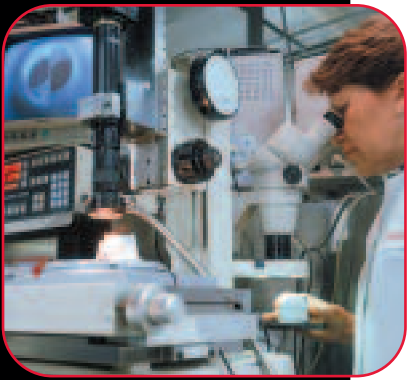
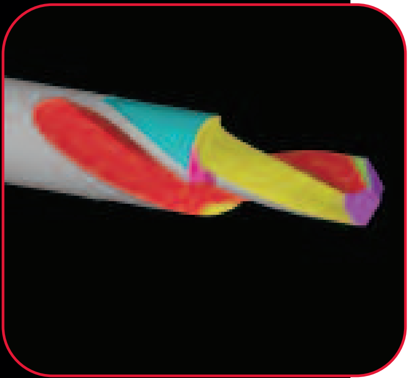
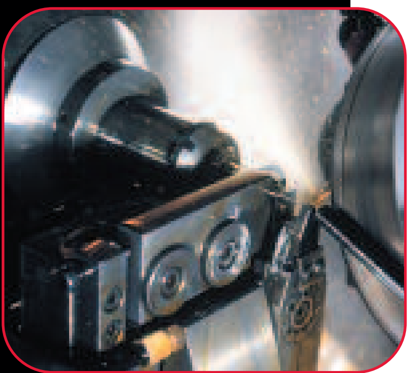
KYOCERA

MICRO TOOLS

METRIC EDITION







Introduction

Since 1987, Kyocera has designed and manufactured tight tolerance carbide cutting tools and miniature parts for a broad range of markets including the electronics and medical industries. We offer high-volume rotary grinding consistency in diameters from 0.05mm to 6.50mm, tolerances as tight as +/-0.6 microns, and stunning surface finishes.

Our state-of-the-art U.S. facility includes 62 Swiss-made Rollomatic CNC grinding centers and extensive automated optical inspection (AOI) to ensure consistency. Every part we build is CAD/CAM designed and has SPC lot traceability as our ISO 9001 certification requires.

If your requirements demand cutting edge technology, consistency, and technical support, Kyocera Micro Tools is the partner for you!

Einführung

Kyocera entwickelt und produziert seit 1987 eng tolerierte Hartmetallschneid-werkzeuge und Miniaturteile für ein breites Marktspektrum, u a. für die Elektronik- und Medizinindustrie. Wir bieten eine hohe Konsistenz bei hochvolumigen Rotationsschleifaufträgen in Durchmessern zwischen 0,05 und 6,50 mm, mit Toleranzen von bis zu +/- 0,6 Mikron und mit einer beeindruckenden Oberflächenbearbeitung.

Unser hochmodernes Werk in den USA beinhaltet 62 aus Schweizer Produktion stammende Rollomatic CNC-Rundschleifmaschinen und umfassende AOI-(Automatic Optical Inspection)- Qualitätskontrollen zur Sicherstellung einer einheitlichen Fertigung. Hinter jedem von uns gebauten Teil steht ein CAD/CAM-Design; die SPC-Rückverfolgbarkeit auf Produktionslosebene ist gemäß den Anforderungen nach ISO 9001 gewährleistet.

Wenn Sie einen Bedarf an Spitzentechnologien, einheitlicher Qualität und technischem Support haben, dann ist Kyocera Micro Tools der richtige Partner für Sie!

Introducción

Desde 1987, Kyocera ha diseñado y fabricado herramientas de corte de carburo de tolerancias estrechas y piezas en miniatura para una amplia variedad de mercados, incluidas las industrias médica y electrónica. Ofrecemos rectificación giratoria uniforme en grandes cantididades de ∅ 0,05mm a ∅ 6.5mm, y tolerancias cerradas hasta +/- 0,6µm y un acabado asombroso.

Nuestra moderna fábrica en los Estados Unidos incluye 62 centros de rectificación de CNC Rollomatic, de fabricación Suiza e inspección óptica automatizada (AOI) para garantizar la uniformidad. Cada pieza que producimos tiene diseño y fabricación asistido por computadora, así como localización de lote con control estadístico de calidad, tal como lo requiere nuestra certificación ISO 9001.

Si sus requisitos exigen tecnología de vanguardia, uniformidad y asistencia técnica, Kyocera Micro Tools es el socio que estaba buscando.

Introdução

Desde 1987, a Kyocera projeta e fabrica ferramentas de corte em carboneto de tungstênio com tolerâncias fechadas e mini-peças para uma ampla variedade de setores, entre os quais o setor eletrônico e o setor médico. Nossos produtos oferecem uniformidade na retificação rotativa em alto volume para diâmetros de 0,05 mm a 6,50 mm, com tolerância fechada de até +/-0,6 mícrons e extraordinário acabamento de superfícies.

Nossas instalações moderníssimas nos EUA contam com 62 retíficas CNC Rollomatic de fabricação suíça e sistemas completos de inspeção óptica automatizada (AOI - Automated Optical Inspection) que garantem a uniformidade dos processos. Todas as peças produzidas pela nossa fábrica são projetadas por CAD/CAM, e os lotes são rastreados por SPC, em conformidade com as certificações ISO 9001.

Se a sua empresa requer a mais avançada tecnologia, qualidade constante e assistência técnica, a Kyocera Micro Tools é a parceira ideal!

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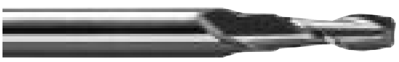

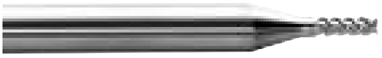

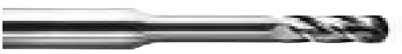

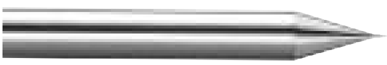

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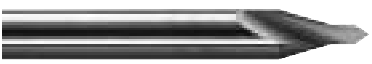
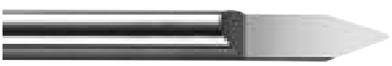
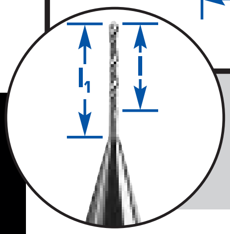




SOLID CARBIDE GENERAL PURPOSE MICRO DRILLS
VOLLHARTMETALL-MEHRZWECK-MIKROBOHRER
MICROBROCAS DE CARBURO SÓLIDO PARA USO GENERAL
MICRO BROCAS EM CARBONETO SÓLIDO PARA USO GERAL



FEATURES

MATERIALS

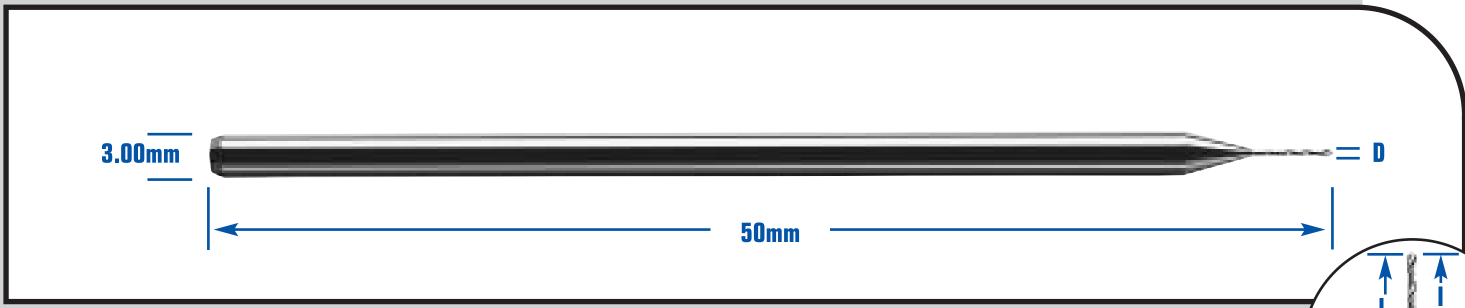
Ni/Co | Al | Steel | Hi-C Steel | Stainless | Cu Alloy | Ti | Plastic | Cast Iron

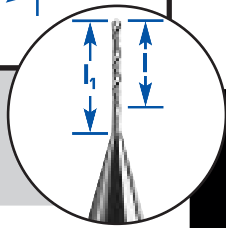
D (mm)	l (mm)	l_1 (mm)	PART NUMBER
0.10	1.0	1.2	226-0039.040
0.12	1.5	1.7	226-0047.060
0.15	2.0	2.2	226-0059.080
0.16	2.0	2.2	226-0063.080
0.17	2.0	2.2	226-0067.080
0.18	2.5	2.7	226-0071.100
0.19	2.5	2.7	226-0075.100
0.20	2.5	2.7	226-0079.100
0.21	2.5	2.7	226-0083.100
0.22	2.5	2.7	226-0087.100
0.23	4.0	4.2	226-0091.158
0.24	4.0	4.2	226-0094.158
0.25	4.0	4.2	226-0098.158
0.26	4.0	4.2	226-0102.158
0.27	4.0	4.2	226-0106.158
0.28	4.0	4.2	226-0110.158
0.29	4.0	4.2	226-0114.158
0.30	5.5	5.7	226-0118.216
0.31	5.5	5.7	226-0122.216
0.32	5.5	5.7	226-0126.216
0.33	5.5	5.7	226-0130.216
0.34	5.5	5.7	226-0134.216
0.35	5.5	5.7	226-0138.216
0.36	5.5	5.7	226-0142.216
0.37	5.5	5.7	226-0146.216
0.38	5.5	5.7	226-0150.216
0.39	5.5	5.7	226-0154.216
0.40	6.0	6.2	226-0157.236
0.45	6.0	6.2	226-0177.236
0.50	6.0	6.2	226-0197.236

D (mm)	l (mm)	l_1 (mm)	PART NUMBER
0.55	8.0	8.2	226-0217.315
0.60	8.0	8.2	226-0236.315
0.65	8.0	8.2	226-0256.315
0.70	8.0	8.2	226-0276.315
0.75	8.0	8.2	226-0295.315
0.80	8.0	8.2	226-0315.315
0.85	8.0	8.2	226-0335.315
0.90	8.0	8.2	226-0354.315
0.95	8.0	8.2	226-0374.315
1.00	8.0	8.2	226-0394.315
1.10	8.0	8.2	226-0433.315
1.20	8.0	8.2	226-0472.315
1.30	8.0	8.2	226-0512.315
1.40	8.0	8.2	226-0551.315
1.50	8.0	8.2	226-0591.315
1.60	8.0	8.2	226-0630.315
1.70	8.0	8.2	226-0669.315
1.80	8.0	8.2	226-0709.315
1.90	8.0	8.2	226-0748.315
2.00	8.0	8.2	226-0787.315
2.10	8.0	8.2	226-0827.315
2.20	8.0	8.2	226-0866.315
2.30	8.0	8.2	226-0906.315
2.40	8.0	8.2	226-0945.315
2.50	8.0	8.2	226-0984.315
2.60	8.0	8.2	226-1024.315
2.70	8.0	8.2	226-1063.315
2.80	8.0	8.2	226-1102.315
2.90	8.0	8.2	226-1142.315
3.00	8.0	8.2	226-1181.315

Other diameters available upon request / Andere Durchmesser auf Anfrage erhältlich / Otros diámetros disponibles por solicitud / Outros diâmetros estão disponíveis a pedido

SOLID CARBIDE GENERAL PURPOSE EXTENDED REACH MICRO DRILLS
VOLLHARTMETALL WERKZEUG - LANGE AUSFÜHRUNG
MICROBROCAS DE CARBURO SÓLIDO DE LARGO ALCANCE
MICRO BROCAS EM CARBONETO SÓLIDO, EXTRA LONGAS





FEATURES

MATERIALS

Ni/Co | Al | Steel | Hi-C Steel | Stainless | Cu Alloy | Ti | Plastic

WC | 3xD | 30° | 130°

D (mm)	l (mm)	l_1 (mm)	PART NUMBER
0.75	11.0	11.2	226-0295.433
0.80	11.0	11.2	226-0315.433
0.85	13.0	13.2	226-0335.512
0.90	13.0	13.2	226-0354.512
0.95	15.0	15.2	226-0374.591
1.00	15.0	15.2	226-0394.591
1.10	17.0	17.2	226-0433.670

D (mm)	l (mm)	l_1 (mm)	PART NUMBER
1.20	17.0	17.2	226-0472.670
1.30	19.0	19.2	226-0512.749
1.40	19.0	19.2	226-0551.749
1.50	20.0	20.2	226-0591.788
1.60	20.0	20.2	226-0630.788
1.70	20.0	20.2	226-0669.788
1.80	20.0	20.2	226-0709.788

WC | 3xD | 30° | 130° | AlTiN

D (mm)	l (mm)	l_1 (mm)	PART NUMBER
0.75	11.0	11.2	226-0295L433
0.80	11.0	11.2	226-0315L433
0.85	13.0	13.2	226-0335L512
0.90	13.0	13.2	226-0354L512
0.95	15.0	15.2	226-0374L591
1.00	15.0	15.2	226-0394L591
1.10	17.0	17.2	226-0433L670

D (mm)	l (mm)	l_1 (mm)	PART NUMBER
1.20	17.0	17.2	226-0472L670
1.30	19.0	19.2	226-0512L749
1.40	19.0	19.2	226-0551L749
1.50	20.0	20.2	226-0591L788
1.60	20.0	20.2	226-0630L788
1.70	20.0	20.2	226-0669L788
1.80	20.0	20.2	226-0709L788

WC | 3xD | 30° | 130° | DLC

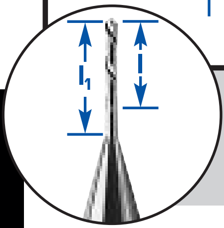
D (mm)	l (mm)	l_1 (mm)	PART NUMBER
0.75	11.0	11.2	226-0295D433
0.80	11.0	11.2	226-0315D433
0.85	13.0	13.2	226-0335D512
0.90	13.0	13.2	226-0354D512
0.95	15.0	15.2	226-0374D591
1.00	15.0	15.2	226-0394D591
1.10	17.0	17.2	226-0433D670

D (mm)	l (mm)	l_1 (mm)	PART NUMBER
1.20	17.0	17.2	226-0472D670
1.30	19.0	19.2	226-0512D749
1.40	19.0	19.2	226-0551D749
1.50	20.0	20.2	226-0591D788
1.60	20.0	20.2	226-0630D788
1.70	20.0	20.2	226-0669D788
1.80	20.0	20.2	226-0709D788

Other diameters available upon request / Andere Durchmesser auf Anfrage erhältlich / Otros diámetros disponibles por solicitud / Outros diâmetros estão disponíveis a pedido

MICRO DRILLS HSS-Co

M42 (HSS-Co) MICRO DRILLS (LH)
M42 (HSS-Co) MIKROBOHRER (LINKS)
MICROBROCAS M42 (CORTE HACIA LA IZQUIERDA)
MICRO BROCAS M42 (LH)



FEATURES

M42 | 25° | 118°

MATERIALS

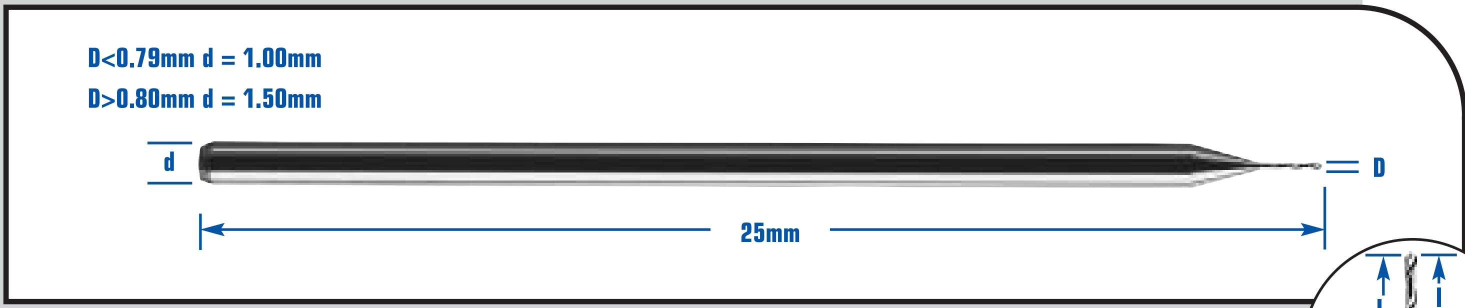
Ni/Co | Al | Steel | Hi-C Steel | Stainless | Ti | Cast Iron

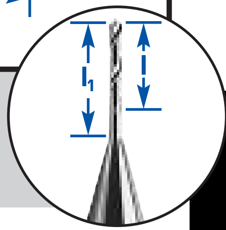
D (mm)	l (mm)	l_1 (mm)	PART NUMBER
0.10	0.5	0.7	395-0039.020
0.11	0.5	0.7	395-0043.020
0.12	0.5	0.7	395-0047.020
0.13	0.8	1.0	395-0051.032
0.14	0.8	1.0	395-0055.032
0.15	0.8	1.0	395-0059.032
0.16	1.1	1.4	395-0063.043
0.17	1.1	1.4	395-0067.043
0.18	1.1	1.4	395-0071.043
0.19	1.1	1.4	395-0075.043
0.20	1.5	1.8	395-0079.059
0.21	1.5	1.8	395-0083.059
0.22	1.5	1.8	395-0087.059
0.23	1.5	1.8	395-0091.059
0.24	1.5	1.8	395-0094.059
0.25	1.9	2.2	395-0098.075
0.26	1.9	2.2	395-0102.075
0.27	1.9	2.2	395-0106.075
0.28	1.9	2.2	395-0110.075
0.29	1.9	2.2	395-0114.075
0.30	1.9	2.2	395-0118.075
0.31	2.4	2.8	395-0122.095
0.32	2.4	2.8	395-0126.095
0.33	2.4	2.8	395-0130.095
0.34	2.4	2.8	395-0134.095
0.35	2.4	2.8	395-0138.095
0.36	2.4	2.8	395-0142.095
0.37	2.4	2.8	395-0146.095
0.38	2.4	2.8	395-0150.095
0.39	3.0	3.6	395-0154.118
0.40	3.0	3.6	395-0157.118
0.41	3.0	3.6	395-0161.118
0.42	3.0	3.6	395-0165.118
0.43	3.0	3.6	395-0169.118
0.44	3.0	3.6	395-0173.118
0.45	3.0	3.6	395-0177.118
0.46	3.0	3.6	395-0181.118
0.47	3.0	3.6	395-0185.118
0.48	3.0	3.6	395-0189.118
0.49	3.4	4.0	395-0193.134
0.50	3.4	4.0	395-0197.134
0.51	3.4	4.0	395-0201.134
0.52	3.4	4.0	395-0205.134
0.53	3.4	4.0	395-0209.134
0.54	3.9	4.5	395-0213.154
0.55	3.9	4.5	395-0217.154

D (mm)	l (mm)	l_1 (mm)	PART NUMBER
0.56	3.9	4.5	395-0220.154
0.57	3.9	4.5	395-0224.154
0.58	3.9	4.5	395-0228.154
0.59	3.9	4.5	395-0232.154
0.60	3.9	4.5	395-0236.154
0.61	4.2	5.0	395-0240.166
0.62	4.2	5.0	395-0244.166
0.63	4.2	5.0	395-0248.166
0.64	4.2	5.0	395-0252.166
0.65	4.2	5.0	395-0256.166
0.66	4.2	5.0	395-0260.166
0.67	4.2	5.0	395-0264.166
0.68	4.8	5.6	395-0268.189
0.69	4.8	5.6	395-0272.189
0.70	4.8	5.6	395-0276.189
0.71	4.8	5.6	395-0280.189
0.72	4.8	5.6	395-0283.189
0.73	4.8	5.6	395-0287.189
0.74	4.8	5.6	395-0291.189
0.75	4.8	5.6	395-0295.189
0.76	5.3	6.3	395-0299.209
0.77	5.3	6.3	395-0303.209
0.78	5.3	6.3	395-0307.209
0.79	5.3	6.3	395-0311.209
0.80	5.3	6.3	395-0315.209
0.81	5.3	6.3	395-0319.209
0.82	5.3	6.3	395-0323.209
0.83	5.3	6.3	395-0327.209
0.84	5.3	6.3	395-0331.209
0.85	5.3	6.3	395-0335.209
0.86	6.0	7.1	395-0339.236
0.87	6.0	7.1	395-0343.236
0.88	6.0	7.1	395-0346.236
0.89	6.0	7.1	395-0350.236
0.90	6.0	7.1	395-0354.236
0.95	6.0	7.1	395-0374.236
1.00	6.8	8.0	395-0394.268
1.05	6.8	8.0	395-0413.268
1.10	7.6	9.0	395-0433.299
1.15	7.6	9.0	395-0453.299
1.20	8.5	10.0	395-0472.335
1.25	8.5	10.0	395-0492.335
1.30	8.5	10.0	395-0512.335
1.35	9.5	11.2	395-0531.374
1.40	9.5	11.2	395-0551.374
1.45	9.5	11.2	395-0571.374

Other diameters available upon request / Andere Durchmesser auf Anfrage erhältlich / Otros diámetros disponibles por solicitud / Outros diâmetros estão disponíveis a pedido

M42 (HSS-Co) MICRO DRILLS (RH)
M42 (HSS-Co) MIKROBOHRER (RECHTS)
MICROBROCAS M42 (CORTE HACIA LA DERECHA)
MICRO BROCAS M42 (RH)





FEATURES

M42 | 25° | 118°

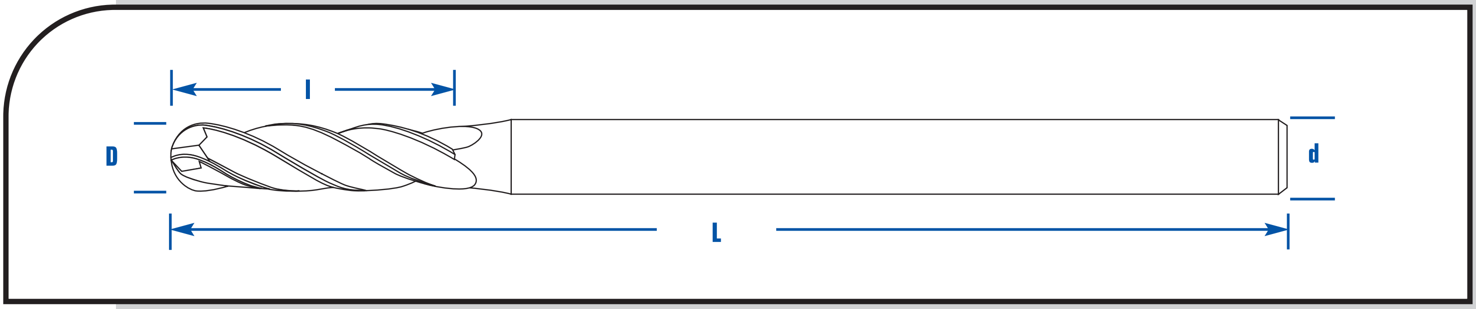
MATERIALS

Ni/Co | Al | Steel | Hi-C Steel | Stainless | Ti | Cast Iron

D (mm)	l (mm)	l_1 (mm)	PART NUMBER
0.10	0.5	0.7	394-0039.020
0.11	0.5	0.7	394-0043.020
0.12	0.5	0.7	394-0047.020
0.13	0.8	1.0	394-0051.032
0.14	0.8	1.0	394-0055.032
0.15	0.8	1.0	394-0059.032
0.16	1.1	1.4	394-0063.043
0.17	1.1	1.4	394-0067.043
0.18	1.1	1.4	394-0071.043
0.19	1.1	1.4	394-0075.043
0.20	1.5	1.8	394-0079.059
0.21	1.5	1.8	394-0083.059
0.22	1.5	1.8	394-0087.059
0.23	1.5	1.8	394-0091.059
0.24	1.5	1.8	394-0094.059
0.25	1.9	2.2	394-0098.075
0.26	1.9	2.2	394-0102.075
0.27	1.9	2.2	394-0106.075
0.28	1.9	2.2	394-0110.075
0.29	1.9	2.2	394-0114.075
0.30	1.9	2.2	394-0118.075
0.31	2.4	2.8	394-0122.095
0.32	2.4	2.8	394-0126.095
0.33	2.4	2.8	394-0130.095
0.34	2.4	2.8	394-0134.095
0.35	2.4	2.8	394-0138.095
0.36	2.4	2.8	394-0142.095
0.37	2.4	2.8	394-0146.095
0.38	2.4	2.8	394-0150.095
0.39	3.0	3.6	394-0154.118
0.40	3.0	3.6	394-0157.118
0.41	3.0	3.6	394-0161.118
0.42	3.0	3.6	394-0165.118
0.43	3.0	3.6	394-0169.118
0.44	3.0	3.6	394-0173.118
0.45	3.0	3.6	394-0177.118
0.46	3.0	3.6	394-0181.118
0.47	3.0	3.6	394-0185.118
0.48	3.0	3.6	394-0189.118
0.49	3.4	4.0	394-0193.134
0.50	3.4	4.0	394-0197.134
0.51	3.4	4.0	394-0201.134
0.52	3.4	4.0	394-0205.134
0.53	3.4	4.0	394-0209.134
0.54	3.9	4.5	394-0213.154
0.55	3.9	4.5	394-0217.154
0.56	3.9	4.5	394-0220.154
0.57	3.9	4.5	394-0224.154
0.58	3.9	4.5	394-0228.154
0.59	3.9	4.5	394-0232.154
0.60	3.9	4.5	394-0236.154
0.61	4.2	5.0	394-0240.166
0.62	4.2	5.0	394-0244.166
0.63	4.2	5.0	394-0248.166
0.64	4.2	5.0	394-0252.166
0.65	4.2	5.0	394-0256.166
0.66	4.2	5.0	394-0260.166
0.67	4.2	5.0	394-0264.166
0.68	4.8	5.6	394-0268.189
0.69	4.8	5.6	394-0272.189
0.70	4.8	5.6	394-0276.189
0.71	4.8	5.6	394-0280.189
0.72	4.8	5.6	394-0283.189
0.73	4.8	5.6	394-0287.189
0.74	4.8	5.6	394-0291.189
0.75	4.8	5.6	394-0295.189
0.76	5.3	6.3	394-0299.209
0.77	5.3	6.3	394-0303.209
0.78	5.3	6.3	394-0307.209
0.79	5.3	6.3	394-0311.209
0.80	5.3	6.3	394-0315.209
0.81	5.3	6.3	394-0319.209
0.82	5.3	6.3	394-0323.209
0.83	5.3	6.3	394-0327.209
0.84	5.3	6.3	394-0331.209
0.85	5.3	6.3	394-0335.209
0.86	6.0	7.1	394-0339.236
0.87	6.0	7.1	394-0343.236
0.88	6.0	7.1	394-0346.236
0.89	6.0	7.1	394-0350.236
0.90	6.0	7.1	394-0354.236
0.95	6.0	7.1	394-0374.236
1.00	6.8	8.0	394-0394.268
1.05	6.8	8.0	394-0413.268
1.10	7.6	9.0	394-0433.299
1.15	7.6	9.0	394-0453.299
1.20	8.5	10.0	394-0472.335
1.25	8.5	10.0	394-0492.335
1.30	8.5	10.0	394-0512.335
1.35	9.5	11.2	394-0531.374
1.40	9.5	11.2	394-0551.374
1.45	9.5	11.2	394-0571.374

Other diameters available upon request / Andere Durchmesser auf Anfrage erhältlich / Otros diámetros disponibles por solicitud / Outros diâmetros estão disponíveis a pedido

SOLID CARBIDE STANDARD LENGTH MICRO END MILLS
VOLLHARTMETALL-MEHRZWECK-MIKROSTIRNFRÄSER
MICROFRESAS UNIVERSALES RADIALES DE CARBURO SÓLIDO PARA USO GENERAL
MICRO FRESAS DE TOPO EM CARBONETO SÓLIDO PARA USO GERAL

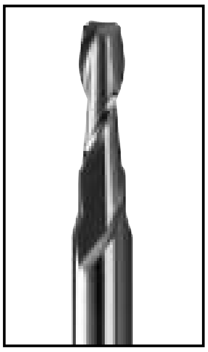


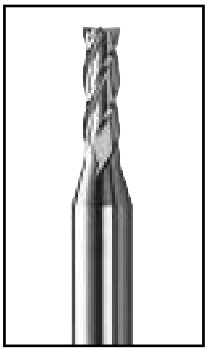
FEATURES

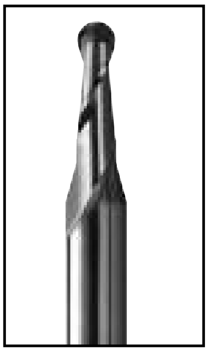
WC | 3xD | 30°

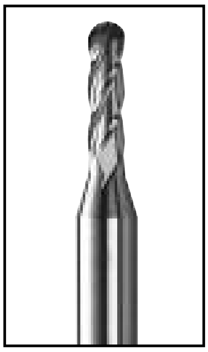
MATERIALS

Ni/Co | Al | Steel | Hi-C Steel | Stainless | Cu Alloy | Ti | Plastic | Cast Iron





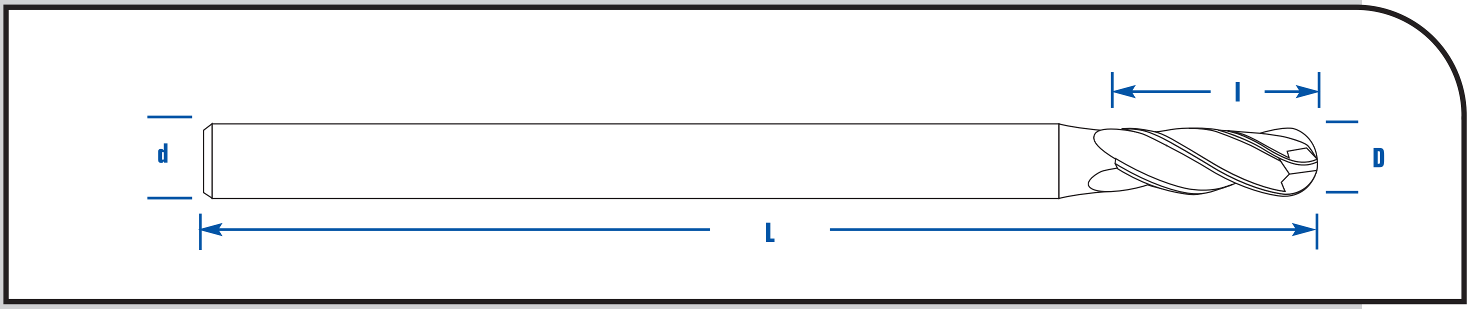




D (mm)	l (mm)	2 FLUTE SQUARE END	4 FLUTE SQUARE END	2 FLUTE BALL NOSE	4 FLUTE BALL NOSE	d	L
0.10	0.30	1610-0039.012	1810-0039.012	1625-0039.012	1825-0039.012	3	38
0.15	0.45	1610-0059.018	1810-0059.018	1625-0059.018	1825-0059.018	3	38
0.20	0.60	1610-0079.024	1810-0079.024	1625-0079.024	1825-0079.024	3	38
0.25	0.75	1610-0098.029	1810-0098.029	1625-0098.029	1825-0098.029	3	38
0.30	0.90	1610-0118.035	1810-0118.035	1625-0118.035	1825-0118.035	3	38
0.35	1.05	1610-0138.041	1810-0138.041	1625-0138.041	1825-0138.041	3	38
0.40	1.20	1610-0157.047	1810-0157.047	1625-0157.047	1825-0157.047	3	38
0.45	1.35	1610-0177.053	1810-0177.053	1625-0177.053	1825-0177.053	3	38
0.50	1.50	1610-0197.059	1810-0197.059	1625-0197.059	1825-0197.059	3	38
0.60	1.80	1610-0236.071	1810-0236.071	1625-0236.071	1825-0236.071	3	38
0.70	2.10	1610-0276.083	1810-0276.083	1625-0276.083	1825-0276.083	3	38
0.80	2.40	1610-0315.095	1810-0315.095	1625-0315.095	1825-0315.095	3	38
0.90	2.70	1610-0354.106	1810-0354.106	1625-0354.106	1825-0354.106	3	38
1.00	3.00	1610-0394.118	1810-0394.118	1625-0394.118	1825-0394.118	3	38
1.50	4.50	1610-0591.177	1810-0591.177	1625-0591.177	1825-0591.177	3	38
2.00	6.00	1610-0787.236	1810-0787.236	1625-0787.236	1825-0787.236	3	38
2.50	7.50	1610-0984.295	1810-0984.295	1625-0984.295	1825-0984.295	3	38
3.00	9.00	1610-1181.354	1810-1181.354	1625-1181.354	1825-1181.354	3	38
3.50	10.50	1610-1378.413	1810-1378.413	1625-1378.413	1825-1378.413	4	50
4.00	12.00	1610-1575.473	1810-1575.473	1625-1575.473	1825-1575.473	5	50
4.50	13.50	1610-1772.532	1810-1772.532	1625-1772.532	1825-1772.532	5	50
5.00	15.00	1610-1968.590	1810-1968.590	1625-1968.590	1825-1968.590	5	50
5.50	16.50	1610-2165.650	1810-2165.650	1625-2165.650	1825-2165.650	6	50
6.00	18.00	1610-2362.709	1810-2362.709	1625-2362.709	1825-2362.709	6	50

Other diameters available upon request / Andere Durchmesser auf Anfrage erhältlich / Otros diámetros disponibles por solicitud / Outros diâmetros estão disponíveis a pedido

SOLID CARBIDE STUB LENGTH MICRO END MILLS
VOLLHARTMETALL-MIKROSTIRNFRÄSER, KURZAUSFÜHRUNG
MICROFRESAS UNIVERSALES RADIALES DE CARBURO SÓLIDO Y LONGITUD CORTA
MICRO FRESAS DE TOPO EM CARBONETO SÓLIDO, PONTA CURTA

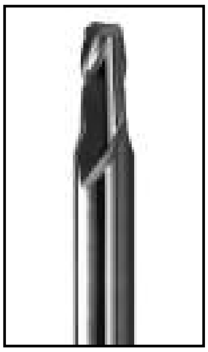


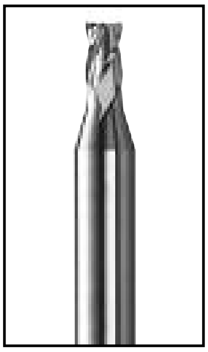
FEATURES

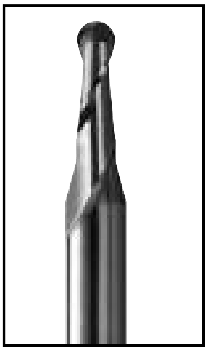
WC · 1.5xD · 30°

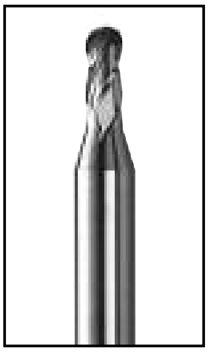
MATERIALS

Ni/Co · Al · Steel · Hi-C Steel · Stainless · Cu Alloy · Ti · Plastic · Cast Iron





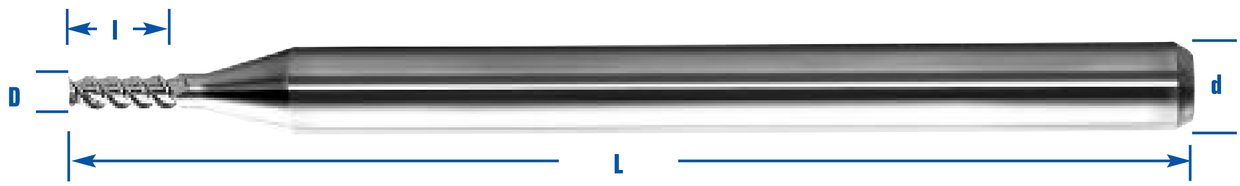




D (mm)	l (mm)	2 FLUTE SQUARE END	4 FLUTE SQUARE END	2 FLUTE BALL NOSE	4 FLUTE BALL NOSE	d	L
0.10	0.15	1620-0039.006	1820-0039.006	1635-0039.006	1835-0039.006	3	38
0.15	0.23	1620-0059.009	1820-0059.009	1635-0059.009	1835-0059.009	3	38
0.20	0.30	1620-0079.012	1820-0079.012	1635-0079.012	1835-0079.012	3	38
0.25	0.38	1620-0098.015	1820-0098.015	1635-0098.015	1835-0098.015	3	38
0.30	0.45	1620-0118.018	1820-0118.018	1635-0118.018	1835-0118.018	3	38
0.35	0.53	1620-0138.021	1820-0138.021	1635-0138.021	1835-0138.021	3	38
0.40	0.60	1620-0157.024	1820-0157.024	1635-0157.024	1835-0157.024	3	38
0.45	0.68	1620-0177.027	1820-0177.027	1635-0177.027	1835-0177.027	3	38
0.50	0.75	1620-0197.030	1820-0197.030	1635-0197.030	1835-0197.030	3	38
0.60	0.90	1620-0236.035	1820-0236.035	1635-0236.035	1835-0236.035	3	38
0.70	1.05	1620-0276.041	1820-0276.041	1635-0276.041	1835-0276.041	3	38
0.80	1.20	1620-0315.047	1820-0315.047	1635-0315.047	1835-0315.047	3	38
0.90	1.35	1620-0354.053	1820-0354.053	1635-0354.053	1835-0354.053	3	38
1.00	1.50	1620-0394.059	1820-0394.059	1635-0394.059	1835-0394.059	3	38
1.50	2.25	1620-0591.089	1820-0591.089	1635-0591.089	1835-0591.089	3	38
2.00	3.00	1620-0787.118	1820-0787.118	1635-0787.118	1835-0787.118	3	38
2.50	3.75	1620-0984.148	1820-0984.148	1635-0984.148	1835-0984.148	3	38
3.00	4.50	1620-1181.177	1820-1181.177	1635-1181.177	1835-1181.177	3	38
3.50	5.25	1620-1378.207	1820-1378.207	1635-1378.207	1835-1378.207	4	50
4.00	6.00	1620-1575.236	1820-1575.236	1635-1575.236	1835-1575.236	5	50
4.50	6.75	1620-1772.266	1820-1772.266	1635-1772.266	1835-1772.266	5	50
5.00	7.50	1620-1968.295	1820-1968.295	1635-1968.295	1835-1968.295	5	50
5.50	8.25	1620-2165.325	1820-2165.325	1635-2165.325	1835-2165.325	6	50
6.00	9.00	1620-2362.354	1820-2362.354	1635-2362.354	1835-2362.354	6	50

Other diameters available upon request / Andere Durchmesser auf Anfrage erhältlich / Otros diámetros disponibles por solicitud / Outros diâmetros estão disponíveis a pedido

HIGH PERFORMANCE MICRO END MILLS
HOCHLEISTUNGS-MIKROSTIRNFRÄSER
MICROFRESAS UNIVERSALES RADIALES DE ALTO RENDIMIENTO
MICRO FRESAS DE TOPO, ALTA PERFORMANCE



FEATURES

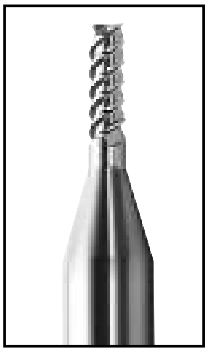
WC | 3xD | 50°

MATERIALS

Ni/Co | Al | Steel | Hi-C Steel | Stainless | Cu Alloy | Ti | Plastic | Graphite

AlTiN

D (mm)	l (mm)	3 FLUTE CORNER RADIUS	4 FLUTE CORNER RADIUS	5 FLUTE CORNER RADIUS	d (mm)	L (mm)
1.00	3.00	1703-0394L118R	1804-0394L118R	1905-0394L118R	3	38
1.50	4.50	1703-0591L177R	1804-0591L177R	1905-0591L177R	3	38
2.00	6.00	1703-0787L236R	1804-0787L236R	1905-0787L236R	3	38
2.50	7.50	1703-0984L295R	1804-0984L295R	1905-0984L295R	3	38
3.00	9.00	1703-1181L354R	1804-1181L354R	1905-1181L354R	3	38
4.00	12.00	1703-1575L473R	1804-1575L473R	1905-1575L473R	5	50
5.00	15.00	1703-1968L590R	1804-1968L590R	1905-1968L590R	5	50
6.00	18.00	1703-2362L709R	1804-2362L709R	1905-2362L709R	6	50

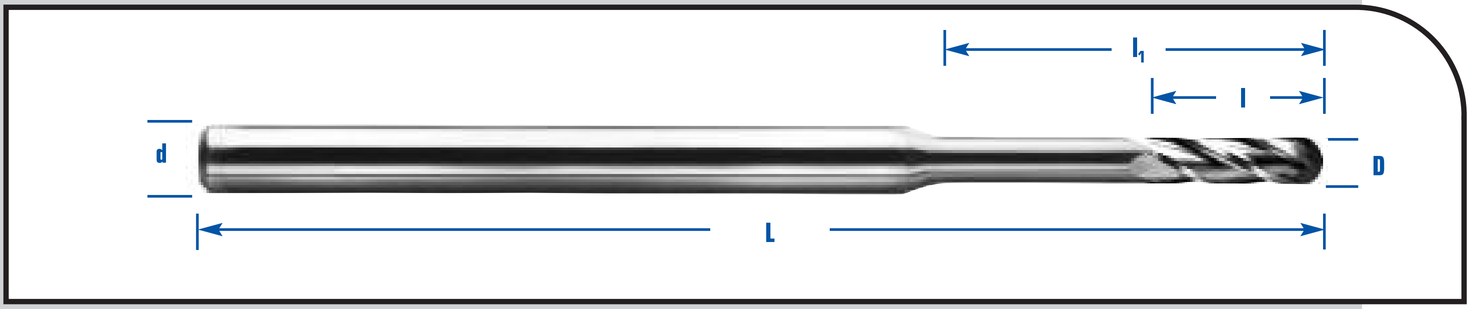


DLC

D (mm)	l (mm)	3 FLUTE CORNER RADIUS	4 FLUTE CORNER RADIUS	5 FLUTE CORNER RADIUS	d (mm)	L (mm)
1.00	3.00	1703-0394D118R	1804-0394D118R	1905-0394D118R	3	38
1.50	4.50	1703-0591D177R	1804-0591D177R	1905-0591D177R	3	38
2.00	6.00	1703-0787D236R	1804-0787D236R	1905-0787D236R	3	38
2.50	7.50	1703-0984D295R	1804-0984D295R	1905-0984D295R	3	38
3.00	9.00	1703-1181D354R	1804-1181D354R	1905-1181D354R	3	38
4.00	12.00	1703-1575D473R	1804-1575D473R	1905-1575D473R	5	50
5.00	15.00	1703-1968D590R	1804-1968D590R	1905-1968D590R	5	50
6.00	18.00	1703-2362D709R	1804-2362D709R	1905-2362D709R	6	50

Other diameters available upon request / Andere Durchmesser auf Anfrage erhältlich / Otros diámetros disponibles por solicitud / Outros diâmetros estão disponíveis a pedido

EXTENDED REACH MICRO END MILLS
MIKROSTIRNFRÄSER - LANGE AUSFÜHRUNG
FRESAS UNIVERSALES RADIALES DE LARGO ALCANCE
FRESAS DE TOPO, EXTRA LONGAS



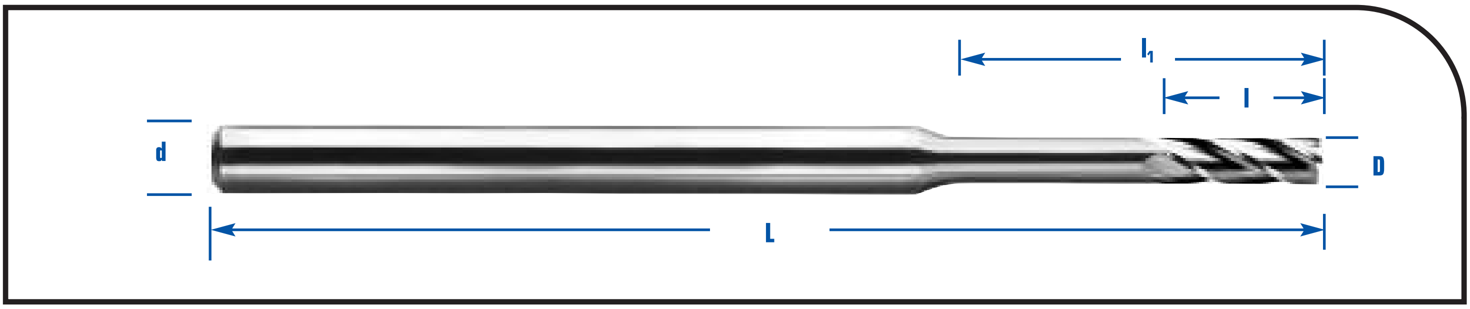
FEATURES

WC | 3xD | 4 | 30° | BALL NOSE

MATERIALS

Ni/Co | Al | Steel | Hi-C Steel | Stainless | Cu Alloy | Ti | Plastic | Cast Iron | Graphite

D (mm)	l (mm)	l_1 (mm)	4 FLUTE BALL NOSE	AlTiN 4 FLUTE BALL NOSE	d (mm)	L (mm)
0.40	1.20	3	1821-0157.118	1821-0157L118	3	38
0.50	1.50	4	1821-0197.158	1821-0197L158	3	38
0.60	1.80	5	1821-0236.197	1821-0236L197	3	38
0.65	1.95	6	1821-0256.236	1821-0256L236	3	38
0.70	2.10	7	1821-0276.276	1821-0276L276	3	38
0.75	2.25	8	1821-0295.315	1821-0295L315	3	38
0.80	2.40	9	1821-0315.355	1821-0315L355	3	50
0.90	2.70	10	1821-0354.394	1821-0354L394	3	50
1.00	3.00	10	1821-0394.394	1821-0394L394	3	50
1.50	4.50	15	1821-0591.591	1821-0591L591	3	50
1.60	4.80	15	1821-0630.591	1821-0630L591	3	50



FEATURES

WC | 3xD | 4 | 30° | CORNER RADIUS

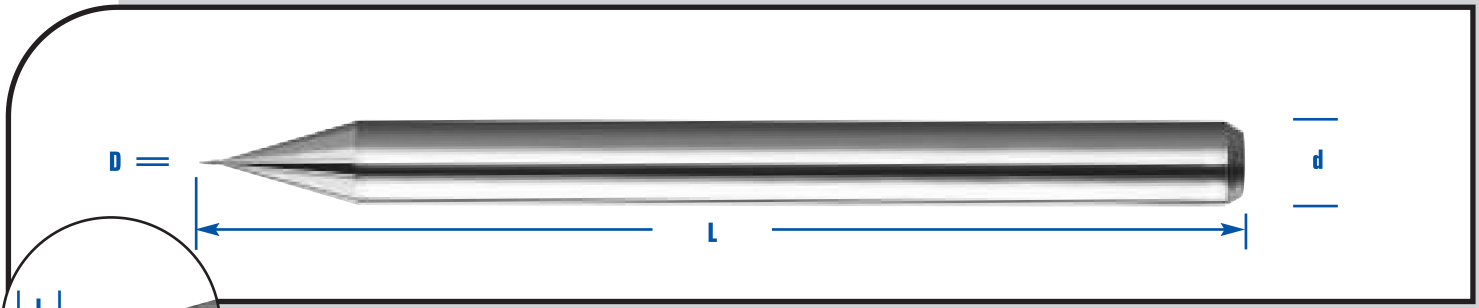
MATERIALS

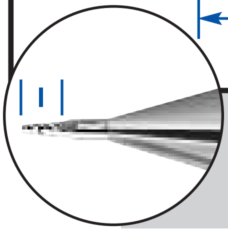
Ni/Co | Al | Steel | Hi-C Steel | Stainless | Cu Alloy | Ti | Plastic | Cast Iron | Graphite

D (mm)	l (mm)	l_1 (mm)	4 FLUTE CORNER RADIUS	AlTiN 4 FLUTE CORNER RADIUS	d (mm)	L (mm)
0.40	1.20	3	1806-0157.118R	1806-0157L118R	3	38
0.50	1.50	4	1806-0197.158R	1806-0197L158R	3	38
0.60	1.80	5	1806-0236.197R	1806-0236L197R	3	38
0.65	1.95	6	1806-0256.236R	1806-0256L236R	3	38
0.70	2.10	7	1806-0276.276R	1806-0276L276R	3	38
0.75	2.25	8	1806-0295.315R	1806-0295L315R	3	38
0.80	2.40	9	1806-0315.355R	1806-0315L355R	3	50
0.90	2.70	10	1806-0354.394R	1806-0354L394R	3	50
1.00	3.00	10	1806-0394.394R	1806-0394L394R	3	50
1.50	4.50	15	1806-0591.591R	1806-0591L591R	3	50
1.60	4.80	15	1806-0630.591R	1806-0630L591R	3	50

Other diameters available upon request / Andere Durchmesser auf Anfrage erhältlich / Otros diámetros disponibles por solicitud / Outros diâmetros estão disponíveis a pedido

TAPERED MICRO END MILLS
MIKRO-KEGELSTIRNFRÄSER
MICROFRESAS UNIVERSALES RADIALES CÓNICAS
MICRO FRESAS DE TOPO, CÔNICAS





FEATURES

WC 3xD 30°

MATERIALS

Ni/Co Al Steel Hi-C Steel Stainless Cu Alloy Ti Plastic

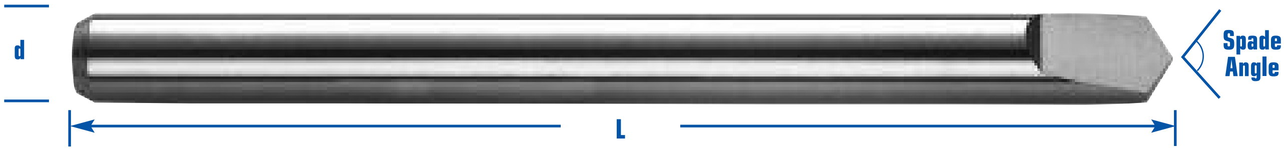
D (mm)	l (mm)	.5° Taper 3 FLUTE CORNER RADIUS .5° TAPER	1° Taper 3 FLUTE CORNER RADIUS 1° TAPER	3° Taper 3 FLUTE CORNER RADIUS 3° TAPER	5° Taper 3 FLUTE CORNER RADIUS 5° TAPER	7° Taper 3 FLUTE CORNER RADIUS 7° TAPER	d (mm)	L (mm)
0.50	1.50	1703-0197.05T	1703-0197.10T	1703-0197.30T	1703-0197.50T	1703-0197.70T	3	38
1.00	3.00	1703-0394.05T	1703-0394.10T	1703-0394.30T	1703-0394.50T	1703-0394.70T	3	38
1.50	4.50	1703-0591.05T	1703-0591.10T	1703-0591.30T	1703-0591.50T	1703-0591.70T	3	38
2.00	6.00	1703-0787.05T	1703-0787.10T	1703-0787.30T	1703-0787.50T	1703-0787.70T	3	38
3.00	9.00	1703-1181.05T	1703-1181.10T	1703-1181.30T	1703-1181.50T	1703-1181.70T	4	38

AlTiN

D (mm)	l (mm)	.5° Taper 3 FLUTE CORNER RADIUS .5° TAPER	1° Taper 3 FLUTE CORNER RADIUS 1° TAPER	3° Taper 3 FLUTE CORNER RADIUS 3° TAPER	5° Taper 3 FLUTE CORNER RADIUS 5° TAPER	7° Taper 3 FLUTE CORNER RADIUS 7° TAPER	d (mm)	L (mm)
0.50	1.50	1703-0197L05T	1703-0197L10T	1703-0197L30T	1703-0197L50T	1703-0197L70T	3	38
1.00	3.00	1703-0394L05T	1703-0394L10T	1703-0394L30T	1703-0394L50T	1703-0394L70T	3	38
1.50	4.50	1703-0591L05T	1703-0591L10T	1703-0591L30T	1703-0591L50T	1703-0591L70T	3	38
2.00	6.00	1703-0787L05T	1703-0787L10T	1703-0787L30T	1703-0787L50T	1703-0787L70T	3	38
3.00	9.00	1703-1181L05T	1703-1181L10T	1703-1181L30T	1703-1181L50T	1703-1181L70T	4	38

Other diameters available upon request / Andere Durchmesser auf Anfrage erhältlich / Otros diámetros disponibles por solicitud / Outros diâmetros estão disponíveis a pedido

SOLID CARBIDE ENGRAVING TOOLS
VOLLHARTMETALL-GRAVIERWERKZEUGE
HERRAMIENTAS DE GRABADO DE CARBURO SÓLIDO
FERRAMENTAS DE GRAVAÇÃO, CARBONETO SÓLIDO



FEATURES

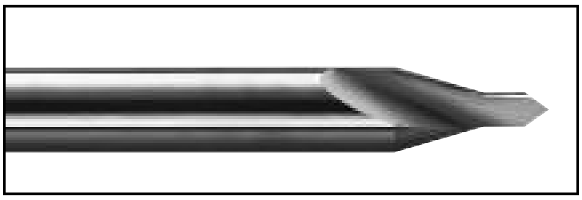
WC

MATERIALS

Ni/Co | Al | Steel | Hi-C Steel | Stainless | Cu Alloy | Ti | Plastic | Cast Iron

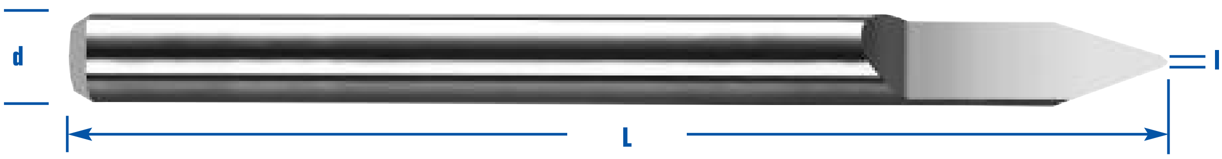
Spade Tools (pictured)

PART NUMBER	d (mm)	SPADE ANGLE	L (mm)
SPD1181-060	3.00	60 deg	38
SPD1181-090	3.00	90 deg	38
SPD1181-118	3.00	118 deg	38



2 Flute Engraving Tools

PART NUMBER	d (mm)	SPADE ANGLE	L (mm)
EGR1181-030	3.00	30 deg	38
EGR1181-060	3.00	60 deg	38
EGR1181-090	3.00	90 deg	38



FEATURES

WC

MATERIALS

Ni/Co | Al | Steel | Hi-C Steel | Stainless | Cu Alloy | Ti | Plastic | Cast Iron

Half Round Engravers

PART NUMBER (mm)	d (mm)	l (mm)	L (mm)
HR118SSS025A	3.00	0.25	38
HR118SSS030A	3.00	0.30	38
HR118SSS035A	3.00	0.35	38
HR118SSS040A	3.00	0.40	38
HR118SSS045A	3.00	0.45	38
HR118SSS050A	3.00	0.50	38
HR118SSS060A	3.00	0.60	38
HR118SSS070A	3.00	0.70	38
HR118SSS080A	3.00	0.80	38

Quarter Round Engravers

PART NUMBER (mm)	d (mm)	l (mm)	L (mm)
QR118SSS025A	3.00	0.25	38
QR118SSS030A	3.00	0.30	38
QR118SSS035A	3.00	0.35	38
QR118SSS040A	3.00	0.40	38
QR118SSS045A	3.00	0.45	38
QR118SSS050A	3.00	0.50	38
QR118SSS060A	3.00	0.60	38
QR118SSS070A	3.00	0.70	38
QR118SSS080A	3.00	0.80	38

Other diameters available upon request / Andere Durchmesser auf Anfrage erhältlich / Otros diámetros disponibles por solicitud / Outros diâmetros estão disponíveis a pedido

DRILLING SPEEDS AND FEEDS
BOHR- UND VERFAHRGESCHWINDIGKEITEN
VELOCIDADES Y AVANCES DE PERFORACIÓN
AVANÇO E VELOCIDADE DE PERFURAÇÃO

Ni/Co | Al | Steel | Hi-C Steel | Stainless | Cu Alloy | Ti | Plastic | Cast Iron

		BHN Hardness	Vc (m/min)	Feed Rate Ø < 1,0 Chip Load Per Tooth (µ)		Feed Rate Ø < 1,5 Chip Load Per Tooth (µ)		Feed Rate Ø < 2.0 Chip Load Per Tooth (µ)		Feed Rate Ø < 2,5 Chip Load Per Tooth (µ)		Feed Rate Ø < 3.0 Chip Load Per Tooth (µ)	
	Low Carbon Steel												
Steel	Magnetic Soft Steel, Leaded Steels	≤ 120	50-80	30	45	35	52	40	60	46	68	52	79
	Plain Carbon Steel Low, Medium Carbon	< 250	25-60	25	40	29	46	33	53	38	61	44	70
	Structural Steel, Case Carburizing Steel	< 200	25-60	25	40	29	46	33	53	38	61	44	70
	High Carbon Steel												
Hi-C Steel	Alloyed Steel, Medium Carbon,Tool Steel, Wrought	<250	20-50	12	35	14	40	16	46	18	53	21	61
	Alloyed Steel, Hardened and Tempered Steel, Tool Steel	>250 ≤350	15-35	10	25	12	29	13	33	15	38	17	44
	Alloyed Steel, Hardened and Tempered Steel, Tool Steel	>350 ≤400	10-25	7	15	8	17	9	20	11	23	12	26
	Stainless Steel												
Stainless	Ferritic + Austenitic, Ferritic, Martensitic	<300	23-53	5	25	6	29	7	33	8	38	9	44
	Austenitic	<250	15-40	5	20	6	23	7	26	8	30	9	35
	Precipitation Hardened	<300	25-65	5	15	6	17	7	20	8	23	9	26
	Nickel Alloys												
Ni/Co	Nickel, Unalloyed	<150	15-40	10	15	12	17	13	20	15	23	17	26
	Nickel Alloys Nimonic 75, Monel 400	>150 <240	10-30	10	15	12	17	13	20	15	23	17	26
	Nickel Alloys Nimonic 80, Inconel 718	>240 <400	9-25	5	10	6	12	7	13	8	15	9	17
	Titanium												
Ti	Titanium, Unalloyed	<200	25-56	7	25	8	29	9	33	11	38	12	44
	Titanium Alloy, Cast	<270	7-25	7	25	8	29	9	33	11	38	12	44
	Titanium Alloys	>270 ≤350	7-25	7	25	8	29	9	33	11	38	12	44
	Cast Iron												
Cast Iron	Soft Gray Cast, Ferritic	<150	30-80	20	50	23	58	26	66	30	76	35	87
	Soft Gray Cast, Pearlitic	>150 <260	30-80	20	50	23	58	26	66	30	76	35	87
	Nodular Graphite, Malleable Cast Iron	>150 <320	25-65	20	50	23	58	26	66	30	76	35	87
	Aluminum												
Al	Al, MG, Unalloyed	100kg	200-350	25	50	29	58	33	66	38	76	44	87
	Al Alloys, Si>5%	150kg	150-300	45	60	52	69	60	79	68	91	79	105
	Al Alloys, Si>5% <10%	120kg	100-200	45	60	52	69	60	79	68	91	79	105
	Copper - Brass Alloys												
Cu Alloy	Copper Alloys, Wrought		100-225	25	40	29	46	33	53	38	61	44	70
	Brass, Bronze		100-225	30	60	35	69	40	79	46	91	52	105
	High Strength Bronze		50-125	25	50	29	58	33	66	38	76	44	87
	Plastics												
Plastic	Duroplastics												
	Thermoplastics		150	50	250	58	288	66	331	76	380	87	437
	Fiber-reinforced synthetics												

Chart values are recommended starting parameters. Your final process parameters will vary depending on materials, machines, and cutting methods. Speeds and feeds can be increased up to 20% with coatings.

Bei den Tabellenwerten handelt es sich um empfohlene Ausgangsparameter. Die endgültigen Prozessparameter hängen von den Materialien, Maschinen und Schneidmethoden ab. Die Bohr- und Verfahrgeschwindigkeiten können mit entsprechenden Beschichtungen um 20 % erhöht werden.

Los valores de los cuadros son parámetros iniciales recomendados. Los parámetros finales de proceso variarán en función de los materiales, las máquinas y los métodos de corte. Las velocidades y los avances pueden aumentarse hasta 20% con revestimientos.

Os valores indicados no quadro são parâmetros iniciais recomendados. Os parâmetros finais de processo variam dependendo do material, da máquina e dos métodos de corte. Com revestimentos, o avanço e a velocidade podem ser aumentados até que 20%.

MILLING SPEEDS AND FEEDS
FRÄS- UND VERFAHRGESCHWINDIGKEITEN
VELOCIDADES Y AVANCES DE FRESADO
ALIMENTAÇÃO E VELOCIDADE DE FRESAGEM

Ni/Co | Al | Steel | Hi-C Steel | Stainless | Cu Alloy | Ti | Plastic | Cast Iron

		BHN Hardness	Vc (m/min)	Feed Rate Ø < 1,0 Chip Load Per Tooth (μ)		Feed Rate Ø < 1,5 Chip Load Per Tooth (μ)		Feed Rate Ø < 2.0 Chip Load Per Tooth (μ)		Feed Rate Ø < 2,5 Chip Load Per Tooth (μ)		Feed Rate Ø < 3.0 Chip Load Per Tooth (μ)	
Low Carbon Steel													
Steel	Magnetic Soft Steel, Leaded Steels	≤ 120	150-188	30	45	35	52	40	60	46	68	52	79
	Plain Carbon Steel Low, Medium Carbon	< 250	118-158	25	40	29	46	33	53	38	61	44	70
	Structural Steel, Case Carburizing Steel	< 200	100-118	25	40	29	46	33	53	38	61	44	70
High Carbon Steel													
Hi-C Steel	Alloyed Steel, Medium Carbon,Tool Steel, Wrought	<250	80-100	12	35	14	40	16	46	18	53	21	61
	Alloyed Steel, Hardened and Tempered Steel, Tool Steel	>250 ≤350	70-91	10	25	12	29	13	33	15	38	17	44
	Alloyed Steel, Hardened and Tempered Steel, Tool Steel	>350 ≤400	60-80	7	15	8	17	9	20	11	23	12	26
Stainless Steel													
Stainless	Ferritic + Austenitic, Ferritic, Martensitic	<300	70-79	5	25	6	29	7	33	8	38	9	44
	Austenitic	<250	60-75	5	20	6	23	7	26	8	30	9	35
	Precipitation Hardened	<300	65-80	5	15	6	17	7	20	8	23	9	26
Nickel Alloys													
Ni/Co	Nickel, Unalloyed	<150	55-65	10	15	12	17	13	20	15	23	17	26
	Nickel Alloys Nimonic 75, Monel 400	>150 <240	30-54	10	15	12	17	13	20	15	23	17	26
	Nickel Alloys Nimonic 80, Inconel 718	>240 <400	24-36	5	10	6	12	7	13	8	15	9	17
Titanium													
Ti	Titanium, Unalloyed	<200	79-100	7	25	8	29	9	33	11	38	12	44
	Titanium Alloy, Cast	<270	72-90	7	25	8	29	9	33	11	38	12	44
	Titanium Alloys	>270 ≤350	68-80	7	25	8	29	9	33	11	38	12	44
Cast Iron													
Cast Iron	Soft Gray Cast, Ferritic	<150	109-131	20	50	23	58	26	66	30	76	35	87
	Soft Gray Cast, Pearlitic	>150 <260	70-91	20	50	23	58	26	66	30	76	35	87
	Nodular Graphite, Malleable Cast Iron	>150 <320	100-109	20	50	23	58	26	66	30	76	35	87
Aluminum													
Al	Al, MG, Unalloyed	100kg	438-550	25	50	29	58	33	66	38	76	44	87
	Al Alloys, Si>5%	150kg	451-500	45	60	52	69	60	79	68	91	79	105
	Al Alloys, Si>5% <10%	120kg	243-350	45	60	52	69	60	79	68	91	79	105
Copper - Brass Alloys													
Cu Alloy	Copper Alloys, Wrought		158-219	25	40	29	46	33	53	38	61	44	70
	Brass, Bronze		201-219	30	60	35	69	40	79	46	91	52	105
	High Strength Bronze		179-201	25	50	29	58	33	66	38	76	44	87
Plastics													
Plastic	Duroplastics		118-131										
	Thermoplastics		179-201	50	250	58	288	66	331	76	380	87	437
	Fiber-reinforced synthetics		80-100										

Chart values are recommended starting parameters. Your final process parameters will vary depending on materials, machines, and cutting methods. Speeds and feeds can be increased up to 20% with coatings.

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