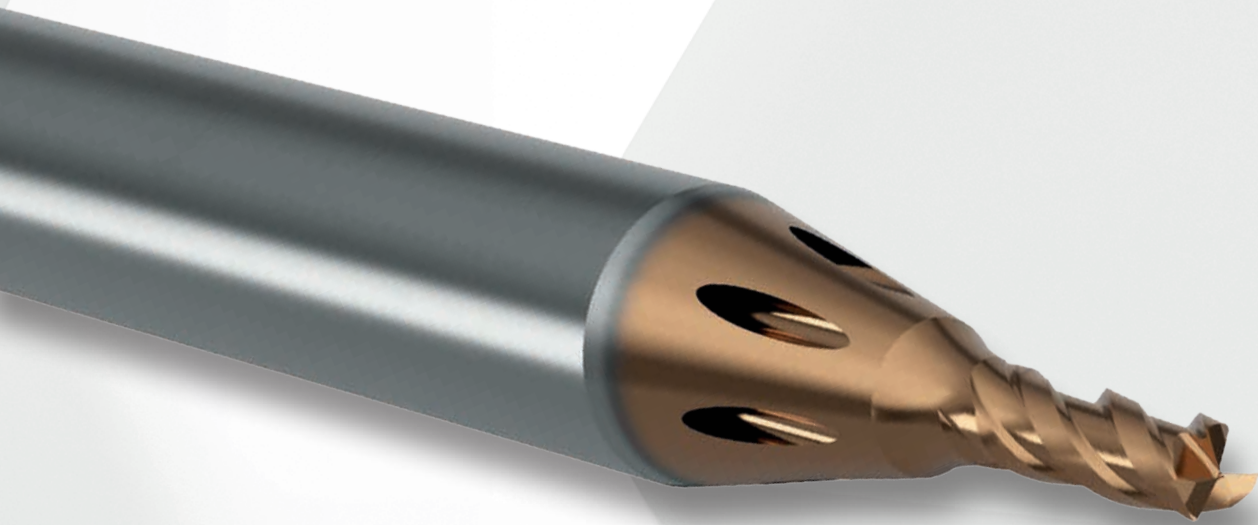




HARTNER

Precision Cutting Tools



TF 100 MULTI-MILL MICRO

THE MULTIFUNCTIONAL MICRO-PRECISION MILLING CUTTER
FOR RAMPING, DRILLING, SLOTTING, ROUGHING
AND FINISHING IN 2.5xD & 5xD

TF 100 MULTI-MILL MICRO



Symmetrical drilling face

- optimised for drilling and ramping operations
- excellent cutting edge stability

Innovative flute form

- very high tool stability
- low-vibration cutting

New transition geometry

- improves overall stability

Peripheral cooling

- guided cooling & lubrication directly in the cutting area
- effective chip removal

Newly developed TiSiN coating

- very high surface quality
- optimum chip transport
- perfect protection against wear in dry and wet machining

New ultra fine carbide

- optimum balance between hardness and toughness for micromachining applications



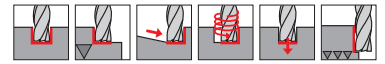
HARTNER

TF 100 MULTI-MILL micro

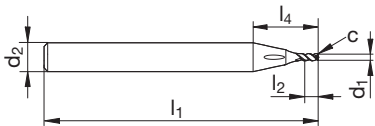
Article no. 85005



P	M	K	N	S	H
•	•	•	•	•	○



for extreme cutting values and cutting performance • with internal cooling: peripheral cooling with 4 or 6 exits • centre cutting • with special drill face



d1 h8 mm	d2 h5 mm	l1 mm	l2 mm	l4 mm	c mm x 45°	Z	Code no.
0.800	4.000	38.000	2.000	9.500	0.016	3	0.800
1.000	4.000	38.000	2.500	9.300	0.020	3	1.000
1.500	4.000	45.000	3.750	9.700	0.030	3	1.500
2.000	6.000	50.000	5.000	14.600	0.040	3	2.000
2.500	6.000	50.000	6.250	15.300	0.050	3	2.500
3.000	6.000	50.000	7.500	16.200	0.060	3	3.000



OPEN SLOTS AND HELIX

Art. no. 85005

Material/ISO material	a _e max	a _p max	v _c	f _z /Ø			v _c	f _z /Ø		v _c	f _z /Ø			v _c	f _z /Ø	
				0.8	1.0	1.2		1.5	1.8		2.0	2.2	2.5		2.8	3.0
Unalloyed steel	1.00xD	1.00xD	140	0.0072	0.0090	0.0108	168	0.0135	0.0162	182	0.0180	0.0198	0.0225	196	0.0252	0.0270
P Low-alloyed steel	1.00xD	1.00xD	140	0.0064	0.0080	0.0096	168	0.0120	0.0144	182	0.0160	0.0176	0.0200	196	0.0224	0.0240
High-alloyed steel and tool steel	1.00xD	0.75xD	140	0.0048	0.0060	0.0072	168	0.0090	0.0108	182	0.0120	0.0132	0.0150	196	0.0168	0.0180
Stainless steel, ferritic, martensitic	1.00xD	1.00xD	140	0.0064	0.0080	0.0096	168	0.0120	0.0144	182	0.0160	0.0176	0.0200	196	0.0224	0.0240
M Stainless steel, austenitic	1.00xD	1.00xD	120	0.0056	0.0070	0.0084	144	0.0105	0.0126	156	0.0140	0.0154	0.0175	168	0.0196	0.0210
Duplex steel, high strength stainless steels	1.00xD	0.75xD	90	0.0049	0.0061	0.0073	108	0.0092	0.0110	117	0.0122	0.0135	0.0153	126	0.0171	0.0184
Grey cast iron	1.00xD	1.00xD	120	0.0056	0.0070	0.0084	144	0.0105	0.0126	156	0.0140	0.0154	0.0175	168	0.0196	0.0210
K Cast iron with spheroidal graphite iron																
Malleable cast iron	1.00xD	1.00xD	100	0.0050	0.0062	0.0075	120	0.0093	0.0112	130	0.0124	0.0137	0.0156	140	0.0174	0.0187
GJV & ADI																
Aluminium-wrought alloys	1.00xD	1.00xD	170	0.0096	0.0120	0.0144	204	0.0180	0.0216	221	0.0240	0.0264	0.0300	238	0.0336	0.0360
N Aluminium-cast alloys																
Copper and copper alloys	1.00xD	1.00xD	125	0.0088	0.0110	0.0133	150	0.0166	0.0199	162.5	0.0221	0.0243	0.0276	175	0.0309	0.0331
Heat-resistant alloys, Fe-based	1.00xD	0.50xD	100	0.0036	0.0045	0.0054	120	0.0068	0.0081	130	0.0090	0.0099	0.0113	140	0.0126	0.0135
S Heat-resistant alloys, Ni-based, CO-based	1.00xD	0.50xD	60	0.0029	0.0037	0.0044	72	0.0055	0.0066	78	0.0073	0.0080	0.0091	84	0.0102	0.0110
Titanium alloys & pure titanium	1.00xD	0.75xD	100	0.0060	0.0075	0.0090	120	0.0113	0.0135	130	0.0150	0.0165	0.0188	140	0.0210	0.0225
H Hardened steel, hardened and tempered, < 55 HRC	1.00xD	0.25xD	35	0.0032	0.0040	0.0048	42	0.0060	0.0072	46	0.0080	0.0088	0.0100	49	0.0112	0.0120

RAMPING AND CLOSED SLOTS

Art. no. 85005

Material/ISO material	a _e max	a _p max	v _c	f _z /Ø			v _c	f _z /Ø		v _c	f _z /Ø			v _c	f _z /Ø	
				0.8	1.0	1.2		1.5	1.8		2.0	2.2	2.5		2.8	3.0
Unalloyed steel	1.00xD	1.00xD	100	0.0043	0.0054	0.0065	120	0.0081	0.0097	130	0.0108	0.0119	0.0135	140	0.0151	0.0162
P Low-alloyed steel	1.00xD	1.00xD	100	0.0038	0.0048	0.0058	120	0.0072	0.0086	130	0.0096	0.0106	0.0120	140	0.0134	0.0144
High-alloyed steel and tool steel	1.00xD	0.75xD	100	0.0029	0.0036	0.0043	120	0.0054	0.0065	130	0.0072	0.0079	0.0090	140	0.0101	0.0108
Stainless steel, ferritic, martensitic	1.00xD	1.00xD	100	0.0038	0.0048	0.0058	120	0.0072	0.0086	130	0.0096	0.0106	0.0120	140	0.0134	0.0144
M Stainless steel, austenitic	1.00xD	1.00xD	90	0.0034	0.0042	0.0050	108	0.0063	0.0076	117	0.0084	0.0092	0.0105	126	0.0118	0.0126
Duplex steel, high strength stainless steels	1.00xD	0.75xD	65	0.0029	0.0037	0.0044	78	0.0055	0.0066	85	0.0073	0.0081	0.0092	91	0.0103	0.0110
Grey cast iron	1.00xD	1.00xD	90	0.0034	0.0042	0.0050	108	0.0063	0.0076	117	0.0084	0.0092	0.0105	126	0.0118	0.0126
K Cast iron with spheroidal graphite iron																
Malleable cast iron	1.00xD	1.00xD	75	0.0030	0.0037	0.0045	90	0.0056	0.0067	98	0.0075	0.0082	0.0093	105	0.0105	0.0112
GJV & ADI																
Aluminium-wrought alloys	1.00xD	1.00xD	120	0.0058	0.0072	0.0086	144	0.0108	0.0130	156	0.0144	0.0158	0.0180	168	0.0202	0.0216
N Aluminium-cast alloys																
Copper and copper alloys	1.00xD	1.00xD	90	0.0053	0.0066	0.0080	108	0.0099	0.0119	117	0.0133	0.0146	0.0166	126	0.0186	0.0199
Heat-resistant alloys, Fe-based	1.00xD	0.50xD	75	0.0022	0.0027	0.0032	90	0.0041	0.0049	98	0.0054	0.0059	0.0068	105	0.0076	0.0081
S Heat-resistant alloys, Ni-based, CO-based	1.00xD	0.50xD	45	0.0018	0.0022	0.0026	54	0.0033	0.0039	59	0.0044	0.0048	0.0055	63	0.0061	0.0066
Titanium alloys & pure titanium	1.00xD	0.75xD	70	0.0036	0.0045	0.0054	84	0.0068	0.0081	91	0.0090	0.0099	0.0113	98	0.0126	0.0135
H Hardened steel, hardened and tempered, < 55 HRC	1.00xD	0.25xD	25	0.0019	0.0024	0.0029	30	0.0036	0.0043	33	0.0048	0.0053	0.0060	35	0.0067	0.0072

ROUGHING

Art. no. 85005

Material/ISO material	a _e max	a _p max	v _c	f _z /Ø			v _c	f _z /Ø		v _c	f _z /Ø			v _c	f _z /Ø	
				0.8	1.0	1.2		1.5	1.8		2.0	2.2	2.5		2.8	3.0
Unalloyed steel	0.25xD	2.00xD	170	0.0113	0.0142	0.0170	204	0.0213	0.0255	221	0.0284	0.0312	0.0354	238	0.0397	0.0425
P Low-alloyed steel	0.25xD	2.00xD	170	0.0101	0.0126	0.0151	204	0.0189	0.0227	221	0.0252	0.0277	0.0315	238	0.0353	0.0378
High-alloyed steel and tool steel	0.20xD	2.00xD	170	0.0076	0.0095	0.0113	204	0.0142	0.0170	221	0.0189	0.0208	0.0236	238	0.0265	0.0284
Stainless steel, ferritic, martensitic	0.25xD	2.00xD	170	0.0101	0.0126	0.0151	204	0.0189	0.0227	221	0.0252	0.0277	0.0315	238	0.0353	0.0378
M Stainless steel, austenitic	0.20xD	2.00xD	145	0.0088	0.0110	0.0132	174	0.0165	0.0198	189	0.0221	0.0243	0.0276	203	0.0309	0.0331
Duplex steel, high strength stainless steels	0.20xD	2.00xD	105	0.0077	0.0096	0.0116	126	0.0145	0.0174	137	0.0193	0.0212	0.0241	147	0.0270	0.0289
Grey cast iron	0.25xD	2.00xD	145	0.0088	0.0110	0.0132	174	0.0165	0.0198	189	0.0221	0.0243	0.0276	203	0.0309	0.0331
K Cast iron with spheroidal graphite iron																
Malleable cast iron	0.25xD	2.00xD	120	0.0078	0.0098	0.0118	144	0.0147	0.0176	156	0.0196	0.0216	0.0245	168	0.0274	0.0294
GJV & ADI																
Aluminium-wrought alloys	0.25xD	2.00xD	200	0.0151	0.0189	0.0227	240	0.0284	0.0340	260	0.0378	0.0416	0.0473	280	0.0529	0.0567
N Aluminium-cast alloys																
Copper and copper alloys	0.25xD	2.00xD	150	0.0139	0.0174	0.0209	180	0.0261	0.0313	195	0.0348	0.0383	0.0435	210	0.0487	0.0522
Heat-resistant alloys, Fe-based	0.15xD	2.00xD	120	0.0057	0.0071	0.0085	144	0.0106	0.0128	156	0.0142	0.0156	0.0177	168	0.0198	0.0213
S Heat-resistant alloys, Ni-based, CO-based	0.15xD	2.00xD	70	0.0046	0.0058	0.0069	84	0.0086	0.0104	91	0.0115	0.0127	0.0144	98	0.0161	0.0173
Titanium alloys & pure titanium	0.20xD	2.00xD	115	0.0095	0.0118	0.0142	138	0.0177	0.0213	150	0.0236	0.0260	0.0295	161	0.0331	0.0354
H Hardened steel, hardened and tempered, < 55 HRC	0.05xD	2.00xD	45	0.0050	0.0063	0.0076	54	0.0095	0.0113	59	0.0126	0.0139	0.0158	63	0.0176	0.0189



FINISHING

Art. no. 85005

Material/ISO material	a _e max	a _p max	v _c	f _z /Ø			v _c	f _z /Ø		v _c	f _z /Ø			v _c	f _z /Ø	
				0.8	1.0	1.2		1.5	1.8		2.0	2.2	2.5		2.8	3.0
Unalloyed steel	0.03xD	2.00xD	180	0.0086	0.0108	0.0130	216	0.0162	0.0194	234	0.0216	0.0238	0.0270	252	0.0302	0.0324
P Low-alloyed steel	0.03xD	2.00xD	180	0.0077	0.0096	0.0115	216	0.0144	0.0173	234	0.0192	0.0211	0.0240	252	0.0269	0.0288
High-alloyed steel and tool steel	0.03xD	2.00xD	180	0.0058	0.0072	0.0086	216	0.0108	0.0130	234	0.0144	0.0158	0.0180	252	0.0202	0.0216
Stainless steel, ferritic, martensitic	0.03xD	2.00xD	180	0.0077	0.0096	0.0115	216	0.0144	0.0173	234	0.0192	0.0211	0.0240	252	0.0269	0.0288
M Stainless steel, austenitic	0.03xD	2.00xD	155	0.0067	0.0084	0.0101	186	0.0126	0.0151	202	0.0168	0.0185	0.0210	217	0.0235	0.0252
Duplex steel, high strength stainless steels	0.03xD	2.00xD	115	0.0059	0.0073	0.0088	138	0.0110	0.0132	150	0.0147	0.0162	0.0184	161	0.0206	0.0220
Grey cast iron	0.03xD	2.00xD	155	0.0067	0.0084	0.0101	186	0.0126	0.0151	202	0.0168	0.0185	0.0210	217	0.0235	0.0252
K Cast iron with spheroidal graphite iron																
Malleable cast iron	0.03xD	2.00xD	130	0.0060	0.0075	0.0090	156	0.0112	0.0134	169	0.0149	0.0164	0.0187	182	0.0209	0.0224
GJV & ADI																
Aluminium-wrought alloys	0.03xD	2.00xD	220	0.0115	0.0144	0.0173	264	0.0216	0.0259	286	0.0288	0.0317	0.0360	308	0.0403	0.0432
N Aluminium-cast alloys																
Copper and copper alloys	0.03xD	2.00xD	160	0.0106	0.0133	0.0159	192	0.0199	0.0239	208	0.0265	0.0292	0.0331	224	0.0371	0.0398
Heat-resistant alloys, Fe-based	0.03xD	2.00xD	130	0.0043	0.0054	0.0065	156	0.0081	0.0097	169	0.0108	0.0119	0.0135	182	0.0151	0.0162
S Heat-resistant alloys, Ni-based, CO-based	0.03xD	2.00xD	75	0.0035	0.0044	0.0053	90	0.0066	0.0079	98	0.0088	0.0096	0.0110	105	0.0123	0.0132
Titanium alloys & pure titanium	0.03xD	2.00xD	120	0.0072	0.0090	0.0108	144	0.0135	0.0162	156	0.0180	0.0198	0.0225	168	0.0252	0.0270
H Hardened steel, hardened and tempered, < 55 HRC	0.02xD	2.00xD	45	0.0038	0.0048	0.0058	54	0.0072	0.0086	59	0.0096	0.0106	0.0120	63	0.0134	0.0144

DRILLING

Art. no. 85005

Material/ISO material	a _p max	v _c	f _z /Ø			v _c	f _z /Ø		v _c	f _z /Ø			v _c	f _z /Ø	
			0.8	1.0	1.2		1.5	1.8		2.0	2.2	2.5		2.8	3.0
Unalloyed steel	1.00xD	100	0.0014	0.0018	0.0022	120	0.0027	0.0032	130	0.0036	0.0040	0.0045	140	0.0050	0.0054
P Low-alloyed steel	1.00xD	100	0.0013	0.0016	0.0019	120	0.0024	0.0029	130	0.0032	0.0035	0.0040	140	0.0045	0.0048
High-alloyed steel and tool steel	0.50xD	90	0.0010	0.0012	0.0014	108	0.0018	0.0022	117	0.0024	0.0026	0.0030	126	0.0034	0.0036
Stainless steel, ferritic, martensitic	0.75xD	90	0.0012	0.0015	0.0018	108	0.0023	0.0027	117	0.0030	0.0033	0.0038	126	0.0042	0.0045
M Stainless steel, austenitic	0.50xD	85	0.0011	0.0014	0.0017	102	0.0021	0.0025	111	0.0028	0.0031	0.0035	119	0.0039	0.0042
Duplex steel, high strength stainless steels	0.25xD	65	0.0010	0.0012	0.0014	78	0.0018	0.0022	85	0.0024	0.0026	0.0030	91	0.0034	0.0036
Grey cast iron	1.00xD	90	0.0011	0.0014	0.0017	108	0.0021	0.0025	117	0.0028	0.0031	0.0035	126	0.0039	0.0042
K Cast iron with spheroidal graphite iron															
Malleable cast iron	1.00xD	75	0.0010	0.0012	0.0014	90	0.0018	0.0022	98	0.0024	0.0026	0.0030	105	0.0034	0.0036
GJV & ADI															
Aluminium-wrought alloys	0.50xD	125	0.0019	0.0024	0.0029	150	0.0036	0.0043	163	0.0048	0.0053	0.0060	175	0.0067	0.0072
N Aluminium-cast alloys															
Copper and copper alloys	0.50xD	90	0.0018	0.0022	0.0026	108	0.0033	0.0040	117	0.0044	0.0048	0.0055	126	0.0062	0.0066
Heat-resistant alloys, Fe-based	0.25xD	75	0.0007	0.0009	0.0011	90	0.0014	0.0016	98	0.0018	0.0020	0.0023	105	0.0025	0.0027
S Heat-resistant alloys, Ni-based, CO-based	0.25xD	45	0.0006	0.0008	0.0009	54	0.0011	0.0014	59	0.0015	0.0017	0.0019	63	0.0021	0.0023
Titanium alloys & pure titanium	0.25xD	70	0.0012	0.0015	0.0018	84	0.0023	0.0027	91	0.0030	0.0033	0.0038	98	0.0042	0.0045

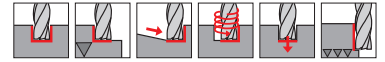


TF 100 MULTI-MILL micro

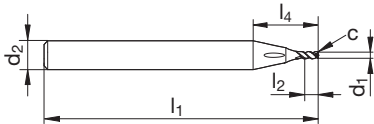
Article no. 85006



P	M	K	N	S	H
•	•	•	•	•	○



for extreme cutting values and cutting performance • with internal cooling: peripheral cooling with 4 or 6 exits • centre cutting • with special drill face



d1 h8 mm	d2 h5 mm	l1 mm	l2 mm	l4 mm	c mm x 45°	Z	Code no.
1.000	4.000	45.000	5.000	11.800	0.020	3	1.000
1.500	4.000	50.000	7.500	13.500	0.030	3	1.500
2.000	6.000	57.000	10.000	19.600	0.040	3	2.000
2.500	6.000	57.000	12.500	21.500	0.050	3	2.500
3.000	6.000	57.000	15.000	23.700	0.060	3	3.000



OPEN SLOTS AND HELIX

Art. no. 85006

Material/ISO material	a _e max	a _p max	v _c	f _z /Ø		v _c	f _z /Ø 1.5	v _c	f _z /Ø		v _c	f _z /Ø	
				1.0	1.2				2.0	2.5		2.8	3.0
Unalloyed steel	1.00xD	0.50xD	112	0.0081	0.0097	134	0.0122	146	0.0162	0.0203	157	0.0227	0.0243
P Low-alloyed steel	1.00xD	0.50xD	112	0.0072	0.0086	134	0.0108	146	0.0144	0.0180	157	0.0202	0.0216
High-alloyed steel and tool steel	1.00xD	0.25xD	112	0.0054	0.0065	134	0.0081	146	0.0108	0.0135	157	0.0151	0.0162
Stainless steel, ferritic, martensitic	1.00xD	0.25xD	112	0.0072	0.0086	134	0.0108	146	0.0144	0.0180	157	0.0202	0.0216
M Stainless steel, austenitic	1.00xD	0.25xD	96	0.0063	0.0076	115	0.0095	125	0.0126	0.0158	134	0.0176	0.0189
Duplex steel, high strength stainless steels	1.00xD	0.25xD	71	0.0055	0.0066	85	0.0083	92	0.0110	0.0138	99	0.0154	0.0165
Grey cast iron	1.00xD	0.50xD	96	0.0063	0.0076	115	0.0095	125	0.0126	0.0158	134	0.0176	0.0189
K Cast iron with spheroidal graphite iron	1.00xD	0.50xD	80	0.0056	0.0067	96	0.0084	104	0.0112	0.0140	112	0.0157	0.0168
Malleable cast iron GJV & ADI	1.00xD	0.50xD	80	0.0056	0.0067	96	0.0084	104	0.0112	0.0140	112	0.0157	0.0168
Aluminium-wrought alloys	1.00xD	0.50xD	136	0.0108	0.0130	163	0.0162	177	0.0216	0.0270	190	0.0302	0.0324
N Aluminium-cast alloys	1.00xD	0.50xD	100	0.0099	0.0119	120	0.0149	130	0.0199	0.0249	140	0.0278	0.0298
Copper and copper alloys	1.00xD	0.50xD	100	0.0099	0.0119	120	0.0149	130	0.0199	0.0249	140	0.0278	0.0298
Heat-resistant alloys, Fe-based	1.00xD	0.25xD	80	0.0041	0.0049	96	0.0061	104	0.0081	0.0101	112	0.0113	0.0122
S Heat-resistant alloys, Ni-based, CO-based	1.00xD	0.25xD	46	0.0033	0.0039	55	0.0049	60	0.0066	0.0082	64	0.0092	0.0099
Titanium alloys & pure titanium	1.00xD	0.25xD	72	0.0068	0.0081	86	0.0101	94	0.0135	0.0169	101	0.0189	0.0203
H Hardened steel, hardened and tempered, < 55 HRC	1.00xD	0.10xD	26	0.0036	0.0043	31	0.0054	34	0.0072	0.0090	36	0.0101	0.0108

RAMPING AND CLOSED SLOTS

Art. no. 85006

Material/ISO material	a _e max	a _p max	v _c	f _z /Ø		v _c	f _z /Ø 1.5	v _c	f _z /Ø		v _c	f _z /Ø	
				1.0	1.2				2.0	2.5		2.8	3.0
Unalloyed steel	1.00xD	0.50xD	78	0.0049	0.0058	94	0.0073	102	0.0097	0.0122	110	0.0136	0.0146
P Low-alloyed steel	1.00xD	0.50xD	78	0.0043	0.0052	94	0.0065	102	0.0086	0.0108	110	0.0121	0.0130
High-alloyed steel and tool steel	1.00xD	0.25xD	78	0.0032	0.0039	94	0.0049	102	0.0065	0.0081	110	0.0091	0.0097
Stainless steel, ferritic, martensitic	1.00xD	0.25xD	78	0.0043	0.0052	94	0.0065	102	0.0086	0.0108	110	0.0121	0.0130
M Stainless steel, austenitic	1.00xD	0.25xD	67	0.0038	0.0045	81	0.0057	87	0.0076	0.0095	94	0.0106	0.0113
Duplex steel, high strength stainless steels	1.00xD	0.25xD	50	0.0033	0.0040	60	0.0050	65	0.0066	0.0083	70	0.0093	0.0099
Grey cast iron	1.00xD	0.50xD	67	0.0038	0.0045	81	0.0057	87	0.0076	0.0095	94	0.0106	0.0113
K Cast iron with spheroidal graphite iron	1.00xD	0.50xD	56	0.0034	0.0040	67	0.0050	73	0.0067	0.0084	78	0.0094	0.0101
Malleable cast iron GJV & ADI	1.00xD	0.50xD	56	0.0034	0.0040	67	0.0050	73	0.0067	0.0084	78	0.0094	0.0101
Aluminium-wrought alloys	1.00xD	0.50xD	95	0.0065	0.0078	114	0.0097	124	0.0130	0.0162	133	0.0181	0.0194
N Aluminium-cast alloys	1.00xD	0.50xD	70	0.0060	0.0072	84	0.0089	91	0.0119	0.0149	98	0.0167	0.0179
Copper and copper alloys	1.00xD	0.50xD	70	0.0060	0.0072	84	0.0089	91	0.0119	0.0149	98	0.0167	0.0179
Heat-resistant alloys, Fe-based	1.00xD	0.25xD	56	0.0024	0.0029	67	0.0036	73	0.0049	0.0061	78	0.0068	0.0073
S Heat-resistant alloys, Ni-based, CO-based	1.00xD	0.25xD	32	0.0020	0.0024	39	0.0030	42	0.0039	0.0049	45	0.0055	0.0059
Titanium alloys & pure titanium	1.00xD	0.25xD	50	0.0041	0.0049	60	0.0061	66	0.0081	0.0101	71	0.0113	0.0122
H Hardened steel, hardened and tempered, < 55 HRC	1.00xD	0.10xD	18	0.0022	0.0026	22	0.0032	24	0.0043	0.0054	25	0.0060	0.0065

ROUGHING

Art. no. 85006

Material/ISO material	a _e max	a _p max	v _c	f _z /Ø		v _c	f _z /Ø 1.5	v _c	f _z /Ø		v _c	f _z /Ø	
				1.0	1.2				2.0	2.5		2.8	3.0
Unalloyed steel	0.10xD	5.00xD	134	0.0128	0.0153	161	0.0191	174	0.0255	0.0319	188	0.0357	0.0383
P Low-alloyed steel	0.10xD	5.00xD	134	0.0113	0.0136	161	0.0170	174	0.0227	0.0284	188	0.0318	0.0340
High-alloyed steel and tool steel	0.08xD	5.00xD	134	0.0085	0.0102	161	0.0128	174	0.0170	0.0213	188	0.0238	0.0255
Stainless steel, ferritic, martensitic	0.10xD	5.00xD	134	0.0113	0.0136	161	0.0170	174	0.0227	0.0284	188	0.0318	0.0340
M Stainless steel, austenitic	0.08xD	5.00xD	115	0.0099	0.0119	138	0.0149	150	0.0198	0.0248	161	0.0278	0.0298
Duplex steel, high strength stainless steels	0.05xD	5.00xD	86	0.0087	0.0104	103	0.0130	112	0.0174	0.0217	120	0.0243	0.0260
Grey cast iron	0.10xD	5.00xD	115	0.0099	0.0119	138	0.0149	150	0.0198	0.0248	161	0.0278	0.0298
K Cast iron with spheroidal graphite iron	0.10xD	5.00xD	96	0.0088	0.0106	115	0.0132	125	0.0176	0.0220	134	0.0247	0.0265
Malleable cast iron GJV & ADI	0.10xD	5.00xD	96	0.0088	0.0106	115	0.0132	125	0.0176	0.0220	134	0.0247	0.0265
Aluminium-wrought alloys	0.15xD	5.00xD	163	0.0170	0.0204	196	0.0255	212	0.0340	0.0425	228	0.0476	0.0510
N Aluminium-cast alloys	0.12xD	5.00xD	120	0.0157	0.0188	144	0.0235	156	0.0313	0.0392	168	0.0438	0.0470
Copper and copper alloys	0.12xD	5.00xD	120	0.0157	0.0188	144	0.0235	156	0.0313	0.0392	168	0.0438	0.0470
Heat-resistant alloys, Fe-based	0.08xD	5.00xD	96	0.0064	0.0077	115	0.0096	125	0.0128	0.0159	134	0.0179	0.0191
S Heat-resistant alloys, Ni-based, CO-based	0.05xD	5.00xD	55	0.0052	0.0062	66	0.0078	72	0.0104	0.0130	77	0.0145	0.0155
Titanium alloys & Reintitan	0.08xD	5.00xD	86	0.0106	0.0128	103	0.0159	112	0.0213	0.0266	120	0.0298	0.0319
H Hardened steel, hardened and tempered, < 55 HRC	0.03xD	5.00xD	31	0.0057	0.0068	37	0.0085	40	0.0113	0.0142	43	0.0159	0.0170



FINISHING

Art. no. 85006

Material/ISO material	a _e max	a _p max	v _c	f _z /Ø		v _c	f _z /Ø 1.5	v _c	f _z /Ø		v _c	f _z /Ø	
				1.0	1.2				2.0	2.5		2.8	3.0
Unalloyed steel	0.02xD	5.00xD	146	0.0097	0.0117	175	0.0146	190	0.0194	0.0243	204	0.0272	0.0292
P Low-alloyed steel	0.02xD	5.00xD	146	0.0086	0.0104	175	0.0130	190	0.0173	0.0216	204	0.0242	0.0259
High-alloyed steel and tool steel	0.02xD	5.00xD	146	0.0065	0.0078	175	0.0097	190	0.0130	0.0162	204	0.0181	0.0194
Stainless steel, ferritic, martensitic	0.02xD	5.00xD	146	0.0086	0.0104	175	0.0130	190	0.0173	0.0216	204	0.0242	0.0259
M Stainless steel, austenitic	0.02xD	5.00xD	125	0.0076	0.0091	150	0.0113	163	0.0151	0.0189	175	0.0212	0.0227
Duplex steel, high strength stainless steels	0.02xD	5.00xD	93	0.0066	0.0079	112	0.0099	121	0.0132	0.0165	130	0.0185	0.0198
Grey cast iron	0.02xD	5.00xD	125	0.0076	0.0091	150	0.0113	163	0.0151	0.0189	175	0.0212	0.0227
Cast iron with spheroidal graphite iron													
Malleable cast iron													
GJV & ADI	0.02xD	5.00xD	104	0.0067	0.0081	125	0.0101	135	0.0134	0.0168	146	0.0188	0.0202
Aluminium-wrought alloys	0.02xD	5.00xD	177	0.0130	0.0156	212	0.0194	230	0.0259	0.0324	248	0.0363	0.0389
N Aluminium-cast alloys	0.02xD	5.00xD	130	0.0119	0.0143	156	0.0179	169	0.0239	0.0298	182	0.0334	0.0358
Copper and copper alloys													
Heat-resistant alloys, Fe-based	0.02xD	5.00xD	104	0.0049	0.0058	125	0.0073	135	0.0097	0.0122	146	0.0136	0.0146
S Heat-resistant alloys, Ni-based, CO-based	0.02xD	5.00xD	60	0.0039	0.0047	72	0.0059	78	0.0079	0.0099	84	0.0111	0.0118
Titanium alloys & pure titanium	0.02xD	5.00xD	94	0.0081	0.0097	113	0.0122	122	0.0162	0.0203	132	0.0227	0.0243
H Hardened steel, hardened and tempered, < 55 HRC	0.01xD	5.00xD	34	0.0043	0.0052	41	0.0065	44	0.0086	0.0108	48	0.0121	0.0130

DRILLING

Art. no. 85006

Material/ISO material	a _p max	v _c	f _z /Ø		v _c	f _z /Ø 1.5	v _c	f _z /Ø		v _c	f _z /Ø	
			1.0	1.2				2.0	2.5		2.8	3.0
Unalloyed steel	0.50xD	84	0.0014	0.0017	101	0.0022	109	0.0029	0.0036	118	0.0040	0.0043
P Low-alloyed steel	0.50xD	84	0.0013	0.0015	101	0.0019	109	0.0026	0.0032	118	0.0036	0.0038
High-alloyed steel and tool steel	0.25xD	84	0.0010	0.0012	101	0.0014	109	0.0019	0.0024	118	0.0027	0.0029
Stainless steel, ferritic, martensitic	0.25xD	84	0.0013	0.0015	101	0.0019	109	0.0026	0.0032	118	0.0036	0.0038
M Stainless steel, austenitic	0.25xD	72	0.0011	0.0013	86	0.0017	94	0.0022	0.0028	101	0.0031	0.0034
Duplex steel, high strength stainless steels	0.25xD	54	0.0010	0.0012	65	0.0015	70	0.0020	0.0024	76	0.0027	0.0029
Grey cast iron	0.50xD	72	0.0011	0.0013	86	0.0017	94	0.0022	0.0028	101	0.0031	0.0034
Cast iron with spheroidal graphite iron												
Malleable cast iron												
GJV & ADI	0.50xD	60	0.0010	0.0012	72	0.0015	78	0.0020	0.0025	84	0.0028	0.0030
Aluminium-wrought alloys	0.50xD	102	0.0019	0.0023	122	0.0029	133	0.0038	0.0048	143	0.0054	0.0058
N Aluminium-cast alloys	0.50xD	75	0.0018	0.0021	90	0.0027	97.5	0.0035	0.0044	105	0.0049	0.0053
Copper and copper alloys												
Heat-resistant alloys, Fe-based	0.25xD	60	0.0007	0.0009	72	0.0011	78	0.0014	0.0018	84	0.0020	0.0022
S Heat-resistant alloys, Ni-based, CO-based	0.25xD	34	0.0006	0.0007	41	0.0009	44	0.0012	0.0015	48	0.0016	0.0018
Titanium alloys & pure titanium	0.25xD	54	0.0012	0.0014	65	0.0018	70	0.0024	0.0030	76	0.0034	0.0036

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