.70	18.00	43	2.50
12604-0245	2.45	.0965	14.70	18.00	43	2.50
12604-0250	2.50	.0984	14.70	18.00	46	3.00
12604-0255	2.55	.1004	15.70	19.00	46	3.00
12604-0260	2.60	.1024	15.70	19.00	46	3.00
12604-0265	2.65	.1043	16.70	20.00	46	3.00
12604-0270	2.70	.1063	16.70	20.00	46	3.00
12604-0275	2.75	.1083	17.70	21.00	46	3.00
12604-0278	2.778	.1094 (7/64)	17.70	21.00	46	3.00
12604-0280	2.80	.1102	17.70	21.00	46	3.00
12604-0285	2.85	.1122	18.70	22.00	46	3.00
12604-0290	2.90	.1142	18.70	22.00	46	3.00
12604-0295	2.95	.1161	19.70	23.00	46	3.00
12604-0300	3.00	.1181	19.70	—	46	3.00
12604-0318	3.175	.1250 (1/8)	19.70	—	46	3.175

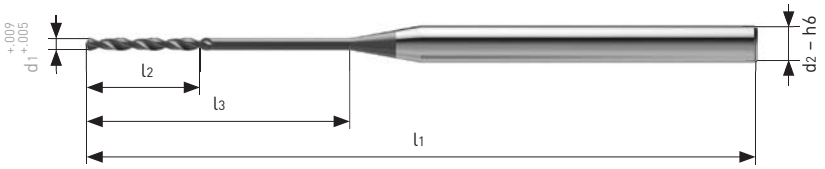
- All dimensions are millimeters unless otherwise noted
- Packaged in quantities of 10 pieces
- For cutting data see pg. 146

Art. 50720





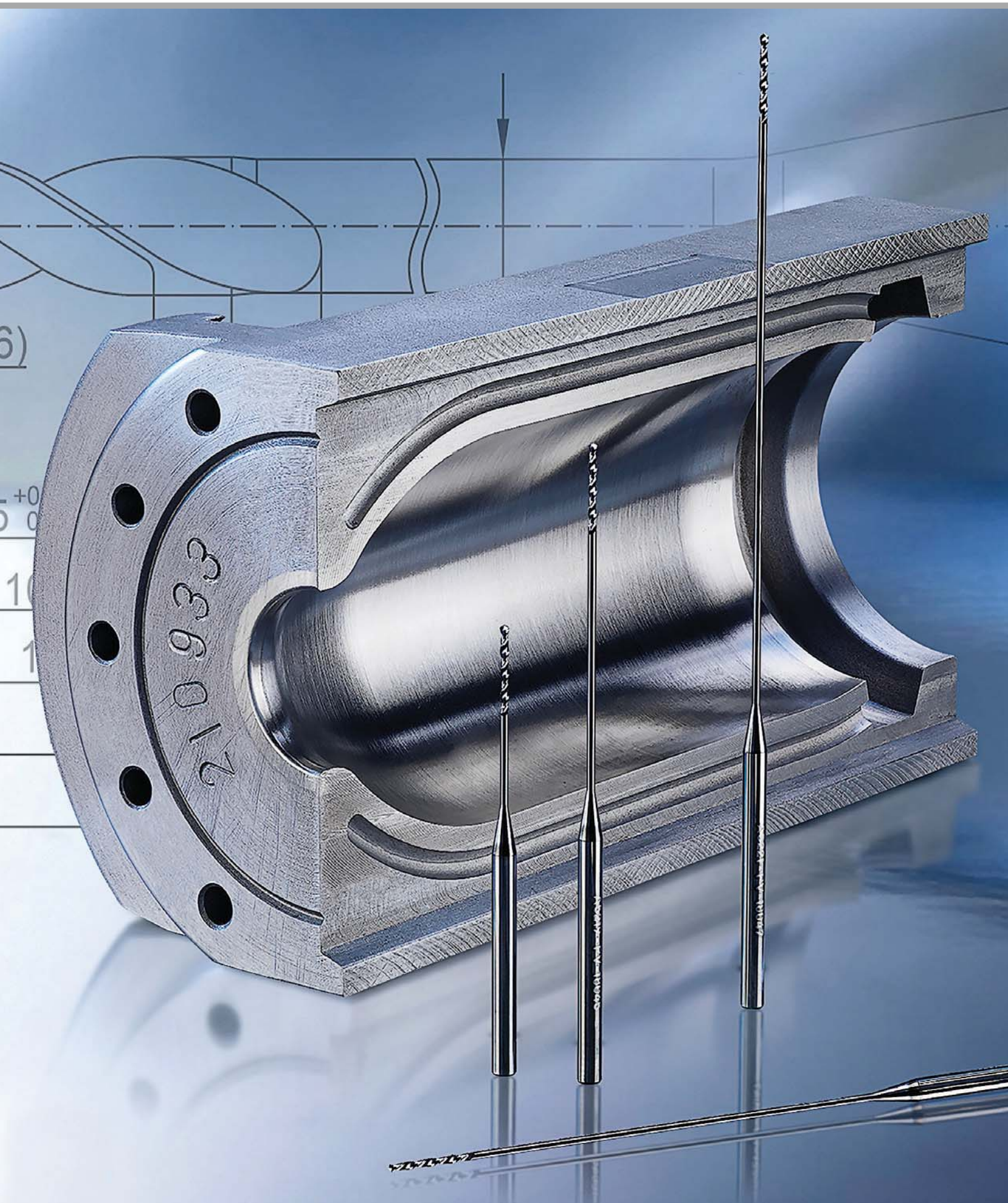




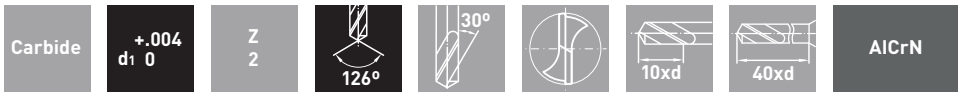
Catalog Number	d1	d1 (in)	d2	l2	l3	l1
50720-0020	.20	.0079	3.00	2.50	4.00	38
50720-0025	.25	.0098	3.00	3.00	5.00	38
50720-0030	.30	.0118	3.00	3.50	6.00	38
50720-0035	.35	.0138	3.00	4.00	7.00	38
50720-0040	.40	.0157	3.00	4.50	8.00	38
50720-0045	.45	.0177	3.00	5.00	9.00	38
50720-0050	.50	.0197	3.00	5.50	10.00	50
50720-0055	.55	.0217	3.00	6.00	11.00	50
50720-0060	.60	.0236	3.00	6.50	12.00	50
50720-0065	.65	.0256	3.00	7.00	13.00	50
50720-0070	.70	.0276	3.00	7.50	14.00	50
50720-0075	.75	.0295	3.00	8.00	15.00	50
50720-0080	.80	.0315	3.00	8.50	16.00	55
50720-0085	.85	.0335	3.00	9.00	17.00	55

Catalog Number	d1	d1 (in)	d2	l2	l3	l1
50720-0090	.90	.0354	3.00	9.50	18.00	55
50720-0095	.95	.0374	3.00	10.00	19.00	55
50720-0100	1.00	.0394	3.00	10.50	20.00	55
50720-0105	1.05	.0413	3.00	11.00	21.00	60
50720-0110	1.10	.0433	3.00	11.50	22.00	60
50720-0115	1.15	.0453	3.00	12.00	23.00	60
50720-0120	1.20	.0472	3.00	12.50	24.00	60
50720-0125	1.25	.0492	3.00	13.00	25.00	60
50720-0130	1.30	.0512	3.00	13.50	26.00	65
50720-0135	1.35	.0531	3.00	14.00	27.00	65
50720-0140	1.40	.0551	3.00	14.50	28.00	65
50720-0145	1.45	.0571	3.00	15.00	29.00	65
50720-0150	1.50	.0591	3.00	15.50	30.00	65

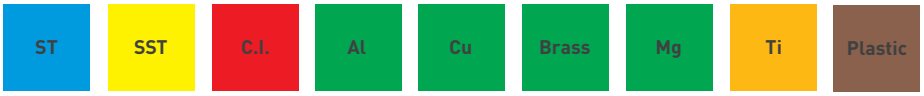
- All dimensions are millimeters unless otherwise noted
- Pilot drill recommended
- For cutting data see pg. 147

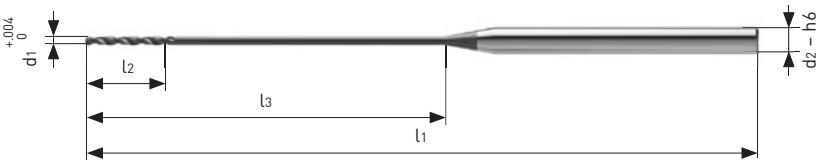


Art. 50740





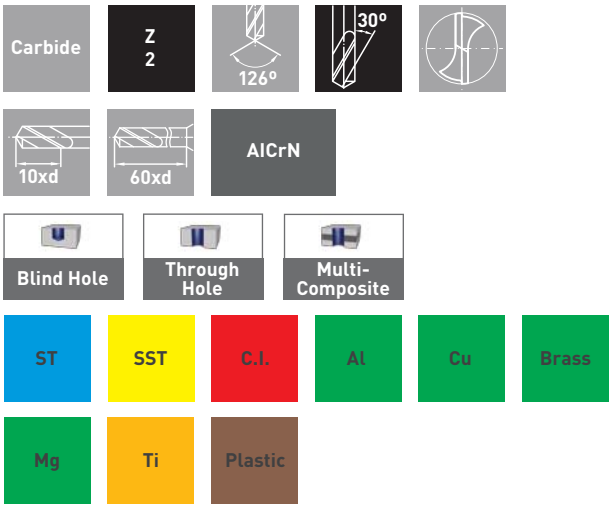




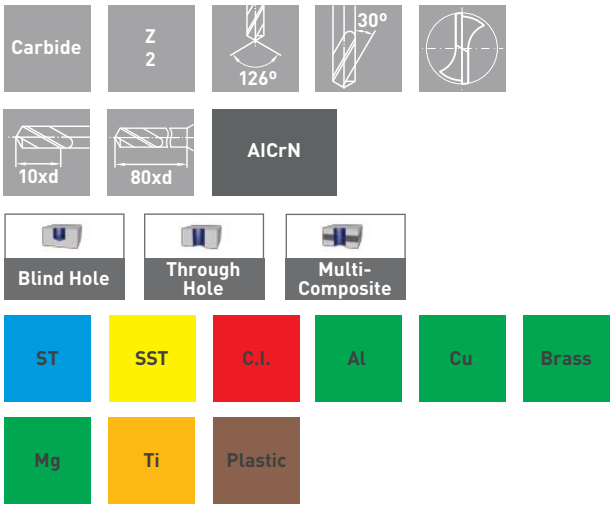
Catalog Number	d1	d1 (in)	d2	l2	l3	l1
50740-0040	.40	.0157	3.00	4.50	16.00	50
50740-0045	.45	.0177	3.00	5.00	18.00	50
50740-0050	.50	.0197	3.00	5.50	20.00	70
50740-0055	.55	.0217	3.00	6.00	22.00	70
50740-0060	.60	.0236	3.00	6.50	24.00	70
50740-0065	.65	.0256	3.00	7.00	26.00	70
50740-0070	.70	.0276	3.00	7.50	28.00	70
50740-0075	.75	.0295	3.00	8.00	30.00	70
50740-0080	.80	.0315	3.00	8.50	32.00	78
50740-0085	.85	.0335	3.00	9.00	34.00	78
50740-0090	.90	.0354	3.00	9.50	36.00	78
50740-0095	.95	.0374	3.00	10.00	38.00	78
50740-0100	1.00	.0394	3.00	10.50	40.00	78
50740-0105	1.05	.0413	3.00	11.00	42.00	88
50740-0110	1.10	.0433	3.00	11.50	44.00	88
50740-0115	1.15	.0453	3.00	12.00	46.00	88
50740-0120	1.20	.0472	3.00	12.50	48.00	88
50740-0125	1.25	.0492	3.00	13.00	50.00	88
50740-0130	1.30	.0512	3.00	13.50	52.00	98
50740-0135	1.35	.0531	3.00	14.00	54.00	98
50740-0140	1.40	.0551	3.00	14.50	56.00	98
50740-0145	1.45	.0571	3.00	15.00	58.00	98
50740-0150	1.50	.0591	3.00	15.50	60.00	98

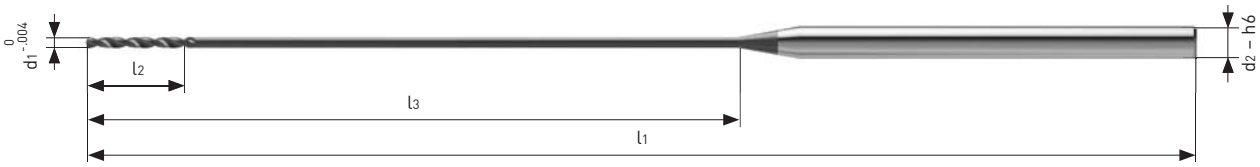
- All dimensions are millimeters unless otherwise noted
- Pilot drill recommended
- For cutting data see pg. 147

Art. 50760



Art. 50780



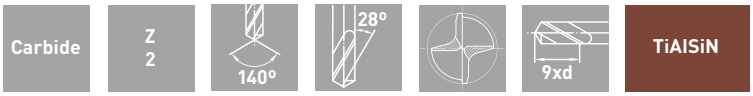


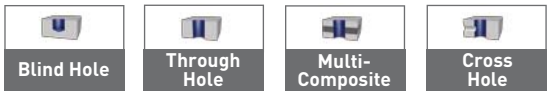
d1	d1 (in)	d2	Art. 50760				Art. 50780			
			Catalog Number	l2	l3	l1	Catalog Number	l2	l3	l1
.40	.0157	3.00	50760-0040	4.50	24.00	60	50780-0040	4.50	32.00	70
.45	.0177	3.00	50760-0045	5.00	27.00	60	50780-0045	5.00	36.00	70
.50	.0197	3.00	50760-0050	5.50	30.00	85	50780-0050	5.50	40.00	100
.55	.0217	3.00	50760-0055	6.00	33.00	85	50780-0055	6.00	44.00	100
.60	.0236	3.00	50760-0060	6.50	36.00	85	50780-0060	6.50	48.00	100
.65	.0256	3.00	50760-0065	7.00	39.00	85	50780-0065	7.00	52.00	100
.70	.0276	3.00	50760-0070	7.50	42.00	85	50780-0070	7.50	56.00	100
.75	.0295	3.00	50760-0075	8.00	45.00	85	50780-0075	8.00	60.00	100
.80	.0315	3.00	50760-0080	8.50	48.00	100	50780-0080	8.50	64.00	120
.85	.0335	3.00	50760-0085	9.00	51.00	100	50780-0085	9.00	68.00	120
.90	.0354	3.00	50760-0090	9.50	54.00	100	50780-0090	9.50	72.00	120
.95	.0374	3.00	50760-0095	10.00	57.00	100	50780-0095	10.00	76.00	120
1.00	.0394	3.00	50760-0100	10.50	60.00	100	50780-0100	10.50	80.00	120
1.05	.0413	3.00	50760-0105	11.00	63.00	115	50780-0105	11.00	84.00	140
1.10	.0433	3.00	50760-0110	11.50	66.00	115	50780-0110	11.50	88.00	140
1.15	.0453	3.00	50760-0115	12.00	69.00	115	50780-0115	12.00	92.00	140
1.20	.0472	3.00	50760-0120	12.50	72.00	115	50780-0120	12.50	96.00	140
1.25	.0492	3.00	50760-0125	13.00	75.00	115	50780-0125	13.00	100.00	140
1.30	.0512	3.00	50760-0130	13.50	78.00	130	50780-0130	13.50	104.00	160
1.35	.0531	3.00	50760-0135	14.00	81.00	130	50780-0135	14.00	108.00	160
1.40	.0551	3.00	50760-0140	14.50	84.00	130	50780-0140	14.50	112.00	160
1.45	.0571	3.00	50760-0145	15.00	87.00	130	50780-0145	15.00	116.00	160
1.50	.0591	3.00	50760-0150	15.50	90.00	130	50780-0150	15.50	120.00	160

- All dimensions are millimeters unless otherwise noted
- Pilot drill recommended
- For cutting data see pg. 147

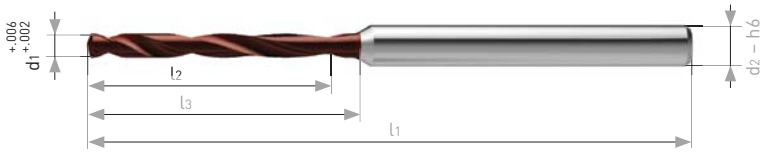
Nirox

Art. 51609









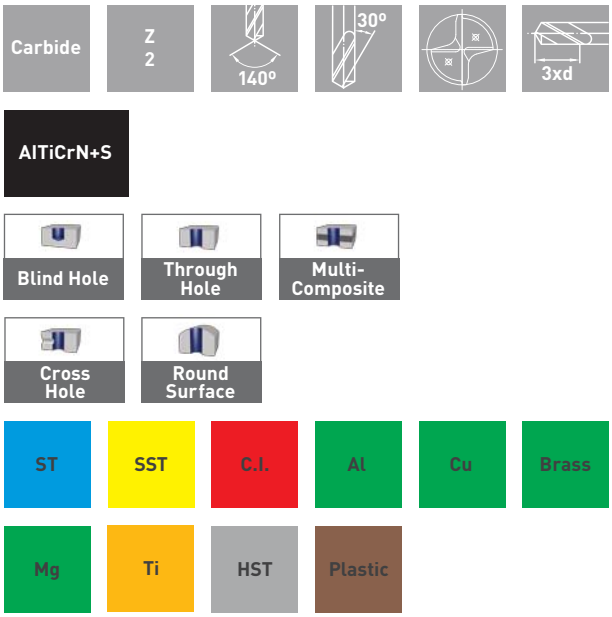
Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
51609-0030	.30	.0118	2.70	3.30	38	3.00
51609-0035	.35	.0138	3.20	3.90	38	3.00
51609-0040	.40	.0157	3.60	4.40	38	3.00
51609-0045	.45	.0177	4.10	5.00	38	3.00
51609-0050	.50	.0197	4.50	5.50	38	3.00
51609-0055	.55	.0217	5.00	6.10	38	3.00
51609-0060	.60	.0236	5.40	6.60	38	3.00
51609-0065	.65	.0256	5.90	7.20	38	3.00
51609-0070	.70	.0276	6.30	7.70	38	3.00
51609-0075	.75	.0295	6.80	8.30	38	3.00
51609-0080	.80	.0315	7.20	8.80	38	3.00
51609-0085	.85	.0335	7.70	9.40	38	3.00
51609-0090	.90	.0354	8.10	9.90	38	3.00
51609-0095	.95	.0374	8.60	10.50	38	3.00
51609-0100	1.00	.0394	9.00	11.00	38	3.00
51609-0105	1.05	.0413	9.50	11.60	38	3.00
51609-0110	1.10	.0433	9.90	12.10	38	3.00
51609-0115	1.15	.0453	10.40	12.70	38	3.00
51609-0120	1.20	.0472	10.80	13.20	38	3.00
51609-0125	1.25	.0492	11.30	13.80	38	3.00
51609-0130	1.30	.0512	11.70	14.30	38	3.00
51609-0135	1.35	.0531	12.20	14.90	38	3.00
51609-0140	1.40	.0551	12.60	15.40	38	3.00
51609-0145	1.45	.0571	13.10	16.00	38	3.00
51609-0150	1.50	.0591	13.50	16.50	38	3.00
51609-0155	1.55	.0610	14.00	17.10	50	3.00
51609-0160	1.60	.0630	14.40	17.60	50	3.00
51609-0165	1.65	.0650	14.90	18.20	50	3.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
51609-0170	1.70	.0669	15.30	18.70	50	3.00
51609-0175	1.75	.0689	15.80	19.30	50	3.00
51609-0180	1.80	.0709	16.20	19.80	50	3.00
51609-0185	1.85	.0728	16.70	20.40	50	3.00
51609-0190	1.90	.0748	17.10	20.90	50	3.00
51609-0195	1.95	.0768	17.60	21.50	50	3.00
51609-0200	2.00	.0787	18.00	22.00	50	3.00
51609-0205	2.05	.0807	18.50	22.60	50	3.00
51609-0210	2.10	.0827	18.90	23.10	50	3.00
51609-0215	2.15	.0846	19.40	23.70	50	3.00
51609-0220	2.20	.0866	19.80	24.20	50	3.00
51609-0225	2.25	.0886	20.30	24.80	50	3.00
51609-0230	2.30	.0906	20.70	25.30	50	3.00
51609-0235	2.35	.0925	21.20	25.90	50	3.00
51609-0240	2.40	.0945	21.60	26.40	50	3.00
51609-0245	2.45	.0965	22.10	27.00	50	3.00
51609-0250	2.50	.0984	22.50	27.50	50	3.00
51609-0255	2.55	.1004	23.00	28.10	50	3.00
51609-0260	2.60	.1024	23.40	28.60	50	3.00
51609-0265	2.65	.1043	23.90	29.20	50	3.00
51609-0270	2.70	.1063	24.30	29.70	50	3.00
51609-0275	2.75	.1083	24.80	3.30	50	3.00
51609-0280	2.80	.1102	25.20	30.80	50	3.00
51609-0285	2.85	.1122	25.70	31.40	50	3.00
51609-0290	2.90	.1142	26.10	31.90	50	3.00
51609-0295	2.95	.1161	26.60	32.50	50	3.00
51609-0300	3.00	.1181	27.00	33.00	50	3.00

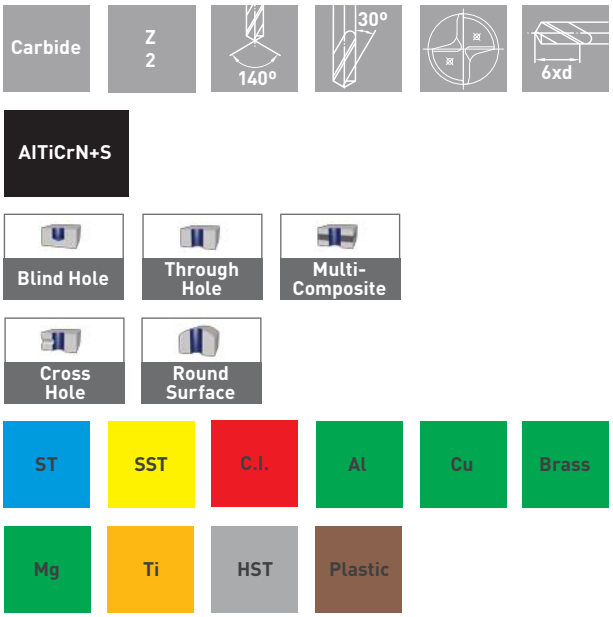
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 148



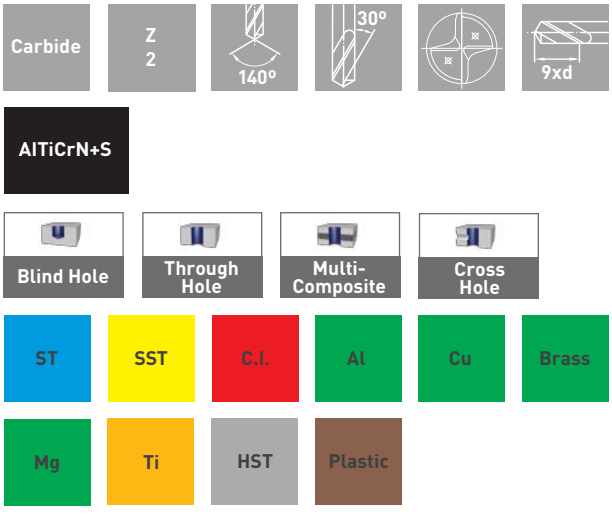
Phoenix TC2 — Art. 52903

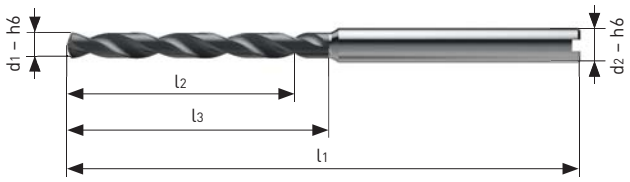


Phoenix TC2 — Art. 52906



Phoenix TC2 — Art. 52909





d1	d1 (in.)	d2	Art. 52903				Art. 52906				Art. 52909			
			Catalog Number	l2	l3	l1	Catalog Number	l2	l3	l1	Catalog Number	l2	l3	l1
1.00	.0394	3.00	52903-0100	3.00	5.00	38	52906-0100	6.00	8.00	38	52909-0100	9.00	11.00	51
1.05	.0413	3.00	52903-0105	3.15	5.25	38	52906-0105	6.30	8.30	38	—	—	—	—
1.10	.0433	3.00	52903-0110	3.30	5.50	38	52906-0110	6.60	8.60	38	52909-0110	9.90	12.00	51
1.15	.0453	3.00	52903-0115	3.45	5.50	38	52906-0115	6.90	8.90	38	—	—	—	—
1.20	.0472	3.00	52903-0120	3.60	5.50	38	52906-0120	7.20	9.20	38	52909-0120	1.80	13.00	51
1.25	.0492	3.00	52903-0125	3.75	6.00	38	52906-0125	7.50	9.50	38	—	—	—	—
1.30	.0512	3.00	52903-0130	3.90	6.00	38	52906-0130	7.80	9.80	38	52909-0130	11.70	14.00	51
1.35	.0531	3.00	52903-0135	4.05	6.00	38	52906-0135	8.10	10.10	38	—	—	—	—
1.40	.0551	3.00	52903-0140	4.20	6.50	38	52906-0140	8.40	10.40	38	52909-0140	12.60	15.00	51
1.45	.0571	3.00	52903-0145	4.35	6.50	38	52906-0145	8.70	10.70	38	—	—	—	—
1.50	.0591	3.00	52903-0150	4.50	6.50	38	52906-0150	9.00	11.00	38	52909-0150	13.50	16.50	51
1.55	.0610	3.00	52903-0155	4.65	7.50	38	52906-0155	9.30	11.30	38	—	—	—	—
1.60	.0630	3.00	52903-0160	4.80	7.50	38	52906-0160	9.60	12.60	38	52909-0160	14.40	17.50	51
1.65	.0650	3.00	52903-0165	4.95	8.00	38	52906-0165	9.90	12.90	38	—	—	—	—
1.70	.0669	3.00	52903-0170	5.10	8.00	38	52906-0170	10.20	13.20	38	52909-0170	15.30	18.50	51
1.75	.0689	3.00	52903-0175	5.25	8.00	38	52906-0175	10.50	13.50	38	—	—	—	—
1.80	.0709	3.00	52903-0180	5.40	8.50	38	52906-0180	10.80	13.80	38	52909-0180	16.20	19.00	51
1.85	.0728	3.00	52903-0185	5.55	8.50	38	52906-0185	11.10	14.10	38	—	—	—	—
1.90	.0748	3.00	52903-0190	5.70	8.50	38	52906-0190	11.40	14.40	38	52909-0190	17.10	20.00	51
1.95	.0768	3.00	52903-0195	5.85	9.00	38	52906-0195	11.70	14.70	38	—	—	—	—
2.00	.0787	3.00	52903-0200	6.00	9.00	38	52906-0200	12.00	15.00	50	52909-0200	18.00	21.00	51
2.05	.0807	3.00	52903-0205	6.15	9.00	38	52906-0205	12.30	15.30	50	—	—	—	—
2.10	.0827	3.00	52903-0210	6.30	9.50	38	52906-0210	12.60	15.60	50	52909-0210	18.90	22.00	61
2.15	.0846	3.00	52903-0215	6.45	9.50	38	52906-0215	12.90	15.90	50	—	—	—	—
2.20	.0866	3.00	52903-0220	6.60	9.50	38	52906-0220	13.20	16.20	50	52909-0220	19.80	23.00	61
2.25	.0886	3.00	52903-0225	6.75	10.00	38	52906-0225	13.50	16.50	50	—	—	—	—
2.30	.0906	3.00	52903-0230	6.90	10.00	38	52906-0230	13.80	16.80	50	52909-0230	20.70	24.00	61
2.35	.0925	3.00	52903-0235	7.05	10.00	38	52906-0235	14.10	17.10	50	—	—	—	—
2.40	.0945	3.00	52903-0240	7.20	10.00	38	52906-0240	14.40	17.40	50	52909-0240	21.60	24.50	61
2.45	.0965	3.00	52903-0245	7.35	10.00	38	52906-0245	14.70	17.70	50	—	—	—	—
2.50	.0984	3.00	52903-0250	7.50	10.50	50	52906-0250	15.00	18.00	50	52909-0250	22.50	25.50	61
2.55	.1004	3.00	52903-0255	7.65	11.00	50	52906-0255	15.30	18.30	50	—	—	—	—
2.60	.1024	3.00	52903-0260	7.80	11.00	50	52906-0260	15.60	18.60	50	52909-0260	23.40	26.50	61
2.65	.1043	3.00	52903-0265	7.95	11.00	50	52906-0265	15.90	18.90	50	—	—	—	—
2.70	.1063	3.00	52903-0270	8.10	11.50	50	52906-0270	16.20	19.20	50	52909-0270	24.30	27.50	61
2.75	.1083	3.00	52903-0275	8.25	11.50	50	52906-0275	16.50	19.50	50	—	—	—	—
2.80	.1102	3.00	52903-0280	8.40	11.50	50	52906-0280	16.80	19.80	50	52909-0280	25.20	28.00	61
2.85	.1122	3.00	52903-0285	8.55	12.00	50	52906-0285	17.10	20.10	50	—	—	—	—
2.90	.1142	3.00	52903-0290	8.70	12.00	50	52906-0290	17.40	20.40	50	52909-0290	26.10	29.00	61
2.95	.1161	3.00	52903-0295	8.85	12.00	50	52906-0295	17.70	20.70	50	—	—	—	—
3.00	.1181	3.00	52903-0300	9.00	12.50	50	52906-0300	18.00	21.00	50	52909-0300	27.00	31.00	61
3.05	.1201	6.00	52903-0305	9.15	12.50	55	52906-0305	18.30	22.30	66	—	—	—	—
3.10	.1220	6.00	52903-0310	9.30	12.50	55	52906-0310	18.60	22.60	66	52909-0310	27.90	32.00	79
3.15	.1240	6.00	52903-0315	9.45	12.50	55	52906-0315	18.90	22.90	66	—	—	—	—
3.20	.1260	6.00	52903-0320	9.60	12.50	55	52906-0320	19.20	23.20	66	52909-0320	28.80	33.00	79

- All dimensions are millimeters unless otherwise noted
- Internal coolant for all sizes
- For cutting data see pg. 148

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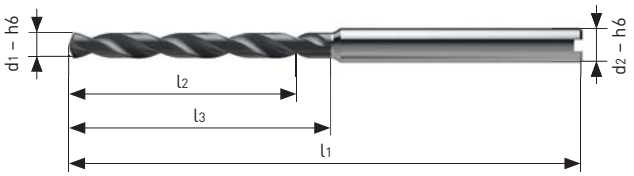
Art. 52903 / 52906 / 52909 Cont.

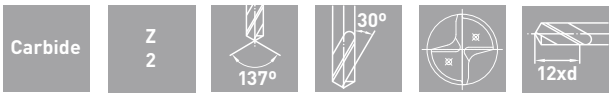


d1	d1 (in.)	d2	Art. 52903				Art. 52906				Art. 52909			
			Catalog Number	l2	l3	l1	Catalog Number	l2	l3	l1	Catalog Number	l2	l3	l1
3.25	.1280	6.00	52903-0325	9.75	12.50	55	52906-0325	19.50	23.50	66	—	—	—	—
3.30	.1299	6.00	52903-0330	9.90	12.50	55	52906-0330	19.80	23.80	66	52909-0330	29.70	34.00	79
3.35	.1319	6.00	52903-0335	10.05	14.00	55	52906-0335	20.10	24.10	66	—	—	—	—
3.40	.1339	6.00	52903-0340	10.20	14.00	55	52906-0340	20.40	24.40	66	52909-0340	30.60	35.00	79
3.45	.1358	6.00	52903-0345	10.35	14.00	55	52906-0345	20.70	24.70	66	—	—	—	—
3.50	.1378	6.00	52903-0350	10.50	14.50	55	52906-0350	21.00	25.00	66	52909-0350	31.50	36.50	79
3.55	.1398	6.00	52903-0355	10.65	14.50	55	52906-0355	21.30	25.30	66	—	—	—	—
3.60	.1417	6.00	52903-0360	10.80	15.00	55	52906-0360	21.60	25.60	66	52909-0360	32.40	37.50	79
3.65	.1437	6.00	52903-0365	10.95	15.00	55	52906-0365	21.90	25.90	66	—	—	—	—
3.70	.1457	6.00	52903-0370	11.10	15.00	55	52906-0370	22.20	26.20	66	52909-0370	33.30	38.50	79
3.75	.1476	6.00	52903-0375	11.25	15.00	55	52906-0375	22.50	26.50	66	—	—	—	—
3.80	.1496	6.00	52903-0380	11.40	15.50	55	52906-0380	22.80	26.80	66	52909-0380	34.20	39.00	79
3.85	.1516	6.00	52903-0385	11.55	15.50	55	52906-0385	23.10	27.10	66	—	—	—	—
3.90	.1535	6.00	52903-0390	11.70	15.50	55	52906-0390	23.40	27.40	66	52909-0390	35.10	4.00	79
3.95	.1555	6.00	52903-0395	11.85	15.50	55	52906-0395	23.70	27.70	66	—	—	—	—
4.00	.1575	6.00	52903-0400	12.00	15.50	55	52906-0400	24.00	28.00	66	52909-0400	36.00	41.00	79
4.05	.1594	6.00	52903-0405	12.15	16.50	60	52906-0405	24.30	30.20	79	—	—	—	—
4.10	.1614	6.00	52903-0410	12.30	18.50	60	52906-0410	24.60	30.50	79	52909-0410	36.90	43.00	91
4.15	.1634	6.00	52903-0415	12.45	18.50	60	52906-0415	24.90	30.80	79	—	—	—	—
4.20	.1654	6.00	52903-0420	12.60	18.50	60	52906-0420	25.20	31.00	79	52909-0420	37.80	44.00	91
4.25	.1673	6.00	52903-0425	12.75	18.50	60	52906-0425	25.50	31.50	79	—	—	—	—
4.30	.1693	6.00	52903-0430	12.90	19.00	60	52906-0430	25.80	32.00	79	52909-0430	38.70	45.00	91
4.35	.1713	6.00	52903-0435	13.05	19.00	60	52906-0435	26.10	32.50	79	—	—	—	—
4.40	.1732	6.00	52903-0440	13.20	19.00	60	52906-0440	26.40	32.50	79	52909-0440	39.60	45.50	91
4.45	.1752	6.00	52903-0445	13.35	2.50	60	52906-0445	26.70	33.00	79	—	—	—	—
4.50	.1772	6.00	52903-0450	13.50	2.50	60	52906-0450	27.00	33.00	79	52909-0450	40.50	46.50	91
4.55	.1791	6.00	52903-0455	13.65	2.50	60	52906-0455	27.30	35.50	79	—	—	—	—
4.60	.1811	6.00	52903-0460	13.80	22.00	60	52906-0460	27.60	35.50	79	52909-0460	41.40	49.50	91
4.65	.1831	6.00	52903-0465	13.95	22.00	60	52906-0465	27.90	36.00	79	—	—	—	—
4.70	.1850	6.00	52903-0470	14.10	22.00	60	52906-0470	28.20	36.00	79	52909-0470	42.30	5.50	91
4.75	.1870	6.00	52903-0475	14.25	22.00	60	52906-0475	28.50	37.00	79	—	—	—	—
4.80	.1890	6.00	52903-0480	14.40	22.50	60	52906-0480	28.80	37.00	79	52909-0480	43.20	51.00	91
4.85	.1909	6.00	52903-0485	14.55	22.50	60	52906-0485	29.10	37.50	79	—	—	—	—
4.90	.1929	6.00	52903-0490	14.70	22.50	60	52906-0490	29.40	37.60	79	52909-0490	44.10	52.00	91
4.95	.1949	6.00	52903-0495	14.85	23.00	60	52906-0495	29.70	38.00	79	—	—	—	—
5.00	.1969	6.00	52903-0500	15.00	23.00	60	52906-0500	30.00	38.00	79	52909-0500	45.00	53.00	91
5.05	.1988	6.00	52903-0505	15.15	23.00	64	52906-0505	30.30	38.50	79	—	—	—	—
5.10	.2008	6.00	52903-0510	15.30	23.50	64	52906-0510	30.60	38.50	79	52909-0510	45.90	54.00	100
5.15	.2028	6.00	52903-0515	15.45	23.50	64	52906-0515	30.90	39.00	79	—	—	—	—

d1	d1 (in.)	d2	Art. 52903				Art. 52906				Art. 52909			
			Catalog Number	l2	l3	l1	Catalog Number	l2	l3	l1	Catalog Number	l2	l3	l1
5.20	.2047	6.00	52903-0520	15.60	23.50	64	52906-0520	31.20	39.00	79	52909-0520	46.80	55.00	100
5.25	.2067	6.00	52903-0525	15.75	23.50	64	52906-0525	31.50	40.00	79	—	—	—	—
5.30	.2087	6.00	52903-0530	15.90	24.00	64	52906-0530	31.80	40.00	79	52909-0530	47.70	56.00	100
5.35	.2106	6.00	52903-0535	16.05	24.00	64	52906-0535	32.10	40.50	79	—	—	—	—
5.40	.2126	6.00	52903-0540	16.20	24.00	64	52906-0540	32.40	40.50	79	52909-0540	48.60	57.00	100
5.45	.2146	6.00	52903-0545	16.35	24.00	64	52906-0545	32.70	41.00	79	—	—	—	—
5.50	.2165	6.00	52903-0550	16.50	24.50	64	52906-0550	33.00	41.00	79	52909-0550	49.50	57.50	100
5.55	.2185	6.00	52903-0555	16.65	24.50	64	52906-0555	33.30	41.50	81	—	—	—	—
5.60	.2205	6.00	52903-0560	16.80	24.50	64	52906-0560	33.60	41.50	81	52909-0560	5.40	58.50	100
5.65	.2224	6.00	52903-0565	16.95	24.50	64	52906-0565	33.90	42.00	81	—	—	—	—
5.70	.2244	6.00	52903-0570	17.10	25.50	64	52906-0570	34.20	42.00	81	52909-0570	51.30	59.50	100
5.75	.2264	6.00	52903-0575	17.25	25.50	64	52906-0575	34.50	43.00	81	—	—	—	—
5.80	.2283	6.00	52903-0580	17.40	25.50	64	52906-0580	34.80	43.00	81	52909-0580	52.20	6.00	100
5.85	.2303	6.00	52903-0585	17.55	25.50	64	52906-0585	35.10	43.50	81	—	—	—	—
5.90	.2323	6.00	52903-0590	17.70	26.00	64	52906-0590	35.40	43.50	81	52909-0590	53.10	61.00	100
5.95	.2343	6.00	52903-0595	17.85	26.00	64	52906-0595	35.70	44.00	81	—	—	—	—
6.00	.2362	6.00	52903-0600	18.00	27.00	64	52906-0600	36.00	44.00	81	52909-0600	54.00	62.00	100
6.10	.2402	8.00	52903-0610	18.30	27.50	68	52906-0610	36.60	45.50	89	52909-0610	54.90	64.00	111
6.20	.2441	8.00	52903-0620	18.60	27.50	68	52906-0620	37.20	46.00	89	52909-0620	55.80	65.00	111
6.30	.2480	8.00	52903-0630	18.90	28.00	68	52906-0630	37.80	47.00	89	52909-0630	56.70	66.00	111
6.40	.2520	8.00	52903-0640	19.20	28.00	68	52906-0640	38.40	47.50	89	52909-0640	57.60	66.50	111
6.50	.2559	8.00	52903-0650	19.50	28.50	68	52906-0650	39.00	48.00	89	52909-0650	58.50	67.50	111
6.60	.2598	8.00	52903-0660	19.80	29.00	68	52906-0660	39.60	48.50	89	52909-0660	59.40	68.50	111
6.70	.2638	8.00	52903-0670	20.10	29.50	68	52906-0670	40.20	49.00	89	52909-0670	6.30	69.50	111
6.80	.2677	8.00	52903-0680	20.40	29.50	68	52906-0680	40.80	50.00	89	52909-0680	61.20	70.00	111
6.90	.2717	8.00	52903-0690	20.70	30.00	68	52906-0690	41.40	50.50	89	52909-0690	62.10	71.00	111
7.00	.2756	8.00	52903-0700	21.00	31.00	68	52906-0700	42.00	52.00	89	52909-0700	63.00	73.00	111
7.10	.2795	8.00	52903-0710	21.30	31.50	72	52906-0710	42.60	52.50	95	52909-0710	63.90	74.00	120
7.20	.2835	8.00	52903-0720	21.60	31.50	72	52906-0720	43.20	53.50	95	52909-0720	64.80	75.00	120
7.30	.2874	8.00	52903-0730	21.90	32.00	72	52906-0730	43.80	54.00	95	52909-0730	65.70	76.00	120
7.40	.2913	8.00	52903-0740	22.20	32.00	72	52906-0740	44.40	54.50	95	52909-0740	66.60	76.50	120
7.50	.2953	8.00	52903-0750	22.50	32.50	72	52906-0750	45.00	55.00	95	52909-0750	67.50	77.50	120
7.60	.2992	8.00	52903-0760	22.80	32.50	72	52906-0760	45.60	55.50	95	52909-0760	68.40	78.50	120
7.70	.3031	8.00	52903-0770	23.10	33.50	72	52906-0770	46.20	56.00	95	52909-0770	69.30	79.50	120
7.80	.3071	8.00	52903-0780	23.40	33.50	72	52906-0780	46.80	57.00	95	52909-0780	7.20	80.00	120
7.90	.3110	8.00	52903-0790	23.70	34.00	72	52906-0790	47.40	57.50	95	52909-0790	72.00	81.00	120
8.00	.3150	8.00	52903-0800	24.00	34.00	72	52906-0800	48.00	58.00	95	52909-0800	72.00	82.00	120
8.50	.3346	10.00	52903-0850	25.50	36.50	79	52906-0850	51.00	62.00	106	52909-0850	76.50	87.50	134
9.00	.3543	10.00	52903-0900	27.00	38.00	79	52906-0900	54.00	65.00	106	52909-0900	81.00	92.00	134
9.50	.3740	10.00	52903-0950	28.50	40.00	85	52906-0950	57.00	68.00	113	52909-0950	85.50	96.50	144
10.00	.3937	10.00	52903-1000	30.00	42.00	85	52906-1000	60.00	72.00	113	52909-1000	90.00	102.00	144

- All dimensions are millimeters unless otherwise noted
- Internal coolant for all sizes
- For cutting data see pg. 148

Phoenix TC2 — Art. 52912



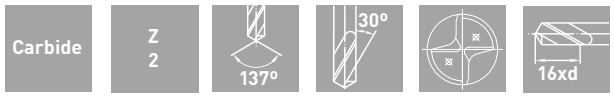








Phoenix TC2 — Art. 52916

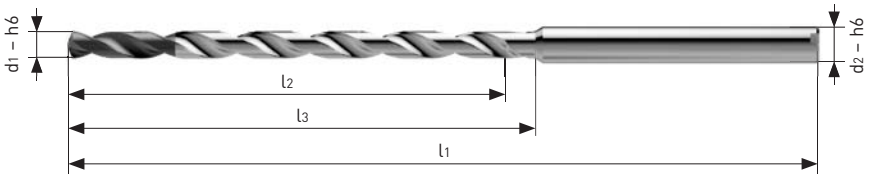












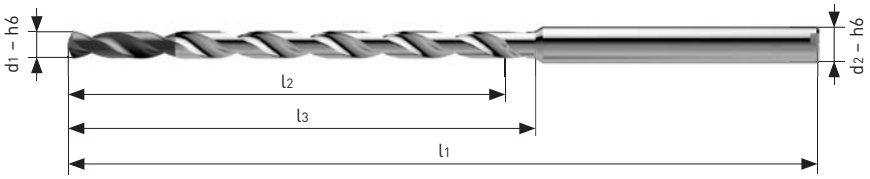
d1	d1 (in.)	d2	Art. 52912				Art. 52916			
			Catalog Number	l2	l3	l1	Catalog Number	l2	l3	l1
1.00	.0394	3.00	52912-0100	12.00	14.00	50	52916-0100	16.00	18.00	65
1.10	.0433	3.00	52912-0110	13.20	15.50	50	52916-0110	17.60	19.50	65
1.20	.0472	3.00	52912-0120	14.40	16.50	50	52916-0120	19.20	21.00	65
1.30	.0512	3.00	52912-0130	15.60	17.50	50	52916-0130	20.80	23.00	65
1.40	.0551	3.00	52912-0140	16.80	19.00	50	52916-0140	22.40	24.50	65
1.50	.0591	3.00	52912-0150	18.00	21.00	50	52916-0150	24.00	27.00	65
1.60	.0630	3.00	52912-0160	19.20	22.50	50	52916-0160	25.60	28.50	65
1.70	.0669	3.00	52912-0170	20.40	23.50	50	52916-0170	27.20	30.00	65
1.80	.0709	3.00	52912-0180	21.60	24.50	50	52916-0180	28.80	32.00	65
1.90	.0748	3.00	52912-0190	22.80	26.00	55	52916-0190	30.40	33.50	65
2.00	.0787	3.00	52912-0200	24.00	27.00	55	52916-0200	32.00	35.00	65
2.10	.0827	3.00	52912-0210	25.20	28.50	55	52916-0210	33.60	36.50	82
2.20	.0866	3.00	52912-0220	26.40	29.50	55	52916-0220	35.20	38.00	82
2.30	.0906	3.00	52912-0230	27.60	30.50	55	52916-0230	36.80	4.00	82
2.40	.0945	3.00	52912-0240	28.80	32.00	55	52916-0240	38.40	41.50	82
2.50	.0984	3.00	52912-0250	30.00	33.00	60	52916-0250	40.00	43.00	82
2.60	.1024	3.00	52912-0260	31.20	34.50	60	52916-0260	41.60	44.50	82
2.70	.1063	3.00	52912-0270	32.40	35.50	60	52916-0270	43.20	46.00	82
2.80	.1102	3.00	52912-0280	33.60	36.50	60	52916-0280	44.80	48.00	82
2.90	.1142	3.00	52912-0290	34.80	38.00	60	52916-0290	46.40	49.50	82
3.00	.1181	3.00	52912-0300	36.00	40.00	60	52916-0300	48.00	52.00	82

d1	d1 (in.)	d2	Art. 52912				Art. 52916			
			Catalog Number	l2	l3	l1	Catalog Number	l2	l3	l1
3.10	.1220	6.00	52912-0310	37.20	41.50	80	52916-0310	49.60	53.50	107
3.20	.1260	6.00	52912-0320	38.40	42.50	80	52916-0320	51.20	55.00	107
3.30	.1299	6.00	52912-0330	39.60	43.50	80	52916-0330	52.80	57.00	107
3.40	.1339	6.00	52912-0340	40.80	45.00	85	52916-0340	54.40	58.50	107
3.50	.1378	6.00	52912-0350	42.00	47.00	85	52916-0350	56.00	61.00	107
3.60	.1417	6.00	52912-0360	43.20	48.50	85	52916-0360	57.60	62.50	107
3.70	.1457	6.00	52912-0370	44.40	49.50	90	52916-0370	59.20	64.00	107
3.80	.1496	6.00	52912-0380	45.60	50.50	90	52916-0380	60.80	66.00	107
3.90	.1535	6.00	52912-0390	46.80	52.00	90	52916-0390	62.40	67.50	107
4.00	.1575	6.00	52912-0400	48.00	53.00	90	52916-0400	64.00	69.00	107
4.10	.1614	6.00	52912-0410	49.20	55.50	105	52916-0410	65.60	71.50	126
4.20	.1654	6.00	52912-0420	50.40	56.50	105	52916-0420	67.20	73.00	126
4.30	.1693	6.00	52912-0430	51.60	57.50	105	52916-0430	68.80	75.00	126
4.40	.1732	6.00	52912-0440	52.80	59.00	105	52916-0440	70.40	76.50	126
4.50	.1772	6.00	52912-0450	54.00	60.00	105	52916-0450	72.00	78.00	126
4.60	.1811	6.00	52912-0460	55.20	63.50	105	52916-0460	73.60	81.50	126
4.70	.1850	6.00	52912-0470	56.40	64.50	105	52916-0470	75.20	83.00	126
4.80	.1890	6.00	52912-0480	57.60	65.50	105	52916-0480	76.80	85.00	126
4.90	.1929	6.00	52912-0490	58.80	67.00	105	52916-0490	78.40	86.50	126
5.00	.1969	6.00	52912-0500	60.00	68.00	105	52916-0500	80.00	88.00	126
5.10	.2008	6.00	52912-0510	61.20	69.50	118	52916-0510	81.60	89.50	142
5.20	.2047	6.00	52912-0520	62.40	70.50	118	52916-0520	83.20	91.00	142
5.30	.2087	6.00	52912-0530	63.60	71.50	118	52916-0530	84.80	93.00	142
5.40	.2126	6.00	52912-0540	64.80	73.00	118	52916-0540	86.40	94.50	142
5.50	.2165	6.00	52912-0550	66.00	74.00	118	52916-0550	88.00	96.00	142
5.60	.2205	6.00	52912-0560	67.20	75.50	118	52916-0560	89.60	97.50	142
5.70	.2244	6.00	52912-0570	68.40	76.50	118	52916-0570	91.20	99.00	142
5.80	.2283	6.00	52912-0580	69.60	77.50	118	52916-0580	92.80	101.00	142
5.90	.2323	6.00	52912-0590	70.80	79.00	118	52916-0590	94.40	102.50	142
6.00	.2362	6.00	52912-0600	72.00	80.00	118	52916-0600	96.00	104.00	142
6.10	.2402	8.00	52912-0610	73.20	82.50	136	52916-0610	97.60	106.50	160
6.20	.2441	8.00	52912-0620	74.40	83.50	136	52916-0620	99.20	108.00	160
6.30	.2480	8.00	52912-0630	75.60	84.50	136	52916-0630	100.80	110.00	160
6.40	.2520	8.00	52912-0640	76.80	86.00	136	52916-0640	102.40	111.50	160
6.50	.2559	8.00	52912-0650	78.00	87.50	136	52916-0650	104.00	113.00	160
6.60	.2598	8.00	52912-0660	79.20	88.50	136	52916-0660	105.60	114.50	160
6.70	.2638	8.00	52912-0670	80.40	89.50	136	52916-0670	107.20	116.00	160
6.80	.2677	8.00	52912-0680	81.60	90.50	136	52916-0680	108.80	118.00	160
6.90	.2717	8.00	52912-0690	82.80	92.00	136	52916-0690	110.40	119.50	160
7.00	.2756	8.00	52912-0700	84.00	94.00	136	52916-0700	112.00	122.00	160
7.10	.2795	8.00	52912-0710	85.20	95.50	148	52916-0710	113.60	123.50	176
7.20	.2835	8.00	52912-0720	86.40	96.50	148	52916-0720	115.20	125.00	176
7.30	.2874	8.00	52912-0730	87.60	97.50	148	52916-0730	116.80	127.00	176
7.40	.2913	8.00	52912-0740	88.80	99.00	148	52916-0740	118.40	128.50	176

- All dimensions are millimeters unless otherwise noted
- Internal coolant for all sizes
- For cutting data see pg. 149

Phoenix TC2

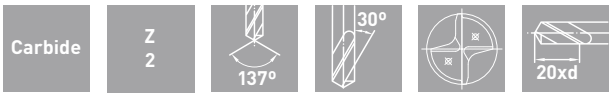
Art. 52912 / 52916 Cont.



d1	d1 (in.)	d2	Art. 52912				Art. 52916			
			Catalog Number	l2	l3	l1	Catalog Number	l2	l3	l1
7.50	.2953	8.00	52912-0750	90.00	100.00	148	52916-0750	120.00	130.00	176
7.60	.2992	8.00	52912-0760	91.20	101.50	148	52916-0760	121.60	131.50	176
7.70	.3031	8.00	52912-0770	92.40	102.50	148	52916-0770	123.20	133.00	176
7.80	.3071	8.00	52912-0780	93.60	103.50	148	52916-0780	124.80	135.00	176
7.90	.3110	8.00	52912-0790	94.80	105.00	148	52916-0790	126.40	136.50	176
8.00	.3150	8.00	52912-0800	96.00	106.00	148	52916-0800	128.00	138.00	176
8.50	.3346	10.00	52912-0850	102.00	113.00	162	52916-0850	136.00	147.00	197
9.00	.3543	10.00	52912-0900	108.00	119.00	162	52916-0900	144.00	155.00	197
9.50	.3740	10.00	52912-0950	114.00	125.00	175	52916-0950	152.00	163.00	214
10.00	.3937	10.00	52912-1000	120.00	132.00	175	52916-1000	160.00	172.00	214

- All dimensions are millimeters unless otherwise noted
- Internal coolant for all sizes
- For cutting data see pg. 149

Phoenix TC2 Art. 52920



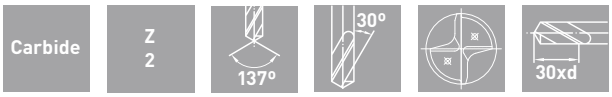








Phoenix TC2 Art. 52930

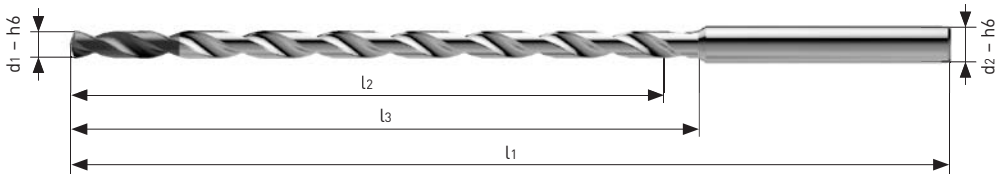










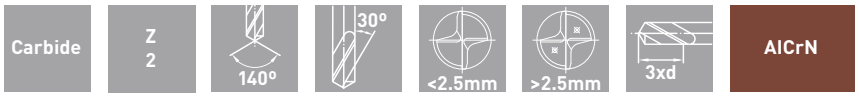


d1	d1 (in.)	d2	Art. 52920				Art. 52930			
			Catalog Number	l2	l3	l1	Catalog Number	l2	l3	l1
3.00	.1181	6.00	52920-0300	60.00	69.00	108	52930-0300	90.00	99.00	138
3.30	.1299	6.00	52920-0330	66.00	75.00	113	52930-0330	99.00	108.00	146
4.00	.1575	6.00	52920-0400	80.00	94.00	132	52930-0400	120.00	134.00	172
4.20	.1654	6.00	52920-0420	84.00	98.00	136	52930-0420	126.00	140.00	178
5.00	.1969	6.00	52920-0500	100.00	107.00	145	52930-0500	150.00	167.00	205
6.00	.2362	6.00	52920-0600	120.00	138.00	176	52930-0600	180.00	198.00	236
6.80	.2677	8.00	52920-0680	136.00	156.00	196	52930-0680	204.00	224.00	264
7.00	.2756	8.00	52920-0700	140.00	161.00	201	52930-0700	210.00	231.00	271
8.00	.3150	8.00	52920-0800	160.00	182.00	222	52930-0800	240.00	262.00	302
8.50	.3346	10.00	52920-0850	170.00	195.00	240	52930-0850	255.00	280.00	325
9.00	.3543	10.00	52920-0900	180.00	207.00	252	52930-0900	270.00	297.00	342
10.00	.3937	10.00	52920-1000	200.00	230.00	275	52930-1000	285.00	300.00	345

- All dimensions are millimeters unless otherwise noted
- Internal coolant for all sizes
- For cutting data see pg. 149

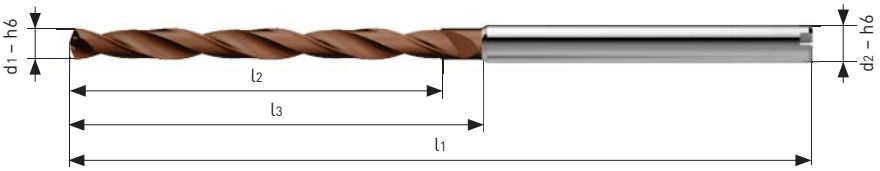
Phoenix

Art. 50938









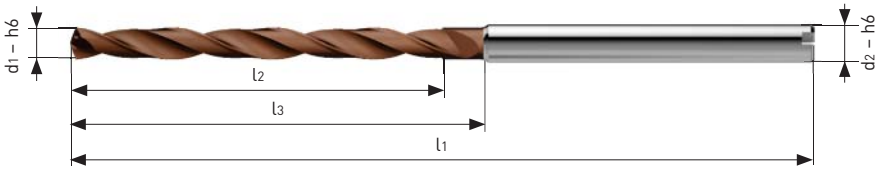
Catalog Number	d_1	d_1 (in.)	d_2	l_2	l_3	l_1
50938-0100	1.00	.0394	3.00	3.00	5.00	38
50938-0110	1.10	.0433	3.00	3.30	5.50	38
50938-0120	1.20	.0472	3.00	3.60	5.50	38
50938-0130	1.30	.0512	3.00	3.90	6.00	38
50938-0140	1.40	.0551	3.00	4.20	6.00	38
50938-0150	1.50	.0591	3.00	4.50	6.50	38
50938-0160	1.60	.0630	3.00	4.80	7.50	38
50938-0170	1.70	.0669	3.00	5.10	8.00	38
50938-0180	1.80	.0709	3.00	5.40	8.50	38
50938-0190	1.90	.0748	3.00	5.70	8.50	38
50938-0200	2.00	.0787	3.00	6.00	9.00	38
50938-0210	2.10	.0827	3.00	6.30	9.50	38
50938-0220	2.20	.0866	3.00	6.60	9.50	38
50938-0230	2.30	.0906	3.00	6.90	10.00	38
50938-0240	2.40	.0945	3.00	7.20	10.00	38
50938-0250	2.50	.0984	3.00	7.50	10.50	50
50938-0260	2.60	.1024	3.00	7.80	11.00	50
50938-0270	2.70	.1063	3.00	8.10	11.50	50
50938-0280	2.80	.1102	3.00	8.40	11.50	50
50938-0290	2.90	.1142	3.00	8.70	12.00	50
50938-0300	3.00	.1181	3.00	9.00	12.50	50
50938-0310	3.10	.1220	6.00	9.30	13.50	55
50938-0320	3.20	.1260	6.00	9.60	13.50	55
50938-0330	3.30	.1299	6.00	9.90	13.50	55
50938-0340	3.40	.1339	6.00	10.20	14.00	55
50938-0350	3.50	.1378	6.00	10.50	14.50	55
50938-0360	3.60	.1417	6.00	10.80	15.00	55
50938-0380	3.80	.1496	6.00	11.40	15.50	55
50938-0390	3.90	.1535	6.00	11.70	15.50	55

Catalog Number	d_1	d_1 (in.)	d_2	l_2	l_3	l_1
50938-0400	4.00	.1575	6.00	12.00	16.00	55
50938-0410	4.10	.1614	6.00	12.30	18.50	60
50938-0420	4.20	.1654	6.00	12.60	18.50	60
50938-0430	4.30	.1693	6.00	12.90	19.00	60
50938-0440	4.40	.1732	6.00	13.20	19.00	60
50938-0450	4.50	.1772	6.00	13.50	20.50	60
50938-0460	4.60	.1811	6.00	13.80	22.00	60
50938-0470	4.70	.1850	6.00	14.10	22.00	60
50938-0480	4.80	.1890	6.00	14.40	22.50	60
50938-0490	4.90	.1929	6.00	14.70	22.50	60
50938-0500	5.00	.1969	6.00	15.00	23.00	60
50938-0510	5.10	.2008	6.00	15.30	23.50	64
50938-0520	5.20	.2047	6.00	15.60	23.50	64
50938-0530	5.30	.2087	6.00	15.90	24.00	64
50938-0540	5.40	.2126	6.00	16.20	24.00	64
50938-0550	5.50	.2165	6.00	16.50	24.50	64
50938-0560	5.60	.2205	6.00	16.80	24.50	64
50938-0570	5.70	.2244	6.00	17.10	25.50	64
50938-0580	5.80	.2283	6.00	17.40	25.50	64
50938-0590	5.90	.2323	6.00	17.70	25.50	64
50938-0600	6.00	.2362	6.00	18.00	27.00	64
50938-0610	6.10	.2402	8.00	18.30	27.50	68
50938-0620	6.20	.2441	8.00	18.60	27.50	68
50938-0630	6.30	.2480	8.00	18.90	28.00	68
50938-0640	6.40	.2520	8.00	19.20	28.00	68
50938-0650	6.50	.2559	8.00	19.50	28.50	68
50938-0660	6.60	.2598	8.00	19.80	29.00	68
50938-0670	6.70	.2638	8.00	20.10	29.50	68
50938-0680	6.80	.2677	8.00	20.40	29.50	68
50938-0690	6.90	.2717	8.00	20.70	30.00	68
50938-0700	7.00	.2756	8.00	21.00	31.00	68
50938-0710	7.10	.2795	8.00	21.30	31.50	72
50938-0720	7.20	.2835	8.00	21.60	31.50	72
50938-0730	7.30	.2874	8.00	21.90	32.00	72
50938-0740	7.40	.2913	8.00	22.20	32.00	72
50938-0750	7.50	.2953	8.00	22.50	32.50	72
50938-0760	7.60	.2992	8.00	22.80	32.50	72
50938-0770	7.70	.3031	8.00	23.10	33.50	72
50938-0780	7.80	.3071	8.00	23.40	33.50	72
50938-0790	7.90	.3110	8.00	23.70	34.00	72
50938-0800	8.00	.3150	8.00	24.00	34.00	72
50938-0810	8.10	.3189	10.00	24.30	35.50	79
50938-0820	8.20	.3228	10.00	24.60	35.50	79
50938-0830	8.30	.3268	10.00	24.90	36.00	79
50938-0840	8.40	.3307	10.00	25.20	36.00	79

- All dimensions are millimeters unless otherwise noted
- Internal coolant beginning at Ø2.5mm
- For cutting data see pg. 150

Phoenix

Art. 50938 Cont.



Catalog Number	d1	d1 (in.)	d2	l2	l3	l1
50938-0850	8.50	.3346	10.00	25.50	36.50	79
50938-0860	8.60	.3386	10.00	25.80	37.00	79
50938-0870	8.70	.3425	10.00	26.10	37.00	79
50938-0880	8.80	.3465	10.00	26.40	37.50	79
50938-0890	8.90	.3504	10.00	26.70	37.50	79
50938-0900	9.00	.3543	10.00	27.00	38.00	79
50938-0910	9.10	.3583	10.00	27.30	38.50	85
50938-0920	9.20	.3622	10.00	27.60	38.50	85
50938-0930	9.30	.3661	10.00	27.90	39.00	85
50938-0940	9.40	.3701	10.00	28.20	39.00	85
50938-0950	9.50	.3740	10.00	28.50	40.00	85
50938-0960	9.60	.3780	10.00	28.80	40.00	85
50938-0970	9.70	.3819	10.00	29.10	40.50	85
50938-0980	9.80	.3858	10.00	29.40	40.50	85
50938-0990	9.90	.3898	10.00	29.70	41.00	85
50938-1000	10.00	.3937	10.00	30.00	42.00	85
50938-1010	10.10	.3976	12.00	30.30	42.50	93
50938-1020	10.20	.4016	12.00	30.60	42.50	93
50938-1030	10.30	.4055	12.00	30.90	43.00	93
50938-1040	10.40	.4094	12.00	31.20	43.00	93
50938-1050	10.50	.4134	12.00	31.50	43.50	93
50938-1060	10.60	.4173	12.00	31.80	44.00	93
50938-1070	10.70	.4213	12.00	32.10	44.00	93
50938-1080	10.80	.4252	12.00	32.40	44.50	93
50938-1090	10.90	.4291	12.00	32.70	44.50	93
50938-1100	11.00	.4331	12.00	33.00	46.00	93
50938-1110	11.10	.4370	12.00	33.30	46.50	97
50938-1120	11.20	.4409	12.00	33.60	46.50	97
50938-1130	11.30	.4449	12.00	33.90	47.00	97
50938-1140	11.40	.4488	12.00	34.20	47.00	97
50938-1150	11.50	.4528	12.00	34.50	48.00	97
50938-1160	11.60	.4567	12.00	34.80	48.00	97
50938-1170	11.70	.4606	12.00	35.10	48.00	97
50938-1180	11.80	.4646	12.00	35.40	48.50	97
50938-1190	11.90	.4685	12.00	35.70	48.50	97
50938-1200	12.00	.4724	12.00	36.00	50.00	97
50938-1250	12.50	.4921	14.00	37.80	53.00	100
50938-1270	12.70	.5000	14.00	38.10	53.00	100

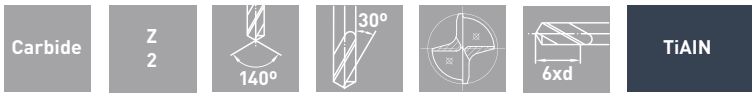
- All dimensions are millimeters unless otherwise noted
- Internal coolant beginning at Ø2.5mm
- For cutting data see pg. 150

SPHINX TOOLS



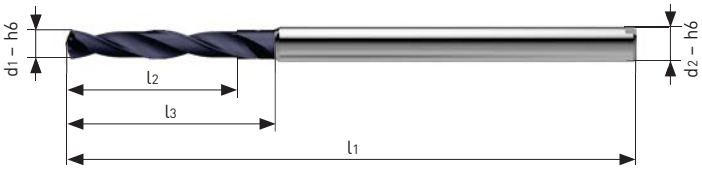
Phoenix

Art. 50940









Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50940-0100	1.00	.0394	6.00	8.00	38	3.00
50940-0105	1.05	.0413	6.30	8.30	38	3.00
50940-0110	1.10	.0433	6.60	8.60	38	3.00
50940-0115	1.15	.0453	6.90	8.90	38	3.00
50940-0120	1.20	.0472	7.20	9.20	38	3.00
50940-0125	1.25	.0492	7.50	9.50	38	3.00
50940-0130	1.30	.0512	7.80	9.80	38	3.00
50940-0135	1.35	.0531	8.10	10.10	38	3.00
50940-0140	1.40	.0551	8.40	10.40	38	3.00
50940-0145	1.45	.0571	8.70	10.70	38	3.00
50940-0150	1.50	.0591	9.00	11.00	38	3.00
50940-0155	1.55	.0610	9.30	11.30	38	3.00
50940-0160	1.60	.0630	9.60	12.60	38	3.00
50940-0165	1.65	.0650	9.90	12.90	38	3.00
50940-0170	1.70	.0669	10.20	13.20	38	3.00
50940-0175	1.75	.0689	10.50	13.50	38	3.00
50940-0180	1.80	.0709	10.80	13.80	38	3.00
50940-0185	1.85	.0728	11.10	14.10	38	3.00
50940-0190	1.90	.0748	11.40	14.40	38	3.00
50940-0195	1.95	.0768	11.70	14.70	38	3.00
50940-0200	2.00	.0787	12.00	15.00	50	3.00
50940-0205	2.05	.0807	12.30	15.30	50	3.00
50940-0210	2.10	.0827	12.60	15.60	50	3.00
50940-0215	2.15	.0846	12.90	15.90	50	3.00
50940-0220	2.20	.0866	13.20	16.20	50	3.00
50940-0225	2.25	.0886	13.50	16.50	50	3.00
50940-0230	2.30	.0906	13.80	16.80	50	3.00
50940-0235	2.35	.0925	14.10	17.10	50	3.00
50940-0240	2.40	.0945	14.40	17.40	50	3.00
50940-0245	2.45	.0965	14.70	17.70	50	3.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50940-0250	2.50	.0984	15.00	18.00	50	3.00
50940-0255	2.55	.1004	15.30	18.30	50	3.00
50940-0260	2.60	.1024	15.60	18.60	50	3.00
50940-0265	2.65	.1043	15.90	18.90	50	3.00
50940-0270	2.70	.1063	16.20	19.20	50	3.00
50940-0275	2.75	.1083	16.50	19.50	50	3.00
50940-0280	2.80	.1102	16.80	19.80	50	3.00
50940-0285	2.85	.1122	17.10	20.10	50	3.00
50940-0290	2.90	.1142	17.40	20.40	50	3.00
50940-0295	2.95	.1161	17.70	20.70	50	3.00
50940-0300	3.00	.1181	18.00	—	50	3.00
50940-0305	3.05	.1201	18.30	22.30	66	6.00
50940-0310	3.10	.1220	18.60	22.60	66	6.00
50940-0315	3.15	.1240	18.90	22.90	66	6.00
50940-0320	3.20	.1260	19.20	23.20	66	6.00
50940-0325	3.25	.1280	19.50	23.50	66	6.00
50940-0330	3.30	.1299	19.80	23.80	66	6.00
50940-0335	3.35	.1319	20.10	24.10	66	6.00
50940-0340	3.40	.1339	20.40	24.40	66	6.00
50940-0345	3.45	.1358	20.70	24.70	66	6.00
50940-0350	3.50	.1378	21.00	25.00	66	6.00
50940-0355	3.55	.1398	21.30	25.30	66	6.00
50940-0360	3.60	.1417	21.60	25.60	66	6.00
50940-0365	3.65	.1437	21.90	25.90	66	6.00
50940-0370	3.70	.1457	22.20	26.20	66	6.00
50940-0375	3.75	.1476	22.50	26.50	66	6.00
50940-0380	3.80	.1496	22.80	26.80	66	6.00
50940-0385	3.85	.1516	23.10	27.10	66	6.00
50940-0390	3.90	.1535	23.40	27.40	66	6.00
50940-0395	3.95	.1555	23.70	27.70	66	6.00

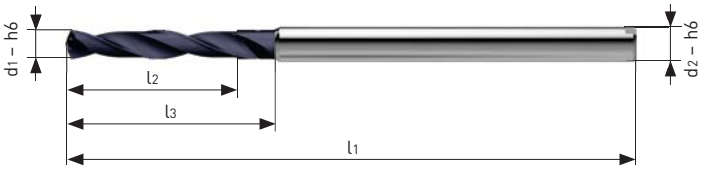
Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50940-0400	4.00	.1575	24.00	28.00	66	6.00
50940-0405	4.05	.1594	24.30	30.20	79	6.00
50940-0410	4.10	.1614	24.60	30.50	79	6.00
50940-0415	4.15	.1634	24.90	30.80	79	6.00
50940-0420	4.20	.1654	25.20	31.00	79	6.00
50940-0425	4.25	.1673	25.50	31.50	79	6.00
50940-0430	4.30	.1693	25.80	32.00	79	6.00
50940-0435	4.35	.1713	26.10	32.50	79	6.00
50940-0440	4.40	.1732	26.40	32.50	79	6.00
50940-0445	4.45	.1752	26.70	33.00	79	6.00
50940-0450	4.50	.1772	27.00	33.00	79	6.00
50940-0455	4.55	.1791	27.30	35.50	79	6.00
50940-0460	4.60	.1811	27.60	35.50	79	6.00
50940-0465	4.65	.1831	27.90	36.00	79	6.00
50940-0470	4.70	.1850	28.20	36.00	79	6.00
50940-0475	4.75	.1870	28.50	37.00	79	6.00
50940-0480	4.80	.1890	28.80	37.00	79	6.00
50940-0485	4.85	.1909	29.10	37.50	79	6.00
50940-0490	4.90	.1929	29.40	37.50	79	6.00
50940-0495	4.95	.1949	29.70	38.00	79	6.00
50940-0500	5.00	.1969	30.00	38.00	79	6.00
50940-0505	5.05	.1988	30.30	38.50	79	6.00
50940-0510	5.10	.2008	30.60	38.50	79	6.00
50940-0515	5.15	.2028	30.90	39.00	79	6.00
50940-0520	5.20	.2047	31.20	39.00	79	6.00
50940-0525	5.25	.2067	31.50	40.00	79	6.00
50940-0530	5.30	.2087	31.80	40.00	79	6.00
50940-0535	5.35	.2106	32.10	40.50	79	6.00
50940-0540	5.40	.2126	32.40	40.50	79	6.00
50940-0545	5.45	.2146	32.70	41.00	79	6.00
50940-0550	5.50	.2165	33.00	41.00	79	6.00
50940-0555	5.55	.2185	33.30	41.50	81	6.00
50940-0560	5.60	.2205	33.60	41.50	81	6.00
50940-0565	5.65	.2224	33.90	42.00	81	6.00
50940-0570	5.70	.2244	34.20	42.00	81	6.00
50940-0575	5.75	.2264	34.50	43.00	81	6.00
50940-0580	5.80	.2283	34.80	43.00	81	6.00
50940-0585	5.85	.2303	35.10	43.50	81	6.00
50940-0590	5.90	.2323	35.40	43.50	81	6.00
50940-0595	5.95	.2343	35.70	44.00	81	6.00
50940-0600	6.00	.2362	36.00	—	81	6.00
50940-0610	6.10	.2402	36.60	45.50	89	8.00
50940-0620	6.20	.2441	37.20	46.00	89	8.00
50940-0630	6.30	.2480	37.80	47.00	89	8.00
50940-0640	6.40	.2520	38.40	47.50	89	8.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50940-0650	6.50	.2559	39.00	48.00	89	8.00
50940-0660	6.60	.2598	39.60	48.50	89	8.00
50940-0670	6.70	.2638	40.20	49.00	89	8.00
50940-0680	6.80	.2677	40.80	50.00	89	8.00
50940-0690	6.90	.2717	41.40	50.50	89	8.00
50940-0700	7.00	.2756	42.00	52.00	89	8.00
50940-0710	7.10	.2795	42.60	52.50	95	8.00
50940-0720	7.20	.2835	43.20	53.50	95	8.00
50940-0730	7.30	.2874	43.80	54.00	95	8.00
50940-0740	7.40	.2913	44.40	54.50	95	8.00
50940-0750	7.50	.2953	45.00	55.00	95	8.00
50940-0760	7.60	.2992	45.60	55.50	95	8.00
50940-0770	7.70	.3031	46.20	56.00	95	8.00
50940-0780	7.80	.3071	46.80	57.00	95	8.00
50940-0790	7.90	.3110	47.40	57.50	95	8.00
50940-0800	8.00	.3150	48.00	58.00	95	8.00
50940-0810	8.10	.3189	48.60	59.50	106	1.00
50940-0820	8.20	.3228	49.20	60.00	106	1.00
50940-0830	8.30	.3268	49.80	61.00	106	1.00
50940-0840	8.40	.3307	50.40	61.50	106	1.00
50940-0850	8.50	.3346	51.00	62.00	106	1.00
50940-0860	8.60	.3386	51.60	62.50	106	1.00
50940-0870	8.70	.3425	52.20	63.00	106	1.00
50940-0880	8.80	.3465	52.80	64.00	106	1.00
50940-0890	8.90	.3504	53.40	64.50	106	1.00
50940-0900	9.00	.3543	54.00	65.00	106	1.00
50940-0910	9.10	.3583	54.60	65.50	113	1.00
50940-0920	9.20	.3622	55.20	66.00	113	1.00
50940-0930	9.30	.3661	55.80	67.00	113	1.00
50940-0940	9.40	.3701	56.40	67.50	113	1.00
50940-0950	9.50	.3740	57.00	68.00	113	1.00
50940-0960	9.60	.3780	57.60	68.50	113	1.00
50940-0970	9.70	.3819	58.20	69.00	113	1.00
50940-0980	9.80	.3858	58.80	70.00	113	1.00
50940-0990	9.90	.3898	59.40	70.50	113	1.00
50940-1000	1.00	.3937	6.00	72.00	113	1.00
50940-1010	1.10	.3976	6.60	72.50	125	12.00
50940-1020	1.20	.4016	61.20	73.00	125	12.00
50940-1030	1.30	.4055	61.80	74.00	125	12.00
50940-1040	1.40	.4094	62.40	74.50	125	12.00
50940-1050	1.50	.4134	63.00	75.00	125	12.00
50940-1060	1.60	.4173	63.60	75.50	125	12.00
50940-1070	1.70	.4213	64.20	76.00	125	12.00
50940-1080	1.80	.4252	64.80	77.00	125	12.00
50940-1090	1.90	.4291	65.40	77.50	125	12.00

- All dimensions are millimeters unless otherwise noted
- Internal coolant for all sizes
- For cutting data see pg. 150

Phoenix

Art. 50940 Cont.



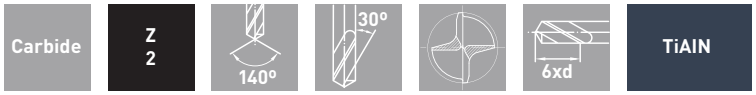
Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50940-1100	11.00	.4331	66.00	79.00	125	12.00
50940-1110	11.10	.4370	66.60	79.50	132	12.00
50940-1120	11.20	.4409	67.20	80.00	132	12.00
50940-1130	11.30	.4449	67.80	81.00	132	12.00
50940-1140	11.40	.4488	68.40	81.50	132	12.00
50940-1150	11.50	.4528	69.00	82.00	132	12.00
50940-1160	11.60	.4567	69.60	82.50	132	12.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50940-1170	11.70	.4606	70.20	83.00	132	12.00
50940-1180	11.80	.4646	70.80	84.00	132	12.00
50940-1190	11.90	.4685	71.40	84.50	132	12.00
50940-1200	12.00	.4724	72.00	86.00	132	12.00
50940-1250	12.50	.4921	75.00	90.00	140	14.00
50940-1270	12.70	.5000	76.20	91.00	140	14.00

- All dimensions are millimeters unless otherwise noted
- Internal coolant for all sizes
- For cutting data see pg. 150

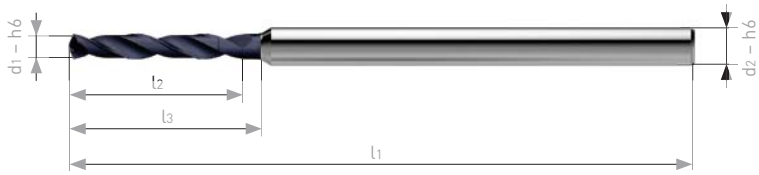
Phoenix

Art. 50941







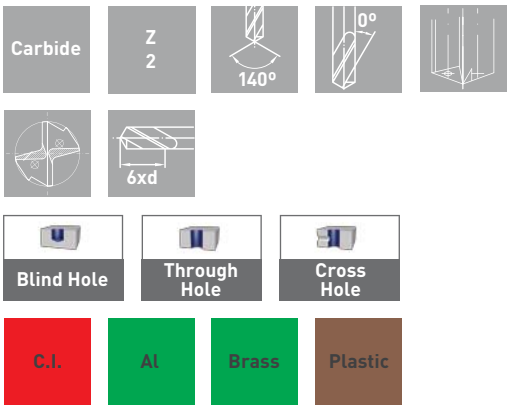


Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50941-0050	.50	.0197	3.00	4.80	38	3.00
50941-0060	.60	.0236	3.60	5.40	38	3.00
50941-0070	.70	.0276	4.20	6.00	38	3.00
50941-0080	.80	.0315	4.80	6.70	38	3.00
50941-0090	.90	.0354	5.40	7.80	38	3.00
50941-0100	1.00	.0394	6.00	8.00	38	3.00
50941-0110	1.10	.0433	6.60	8.60	38	3.00
50941-0120	1.20	.0472	7.20	9.20	38	3.00
50941-0130	1.30	.0512	7.80	9.80	38	3.00
50941-0140	1.40	.0551	8.40	10.40	38	3.00

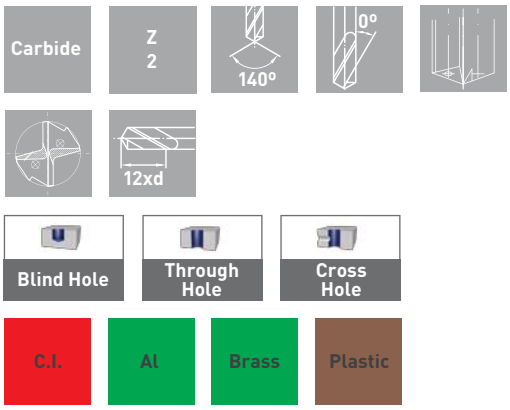
Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50941-0150	1.50	.0591	9.00	11.00	38	3.00
50941-0160	1.60	.0630	9.60	12.60	38	3.00
50941-0170	1.70	.0669	10.20	13.20	38	3.00
50941-0180	1.80	.0709	10.80	13.80	38	3.00
50941-0190	1.90	.0748	11.40	14.40	38	3.00
50941-0200	2.00	.0787	12.00	15.00	50	3.00
50941-0210	2.10	.0827	12.60	15.60	50	3.00
50941-0220	2.20	.0866	13.20	16.20	50	3.00
50941-0230	2.30	.0906	13.80	16.80	50	3.00
50941-0240	2.40	.0945	14.40	17.40	50	3.00

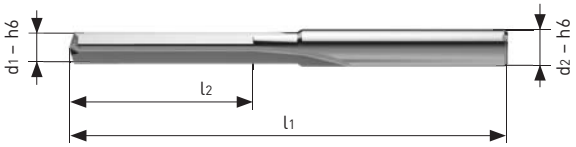
- All dimensions are millimeters unless otherwise noted
- Internal coolant for all sizes
- For cutting data see pg. 151

Quadro Art. 52100



Quadro Art. 52200





d1	d1 (in.)	d2	Art. 52100			Art. 52200		
			Catalog Number	l2	l1	Catalog Number	l2	l1
3.00	.1181	6.00	52100-0030	18.00	82	52200-0030	36.00	106
3.20	.1260	6.00	—	—	—	52200-0032	39.00	106
3.30	.1299	6.00	52100-0033	20.00	82	52200-0033	40.00	106
3.50	.1378	6.00	52100-0035	21.00	82	52200-0035	42.00	106
4.00	.1575	6.00	52100-0040	24.00	82	52200-0040	48.00	106
4.20	.1654	6.00	52100-0042	26.00	88	52200-0042	51.00	118
4.50	.1772	6.00	52100-0045	27.00	88	52200-0045	54.00	118
4.80	.1890	6.00	—	—	—	52200-0048	58.00	118
5.00	.1969	6.00	52100-0050	30.00	88	52200-0050	60.00	118
5.50	.2165	6.00	52100-0055	33.00	94	52200-0055	66.00	130
6.00	.2362	6.00	52100-0060	36.00	94	52200-0060	72.00	130
6.40	.2520	8.00	—	—	—	52200-0064	78.00	144
6.50	.2559	8.00	52100-0065	39.00	102	52200-0065	78.00	144
6.80	.2677	8.00	52100-0068	41.00	102	52200-0068	82.00	144
7.00	.2756	8.00	52100-0070	42.00	102	52200-0070	84.00	144
7.50	.2953	8.00	52100-0075	45.00	108	52200-0075	90.00	156
7.60	.2992	8.00	—	—	—	52200-0076	92.00	156
8.00	.3150	8.00	52100-0080	48.00	108	52200-0080	96.00	156
8.50	.3346	10.00	52100-0085	51.00	121	52200-0085	102.00	175
9.00	.3543	10.00	52100-0090	54.00	121	52200-0090	108.00	175
9.50	.3740	10.00	52100-0095	57.00	127	52200-0095	114.00	187
10.00	.3937	10.00	52100-1000	60.00	127	52200-1000	120.00	187
10.20	.4016	12.00	52100-1020	62.00	141	52200-1020	123.00	207
10.50	.4134	12.00	52100-1050	63.00	141	52200-1050	126.00	207
11.00	.4331	12.00	52100-1100	66.00	141	52200-1100	132.00	207
11.50	.4528	12.00	52100-1150	69.00	147	52200-1150	138.00	219
12.00	.4724	12.00	52100-1200	72.00	147	52200-1200	144.00	219
12.50	.4921	14.00	52100-1250	75.00	155	52200-1250	150.00	233

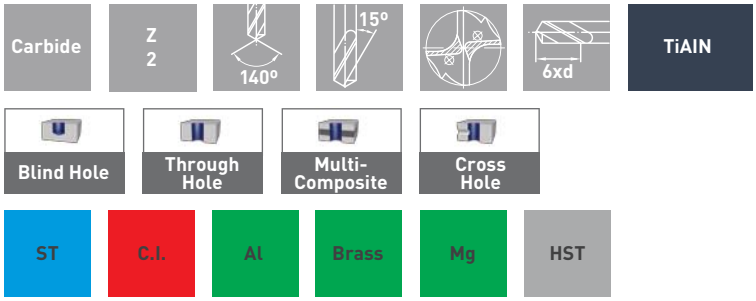
d_1	d_1 (in.)	d_2	Art. 52100			Art. 52200		
			Catalog Number	l_2	l_1	Catalog Number	l_2	l_1
12.70	.5000	14.00	—	—	—	52200-1270	153.00	233
13.00	.5118	14.00	52100-1300	78.00	155	52200-1300	156.00	233
13.50	.5315	14.00	52100-1350	81.00	162	52200-1350	162.00	245
14.00	.5512	14.00	52100-1400	84.00	162	52200-1400	168.00	245
14.50	.5709	16.00	52100-1450	87.00	172	52200-1450	174.00	262
15.00	.5906	16.00	52100-1500	90.00	172	52200-1500	180.00	262
15.50	.6102	16.00	52100-1550	93.00	178	52200-1550	186.00	274
15.90	.6260	16.00	—	—	—	52200-1590	191.00	274
16.00	.6299	16.00	52100-1600	96.00	178	52200-1600	192.00	274
16.50	.6496	18.00	52100-1650	99.00	192	52200-1650	198.00	300
17.00	.6693	18.00	52100-1700	102.00	192	52200-1700	204.00	300
17.50	.6890	18.00	52100-1750	105.00	192	52200-1750	210.00	300
18.00	.7087	18.00	52100-1800	108.00	192	52200-1800	216.00	300
18.50	.7283	20.00	52100-1850	111.00	207	52200-1850	222.00	327
19.00	.7480	20.00	52100-1900	114.00	207	52200-1900	228.00	327
19.50	.7677	20.00	52100-1950	117.00	207	52200-1950	234.00	327
20.00	.7874	20.00	52100-2000	120.00	207	52200-2000	240.00	327

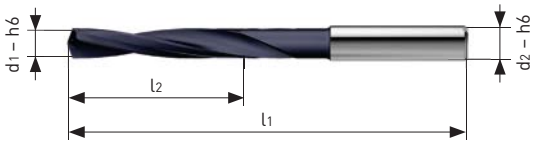
- All dimensions are millimeters unless otherwise noted
- Internal coolant for all sizes
- For cutting data see pg. 151



Quadro

Art. 52150

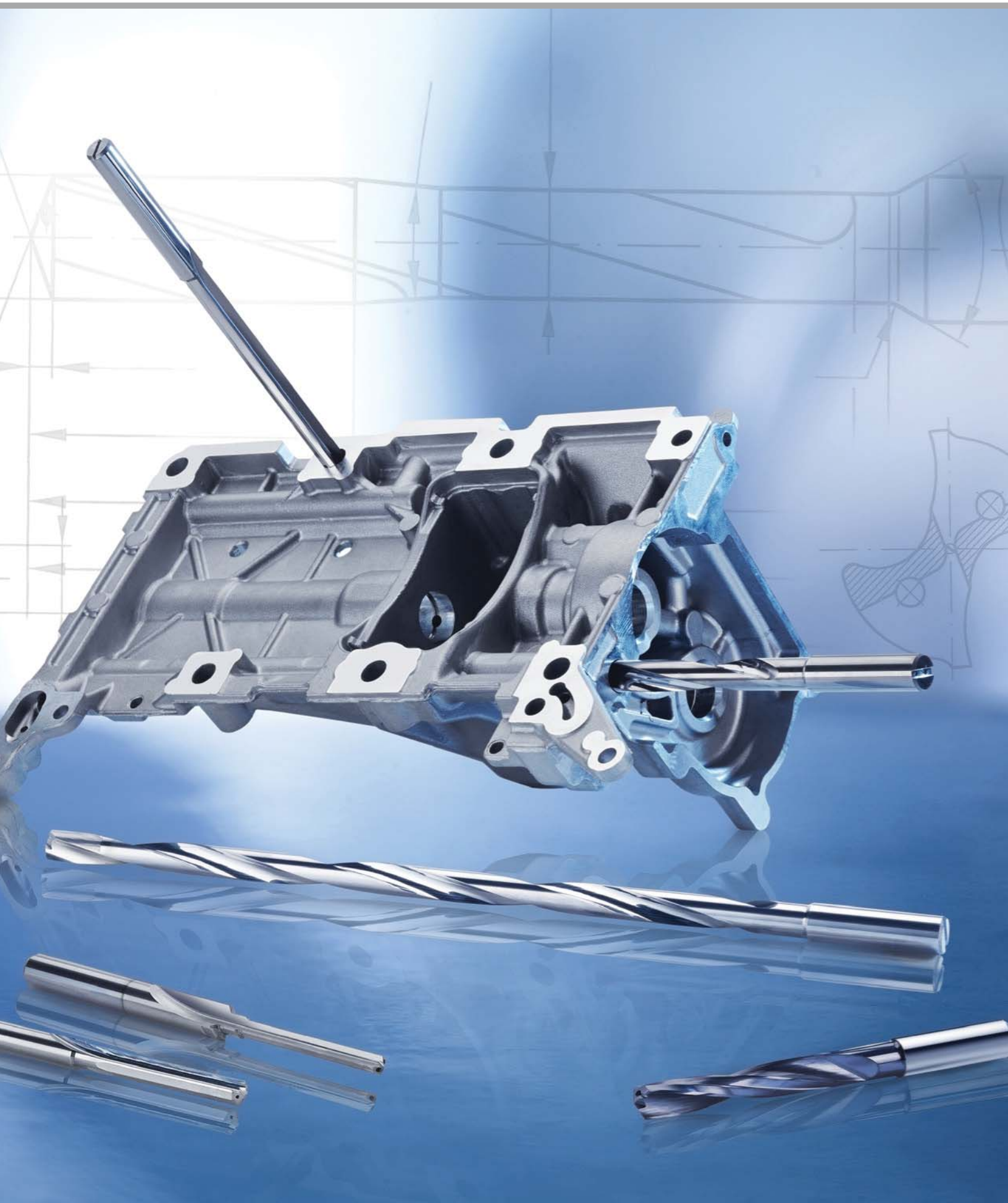




Catalog Number	d1	d1 (in.)	l2	l1	d2
52150-0040	4.00	.1575	24.00	75	6.00
52150-0042	4.20	.1654	25.50	75	6.00
52150-0045	4.50	.1772	27.00	75	6.00
52150-0050	5.00	.1969	30.00	87	6.00
52150-0055	5.50	.2165	33.00	87	6.00
52150-0060	6.00	.2362	36.00	87	6.00
52150-0065	6.50	.2559	39.00	100	8.00
52150-0068	6.80	.2677	41.00	100	8.00
52150-0070	7.00	.2756	42.00	100	8.00
52150-0075	7.50	.2953	45.00	100	8.00
52150-0080	8.00	.3150	48.00	100	8.00
52150-0085	8.50	.3346	51.00	118	10.00
52150-0090	9.00	.3543	54.00	118	10.00
52150-0095	9.50	.3740	57.00	118	10.00
52150-1000	10.00	.3937	60.00	118	10.00
52150-1020	10.20	.4016	62.00	135	12.00
52150-1050	10.50	.4134	63.00	135	12.00
52150-1100	11.00	.4331	66.00	135	12.00

Catalog Number	d1	d1 (in.)	l2	l1	d2
52150-1150	11.50	.4528	69.00	135	12.00
52150-1200	12.00	.4724	72.00	135	12.00
52150-1250	12.50	.4921	75.00	147	14.00
52150-1300	13.00	.5118	78.00	147	14.00
52150-1350	13.50	.5315	81.00	147	14.00
52150-1400	14.00	.5512	84.00	147	14.00
52150-1450	14.50	.5709	87.00	164	16.00
52150-1500	15.00	.5906	90.00	164	16.00
52150-1550	15.50	.6102	93.00	164	16.00
52150-1600	16.00	.6299	96.00	164	16.00
52150-1650	16.50	.6496	99.00	178	18.00
52150-1700	17.00	.6693	102.00	178	18.00
52150-1750	17.50	.6890	105.00	178	18.00
52150-1800	18.00	.7087	108.00	178	18.00
52150-1850	18.50	.7283	111.00	195	20.00
52150-1900	19.00	.7480	114.00	195	20.00
52150-1950	19.50	.7677	117.00	195	20.00
52150-2000	20.00	.7874	120.00	195	20.00

- All dimensions are millimeters unless otherwise noted
- Internal coolant for all sizes
- For cutting data see pg. 152



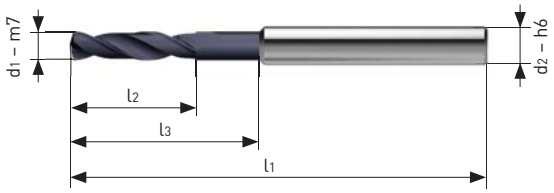
Fastcut

Art. 50950

Carbide | d1 - m7 | DIN 6537 | Z 2 | 140° | 30° | 3xd | TiAlN

Blind Hole | Through Hole | Multi-Composite | Cross Hole | Round Surface

ST | SST | C.I. | Al | Ti | HST



Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50950-0300	3.00	.1181	14.00	20.00	62	6.00
50950-0310	3.10	.1220	14.00	20.00	62	6.00
50950-0320	3.20	.1260	14.00	20.00	62	6.00
50950-0330	3.30	.1299	14.00	20.00	62	6.00
50950-0340	3.40	.1339	14.00	20.00	62	6.00
50950-0350	3.50	.1378	14.00	20.00	62	6.00
50950-0360	3.60	.1417	14.00	20.00	62	6.00
50950-0370	3.70	.1457	14.00	20.00	62	6.00
50950-0380	3.80	.1496	17.00	24.00	66	6.00
50950-0390	3.90	.1535	17.00	24.00	66	6.00
50950-0400	4.00	.1575	17.00	24.00	66	6.00
50950-0410	4.10	.1614	17.00	24.00	66	6.00
50950-0420	4.20	.1654	17.00	24.00	66	6.00
50950-0430	4.30	.1693	17.00	24.00	66	6.00
50950-0440	4.40	.1732	17.00	24.00	66	6.00
50950-0450	4.50	.1772	17.00	24.00	66	6.00
50950-0460	4.60	.1811	17.00	24.00	66	6.00
50950-0470	4.70	.1850	17.00	24.00	66	6.00
50950-0480	4.80	.1890	20.00	28.00	66	6.00
50950-0490	4.90	.1929	20.00	28.00	66	6.00
50950-0500	5.00	.1969	20.00	28.00	66	6.00
50950-0510	5.10	.2008	20.00	28.00	66	6.00
50950-0520	5.20	.2047	20.00	28.00	66	6.00
50950-0530	5.30	.2087	20.00	28.00	66	6.00
50950-0540	5.40	.2126	20.00	28.00	66	6.00
50950-0550	5.50	.2165	20.00	28.00	66	6.00
50950-0560	5.60	.2205	20.00	28.00	66	6.00
50950-0570	5.70	.2244	20.00	28.00	66	6.00
50950-0580	5.80	.2283	20.00	28.00	66	6.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50950-0590	5.90	.2323	20.00	28.00	66	6.00
50950-0600	6.00	.2362	20.00	28.00	66	6.00
50950-0610	6.10	.2402	24.00	34.00	79	8.00
50950-0620	6.20	.2441	24.00	34.00	79	8.00
50950-0630	6.30	.2480	24.00	34.00	79	8.00
50950-0640	6.40	.2520	24.00	34.00	79	8.00
50950-0650	6.50	.2559	24.00	34.00	79	8.00
50950-0660	6.60	.2598	24.00	34.00	79	8.00
50950-0670	6.70	.2638	24.00	34.00	79	8.00
50950-0680	6.80	.2677	24.00	34.00	79	8.00
50950-0690	6.90	.2717	24.00	34.00	79	8.00
50950-0700	7.00	.2756	24.00	34.00	79	8.00
50950-0710	7.10	.2795	29.00	41.00	79	8.00
50950-0720	7.20	.2835	29.00	41.00	79	8.00
50950-0730	7.30	.2874	29.00	41.00	79	8.00
50950-0740	7.40	.2913	29.00	41.00	79	8.00
50950-0750	7.50	.2953	29.00	41.00	79	8.00
50950-0760	7.60	.2992	29.00	41.00	79	8.00
50950-0770	7.70	.3031	29.00	41.00	79	8.00
50950-0780	7.80	.3071	29.00	41.00	79	8.00
50950-0790	7.90	.3110	29.00	41.00	79	8.00
50950-0800	8.00	.3150	29.00	41.00	79	8.00
50950-0810	8.10	.3189	35.00	47.00	89	10.00
50950-0820	8.20	.3228	35.00	47.00	89	10.00
50950-0830	8.30	.3268	35.00	47.00	89	10.00
50950-0840	8.40	.3307	35.00	47.00	89	10.00
50950-0850	8.50	.3346	35.00	47.00	89	10.00
50950-0860	8.60	.3386	35.00	47.00	89	10.00
50950-0870	8.70	.3425	35.00	47.00	89	10.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50950-0880	8.80	.3465	35.00	47.00	89	10.00
50950-0890	8.90	.3504	35.00	47.00	89	10.00
50950-0900	9.00	.3543	35.00	47.00	89	10.00
50950-0910	9.10	.3583	35.00	47.00	89	10.00
50950-0920	9.20	.3622	35.00	47.00	89	10.00
50950-0930	9.30	.3661	35.00	47.00	89	10.00
50950-0940	9.40	.3701	35.00	47.00	89	10.00
50950-0950	9.50	.3740	35.00	47.00	89	10.00
50950-0960	9.60	.3780	35.00	47.00	89	10.00
50950-0970	9.70	.3819	35.00	47.00	89	10.00
50950-0980	9.80	.3858	35.00	47.00	89	10.00
50950-0990	9.90	.3898	35.00	47.00	89	10.00
50950-1000	10.00	.3937	35.00	47.00	89	10.00
50950-1010	10.10	.3976	40.00	55.00	102	12.00
50950-1020	10.20	.4016	40.00	55.00	102	12.00
50950-1030	10.30	.4055	40.00	55.00	102	12.00
50950-1040	10.40	.4094	40.00	55.00	102	12.00
50950-1050	10.50	.4134	40.00	55.00	102	12.00
50950-1060	10.60	.4173	40.00	55.00	102	12.00
50950-1070	10.70	.4213	40.00	55.00	102	12.00
50950-1080	10.80	.4252	40.00	55.00	102	12.00
50950-1090	10.90	.4291	40.00	55.00	102	12.00
50950-1100	11.00	.4331	40.00	55.00	102	12.00
50950-1110	11.10	.4370	40.00	55.00	102	12.00
50950-1120	11.20	.4409	40.00	55.00	102	12.00
50950-1130	11.30	.4449	40.00	55.00	102	12.00
50950-1140	11.40	.4488	40.00	55.00	102	12.00
50950-1150	11.50	.4528	40.00	55.00	102	12.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
50950-1160	11.60	.4567	40.00	55.00	102	12.00
50950-1170	11.70	.4606	40.00	55.00	102	12.00
50950-1180	11.80	.4646	40.00	55.00	102	12.00
50950-1190	11.90	.4685	40.00	55.00	102	12.00
50950-1200	12.00	.4724	40.00	55.00	102	12.00
50950-1250	12.50	.4921	43.00	60.00	107	14.00
50950-1280	12.80	.5039	43.00	60.00	107	14.00
50950-1300	13.00	.5118	43.00	60.00	107	14.00
50950-1350	13.50	.5315	43.00	60.00	107	14.00
50950-1380	13.80	.5433	43.00	60.00	107	14.00
50950-1400	14.00	.5512	43.00	60.00	107	14.00
50950-1450	14.50	.5709	45.00	65.00	115	16.00
50950-1480	14.80	.5827	45.00	65.00	115	16.00
50950-1500	15.00	.5906	45.00	65.00	115	16.00
50950-1550	15.50	.6102	45.00	65.00	115	16.00
50950-1580	15.80	.6220	45.00	65.00	115	16.00
50950-1600	16.00	.6299	45.00	65.00	115	16.00
50950-1650	16.50	.6496	51.00	73.00	123	18.00
50950-1700	17.00	.6693	51.00	73.00	123	18.00
50950-1750	17.50	.6890	51.00	73.00	123	18.00
50950-1800	18.00	.7087	51.00	73.00	123	18.00
50950-1850	18.50	.7283	55.00	79.00	131	20.00
50950-1880	18.80	.7402	55.00	79.00	131	20.00
50950-1900	19.00	.7480	55.00	79.00	131	20.00
50950-1950	19.50	.7677	55.00	79.00	131	20.00
50950-1980	19.80	.7795	55.00	79.00	131	20.00
50950-2000	20.00	.7874	55.00	79.00	131	20.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 153

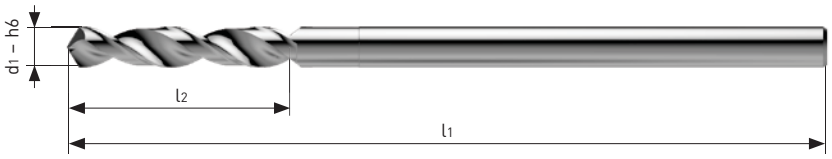
Posicut

Art. 50830

Carbide | DIN 6539 | Z 2 | 118° | 35° | ≈5xd

Blind Hole | Through Hole

ST | SST | C.I. | Al | Cu | Mg | Ti | Plastic



Catalog Number	d1	d1 (in.)	l2	l1
50830-0003	.30	.0118	1.50	19
50830-0004	.40	.0157	2.30	19
50830-0005	.50	.0197	2.80	20
50830-0006	.60	.0236	3.30	21
50830-0007	.70	.0276	4.30	23
50830-0008	.80	.0315	4.80	24
50830-0009	.90	.0354	5.30	25
50830-0010	1.00	.0394	5.70	26
50830-0011	1.10	.0433	6.70	28
50830-0012	1.20	.0472	7.70	30
50830-0013	1.30	.0512	7.70	30
50830-0014	1.40	.0551	8.70	32
50830-0015	1.50	.0591	8.70	32
50830-0016	1.60	.0630	9.70	34
50830-0017	1.70	.0669	9.70	34
50830-0018	1.80	.0709	10.70	36
50830-0019	1.90	.0748	10.70	36
50830-0020	2.00	.0787	11.50	38
50830-0021	2.10	.0827	11.50	38
50830-0022	2.20	.0866	12.50	40
50830-0023	2.30	.0906	12.50	40
50830-0024	2.40	.0945	13.50	43
50830-0025	2.50	.0984	13.50	43
50830-0026	2.60	.1024	13.50	43
50830-0027	2.70	.1063	15.50	46
50830-0028	2.80	.1102	15.50	46
50830-0029	2.90	.1142	15.50	46
50830-0030	3.00	.1181	15.50	46
50830-0031	3.10	.1220	17.50	49
50830-0032	3.20	.1260	17.50	49

Catalog Number	d1	d1 (in.)	l2	l1
50830-0033	3.30	.1299	17.50	49
50830-0034	3.40	.1339	19.50	52
50830-0035	3.50	.1378	19.50	52
50830-0036	3.60	.1417	19.50	52
50830-0037	3.70	.1457	19.50	52
50830-0038	3.80	.1496	21.50	55
50830-0039	3.90	.1535	21.50	55
50830-0040	4.00	.1575	21.50	55
50830-0041	4.10	.1614	21.50	55
50830-0042	4.20	.1654	21.50	55
50830-0043	4.30	.1693	23.00	58
50830-0044	4.40	.1732	23.00	58
50830-0045	4.50	.1772	23.00	58
50830-0046	4.60	.1811	23.00	58
50830-0047	4.70	.1850	23.00	58
50830-0048	4.80	.1890	25.00	62
50830-0049	4.90	.1929	25.00	62
50830-0050	5.00	.1969	25.00	62
50830-0051	5.10	.2008	25.00	62
50830-0052	5.20	.2047	25.00	62
50830-0053	5.30	.2087	25.00	62
50830-0054	5.40	.2126	27.00	66
50830-0055	5.50	.2165	27.00	66
50830-0056	5.60	.2205	27.00	66
50830-0057	5.70	.2244	27.00	66
50830-0058	5.80	.2283	27.00	66
50830-0059	5.90	.2323	27.00	66
50830-0060	6.00	.2362	27.00	66
50830-0061	6.10	.2402	30.00	70
50830-0062	6.20	.2441	30.00	70

Catalog Number	d_1	d_1 (in.)	l_2	l_1
50830-0063	6.30	.2480	30.00	70
50830-0064	6.40	.2520	30.00	70
50830-0065	6.50	.2559	30.00	70
50830-0066	6.60	.2598	30.00	70
50830-0067	6.70	.2638	30.00	70
50830-0068	6.80	.2677	33.00	74
50830-0069	6.90	.2717	33.00	74
50830-0070	7.00	.2756	33.00	74
50830-0071	7.10	.2795	33.00	74
50830-0072	7.20	.2835	33.00	74
50830-0073	7.30	.2874	33.00	74
50830-0074	7.40	.2913	33.00	74
50830-0075	7.50	.2953	33.00	74
50830-0076	7.60	.2992	36.00	79
50830-0077	7.70	.3031	36.00	79
50830-0078	7.80	.3071	36.00	79
50830-0079	7.90	.3110	36.00	79
50830-0080	8.00	.3150	36.00	79
50830-0081	8.10	.3189	36.00	79
50830-0082	8.20	.3228	36.00	79
50830-0083	8.30	.3268	36.00	79
50830-0084	8.40	.3307	36.00	79
50830-0085	8.50	.3346	36.00	79
50830-0086	8.60	.3386	39.00	84
50830-0087	8.70	.3425	39.00	84
50830-0088	8.80	.3465	39.00	84
50830-0089	8.90	.3504	39.00	84

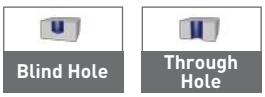
Catalog Number	d_1	d_1 (in.)	l_2	l_1
50830-0090	9.00	.3543	39.00	84
50830-0091	9.10	.3583	39.00	84
50830-0092	9.20	.3622	39.00	84
50830-0093	9.30	.3661	39.00	84
50830-0094	9.40	.3701	39.00	84
50830-0095	9.50	.3740	39.00	84
50830-0096	9.60	.3780	41.00	89
50830-0097	9.70	.3819	41.00	89
50830-0098	9.80	.3858	41.00	89
50830-0099	9.90	.3898	41.00	89
50830-0100	10.00	.3937	41.00	89
50830-0102	10.20	.4016	41.00	89
50830-0105	10.50	.4134	41.00	89
50830-0110	11.00	.4331	45.00	95
50830-0115	11.50	.4528	45.00	95
50830-0120	12.00	.4724	49.00	102
50830-0125	12.50	.4921	49.00	102
50830-0130	13.00	.5118	49.00	102
50830-0135	13.50	.5315	52.00	107
50830-0140	14.00	.5512	52.00	107
50830-0150	15.00	.5906	54.00	111
50830-0160	16.00	.6299	56.00	115
50830-0170	17.00	.6693	58.00	119
50830-0180	18.00	.7087	60.00	123
50830-0190	19.00	.7480	62.00	127
50830-0200	2.00	.7874	64.00	131

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 154

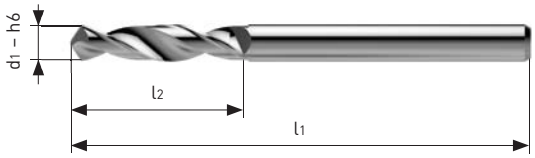
Spirec

Art. 50838









Catalog Number	d1	d1 (in.)	l2	l1
50838-0030	.30	.0118	3.70	38
50838-0035	.35	.0138	3.70	38
50838-0040	.40	.0157	4.70	38
50838-0045	.45	.0177	4.70	38
50838-0050	.50	.0197	5.70	38
50838-0055	.55	.0217	5.70	38
50838-0060	.60	.0236	7.70	38
50838-0065	.65	.0256	7.70	38
50838-0070	.70	.0276	9.70	38
50838-0075	.75	.0295	9.70	38
50838-0080	.80	.0315	11.70	38
50838-0085	.85	.0335	11.70	38
50838-0090	.90	.0354	14.70	38
50838-0095	.95	.0374	14.70	38
50838-0100	1.00	.0394	14.70	38
50838-0105	1.05	.0413	14.70	38
50838-0110	1.10	.0433	14.70	38
50838-0115	1.15	.0453	14.70	38
50838-0120	1.20	.0472	14.70	38
50838-0125	1.25	.0492	14.70	38
50838-0130	1.30	.0512	14.70	38
50838-0135	1.35	.0531	14.70	38
50838-0140	1.40	.0551	14.70	38
50838-0145	1.45	.0571	14.70	38
50838-0150	1.50	.0591	14.70	38
50838-0155	1.55	.0610	14.70	38
50838-0160	1.60	.0630	14.70	38
50838-0165	1.65	.0650	14.70	38
50838-0170	1.70	.0669	14.70	38
50838-0175	1.75	.0689	14.70	38

Catalog Number	d1	d1 (in.)	l2	l1
50838-0180	1.80	.0709	14.70	38
50838-0185	1.85	.0728	14.70	38
50838-0190	1.90	.0748	14.70	38
50838-0195	1.95	.0768	14.70	38
50838-0200	2.00	.0787	14.70	38
50838-0205	2.05	.0807	14.70	38
50838-0210	2.10	.0827	14.70	38
50838-0215	2.15	.0846	14.70	38
50838-0220	2.20	.0866	14.70	38
50838-0225	2.25	.0886	14.70	38
50838-0230	2.30	.0906	14.70	38
50838-0235	2.35	.0925	14.70	38
50838-0240	2.40	.0945	14.70	38
50838-0245	2.45	.0965	14.70	38
50838-0250	2.50	.0984	14.70	38
50838-0255	2.55	.1004	14.70	38
50838-0260	2.60	.1024	14.70	38
50838-0265	2.65	.1043	14.70	38
50838-0270	2.70	.1063	14.70	38
50838-0275	2.75	.1083	14.70	38
50838-0280	2.80	.1102	14.70	38
50838-0285	2.85	.1122	14.70	38
50838-0290	2.90	.1142	14.70	38
50838-0295	2.95	.1161	14.70	38
50838-0300	3.00	.1181	14.70	38
50838-0305	3.05	.1201	14.70	38
50838-0310	3.10	.1220	14.70	38
50838-0315	3.15	.1240	14.70	38
50838-3175	3.175	.1250	14.70	38
50838-0320	3.20	.1260	19.70	50

Catalog Number	d_1	d_1 (in.)	l_2	l_1
50838-0330	3.30	.1299	19.70	50
50838-0340	3.40	.1339	19.70	50
50838-0350	3.50	.1378	19.70	50
50838-0360	3.60	.1417	19.70	50
50838-0370	3.70	.1457	19.70	50
50838-0380	3.80	.1496	19.70	50
50838-0390	3.90	.1535	19.70	50
50838-0400	4.00	.1575	19.70	50
50838-0410	4.10	.1614	24.70	50
50838-0420	4.20	.1654	24.70	50
50838-0430	4.30	.1693	24.70	50
50838-0440	4.40	.1732	24.70	50
50838-0450	4.50	.1772	24.70	50
50838-0460	4.60	.1811	24.70	50
50838-0470	4.70	.1850	24.70	50
50838-0480	4.80	.1890	24.70	50
50838-0490	4.90	.1929	24.70	50
50838-0500	5.00	.1969	24.70	50
50838-0510	5.10	.2008	24.70	50
50838-0520	5.20	.2047	24.70	50
50838-0530	5.30	.2087	24.70	50
50838-0540	5.40	.2126	24.70	50
50838-0550	5.50	.2165	24.70	50
50838-0560	5.60	.2205	24.70	50
50838-0570	5.70	.2244	24.70	50
50838-0580	5.80	.2283	24.70	50
50838-0590	5.90	.2323	24.70	50
50838-0600	6.00	.2362	24.70	50

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 154



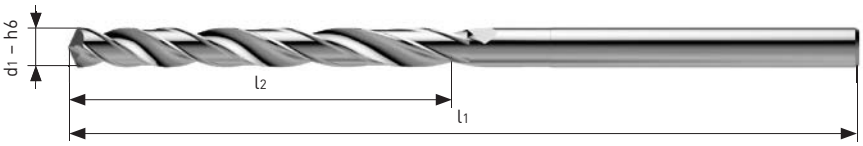
Spicut

Art. 50820









Catalog Number	d1	d1 (in.)	l2	l1
50820-0007	.70	.0276	8.00	28
50820-0008	.80	.0315	9.00	30
50820-0009	.90	.0354	10.00	32
50820-0010	1.00	.0394	11.00	34
50820-0011	1.10	.0433	13.00	36
50820-0012	1.20	.0472	15.00	38
50820-0013	1.30	.0512	15.00	38
50820-0014	1.40	.0551	17.00	40
50820-0015	1.50	.0591	17.00	40
50820-0016	1.60	.0630	19.00	43
50820-0017	1.70	.0669	19.00	43
50820-0018	1.80	.0709	21.00	46
50820-0019	1.90	.0748	21.00	46
50820-0020	2.00	.0787	23.00	49
50820-0021	2.10	.0827	23.00	49
50820-0022	2.20	.0866	26.00	53
50820-0023	2.30	.0906	26.00	53
50820-0024	2.40	.0945	29.00	57
50820-0025	2.50	.0984	29.00	57
50820-0026	2.60	.1024	29.00	57
50820-0027	2.70	.1063	31.00	61
50820-0028	2.80	.1102	31.00	61
50820-0029	2.90	.1142	31.00	61
50820-0030	3.00	.1181	31.00	61
50820-0031	3.10	.1220	34.00	65
50820-0032	3.20	.1260	34.00	65
50820-0033	3.30	.1299	34.00	65
50820-0034	3.40	.1339	37.00	70
50820-0035	3.50	.1378	37.00	70
50820-0036	3.60	.1417	37.00	70

Catalog Number	d1	d1 (in.)	l2	l1
50820-0037	3.70	.1457	37.00	70
50820-0038	3.80	.1496	41.00	75
50820-0039	3.90	.1535	41.00	75
50820-0040	4.00	.1575	41.00	75
50820-0041	4.10	.1614	41.00	75
50820-0042	4.20	.1654	41.00	75
50820-0043	4.30	.1693	45.00	80
50820-0044	4.40	.1732	45.00	80
50820-0045	4.50	.1772	45.00	80
50820-0046	4.60	.1811	45.00	80
50820-0047	4.70	.1850	45.00	80
50820-0048	4.80	.1890	50.00	86
50820-0049	4.90	.1929	50.00	86
50820-0050	5.00	.1969	50.00	86
50820-0051	5.10	.2008	50.00	86
50820-0052	5.20	.2047	50.00	86
50820-0053	5.30	.2087	50.00	86
50820-0054	5.40	.2126	55.00	93
50820-0055	5.50	.2165	55.00	93
50820-0056	5.60	.2205	55.00	93
50820-0057	5.70	.2244	55.00	93
50820-0058	5.80	.2283	55.00	93
50820-0059	5.90	.2323	55.00	93
50820-0060	6.00	.2362	55.00	93
50820-0061	6.10	.2402	61.00	101
50820-0062	6.20	.2441	61.00	101
50820-0063	6.30	.2480	61.00	101
50820-0064	6.40	.2520	61.00	101
50820-0065	6.50	.2559	61.00	101
50820-0066	6.60	.2598	61.00	101

Catalog Number	d1	d1 (in.)	l2	l1
50820-0067	6.70	.2638	61.00	101
50820-0068	6.80	.2677	67.00	109
50820-0069	6.90	.2717	67.00	109
50820-0070	7.00	.2756	67.00	109
50820-0071	7.10	.2795	67.00	109
50820-0072	7.20	.2835	67.00	109
50820-0073	7.30	.2874	67.00	109
50820-0074	7.40	.2913	67.00	109
50820-0075	7.50	.2953	67.00	109
50820-0076	7.60	.2992	73.00	117
50820-0077	7.70	.3031	73.00	117
50820-0078	7.80	.3071	73.00	117
50820-0079	7.90	.3110	73.00	117
50820-0080	8.00	.3150	73.00	117
50820-0081	8.10	.3189	73.00	117
50820-0082	8.20	.3228	73.00	117
50820-0083	8.30	.3268	73.00	117
50820-0084	8.40	.3307	73.00	117
50820-0085	8.50	.3346	73.00	117
50820-0086	8.60	.3386	78.00	125
50820-0087	8.70	.3425	78.00	125
50820-0088	8.80	.3465	78.00	125

Catalog Number	d1	d1 (in.)	l2	l1
50820-0089	8.90	.3504	78.00	125
50820-0090	9.00	.3543	78.00	125
50820-0091	9.10	.3583	78.00	125
50820-0092	9.20	.3622	78.00	125
50820-0093	9.30	.3661	78.00	125
50820-0094	9.40	.3701	78.00	125
50820-0095	9.50	.3740	78.00	125
50820-0096	9.60	.3780	84.00	133
50820-0097	9.70	.3819	84.00	133
50820-0098	9.80	.3858	84.00	133
50820-0099	9.90	.3898	84.00	133
50820-0100	1.00	.3937	84.00	133
50820-0102	1.20	.4016	84.00	133
50820-0105	1.50	.4134	84.00	133
50820-0110	11.00	.4331	91.00	142
50820-0115	11.50	.4528	91.00	142
50820-0120	12.00	.4724	98.00	151
50820-0125	12.50	.4921	98.00	151
50820-0130	13.00	.5118	98.00	151
50820-0135	13.50	.5315	105.00	160
50820-0140	14.00	.5512	105.00	160

- All dimensions are millimeters unless otherwise noted
- Degressive helix from 35° to 15°
- Four margins beginning at Ø2mm
- For cutting data see pg. 155

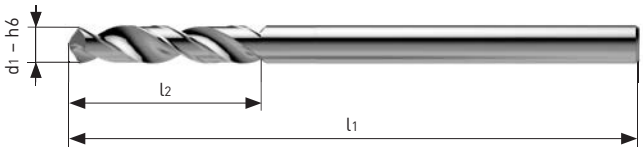
Asycut

Art. 50840









Catalog Number	d1	d1 (in.)	l2	l1
50840-0020	2.00	.0787	11.5	38
50840-0021	2.10	.0827	11.5	38
50840-0022	2.20	.0866	12.5	40
50840-0023	2.30	.0906	12.5	40
50840-0024	2.40	.0945	13.5	43
50840-0025	2.50	.0984	13.5	43
50840-0026	2.60	.1024	13.5	43
50840-0027	2.70	.1063	15.5	46
50840-0028	2.80	.1102	15.5	46
50840-0029	2.90	.1142	15.5	46
50840-0030	3.00	.1181	15.5	46
50840-0031	3.10	.1220	17.5	49
50840-0032	3.20	.1260	17.5	49
50840-0033	3.30	.1299	17.5	49
50840-0034	3.40	.1339	19.5	52
50840-0035	3.50	.1378	19.5	52
50840-0036	3.60	.1417	19.5	52
50840-0037	3.70	.1457	19.5	52
50840-0038	3.80	.1496	21.5	55
50840-0039	3.90	.1535	21.5	55
50840-0040	4.00	.1575	21.5	55
50840-0041	4.10	.1614	21.5	55
50840-0042	4.20	.1654	21.5	55
50840-0043	4.30	.1693	23.0	58
50840-0044	4.40	.1732	23.0	58
50840-0045	4.50	.1772	23.0	58
50840-0046	4.60	.1811	23.0	58
50840-0047	4.70	.1850	23.0	58
50840-0048	4.80	.1890	25.0	62
50840-0049	4.90	.1929	25.0	62

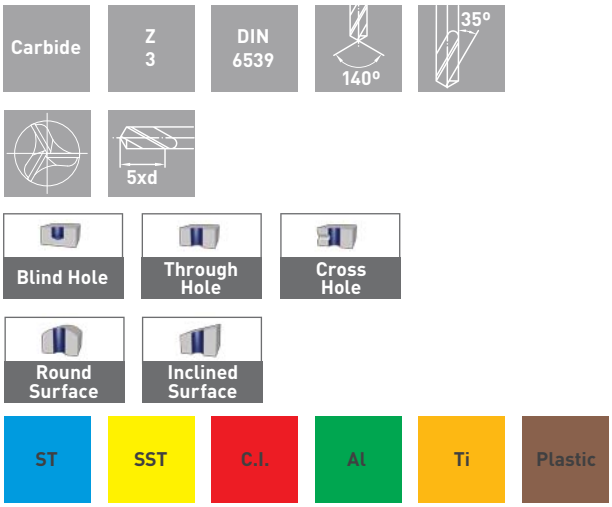
Catalog Number	d1	d1 (in.)	l2	l1
50840-0050	5.00	.1969	25.0	62
50840-0051	5.10	.2008	25.0	62
50840-0052	5.20	.2047	25.0	62
50840-0053	5.30	.2087	25.0	62
50840-0054	5.40	.2126	27.0	66
50840-0055	5.50	.2165	27.0	66
50840-0056	5.60	.2205	27.0	66
50840-0057	5.70	.2244	27.0	66
50840-0058	5.80	.2283	27.0	66
50840-0059	5.90	.2323	27.0	66
50840-0060	6.00	.2362	27.0	66
50840-0061	6.10	.2402	30.0	70
50840-0062	6.20	.2441	30.0	70
50840-0063	6.30	.2480	30.0	70
50840-0064	6.40	.2520	30.0	70
50840-0065	6.50	.2559	30.0	70
50840-0066	6.60	.2598	30.0	70
50840-0067	6.70	.2638	30.0	70
50840-0068	6.80	.2677	33.0	74
50840-0069	6.90	.2717	33.0	74
50840-0070	7.00	.2756	33.0	74
50840-0071	7.10	.2795	33.0	74
50840-0072	7.20	.2835	33.0	74
50840-0073	7.30	.2874	33.0	74
50840-0074	7.40	.2913	33.0	74
50840-0075	7.50	.2953	33.0	74
50840-0076	7.60	.2992	36.0	79
50840-0077	7.70	.3031	36.0	79
50840-0078	7.80	.3071	36.0	79
50840-0079	7.90	.3110	36.0	79

Catalog Number	d_1	d_1 (in.)	l_2	l_1
50840-0080	8.00	.3150	36.0	79
50840-0081	8.10	.3189	36.0	79
50840-0082	8.20	.3228	36.0	79
50840-0083	8.30	.3268	36.0	79
50840-0084	8.40	.3307	36.0	79
50840-0085	8.50	.3346	36.0	79
50840-0086	8.60	.3386	39.0	84
50840-0087	8.70	.3425	39.0	84
50840-0088	8.80	.3465	39.0	84
50840-0089	8.90	.3504	39.0	84
50840-0090	9.00	.3543	39.0	84
50840-0091	9.10	.3583	39.0	84
50840-0092	9.20	.3622	39.0	84
50840-0093	9.30	.3661	39.0	84
50840-0094	9.40	.3701	39.0	84

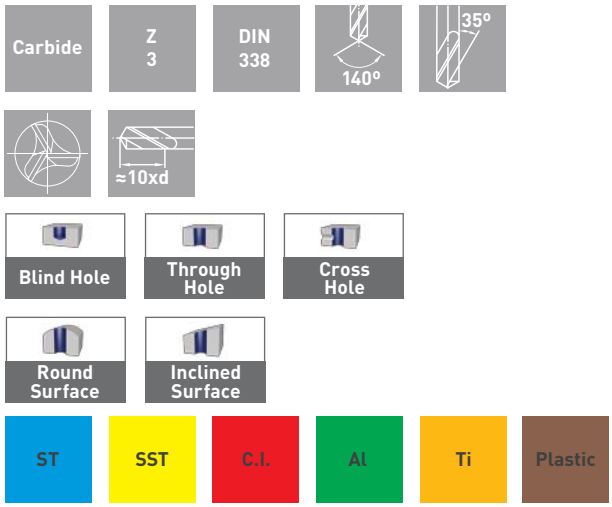
Catalog Number	d_1	d_1 (in.)	l_2	l_1
50840-0095	9.50	.3740	39.0	84
50840-0096	9.60	.3780	41.0	89
50840-0097	9.70	.3819	41.0	89
50840-0098	9.80	.3858	41.0	89
50840-0099	9.90	.3898	41.0	89
50840-0100	10.00	.3937	41.0	89
50840-0102	10.20	.4016	41.0	89
50840-0105	10.50	.4134	41.0	89
50840-0110	11.00	.4331	45.0	95
50840-0115	11.50	.4528	45.0	95
50840-0120	12.00	.4724	49.0	102
50840-0125	12.50	.4921	49.0	102
50840-0130	13.00	.5118	49.0	102
50840-0135	13.50	.5315	52.0	107
50840-0140	14.00	.5512	52.0	107

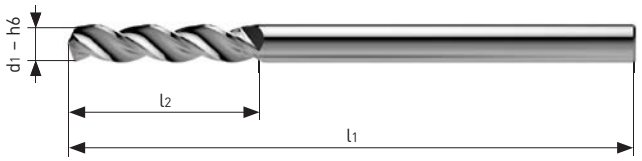
- All dimensions are millimeters unless otherwise noted
- Three margin asymmetrical flute design
- For cutting data see pg. 156

Tricut — Art. 55654



Tricut — Art. 55338





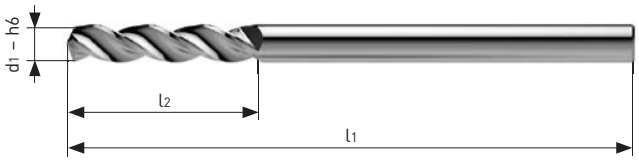
d1	d1 (in.)	Art. 55654			Art. 55338		
		Catalog Number	l2	l1	Catalog Number	l2	l1
1.00	.0394	55654-0010	6.00	26	55338-0010	11.50	34
1.10	.0433	55654-0011	6.50	28	55338-0011	13.00	36
1.20	.0472	55654-0012	7.50	30	55338-0012	15.00	38
1.30	.0512	55654-0013	7.50	30	55338-0013	15.00	38
1.40	.0551	55654-0014	8.50	32	55338-0014	17.00	40
1.50	.0591	55654-0015	8.50	32	55338-0015	17.00	40
1.60	.0630	55654-0016	9.50	34	55338-0016	19.00	43
1.70	.0669	55654-0017	9.50	34	55338-0017	19.00	43
1.80	.0709	55654-0018	10.50	36	55338-0018	21.00	46
1.90	.0748	55654-0019	10.50	36	55338-0019	21.00	46
2.00	.0787	55654-0020	11.50	38	55338-0020	22.00	49
2.10	.0827	55654-0021	11.50	38	55338-0021	22.00	49
2.20	.0866	55654-0022	12.50	40	55338-0022	25.00	53
2.30	.0906	55654-0023	12.50	40	55338-0023	25.00	53
2.40	.0945	55654-0024	13.50	43	55338-0024	28.00	57
2.50	.0984	55654-0025	13.50	43	55338-0025	28.00	57
2.60	.1024	55654-0026	13.50	43	55338-0026	28.00	57
2.70	.1063	55654-0027	15.50	46	55338-0027	31.00	61
2.80	.1102	55654-0028	15.50	46	55338-0028	31.00	61
2.90	.1142	55654-0029	15.50	46	55338-0029	31.00	61
3.00	.1181	55654-0030	15.50	46	55338-0030	31.00	61
3.10	.1220	55654-0031	17.00	49	55338-0031	34.00	65
3.175	.1250 (1/8)	55654-3175	17.00	49	—	—	—
3.20	.1260	55654-0032	17.00	49	55338-0032	34.00	65
3.30	.1299	55654-0033	17.00	49	55338-0033	34.00	65

d_1	d_1 (in.)	Art. 55654			Art. 55338		
		Catalog Number	l_2	l_1	Catalog Number	l_2	l_1
3.40	.1339	55654-0034	19.00	52	55338-0034	37.00	70
3.50	.1378	55654-0035	19.00	52	55338-0035	37.00	70
3.60	.1417	55654-0036	19.00	52	55338-0036	37.00	70
3.70	.1457	55654-0037	19.00	52	55338-0037	37.00	70
3.80	.1496	55654-0038	21.00	55	55338-0038	41.00	75
3.90	.1535	55654-0039	21.00	55	55338-0039	41.00	75
3.969	.1563 (5/32)	55654-3969	21.00	55	—	—	—
4.00	.1575	55654-0040	21.00	55	55338-0040	41.00	75
4.10	.1614	55654-0041	21.00	55	55338-0041	41.00	75
4.20	.1654	55654-0042	21.00	55	55338-0042	41.00	75
4.30	.1693	55654-0043	22.50	58	55338-0043	45.00	80
4.40	.1732	55654-0044	22.50	58	55338-0044	45.00	80
4.50	.1772	55654-0045	22.50	58	55338-0045	45.00	80
4.60	.1811	55654-0046	22.50	58	55338-0046	45.00	80
4.70	.1850	55654-0047	22.50	58	55338-0047	45.00	80
4.763	.1875 (3/16)	55654-4763	24.50	62	—	—	—
4.80	.1890	55654-0048	24.50	62	55338-0048	50.00	86
4.90	.1929	55654-0049	24.50	62	55338-0049	50.00	86
5.00	.1969	55654-0050	24.50	62	55338-0050	50.00	86
5.10	.2008	55654-0051	24.50	62	55338-0051	50.00	86
5.20	.2047	55654-0052	24.50	62	55338-0052	50.00	86
5.30	.2087	55654-0053	24.50	62	55338-0053	50.00	86
5.40	.2126	55654-0054	26.00	66	55338-0054	55.00	93
5.50	.2165	55654-0055	26.00	66	55338-0055	55.00	93
5.556	.2187 (7/32)	55654-5556	26.00	66	—	—	—
5.60	.2205	55654-0056	26.00	66	55338-0056	55.00	93
5.70	.2244	55654-0057	26.00	66	55338-0057	55.00	93
5.80	.2283	55654-0058	26.00	66	55338-0058	55.00	93
5.90	.2323	55654-0059	26.00	66	55338-0059	55.00	93
6.00	.2362	55654-0060	26.00	66	55338-0060	55.00	93
6.10	.2402	55654-0061	28.50	70	55338-0061	60.00	101
6.20	.2441	55654-0062	28.50	70	55338-0062	60.00	101
6.30	.2480	55654-0063	28.50	70	55338-0063	60.00	101
6.35	.2500 (1/4)	55654-6350	28.50	70	—	—	—
6.40	.2520	55654-0064	28.50	70	55338-0064	60.00	101
6.50	.2559	55654-0065	28.50	70	55338-0065	60.00	101
6.60	.2598	55654-0066	28.50	70	55338-0066	60.00	101
6.70	.2638	55654-0067	28.50	70	55338-0067	60.00	101
6.80	.2677	55654-0068	31.00	74	55338-0068	66.00	109
6.90	.2717	55654-0069	31.00	74	55338-0069	66.00	109
7.00	.2756	55654-0070	31.00	74	55338-0070	66.00	109
7.10	.2795	55654-0071	31.00	74	55338-0071	66.00	109
7.144	.2813 (9/32)	55654-7144	31.00	74	—	—	—
7.20	.2835	55654-0072	31.00	74	55338-0072	66.00	109
7.30	.2874	55654-0073	31.00	74	55338-0073	66.00	109
7.40	.2913	55654-0074	31.00	74	55338-0074	66.00	109

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 157

Tricut

Art. 55654 / 55338 Cont.



d1	d1 (in.)	Art. 55654			Art. 55338		
		Catalog Number	l2	l1	Catalog Number	l2	l1
7.50	.2953	55654-0075	31.00	74	55338-0075	66.00	109
7.60	.2992	55654-0076	34.00	79	55338-0076	72.00	117
7.70	.3031	55654-0077	34.00	79	55338-0077	72.00	117
7.80	.3071	55654-0078	34.00	79	55338-0078	72.00	117
7.90	.3110	55654-0079	34.00	79	55338-0079	72.00	117
7.938	.3125 (5/16)	55654-7938	34.00	79	—	—	—
8.00	.3150	55654-0080	34.00	79	55338-0080	72.00	117
8.10	.3189	55654-0081	34.00	79	55338-0081	72.00	117
8.20	.3228	55654-0082	34.00	79	55338-0082	72.00	117
8.30	.3268	55654-0083	34.00	79	55338-0083	72.00	117
8.40	.3307	55654-0084	34.00	79	55338-0084	72.00	117
8.50	.3346	55654-0085	34.00	79	55338-0085	72.00	117
8.60	.3386	55654-0086	36.50	84	55338-0086	78.00	125
8.70	.3425	55654-0087	36.50	84	55338-0087	78.00	125
8.80	.3465	55654-0088	36.50	84	55338-0088	78.00	125
8.90	.3504	55654-0089	36.50	84	55338-0089	78.00	125
9.00	.3543	55654-0090	36.50	84	55338-0090	78.00	125
9.10	.3583	55654-0091	36.50	84	55338-0091	78.00	125
9.20	.3622	55654-0092	36.50	84	55338-0092	78.00	125
9.30	.3661	55654-0093	36.50	84	55338-0093	78.00	125
9.40	.3701	55654-0094	36.50	84	55338-0094	78.00	125
9.50	.3740	55654-0095	36.50	84	55338-0095	78.00	125
9.525	.3750 (3/8)	55654-9525	39.00	89	—	—	—
9.60	.3780	55654-0096	39.00	89	55338-0096	84.00	133
9.70	.3819	55654-0097	39.00	89	55338-0097	84.00	133
9.80	.3858	55654-0098	39.00	89	55338-0098	84.00	133
9.90	.3898	55654-0099	39.00	89	55338-0099	84.00	133
10.00	.3937	55654-1000	39.00	89	55338-0100	84.00	133
10.20	.4016	55654-1020	39.00	89	55338-0102	84.00	133
10.50	.4134	55654-1050	39.00	89	55338-0105	84.00	133
11.00	.4331	55654-1100	43.00	95	55338-0110	91.00	142
11.113	.4375 (7/16)	55654-1111	43.00	95	—	—	—
11.50	.4528	55654-1150	43.00	95	55338-0115	91.00	142
12.00	.4724	55654-1200	47.00	102	55338-0120	98.00	151
12.50	.4921	55654-1250	47.00	102	55338-0125	98.00	151
12.70	.5000 (1/2)	55654-1270	47.00	102	—	—	—
13.00	.5118	55654-1300	47.00	102	55338-0130	98.00	151
13.50	.5315	55654-1350	50.00	107	55338-0135	105.00	160
14.00	.5512	55654-1400	50.00	107	55338-0140	105.00	160

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 157



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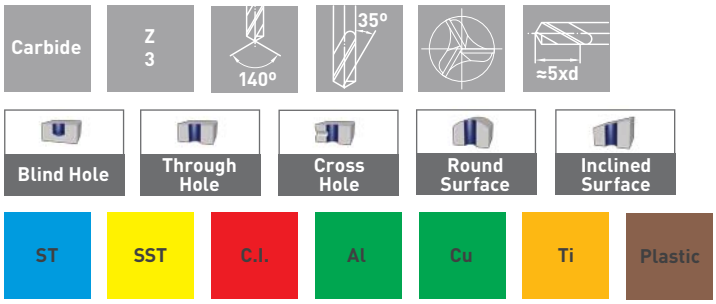
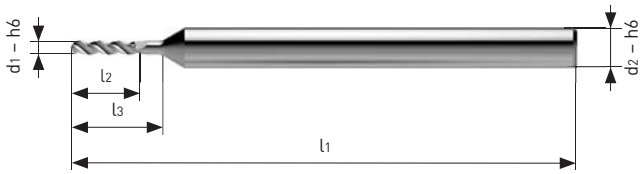
Art. 55652





Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
55652-0020	.20	.0079	1.00	1.50	38	3.00
55652-0021	.21	.0083	1.05	1.50	38	3.00
55652-0022	.22	.0087	1.10	1.60	38	3.00
55652-0023	.23	.0091	1.15	1.60	38	3.00
55652-0024	.24	.0094	1.20	1.70	38	3.00
55652-0025	.25	.0098	1.25	1.70	38	3.00
55652-0026	.26	.0102	1.30	1.80	38	3.00
55652-0027	.27	.0106	1.35	1.80	38	3.00
55652-0028	.28	.0110	1.40	1.90	38	3.00
55652-0029	.29	.0114	1.45	1.90	38	3.00
55652-0030	.30	.0118	1.50	2.00	38	3.00
55652-0031	.31	.0122	1.55	2.00	38	3.00
55652-0032	.32	.0126	1.60	2.10	38	3.00
55652-0033	.33	.0130	1.65	2.10	38	3.00
55652-0034	.34	.0134	1.70	2.20	38	3.00
55652-0035	.35	.0138	1.75	2.20	38	3.00
55652-0036	.36	.0142	1.80	2.30	38	3.00
55652-0037	.37	.0146	1.85	2.30	38	3.00
55652-0038	.38	.0150	1.90	2.40	38	3.00
55652-0039	.39	.0154	1.95	2.40	38	3.00
55652-0040	.40	.0157	2.00	2.50	38	3.00
55652-0041	.41	.0161	2.05	2.50	38	3.00
55652-0042	.42	.0165	2.10	2.60	38	3.00
55652-0043	.43	.0169	2.15	2.60	38	3.00
55652-0044	.44	.0173	2.20	2.70	38	3.00
55652-0045	.45	.0177	2.25	2.70	38	3.00
55652-0046	.46	.0181	2.30	2.80	38	3.00
55652-0047	.47	.0185	2.35	2.80	38	3.00
55652-0048	.48	.0189	2.40	2.90	38	3.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
55652-0049	.49	.0193	2.45	2.90	38	3.00
55652-0050	.50	.0197	2.50	3.00	38	3.00
55652-0051	.51	.0201	2.55	3.00	38	3.00
55652-0052	.52	.0205	2.60	3.10	38	3.00
55652-0053	.53	.0209	2.65	3.10	38	3.00
55652-0054	.54	.0213	2.70	3.20	38	3.00
55652-0055	.55	.0217	2.75	3.20	38	3.00
55652-0056	.56	.0220	2.80	3.30	38	3.00
55652-0057	.57	.0224	2.85	3.30	38	3.00
55652-0058	.58	.0228	2.90	3.40	38	3.00
55652-0059	.59	.0232	2.95	3.40	38	3.00
55652-0060	.60	.0236	3.00	3.50	38	3.00
55652-0061	.61	.0240	3.05	3.50	38	3.00
55652-0062	.62	.0244	3.10	3.60	38	3.00
55652-0063	.63	.0248	3.15	3.60	38	3.00
55652-0064	.64	.0252	3.20	3.70	38	3.00
55652-0065	.65	.0256	3.25	3.70	38	3.00
55652-0066	.66	.0260	3.30	3.80	38	3.00
55652-0067	.67	.0264	3.35	3.80	38	3.00
55652-0068	.68	.0268	3.40	3.90	38	3.00
55652-0069	.69	.0272	3.45	3.90	38	3.00
55652-0070	.70	.0276	3.50	4.00	38	3.00
55652-0071	.71	.0280	3.55	4.00	38	3.00
55652-0072	.72	.0283	3.60	4.10	38	3.00
55652-0073	.73	.0287	3.65	4.10	38	3.00
55652-0074	.74	.0291	3.70	4.20	38	3.00
55652-0075	.75	.0295	3.75	4.20	38	3.00
55652-0076	.76	.0299	3.80	4.30	38	3.00
55652-0077	.77	.0303	3.85	4.30	38	3.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
55652-0078	.78	.0307	3.90	4.40	38	3.00
55652-0079	.79	.0311	3.95	4.40	38	3.00
55652-0080	.80	.0315	4.00	4.50	38	3.00
55652-0081	.81	.0319	4.05	4.50	38	3.00
55652-0082	.82	.0323	4.10	4.60	38	3.00
55652-0083	.83	.0327	4.15	4.60	38	3.00
55652-0084	.84	.0331	4.20	4.70	38	3.00
55652-0085	.85	.0335	4.25	4.70	38	3.00
55652-0086	.86	.0339	4.30	4.80	38	3.00
55652-0087	.87	.0343	4.35	4.80	38	3.00
55652-0088	.88	.0346	4.40	4.90	38	3.00
55652-0089	.89	.0350	4.45	4.90	38	3.00
55652-0090	.90	.0354	4.50	5.00	38	3.00
55652-0091	.91	.0358	4.55	5.00	38	3.00
55652-0092	.92	.0362	4.60	5.10	38	3.00
55652-0093	.93	.0366	4.65	5.10	38	3.00
55652-0094	.94	.0370	4.70	5.20	38	3.00
55652-0095	.95	.0374	4.75	5.20	38	3.00
55652-0096	.96	.0378	4.80	5.30	38	3.00
55652-0097	.97	.0382	4.85	5.30	38	3.00
55652-0098	.98	.0386	4.90	5.40	38	3.00
55652-0099	.99	.0390	4.95	5.40	38	3.00
55652-0100	1.00	.0394	5.00	6.50	38	3.00
55652-0101	1.01	.0398	5.05	6.50	38	3.00
55652-0102	1.02	.0402	5.10	6.50	38	3.00
55652-0103	1.03	.0406	5.15	6.50	38	3.00
55652-0104	1.04	.0409	5.20	6.50	38	3.00
55652-0105	1.05	.0413	5.25	6.50	38	3.00
55652-0106	1.06	.0417	5.30	6.50	38	3.00
55652-0107	1.07	.0421	5.35	7.50	38	3.00
55652-0108	1.08	.0425	5.40	7.50	38	3.00
55652-0109	1.09	.0429	5.45	7.50	38	3.00
55652-0110	1.10	.0433	5.50	7.50	38	3.00
55652-0111	1.11	.0437	5.55	7.50	38	3.00
55652-0112	1.12	.0441	5.60	7.50	38	3.00
55652-0113	1.13	.0445	5.65	7.50	38	3.00
55652-0114	1.14	.0449	5.70	7.50	38	3.00
55652-0115	1.15	.0453	5.75	7.50	38	3.00
55652-0116	1.16	.0457	5.80	7.50	38	3.00
55652-0117	1.17	.0461	5.85	7.50	38	3.00
55652-0118	1.18	.0465	5.90	8.50	38	3.00
55652-0119	1.19	.0469	5.95	8.50	38	3.00
55652-0120	1.20	.0472	6.00	8.50	38	3.00
55652-0121	1.21	.0476	6.05	8.50	38	3.00
55652-0122	1.22	.0480	6.10	8.50	38	3.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
55652-0123	1.23	.0484	6.15	8.50	38	3.00
55652-0124	1.24	.0488	6.20	8.50	38	3.00
55652-0125	1.25	.0492	6.25	8.50	38	3.00
55652-0126	1.26	.0496	6.30	8.50	38	3.00
55652-0127	1.27	.0500	6.35	8.50	38	3.00
55652-0128	1.28	.0504	6.40	8.50	38	3.00
55652-0129	1.29	.0508	6.45	8.50	38	3.00
55652-0130	1.30	.0512	6.50	8.50	38	3.00
55652-0131	1.31	.0516	6.55	8.50	38	3.00
55652-0132	1.32	.0520	6.60	8.50	38	3.00
55652-0133	1.33	.0524	6.65	9.50	38	3.00
55652-0134	1.34	.0528	6.70	9.50	38	3.00
55652-0135	1.35	.0531	6.75	9.50	38	3.00
55652-0136	1.36	.0535	6.80	9.50	38	3.00
55652-0137	1.37	.0539	6.85	9.50	38	3.00
55652-0138	1.38	.0543	6.90	9.50	38	3.00
55652-0139	1.39	.0547	6.95	9.50	38	3.00
55652-0140	1.40	.0551	7.00	9.50	38	3.00
55652-0141	1.41	.0555	7.05	9.50	38	3.00
55652-0142	1.42	.0559	7.10	9.50	38	3.00
55652-0143	1.43	.0563	7.15	9.50	38	3.00
55652-0144	1.44	.0567	7.20	9.50	38	3.00
55652-0145	1.45	.0571	7.25	9.50	38	3.00
55652-0146	1.46	.0575	7.30	9.50	38	3.00
55652-0147	1.47	.0579	7.35	9.50	38	3.00
55652-0148	1.48	.0583	7.40	9.50	38	3.00
55652-0149	1.49	.0587	7.45	9.50	38	3.00
55652-0150	1.50	.0591	7.50	9.50	38	3.00
55652-0151	1.51	.0594	7.55	10.50	38	3.00
55652-0152	1.52	.0598	7.60	10.50	38	3.00
55652-0153	1.53	.0602	7.65	10.50	38	3.00
55652-0154	1.54	.0606	7.70	10.50	38	3.00
55652-0155	1.55	.0610	7.75	10.50	38	3.00
55652-0156	1.56	.0614	7.80	10.50	38	3.00
55652-0157	1.57	.0618	7.85	10.50	38	3.00
55652-0158	1.58	.0622	7.90	10.50	38	3.00
55652-0159	1.59	.0626	7.95	10.50	38	3.00
55652-0160	1.60	.0630	8.00	10.50	38	3.00
55652-0161	1.61	.0634	8.05	10.50	38	3.00
55652-0162	1.62	.0638	8.10	10.50	38	3.00
55652-0163	1.63	.0642	8.15	10.50	38	3.00
55652-0164	1.64	.0646	8.20	10.50	38	3.00
55652-0165	1.65	.0650	8.25	10.50	38	3.00
55652-0166	1.66	.0654	8.30	10.50	38	3.00
55652-0167	1.67	.0657	8.35	10.50	38	3.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 158

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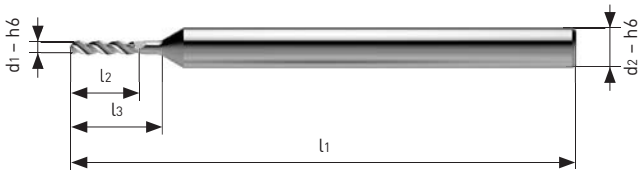
Art. 55652 Cont.



Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
55652-0168	1.68	.0661	8.40	10.50	38	3.00
55652-0169	1.69	.0665	8.45	10.50	38	3.00
55652-0170	1.70	.0669	8.50	10.50	38	3.00
55652-0171	1.71	.0673	8.55	11.50	38	3.00
55652-0172	1.72	.0677	8.60	11.50	38	3.00
55652-0173	1.73	.0681	8.65	11.50	38	3.00
55652-0174	1.74	.0685	8.70	11.50	38	3.00
55652-0175	1.75	.0689	8.75	11.50	38	3.00
55652-0176	1.76	.0693	8.80	11.50	38	3.00
55652-0177	1.77	.0697	8.85	11.50	38	3.00
55652-0178	1.78	.0701	8.90	11.50	38	3.00
55652-0179	1.79	.0705	8.95	11.50	38	3.00
55652-0180	1.80	.0709	9.00	11.50	38	3.00
55652-0181	1.81	.0713	9.05	11.50	38	3.00
55652-0182	1.82	.0717	9.10	11.50	38	3.00
55652-0183	1.83	.0720	9.15	11.50	38	3.00
55652-0184	1.84	.0724	9.20	11.50	38	3.00
55652-0185	1.85	.0728	9.25	11.50	38	3.00
55652-0186	1.86	.0732	9.30	11.50	38	3.00
55652-0187	1.87	.0736	9.35	11.50	38	3.00
55652-0188	1.88	.0740	9.40	11.50	38	3.00
55652-0189	1.89	.0744	9.45	11.50	38	3.00
55652-0190	1.90	.0748	9.50	11.50	38	3.00
55652-0191	1.91	.0752	9.55	12.50	38	3.00
55652-0192	1.92	.0756	9.60	12.50	38	3.00
55652-0193	1.93	.0760	9.65	12.50	38	3.00
55652-0194	1.94	.0764	9.70	12.50	38	3.00
55652-0195	1.95	.0768	9.75	12.50	38	3.00
55652-0196	1.96	.0772	9.80	12.50	38	3.00
55652-0197	1.97	.0776	9.85	12.50	38	3.00
55652-0198	1.98	.0780	9.90	12.50	38	3.00
55652-0199	1.99	.0783	9.95	12.50	38	3.00
55652-0200	2.00	.0787	10.00	12.50	38	3.00
55652-0201	2.01	.0791	10.05	12.50	38	3.00
55652-0202	2.02	.0795	10.10	12.50	38	3.00
55652-0203	2.03	.0799	10.15	12.50	38	3.00
55652-0204	2.04	.0803	10.20	12.50	38	3.00
55652-0205	2.05	.0807	10.25	12.50	38	3.00
55652-0206	2.06	.0811	10.30	12.50	38	3.00

Catalog Number	d1	d1 (in.)	l2	l3	l1	d2
55652-0207	2.07	.0815	10.35	12.50	38	3.00
55652-0208	2.08	.0819	10.40	12.50	38	3.00
55652-0209	2.09	.0823	10.45	12.50	38	3.00
55652-0210	2.10	.0827	10.50	12.50	38	3.00
55652-0211	2.11	.0831	10.55	12.50	38	3.00
55652-0212	2.12	.0835	10.60	12.50	38	3.00
55652-0213	2.13	.0839	10.65	13.50	38	3.00
55652-0214	2.14	.0843	10.70	13.50	38	3.00
55652-0215	2.15	.0846	10.75	13.50	38	3.00
55652-0216	2.16	.0850	10.80	13.50	38	3.00
55652-0217	2.17	.0854	10.85	13.50	38	3.00
55652-0218	2.18	.0858	10.90	13.50	38	3.00
55652-0219	2.19	.0862	10.95	13.50	38	3.00
55652-0220	2.20	.0866	11.00	13.50	38	3.00
55652-0221	2.21	.0870	11.05	13.50	38	3.00
55652-0222	2.22	.0874	11.10	13.50	38	3.00
55652-0223	2.23	.0878	11.15	13.50	38	3.00
55652-0224	2.24	.0882	11.20	13.50	38	3.00
55652-0225	2.25	.0886	11.25	13.50	38	3.00
55652-0226	2.26	.0890	11.30	13.50	38	3.00
55652-0227	2.27	.0894	11.35	13.50	38	3.00
55652-0228	2.28	.0898	11.40	13.50	38	3.00
55652-0229	2.29	.0902	11.45	13.50	38	3.00
55652-0230	2.30	.0906	11.50	13.50	38	3.00
55652-0231	2.31	.0909	11.55	13.50	38	3.00
55652-0232	2.32	.0913	11.60	13.50	38	3.00
55652-0233	2.33	.0917	11.65	13.50	38	3.00
55652-0234	2.34	.0921	11.70	13.50	38	3.00
55652-0235	2.35	.0925	11.75	13.50	38	3.00
55652-0236	2.36	.0929	11.80	13.50	38	3.00
55652-0237	2.37	.0933	11.85	14.50	38	3.00
55652-0238	2.38	.0937	11.90	14.50	38	3.00
55652-0239	2.39	.0941	11.95	14.50	38	3.00
55652-0240	2.40	.0945	12.00	14.50	38	3.00
55652-0241	2.41	.0949	12.05	14.50	38	3.00
55652-0242	2.42	.0953	12.10	14.50	38	3.00
55652-0243	2.43	.0957	12.15	14.50	38	3.00
55652-0244	2.44	.0961	12.20	14.50	38	3.00
55652-0245	2.45	.0965	12.25	14.50	38	3.00

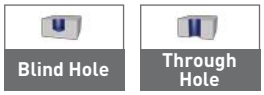
Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
55652-0246	2.46	.0969	12.30	14.50	38	3.00
55652-0247	2.47	.0972	12.35	14.50	38	3.00
55652-0248	2.48	.0976	12.40	14.50	38	3.00
55652-0249	2.49	.0980	12.45	14.50	38	3.00
55652-0250	2.50	.0984	12.50	14.50	38	3.00
55652-0251	2.51	.0988	12.55	14.50	38	3.00
55652-0252	2.52	.0992	12.60	14.50	38	3.00
55652-0253	2.53	.0996	12.65	14.50	38	3.00
55652-0254	2.54	.1000	12.70	14.50	38	3.00
55652-0255	2.55	.1004	12.75	14.50	38	3.00
55652-0256	2.56	.1008	12.80	14.50	38	3.00
55652-0257	2.57	.1012	12.85	14.50	38	3.00
55652-0258	2.58	.1016	12.90	14.50	38	3.00
55652-0259	2.59	.1020	12.95	14.50	38	3.00
55652-0260	2.60	.1024	13.00	14.50	38	3.00
55652-0261	2.61	.1028	13.05	14.50	38	3.00
55652-0262	2.62	.1031	13.10	14.50	38	3.00
55652-0263	2.63	.1035	13.15	14.50	38	3.00
55652-0264	2.64	.1039	13.20	14.50	38	3.00
55652-0265	2.65	.1043	13.25	14.50	38	3.00
55652-0266	2.66	.1047	13.30	16.50	38	3.00
55652-0267	2.67	.1051	13.35	16.50	38	3.00
55652-0268	2.68	.1055	13.40	16.50	38	3.00
55652-0269	2.69	.1059	13.45	16.50	38	3.00
55652-0270	2.70	.1063	13.50	16.50	38	3.00
55652-0271	2.71	.1067	13.55	16.50	38	3.00
55652-0272	2.72	.1071	13.60	16.50	38	3.00

Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
55652-0273	2.73	.1075	13.65	16.50	38	3.00
55652-0274	2.74	.1079	13.70	16.50	38	3.00
55652-0275	2.75	.1083	13.75	16.50	38	3.00
55652-0276	2.76	.1087	13.80	16.50	38	3.00
55652-0277	2.77	.1091	13.85	16.50	38	3.00
55652-0278	2.78	.1094	13.90	16.50	38	3.00
55652-0279	2.79	.1098	13.95	16.50	38	3.00
55652-0280	2.80	.1102	14.00	16.50	38	3.00
55652-0281	2.81	.1106	14.05	16.50	38	3.00
55652-0282	2.82	.1110	14.10	16.50	38	3.00
55652-0283	2.83	.1114	14.15	16.50	38	3.00
55652-0284	2.84	.1118	14.20	16.50	38	3.00
55652-0285	2.85	.1122	14.25	16.50	38	3.00
55652-0286	2.86	.1126	14.30	16.50	38	3.00
55652-0287	2.87	.1130	14.35	16.50	38	3.00
55652-0288	2.88	.1134	14.40	16.50	38	3.00
55652-0289	2.89	.1138	14.45	16.50	38	3.00
55652-0290	2.90	.1142	14.50	16.50	38	3.00
55652-0291	2.91	.1146	14.55	16.50	38	3.00
55652-0292	2.92	.1150	14.60	16.50	38	3.00
55652-0293	2.93	.1154	14.65	16.50	38	3.00
55652-0294	2.94	.1157	14.70	16.50	38	3.00
55652-0295	2.95	.1161	14.75	16.50	38	3.00
55652-0296	2.96	.1165	14.80	16.50	38	3.00
55652-0297	2.97	.1169	14.85	16.50	38	3.00
55652-0298	2.98	.1173	14.90	16.50	38	3.00
55652-0299	2.99	.1177	14.95	16.50	38	3.00

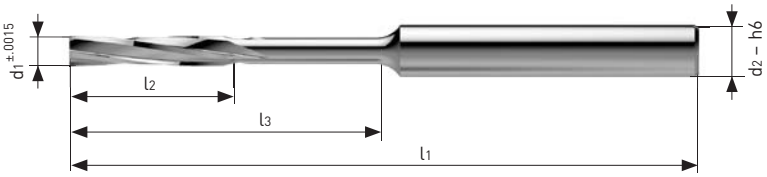
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 158

Art. 58000









Catalog Number	Ø	d1	d1 (in.)	l2	l3	l1	d2	z
58000-0098	1.0–P7	.987	.0389	8.00	16.00	48	3.00	3.00
58000-0100	1.0–H7	1.005	.0396	8.00	16.00	48	3.00	3.00
58000-0101	1.0–F7	1.011	.0398	8.00	16.00	48	3.00	3.00
58000-0110		1.102	.0434	8.00	16.00	48	3.00	3.00
58000-0111		1.115	.0439	8.00	16.00	48	3.00	3.00
58000-0125		1.255	.0494	8.00	16.00	48	3.00	3.00
58000-0148		1.480	.0583	10.00	20.00	52	3.00	3.00
58000-0167		1.679	.0661	11.00	22.00	54	3.00	3.00
58000-0169		1.690	.0665	11.00	22.00	54	3.00	3.00
58000-0169		1.692	.0666	11.00	22.00	54	3.00	3.00
58000-0169		1.695	.0667	11.00	22.00	54	3.00	3.00
58000-0169		1.697	.0668	11.00	22.00	54	3.00	3.00
58000-0170		1.701	.0670	11.00	22.00	54	3.00	3.00
58000-0179		1.790	.0705	11.00	22.00	54	3.00	3.00
58000-0198		1.985	.0781	11.00	22.00	54	3.00	4.00
58000-0198	2.0–P7	1.987	.0782	11.00	22.00	54	3.00	4.00
58000-0199		1.995	.0785	11.00	22.00	54	3.00	4.00
58000-0200	2.0–H7	2.005	.0789	11.00	22.00	54	3.00	4.00
58000-0201	2.0–F7	2.011	.0792	11.00	22.00	54	3.00	4.00
58000-0201		2.015	.0793	11.00	22.00	54	3.00	4.00
58000-0204		2.040	.0803	11.00	22.00	54	3.00	4.00
58000-0224		2.240	.0882	12.00	24.00	56	3.00	4.00
58000-0228		2.285	.0900	12.00	24.00	56	3.00	4.00
58000-0248		2.483	.0978	14.00	26.00	56	3.00	4.00
58000-0297		2.970	.1169	15.00	30.00	60	3.00	4.00
58000-0298		2.980	.1173	15.00	30.00	60	3.00	4.00
58000-0298	3.0–P7	2.987	.1176	15.00	30.00	60	3.00	4.00
58000-0299		2.995	.1179	15.00	30.00	60	3.00	4.00
58000-0300	3.0–H7	3.005	.1183	15.00	30.00	60	3.00	4.00
58000-0301	3.0–F7	3.011	.1185	15.00	30.00	60	3.00	4.00
58000-0302		3.020	.1189	15.00	30.00	60	3.00	4.00

Catalog Number	Ø	d1	d1 (in.)	l2	l3	l1	d2	z
58000-0303		3.030	.1192	15.00	30.00	60	3.00	4.00
58000-0304		3.045	.1199	15.00	30.00	60	3.00	4.00
58000-0305		3.050	.1201	15.00	30.00	60	3.00	4.00
58000-0306		3.060	.1205	15.00	30.00	60	3.00	4.00
58000-0387		3.870	.1524	19.00	38.00	76	6.00	4.00
58000-0397		3.970	.1563	19.00	38.00	76	6.00	6.00
58000-0398		3.980	.1567	19.00	38.00	76	6.00	6.00
58000-0398	4.0–P7	3.986	.1569	19.00	38.00	76	6.00	6.00
58000-0399		3.992	.1572	19.00	38.00	76	6.00	6.00
58000-0400	4.0–H7	4.006	.1577	19.00	38.00	76	6.00	6.00
58000-0401	4.0–F7	4.016	.1581	19.00	38.00	76	6.00	6.00
58000-0402		4.020	.1583	19.00	38.00	76	6.00	6.00
58000-0402		4.025	.1585	19.00	38.00	76	6.00	6.00
58000-0403		4.030	.1587	19.00	38.00	76	6.00	6.00
58000-0404		4.040	.1591	19.00	38.00	76	6.00	6.00
58000-0497		4.970	.1957	23.00	46.00	84	6.00	6.00
58000-0498		4.980	.1961	23.00	46.00	84	6.00	6.00
58000-0498	5.0–P7	4.986	.1963	23.00	46.00	84	6.00	6.00
58000-0500	5.0–H7	5.006	.1971	23.00	46.00	84	6.00	6.00
58000-0501	5.0–F7	5.018	.1976	23.00	46.00	84	6.00	6.00
58000-0502		5.020	.1976	23.00	46.00	84	6.00	6.00
58000-0503		5.030	.1980	23.00	46.00	84	6.00	6.00
58000-0520		5.206	.2050	23.00	46.00	84	6.00	6.00
58000-0522		5.220	.2055	23.00	46.00	84	6.00	6.00
58000-0597		5.970	.2350	26.00	52.00	90	6.00	6.00
58000-0598		5.980	.2354	26.00	52.00	90	6.00	6.00
58000-0598	6.0–P7	5.986	.2357	26.00	52.00	90	6.00	6.00
58000-0600	6.0–H7	6.006	.2365	26.00	52.00	90	6.00	6.00
58000-0601	6.0–F7	6.018	.2369	26.00	52.00	90	6.00	6.00
58000-0602		6.020	.2370	26.00	52.00	90	6.00	6.00
58000-0603		6.030	.2374	26.00	52.00	90	6.00	6.00

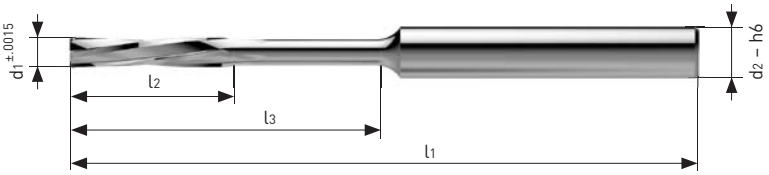
- All dimensions are millimeters unless otherwise noted
- Intermediate diameters available upon request
- For cutting data see pg. 159

Art. 58500

Carbide | Z 3-6 | -8xd | 10° | RIGHT LEFT

Through Hole

ST | SST | C.I. | Al | Cu | Ti



Catalog Number	Ø	d1	d1 (in.)	l2	l3	l1	d2	z
58500-0098	1.0–P7	.987	.0389	8.00	16.00	48	3.00	3.00
58500-0100	1.0–H7	1.005	.0396	8.00	16.00	48	3.00	3.00
58500-0101	1.0–F7	1.011	.0398	8.00	16.00	48	3.00	3.00
58500-0110		1.102	.0434	8.00	16.00	48	3.00	3.00
58500-0111		1.115	.0439	8.00	16.00	48	3.00	3.00
58500-0125		1.255	.0494	8.00	16.00	48	3.00	3.00
58500-0148		1.480	.0583	10.00	20.00	52	3.00	3.00
58500-0167		1.679	.0661	11.00	22.00	54	3.00	3.00
58500-0169		1.690	.0665	11.00	22.00	54	3.00	3.00
58500-0169		1.692	.0666	11.00	22.00	54	3.00	3.00
58500-0169		1.695	.0667	11.00	22.00	54	3.00	3.00
58500-0169		1.697	.0668	11.00	22.00	54	3.00	3.00
58500-0170		1.701	.0670	11.00	22.00	54	3.00	3.00
58500-0179		1.790	.0705	11.00	22.00	54	3.00	3.00
58500-0198		1.985	.0781	11.00	22.00	54	3.00	4.00
58500-0198	2.0–P7	1.987	.0782	11.00	22.00	54	3.00	4.00
58500-0199		1.995	.0785	11.00	22.00	54	3.00	4.00
58500-0200	2.0–H7	2.005	.0789	11.00	22.00	54	3.00	4.00
58500-0201	2.0–F7	2.011	.0792	11.00	22.00	54	3.00	4.00
58500-0201		2.015	.0793	11.00	22.00	54	3.00	4.00
58500-0204		2.040	.0803	11.00	22.00	54	3.00	4.00
58500-0224		2.240	.0882	12.00	24.00	56	3.00	4.00
58500-0228		2.285	.0900	12.00	24.00	56	3.00	4.00
58500-0248		2.483	.0978	14.00	26.00	58	3.00	4.00
58500-0297		2.970	.1169	15.00	30.00	60	3.00	4.00
58500-0298		2.980	.1173	15.00	30.00	60	3.00	4.00
58500-0298	3.0–P7	2.987	.1176	15.00	30.00	60	3.00	4.00
58500-0299		2.995	.1179	15.00	30.00	60	3.00	4.00
58500-0300	3.0–H7	3.005	.1183	15.00	30.00	60	3.00	4.00
58500-0301	3.0–F7	3.011	.1185	15.00	30.00	60	3.00	4.00
58500-0302		3.020	.1189	15.00	30.00	60	3.00	4.00

Catalog Number	Ø	d1	d1 (in.)	l2	l3	l1	d2	z
58500-0303		3.030	.1192	15.00	30.00	60	3.00	4.00
58500-0304		3.045	.1199	15.00	30.00	60	3.00	4.00
58500-0305		3.050	.1201	15.00	30.00	60	3.00	4.00
58500-0306		3.060	.1205	15.00	30.00	60	3.00	4.00
58500-0387		3.870	.1524	19.00	38.00	76	6.00	4.00
58500-0397		3.970	.1563	19.00	38.00	76	6.00	6.00
58500-0398		3.980	.1567	19.00	38.00	76	6.00	6.00
58500-0398	4.0–P7	3.986	.1569	19.00	38.00	76	6.00	6.00
58500-0399		3.992	.1572	19.00	38.00	76	6.00	6.00
58500-0400	4.0–H7	4.006	.1577	19.00	38.00	76	6.00	6.00
58500-0401	4.0–F7	4.016	.1581	19.00	38.00	76	6.00	6.00
58500-0402		4.020	.1583	19.00	38.00	76	6.00	6.00
58500-0402		4.025	.1585	19.00	38.00	76	6.00	6.00
58500-0403		4.030	.1587	19.00	38.00	76	6.00	6.00
58500-0404		4.040	.1591	19.00	38.00	76	6.00	6.00
58500-0497		4.970	.1957	23.00	46.00	84	6.00	6.00
58500-0498		4.980	.1961	23.00	46.00	84	6.00	6.00
58500-0498	5.0–P7	4.986	.1963	23.00	46.00	84	6.00	6.00
58500-0500	5.0–H7	5.006	.1971	23.00	46.00	84	6.00	6.00
58500-0501	5.0–F7	5.018	.1976	23.00	46.00	84	6.00	6.00
58500-0502		5.020	.1976	23.00	46.00	84	6.00	6.00
58500-0503		5.030	.1980	23.00	46.00	84	6.00	6.00
58500-0520		5.206	.2050	23.00	46.00	84	6.00	6.00
58500-0522		5.220	.2055	23.00	46.00	84	6.00	6.00
58500-0597		5.970	.2350	26.00	52.00	90	6.00	6.00
58500-0598		5.980	.2354	26.00	52.00	90	6.00	6.00
58500-0598	6.0–P7	5.986	.2357	26.00	52.00	90	6.00	6.00
58500-0600	6.0–H7	6.006	.2365	26.00	52.00	90	6.00	6.00
58500-0601	6.0–F7	6.018	.2369	26.00	52.00	90	6.00	6.00
58500-0602		6.020	.2370	26.00	52.00	90	6.00	6.00
58500-0603		6.030	.2374	26.00	52.00	90	6.00	6.00

- All dimensions are millimeters unless otherwise noted
- Intermediate diameters available upon request
- For cutting data see pg. 159

Milling

	Article	Diameter Range	Increments	Cutting Length	Point Angle	Helix Angle	Number of Teeth	
Engraving Mill								
	70030	.02–.15	.01		30°	0°	1	
	70040	.02–.15	.01		40°	0°	1	
	70050	.02–.15	.01		50°	0°	1	
	70060	.02–.15	.01		60°	0°	1	
	70090	.02–.15	.01		90°	0°	1	
	70130	.04–.10	.01		30°	0°	1	
	70140	.04–.10	.01		40°	0°	1	
	70150	.04–.10	.01		50°	0°	1	
	70160	.04–.10	.01		60°	0°	1	
	70190	.04–.10	.01		90°	0°	1	
Micro End Mill								
	72075	.20–2.00	.10	.75×Ø		30°	2	
	72150	.10–2.00	.10	1.5×Ø		30°	2	
	42000	.10–3.00	.05	3×Ø		30°	2	
	72500	.30–2.50	.10	5×Ø		30°	2	
	72800	.40–2.50	.10	8×Ø		30°	2	
	73130	.30–3.00	.10	1.3×Ø		30°	3	
	73200	.30–2.90	.10	2×Ø		30°	3	

	Material	Workpiece Material *							Application *	Page
		P	M	K	N	S	H	O		
	Carbide	✓	✓	✓	✓	✓		✓		108
	Carbide	✓	✓	✓	✓	✓		✓		108
	Carbide	✓	✓	✓	✓	✓		✓		108
	Carbide	✓	✓	✓	✓	✓		✓		108
	Carbide	✓	✓	✓	✓	✓		✓		108
	Carbide	✓	✓	✓	✓	✓		✓		110
	Carbide	✓	✓	✓	✓	✓		✓		110
	Carbide	✓	✓	✓	✓	✓		✓		110
	Carbide	✓	✓	✓	✓	✓		✓		110
	Carbide	✓	✓	✓	✓	✓		✓		110
	Carbide	✓	•	✓	✓	•		•		112
	Carbide	✓	•	✓	✓	•		•		112
	Carbide	✓	•	✓	✓	•		•		113
	Carbide	✓	•	✓	✓	•		•		114
	Carbide	✓	•	✓	✓	•		•		114
	Carbide	✓	•	✓	•	•				116
	Carbide	✓	•	✓	•	•				116

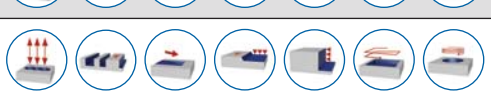
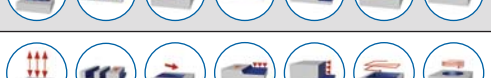
* S. 142+143
p. 142+143

✓ outstanding

• suitable

Milling

	Article	Diameter Range	Increments	Cutting Length	Point Angle	Helix Angle	Number of Teeth	
Micro End Mill								
	73300	.30–2.90	.10	3×Ø		30°	3	
	73800	.50–2.50	.10	8×Ø		30°	3	
	73725	.30–2.90	.10	2.5×Ø		45°	3	
	43105	.30–3.00	.10	1×Ø		35°	3	
	43305	.30–3.00	.10	3×Ø		35°	3	
	74720	.30–2.90	.10	2×Ø		40°	4	
	74740	.40–2.90	.10	4×Ø		40°	4	
Ball Nose End Mill								
	74075	.20–2.00	.10	.75×Ø		30°	2	
	74150	.20–2.00	.10	1.5×Ø		30°	2	
	74300	.20–2.80	.10	3×Ø		30°	2	
End Mill								
	40000	2.00–12.00	.50	DIN 6528		30°	2	
	40002	2.00–12.00	.50	DIN 6528		30°	3	
	40004	2.00–12.00	.50	DIN 6528		30°	4	
	47000	3.00–20.00	1.00	1.5–4×Ø		55°	2	
	47500	6.00–20.00	2.00	4–8×Ø		55°	2	
	76300	1.50–6.00	.50	1.5–4×Ø		30°	3	

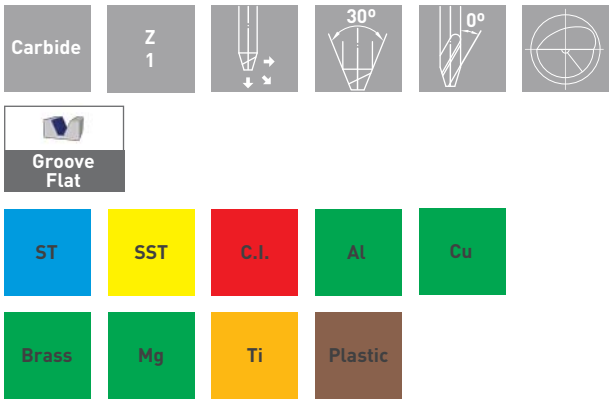
	Material	Workpiece Material *							Application *	Page
		P	M	K	N	S	H	O		
	Carbide	✓	•	✓	•	•				116
	Carbide	✓	•	✓	✓	•				116
	Carbide	✓	✓	✓	•	✓				118
	Carbide; Cro-Nova	✓	✓	•	✓	✓	•	•		119
	Carbide; Cro-Nova	✓	✓	•	✓	✓	•	•		119
	Carbide	✓	✓	✓	•	•				120
	Carbide	✓	✓	✓	•	•				121
	Carbide	✓	•	✓	✓	•		•		122
	Carbide	✓	•	✓	✓	•		•		122
	Carbide	✓	•	✓	✓	•		•		122
	Carbide	•		•	✓			•		124
	Carbide	✓	•	✓	✓					125
	Carbide	✓	•	✓						126
	Carbide				✓			•		127
	Carbide				✓			•		128
	Carbide	✓	•	✓						129

* S. 142+143
p. 142+143

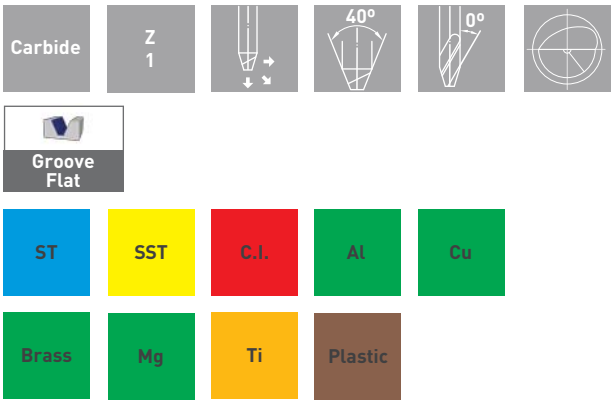
✓ outstanding

• suitable

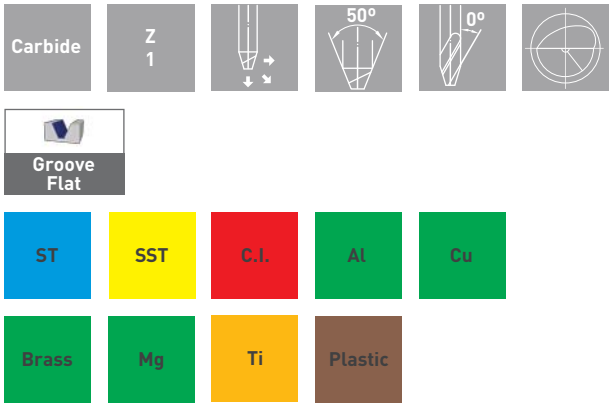
Art. 70030



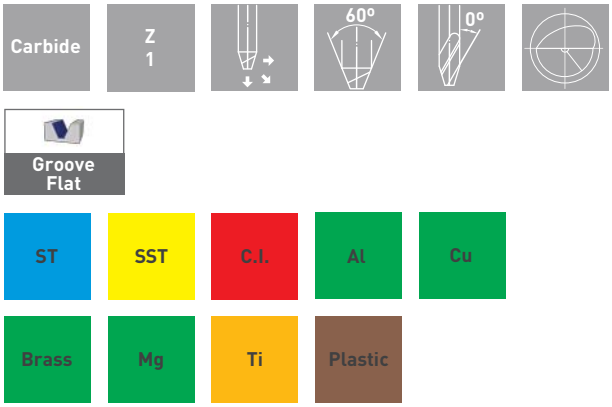
Art. 70040



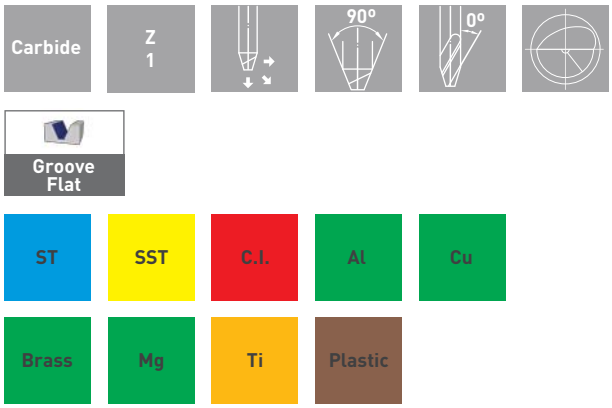
Art. 70050

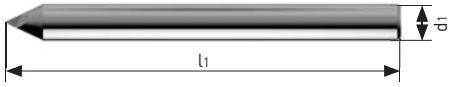


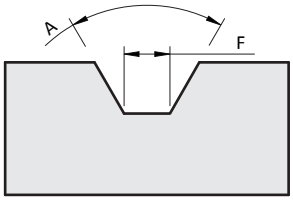
Art. 70060



Art. 70090







Catalog Number	Point Angle A	Flat Width		L1	d1
		F	F (in.)		
70030-0002	30°	.02	.0008	33	3.00
70030-0003		.03	.0012	33	3.00
70030-0004		.04	.0016	33	3.00
70030-0005		.05	.0020	33	3.00
70030-0006		.06	.0024	33	3.00
70030-0007		.07	.0028	33	3.00
70030-0008		.08	.0031	33	3.00
70030-0009		.09	.0035	33	3.00
70030-0010		.10	.0039	33	3.00
70030-0012		.12	.0047	33	3.00
70030-0015		.15	.0059	33	3.00
70040-0002	40°	.02	.0008	33	3.00
70040-0003		.03	.0012	33	3.00
70040-0004		.04	.0016	33	3.00
70040-0005		.05	.0020	33	3.00
70040-0006		.06	.0024	33	3.00
70040-0007		.07	.0028	33	3.00
70040-0008		.08	.0031	33	3.00
70040-0009		.09	.0035	33	3.00
70040-0010		.10	.0039	33	3.00
70040-0012		.12	.0047	33	3.00
70040-0015		.15	.0059	33	3.00
70050-0002	50°	.02	.0008	33	3.00
70050-0003		.03	.0012	33	3.00
70050-0004		.04	.0016	33	3.00
70050-0005		.05	.0020	33	3.00
70050-0006		.06	.0024	33	3.00
70050-0007		.07	.0028	33	3.00
70050-0008		.08	.0031	33	3.00
70050-0009		.09	.0035	33	3.00
70050-0010		.10	.0039	33	3.00
70050-0012		.12	.0047	33	3.00
70050-0015		.15	.0059	33	3.00

Catalog Number	Point Angle A	Flat Width		L1	d1
		F	F (in.)		
70060-0002	60°	.02	.0008	33	3.00
70060-0003		.03	.0012	33	3.00
70060-0004		.04	.0016	33	3.00
70060-0005		.05	.0020	33	3.00
70060-0006		.06	.0024	33	3.00
70060-0007		.07	.0028	33	3.00
70060-0008		.08	.0031	33	3.00
70060-0009		.09	.0035	33	3.00
70060-0010		.10	.0039	33	3.00
70060-0012		.12	.0047	33	3.00
70060-0015		.15	.0059	33	3.00
70090-0002	90°	.02	.0008	33	3.00
70090-0003		.03	.0012	33	3.00
70090-0004		.04	.0016	33	3.00
70090-0005		.05	.0020	33	3.00
70090-0006		.06	.0024	33	3.00
70090-0007		.07	.0028	33	3.00
70090-0008		.08	.0031	33	3.00
70090-0009		.09	.0035	33	3.00
70090-0010		.10	.0039	33	3.00
70090-0012		.12	.0047	33	3.00
70090-0015		.15	.0059	33	3.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 160

Art. 70130







Art. 70140







Art. 70150







Art. 70160





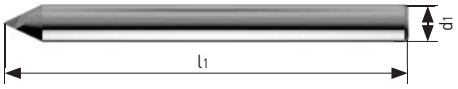


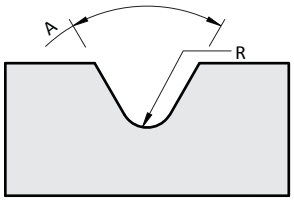
Art. 70190









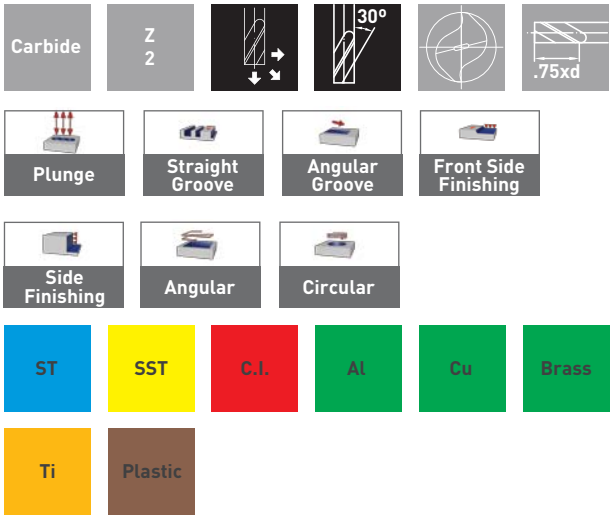


Catalog Number	Point Angle A	Radius		L1	d1
		R	R (in.)		
70130-0004	30°	.04	.0016	33	3.00
70130-0005		.05	.0020	33	3.00
70130-0006		.06	.0024	33	3.00
70130-0007		.07	.0028	33	3.00
70130-0008		.08	.0031	33	3.00
70130-0009		.09	.0035	33	3.00
70130-0010		.10	.0039	33	3.00
70140-0004	40°	.04	.0016	33	3.00
70140-0005		.05	.0020	33	3.00
70140-0006		.06	.0024	33	3.00
70140-0007		.07	.0028	33	3.00
70140-0008		.08	.0031	33	3.00
70140-0009		.09	.0035	33	3.00
70140-0010		.10	.0039	33	3.00
70150-0004	50°	.04	.0016	33	3.00
70150-0005		.05	.0020	33	3.00
70150-0006		.06	.0024	33	3.00
70150-0007		.07	.0028	33	3.00
70150-0008		.08	.0031	33	3.00
70150-0009		.09	.0035	33	3.00
70150-0010		.10	.0039	33	3.00
70160-0004	60°	.04	.0016	33	3.00
70160-0005		.05	.0020	33	3.00
70160-0006		.06	.0024	33	3.00
70160-0007		.07	.0028	33	3.00
70160-0008		.08	.0031	33	3.00
70160-0009		.09	.0035	33	3.00
70160-0010		.10	.0039	33	3.00
70190-0004	90°	.04	.0016	33	3.00
70190-0005		.05	.0020	33	3.00
70190-0006		.06	.0024	33	3.00
70190-0007		.07	.0028	33	3.00
70190-0008		.08	.0031	33	3.00
70190-0009		.09	.0035	33	3.00
70190-0010		.10	.0039	33	3.00

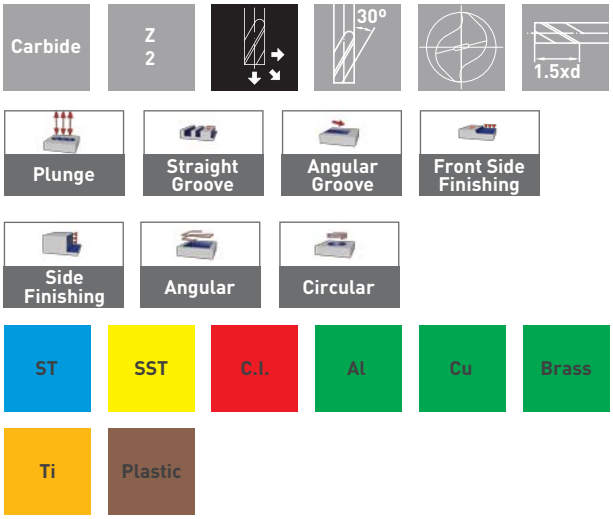


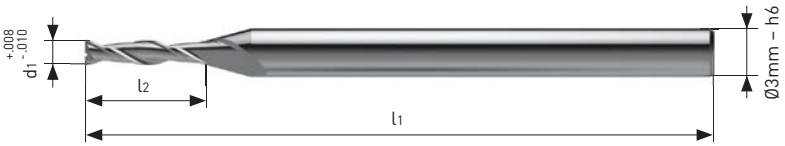
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 160

Art. 72075



Art. 72150

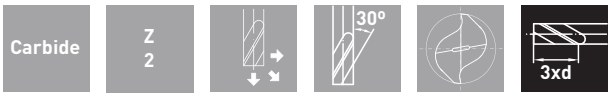




d1	d1 (in.)	72075			72150		
		Catalog Number	l2	l1	Catalog Number	l2	l1
.10	.0039	—	—	—	72150-0010	.15	39
.15	.0059	—	—	—	72150-0015	.20	39
.20	.0079	72075-0020	.15	39	72150-0020	.30	39
.25	.0098	—	—	—	72150-0025	.35	39
.30	.0118	72075-0030	.25	39	72150-0030	.45	39
.40	.0157	72075-0040	.30	39	72150-0040	.60	39
.50	.0197	72075-0050	.37	39	72150-0050	.75	39
.60	.0236	72075-0060	.45	39	72150-0060	.90	39
.70	.0276	72075-0070	.53	39	72150-0070	1.05	39
.80	.0315	72075-0080	.60	39	72150-0080	1.20	39
.90	.0354	72075-0090	.70	39	72150-0090	1.35	39
1.00	.0394	72075-0100	.75	39	72150-0100	1.50	39
1.10	.0433	72075-0110	.90	39	72150-0110	1.65	39
1.20	.0472	72075-0120	.90	39	72150-0120	1.80	39
1.30	.0512	72075-0130	1.00	39	72150-0130	1.95	39
1.40	.0551	72075-0140	1.10	39	72150-0140	2.10	39
1.50	.0591	72075-0150	1.15	39	72150-0150	2.25	39
1.60	.0630	72075-0160	1.20	39	72150-0160	2.40	39
1.70	.0669	72075-0170	1.30	39	72150-0170	2.55	39
1.80	.0709	72075-0180	1.40	39	72150-0180	2.70	39
1.90	.0748	72075-0190	1.45	39	72150-0190	2.85	39
2.00	.0787	72075-0200	1.50	39	72150-0200	3.00	39
2.50	.0984	—	—	—	—	—	—

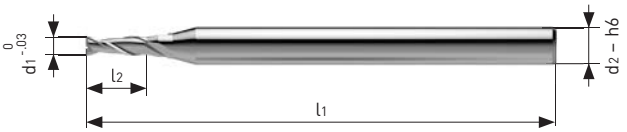
- All dimensions are millimeters unless otherwise noted
* Indicates Ø4mm - h6 shank
- For cutting data see pg. 160

Art. 42000







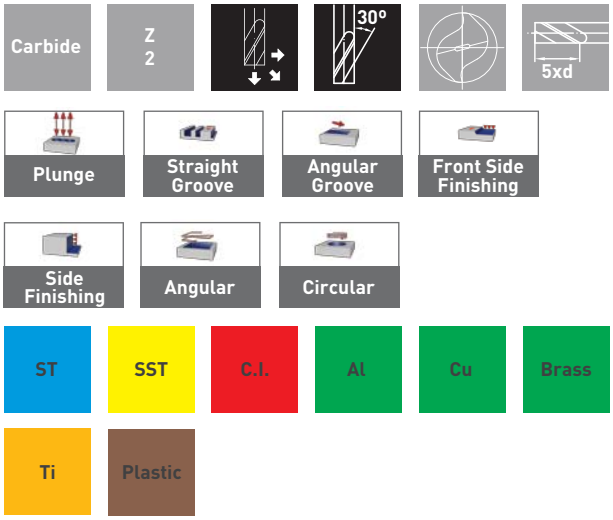


Catalog Number	d1	d1 (in.)	l2	l1	d2
42000-0010	.10	.0039	.30	38	3.00
42000-0015	.15	.0059	.45	38	3.00
42000-0020	.20	.0079	.60	38	3.00
42000-0025	.25	.0098	.75	38	3.00
42000-0030	.30	.0118	.90	38	3.00
42000-0035	.35	.0138	1.05	38	3.00
42000-0040	.40	.0157	1.20	38	3.00
42000-0045	.45	.0177	1.35	38	3.00
42000-0050	.50	.0197	1.50	38	3.00
42000-0055	.55	.0217	1.65	38	3.00
42000-0060	.60	.0236	1.80	38	3.00
42000-0065	.65	.0256	1.95	38	3.00
42000-0070	.70	.0276	2.10	38	3.00
42000-0075	.75	.0295	2.25	38	3.00
42000-0080	.80	.0315	2.40	38	3.00
42000-0085	.85	.0335	2.55	38	3.00
42000-0090	.90	.0354	2.70	38	3.00
42000-0095	.95	.0374	2.85	38	3.00
42000-0100	1.00	.0394	3.00	38	3.00
42000-0105	1.05	.0413	3.10	38	3.00
42000-0110	1.10	.0433	3.30	38	3.00
42000-0115	1.15	.0453	3.40	38	3.00
42000-0120	1.20	.0472	3.60	38	3.00
42000-0125	1.25	.0492	3.70	38	3.00
42000-0130	1.30	.0512	3.90	38	3.00

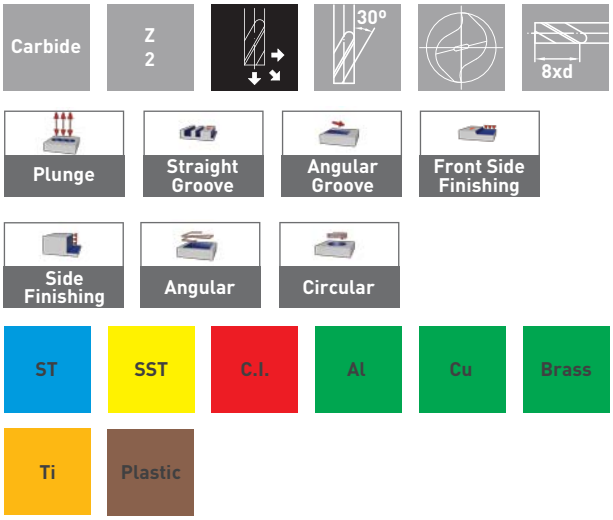
Catalog Number	d1	d1 (in.)	l2	l1	d2
42000-0135	1.35	.0531	4.00	38	3.00
42000-0140	1.40	.0551	4.20	38	3.00
42000-0145	1.45	.0571	4.30	38	3.00
42000-0150	1.50	.0591	4.50	38	3.00
42000-0155	1.55	.0610	4.60	38	3.00
42000-0160	1.60	.0630	4.80	38	3.00
42000-0165	1.65	.0650	4.90	38	3.00
42000-0170	1.70	.0669	5.10	38	3.00
42000-0175	1.75	.0689	5.20	38	3.00
42000-0180	1.80	.0709	5.40	38	3.00
42000-0185	1.85	.0728	5.50	38	3.00
42000-0190	1.90	.0748	5.70	38	3.00
42000-0195	1.95	.0768	5.80	38	3.00
42000-0200	2.00	.0787	6.00	38	3.00
42000-0210	2.10	.0827	6.30	38	3.00
42000-0220	2.20	.0866	6.60	38	3.00
42000-0230	2.30	.0906	6.90	38	3.00
42000-0240	2.40	.0945	7.20	38	3.00
42000-0250	2.50	.0984	7.50	38	3.00
42000-0260	2.60	.1024	7.80	38	3.00
42000-0270	2.70	.1063	8.10	38	3.00
42000-0280	2.80	.1102	8.40	38	3.00
42000-0290	2.90	.1142	8.70	38	3.00
42000-0300	3.00	.1181	9.00	38	3.00

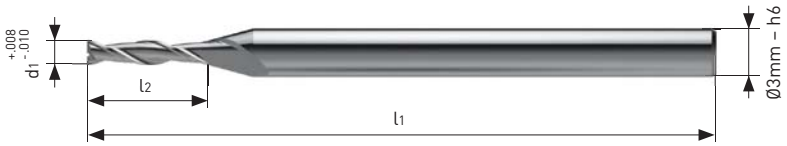
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 161

Art. 72500



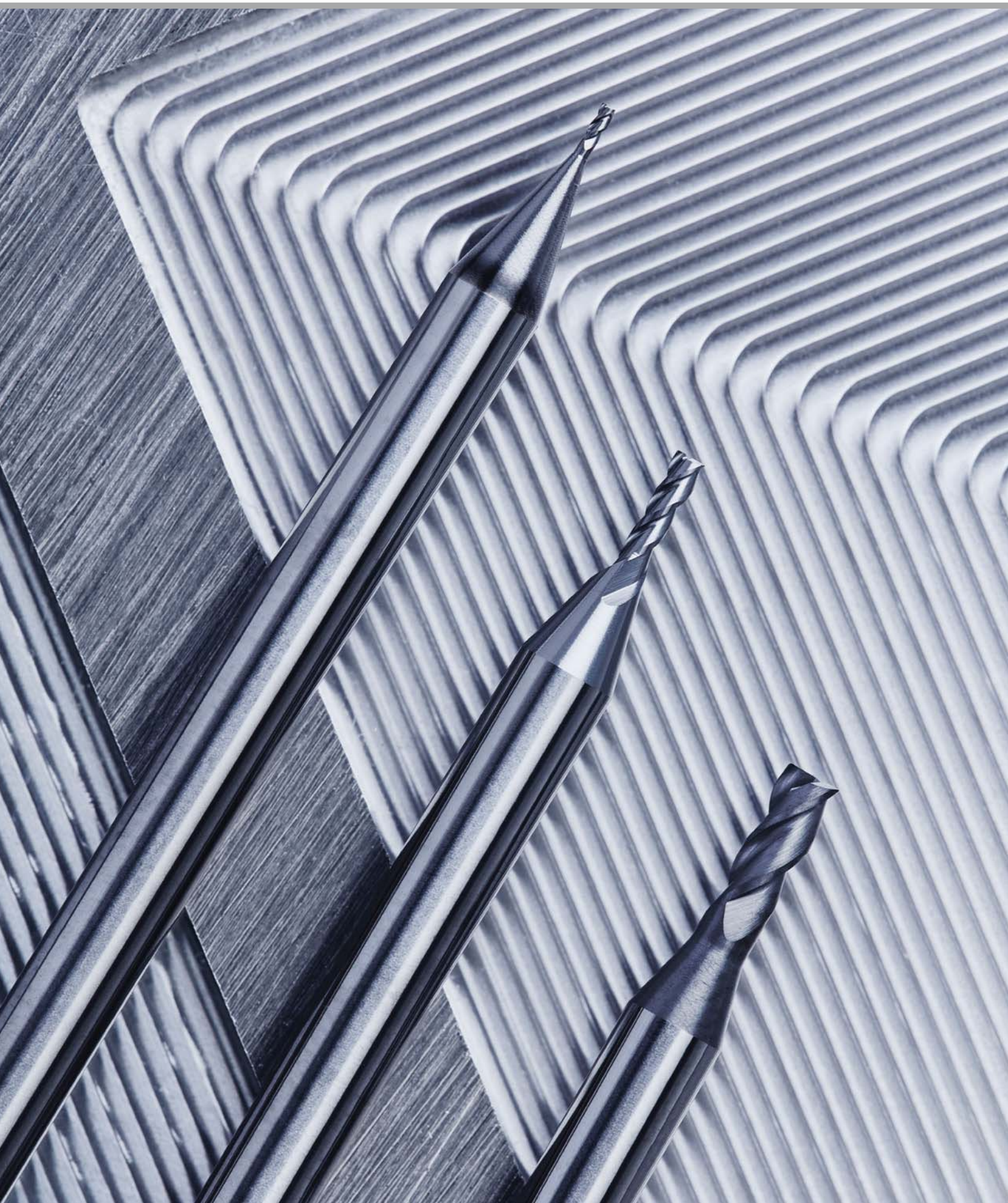
Art. 72800



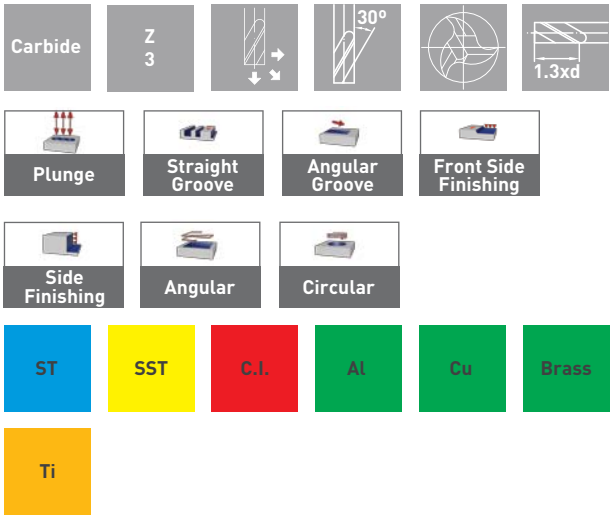


d1	d1 (in.)	72500			72800		
		Catalog Number	l2	l1	Catalog Number	l2	l1
.10	.0039	—	—	—	—	—	—
.15	.0059	—	—	—	—	—	—
.20	.0079	—	—	—	—	—	—
.25	.0098	—	—	—	—	—	—
.30	.0118	72500-0030	1.50	39	—	—	—
.40	.0157	72500-0040	2.00	39	72800-0040	3.20	39
.50	.0197	72500-0050	2.50	39	72800-0050	4.00	39
.60	.0236	72500-0060	3.00	39	72800-0060	5.00	39
.70	.0276	72500-0070	3.50	39	72800-0070	5.60	39
.80	.0315	72500-0080	4.00	39	72800-0080	6.00	39
.90	.0354	72500-0090	4.50	39	72800-0090	7.20	39
1.00	.0394	72500-0100	5.00	39	72800-0100	8.00	39
1.10	.0433	72500-0110	5.50	39	—	—	—
1.20	.0472	72500-0120	6.00	39	72800-0120	9.00	39
1.30	.0512	—	—	—	—	—	—
1.40	.0551	—	—	—	—	—	—
1.50	.0591	72500-0150	7.50	39	72800-0150	12.00	50
1.60	.0630	—	—	—	—	—	—
1.70	.0669	—	—	—	—	—	—
1.80	.0709	—	—	—	—	—	—
1.90	.0748	—	—	—	—	—	—
2.00	.0787	72500-0200	10.00	39	72800-0200	16.00	50
2.50	.0984	72500-0250	12.50	39	72800-0250	20.00	50

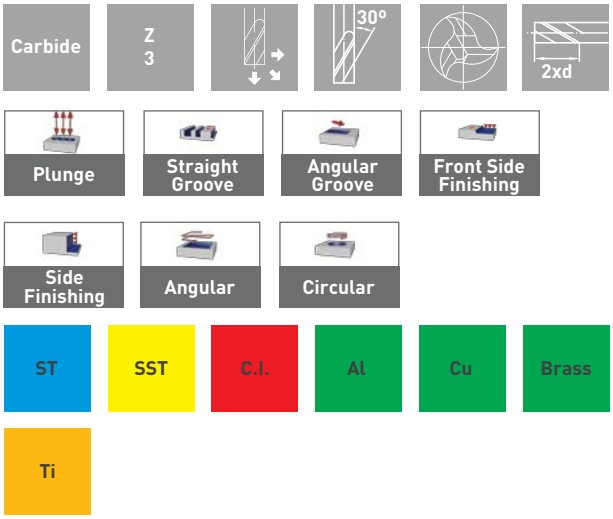
- All dimensions are millimeters unless otherwise noted
* Indicates Ø4mm - h6 shank
- For cutting data see pg. 161



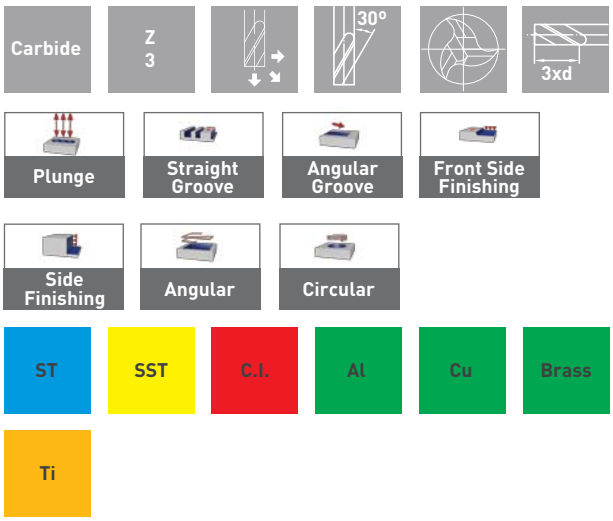
Art. 73130



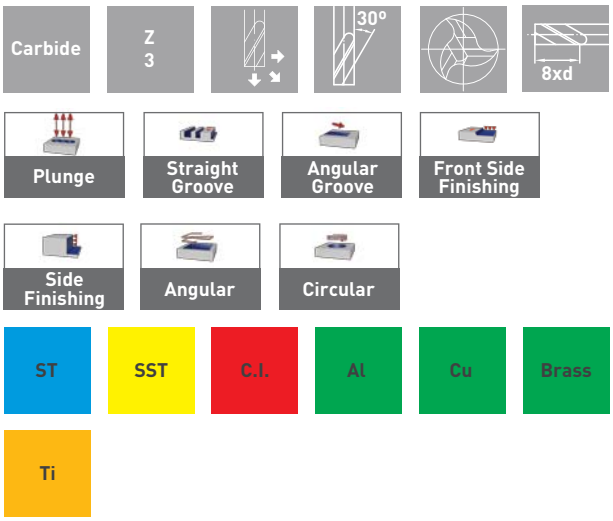
Art. 73200

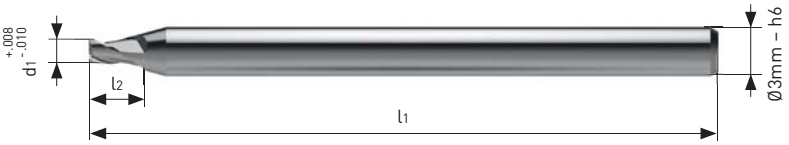


Art. 73300



Art. 73800





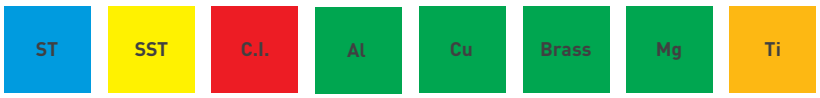
d1	d1 (in.)	73130			73200			73300			73800		
		Catalog Number	l2	l1	Catalog Number	l2	l1	Catalog Number	l2	l1	Catalog Number	l2	l1
.30	.0118	73130-0030	.40	39	73200-0030	.60	39	73300-0030	.90	39	—	—	—
.40	.0157	73130-0040	.50	39	73200-0040	.80	39	73300-0040	1.20	39	—	—	—
.45	.0177	73130-0045	.60	39	—	—	—	—	—	—	—	—	—
.50	.0197	73130-0050	.70	39	73200-0050	1.00	39	73300-0050	1.50	39	73800-0050	4.00	39
.60	.0236	73130-0060	.80	39	73200-0060	1.20	39	73300-0060	2.00	39	73800-0060	5.00	39
.70	.0276	73130-0070	.90	39	73200-0070	1.40	39	73300-0070	2.00	39	73800-0070	5.60	39
.75	.0295	—	—	—	73200-0075	1.50	39	73300-0075	2.00	39	—	—	—
.80	.0315	73130-0080	1.00	39	73200-0080	1.60	39	73300-0080	2.50	39	73800-0080	6.00	39
.90	.0354	73130-0090	1.30	39	73200-0090	1.80	39	73300-0090	2.50	39	73800-0090	7.20	39
1.00	.0394	73130-0100	1.30	39	73200-0100	2.00	39	73300-0100	3.00	39	73800-0100	8.00	39
1.10	.0433	73130-0110	1.50	39	73200-0110	2.20	39	73300-0110	3.30	39	—	—	—
1.20	.0472	73130-0120	1.60	39	73200-0120	2.40	39	73300-0120	4.00	39	73800-0120	9.00	39
1.30	.0512	73130-0130	1.80	39	73200-0130	2.60	39	73300-0130	4.00	39	—	—	—
1.40	.0551	73130-0140	1.80	39	73200-0140	2.80	39	73300-0140	4.00	39	—	—	—
1.50	.0591	73130-0150	2.00	39	73200-0150	3.00	39	73300-0150	4.50	39	73800-0150	12.00	50
1.60	.0630	73130-0160	2.00	39	73200-0160	3.20	39	73300-0160	4.50	39	—	—	—
1.70	.0669	73130-0170	2.00	39	73200-0170	3.40	39	73300-0170	5.00	39	—	—	—
1.80	.0709	73130-0180	2.40	39	73200-0180	3.60	39	73300-0180	6.00	39	—	—	—
1.90	.0748	73130-0190	2.40	39	73200-0190	3.80	39	73300-0190	6.00	39	—	—	—
2.00	.0787	73130-0200	2.60	39	73200-0200	4.00	39	73300-0200	6.00	39	73800-0200	16.00	50
2.10	.0827	—	—	—	73200-0210	4.20	39	73300-0210	6.50	39	—	—	—
2.20	.0866	73130-0220	3.00	39	73200-0220	4.40	39	73300-0220	7.00	39	—	—	—
2.30	.0906	—	—	—	73200-0230	4.60	39	73300-0230	7.00	39	—	—	—
2.40	.0945	—	—	—	73200-0240	4.80	39	73300-0240	7.50	39	—	—	—
2.50	.0984	73130-0250	3.30	39	73200-0250	5.00	39	73300-0250	7.50	39	73800-0250	20.00	50
2.60	.1024	—	—	—	73200-0260	5.20	39	73300-0260	7.50	39	—	—	—
2.70	.1063	—	—	—	73200-0270	5.40	39	73300-0270	8.00	39	—	—	—
2.80	.1102	73130-0280	3.50	39	73200-0280	5.60	39	73300-0280	8.00	39	—	—	—
2.90	.1142	73130-0290	3.50	39	73200-0290	5.80	39	73300-0290	8.50	39	—	—	—
3.00	.1181	—	—	—	—	—	—	—	—	—	—	—	—

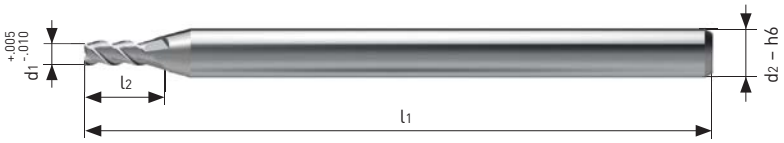
* Indicates Ø4mm - h6 shank
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 162-163

Art. 73725





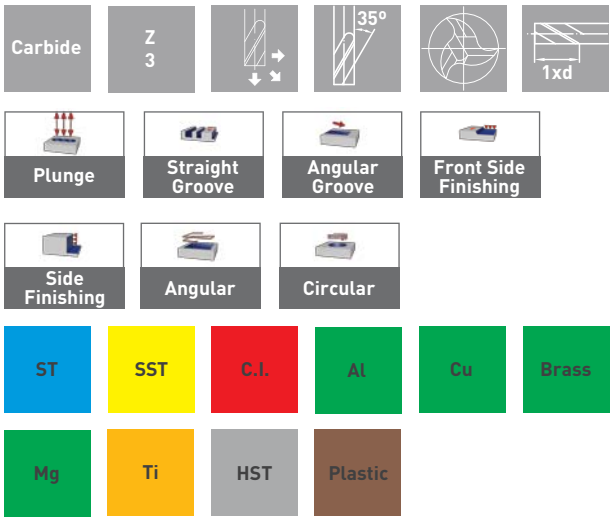




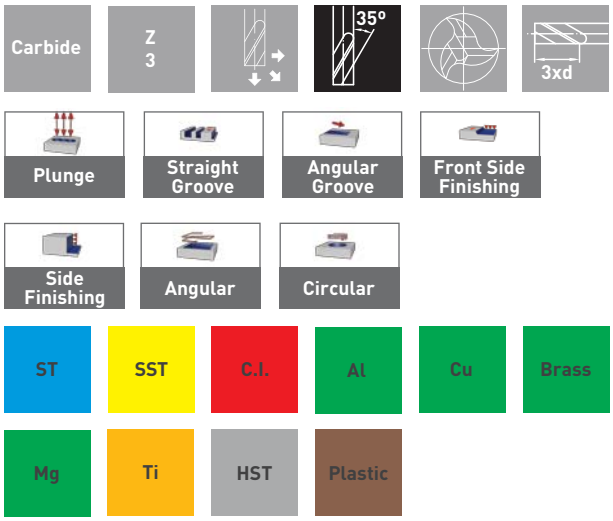
Catalog Number	d_1	d_1 (in.)	l_2	l_1	d_2
73725-0030	.30	.0118	.80	39	3.00
73725-0040	.40	.0157	1.00	39	3.00
73725-0050	.50	.0197	1.30	39	3.00
73725-0060	.60	.0236	1.50	39	3.00
73725-0070	.70	.0276	1.70	39	3.00
73725-0080	.80	.0315	2.00	39	3.00
73725-0090	.90	.0354	2.30	39	3.00
73725-0100	1.00	.0394	2.50	39	3.00
73725-0110	1.10	.0433	2.80	39	3.00
73725-0120	1.20	.0472	3.00	39	3.00
73725-0130	1.30	.0512	3.30	39	3.00
73725-0140	1.40	.0551	3.50	39	3.00
73725-0150	1.50	.0591	3.80	39	3.00
73725-0160	1.60	.0630	4.00	39	3.00
73725-0170	1.70	.0669	4.30	39	3.00
73725-0180	1.80	.0709	4.50	39	3.00
73725-0190	1.90	.0748	4.80	39	3.00
73725-0200	2.00	.0787	5.00	39	3.00
73725-0210	2.10	.0827	5.30	39	3.00
73725-0220	2.20	.0866	5.50	39	3.00
73725-0230	2.30	.0906	5.80	39	3.00
73725-0240	2.40	.0945	6.00	39	3.00
73725-0250	2.50	.0984	6.30	39	3.00
73725-0260	2.60	.1024	6.50	39	3.00
73725-0270	2.70	.1063	6.80	39	3.00
73725-0280	2.80	.1102	7.00	39	3.00
73725-0290	2.90	.1142	7.30	39	3.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 163

Art. 43105



Art. 43305





d1	d1 (in.)	43105		43305		
		Catalog Number	l2	Catalog Number	l2	l3
.30	.0118	43105-0030	.30	43305-0030	.30	.90
.40	.0157	43105-0040	.40	43305-0040	.40	1.20
.50	.0197	43105-0050	.50	43305-0050	.50	1.50
.60	.0236	43105-0060	.60	43305-0060	.60	1.80
.70	.0276	43105-0070	.70	43305-0070	.70	2.10
.80	.0315	43105-0080	.80	43305-0080	.80	2.40
.90	.0354	43105-0090	.90	43305-0090	.90	2.70
1.00	.0394	43105-0100	1.00	43305-0100	1.00	3.00
1.10	.0433	43105-0110	1.10	43305-0110	1.10	3.30
1.20	.0472	43105-0120	1.20	43305-0120	1.20	3.60
1.30	.0512	43105-0130	1.30	43305-0130	1.30	3.90
1.40	.0551	43105-0140	1.40	43305-0140	1.40	4.20
1.50	.0591	43105-0150	1.50	43305-0150	1.50	4.50
1.60	.0630	43105-0160	1.60	43305-0160	1.60	4.80

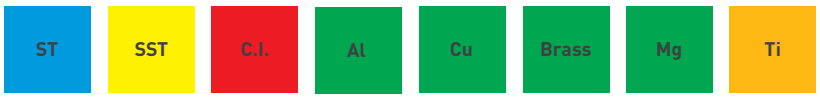
d1	d1 (in.)	43105		43305		
		Catalog Number	l2	Catalog Number	l2	l3
1.70	.0669	43105-0170	1.70	43305-0170	1.70	5.10
1.80	.0709	43105-0180	1.80	43305-0180	1.80	5.40
1.90	.0748	43105-0190	1.90	43305-0190	1.90	5.70
2.00	.0787	43105-0200	2.00	43305-0200	2.00	6.00
2.10	.0827	43105-0210	2.10	43305-0210	2.10	6.30
2.20	.0866	43105-0220	2.20	43305-0220	2.20	6.60
2.30	.0906	43105-0230	2.30	43305-0230	2.30	6.90
2.40	.0945	43105-0240	2.40	43305-0240	2.40	7.20
2.50	.0984	43105-0250	2.50	43305-0250	2.50	7.50
2.60	.1024	43105-0260	2.60	43305-0260	2.60	7.80
2.70	.1063	43105-0270	2.70	43305-0270	2.70	8.10
2.80	.1102	43105-0280	2.80	43305-0280	2.80	8.40
2.90	.1142	43105-0290	2.90	43305-0290	2.90	8.70
3.00	.1181	43105-0300	3.00	43305-0300	3.00	9.00

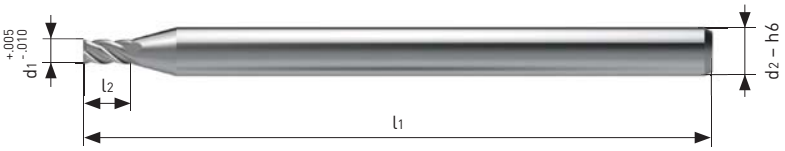
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 164

Art. 74720









Catalog Number	d_1	d_1 (in.)	l_2	l_1	d_2
74720-0030	.30	.0118	.60	39	3.00
74720-0040	.40	.0157	.80	39	3.00
74720-0050	.50	.0197	1.00	39	3.00
74720-0060	.60	.0236	1.20	39	3.00
74720-0070	.70	.0276	1.40	39	3.00
74720-0080	.80	.0315	1.60	39	3.00
74720-0090	.90	.0354	1.80	39	3.00
74720-0100	1.00	.0394	2.00	39	3.00
74720-0110	1.10	.0433	2.20	39	3.00
74720-0120	1.20	.0472	2.40	39	3.00
74720-0130	1.30	.0512	2.60	39	3.00
74720-0140	1.40	.0551	2.80	39	3.00
74720-0150	1.50	.0591	3.00	39	3.00
74720-0160	1.60	.0630	3.20	39	3.00
74720-0170	1.70	.0669	3.40	39	3.00
74720-0180	1.80	.0709	3.60	39	3.00
74720-0190	1.90	.0748	3.80	39	3.00
74720-0200	2.00	.0787	4.00	39	3.00
74720-0210	2.10	.0827	4.20	39	3.00
74720-0220	2.20	.0866	4.40	39	3.00
74720-0230	2.30	.0906	4.60	39	3.00
74720-0240	2.40	.0945	4.80	39	3.00
74720-0250	2.50	.0984	5.00	39	3.00
74720-0260	2.60	.1024	5.20	39	3.00
74720-0270	2.70	.1063	5.40	39	3.00
74720-0280	2.80	.1102	5.60	39	3.00
74720-0290	2.90	.1142	5.80	39	3.00

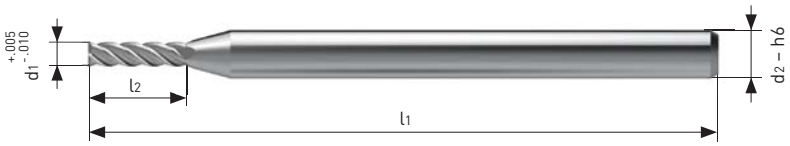
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 165

Art. 74740





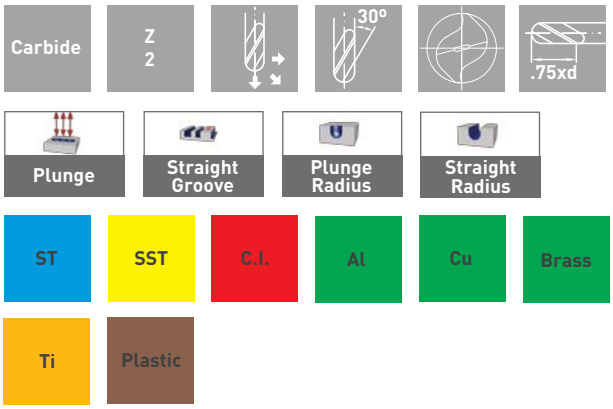




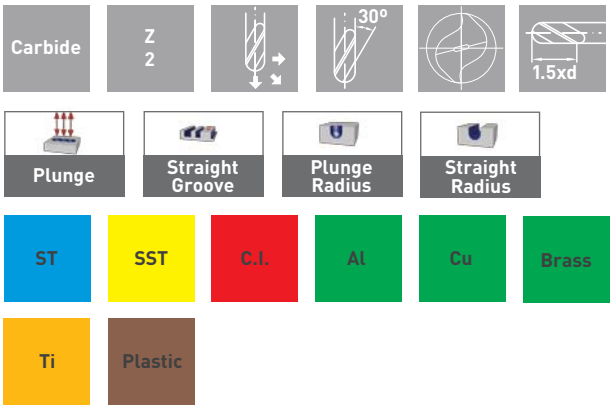
Catalog Number	d_1	d_1 (in.)	l_2	l_1	d_2
74740-0040	.40	.0157	1.60	39	3.00
74740-0050	.50	.0197	2.00	39	3.00
74740-0060	.60	.0236	2.40	39	3.00
74740-0070	.70	.0276	2.80	39	3.00
74740-0080	.80	.0315	3.20	39	3.00
74740-0090	.90	.0354	3.60	39	3.00
74740-0100	1.00	.0394	4.00	39	3.00
74740-0110	1.10	.0433	4.40	39	3.00
74740-0120	1.20	.0472	4.80	39	3.00
74740-0130	1.30	.0512	5.20	39	3.00
74740-0140	1.40	.0551	5.60	39	3.00
74740-0150	1.50	.0591	6.00	39	3.00
74740-0160	1.60	.0630	6.40	39	3.00
74740-0170	1.70	.0669	6.80	39	3.00
74740-0180	1.80	.0709	7.20	39	3.00
74740-0190	1.90	.0748	7.60	39	3.00
74740-0200	2.00	.0787	8.00	39	3.00
74740-0210	2.10	.0827	8.40	39	3.00
74740-0220	2.20	.0866	8.80	39	3.00
74740-0230	2.30	.0906	9.20	39	3.00
74740-0240	2.40	.0945	9.60	39	3.00
74740-0250	2.50	.0984	10.00	39	3.00
74740-0260	2.60	.1024	10.40	39	3.00
74740-0270	2.70	.1063	10.80	39	3.00
74740-0280	2.80	.1102	11.20	39	3.00
74740-0290	2.90	.1142	11.60	39	3.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 165

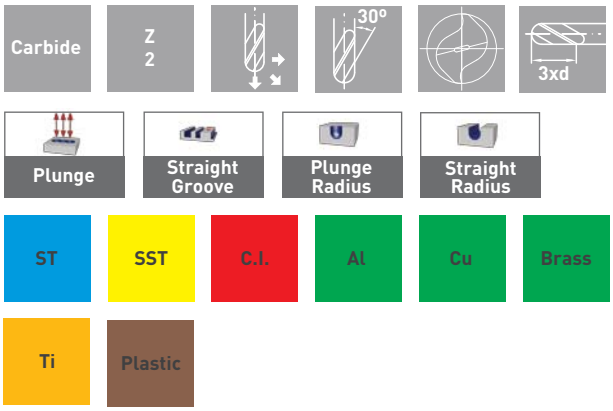
Art. 74075

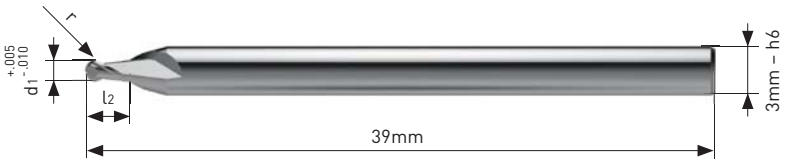


Art. 74150



Art. 74300





d1	d1 (in.)	r	74075		74150		74300	
			Catalog Number	l2	Catalog Number	l2	Catalog Number	l2
.20	.0079	.100	74075-0020	.15	74150-0020	.30	74300-0020	.60
.25	.0098	.125	—	—	74150-0025	.35	—	—
.30	.0118	.150	74075-0030	.20	74150-0030	.45	74300-0030	1.00
.40	.0157	.200	74075-0040	.30	74150-0040	.60	74300-0040	1.00
.50	.0197	.250	74075-0050	.37	74150-0050	.75	74300-0050	1.50
.60	.0236	.300	74075-0060	.45	74150-0060	.90	74300-0060	1.50
.70	.0276	.350	—	—	74150-0070	1.05	74300-0070	2.00
.80	.0315	.400	74075-0080	.60	74150-0080	1.20	74300-0080	2.00
.90	.0354	.450	—	—	74150-0090	1.35	74300-0090	2.50
1.00	.0394	.500	74075-0100	.75	74150-0100	1.50	74300-0100	3.00
1.10	.0433	.550	—	—	74150-0110	1.65	—	—
1.20	.0472	.600	—	—	74150-0120	1.80	74300-0110	4.00
1.30	.0512	.650	—	—	74150-0130	1.95	—	—
1.40	.0551	.700	—	—	74150-0140	2.10	74300-0140	4.00
1.50	.0591	.750	—	—	74150-0150	2.25	74300-0150	4.00
1.60	.0630	.800	—	—	74150-0160	2.40	74300-0160	4.00
1.80	.0709	.900	—	—	74150-0180	2.70	74300-0180	5.50
1.90	.0748	.950	—	—	—	—	—	—
2.00	.0787	1.000	—	—	74150-0200	3.00	74300-0200	6.00
2.10	.0827	1.050	—	—	—	—	74300-0210	6.00
2.20	.0866	1.100	—	—	—	—	74300-0220	6.00
2.50	.0984	1.250	—	—	—	—	74300-0250	7.50
2.80	.1102	1.400	—	—	—	—	74300-0280	8.40

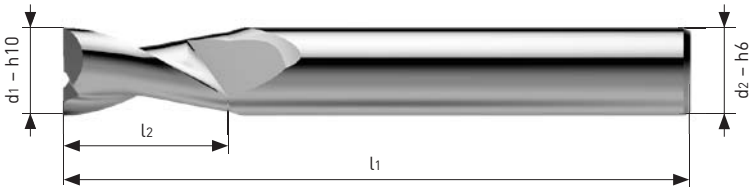
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 166

Art. 40000

Carbide | DIN 6528 | Z 2 | 30°

Plunge | Straight Groove | Angular Groove | Front Side Finishing | Side Finishing | Angular | Circular

ST | C.I. | Al | Cu | Brass | Mg



Catalog Number	d1	d1 (in.)	l2	l1	d2
40000-0200	2.00	.0787	8.00	50	2.00
40000-0250	2.50	.0984	8.00	50	2.50
40000-0300	3.00	.1181	8.00	50	3.00
40000-0350	3.50	.1378	8.00	50	3.50
40000-0400	4.00	.1575	8.00	50	4.00
40000-0450	4.50	.1772	8.00	50	4.50
40000-0500	5.00	.1969	10.00	50	5.00
40000-0600	6.00	.2362	10.00	57	6.00
40000-0800	8.00	.3150	16.00	63	8.00
40000-1000	10.00	.3937	19.00	72	10.00
40000-1200	12.00	.4724	22.00	83	12.00

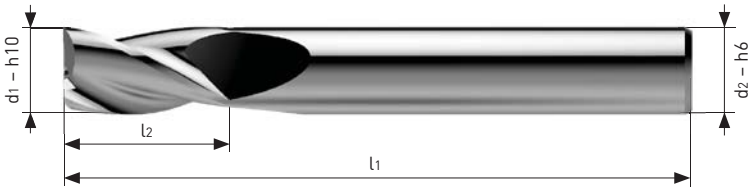
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 166

Art. 40002

Carbide | DIN 6528 | Z 3 | 30°

Plunge | Straight Groove | Angular Groove | Front Side Finishing | Side Finishing | Angular | Circular

ST | SST | C.I.



Catalog Number	d_1	d_1 (in.)	l_2	l_1	d_2
40002-0200	2.00	.0787	8.00	50	2.00
40002-0250	2.50	.0984	8.00	50	2.50
40002-0300	3.00	.1181	8.00	50	3.00
40002-0350	3.50	.1378	8.00	50	3.50
40002-0400	4.00	.1575	8.00	50	4.00
40002-0450	4.50	.1772	8.00	50	4.50
40002-0500	5.00	.1969	10.00	50	5.00
40002-0600	6.00	.2362	10.00	57	6.00
40002-0800	8.00	.3150	16.00	63	8.00
40002-1000	10.00	.3937	19.00	72	10.00
40002-1200	12.00	.4724	22.00	83	12.00

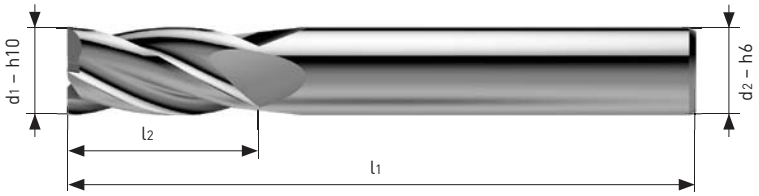
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 167

Art. 40004

Carbide | DIN 6528 | Z 4 | 30°

Plunge | Straight Groove | Angular Groove | Front Side Finishing | Side Finishing | Angular | Circular

ST | SST | C.I.



Catalog Number	d_1	d_1 (in.)	l_2	l_1	d_2
40004-0200	2.00	.0787	10.00	50	2.00
40004-0250	2.50	.0984	10.00	50	2.50
40004-0300	3.00	.1181	10.00	50	3.00
40004-0350	3.50	.1378	10.00	50	3.50
40004-0400	4.00	.1575	11.00	50	4.00
40004-0450	4.50	.1772	11.00	50	4.50
40004-0500	5.00	.1969	13.00	50	5.00
40004-0600	6.00	.2362	13.00	57	6.00
40004-0800	8.00	.3150	19.00	63	8.00
40004-1000	10.00	.3937	22.00	72	10.00
40004-1200	12.00	.4724	26.00	83	12.00

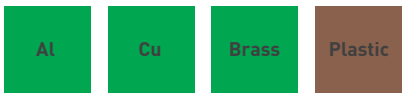
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 167

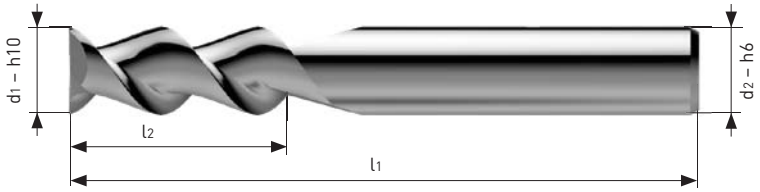
AC2

Art. 47000









Catalog Number	d_1	d_1 (in.)	l_2	l_1	d_2
47000-0300	3.00	.1181	12.00	50	3.00
47000-0400	4.00	.1575	15.00	50	4.00
47000-0500	5.00	.1969	20.00	50	5.00
47000-0600	6.00	.2362	20.00	57	6.00
47000-0800	8.00	.3150	20.00	63	8.00
47000-1000	10.00	.3937	25.00	72	10.00
47000-1200	12.00	.4724	25.00	83	12.00
47000-1400	14.00	.5512	30.00	90	14.00
47000-1600	16.00	.6299	30.00	92	16.00
47000-2000	20.00	.7874	38.00	104	20.00

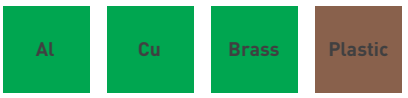
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 168

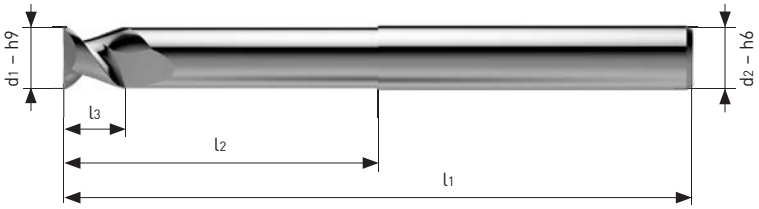
ACL2

Art. 47500









Catalog Number	d_1	d_1 (in.)	l_2	l_3	l_1	d_2
47500-0600	6.00	.2362	50.00	6.00	100	6.00
47500-0800	8.00	.3150	50.00	8.00	100	8.00
47500-1000	10.00	.3937	50.00	10.00	100	10.00
47500-1200	12.00	.4724	50.00	12.00	100	12.00
47500-1600	16.00	.6299	75.00	16.00	125	16.00
47500-2000	20.00	.7874	75.00	20.00	125	20.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 168

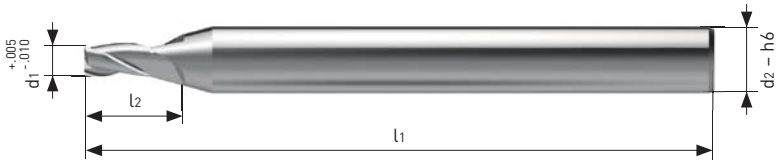
AC2

Art. 76300

Carbide | Z 3 | 30°

Plunge | Straight Groove | Angular Groove | Front Side Finishing | Side Finishing | Angular | Circular

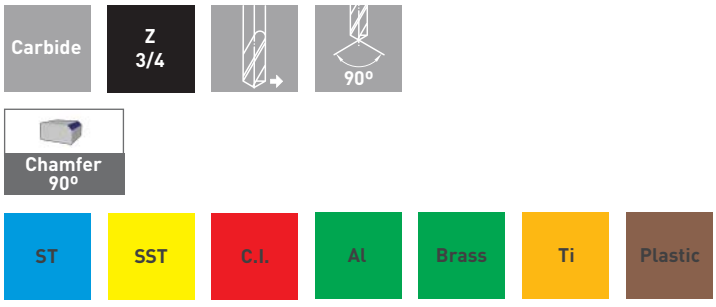
ST | SST | C.I.

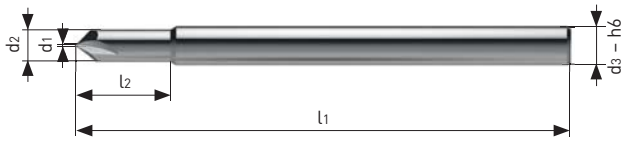


Catalog Number	d1	d1 (in.)	l2	l1	d2
76300-0150	1.50	.0591	6.00	57	6.00
76300-0200	2.00	.0787	6.00	57	6.00
76300-0250	2.50	.0984	6.00	57	6.00
76300-0300	3.00	.1181	7.00	57	6.00
76300-0350	3.50	.1378	7.00	57	6.00
76300-0400	4.00	.1575	8.00	57	6.00
76300-0450	4.50	.1772	8.00	57	6.00
76300-0500	5.00	.1969	10.00	57	6.00
76300-0550	5.50	.2165	10.00	57	6.00
76300-0600	6.00	.2362	10.00	57	6.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 168

Art. 73000





Catalog Number	d_1	d_2	d_2 (in.)	l_2	l_1	d_3	z
73000-0050	.10	.50	.0197	3.00	39	3.00	3
73000-0100	.10	1.00	.0394	3.00	39	3.00	3
73000-0150	.10	1.50	.0591	4.50	39	3.00	3
73000-0200	.10	2.00	.0787	6.00	39	3.00	3
73000-0250	.10	2.50	.0984	7.50	39	3.00	3
73000-0300	.10	3.00	.1181	7.50	39	3.00	3
73000-0600	.70	6.00	.2362	—	50	6.00	4
73000-0800	1.20	8.00	.3150	—	60	8.00	4

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 169

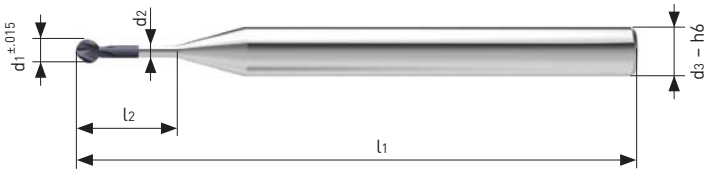
Lollipop

Art. 43400

Carbide | Z 3 | 12° | AlTiCrN+S

Deburring

ST | SST | C.I. | Al | Cu | Brass | Mg | Ti | Plastic

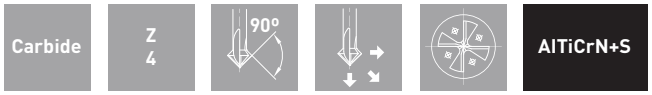


Catalog Number	d1	d1 (in.)	d2	l2	l1	d3
43400-0100	1.00	.0394	.60	4.00	60	4.00
43400-0150	1.50	.0591	.90	6.00	60	4.00
43400-0200	2.00	.0787	1.20	8.00	60	4.00
43400-0250	2.50	.0984	1.35	10.00	70	6.00
43400-0300	3.00	.1181	1.50	12.00	70	6.00
43400-0400	4.00	.1575	2.00	16.00	70	6.00
43400-0500	5.00	.1969	2.50	20.00	80	8.00
43400-0600	6.00	.2362	3.00	24.00	80	8.00

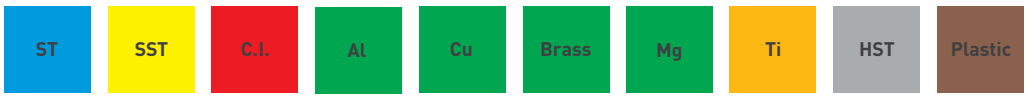
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 169

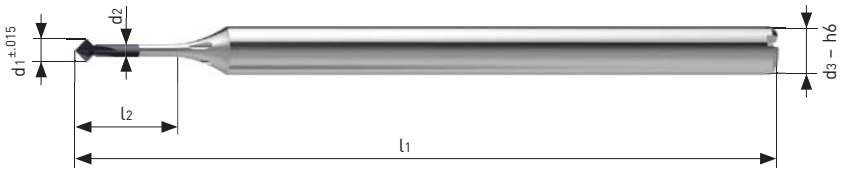
Noventa

Art. 44400









Catalog Number	d_1	d_1 (in.)	d_2	l_2	l_1	d_3
44400-0080	.80	.0315	.30	3.6	60	4.00
44400-0100	1.00	.0394	.40	4.0	60	4.00
44400-0150	1.50	.0591	.60	6.0	60	4.00
44400-0200	2.00	.0787	1.00	8.0	60	4.00
44400-0250	2.50	.0984	1.30	10.0	70	6.00
44400-0300	3.00	.1181	1.80	12.0	70	6.00
44400-0400	4.00	.1575	2.50	16.0	70	6.00
44400-0500	5.00	.1969	3.20	20.0	80	8.00
44400-0600	6.00	.2362	4.00	24.0	80	8.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 170

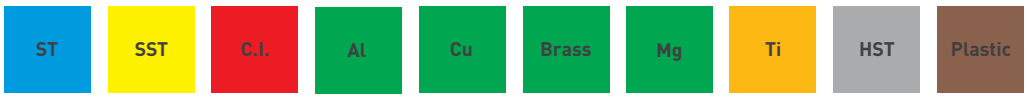


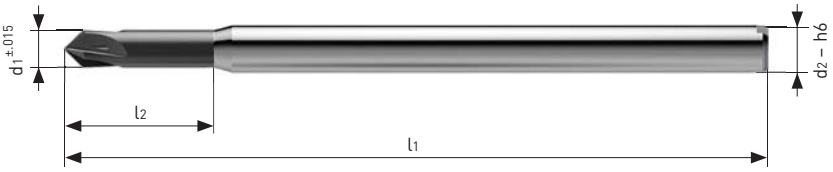
Ninety

Art. 45400





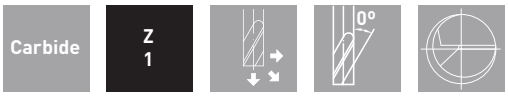




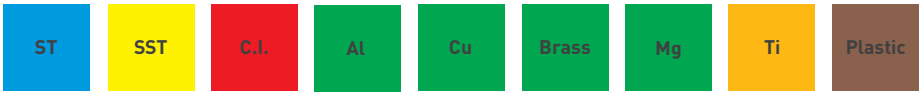
Catalog Number	d1	d1 (in.)	l2	l1	d2
45400-0100	1.00	.0394	4.00	60	4.00
45400-0150	1.50	.0591	6.00	60	4.00
45400-0200	2.00	.0787	8.00	60	4.00
45400-0250	2.50	.0984	10.00	60	4.00
45400-0300	3.00	.1181	12.00	70	4.00
45400-0400	4.00	.1575	—	70	4.00
45400-0500	5.00	.1969	20.00	80	6.00
45400-0600	6.00	.2362	—	80	6.00

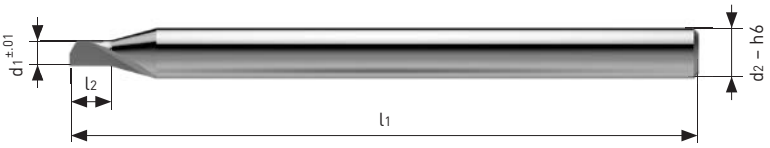
- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 170

Art. 71330





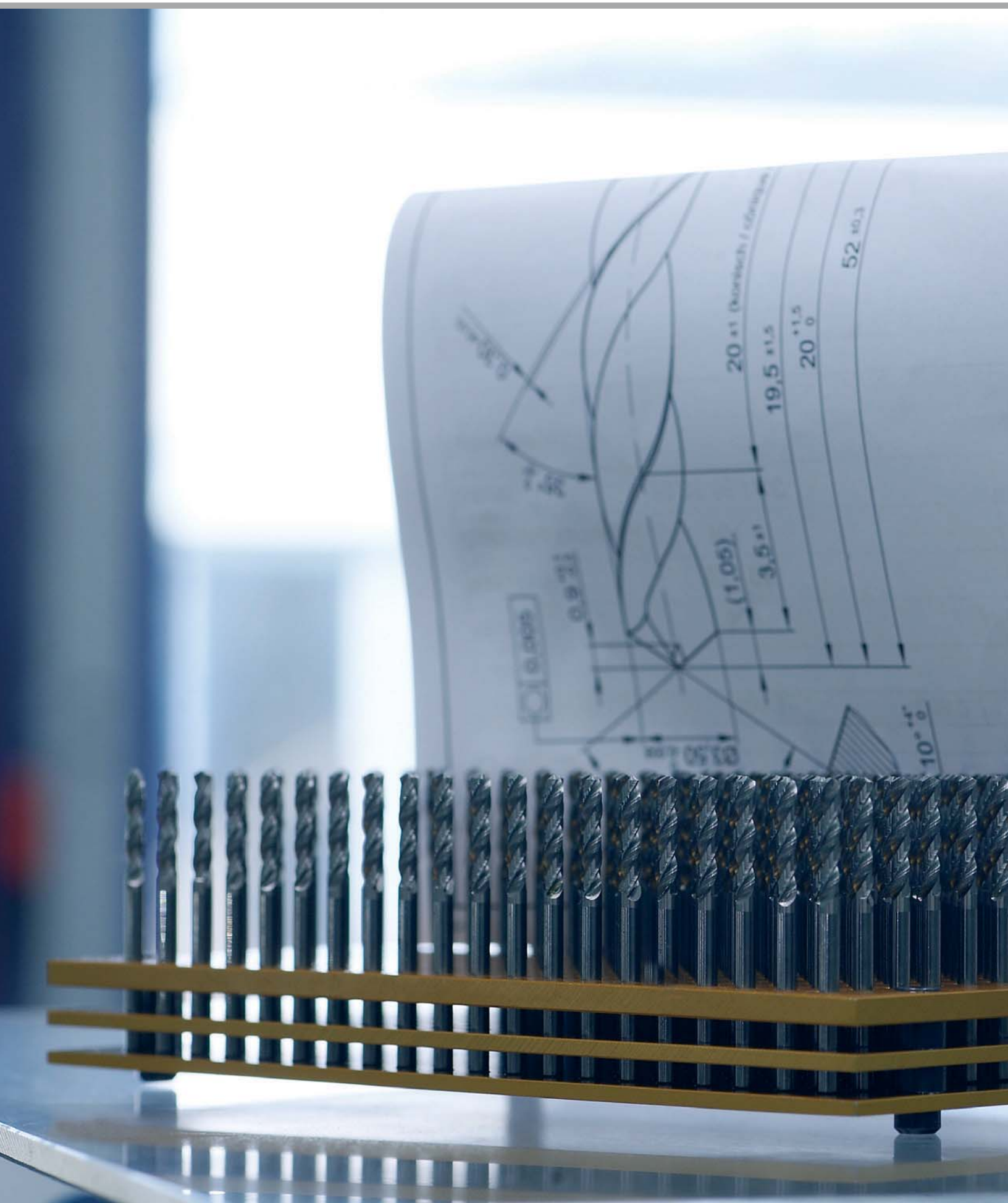




Catalog Number	d_1	d_1 (in.)	l_2	l_1	d_2
71330-0020	.20	.0079	.40	39	3.00
71330-0030	.30	.0118	.60	39	3.00
71330-0040	.40	.0157	.80	39	3.00
71330-0050	.50	.0197	1.00	39	3.00
71330-0060	.60	.0236	1.20	39	3.00
71330-0070	.70	.0276	1.40	39	3.00
71330-0080	.80	.0315	1.60	39	3.00
71330-0090	.90	.0354	1.80	39	3.00
71330-0100	1.00	.0394	2.00	39	3.00
71330-0110	1.10	.0433	2.20	39	3.00
71330-0120	1.20	.0472	2.40	39	3.00
71330-0130	1.30	.0512	2.60	39	3.00
71330-0140	1.40	.0551	2.80	39	3.00
71330-0150	1.50	.0591	3.00	39	3.00
71330-0160	1.60	.0630	3.20	39	3.00
71330-0170	1.70	.0669	3.40	39	3.00
71330-0180	1.80	.0709	3.60	39	3.00
71330-0190	1.90	.0748	3.80	39	3.00
71330-0200	2.00	.0787	4.00	39	3.00
71330-0210	2.10	.0827	4.20	39	3.00
71330-0220	2.20	.0866	4.40	39	3.00
71330-0230	2.30	.0906	4.60	39	3.00
71330-0240	2.40	.0945	4.80	39	3.00
71330-0250	2.50	.0984	5.00	39	3.00
71330-0260	2.60	.1024	5.20	39	3.00
71330-0270	2.70	.1063	5.40	39	3.00
71330-0280	2.80	.1102	5.60	39	3.00
71330-0290	2.90	.1142	5.80	39	3.00
71330-0300	3.00	.1181	6.00	40	4.00

- All dimensions are millimeters unless otherwise noted
- For cutting data see pg. 171

SPHINX TOOLS



Cutting Speed v:

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

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

End Mill

V_C = Cutting speed in m/min

f_Z = Cutting speed in mm/tooth

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

a_p = Cutting depth

a_e = Cutting width

Hole Dia. (Ø)	Tolerance (Upper Limit/Lower Limit)								
	H1	H2	H3	H4	H5	H6	H7	H8	H9
Ø≤3	+.0008	+.0012	+.002	+.003	+.004	+.006	+.010	+.014	+.025
	0	0	0	0	0	0	0	0	0
3<Ø≤6	+.001	+.0015	+.0025	+.004	+.005	+.008	+.012	+.018	+.030
	0	0	0	0	0	0	0	0	0
6<Ø≤10	+.001	+.0015	+.0025	+.004	+.006	+.009	+.015	+.022	+.036
	0	0	0	0	0	0	0	0	0
10<Ø≤18	+.0012	+.002	+.003	+.005	+.008	+.011	+.018	+.027	+.043
	0	0	0	0	0	0	0	0	0
18<Ø≤30	+.0015	+.0025	+.004	+.006	+.009	+.013	+.021	+.033	+.052
	0	0	0	0	0	0	0	0	0
30<Ø≤50	+.0015	+.0025	+.004	+.007	+.011	+.016	+.025	+.039	+.062
	0	0	0	0	0	0	0	0	0
50<Ø≤80	+.002	+.003	+.005	+.008	+.013	+.019	+.030	+.046	+.074
	0	0	0	0	0	0	0	0	0
80<Ø≤120	+.0025	+.004	+.006	+.010	+.015	+.022	+.035	+.054	+.087
	0	0	0	0	0	0	0	0	0
120<Ø≤180	+.0035	+.005	+.008	+.012	+.018	+.025	+.040	+.063	+.100
	0	0	0	0	0	0	0	0	0
180<Ø≤250	+.0045	+.007	+.010	+.014	+.020	+.029	+.046	+.072	+.115
	0	0	0	0	0	0	0	0	0
250<Ø≤315	+.006	+.008	+.012	+.016	+.023	+.032	+.052	+.081	+.130
	0	0	0	0	0	0	0	0	0
315<Ø≤400	+.007	+.009	+.013	+.018	+.025	+.036	+.057	+.089	+.140
	0	0	0	0	0	0	0	0	0
400<Ø≤500	+.008	+.010	+.015	+.020	+.027	+.040	+.063	+.097	+.155
	0	0	0	0	0	0	0	0	0

- All dimensions are millimeters unless otherwise noted

Shaft Dia. (Ø)	Tolerance (Upper Limit/Lower Limit)								
	h1	h2	h3	h4	h5	h6	h7	h8	h9
Ø≤3	0	0	0	0	0	0	0	0	0
	-.0008	-.0012	-.002	-.003	-.004	-.006	-.010	-.014	-.025
3<Ø≤6	0	0	0	0	0	0	0	0	0
	-.001	-.0015	-.0025	-.004	-.005	-.008	-.012	-.018	-.030
6<Ø≤10	0	0	0	0	0	0	0	0	0
	-.001	-.0015	-.0025	-.004	-.006	-.009	-.015	-.022	-.036
10<Ø≤18	0	0	0	0	0	0	0	0	0
	-.0012	-.002	-.003	-.005	-.008	-.011	-.018	-.027	-.043
18<Ø≤30	0	0	0	0	0	0	0	0	0
	-.0015	-.0025	-.004	-.006	-.009	-.013	-.021	-.033	-.052
30<Ø≤50	0	0	0	0	0	0	0	0	0
	-.0015	-.0025	-.004	-.007	-.011	-.016	-.025	-.039	-.062
50<Ø≤80	0	0	0	0	0	0	0	0	0
	-.002	-.003	-.005	-.008	-.013	-.019	-.030	-.046	-.074
80<Ø≤120	0	0	0	0	0	0	0	0	0
	-.0025	-.004	-.006	-.010	-.015	-.022	-.035	-.054	-.087
120<Ø≤180	0	0	0	0	0	0	0	0	0
	-.0035	-.005	-.008	-.012	-.018	-.025	-.040	-.063	-.100
180<Ø≤250	0	0	0	0	0	0	0	0	0
	-.0045	-.007	-.010	-.014	-.020	-.029	-.046	-.072	-.115
250<Ø≤315	0	0	0	0	0	0	0	0	0
	-.006	-.008	-.012	-.016	-.023	-.032	-.052	-.081	-.130
315<Ø≤400	0	0	0	0	0	0	0	0	0
	-.007	-.009	-.013	-.018	-.025	-.036	-.057	-.089	-.140
400<Ø≤500	0	0	0	0	0	0	0	0	0
	-.008	-.010	-.015	-.020	-.027	-.040	-.063	-.097	-.155

- All dimensions are millimeters unless otherwise noted

Art. 50806 / 50809

Material		Ø.50–1.00	Ø1.10–2.90	Ø3.00–6.00
P1	V_c	15–25	25–40	25–40
	f	.020–.080	.060–.140	.120–.250
P2	V_c	12–20	20–35	20–35
	f	.010–.060	.040–.120	.100–.220
P3	V_c	8–18	12–30	12–30
	f	.010–.040	.030–.090	.080–.200
M1	V_c	6–12	10–20	10–20
	f	.020–.050	.030–.070	.050–.150
M2	V_c	5–10	8–16	8–16
	f	.010–.040	.030–.060	.040–.080
K1	V_c	15–25	25–40	25–40
	f	.010–.050	.030–.080	.070–.150
K2	V_c	12–20	20–35	20–35
	f	.010–.040	.030–.060	.050–.100
N1	V_c	30–45	45–60	45–60
	f	.030–.080	.060–.120	.100–.250
N2	V_c	20–35	30–45	30–45
	f	.040–.080	.070–.150	.130–.300
N3	V_c	15–30	25–40	25–40
	f	.020–.070	.060–.120	.100–.250
N4	V_c	15–25	25–40	25–40
	f	.010–.050	.030–.080	.060–.150
N5	V_c	30–45	45–60	45–60
	f	.040–.080	.070–.130	.100–.250
N6	V_c	15–30	25–40	25–40
	f	.010–.040	.038–.065	.060–.090
N7	V_c	15–25	25–40	25–40
	f	.010–.040	.030–.080	.050–.130
N8	V_c	8–18	12–30	12–30
	f	.010–.040	.020–.050	.030–.100
S1	V_c	20–35	30–45	30–45
	f	.010–.040	.020–.056	.040–.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	.020–.060	.050–.120	.100–.250
O2	V_c			
	f			
O3	V_c			
	f			

Art. 50808

Material		Ø.50–1.00	Ø1.10–2.00	Ø2.10–3.00
P1	V_c	20–35	35–50	35–50
	f	.010–.030	.030–.050	.050–.070
P2	V_c	15–30	30–45	30–45
	f	.010–.025	.025–.045	.045–.065
P3	V_c	12–25	25–40	25–40
	f	.010–.020	.020–.040	.040–.060
M1	V_c	10–20	20–35	20–35
	f	.010–.020	.020–.035	.035–.045
M2	V_c	8–16	16–30	16–30
	f	.010–.020	.020–.030	.030–.040
K1	V_c	20–35	35–50	35–50
	f	.010–.035	.035–.055	.055–.075
K2	V_c	15–30	30–45	30–45
	f	.010–.030	.030–.050	.050–.070
N1	V_c	35–50	50–65	50–65
	f	.020–.040	.040–.060	.060–.080
N2	V_c	25–40	40–55	40–55
	f	.020–.050	.050–.070	.070–.090
N3	V_c	20–35	35–50	35–50
	f	.020–.040	.040–.060	.060–.080
N4	V_c	15–30	30–45	30–45
	f	.010–.030	.030–.050	.050–.070
N5	V_c	35–50	50–65	50–65
	f	.020–.050	.050–.070	.070–.090
N6	V_c	20–35	35–50	35–50
	f	.010–.030	.030–.050	.050–.070
N7	V_c	15–30	30–45	30–45
	f	.010–.025	.025–.045	.045–.065
N8	V_c	10–20	20–35	20–35
	f	.010–.020	.020–.030	.030–.040
S1	V_c	25–35	35–50	35–50
	f	.010–.030	.030–.050	.050–.070
S2	V_c	10–15	15–25	15–25
	f	.010–.020	.020–.035	.035–.050
H1	V_c	10–15	15–25	15–25
	f	.010–.020	.020–.030	.030–.040
H2	V_c			
	f			
H3	V_c			
	f			
O1	V_c	20–35	30–45	30–45
	f	.020–.050	.050–.075	.075–.100
O2	V_c	20–35	30–45	30–45
	f	.015–.035	.035–.055	.055–.080
O3	V_c			
	f			

Art. 50810 / 50812 / 50814 / 50818

Material		Ø3.00–6.00	Ø6.00–12.00	Ø12.00–2.00
P1	V_c	25–40	25–40	25–40
	f	.120–.250	.250–.300	.300–.400
P2	V_c	20–35	20–35	20–35
	f	.100–.200	.200–.250	.250–.300
P3	V_c	10–30	10–30	10–30
	f	.008–.150	.150–.220	.220–.300
M1	V_c	10–20	10–20	10–20
	f	.050–.150	.150–.200	.200–.250
M2	V_c	8–16	8–16	8–16
	f	.040–.080	.080–.140	.140–.200
K1	V_c	25–40	25–40	25–40
	f	.070–.150	.150–.200	.200–.350
K2	V_c	20–35	20–35	20–35
	f	.050–.100	.100–.150	.150–.250
N1	V_c	45–60	45–60	45–60
	f	.100–.250	.250–.350	.350–.400
N2	V_c	30–45	30–45	30–45
	f	.150–.300	.300–.400	.400–.600
N3	V_c	25–40	25–40	25–40
	f	.100–.250	.250–.350	.350–.550
N4	V_c	25–40	25–40	25–40
	f	.060–.150	.150–.250	.250–.400
N5	V_c	45–60	45–60	45–60
	f	.100–.250	.250–.350	.350–.450
N6	V_c	25–40	25–40	25–40
	f	.060–.100	.100–.150	.150–.250
N7	V_c	25–40	25–40	25–40
	f	.050–.150	.150–.250	.250–.350
N8	V_c	12–30	12–30	12–30
	f	.030–.100	.100–.150	.150–.200
S1	V_c	30–45	30–45	30–45
	f	.040–.150	.150–.200	.200–.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	.100–.250	.250–.400	.400–.800
O2	V_c			
	f			
O3	V_c			
	f			

Art. 50811 / 50813 / 50815

Material		Ø2.00–4.00	Ø4.00–6.00	Ø6.00–12.00
P1	V_c	40–60	40–60	40–60
	f	.120–.250	.250–.300	.300–.400
P2	V_c	35–55	35–55	35–55
	f	.100–.200	.200–.250	.250–.300
P3	V_c	30–45	30–45	30–45
	f	.008–.150	.150–.220	.220–.300
M1	V_c	25–40	25–40	25–40
	f	.050–.150	.150–.200	.200–.250
M2	V_c	20–35	20–35	20–35
	f	.040–.080	.080–.140	.140–.200
K1	V_c	35–50	35–50	35–50
	f	.070–.150	.150–.200	.200–.350
K2	V_c	30–45	30–45	30–45
	f	.050–.100	.100–.150	.150–.250
N1	V_c	60–70	60–70	60–70
	f	.100–.250	.250–.350	.350–.400
N2	V_c	50–60	50–60	50–60
	f	.150–.300	.300–.400	.400–.600
N3	V_c	40–55	40–55	40–55
	f	.100–.250	.250–.350	.350–.550
N4	V_c	35–50	35–50	35–50
	f	.060–.150	.150–.250	.250–.400
N5	V_c	60–70	60–70	60–70
	f	.100–.250	.250–.350	.350–.450
N6	V_c	40–55	40–55	40–55
	f	.060–.100	.100–.150	.150–.250
N7	V_c	35–50	35–50	35–50
	f	.050–.150	.150–.250	.250–.350
N8	V_c	25–40	25–40	25–40
	f	.030–.100	.100–.150	.150–.200
S1	V_c	35–50	35–50	35–50
	f	.040–.150	.150–.200	.200–.300
S2	V_c	15–25	15–25	15–25
	f	.030–.100	.100–.150	.150–.200
H1	V_c	15–25	15–25	15–25
	f	.040–.060	.060–.080	.080–.120
H2	V_c			
	f			
H3	V_c			
	f			
O1	V_c	30–45	30–45	30–45
	f	.100–.250	.250–.400	.400–.800
O2	V_c	30–45	30–45	30–45
	f	.080–.200	.200–.350	.350–.600
O3	V_c			
	f			

Art. 56005

Material		Ø.10–.30	Ø.35–.80	Ø.85–1.50
P1	V_c	8–18	15–30	30–60
	f	.001–.003	.002–.010	.010–.020
P2	V_c	6–16	12–25	20–40
	f	.001–.002	.002–.008	.006–.015
P3	V_c	6–13	10–20	18–35
	f	.001–.002	.002–.005	.004–.012
M1	V_c	5–12	10–18	15–30
	f	.001–.002	.002–.005	.004–.010
M2	V_c	5–10	8–15	13–25
	f	.001–.002	.002–.004	.003–.009
K1	V_c	8–18	15–30	30–60
	f	.003–.008	.006–.010	.008–.025
K2	V_c	6–16	12–25	20–40
	f	.002–.004	.005–.008	.007–.020
N1	V_c	12–20	18–35	35–65
	f	.001–.004	.003–.008	.006–.015
N2	V_c	10–18	15–30	25–50
	f	.002–.005	.004–.010	.008–.025
N3	V_c	8–18	15–30	30–60
	f	.002–.005	.004–.008	.006–.020
N4	V_c	8–18	15–30	30–60
	f	.001–.004	.003–.006	.005–.015
N5	V_c	12–20	18–35	35–65
	f	.002–.005	.004–.010	.009–.025
N6	V_c	8–18	15–30	30–60
	f	.002–.005	.004–.008	.007–.020
N7	V_c	8–18	15–30	30–60
	f	.002–.005	.004–.008	.007–.020
N8	V_c	6–13	10–20	18–35
	f	.001–.004	.002–.007	.005–.015
S1	V_c	15–30	28–45	30–45
	f	.002–.006	.005–.010	.008–.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	.005–.010	.008–.015	.013–.035
O2	V_c			
	f			
O3	V_c			
	f			

Art. 56033

Material		Ø.03–.10	Ø.11–.50	Ø.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	.001–.003	.002–.010	.010–.018	.018–.028	.028–.045
P2	V_c	1.2–4	3.5–8	8–25	25–50	25–50
	f	.001–.002	.002–.008	.008–.016	.016–.026	.026–.040
P3	V_c	1–3	3–6	6–20	20–45	20–45
	f	.001–.002	.002–.007	.007–.013	.013–.024	.024–.035
M1	V_c	1.2–4	3.5–8	8–20	20–45	20–45
	f	.001–.002	.002–.007	.007–.013	.013–.023	.023–.033
M2	V_c	1–3	3–6	5–15	15–30	15–30
	f	.001–.002	.002–.005	.005–.010	.010–.020	.020–.030
K1	V_c	1.5–5	4–10	10–30	30–60	30–60
	f	.001–.004	.004–.008	.008–.015	.015–.030	.030–.045
K2	V_c	1.2–4	3.5–8	8–25	25–50	25–50
	f	.001–.003	.003–.007	.007–.013	.013–.025	.025–.040
N1	V_c	2–6	5–15	15–40	40–70	40–70
	f	.001–.003	.003–.006	.006–.012	.012–.023	.023–.035
N2	V_c	1.8–5.5	5–15	15–40	40–65	40–65
	f	.001–.003	.003–.007	.007–.013	.013–.025	.025–.040
N3	V_c	1.5–5	4–12	12–30	30–60	30–60
	f	.001–.002	.002–.006	.006–.011	.011–.022	.022–.035
N4	V_c	1.5–5	4–12	12–30	30–60	30–60
	f	.001–.002	.002–.005	.005–.010	.010–.020	.020–.030
N5	V_c	2–6	5–15	15–35	35–65	35–65
	f	.001–.003	.003–.006	.006–.013	.013–.025	.025–.040
N6	V_c	1.5–5	4–12	12–30	30–60	30–60
	f	.001–.002	.002–.004	.004–.010	.010–.022	.022–.035
N7	V_c	1.5–5	4–12	12–30	30–60	30–60
	f	.001–.002	.002–.004	.004–.009	.009–.020	.020–.031
N8	V_c	1–3	3–6	6–20	20–45	20–45
	f	.001–.002	.002–.004	.004–.008	.008–.016	.016–.027
S1	V_c	.8–5	4–7	7–15	15–30	15–30
	f	.001–.002	.002–.004	.004–.009	.009–.018	.018–.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	.001–.003	.003–.008	.008–.014	.014–.035	.035–.060
O2	V_c					
	f					
O3	V_c					
	f					

Art. 56036

Material		Ø.30–.95	Ø1.00–1.95	Ø2.00–2.95	Ø3.00–3.95	Ø4.00–6.00
P1	V_c	40–60	60–90	60–90	60–90	60–90
	f	.010–.025	.025–.040	.040–.055	.055–.070	.070–.100
P2	V_c	30–50	50–70	50–70	50–70	50–70
	f	.009–.023	.023–.036	.036–.050	.050–.065	.065–.080
P3	V_c	20–40	40–60	40–60	40–60	40–60
	f	.006–.015	.015–.025	.025–.040	.040–.055	.055–.070
M1	V_c	20–35	35–50	35–50	35–50	35–50
	f	.005–.013	.013–.023	.023–.035	.035–.050	.050–.065
M2	V_c	20–30	30–45	30–45	30–45	30–45
	f	.004–.010	.010–.020	.020–.032	.032–.046	.046–.060
K1	V_c	60–100	100–150	100–150	100–150	100–150
	f	.015–.025	.025–.038	.038–.055	.055–.075	.075–.130
K2	V_c	40–80	80–130	80–130	80–130	80–130
	f	.012–.022	.022–.035	.035–.050	.050–.070	.070–.090
N1	V_c	60–90	90–120	90–120	90–120	90–120
	f	.015–.025	.025–.035	.035–.050	.050–.070	.070–.085
N2	V_c	70–120	120–150	120–150	120–150	120–150
	f	.016–.027	.027–.042	.042–.060	.060–.080	.080–.110
N3	V_c	70–120	120–150	120–150	120–150	120–150
	f	.015–.025	.025–.035	.035–.050	.050–.070	.070–.085
N4	V_c	40–70	70–100	70–100	70–100	70–100
	f	.013–.023	.023–.033	.033–.045	.045–.060	.060–.080
N5	V_c	70–120	120–150	120–150	120–150	120–150
	f	.015–.025	.025–.035	.035–.050	.050–.070	.070–.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	.010–.022	.022–.035	.035–.050	.050–.070	.070–.090
S2	V_c					
	f					
H1	V_c	15–25	20–35	20–35	20–35	20–35
	f	.005–.010	.010–.020	.020–.030	.030–.040	.040–.055
H2	V_c					
	f					
H3	V_c					
	f					
O1	V_c					
	f					
O2	V_c					
	f					
O3	V_c					
	f					

Art. 16004

Material		Ø.10–.30	Ø.35–.50	Ø.55–.80	Ø.85–1.50
P1	V_c	1.0–2.0	2.0–5.5	3.5–11	9.0–15
	f	.001–.005	.004–.007	.006–.011	.010–.015
P2	V_c	.8–1.5	1.2–4.0	3.5–8.0	7.0–12
	f	.001–.003	.002–.006	.005–.007	.006–.010
P3	V_c				
	f				
M1	V_c	.8–1.5	1.2–4.0	3.5–8.0	7.0–12
	f	.001–.002	.002–.004	.003–.006	.005–.010
M2	V_c	.5–1.2	1.0–3.5	2.0–5.0	3.0–7.5
	f	.001–.002	.002–.004	.003–.005	.004–.008
K1	V_c	1.0–2.0	2.0–5.5	3.5–11	9.0–15
	f	.001–.005	.004–.008	.007–.011	.010–.015
K2	V_c	.8–1.5	1.2–4.0	3.5–8.0	7.0–12
	f	.001–.003	.002–.006	.005–.007	.006–.010
N1	V_c	1.0–2.0	2.0–5.5	3.5–11	9.0–15
	f	.001–.006	.005–.010	.008–.015	.013–.025
N2	V_c	.8–1.5	1.2–4.0	3.5–8.0	7.0–12
	f	.002–.006	.005–.010	.008–.015	.013–.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	.002–.006	.005–.010	.008–.015	.013–.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				

Art. 50695 / 50699

Material		Ø.05–.30	Ø.31–.50	Ø.51–.80	Ø.81–1.20	Ø1.21–2.00
P1	V_c	1.0–6.0	6.0–15	10–23	23–60	23–60
	f	.001–.004	.003–.008	.007–.013	.012–.018	.016–.025
P2	V_c	1.0–6.0	2.0–10	3.5–16	7.0–30	7.0–30
	f	.001–.003	.002–.007	.006–.012	.010–.016	.014–.022
P3	V_c	.5–5.0	1.0–8.0	2.5–13	5.0–25	5.0–25
	f	.001–.002	.002–.006	.005–.010	.008–.014	.012–.020
M1	V_c	.5–3.0	1.0–6.0	4.0–10	8.0–18	8.0–18
	f	.001–.002	.002–.005	.004–.008	.007–.012	.010–.016
M2	V_c					
	f					
K1	V_c	2.0–8.0	6.0–15	10–23	23–60	23–60
	f	.001–.004	.003–.008	.007–.013	.012–.018	.016–.025
K2	V_c	1.0–6.0	2.0–10	3.5–16	7.0–30	7.0–30
	f	.001–.003	.002–.007	.006–.012	.010–.016	.014–.022
N1	V_c					
	f					
N2	V_c	3.0–16	8.0–26	13–55	30–100	30–100
	f	.001–.004	.004–.007	.007–.011	.010–.016	.015–.022
N3	V_c	2.5–13	6.0–22	10–40	20–80	20–80
	f	.001–.004	.004–.006	.005–.010	.009–.015	.014–.020
N4	V_c	2.0–8.0	6.0–15	10–23	23–60	23–60
	f	.001–.002	.002–.005	.004–.008	.007–.017	.010–.016
N5	V_c	3.0–16	8.0–26	13–55	30–100	30–100
	f	.001–.004	.004–.006	.005–.010	.009–.015	.014–.020
N6	V_c					
	f					
N7	V_c	2.0–8.0	6.0–15	10–23	23–60	23–60
	f	.001–.004	.004–.006	.005–.010	.009–.015	.014–.020
N8	V_c	1.0–6.0	2.0–10	3.5–16	7.0–30	7.0–30
	f	.001–.002	.002–.005	.004–.008	.007–.010	.008–.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

Material		Ø.03–.30	Ø.31–.50	Ø.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	.001–.004	.003–.008	.007–.015	.014–.025	.023–.035
P2	V_c	1.2–4	3.5–8	8–25	25–50	25–50
	f	.001–.003	.002–.007	.006–.014	.012–.023	.021–.032
P3	V_c	1–3	3–6	6–20	20–45	20–45
	f	.001–.002	.002–.006	.005–.013	.011–.020	.018–.030
M1	V_c	1.2–4	3.5–8	8–20	20–45	20–45
	f	.001–.002	.002–.005	.004–.011	.010–.018	.016–.028
M2	V_c	1–3	3–6	5–15	15–30	15–30
	f	.001–.002	.002–.004	.003–.009	.008–.016	.016–.028
K1	V_c	1.5–5	4–10	10–30	30–60	30–60
	f	.001–.004	.003–.008	.007–.015	.014–.025	.023–.035
K2	V_c	1.2–4	3.5–8	8–25	25–50	25–50
	f	.001–.003	.002–.007	.006–.014	.012–.022	.020–.032
N1	V_c	2–6	5–15	15–40	40–70	40–70
	f	.001–.003	.002–.006	.005–.013	.012–.020	.018–.030
N2	V_c	1.8–5.5	5.0–15	15–40	40–65	40–65
	f	.001–.004	.003–.007	.006–.015	.014–.022	.020–.035
N3	V_c	1.5–5	4–12	12–30	30–60	30–60
	f	.001–.004	.003–.006	.006–.013	.012–.020	.018–.032
N4	V_c	1.5–5	4–12	12–30	30–60	30–60
	f	.001–.002	.002–.005	.004–.010	.009–.016	.015–.025
N5	V_c	2–6	5–15	15–35	35–65	35–65
	f	.001–.004	.003–.006	.005–.013	.012–.020	.018–.032
N6	V_c	1.5–5	4–12	12–30	30–60	30–60
	f	.001–.002	.002–.005	.004–.010	.009–.016	.015–.020
N7	V_c	1.5–5	4–12	12–30	30–60	30–60
	f	.001–.004	.003–.006	.005–.012	.011–.018	.016–.025
N8	V_c	1–3	2.5–6	6–20	20–45	20–45
	f	.001–.002	.002–.005	.004–.009	.008–.013	.012–.018
S1	V_c	.8–5	4–7	7–15	15–30	15–30
	f	.001–.003	.002–.006	.005–.013	.012–.020	.018–.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	.001–.004	.003–.010	.009–.018	.016–.028	.026–.040
O2	V_c					
	f					
O3	V_c					
	f					

Art. 51201

Material		Ø.30–.50	Ø.51–1.00	Ø1.01–2.00	Ø2.01–3.00
P1	V_c	5–12	12–35	35–65	35–60
	f	.003–.008	.007–.015	.014–.025	.023–.035
P2	V_c	4–9	9–28	28–55	28–55
	f	.002–.007	.006–.014	.012–.023	.021–.032
P3	V_c	3.3–7	7–23	23–50	23–50
	f	.002–.006	.005–.013	.011–.020	.018–.030
M1	V_c	4–9	9–28	28–55	28–55
	f	.002–.005	.004–.011	.010–.018	.016–.028
M2	V_c	3–8	8–20	18–35	18–35
	f	.002–.004	.003–.009	.008–.016	.016–.028
K1	V_c	5–12	12–35	35–65	35–60
	f	.003–.008	.007–.015	.014–.025	.023–.035
K2	V_c	4–10	10–30	30–55	30–50
	f	.002–.007	.006–.014	.012–.022	.020–.032
N1	V_c	6–19	19–45	45–80	45–80
	f	.002–.006	.005–.013	.012–.020	.018–.030
N2	V_c	5.5–17	17–45	45–70	45–70
	f	.003–.007	.006–.015	.014–.022	.020–.035
N3	V_c	5.5–15	15–35	35–65	35–65
	f	.003–.006	.006–.013	.012–.020	.018–.032
N4	V_c	5.5–15	15–35	35–65	35–65
	f	.002–.005	.004–.010	.009–.016	.015–.025
N5	V_c	6.5–18	18–40	40–70	40–70
	f	.003–.006	.005–.013	.012–.020	.018–.032
N6	V_c	5.5–15	15–35	35–65	35–65
	f	.002–.005	.004–.010	.009–.016	.015–.020
N7	V_c	5.5–15	15–35	35–65	35–65
	f	.003–.006	.005–.012	.011–.018	.016–.025
N8	V_c	3–7	7–23	23–50	23–50
	f	.002–.005	.004–.009	.008–.013	.012–.018
S1	V_c	5–8	8.0–18	18–35	18–35
	f	.002–.006	.005–.013	.012–.020	.018–.030
S2	V_c	2.5–7	6–12	11–20	11–20
	f	.002–.004	.003–.007	.006–.011	.010–.018
H1	V_c	2.5–7	6–12	11–20	11–20
	f	.002–.004	.003–.007	.006–.011	.010–.018
H2	V_c				
	f				
H3	V_c				
	f				
O1	V_c	5–12	12–35	35–65	35–60
	f	.003–.010	.009–.018	.016–.028	.026–.040
O2	V_c	2.5–6	6–20	20–45	20–45
	f	.002–.009	.008–.016	.015–.025	.022–.035
O3	V_c				
	f				

Art. 50621

Material		Ø.20–.50	Ø.51–1.00	Ø1.01–2.00	Ø2.01–3.00
P1	V_c	6–15	15–35	15–35	15–35
	f	.001–.010	.010–.020	.020–.030	.030–.045
P2	V_c	5–13	13–30	13–30	13–30
	f	.001–.008	.008–.018	.018–.028	.028–.042
P3	V_c	4–12	12–25	12–25	12–25
	f	.001–.007	.007–.016	.016–.025	.025–.038
M1	V_c	4–12	12–25	12–25	12–25
	f	.001–.007	.007–.016	.016–.025	.025–.038
M2	V_c				
	f				
K1	V_c	6–15	15–35	15–35	15–35
	f	.001–.010	.010–.020	.020–.030	.030–.045
K2	V_c	5–13	13–30	13–30	13–30
	f	.001–.008	.008–.018	.018–.028	.028–.042
N1	V_c				
	f				
N2	V_c	8–20	20–45	20–45	20–45
	f	.001–.010	.010–.020	.020–.030	.030–.045
N3	V_c	6–18	18–40	18–40	18–40
	f	.001–.008	.008–.018	.018–.028	.028–.042
N4	V_c				
	f				
N5	V_c	6–18	18–40	18–40	18–40
	f	.001–.010	.010–.020	.020–.035	.035–.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

Material		Ø.20–.50	Ø.51–1.00	Ø1.01–2.00	Ø2.01–3.00
P1	V_c	8–20	20–40	20–40	20–40
	f	.001–.010	.010–.020	.020–.030	.030–.045
P2	V_c	6–18	18–38	18–38	18–38
	f	.001–.008	.008–.018	.018–.028	.028–.042
P3	V_c	5–14	14–30	14–30	14–30
	f	.001–.007	.007–.016	.016–.025	.025–.038
M1	V_c	5–14	14–30	14–30	14–30
	f	.001–.007	.007–.016	.016–.025	.025–.038
M2	V_c				
	f				
K1	V_c	8–20	20–40	20–40	20–40
	f	.001–.010	.010–.020	.020–.030	.030–.045
K2	V_c	6–18	18–38	18–38	18–38
	f	.001–.008	.008–.018	.018–.028	.028–.042
N1	V_c				
	f				
N2	V_c	10–25	25–55	25–55	25–55
	f	.001–.010	.010–.020	.020–.030	.030–.045
N3	V_c	8–22	22–50	22–50	22–50
	f	.001–.008	.008–.018	.018–.028	.028–.042
N4	V_c				
	f				
N5	V_c	8–22	22–50	22–50	22–50
	f	.001–.010	.010–.020	.020–.035	.035–.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	.001–.004	.004–.008	.008–.015	.015–.025
H2	V_c				
	f				
H3	V_c				
	f				
O1	V_c				
	f				
O2	V_c				
	f				
O3	V_c				
	f				

Art. 12604

Material		Ø.05–.30	Ø.31–.80	Ø.81–1.50	Ø1.55–3.17
P1	V_c	1.0–2.0	2.0–8.0	8.0–20	8.0–20
	f	.001–.005	.005–.011	.010–.015	.014–.021
P2	V_c	.5–1.5	1.5–7.0	7.0–16	7.0–16
	f	.001–.002	.002–.006	.005–.009	.008–.012
P3	V_c				
	f				
M1	V_c	.5–1.5	1.5–7.0	7.0–16	7.0–16
	f	.001–.002	.002–.006	.005–.009	.008–.015
M2	V_c	.5–1.2	1.2–6.0	6.0–15	6.0–15
	f	.001–.002	.002–.005	.004–.007	.006–.012
K1	V_c	1.0–5.0	5.0–10	10–20	10–20
	f	.001–.005	.004–.011	.010–.015	.014–.020
K2	V_c	.8–4.0	4.0–8.0	8.0–18	8.0–18
	f	.001–.004	.003–.008	.007–.011	.010–.016
N1	V_c	2.0–7.0	7.0–13	13–25	13–25
	f	.001–.004	.003–.010	.009–.016	.015–.022
N2	V_c	1.5–6.0	6.0–12	12–22	12–22
	f	.001–.005	.004–.011	.010–.020	.018–.035
N3	V_c				
	f				
N4	V_c				
	f				
N5	V_c	2.0–7.0	7.0–13	13–25	13–25
	f	.001–.004	.003–.010	.009–.018	.017–.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				

Art. 50720

Material		Ø.20–.50	Ø.55–.80	Ø.85–1.20	Ø1.25–2.00
P1	V_c	8–20	20–40	20–40	20–40
	f	.001–.010	.010–.018	.018–.025	.025–.035
P2	V_c	6–18	18–38	18–38	18–38
	f	.001–.008	.008–.016	.016–.023	.023–.033
P3	V_c	5–14	14–30	14–30	14–30
	f	.001–.007	.007–.015	.015–.020	.020–.030
M1	V_c	5–14	14–30	14–30	14–30
	f	.001–.008	.008–.016	.016–.023	.023–.033
M2	V_c	3–12	12–25	12–25	12–25
	f	.001–.005	.005–.010	.010–.016	.016–.020
K1	V_c	8–20	20–40	20–40	20–40
	f	.001–.010	.010–.018	.018–.025	.025–.035
K2	V_c	6–18	6–18	6–18	6–18
	f	.001–.008	.008–.016	.016–.023	.023–.033
N1	V_c	6–18	18–38	18–38	18–38
	f	.001–.007	.007–.015	.015–.020	.020–.030
N2	V_c	10–25	25–55	25–55	25–55
	f	.001–.010	.010–.018	.018–.025	.025–.035
N3	V_c	8–22	22–50	22–50	22–50
	f	.001–.008	.008–.016	.016–.023	.023–.033
N4	V_c	5–14	14–30	14–30	14–30
	f	.001–.005	.005–.010	.010–.016	.016–.020
N5	V_c	10–25	25–55	25–55	25–55
	f	.001–.010	.010–.018	.018–.025	.025–.035
N6	V_c	5–15	15–30	15–30	15–30
	f	.001–.005	.005–.010	.010–.016	.016–.020
N7	V_c				
	f				
N8	V_c				
	f				
S1	V_c	6–10	10–20	10–20	10–20
	f	.001–.005	.005–.010	.010–.016	.016–.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	.005–.015	.015–.030	.030–.045	.045–.060
O2	V_c				
	f				
O3	V_c				
	f				

Art. 50740 / 50760 / 50780

Material		Ø.20–.50	Ø.55–.80	Ø.85–1.20	Ø1.25–2.00
P1	V_c	6–10	10–25	10–25	10–25
	f	.001–.006	.006–.010	.010–.022	.022–.030
P2	V_c	5–8	8–20	8–20	8–20
	f	.001–.005	.005–.008	.008–.015	.015–.020
P3	V_c	4–7	7–18	7–18	7–18
	f	.001–.004	.004–.007	.007–.012	.012–.015
M1	V_c	4–5	5–15	5–15	5–15
	f	.001–.003	.003–.006	.006–.012	.012–.018
M2	V_c	2–4	4–12	4–12	4–12
	f	.001–.003	.003–.005	.005–.010	.010–.015
K1	V_c	6–10	10–25	10–25	10–25
	f	.001–.006	.006–.010	.010–.022	.022–.030
K2	V_c	5–8	8–20	8–20	8–20
	f	.001–.005	.005–.008	.008–.015	.015–.020
N1	V_c	4–6	6–18	6–18	6–18
	f	.001–.004	.004–.007	.007–.012	.012–.015
N2	V_c	6–10	10–25	10–25	10–25
	f	.001–.006	.006–.010	.010–.022	.022–.030
N3	V_c	5–8	8–20	8–20	8–20
	f	.001–.005	.005–.008	.008–.015	.015–.020
N4	V_c	3–5	5–15	5–15	5–15
	f	.001–.004	.004–.007	.007–.012	.012–.015
N5	V_c	6–10	10–25	10–25	10–25
	f	.001–.006	.006–.010	.010–.022	.022–.030
N6	V_c	4–6	6–18	6–18	6–18
	f	.001–.003	.003–.005	.005–.010	.010–.015
N7	V_c				
	f				
N8	V_c				
	f				
S1	V_c	3–5	5–12	5–12	5–12
	f	.001–.003	.003–.005	.005–.010	.010–.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	.005–.010	.010–.015	.015–.020	.020–.025
O2	V_c				
	f				
O3	V_c				
	f				

Art. 51609

Material		Ø.30–.95	Ø1.00–1.95	Ø2.00–3.00
P1	V_c	50–70	70–100	70–100
	f	.010–.025	.025–.040	.040–.055
P2	V_c	40–60	60–80	60–80
	f	.010–.025	.025–.035	.035–.050
P3	V_c	30–50	50–70	50–70
	f	.010–.020	.015–.025	.025–.040
M1	V_c	20–35	30–45	30–45
	f	.005–.008	.015–.025	.025–.035
M2	V_c	20–30	25–35	25–35
	f	.005–.008	.010–.020	.020–.030
K1	V_c	70–110	110–150	110–150
	f	.020– .050	.030–.040	.040–.050
K2	V_c	50–90	90–130	90–130
	f	.015– .040	.025–.035	.035–.050
N1	V_c	70–100	100–130	100–130
	f	.020–.030	.030–.040	.040–.050
N2	V_c	80–120	130–160	130–160
	f	.020–.030	.030–.050	.050–.060
N3	V_c	80–120	130–160	130–160
	f	.020–.030	.030–.050	.050–.060
N4	V_c	50–80	80–110	80–110
	f	.015–.025	.025–.035	.035–.045
N5	V_c	80–120	130–160	130–160
	f	.015–.025	.025–.035	.035–.045
N6	V_c			
	f			
N7	V_c			
	f			
N8	V_c			
	f			
S1	V_c	20–30	20–30	20–30
	f	.005–.010	.010–.020	.020–.030
S2	V_c	15–25	15–25	15–25
	f	.005–.010	.010–.020	.020–.030
H1	V_c	20–30	25–40	25–40
	f	.005–.015	.015–.025	.025–.035
H2	V_c	8–12	12–15	15–20
	f	.003–.008	.008–.015	.015–.020
H3	V_c			
	f			
O1	V_c	60–100	70–110	70–110
	f	.010–.020	.020–.030	.030–.040
O2	V_c			
	f			
O3	V_c			
	f			

Art. 52903 / 52906 / 52909

Material		Ø1.00–1.90	Ø2.00–5.00	Ø5.10–8.00	Ø8.10–12.70
P1	V_c	70–110	70–110	70–110	70–110
	f	.025–.055	.050–.130	.125–.170	.165–.215
P2	V_c	60–100	60–100	60–100	60–100
	f	.020–.050	.045–.120	.115–.150	.140–.190
P3	V_c	60–100	60–100	60–100	60–100
	f	.020–.050	.045–.120	.115–.150	.140–.190
M1	V_c	60–100	60–100	60–100	60–100
	f	.020–.050	.045–.120	.115–.150	.140–.190
M2	V_c	50–90	50–90	50–90	50–90
	f	.015–.045	.040–.100	.090–.130	.120–.150
K1	V_c	90–140	90–140	90–140	90–140
	f	.050–.110	.100–.270	.260–.340	.320–.420
K2	V_c	80–120	80–120	80–120	80–120
	f	.040–.100	.090–.250	.240–.300	.280–.360
N1	V_c	120–170	120–170	120–170	120–170
	f	.050–.110	.100–.250	.240–.340	.320–.420
N2	V_c	150–200	150–200	150–200	150–200
	f	.050–.110	.100–.250	.240–.340	.320–.420
N3	V_c	200–250	200–250	200–250	200–250
	f	.050–.110	.100–.250	.240–.340	.320–.420
N4	V_c	90–130	90–130	90–130	90–130
	f	.050–.110	.100–.250	.240–.340	.320–.420
N5	V_c	150–200	150–200	150–200	150–200
	f	.050–.110	.100–.250	.240–.340	.320–.420
N6	V_c	60–100	60–100	60–100	60–100
	f	.020–.050	.045–.120	.115–.150	.140–.190
N7	V_c				
	f				
N8	V_c				
	f				
S1	V_c	30–60	30–60	30–60	30–60
	f	.015–.035	.030–.085	.080–.110	.100–.135
S2	V_c	20–50	20–50	20–50	20–50
	f	.020–.050	.045–.120	.115–.150	.140–.190
H1	V_c	30–60	30–60	30–60	30–60
	f	.020–.030	.030–.100	.090–.140	.120–.170
H2	V_c				
	f				
H3	V_c				
	f				
O1	V_c	70–110	70–110	70–110	70–110
	f	.025–.055	.050–.130	.125–.170	.165–.215
O2	V_c				
	f				
O3	V_c				
	f				

Art. 52912 / 52916

Material		Ø1.00–2.40	Ø2.50–5.00	Ø5.10–8.00	Ø8.10–1.00
P1	V_c	70–110	70–110	70–110	70–110
	f	.030–.080	.060–.130	.125–.170	.170–.240
P2	V_c	60–100	60–100	60–100	60–100
	f	.020–.060	.050–.120	.115–.150	.150–.220
P3	V_c	50–90	50–90	50–90	50–90
	f	.015–.050	.040–.100	.080–.130	.140–.200
M1	V_c	50–90	50–90	50–90	50–90
	f	.015–.050	.040–.100	.080–.130	.140–.190
M2	V_c	40–80	40–80	40–80	40–80
	f	.010–.045	.030–.090	.070–.120	.120–.170
K1	V_c	90–140	90–140	90–140	90–140
	f	.030–.080	.080–.150	.150–.280	.280–.350
K2	V_c	80–120	80–120	80–120	80–120
	f	.040–.100	.060–.130	.130–.220	.220–.300
N1	V_c	150–200	150–200	150–200	150–200
	f	.050–.110	.100–.250	.240–.340	.320–.420
N2	V_c	150–200	150–200	150–200	150–200
	f	.050–.110	.100–.250	.240–.340	.320–.420
N3	V_c	150–200	150–200	150–200	150–200
	f	.050–.110	.100–.250	.240–.340	.320–.420
N4	V_c	120–170	120–170	120–170	120–170
	f	.030–.080	.060–.130	.140–.190	.165–.210
N5	V_c	120–170	120–170	120–170	120–170
	f	.040–.100	.100–.250	.240–.300	.280–.360
N6	V_c	80–120	80–120	80–120	80–120
	f	.040–.100	.100–.250	.240–.300	.280–.360
N7	V_c				
	f				
N8	V_c				
	f				
S1	V_c	50–90	50–90	50–90	50–90
	f	.020–.060	.040–.100	.100–.200	.100–.135
S2	V_c	30–55	30–55	30–55	30–55
	f	.010–.040	.030–.070	.080–.130	.100–.170
H1	V_c	30–60	30–60	30–60	30–60
	f	.015–.050	.040–.100	.090–.140	.120–.150
H2	V_c				
	f				
H3	V_c				
	f				
O1	V_c	70–110	70–110	70–110	70–110
	f	.025–.050	.050–.130	.130–.170	.170–.220
O2	V_c				
	f				
O3	V_c				
	f				

Art. 52920 / 52930

Material		Ø3.00–5.00	Ø5.10–8.00	Ø8.10–1.00
P1	V_c			
	f			
P2	V_c			
	f			
P3	V_c	40–80	40–80	40–80
	f	.050–.085	.080–.110	.100–.150
M1	V_c	30–70	30–70	30–70
	f	.045–.070	.065–.085	.080–.120
M2	V_c	25–55	25–55	25–55
	f	.035–.050	.045–.065	.080–.110
K1	V_c	70–110	70–110	70–110
	f	.100–.200	.180–.250	.230–.280
K2	V_c	60–100	60–100	60–100
	f	.090–.180	.170–.240	.220–.260
N1	V_c	60–100	60–100	60–100
	f	.130–.250	.230–.340	.320–.380
N2	V_c	65–100	65–100	65–100
	f	.130–.250	.230–.340	.320–.380
N3	V_c	70–110	70–110	70–110
	f	.130–.250	.230–.340	.320–.380
N4	V_c			
	f			
N5	V_c			
	f			
N6	V_c			
	f			
N7	V_c			
	f			
N8	V_c			
	f			
S1	V_c	30–60	30–60	30–60
	f	.035–.070	.065–.085	.080–.110
S2	V_c	20–50	20–50	20–50
	f	.030–.060	.050–.080	.070–.100
H1	V_c	20–40	20–40	20–40
	f	.010–.035	.030–.040	.035–.060
H2	V_c			
	f			
H3	V_c			
	f			
O1	V_c	60–100	60–100	60–100
	f	.090–.180	.170–.240	.220–.260
O2	V_c			
	f			
O3	V_c			
	f			

Art. 50938

Material		Ø1.00–2.40	Ø2.50–5.00	Ø5.10–8.00	Ø8.10–12.70
P1	V_c	50–80	60–100	60–100	60–100
	f	.030–.070	.045–.120	.110–.150	.150–.200
P2	V_c	45–70	55–90	55–90	55–90
	f	.030–.060	.040–.115	.100–.140	.140–.180
P3	V_c	40–60	55–90	55–90	55–90
	f	.020–.050	.040–.115	.100–.140	.140–.180
M1	V_c	20–45	50–90	50–90	50–90
	f	.010–.040	.040–.100	.090–.130	.120–.150
M2	V_c	20–40	40–80	40–80	40–80
	f	.010–.035	.035–.090	.075–.110	.110–.130
K1	V_c	60–80	80–120	80–120	80–120
	f	.050–.080	.090–.250	.240–.300	.280–.360
K2	V_c	50–70	70–100	70–100	70–100
	f	.040–.070	.080–.230	.220–.280	.265–.320
N1	V_c				
	f				
N2	V_c	80–110	140–190	140–190	140–190
	f	.040–.130	.090–.230	.220–.300	.300–.360
N3	V_c	90–130	180–220	180–220	180–220
	f	.040–.140	.090–.230	.220–.300	.300–.360
N4	V_c				
	f				
N5	V_c				
	f				
N6	V_c				
	f				
N7	V_c				
	f				
N8	V_c				
	f				
S1	V_c	20–40	25–55	25–55	25–55
	f	.010–.030	.025–.050	.040–.070	.060–.100
S2	V_c				
	f				
H1	V_c	25–45	35–55	35–55	35–55
	f	.010–.020	.015–.040	.030–.060	.050–.090
H2	V_c				
	f				
H3	V_c				
	f				
O1	V_c				
	f				
O2	V_c				
	f				
O3	V_c				
	f				

Art. 50940

Material		Ø1.00–1.90	Ø2.00–5.00	Ø5.10–8.00	Ø8.10–12.70
P1	V_c	60–100	60–100	60–100	60–100
	f	.020–.050	.045–.120	.110–.150	.150–.200
P2	V_c	55–90	55–90	55–90	55–90
	f	.015–.045	.040–.115	.100–.140	.140–.180
P3	V_c	55–90	55–90	55–90	55–90
	f	.015–.045	.040–.115	.100–.140	.140–.180
M1	V_c	50–90	50–90	50–90	50–90
	f	.015–.045	.040–.100	.090–.130	.120–.150
M2	V_c	40–80	40–80	40–80	40–80
	f	.010–.040	.035–.090	.075–.110	.110–.130
K1	V_c	80–120	80–120	80–120	80–120
	f	.040–.100	.090–.250	.240–.300	.280–.360
K2	V_c	70–100	70–100	70–100	70–100
	f	.030–.090	.080–.230	.220–.280	.265–.320
N1	V_c				
	f				
N2	V_c	140–190	140–190	140–190	140–190
	f	.040–.100	.090–.230	.220–.300	.300–.360
N3	V_c	180–220	180–220	180–220	180–220
	f	.040–.100	.090–.230	.220–.300	.300–.360
N4	V_c				
	f				
N5	V_c				
	f				
N6	V_c				
	f				
N7	V_c				
	f				
N8	V_c				
	f				
S1	V_c	25–55	25–55	25–55	25–55
	f	.010–.030	.025–.050	.040–.070	.060–.100
S2	V_c				
	f				
H1	V_c	30–50	30–50	30–50	30–50
	f	.005–.015	.010–.040	.030–.050	.050–.065
H2	V_c				
	f				
H3	V_c				
	f				
O1	V_c				
	f				
O2	V_c				
	f				
O3	V_c				
	f				

Art. 50941

Material		Ø.50–.90	Ø1.00–1.90	Ø2.00–3.00
P1	V_c	50–70	70–100	70–100
	f	.020–.040	.035–.060	.060–.120
P2	V_c	40–60	60–80	60–80
	f	.010–.030	.025–.045	.045–.100
P3	V_c	30–50	50–70	50–70
	f	.010–.020	.015–.040	.040–.080
M1	V_c	20–35	30–45	30–45
	f	.005–.008	.008–.020	.020–.030
M2	V_c	20–30	25–35	25–35
	f	.005–.008	.008–.015	.015–.025
K1	V_c	50–100	100–150	100–150
	f	.020–.050	.040–.080	.080–.120
K2	V_c	50–90	90–130	90–130
	f	.015–.040	.030–.060	.060–.100
N1	V_c			
	f			
N2	V_c	60–120	120–150	120–150
	f	.020–.040	.040–.080	.080–.120
N3	V_c	80–120	130–170	130–170
	f	.020–.040	.040–.080	.080–.120
N4	V_c			
	f			
N5	V_c			
	f			
N6	V_c			
	f			
N7	V_c			
	f			
N8	V_c			
	f			
S1	V_c	30–40	30–40	30–40
	f	.005–.008	.008–.020	.020–.035
S2	V_c			
	f			
H1	V_c	10–20	15–30	15–30
	f	.003–.006	.005–.015	.015–.020
H2	V_c			
	f			
H3	V_c			
	f			
O1	V_c			
	f			
O2	V_c			
	f			
O3	V_c			
	f			

Art. 52100 / 52200

Material		Ø3.00–4.00	Ø4.10–8.00	Ø8.10–12.00	Ø12.10–16.00	Ø16.10–2.00
P1	V_c					
	f					
P2	V_c					
	f					
P3	V_c					
	f					
M1	V_c					
	f					
M2	V_c					
	f					
K1	V_c	60–110	60–110	60–110	60–110	60–110
	f	.040–.060	.050–.200	.160–.300	.280–.400	.380–.500
K2	V_c	50–100	50–100	50–100	50–100	50–100
	f	.020–.050	.040–.160	.140–.250	.220–.350	.320–.400
N1	V_c					
	f					
N2	V_c	200–250	200–250	200–250	200–250	200–250
	f	.040–.060	.050–.150	.140–.260	.250–.400	.380–.600
N3	V_c	220–280	220–280	220–280	220–280	220–280
	f	.040–.060	.050–.150	.140–.260	.250–.400	.380–.600
N4	V_c					
	f					
N5	V_c	80–120	80–120	80–120	80–120	80–120
	f	.040–.060	.050–.150	.140–.250	.230–.330	.300–.400
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	20–40	20–40	20–40	20–40	20–40
	f	.030–.050	.040–.100	.080–.150	.130–.180	.160–.200
O2	V_c					
	f					
O3	V_c					
	f					

Art. 52150

Material		Ø4.00–7.00	Ø7.10–1.00	Ø1.10–13.00	Ø13.10–16.00	Ø16.10–2.00
P1	V_c	90–120	90–120	90–120	90–120	90–120
	f	.080–.200	.180–.350	.300–.400	.350–.450	.400–.600
P2	V_c	80–150	80–150	80–150	80–150	80–150
	f	.050–.180	.160–.250	.220–.350	.330–.400	.380–.550
P3	V_c					
	f					
M1	V_c					
	f					
M2	V_c					
	f					
K1	V_c	200–250	200–250	200–250	200–250	200–250
	f	.100–.250	.220–.350	.330–.450	.420–.550	.520–.700
K2	V_c	160–200	160–200	160–200	160–200	160–200
	f	.080–.180	.160–.250	.230–.350	.330–.500	.450–.550
N1	V_c					
	f					
N2	V_c					
	f					
N3	V_c	250–300	250–300	250–300	250–300	250–300
	f	.050–.150	.130–.250	.230–.350	.330–.450	.430–.550
N4	V_c					
	f					
N5	V_c	80–120	80–120	80–120	80–120	80–120
	f	.050–.120	.100–.220	.200–.320	.300–.400	.380–.450
N6	V_c					
	f					
N7	V_c					
	f					
N8	V_c					
	f					
S1	V_c					
	f					
S2	V_c					
	f					
H1	V_c	70–100	70–100	70–100	70–100	70–100
	f	.050–.100	.080–.180	.160–.260	.240–.300	.280–.350
H2	V_c					
	f					
H3	V_c					
	f					
O1	V_c					
	f					
O2	V_c					
	f					
O3	V_c					
	f					

Art. 50950

Material		Ø3.00–5.00	Ø5.10–8.00	Ø8.10–12.00	Ø12.10–16.00	Ø16.10–2.00
P1	V_c	80–120	80–120	80–120	80–120	80–120
	f	.060–.150	.120–.250	.220–.350	.320–.450	.400–.500
P2	V_c	60–80	60–80	60–80	60–80	60–80
	f	.050–.120	.100–.220	.200–.300	.280–.360	.340–.450
P3	V_c	50–70	50–70	50–70	50–70	50–70
	f	.040–.100	.090–.180	.160–.260	.240–.320	.300–.380
M1	V_c	40–60	40–60	40–60	40–60	40–60
	f	.030–.080	.070–.150	.140–.180	.170–.250	.230–.320
M2	V_c	30–50	30–50	30–50	30–50	30–50
	f	.030–.080	.070–.130	.120–.160	.150–.220	.200–.300
K1	V_c	100–130	100–130	100–130	100–130	100–130
	f	.100–.250	.230–.350	.320–.450	.400–.500	.450–.600
K2	V_c	60–80	60–80	60–80	60–80	60–80
	f	.060–.200	.180–.280	.250–.350	.320–.450	.420–.500
N1	V_c					
	f					
N2	V_c	150–200	150–200	150–200	150–200	150–200
	f	.100–.270	.250–.350	.330–.400	.380–.480	.460–.550
N3	V_c	130–160	130–160	130–160	130–160	130–160
	f	.100–.250	.220–.320	.300–.380	.360–.450	.420–.500
N4	V_c					
	f					
N5	V_c					
	f					
N6	V_c					
	f					
N7	V_c					
	f					
N8	V_c					
	f					
S1	V_c	30–60	30–60	30–60	30–60	30–60
	f	.005–.040	.030–.070	.060–.110	.100–.150	.140–.180
S2	V_c					
	f					
H1	V_c	60–90	60–90	60–90	60–90	60–90
	f	.050–.120	.100–.220	.200–.300	.280–.360	.340–.400
H2	V_c	40–60	40–60	40–60	40–60	40–60
	f	.030–.070	.060–.130	.110–.180	.160–.240	.200–.260
H3	V_c	15–35	15–35	15–35	15–35	15–35
	f	.005–.030	.020–.050	.040–.070	.060–.100	.080–.120
O1	V_c					
	f					
O2	V_c					
	f					
O3	V_c					
	f					

Art. 50830

Material		Ø.30–1.00	Ø1.10–5.00	Ø5.10–1.00	Ø1.10–15.00	Ø15.10–2.00
P1	V_c	30–60	50–90	50–90	50–90	50–90
	f	.010–.040	.038–.080	.076–.110	.100–.180	.170–.260
P2	V_c	20–35	30–60	30–60	30–60	30–60
	f	.010–.030	.028–.070	.065–.090	.085–.160	.150–.230
P3	V_c	15–30	25–50	25–50	25–50	25–50
	f	.005–.020	.018–.060	.057–.085	.080–.130	.125–.200
M1	V_c	15–30	25–50	25–50	25–50	25–50
	f	.005–.020	.018–.060	.057–.085	.080–.130	.125–.200
M2	V_c	10–20	15–40	15–40	15–40	15–40
	f	.004–.018	.016–.050	.048–.090	.085–.120	.110–.160
K1	V_c	40–80	70–120	70–120	70–120	70–120
	f	.010–.060	.055–.090	.085–.110	.100–.280	.260–.500
K2	V_c	30–50	40–80	40–80	40–80	40–80
	f	.010–.030	.028–.070	.067–.100	.095–.180	.170–.300
N1	V_c	30–60	50–90	50–90	50–90	50–90
	f	.012–.045	.042–.085	.080–.140	.135–.250	.230–.300
N2	V_c	40–80	70–120	70–120	70–120	70–120
	f	.015–.050	.480–.100	.095–.180	.170–.280	.260–.450
N3	V_c	30–70	60–110	60–110	60–110	60–110
	f	.010–.045	.040–.085	.080–.160	.150–.260	.240–.400
N4	V_c	20–40	30–70	30–70	30–70	30–70
	f	.005–.030	.028–.070	.065–.090	.085–.160	.150–.230
N5	V_c					
	f					
N6	V_c	15–30	25–50	25–50	25–50	25–50
	f	.012–.045	.042–.085	.080–.140	.135–.250	.230–.300
N7	V_c	15–30	25–50	25–50	25–50	25–50
	f	.012–.045	.042–.085	.080–.140	.135–.250	.230–.300
N8	V_c	10–20	15–35	15–35	15–35	15–35
	f	.004–.018	.016–.050	.048–.090	.085–.120	.110–.180
S1	V_c	20–30	25–50	25–50	25–50	25–50
	f	.020–.040	.038–.070	.065–.100	.095–.150	.145–.200
S2	V_c	10–20	15–35	15–35	15–35	15–35
	f	.004–.018	.016–.050	.048–.090	.085–.120	.110–.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	.015–.050	.048–.100	.095–.180	.170–.280	.260–.450
O2	V_c					
	f					
O3	V_c					
	f					

Art. 50838

Material		Ø.30–1.00	Ø1.05–3.00	Ø3.105–6.00
P1	V_c	30–60	50–90	50–90
	f	.010–.040	.038–.050	.045–.060
P2	V_c	20–35	30–60	30–60
	f	.010–.030	.028–.045	.040–.055
P3	V_c	15–30	25–50	25–50
	f	.005–.020	.018–.035	.030–.050
M1	V_c	15–30	25–50	25–50
	f	.005–.020	.018–.035	.030–.050
M2	V_c	10–20	15–40	15–40
	f	.004–.018	.016–.030	.028–.040
K1	V_c	40–80	70–120	70–120
	f	.010–.060	.055–.070	.065–.100
K2	V_c	30–50	40–80	40–80
	f	.010–.030	.028–.055	.050–.080
N1	V_c	30–60	50–90	50–90
	f	.012–.045	.042–.060	.055–.090
N2	V_c	40–80	70–120	70–120
	f	.015–.050	.048–.070	.065–.110
N3	V_c	30–70	60–110	60–110
	f	.010–.045	.040–.065	.060–.100
N4	V_c	20–40	30–70	30–70
	f	.005–.030	.028–.050	.048–.075
N5	V_c	30–60	50–90	50–90
	f	.015–.050	.048–.070	.065–.110
N6	V_c	15–30	25–50	25–50
	f	.012–.045	.040–.065	.060–.100
N7	V_c			
	f			
N8	V_c			
	f			
S1	V_c	20–35	30–60	30–60
	f	.010–.030	.028–.045	.040–.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	.015–.050	.048–.070	.065–.120
O2	V_c			
	f			
O3	V_c			
	f			

Art. 50820

Material		Ø.70–2.50	Ø2.60–6.00	Ø6.10–9.00	Ø9.10–11.00	Ø11.10–14.00
P1	V_c	30–60	50–90	50–90	50–90	50–90
	f	.010–.020	.018–.040	.038–.065	.060–.090	.085–.120
P2	V_c	20–35	30–60	30–60	30–60	30–60
	f	.008–.018	.016–.035	.033–.055	.050–.075	.070–.100
P3	V_c					
	f					
M1	V_c					
	f					
M2	V_c					
	f					
K1	V_c	20–40	30–70	30–70	30–70	30–70
	f	.010–.025	.023–.045	.042–.075	.072–.110	.100–.150
K2	V_c	15–30	25–50	25–50	25–50	25–50
	f	.010–.020	.018–.040	.038–.065	.060–.090	.085–.120
N1	V_c					
	f					
N2	V_c	80–120	110–160	110–160	110–160	110–160
	f	.010–.030	.028–.080	.075–.120	.110–.160	.150–.200
N3	V_c	60–100	50–120	50–120	50–120	50–120
	f	.010–.030	.028–.080	.075–.120	.110–.160	.150–.200
N4	V_c					
	f					
N5	V_c	40–70	60–120	60–120	60–120	60–120
	f	.010–.025	.023–.045	.042–.075	.072–.110	.100–.150
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. 50840

Material		Ø2.00–5.00	Ø5.10–8.00	Ø8.10–11.00	Ø11.10–14.00
P1	V_c	30–60	30–60	30–60	30–60
	f	.020–.050	.045–.090	.080–.150	.130–.200
P2	V_c	25–50	25–50	25–50	25–50
	f	.015–.045	.040–.080	.075–.120	.100–.150
P3	V_c				
	f				
M1	V_c	20–45	20–45	20–45	20–45
	f	.150–.040	.035–.070	.065–.100	.090–.130
M2	V_c	15–35	15–35	15–35	15–35
	f	.010–.035	.030–.060	.055–.085	.080–.110
K1	V_c	30–60	30–60	30–60	30–60
	f	.020–.050	.450–.090	.080–.150	.130–.200
K2	V_c	25–50	25–50	25–50	25–50
	f	.015–.045	.040–.080	.075–.120	.100–.150
N1	V_c	30–60	30–60	30–60	30–60
	f	.020–.050	.045–.090	.080–.150	.130–.200
N2	V_c	60–100	60–100	60–100	60–100
	f	.030–.080	.070–.150	.140–.220	.200–.300
N3	V_c	50–90	50–90	50–90	50–90
	f	.025–.070	.060–.130	.120–.190	.180–.250
N4	V_c	50–90	50–90	50–90	50–90
	f	.030–.090	.080–.150	.130–.200	.180–.300
N5	V_c				
	f				
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. 55654 / 55338

Material		Ø1.00–2.00	Ø2.10–5.00	Ø5.10–8.00	Ø8.10–11.00	Ø11.10–14.00
P1	V_c	40–60	40–60	40–60	40–60	40–60
	f	.015–.040	.035–.080	.075–.170	.160–.230	.200–.300
P2	V_c	30–50	30–50	30–50	30–50	30–50
	f	.010–.035	.030–.075	.070–.155	.150–.210	.190–.250
P3	V_c					
	f					
M1	V_c	25–40	25–40	25–40	25–40	25–40
	f	.010–.030	.025–.070	.060–.100	.090–.140	.120–.200
M2	V_c					
	f					
K1	V_c	60–100	60–100	60–100	60–100	60–100
	f	.020–.050	.040–.090	.080–.180	.160–.280	.250–.350
K2	V_c	40–80	40–80	40–80	40–80	40–80
	f	.015–.040	.035–.080	.700–.170	.150–.230	.210–.300
N1	V_c					
	f					
N2	V_c	80–120	80–120	80–120	80–120	80–120
	f	.020–.060	.050–.120	.100–.230	.210–.340	.330–.450
N3	V_c	60–100	60–100	60–100	60–100	60–100
	f	.020–.060	.050–.120	.100–.230	.210–.340	.330–.450
N4	V_c					
	f					
N5	V_c					
	f					
N6	V_c					
	f					
N7	V_c					
	f					
N8	V_c					
	f					
S1	V_c	30–50	30–50	30–50	30–50	30–50
	f	.010–.030	.025–.070	.060–.130	.100–.160	.150–.200
S2	V_c					
	f					
H1	V_c					
	f					
H2	V_c					
	f					
H3	V_c					
	f					
O1	V_c	30–50	30–50	30–50	30–50	30–50
	f	.013–.035	.035–.045	.045–.060	.060–.080	.080–.100
O2	V_c					
	f					
O3	V_c					
	f					

Art. 55652

Material		Ø.20–.50	Ø.51–1.00	Ø1.01–2.00	Ø2.01–2.99
P1	V_c	10–25	25–40	40–60	40–60
	f	.005–.008	.007–.015	.013–.040	.035–.050
P2	V_c	8.0–20	20–30	30–50	30–50
	f	.004–.007	.006–.015	.013–.035	.030–.045
P3	V_c				
	f				
M1	V_c	8–15	15–25	25–40	25–40
	f	.003–.006	.005–.012	.010–.020	.018–.030
M2	V_c				
	f				
K1	V_c	20–45	45–60	60–100	60–100
	f	.004–.008	.007–.015	.013–.040	.035–.050
K2	V_c	15–30	30–40	40–80	40–80
	f	.002–.006	.005–.013	.011–.032	.030–.045
N1	V_c				
	f				
N2	V_c	20–50	50–80	80–120	80–120
	f	.005–.010	.008–.020	.018–.050	.040–.080
N3	V_c	10–30	30–60	60–100	60–100
	f	.005–.010	.008–.020	.018–.050	.040–.080
N4	V_c				
	f				
N5	V_c				
	f				
N6	V_c				
	f				
N7	V_c				
	f				
N8	V_c				
	f				
S1	V_c	10–20	20–30	30–50	30–50
	f	.002–.005	.004–.010	.008–.030	.028–.040
S2	V_c				
	f				
H1	V_c				
	f				
H2	V_c				
	f				
H3	V_c				
	f				
O1	V_c	8.0–20	20–30	30–50	30–50
	f	.004–.007	.006–.015	.013–.035	.030–.045
O2	V_c				
	f				
O3	V_c				
	f				

Art. 58000 / 58500

Material		Ø.99–2.00	Ø2.01–3.00	Ø3.01–4.00	Ø4.01–5.00	Ø5.01–6.00
P1	V_c	20–30	20–30	20–30	20–30	20–30
	f	.050–.100	.080–.130	.120–.180	.170–.230	.220–.280
P2	V_c	15–25	15–25	15–25	15–25	15–25
	f	.040–.080	.070–.120	.110–.170	.160–.220	.210–.260
P3	V_c	10–20	10–20	10–20	10–20	10–20
	f	.035–.070	.060–.100	.090–.150	.130–.180	.170–.200
M1	V_c	10–20	10–20	10–20	10–20	10–20
	f	.040–.080	.070–.120	.110–.170	.160–.220	.200–.260
M2	V_c	10–15	10–15	10–15	10–15	10–15
	f	.035–.070	.060–.100	.090–.150	.130–.180	.170–.200
K1	V_c	20–30	20–30	20–30	20–30	20–30
	f	.050–.100	.080–.150	.140–.220	.200–.260	.030–.280
K2	V_c	15–25	15–25	15–25	15–25	15–25
	f	.050–.090	.750–.140	.130–.200	.180–.240	.200–.260
N1	V_c					
	f					
N2	V_c	30–40	30–40	30–40	30–40	30–40
	f	.060–.120	.110–.160	.150–.220	.200–.260	.240–.300
N3	V_c	25–35	25–35	25–35	25–35	25–35
	f	.060–.120	.110–.160	.150–.220	.200–.260	.240–.300
N4	V_c	15–25	15–25	15–25	15–25	15–25
	f	.035–.070	.060–.100	.090–.150	.130–.180	.170–.200
N5	V_c	30–40	30–40	30–40	30–40	30–40
	f	.035–.070	.060–.100	.090–.150	.130–.180	.170–.200
N6	V_c					
	f					
N7	V_c					
	f					
N8	V_c					
	f					
S1	V_c	10–15	10–15	10–15	10–15	10–15
	f	.035–.070	.060–.100	.090–.150	.130–.180	.170–.200
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. 70030–70090 / 70130–70190

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

Art. 72075 / 72150

Material		Ø.10–.30	Ø.40–1.50	Ø1.50–3.0	a_p	a_e
P1	V_c	60–80	60–80	60–80		
	f_z	.001–.005	.004–.020	.018–.040	.5×d1	1×d1
P2	V_c	50–70	50–70	50–70		
	f_z	.001–.005	.004–.020	.018–.040	.3×d1	1×d1
P3	V_c	40–60	40–60	40–60		
	f_z	.001–.004	.003–.200	.015–.035	.2×d1	1×d1
M1	V_c	30–50	30–50	30–50		
	f_z	.001–.004	.003–.020	.015–.035	.4×d1	1×d1
M2	V_c	25–40	25–40	25–40		
	f_z	.001–.004	.003–.016	.014–.028	.25×d1	1×d1
K1	V_c	40–70	40–70	40–70		
	f_z	.001–.005	.004–.020	.018–.040	1×d1	1×d1
K2	V_c	30–60	30–60	30–60		
	f_z	.001–.004	.003–.020	.015–.035	.4×d1	1×d1
N1	V_c	70–100	70–100	70–100		
	f_z	.001–.004	.003–.020	.015–.035	1×d1	1×d1
N2	V_c	80–120	80–120	80–120		
	f_z	.001–.005	.004–.020	.018–.040	.9×d1	1×d1
N3	V_c	60–100	60–100	60–100		
	f_z	.001–.005	.004–.020	.018–.040	.9×d1	1×d1
N4	V_c					
	f_z					
N5	V_c	40–80	40–80	40–80		
	f_z	.001–.005	.004–.020	.018–.040	1×d1	1×d1
N6	V_c	25–50	25–50	25–50		
	f_z	.001–.004	.003–.020	.015–.035	.5×d1	1×d1
N7	V_c					
	f_z					
N8	V_c					
	f_z					
S1	V_c	25–50	25–50	25–50		
	f_z	.001–.003	.002–.015	.012–.030	.4×d1	1×d1
S2	V_c					
	f_z					
H1	V_c					
	f_z					
H2	V_c					
	f_z					
H3	V_c					
	f_z					
O1	V_c	80–120	80–120	80–120		
	f_z	.001–.006	.005–.025	.020–.045	1×d1	1×d1
O2	V_c					
	f_z					
O3	V_c					
	f_z					

Art. 42000

Material		Ø.30–.70	Ø.70–1.50	Ø1.50–2.50	a_p	a_e
P1	v_c	60–80	60–80	60–80		
	f_z	.005–.010	.008–.020	.018–.040	.30 x d1	1 x d1
P2	v_c	50–70	50–70	50–70		
	f_z	.005–.010	.008–.020	.018–.040	.15 x d1	1 x d1
P3	v_c	40–60	40–60	40–60		
	f_z	.004–.010	.006–.020	.0015–.035	.10 x d1	1 x d1
M1	v_c	30–50	30–50	30–50		
	f_z	.004–.010	.006–.020	.015–.035	.10 x d1	1 x d1
M2	v_c	25–40	25–40	25–40		
	f_z	.004–.008	.005–.016	.014–.028	.10 x d1	1 x d1
K1	v_c	40–70	40–70	40–70		
	f_z	.005–.010	.008–.020	.018–.040	.40 x d1	1 x d1
K2	v_c	30–60	30–60	30–60		
	f_z	.004–.010	.006–.020	.015–.035	.20 x d1	1 x d1
N1	v_c	70–100	70–100	70–100		
	f_z	.004–.01	.006–.020	.015–0035	.40 x d1	1 x d1
N2	v_c	80–120	80–120	80–120		
	f_z	.005–.010	.008–.020	.018–.040	.25 x d1	1 x d1
N3	v_c	60–100	60–100	60–100		
	f_z	.005–.010	.008–.020	.018–.040	.25 x d1	1 x d1
N4	v_c					
	f_z					
N5	v_c	40–80	40–80	40–80		
	f_z	.005–.010	.008–.020	.018–.040	.40 x d1	1 x d1
N6	v_c	25–50	25–50	25–50		
	f_z	.004–.010	.006–.020	.015–.035	.20 x d1	1 x d1
N7	v_c					
	f_z					
N8	v_c					
	f_z					
S1	v_c	25–50	25–50	25–50		
	f_z	.003–.008	.006–.015	.012–.030	.20 x d1	1 x d1
S2	v_c					
	f_z					
H1	v_c					
	f_z					
H2	v_c					
	f_z					
H3	v_c					
	f_z					
O1	v_c	80–120	80–120	80–120		
	f_z	.006–.012	.010–.025	.020–.045	.20 x d1	1 x d1
O2	v_c					
	f_z					
O3	v_c					
	f_z					

Art. 72500 / 72800

Material		Ø.30–.70	Ø.70–1.50	Ø1.50–2.50	a_p	a_e
P1	v_c	60–80	60–80	60–80		
	f_z	.005–.010	.008–.020	.018–.040	.30 × d1	1 × d1
P2	v_c	50–70	50–70	50–70		
	f_z	.005–.010	.008–.020	.018–.040	.15 × d1	1 × d1
P3	v_c	40–60	40–60	40–60		
	f_z	.004–.010	.006–.020	.0015–.035	.10 × d1	1 × d1
M1	v_c	30–50	30–50	30–50		
	f_z	.004–.010	.006–.020	.015–.035	.10 × d1	1 × d1
M2	v_c	25–40	25–40	25–40		
	f_z	.004–.008	.005–.016	.014–.028	.10 × d1	1 × d1
K1	v_c	40–70	40–70	40–70		
	f_z	.005–.010	.008–.020	.018–.040	.40 × d1	1 × d1
K2	v_c	30–60	30–60	30–60		
	f_z	.004–.010	.006–.020	.015–.035	.20 × d1	1 × d1
N1	v_c	70–100	70–100	70–100		
	f_z	.004–.01	.006–.020	.015–0035	.40 × d1	1 × d1
N2	v_c	80–120	80–120	80–120		
	f_z	.005–.010	.008–.020	.018–.040	.25 × d1	1 × d1
N3	v_c	60–100	60–100	60–100		
	f_z	.005–.010	.008–.020	.018–.040	.25 × d1	1 × d1
N4	v_c					
	f_z					
N5	v_c	40–80	40–80	40–80		
	f_z	.005–.010	.008–.020	.018–.040	.40 × d1	1 × d1
N6	v_c	25–50	25–50	25–50		
	f_z	.004–.010	.006–.020	.015–.035	.20 × d1	1 × d1
N7	v_c					
	f_z					
N8	v_c					
	f_z					
S1	v_c	25–50	25–50	25–50		
	f_z	.003–.008	.006–.015	.012–.030	.20 × d1	1 × d1
S2	v_c					
	f_z					
H1	v_c					
	f_z					
H2	v_c					
	f_z					
H3	v_c					
	f_z					
O1	v_c	80–120	80–120	80–120		
	f_z	.006–.012	.010–.025	.020–.045	.20 × d1	1 × d1
O2	v_c					
	f_z					
O3	v_c					
	f_z					

Art. 73130

Material		Ø.30–.70	Ø.70–1.50	Ø1.50–2.90	a_p	a_e
P1	v_c	60–80	60–80	60–80		
	f_z	.005–.010	.008–.020	.018–.040	.80 x d1	1 x d1
P2	v_c	50–70	50–70	50–70		
	f_z	.005–.010	.008–.020	.018–.040	.60 x d1	1 x d1
P3	v_c	40–60	40–60	40–60		
	f_z	.004–.010	.006–.020	.0015–.035	.50 x d1	1 x d1
M1	v_c	30–50	30–50	30–50		
	f_z	.004–.010	.006–.020	.015–.035	.50 x d1	1 x d1
M2	v_c	25–40	25–40	25–40		
	f_z	.004–.008	.005–.016	.014–.028	.40 x d1	1 x d1
K1	v_c	40–70	40–70	40–70		
	f_z	.005–.010	.008–.020	.018–.040	.80 x d1	1 x d1
K2	v_c	30–60	30–60	30–60		
	f_z	.004–.010	.006–.020	.015–.035	.80 x d1	1 x d1
N1	v_c	70–100	70–100	70–100		
	f_z	.004–.01	.006–.020	.015–0035	1.00 x d1	1 x d1
N2	v_c	80–120	80–120	80–120		
	f_z	.005–.010	.008–.020	.018–.040	1.00 x d1	1 x d1
N3	v_c	60–100	60–100	60–100		
	f_z	.005–.010	.008–.020	.018–.040	1.30 x d1	1 x d1
N4	v_c					
	f_z					
N5	v_c	40–80	40–80	40–80		
	f_z	.005–.010	.008–.020	.018–.040	1.00 x d1	1 x d1
N6	v_c	25–50	25–50	25–50		
	f_z	.004–.010	.006–.020	.015–.035	.80 x d1	1 x d1
N7	v_c					
	f_z					
N8	v_c					
	f_z					
S1	v_c	25–50	25–50	25–50		
	f_z	.003–.008	.006–.015	.012–.030	.80 x d1	1 x d1
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					

Art. 73200 / 73300

Material		Ø.30–.70	Ø.70–1.50	Ø1.50–2.90	a_p	a_e
P1	v_c	60–80	60–80	60–80		
	f_z	.005–.010	.008–.020	.018–.040	.9×d1	1×d1
P2	v_c	50–70	50–70	50–70		
	f_z	.005–.010	.008–.020	.018–.040	.8×d1	1×d1
P3	v_c	40–60	40–60	40–60		
	f_z	.004–.010	.006–.020	.0015–.035	.7×d1	1×d1
M1	v_c	30–50	30–50	30–50		
	f_z	.004–.010	.006–.020	.015–.035	.6×d1	1×d1
M2	v_c	25–40	25–40	25–40		
	f_z	.004–.008	.005–.016	.014–.028	.5×d1	1×d1
K1	v_c	40–70	40–70	40–70		
	f_z	.005–.010	.008–.020	.018–.040	1.0×d1	1×d1
K2	v_c	30–60	30–60	30–60		
	f_z	.004–.010	.006–.020	.015–.035	.9×d1	1×d1
N1	v_c	70–100	70–100	70–100		
	f_z	.004–.01	.006–.020	.015–0035	.9×d1	1×d1
N2	v_c	80–120	80–120	80–120		
	f_z	.005–.010	.008–.020	.018–.040	.9×d1	1×d1
N3	v_c	60–100	60–100	60–100		
	f_z	.005–.010	.008–.020	.018–.040	.9×d1	1×d1
N4	v_c					
	f_z					
N5	v_c	40–80	40–80	40–80		
	f_z	.005–.010	.008–.020	.018–.040	1×d1	1×d1
N6	v_c	25–50	25–50	25–50		
	f_z	.004–.010	.006–.020	.015–.035	.8×d1	1×d1
N7	v_c					
	f_z					
N8	v_c					
	f_z					
S1	v_c	25–50	25–50	25–50		
	f_z	.003–.008	.006–.015	.012–.030	.7×d1	1×d1
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					

Art. 73800

Material		Ø.50–1.00	Ø1.00–2.00	Ø2.00–2.50	a_p	a_e
P1	v_c	60–80	60–80	60–80		
	f_z	.003–.008	.008–.016	.016–.030	.30 × d1	1 × d1
P2	v_c	50–70	50–70	50–70		
	f_z	.003–.008	.008–.016	.016–.030	.15 × d1	1 × d1
P3	v_c	40–60	40–60	40–60		
	f_z	.002–.007	.007–.014	.014–.026	.10 × d1	1 × d1
M1	v_c	30–50	30–50	30–50		
	f_z	.002–.007	.007–.014	.014–.026	.20 × d1	1 × d1
M2	v_c	25–40	25–40	25–40		
	f_z	.002–.006	.006–.012	.012–.022	.10 × d1	1 × d1
K1	v_c	40–70	40–70	40–70		
	f_z	.003–.008	.008–.016	.016–.030	.40 × d1	1 × d1
K2	v_c	30–60	30–60	30–60		
	f_z	.002–.007	.007–.014	.014–.026	.20 × d1	1 × d1
N1	v_c	70–100	70–100	70–100		
	f_z	.002–.007	.007–.014	.014–.026	.40 × d1	1 × d1
N2	v_c	80–120	80–120	80–120		
	f_z	.003–.008	.008–.016	.016–.030	.25 × d1	1 × d1
N3	v_c	60–100	60–100	60–100		
	f_z	.003–.008	.008–.016	.016–.030	.25 × d1	1 × d1
N4	v_c					
	f_z					
N5	v_c	40–80	40–80	40–80		
	f_z	.003–.008	.008–.016	.016–.030	.40 × d1	1 × d1
N6	v_c	25–50	25–50	25–50		
	f_z	.002–.007	.007–.014	.014–.026	.20 × d1	1 × d1
N7	v_c					
	f_z					
N8	v_c					
	f_z					
S1	v_c	25–50	25–50	25–50		
	f_z	.002–.006	.006–.012	.012–.020	.20 × d1	1 × d1
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					

Art. 73725

Material		Ø.30–.70	Ø.70–1.50	Ø1.50–2.90	a_p	a_e
P1	v_c	60–80	60–80	60–80		
	f_z	.003–.008	.008–.016	.016–.030	.45 × d1	1 × d1
P2	v_c	50–70	50–70	50–70		
	f_z	.003–.008	.008–.016	.016–.030	.25 × d1	1 × d1
P3	v_c	40–60	40–60	40–60		
	f_z	.002–.007	.007–.014	.014–.026	.15 × d1	1 × d1
M1	v_c	30–50	30–50	30–50		
	f_z	.002–.007	.007–.014	.014–.026	.35 × d1	1 × d1
M2	v_c	25–40	25–40	25–40		
	f_z	.002–.006	.006–.012	.012–.022	.2 × d1	1 × d1
K1	v_c	40–70	40–70	40–70		
	f_z	.003–.008	.008–.016	.016–.030	.8 × d1	1 × d1
K2	v_c	30–60	30–60	30–60		
	f_z	.002–.007	.007–.014	.014–.026	.35 × d1	1 × d1
N1	v_c	70–100	70–100	70–100		
	f_z	.002–.007	.007–.014	.014–.026	.8 × d1	1 × d1
N2	v_c	80–120	80–120	80–120		
	f_z	.003–.008	.008–.016	.016–.030	.7 × d1	1 × d1
N3	v_c	60–100	60–100	60–100		
	f_z	.003–.008	.008–.016	.016–.030	.7 × d1	1 × d1
N4	v_c					
	f_z					
N5	v_c	40–80	40–80	40–80		
	f_z	.003–.008	.008–.016	.016–.030	.8 × d1	1 × d1
N6	v_c	25–50	25–50	25–50		
	f_z	.002–.007	.007–.014	.014–.026	.45 × d1	1 × d1
N7	v_c					
	f_z					
N8	v_c					
	f_z					
S1	v_c	25–50	25–50	25–50		
	f_z	.002–.006	.006–.012	.012–.020	.3 × d1	1 × d1
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					

Art. 43105

Material		Ø.30–.70	Ø.80–1.50	Ø1.60–3.00	a_p	a_e
P1	V_c	80–120	80–120	80–120		
	f_z	.002–.005	.003–.015	.005–.030	.8×d1	1×d1
P2	V_c	70–100	70–100	70–100		
	f_z	.001–.004	.003–.012	.005–.025	.6×d1	1×d1
P3	V_c	40–70	40–70	40–70		
	f_z	.001–.003	.002–.012	.003–.018	.5×d1	1×d1
M1	V_c	60–90	60–90	60–90		
	f_z	.001–.003	.002–.012	.003–.016	.5×d1	1×d1
M2	V_c	30–60	30–60	30–60		
	f_z	.001–.003	.002–.010	.003–.013	.4×d1	1×d1
K1	V_c	150–200	150–200	150–200		
	f_z	.002–.005	.003–.014	.005–.028	.8×d1	1×d1
K2	V_c	60–100	60–100	60–100		
	f_z	.001–.006	.003–.012	.005–.023	.8×d1	1×d1
N1	V_c	150–300	150–300	150–300		
	f_z	.001–.004	.002–.012	.004–.025	1×d1	1×d1
N2	V_c	150–300	150–300	150–300		
	f_z	.002–.005	.003–.014	.005–.028	1×d1	1×d1
N3	V_c	130–250	130–250	130–250		
	f_z	.002–.015	.004–.030	.006–.060	1×d1	1×d1
N4	V_c	60–100	60–100	60–100		
	f_z	.001–.009	.003–.018	.004–.036	.8×d1	1×d1
N5	V_c	100–250	100–250	100–250		
	f_z	.002–.010	.004–.020	.006–.040	1×d1	1×d1
N6	V_c	80–150	80–150	80–150		
	f_z	.001–.008	.002–.018	.004–.035	.8×d1	1×d1
N7	V_c	80–130	80–130	80–130		
	f_z	.002–.010	.003–.020	.006–.050	1×d1	1×d1
N8	V_c	80–130	80–130	80–130		
	f_z	.002–.010	.003–.020	.006–.050	1×d1	1×d1
S1	V_c	40–70	40–70	40–70		
	f_z	.001–.005	.003–.012	.005–.025	.8×d1	1×d1
S2	V_c	20–40	20–40	20–40		
	f_z	.001–.002	.001–.004	.002–.008	.2×d1	1×d1
H1	V_c	20–45	20–45	20–45		
	f_z	.001–.002	.001–.003	.002–.006	.2×d1	1×d1
H2	V_c					
	f_z					
H3	V_c					
	f_z					
O1	V_c	100–150	100–150	100–150		
	f_z	.003–.025	.006–.055	.010–.095	1×d1	1×d1
O2	V_c					
	f_z					
O3	V_c					
	f_z					

Art. 43305

Material		Ø.30–.70	Ø.80–1.50	Ø1.60–3.00	a_p	a_e
P1	V_c	80–120	80–120	80–120		
	f_z	.001–.004	.002–.012	.004–.025	.6×d1	1×d1
P2	V_c	70–100	70–100	70–100		
	f_z	.001–.003	.002–.008	.003–.020	.4×d1	1×d1
P3	V_c	40–70	40–70	40–70		
	f_z	.001–.003	.001–.010	.002–.015	.3×d1	1×d1
M1	V_c	60–90	60–90	60–90		
	f_z	.001–.003	.002–.008	.002–.012	.3×d1	1×d1
M2	V_c	30–60	30–60	30–60		
	f_z	.001–.003	.002–.008	.002–.009	.2×d1	1×d1
K1	V_c	150–200	150–200	150–200		
	f_z	.001–.004	.001–.010	.002–.023	.6×d1	1×d1
K2	V_c	60–100	60–100	60–100		
	f_z	.001–.005	.002–.010	.003–.019	.6×d1	1×d1
N1	V_c	150–300	150–300	150–300		
	f_z	.001–.003	.001–.010	.002–.020	.8×d1	1×d1
N2	V_c	150–300	150–300	150–300		
	f_z	.001–.005	.002–.011	.003–.024	.8×d1	1×d1
N3	V_c	130–250	130–250	130–250		
	f_z	.001–.012	.002–.025	.003–.050	1×d1	1×d1
N4	V_c	60–100	60–100	60–100		
	f_z	.001–.007	.001–.016	.002–.032	.6×d1	1×d1
N5	V_c	100–250	100–250	100–250		
	f_z	.001–.008	.002–.018	.003–.030	.8×d1	1×d1
N6	V_c	80–150	80–150	80–150		
	f_z	.001–.006	.001–.015	.002–.030	.6×d1	1×d1
N7	V_c	80–130	80–130	80–130		
	f_z	.001–.008	.001–.015	.002–.035	.8×d1	1×d1
N8	V_c	80–130	80–130	80–130		
	f_z	.001–.008	.001–.016	.003–.040	.8×d1	1×d1
S1	V_c	40–70	40–70	40–70		
	f_z	.001–.003	.002–.008	.003–.018	.6×d1	1×d1
S2	V_c	20–40	20–40	20–40		
	f_z	.001–.002	.001–.003	.002–.005	.1×d1	1×d1
H1	V_c	20–45	20–45	20–45		
	f_z	.001–.002	.001–.003	.002–.006	.1×d1	1×d1
H2	V_c					
	f_z					
H3	V_c					
	f_z					
O1	V_c	100–150	100–150	100–150		
	f_z	.002–.020	.005–.050	.008–.090	1×d1	1×d1
O2	V_c					
	f_z					
O3	V_c					
	f_z					

Art. 74720

Material		Ø.30–.70	Ø.70 – 1.50	Ø1.50 – 2.90	a_p	a_e
P1	V_c	60–80	60–80	60–80		
	f_z	.003–.008	.008–.016	.016–.030	.45 x d1	1 x d1
P2	V_c	50–70	50–70	50–70		
	f_z	.003–.008	.008–.016	.016–.030	.25 x d1	1 x d1
P3	V_c	40–60	40–60	40–60		
	f_z	.002–.007	.007–.014	.014–.026	.20 x d1	1 x d1
M1	V_c	30–50	30–50	30–50		
	f_z	.002–.007	.007–.014	.014–.026	.15 x d1	1 x d1
M2	V_c	25–40	25–40	25–40		
	f_z	.002–.006	.006–.012	.012–.022	.20 x d1	1 x d1
K1	V_c	40–70	40–70	40–70		
	f_z	.003–.008	.008–.016	.016–.030	.70 x d1	1 x d1
K2	V_c	30–60	30–60	30–60		
	f_z	.002–.007	.007–.014	.014–.026	.35 x d1	1 x d1
N1	V_c	70–100	70–100	70–100		
	f_z	.002–.007	.007–.014	.014–.026	.80 x d1	1 x d1
N2	V_c	80–120	80–120	80–120		
	f_z	.003–.008	.008–.016	.016–.030	.70 x d1	1 x d1
N3	V_c	60–100	60–100	60–100		
	f_z	.003–.008	.008–.016	.016–.030	.70 x d1	1 x d1
N4	V_c					
	f_z					
N5	V_c	40–80	40–80	40–80		
	f_z	.003–.008	.008–.016	.016–.030	.80 x d1	1 x d1
N6	V_c	25–50	25–50	25–50		
	f_z	.002–.007	.007–.014	.014–.026	.45 x d1	1 x d1
N7	V_c					
	f_z					
N8	V_c					
	f_z					
S1	V_c	25–50	25–50	25–50		
	f_z	.002–.006	.006–.012	.012–.020	.30 x d1	1 x d1
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					

Art. 74740

Material		Ø.40–.70	Ø.70–1.50	Ø1.50–2.90	a_p	a_e
P1	V_c	60–80	60–80	60–80		
	f_z	.003–.008	.008–.016	.016–.030	.40 x d1	1 x d1
P2	V_c	50–70	50–70	50–70		
	f_z	.003–.008	.008–.016	.016–.030	.20 x d1	1 x d1
P3	V_c	40–60	40–60	40–60		
	f_z	.002–.007	.007–.014	.014–.026	.12 x d1	1 x d1
M1	V_c	30–50	30–50	30–50		
	f_z	.002–.007	.007–.014	.014–.026	.30 x d1	1 x d1
M2	V_c	25–40	25–40	25–40		
	f_z	.002–.006	.006–.012	.012–.022	.15 x d1	1 x d1
K1	V_c	40–70	40–70	40–70		
	f_z	.003–.008	.008–.016	.016–.030	.65 x d1	1 x d1
K2	V_c	30–60	30–60	30–60		
	f_z	.002–.007	.007–.014	.014–.026	.30 x d1	1 x d1
N1	V_c	70–100	70–100	70–100		
	f_z	.002–.007	.007–.014	.014–.026	.65 x d1	1 x d1
N2	V_c	80–120	80–120	80–120		
	f_z	.003–.008	.008–.016	.016–.030	.5 x d1	1 x d1
N3	V_c	60–100	60–100	60–100		
	f_z	.003–.008	.008–.016	.016–.030	.5 x d1	1 x d1
N4	V_c					
	f_z					
N5	V_c	40–80	40–80	40–80		
	f_z	.003–.008	.008–.016	.016–.030	.65 x d1	1 x d1
N6	V_c	25–50	25–50	25–50		
	f_z	.002–.007	.007–.014	.014–.026	.40 x d1	1 x d1
N7	V_c					
	f_z					
N8	V_c					
	f_z					
S1	V_c	25–50	25–50	25–50		
	f_z	.002–.006	.006–.012	.012–.020	.3 x d1	1 x d1
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					

Art. 74075 / 74150 / 74300

Material		Ø.20–.70	Ø.70–1.50	Ø1.50–2.80	ap	ae
P1	V_c	60–80	60–80	60–80		
	f_z	.004–.010	.008–.020	.018–.040	.45×d1	1×d1
P2	V_c	50–70	50–70	50–70		
	f_z	.004–.010	.008–.020	.018–.040	.25×d1	1×d1
P3	V_c	40–60	40–60	40–60		
	f_z	.003–.010	.006–.020	.0015–.035	.15×d1	1×d1
M1	V_c	30–50	30–50	30–50		
	f_z	.003–.010	.006–.020	.015–.035	.35×d1	1×d1
M2	V_c	25–40	25–40	25–40		
	f_z	.003–.008	.005–.016	.014–.028	.2×d1	1×d1
K1	V_c	40–70	40–70	40–70		
	f_z	.004–.010	.008–.020	.018–.040	.8×d1	1×d1
K2	V_c	30–60	30–60	30–60		
	f_z	.003–.010	.006–.020	.015–.035	.35×d1	1×d1
N1	V_c	70–100	70–100	70–100		
	f_z	.003–.01	.006–.020	.015–0035	.8×d1	1×d1
N2	V_c	80–120	80–120	80–120		
	f_z	.004–.010	.008–.020	.018–.040	.7×d1	1×d1
N3	V_c	60–100	60–100	60–100		
	f_z	.004–.010	.008–.020	.018–.040	.7×d1	1×d1
N4	V_c					
	f_z					
N5	V_c	40–80	40–80	40–80		
	f_z	.004–.010	.008–.020	.018–.040	.8×d1	1×d1
N6	V_c	25–50	25–50	25–50		
	f_z	.004–.010	.006–.020	.015–.035	.45×d1	1×d1
N7	V_c					
	f_z					
N8	V_c					
	f_z					
S1	V_c	25–50	25–50	25–50		
	f_z	.002–.008	.006–.015	.012–.030	.3×d1	1×d1
S2	V_c					
	f_z					
H1	V_c					
	f_z					
H2	V_c					
	f_z					
H3	V_c					
	f_z					
O1	V_c	80–120	80–120	80–120		
	f_z	.005–.012	.010–.025	.020–.045	.9×d1	1×d1
O2	V_c					
	f_z					
O3	V_c					
	f_z					

Art. 40000

Material		Ø2.00–5.00	Ø6.00–12.00	ap	ae
P1	V_c	60–90	60–90		
	f_z	.015–.060	.050–.100	.5×d1	1×d1
P2	V_c	50–80	50–80		
	f_z	.015–.060	.050–.100	.3×d1	1×d1
P3	V_c				
	f_z				
M1	V_c				
	f_z				
M2	V_c				
	f_z				
K1	V_c	40–60	40–60		
	f_z	.020–.070	.050–.110	1×d1	1×d1
K2	V_c	30–50	30–50		
	f_z	.015–.060	.050–.100	.4×d1	1×d1
N1	V_c	100–150	100–150		
	f_z	.015–.060	.040–.120	1×d1	1×d1
N2	V_c	200–250	200–250		
	f_z	.020–.070	.050–.120	1×d1	1×d1
N3	V_c	180–220	180–220		
	f_z	.020–.070	.050–.120	1×d1	1×d1
N4	V_c	50–100	50–100		
	f_z	.015–.050	.030–.080	.5×d1	1×d1
N5	V_c	100–150	100–150		
	f_z	.020–.070	.050–.120	1×d1	1×d1
N6	V_c	30–60	30–60		
	f_z	.015–.050	.040–.100	.7×d1	1×d1
N7	V_c				
	f_z				
N8	V_c				
	f_z				
S1	V_c				
	f_z				
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				

Art. 40002

Material		Ø2.00–5.00	Ø6.00–12.00	ap	ae
P1	V_c	60–80	60–80		
	f_z	.015–.060	.030–.110	1×d1	1×d1
P2	V_c	50–70	50–70		
	f_z	.015–.060	.030–.110	.6×d1	1×d1
P3	V_c	40–60	40–60		
	f_z	.010–.050	.020–.100	.5×d1	1×d1
M1	V_c	40–60	40–60		
	f_z	.010–.050	.020–.100	.5×d1	1×d1
M2	V_c				
	f_z				
K1	V_c	60–80	60–80		
	f_z	.015–.060	.030–.110	1×d1	1×d1
K2	V_c	50–70	60–80		
	f_z	.015–.060	.030–.100	.6×d1	1×d1
N1	V_c				
	f_z				
N2	V_c				
	f_z				
N3	V_c				
	f_z				
N4	V_c				
	f_z				
N5	V_c				
	f_z				
N6	V_c				
	f_z				
N7	V_c				
	f_z				
N8	V_c				
	f_z				
S1	V_c				
	f_z				
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				

Art. 40004

Material		Ø2.00–5.00	Ø6.00–12.00	ap	ae
P1	V_c	60–80	60–80		
	f_z	.020–.060	.030–.110	.5×d1	1×d1
P2	V_c	50–70	50–70		
	f_z	.015–.060	.030–.110	.5×d1	1×d1
P3	V_c	40–60	40–60		
	f_z	.010–.050	.020–.100	.4×d1	1×d1
M1	V_c	40–60	40–60		
	f_z	.010–.050	.020–.100	.4×d1	1×d1
M2	V_c				
	f_z				
K1	V_c	60–80	60–80		
	f_z	.020–.060	.030–.110	.80×d1	1×d1
K2	V_c	50–70	50–70		
	f_z	.150–.050	.030–.100	.70×d1	1×d1
N1	V_c				
	f_z				
N2	V_c				
	f_z				
N3	V_c				
	f_z				
N4	V_c				
	f_z				
N5	V_c				
	f_z				
N6	V_c				
	f_z				
N7	V_c				
	f_z				
N8	V_c				
	f_z				
S1	V_c				
	f_z				
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				

Art. 47000 / 47500

Material		Ø2.00–5.00	Ø6.00–12.00	Ø13.00–2.00	ap	ae
P1	V_c					
	f_z					
P2	V_c					
	f_z					
P3	V_c					
	f_z					
M1	V_c					
	f_z					
M2	V_c					
	f_z					
K1	V_c					
	f_z					
K2	V_c					
	f_z					
N1	V_c	300–600	300–600	300–600		
	f_z	.030–.050	.050–.120	.120–.200	.5×d1	1×d1
N2	V_c	300–1000	300–1000	300–1000		
	f_z	.030–.060	.060–.140	.140–.250	.5×d1	1×d1
N3	V_c	300–1000	300–1000	300–1000		
	f_z	.030–.060	.060–.140	.140–.250	.5×d1	1×d1
N4	V_c					
	f_z					
N5	V_c					
	f_z					
N6	V_c					
	f_z					
N7	V_c					
	f_z					
N8	V_c					
	f_z					
S1	V_c					
	f_z					
S2	V_c					
	f_z					
H1	V_c					
	f_z					
H2	V_c					
	f_z					
H3	V_c					
	f_z					
O1	V_c	300–600	300–600	300–600		
	f_z	.030–.050	.050–.120	.120–.200	.5×d1	1×d1
O2	V_c					
	f_z					
O3	V_c					
	f_z					

Art. 76300

Material		Ø1.50–2.50	Ø2.50–4.00	Ø4.00–6.00	ap	ae
P1	V_c	60–80	60–80	60–80		
	f_z	.010–.020	.020–.040	.040–.060	1 × d1	1 × d1
P2	V_c	50–70	50–70	50–70		
	f_z	.010–.020	.020–.040	.040–.060	.6 × d1	1 × d1
P3	V_c	40–60	40–60	40–60		
	f_z	.008–.015	.015–.035	.035–.050	.5 × d1	1 × d1
M1	V_c	40–60	40–60	40–60		
	f_z	.008–.015	.015–.035	.035–.050	.5 × d1	1 × d1
M2	V_c					
	f_z					
K1	V_c	60–80	60–80	60–80		
	f_z	.010–.020	.020–.040	.040–.060	1 × d1	1 × d1
K2	V_c	50–70	50–70	50–70		
	f_z	.010–.020	.020–.040	.040–.060	.6 × d1	1 × d1
N1	V_c					
	f_z					
N2	V_c					
	f_z					
N3	V_c					
	f_z					
N4	V_c					
	f_z					
N5	V_c					
	f_z					
N6	V_c					
	f_z					
N7	V_c					
	f_z					
N8	V_c					
	f_z					
S1	V_c					
	f_z					
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					

Art. 73000

Material		Ø.50–1.50	Ø2.00–3.00	Ø6.00–8.00
P1	V_c	70–120	70–120	70–120
	f_z	.004–.015	.015–.030	.050–.120
P2	V_c	60–100	60–100	60–100
	f_z	.003–.013	.013–.025	.045–.100
P3	V_c	40–80	40–80	40–80
	f_z	.002–.012	.012–.023	.040–.090
M1	V_c	40–80	40–80	40–80
	f_z	.002–.012	.008–.020	.030–.080
M2	V_c	30–70	30–70	30–70
	f_z	.001–.010	.010–.016	.025–.070
K1	V_c	120–150	100–150	100–150
	f_z	.004–.015	.015–.030	.050–.120
K2	V_c	100–130	100–130	100–130
	f_z	.003–.013	.013–.025	.045–.100
N1	V_c	150–200	150–200	150–200
	f_z	.005–.018	.018–.035	.060–.150
N2	V_c	150–200	150–200	150–200
	f_z	.005–.018	.018–.035	.060–.150
N3	V_c	150–200	150–200	150–200
	f_z	.004–.015	.015–.030	.050–.120
N4	V_c	150–200	150–200	150–200
	f_z	.005–.018	.018–.035	.060–.150
N5	V_c	150–200	150–200	150–200
	f_z	.005–.018	.018–.035	.060–.150
N6	V_c			
	f_z			
N7	V_c	80–120	80–120	80–120
	f_z	.005–.018	.018–.035	.060–.150
N8	V_c	80–120	80–120	80–120
	f_z	.005–.018	.018–.035	.060–.150
S1	V_c	40–70	40–70	40–70
	f_z	.002–.012	.012–.023	.040–.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			

Art. 43400

Material		Ø1.00–2.00	Ø3.00–4.00	Ø5.00–6.00
P1	V_c	80–120	80–120	80–120
	f_z	.020–.030	.030–.040	.040–.050
P2	V_c	80–100	80–100	80–100
	f_z	.010–.020	.020–.030	.030–.040
P3	V_c	50–80	50–80	50–80
	f_z	.005–.015	.015–.025	.025–.035
M1	V_c	60–100	60–100	60–100
	f_z	.010–.015	.015–.025	.025–.035
M2	V_c	40–70	40–70	40–70
	f_z	.015–.025	.025–.035	.035–.045
K1	V_c	100–150	100–150	100–150
	f_z	.010–.020	.020–.030	.030–.040
K2	V_c	60–100	60–100	60–100
	f_z	.005–.015	.015–.025	.025–.035
N1	V_c	150–200	150–200	150–200
	f_z	.020–.030	.030–.040	.040–.050
N2	V_c	150–200	150–200	150–200
	f_z	.020–.030	.030–.050	.050–.060
N3	V_c	130–200	130–200	130–200
	f_z	.020–.030	.030–.050	.050–.060
N4	V_c	60–150	60–150	60–150
	f_z	.015–.025	.025–.035	.035–.045
N5	V_c	100–200	100–200	100–200
	f_z	.015–.025	.025–.035	.035–.045
N6	V_c	80–150	80–150	80–150
	f_z	.010–.020	.020–.030	.030–.040
N7	V_c	80–150	80–150	80–150
	f_z	.010–.020	.020–.030	.030–.040
N8	V_c	80–150	80–150	80–150
	f_z	.010–.020	.020–.030	.030–.040
S1	V_c	40–70	40–70	40–70
	f_z	.010–.025	.020–.035	.030–.045
S2	V_c	20–40	20–40	20–40
	f_z	.005–.015	.015–.025	.020–.035
H1	V_c	20–45	25–40	25–40
	f_z	.005–.015	.015–.025	.025–.035
H2	V_c	20–30	15–25	15–25
	f_z	.005–.010	.010–.015	.015–.020
H3	V_c			
	f_z			
O1	V_c	100–150	70–110	70–110
	f_z	.010–.020	.020–.030	.030–.040
O2	V_c			
	f_z			
O3	V_c			
	f_z			

Art. 44400

Material		Ø.80-1.50	Ø2.00-3.00	Ø4.00–6.00
P1	V_c	140–160	140–160	140–160
	f_z	.020–.030	.030–.040	.040–.060
P2	V_c	120–140	120–140	120–140
	f_z	.010–.020	.020–.030	.030–.050
P3	V_c	100–120	100–120	100–120
	f_z	.005–015	.015–.025	.025–.045
M1	V_c	100–120	100–120	100–120
	f_z	.010–.020	.020–.030	.030–.050
M2	V_c	80–100	80–100	80–100
	f_z	.005–.015	.015–.025	.025–.045
K1	V_c	120–140	120–140	120–140
	f_z	.015–.025	.025–.035	.035–.055
K2	V_c	100–120	100–120	100–120
	f_z	.010–.020	.020–.030	.030–.040
N1	V_c	230–250	230–250	230–250
	f_z	.020–.030	.030–.040	.040–.060
N2	V_c	200–220	200–220	200–220
	f_z	.020–.030	.030–.040	.040–.060
N3	V_c	180–200	180–200	180–200
	f_z	.020–.030	.030–.040	.040–.060
N4	V_c	80–100	80–100	80–100
	f_z	.015–.025	.025–.035	.035–.055
N5	V_c	130–150	130–150	130–150
	f_z	.015–.025	.025–.035	.035–.055
N6	V_c	100–120	100–120	100–120
	f_z	.010–.020	.020–.030	.030–.050
N7	V_c	100–120	100–120	100–120
	f_z	.010–.020	.020–.030	.030–.050
N8	V_c	100–120	100–120	100–120
	f_z	.010–.020	.020–.030	.030–.050
S1	V_c	60–80	60–80	60–80
	f_z	.010–.020	.020–.030	.030–.050
S2	V_c	40–60	40–60	40–60
	f_z	.005–.015	.015–.025	.025–.045
H1	V_c	40–60	40–60	40–60
	f_z	.005–.015	.015–.025	.025–.035
H2	V_c	30–50	30–50	30–50
	f_z	.005–.010	.010–.020	.020–.030
H3	V_c			
	f_z			
O1	V_c	140–160	140–160	140–160
	f_z	.015–.025	.025–.035	.035–.055
O2	V_c			
	f_z			
O3	V_c			
	f_z			

Art. 45400

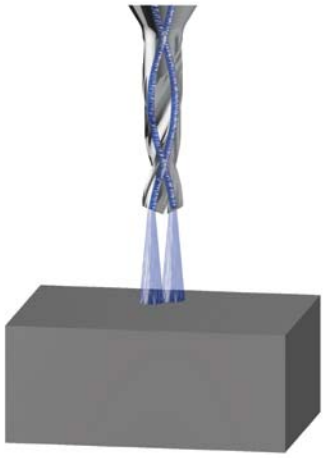
Material		Ø1.00–2.00	Ø3.00–4.00	Ø5.00–6.00
P1	V_c	140–160	140–160	140–160
	f_z	.025–.030	.035–.045	.050–.070
P2	V_c	120–140	120–140	120–140
	f_z	.015–.020	.025–.035	.040–.060
P3	V_c	100–120	100–120	100–120
	f_z	.010–.015	.020–.030	.035–.055
M1	V_c	100–120	100–120	100–120
	f_z	.015–.020	.025–.035	.040–.060
M2	V_c	80–100	80–100	80–100
	f_z	.010–.015	.020–.030	.035–.055
K1	V_c	120–140	120–140	120–140
	f_z	.020–.025	.030–.040	.045–.065
K2	V_c	100–120	100–120	100–120
	f_z	.015–.020	.025–.035	.040–.060
N1	V_c	230–250	230–250	230–250
	f_z	.025–.030	.035–.045	.050–.070
N2	V_c	200–220	200–220	200–220
	f_z	.025–.030	.035–.045	.050–.070
N3	V_c	180–200	180–200	180–200
	f_z	.025–.030	.035–.045	.050–.070
N4	V_c	80–100	80–100	80–100
	f_z	.020–.025	.030–.040	.045–.065
N5	V_c	130–150	130–150	130–150
	f_z	.020–.025	.030–.040	.045–.065
N6	V_c	100–120	100–120	100–120
	f_z	.015–.020	.025–.035	.040–.060
N7	V_c	100–120	100–120	100–120
	f_z	.015–.020	.025–.035	.040–.060
N8	V_c	100–120	100–120	100–120
	f_z	.015–.020	.025–.035	.040–.060
S1	V_c	60–80	60–80	60–80
	f_z	.015–.020	.025–.035	.040–.060
S2	V_c	40–60	40–60	40–60
	f_z	.010–.015	.020–.030	.035–.055
H1	V_c	40–60	40–60	40–60
	f_z	.010–.015	.020–.030	.035–.055
H2	V_c	30–50	30–50	30–50
	f_z	.010–.010	.015–.025	.030–.040
H3	V_c			
	f_z			
O1	V_c	140–160	140–160	140–160
	f_z	.020–.025	.030–.040	.045–.065
O2	V_c			
	f_z			
O3	V_c			
	f_z			

Art. 71330

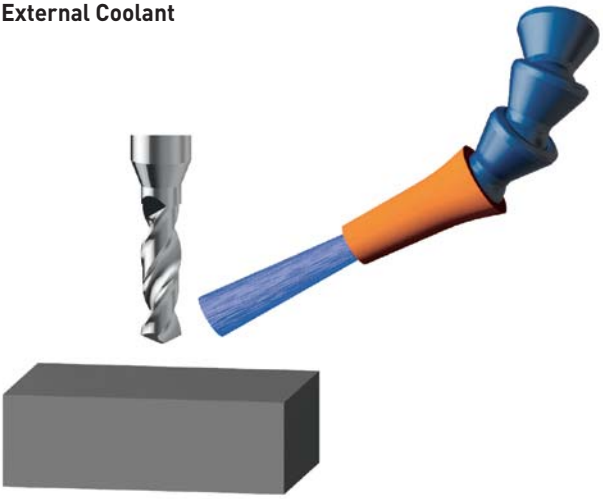
Material		Ø.20–1.00	Ø1.00–2.00	Ø2.00–3.00	ap	ae
P1	V_c	40–60	40–60	40–60		
	f_z	.002–.013	.013–.020	.020–.030	1×d	.2×d
P2	V_c	30–50	30–50	30–50		
	f_z	.002–.012	.012–.018	.018–.025	1×d	.2×d
P3	V_c					
	f_z					
M1	V_c	25–40	25–40	24–40		
	f_z	.002–.011	.011–.016	.016–.022	1×d	.1×d
M2	V_c	20–35	20–35	20–35		
	f_z	.002–.010	.010–.015	.015–.020	1×d	.1×d
K1	V_c	40–60	40–60	40–60		
	f_z	.002–.013	.013–.020	.020–.030	1×d	.2×d
K2	V_c	35–55	35–55	35–55		
	f_z	.002–.012	.012–.018	.018–.025	1×d	.2×d
N1	V_c					
	f_z					
N2	V_c	150–200	150–200	150–200		
	f_z	.003–.015	.015–.030	.030–.050	1×d	.2×d
N3	V_c	150–200	150–200	150–200		
	f_z	.002–.013	.013–.020	.020–.030	1×d	.1×d
N4	V_c					
	f_z					
N5	V_c	100–130	100–130	100–130		
	f_z	.003–.015	.015–.030	.030–.050	1×d	.2×d
N6	V_c					
	f_z					
N7	V_c	120–150	120–150	120–150		
	f_z	.003–.015	.015–.030	.030–.050	1×d	.2×d
N8	V_c	120–150	120–150	120–150		
	f_z	.002–.013	.013–.020	.020–.030	1×d	.1×d
S1	V_c	30–50	30–50	30–50		
	f_z	.002–.012	.012–.018	.018–.025	1×d	.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	.003–.015	.015–.030	.030–.050	1×d	.2×d
O2	V_c					
	f_z					
O3	V_c					
	f_z					

COOLANT

Internal Coolant



External Coolant



Diameter	Pressure			
	bar		psi	
	<6xd	>6xd	<6xd	>6xd
1.00–3.00	30	60	435	870
3.00–6.00	20	30	290	435
6.00–1.00	10	20	145	290

SPOT DRILLING – Entering and Exit

Centering



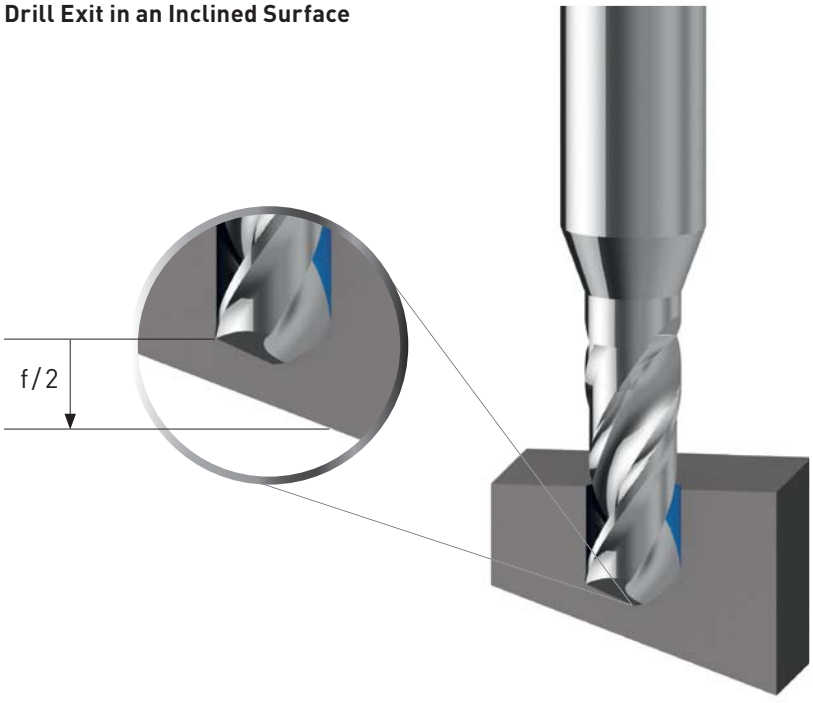
Pilot Hole



Milling a Flat



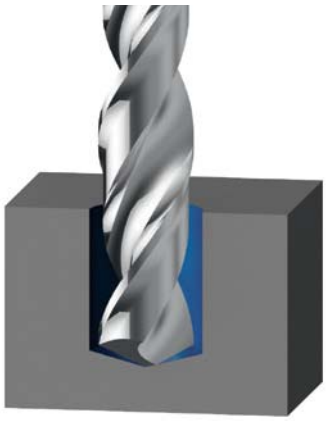
Drill Exit in an Inclined Surface



CAUTION

Reduce feed rate by 50%

PILOT DRILLING (Subsequent tool shown, not pilot tool)



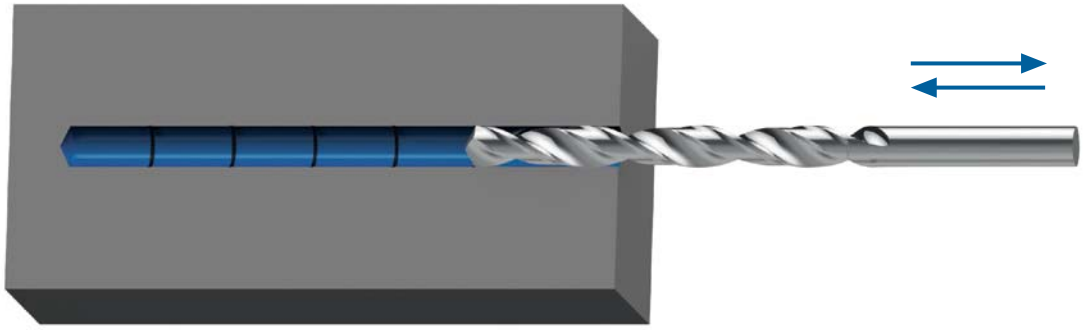


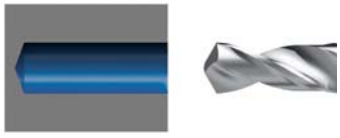
- Pilot diameter too small



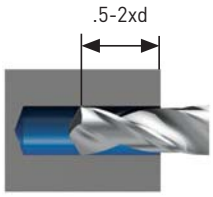
- Pilot point angle too small

PECKING CYCLE



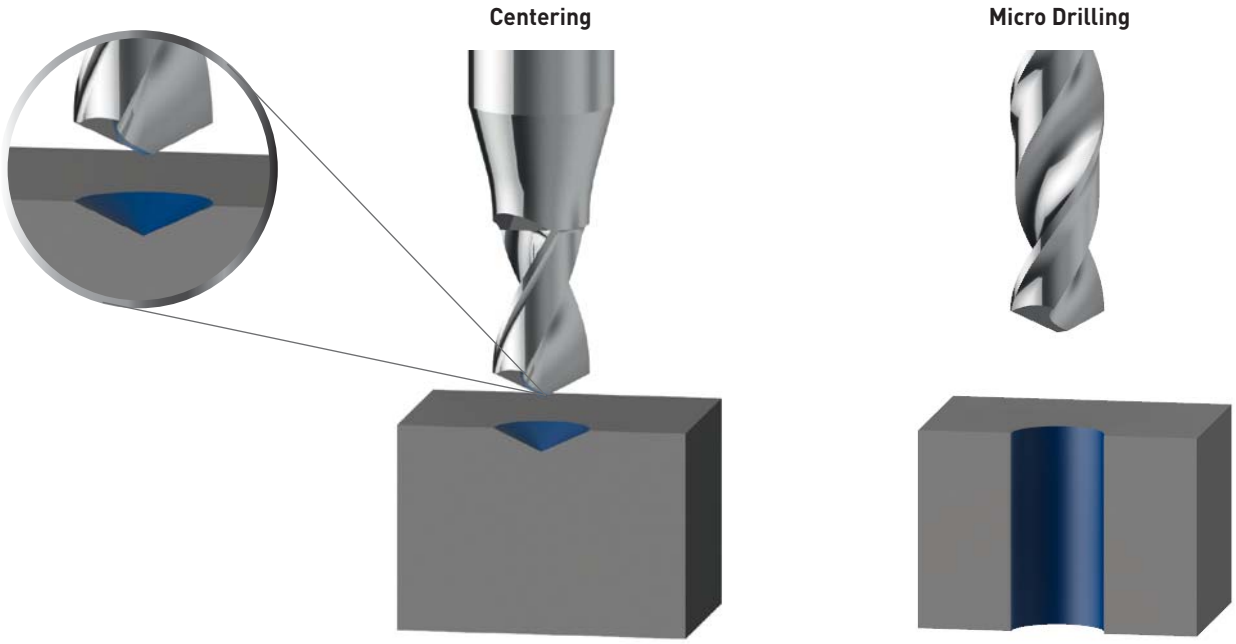


- No Pecking Cycle



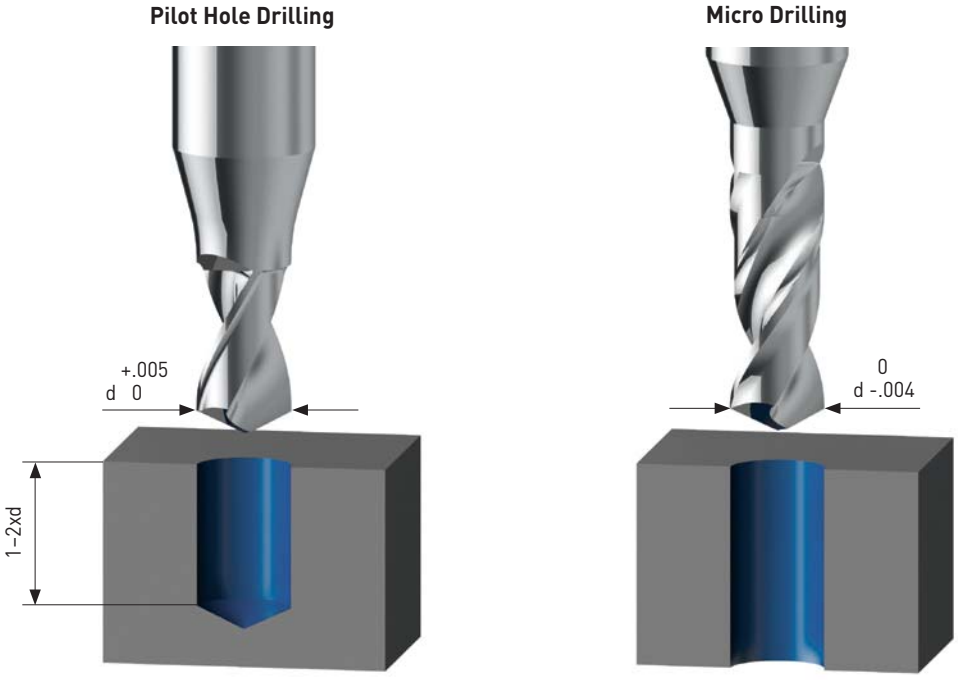
- Pecking .5-2xd

CENTERING ≤6xd

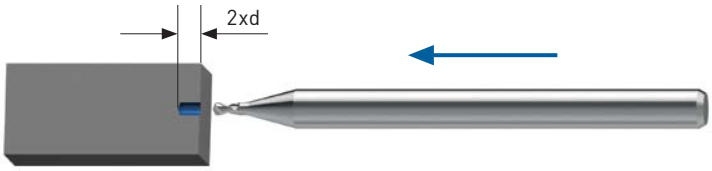


PILOT HOLE DRILLING ≥6xd





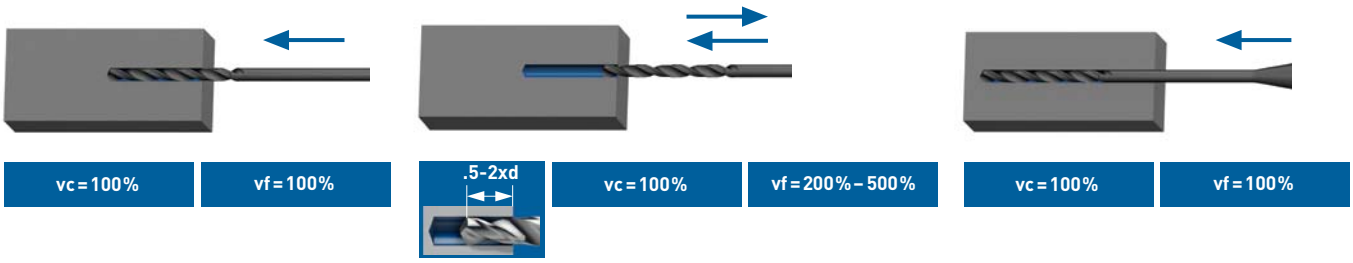
Micro Deep Hole Drilling – Art. 50720



Art. 56033 Ø +.01



n = Max 500 RPM	vf = 25% - 50%



vc = 100%	vf = 100%	vc = 100%	vf = 200% – 500%	vc = 100%	vf = 100%



vc = 100%	vf = 200% – 500%



n = Max 500 RPM	vf = Max

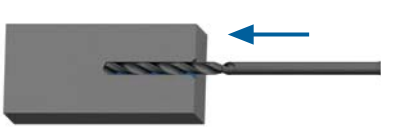
Micro Deep Hole Drilling – Art. 50740/50760/50780



Art. 56036



n = Max 500 RPM	vf = 25% – 50%









vc = 100%	vf = 100%	vc = 100%	vf = 200% – 500%	vc = 100%	vf = 100%



vc = 100%	vf = 200% – 500%



n = Max 500 RPM	vf = Max

Centering ≤9xd – Art. 50810/50812/50814/50818

Without Centering



• Smooth entering surface

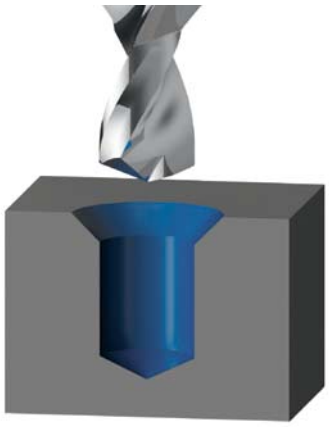
Center Drilling



• Rough or uneven entering surface

Pilot Hole Drilling >9xd – Art. 56036/50950

Pilot Hole Drilling



• Smooth entering surface

Pilot Hole Drilling

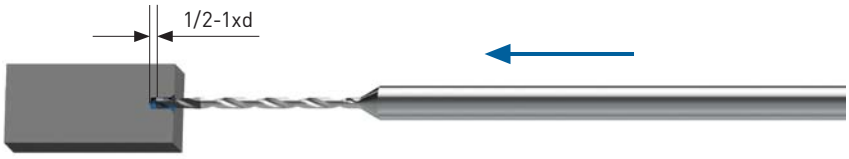


• Rough or uneven entering surface

Drilling Strategy >9xd



Art. 56036





n = Max 500 RPM | vf = 25% - 50%



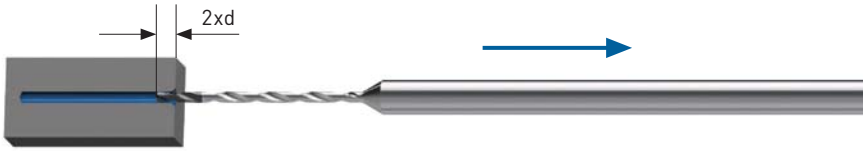


vc = 100% → start vf | vc = 100% | vf = 100%





vc = 100% | vf = 100%





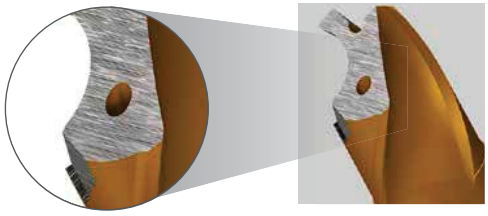
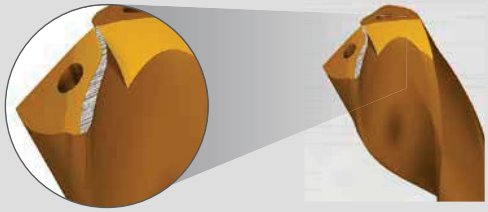
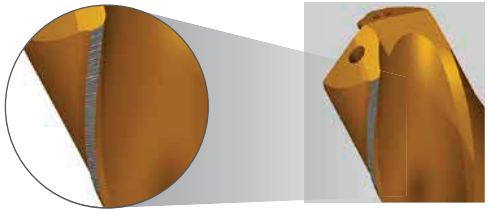
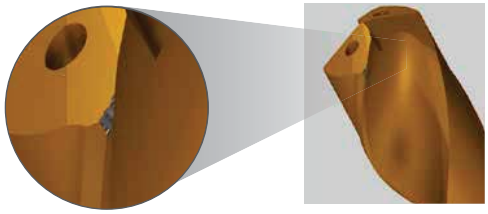
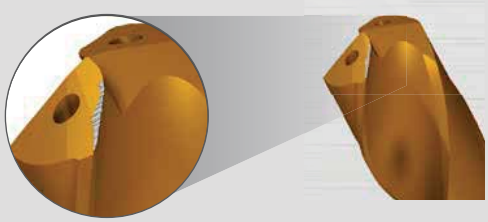
vc = 100% | vf = 200% – 500%





n = Max 500 RPM | vf = Max

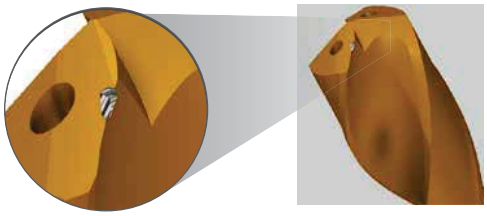
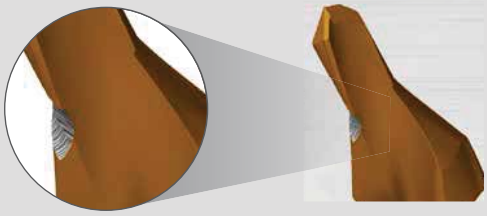
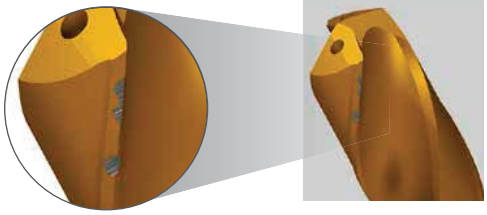
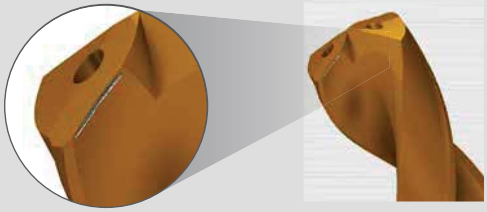
Troubleshooting in Case of Tool Wear

Type Of Wear	Cutting Conditions	
	Cutting Speed	Feed Rate
Drill Breakage 	⚠	↓
Flank Wear 	↓	↑
Wear on Margin 	↓	●
Chipping on Chisel Edge 	⚠	↑
Chipping on Corner 	⚠	↓
Wear on Main Cutting Edge 	↑	↑

Cutting Conditions			
Entry Feed Rate	Exit Feed Rate	Pre-Machining (Centering, Pilot Hole Drilling)	Pecking Cycle
↓	↓	⚠	⚠
↑	⚠	●	●
●	●	⚠	⚠
↑	↓	⚠	●
↓	↓	⚠	⚠
⚠	⚠	⚠	●

↑ increase ↓ reduce ⚠ verify ● not relevant

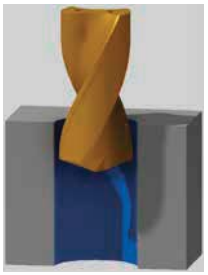
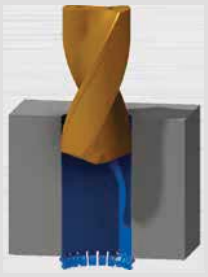
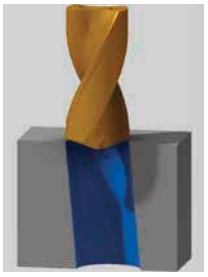
Troubleshooting in Case of Tool Wear

Type of Wear	Cutting Conditions	
	Cutting Speed	Feed Rate
Chipping Main Cutting Edge 	⚠	↓
Chipping on Step Transition 	⚠	↓
Chipping on Margin 	●	⚠
Built-Up Edge 	↑	⚠

Cutting Conditions			
Entry Feed Rate	Exit Feed Rate	Pre-Machining (Centering, Pilot Hole Drilling)	Pecking Cycle
↓	↓	⚠	⚠
↓	↓	⚠	⚠
⚠	⚠	⚠	⚠
●	⚠	●	●

↑ increase ↓ reduce ⚠ verify ● not relevant

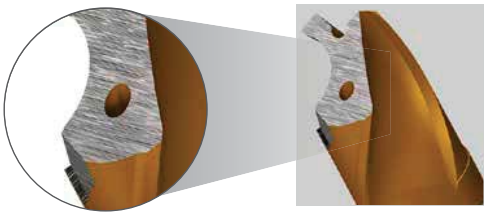
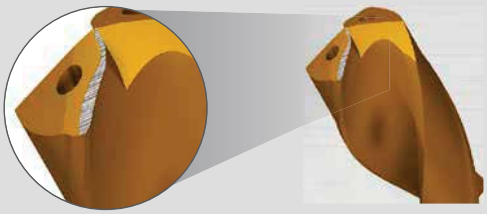
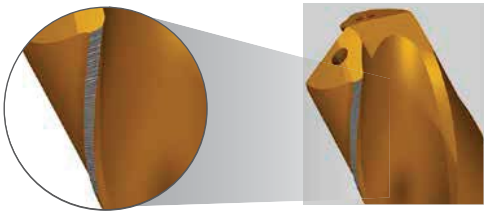
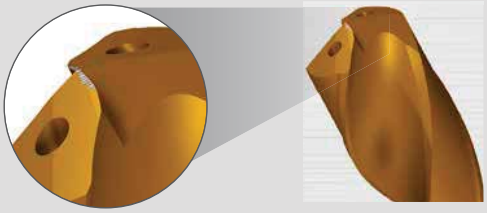
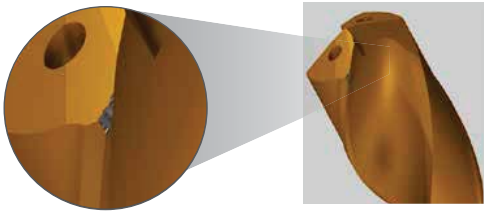
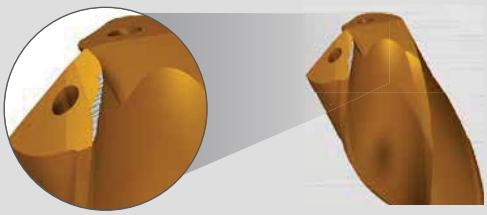
Troubleshooting in Case of Deviation at the Workpiece

Type of Wear	Cutting Conditions	
	Cutting Speed	Feed Rate
Diameter Too Large 	↓	↑
Misalignment from the Center 	●	↓
Poor Surface Quality 	↑	↓
Burr Formation at Bore Exit 	⚠	●
Bore Runout 	⚠	↑

Cutting Conditions			
Entry Feed Rate	Exit Feed Rate	Pre-Machining (Centering, Pilot Hole Drilling)	Pecking Cycle
↑	⚠	⚠	⚠
↓	⚠	⚠	●
●	●	⚠	⚠
●	↓	●	●
⚠	●	⚠	⚠

↑ increase ↓ reduce ⚠ verify ● not relevant

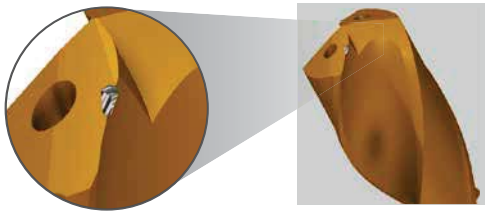
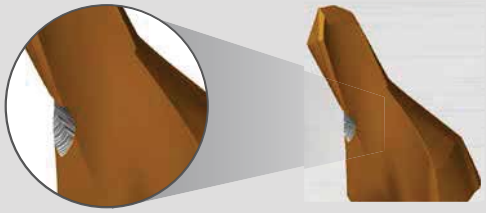
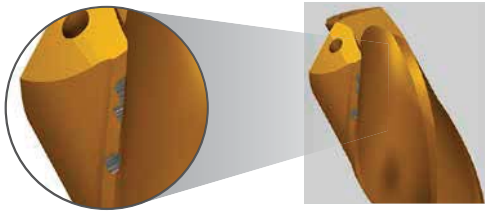
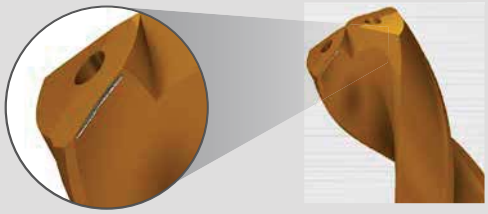
Troubleshooting in Case of Tool Wear

Type of Wear	Coolant	
	Concentration of Coolant	Rate of Coolant
Drill Breakage 	●	↑
Flank Wear 	↑	↑
Wear on Margin 	↑	↑
Chipping on Chisel Edge 	●	↑
Chipping on Corner 	●	↑
Wear on Main Cutting Edge 	↑	↑

Coolant	Machine and Fitting of the Tool			
Coolant Pressure	Concentricity	Shorter Projecting Length	Workpiece Clamping	Stability of the Machine
↑	⚠	⚠	⚠	⚠
↑	⚠	⚠	⚠	⚠
↑	⚠	●	⚠	⚠
↑	⚠	⚠	⚠	⚠
↑	⚠	⚠	⚠	⚠
↑	⚠	⚠	⚠	⚠

↑ increase ↓ reduce ⚠ verify ● not relevant

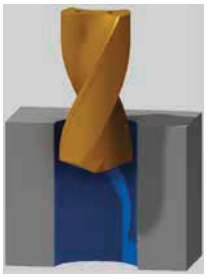
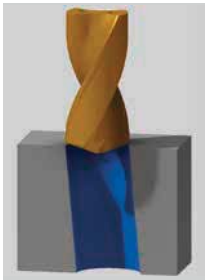
Troubleshooting in Case of Tool Wear

Type of Wear	Coolant	
	Concentration of Coolant	Rate of Coolant
Chipping Main Cutting Edge 	●	●
Chipping on Step Transition 	●	●
Chipping on Margin 	●	●
Built-Up Edge 	↑	↑

Coolant	Machine and Fitting of the Tool			
Coolant Pressure	Concentricity	Shorter Projecting Length	Workpiece Clamping	Stability of the Machine
●	⚠	⚠	⚠	⚠
●	⚠	⚠	⚠	⚠
●	●	●	⚠	⚠
⬆	⚠	●	●	●

⬆ increase ⬇ reduce ⚠ verify ● not relevant

Troubleshooting in Case of Deviation at the Workpiece

Type of Wear	Coolant	
	Concentration of Coolant	Rate of Coolant
Diameter Too Large 	↓	⚠
Misalignment from the Center 	●	●
Poor Surface Quality 	↑	↑
Burr Formation at Bore Exit 	●	●
Bore Runout 	●	⚠

Coolant	Machine and Fitting of the Tool			
Coolant Pressure	Concentricity	Shorter Projecting Length	Workpiece Clamping	Stability of the Machine
⚠	⚠	⚠	⚠	⚠
●	⚠	⚠	⚠	●
⬆	⚠	⚠	⚠	⚠
●	●	●	⚠	●
⚠	●	⚠	⚠	⚠

⬆ increase ⬇ reduce ⚠ verify ● not relevant