Micro-precision drills

Series no. **301**

~5xD	DIN 1899	N	118°	0/-0.004	Cyl	R
Cutting depth	Standard	Type	Point angle	Tolerance on Ø	Shank form	Cutting direction

Tool material: **HSS-E-PM**

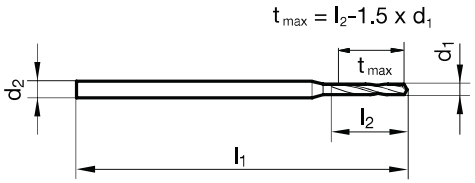
Surface: ◯

P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	●
S	Titanium alloys	○
H	Hardened steel	

●=Optimal
○=Limited

facet point grinding • with reinforced shank • < Ø 0.15 mm Co-alloyed high speed steel

high-alloyed steels



Speeds and feeds information on pg. 488

Diameter (d_1) inch	wire/ltr	mm	d2 h7 mm	l_1 mm	t_{max} mm	l_2 mm	EDP #
0.0020		0.05	1.00	25.00	0.33	0.40	9003010000500
0.0024		0.06	1.00	25.00	0.31	0.40	9003010000600
0.0028		0.07	1.00	25.00	0.40	0.50	9003010000700
0.0030		0.08	1.00	25.00	0.39	0.50	9003010000750
0.0031		0.08	1.00	25.00	0.38	0.50	9003010000800
0.0035		0.09	1.00	25.00	0.37	0.50	9003010000900
0.0039		0.10	1.00	25.00	0.35	0.50	9003010001000
0.0041		0.11	1.00	25.00	0.34	0.50	9003010001050
0.0043		0.11	1.00	25.00	0.34	0.50	9003010001100
0.0045		0.12	1.00	25.00	0.33	0.50	9003010001150
0.0047		0.12	1.00	25.00	0.32	0.50	9003010001200
0.0049		0.13	1.00	25.00	0.61	0.80	9003010001250
0.0050		0.13	1.00	25.00	0.61	0.80	9003010001280
0.0051		0.13	1.00	25.00	0.61	0.80	9003010001300
0.0055		0.14	1.00	25.00	0.59	0.80	9003010001400
0.0056		0.14	1.00	25.00	0.59	0.80	9003010001430
0.0057		0.15	1.00	25.00	0.58	0.80	9003010001450
0.0058		0.15	1.00	25.00	0.58	0.80	9003010001470
0.0059	#97	0.15	1.00	25.00	0.58	0.80	9003010001500
0.0061		0.16	1.00	25.00	0.87	1.10	9003010001550
0.0063	#96	0.16	1.00	25.00	0.86	1.10	9003010001600
0.0067	#95	0.17	1.00	25.00	0.85	1.10	9003010001700
0.0069		0.18	1.00	25.00	0.84	1.10	9003010001750
0.0071	#94	0.18	1.00	25.00	0.83	1.10	9003010001800
0.0075	#93	0.19	1.00	25.00	0.82	1.10	9003010001900
0.0077		0.20	1.00	25.00	1.21	1.50	9003010001950
0.0079	#92	0.20	1.00	25.00	1.20	1.50	9003010002000
0.0081		0.21	1.00	25.00	1.19	1.50	9003010002050
0.0083	#91	0.21	1.00	25.00	1.19	1.50	9003010002100
0.0087	#90	0.22	1.00	25.00	1.17	1.50	9003010002200
0.0089		0.23	1.00	25.00	1.16	1.50	9003010002250
0.0091	#89	0.23	1.00	25.00	1.16	1.50	9003010002300
0.0093		0.24	1.00	25.00	1.15	1.50	9003010002350
0.0094	#88	0.24	1.00	25.00	1.14	1.50	9003010002400
0.0096		0.25	1.00	25.00	1.53	1.90	9003010002450
0.0098	#87	0.25	1.00	25.00	1.53	1.90	9003010002500
0.0100		0.26	1.00	25.00	1.52	1.90	9003010002550
0.0102		0.26	1.00	25.00	1.51	1.90	9003010002600
0.0104		0.27	1.00	25.00	1.50	1.90	9003010002650
0.0106	#86	0.27	1.00	25.00	1.50	1.90	9003010002700
0.0108		0.28	1.00	25.00	1.49	1.90	9003010002750
0.0110	#85	0.28	1.00	25.00	1.48	1.90	9003010002800
0.0114	#84	0.29	1.00	25.00	1.47	1.90	9003010002900
0.0116		0.30	1.00	25.00	1.46	1.90	9003010002950
0.0118		0.30	1.00	25.00	1.45	1.90	9003010003000

Diameter (d_1) inch	wire/ltr	mm	d2 h7 mm	l_1 mm	t_{max} mm	l_2 mm	EDP #
0.0120		0.31	1.00	25.00	1.94	2.40	9003010003050
0.0122	#83	0.31	1.00	25.00	1.94	2.40	9003010003100
0.0124		0.32	1.00	25.00	1.93	2.40	9003010003150
0.0126	#82	0.32	1.00	25.00	1.92	2.40	9003010003200
0.0128		0.33	1.00	25.00	1.91	2.40	9003010003250
0.0130	#81	0.33	1.00	25.00	1.91	2.40	9003010003300
0.0134	#80	0.34	1.00	25.00	1.89	2.40	9003010003400
0.0136		0.35	1.00	25.00	1.88	2.40	9003010003450
0.0138		0.35	1.00	25.00	1.88	2.40	9003010003500
0.0140		0.36	1.00	25.00	1.87	2.40	9003010003550
0.0142		0.36	1.00	25.00	1.86	2.40	9003010003600
0.0144		0.37	1.00	25.00	1.85	2.40	9003010003650
0.0146	#79	0.37	1.00	25.00	1.85	2.40	9003010003700
0.0148		0.38	1.00	25.00	1.84	2.40	9003010003750
0.0150		0.38	1.00	25.00	1.83	2.40	9003010003800
0.0152		0.39	1.00	25.00	2.42	3.00	9003010003850
0.0154		0.39	1.00	25.00	2.42	3.00	9003010003900
0.0157	1/64	0.40	1.00	25.00	2.40	3.00	9003010004000
0.0159		0.41	1.00	25.00	2.39	3.00	9003010004050
0.0161	#78	0.41	1.00	25.00	2.39	3.00	9003010004100
0.0163		0.42	1.00	25.00	2.38	3.00	9003010004150
0.0165		0.42	1.00	25.00	2.37	3.00	9003010004200
0.0167		0.43	1.00	25.00	2.36	3.00	9003010004250
0.0169		0.43	1.00	25.00	2.36	3.00	9003010004300
0.0170		0.43	1.00	25.00	2.35	3.00	9003010004320
0.0173		0.44	1.00	25.00	2.34	3.00	9003010004400
0.0175		0.45	1.00	25.00	2.33	3.00	9003010004450
0.0177		0.45	1.00	25.00	2.33	3.00	9003010004500
0.0181	#77	0.46	1.00	25.00	2.31	3.00	9003010004600
0.0185		0.47	1.00	25.00	2.30	3.00	9003010004700
0.0187		0.48	1.00	25.00	2.29	3.00	9003010004750
0.0189		0.48	1.00	25.00	2.28	3.00	9003010004800
0.0191		0.49	1.00	25.00	2.67	3.40	9003010004850
0.0193		0.49	1.00	25.00	2.67	3.40	9003010004900
0.0195		0.50	1.00	25.00	2.66	3.40	9003010004950
0.0197		0.50	1.00	25.00	2.65	3.40	9003010005000
0.0199		0.51	1.00	25.00	2.64	3.40	9003010005050
0.0201	#76	0.51	1.00	25.00	2.64	3.40	9003010005100
0.0203		0.52	1.00	25.00	2.63	3.40	9003010005150
0.0205		0.52	1.00	25.00	2.62	3.40	9003010005200
0.0207		0.53	1.00	25.00	2.61	3.40	9003010005250
0.0209	#75	0.53	1.00	25.00	2.61	3.40	9003010005300
0.0211		0.54	1.00	25.00	3.10	3.90	9003010005350
0.0213		0.54	1.00	25.00	3.09	3.90	9003010005400
0.0215		0.55	1.00	25.00	3.08	3.90	9003010005450

Diameter (d_1) inch	wire/ltr	mm	d2 h7 mm	l_1 mm	t_{max} mm	l_2 mm	EDP #
0.0217		0.55	1.00	25.00	3.08	3.90	9003010005500
0.0219		0.56	1.00	25.00	3.07	3.90	9003010005550
0.0220		0.56	1.00	25.00	3.06	3.90	9003010005600
0.0224	#74	0.57	1.00	25.00	3.05	3.90	9003010005700
0.0228		0.58	1.00	25.00	3.03	3.90	9003010005800
0.0230		0.59	1.00	25.00	3.02	3.90	9003010005850
0.0232		0.59	1.00	25.00	3.02	3.90	9003010005900
0.0234		0.60	1.00	25.00	3.01	3.90	9003010005950
0.0236		0.60	1.00	25.00	3.00	3.90	9003010006000
0.0238		0.61	1.00	25.00	3.29	4.20	9003010006050
0.0240	#73	0.61	1.00	25.00	3.29	4.20	9003010006100
0.0242		0.62	1.00	25.00	3.28	4.20	9003010006150
0.0244		0.62	1.00	25.00	3.27	4.20	9003010006200
0.0246		0.63	1.00	25.00	3.26	4.20	9003010006250
0.0248		0.63	1.00	25.00	3.26	4.20	9003010006300
0.0249		0.63	1.00	25.00	3.25	4.20	9003010006320
0.0252	#72	0.64	1.00	25.00	3.24	4.20	9003010006400
0.0256		0.65	1.00	25.00	3.23	4.20	9003010006500
0.0258		0.66	1.00	25.00	3.22	4.20	9003010006550
0.0260	#71	0.66	1.00	25.00	3.21	4.20	9003010006600
0.0262		0.67	1.00	25.00	3.20	4.20	9003010006650
0.0264		0.67	1.00	25.00	3.20	4.20	9003010006700
0.0266		0.68	1.00	25.00	3.79	4.80	9003010006750
0.0268		0.68	1.00	25.00	3.78	4.80	9003010006800
0.0272		0.69	1.00	25.00	3.77	4.80	9003010006900
0.0276		0.70	1.00	25.00	3.75	4.80	9003010007000
0.0278		0.71	1.00	25.00	3.74	4.80	9003010007050
0.0280	#70	0.71	1.00	25.00	3.74	4.80	9003010007100
0.0283		0.72	1.00	25.00	3.72	4.80	9003010007200
0.0285		0.73	1.00	25.00	3.71	4.80	9003010007250
0.0287		0.73	1.00	25.00	3.71	4.80	9003010007300
0.0291	#69	0.74	1.00	25.00	3.69	4.80	9003010007400
0.0295		0.75	1.00	25.00	3.68	4.80	9003010007500
0.0299		0.76	1.00	25.00	4.16	5.30	9003010007600
0.0303		0.77	1.00	25.00	4.15	5.30	9003010007700
0.0307		0.78	1.00	25.00	4.13	5.30	9003010007800
0.0311	1/32 #68	0.79	1.00	25.00	4.12	5.30	9003010007900
0.0313		0.80	1.50	25.00	4.11	5.30	9003010007950
0.0315		0.80	1.50	25.00	4.10	5.30	9003010008000
0.0319	#67	0.81	1.50	25.00	4.09	5.30	9003010008100
0.0323		0.82	1.50	25.00	4.07	5.30	9003010008200
0.0327		0.83	1.50	25.00	4.06	5.30	9003010008300
0.0331	#66	0.84	1.50	25.00	4.04	5.30	9003010008400
0.0335		0.85	1.50	25.00	4.03	5.30	9003010008500
0.0339		0.86	1.50	25.00	4.71	6.00	9003010008600
0.0343		0.87	1.50	25.00	4.70	6.00	9003010008700
0.0346		0.88	1.50	25.00	4.68	6.00	9003010008800
0.0350	#65	0.89	1.50	25.00	4.67	6.00	9003010008900
0.0354		0.90	1.50	25.00	4.65	6.00	9003010009000
0.0358	#64	0.91	1.50	25.00	4.64	6.00	9003010009100
0.0362		0.92	1.50	25.00	4.62	6.00	9003010009200
0.0364		0.93	1.50	25.00	4.61	6.00	9003010009250
0.0366		0.93	1.50	25.00	4.61	6.00	9003010009300
0.0370	#63	0.94	1.50	25.00	4.59	6.00	9003010009400
0.0374		0.95	1.50	25.00	4.58	6.00	9003010009500
0.0378		0.96	1.50	25.00	5.36	6.80	9003010009600
0.0382	#62	0.97	1.50	25.00	5.35	6.80	9003010009700
0.0386		0.98	1.50	25.00	5.33	6.80	9003010009800
0.0390	#61	0.99	1.50	25.00	5.32	6.80	9003010009900
0.0394		1.00	1.50	25.00	5.30	6.80	9003010010000
0.0398		1.01	1.50	25.00	5.29	6.80	9003010010100
0.0402	#60	1.02	1.50	25.00	5.27	6.80	9003010010200
0.0406		1.03	1.50	25.00	5.26	6.80	9003010010300
0.0409	#59	1.04	1.50	25.00	5.24	6.80	9003010010400
0.0413		1.05	1.50	25.00	5.23	6.80	9003010010500
0.0415		1.06	1.50	25.00	5.22	6.80	9003010010550
0.0417		1.06	1.50	25.00	5.21	6.80	9003010010600
0.0421	#58	1.07	1.50	25.00	6.00	7.60	9003010010700
0.0425		1.08	1.50	25.00	5.98	7.60	9003010010800
0.0429	#57	1.09	1.50	25.00	5.97	7.60	9003010010900
0.0431		1.10	1.50	25.00	5.96	7.60	9003010010950
0.0433		1.10	1.50	25.00	5.95	7.60	9003010011000
0.0437		1.11	1.50	25.00	5.94	7.60	9003010011100
0.0441		1.12	1.50	25.00	5.92	7.60	9003010011200
0.0445		1.13	1.50	25.00	5.91	7.60	9003010011300
0.0449		1.14	1.50	25.00	5.89	7.60	9003010011400
0.0453		1.15	1.50	25.00	5.88	7.60	9003010011500
0.0457		1.16	1.50	25.00	5.86	7.60	9003010011600
0.0461		1.17	1.50	25.00	5.85	7.60	9003010011700
0.0463		1.18	1.50	25.00	5.84	7.60	9003010011750
0.0465	#56	1.18	1.50	25.00	5.83	7.60	9003010011800
0.0469	3/64	1.19	1.50	25.00	6.72	8.50	9003010011900
0.0472		1.20	1.50	25.00	6.70	8.50	9003010012000
0.0476		1.21	1.50	25.00	6.69	8.50	9003010012100
0.0480		1.22	1.50	25.00	6.67	8.50	9003010012200
0.0484		1.23	1.50	25.00	6.66	8.50	9003010012300
0.0488		1.24	1.50	25.00	6.64	8.50	9003010012400
0.0492		1.25	1.50	25.00	6.63	8.50	9003010012500
0.0496		1.26	1.50	25.00	6.61	8.50	9003010012600
0.0498		1.27	1.50	25.00	6.60	8.50	9003010012650
0.0500		1.27	1.50	25.00	6.60	8.50	9003010012700
0.0504		1.28	1.50	25.00	6.58	8.50	9003010012800
0.0508		1.29	1.50	25.00	6.57	8.50	9003010012900
0.0512		1.30	1.50	25.00	6.55	8.50	9003010013000
0.0516		1.31	1.50	25.00	6.54	8.50	9003010013100
0.0520	#55	1.32	1.50	25.00	6.52	8.50	9003010013200
0.0524		1.33	1.50	25.00	7.51	9.50	9003010013300
0.0528		1.34	1.50	25.00	7.49	9.50	9003010013400
0.0531		1.35	1.50	25.00	7.48	9.50	9003010013500
0.0539		1.37	1.50	25.00	7.45	9.50	9003010013700
0.0543		1.38	1.50	25.00	7.43	9.50	9003010013800
0.0547		1.39	1.50	25.00	7.42	9.50	9003010013900
0.0551	#54	1.40	1.50	25.00	7.40	9.50	9003010014000
0.0555		1.41	1.50	25.00	7.39	9.50	9003010014100
0.0559		1.42	1.50	25.00	7.37	9.50	9003010014200
0.0563		1.43	1.50	25.00	7.36	9.50	9003010014300
0.0567		1.44	1.50	25.00	7.34	9.50	9003010014400
0.0571		1.45	1.50	25.00	7.33	9.50	9003010014500
0.0575		1.46	2.00	30.00	7.31	9.50	9003010014600
0.0579		1.47	2.00	30.00	7.30	9.50	9003010014700
0.0591		1.50	2.00	30.00	7.25	9.50	9003010015000
0.0602		1.53	2.00	30.00	8.31	10.60	9003010015300
0.0610		1.55	2.00	30.00	8.28	10.60	9003010015500
0.0626	1/16	1.59	2.00	30.00	8.22	10.60	9003010015900
0.0630		1.60	2.00	30.00	8.20	10.60	9003010016000
0.0634	#52	1.61	2.00	30.00	8.19	10.60	9003010016100
0.0650		1.65	2.00	30.00	8.13	10.60	9003010016500
0.0669	#51	1.70	2.00	30.00	8.05	10.60	9003010017000
0.0673		1.71	2.00	30.00	9.24	11.80	9003010017100
0.0681		1.73	2.00	30.00	9.21	11.80	9003010017300
0.0687		1.75	2.00	30.00	9.18	11.80	9003010017450
0.0689		1.75	2.00	30.00	9.18	11.80	9003010017500
0.0699		1.78	2.00	30.00	9.14	11.80	9003010017750
0.0709		1.80	2.00	30.00	9.10	11.80	9003010018000
0.0720		1.83	2.00	30.00	9.06	11.80	9003010018300
0.0724		1.84	2.00	30.00	9.04	11.80	9003010018400
0.0728	#49	1.85	2.00	30.00	9.03	11.80	9003010018500
0.0748		1.90	2.00	30.00	8.95	11.80	9003010019000
0.0756		1.92	2.00	30.00	10.32	13.20	9003010019200

Series # 294

Material group	Hardness HRc	Hardness Bhn	SFM	Feed Rate - IPR .5 mm	1.0 mm	2.0 mm	2.5 mm	3.15 mm	4.0 mm	5.0 mm	6.3 mm	8 mm
Common structural steels	-	≤ 150	100	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
	≤ 32	≤ 301	80	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
Free-cutting steels	≤ 25	≤ 255	100	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
	≤ 32	≤ 301	100	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
Unalloyed heat-treatable steels	≤ 20	≤ 220	80	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
	≤ 25	≤ 255	65	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
	≤ 32	≤ 301	65	0.0003	0.0005	0.0013	0.0016	0.0020	0.0025	0.0025	0.0031	0.0039
Alloyed heat-treatable steels	≤ 32	≤ 301	50	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
	≤ 43	≤ 402	25	0.0003	0.0005	0.0013	0.0016	0.0020	0.0025	0.0025	0.0031	0.0039
Unalloyed case hardened steels	≤ 25	≤ 255	80	0.0004	0.0006	0.0020	0.0025	0.0031	0.0039	0.0039	0.0049	0.0063
Alloyed case hardened steels	≤ 32	≤ 301	50	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
	≤ 43	≤ 402	25	0.0003	0.0005	0.0013	0.0016	0.0020	0.0025	0.0025	0.0031	0.0039
Nitriding steels	≤ 32	≤ 301	35	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
	≤ 43	≤ 402	25	0.0003	0.0005	0.0013	0.0016	0.0020	0.0025	0.0025	0.0031	0.0039
Tool steels	≤ 25	≤ 255	35	0.0003	0.0005	0.0013	0.0016	0.0020	0.0025	0.0025	0.0031	0.0039
	≤ 43	≤ 402	20	0.0003	0.0005	0.0013	0.0016	0.0020	0.0025	0.0025	0.0031	0.0039
High speed steels	≤ 43	≤ 402	20	0.0003	0.0005	0.0013	0.0016	0.0020	0.0025	0.0025	0.0031	0.0039
Spring steels	≤ 38	≤ 354	15	0.0002	0.0003	0.0010	0.0013	0.0016	0.0020	0.0020	0.0025	0.0031
Hardened steels	≤ 48	≤ 460										
	≤ 66	-										
Stainless steels, sulphured	≤ 28	≤ 273	35	0.0003	0.0005	0.0013	0.0016	0.0020	0.0025	0.0025	0.0031	0.0039
austenitic	≤ 36	≤ 337	25	0.0003	0.0005	0.0013	0.0016	0.0020	0.0025	0.0025	0.0031	0.0039
martensitic	≤ 46	≤ 435	20	0.0003	0.0005	0.0013	0.0016	0.0020	0.0025	0.0025	0.0031	0.0039
Cast iron	≤ 23	≤ 242	65	0.0005	0.0007	0.0025	0.0031	0.0039	0.0049	0.0049	0.0063	0.0079
	≤ 38	≤ 354	65	0.0004	0.0006	0.0020	0.0025	0.0031	0.0039	0.0039	0.0049	0.0063
Spheroidal graphite iron and malleable cast iron	≤ 23	≤ 242	80	0.0005	0.0007	0.0025	0.0031	0.0039	0.0049	0.0049	0.0063	0.0079
	≤ 38	≤ 354	65	0.0004	0.0006	0.0020	0.0025	0.0031	0.0039	0.0039	0.0049	0.0063
Chilled cast iron	≤ 38	≤ 354										
New cast materials GGV	≤ 20	≤ 220										
	≤ 32	≤ 301										
New cast materials ADI	≤ 32	≤ 301										
	≤ 43	≤ 402										
Special alloys	≤ 54	≤ 549	10	0.0002	0.0002	0.0008	0.0010	0.0013	0.0016	0.0016	0.0020	0.0025
Ti and Ti-alloys	≤ 25	≤ 255	15	0.0002	0.0003	0.0010	0.0013	0.0016	0.0020	0.0020	0.0025	0.0031
	≤ 43	≤ 402	15	0.0002	0.0003	0.0010	0.0013	0.0016	0.0020	0.0020	0.0025	0.0031
Aluminium and Al-alloys	-	≤ 120	230	0.0006	0.0008	0.0031	0.0039	0.0049	0.0063	0.0063	0.0079	0.0098
Al wrought alloys	-	≤ 200	230	0.0006	0.0008	0.0031	0.0039	0.0049	0.0063	0.0063	0.0079	0.0098
Al cast alloys ≤ 10 % Si	-	≤ 180	130	0.0005	0.0007	0.0025	0.0031	0.0039	0.0049	0.0049	0.0063	0.0079
≤ 24 % Si	-	≤ 180	130	0.0005	0.0007	0.0025	0.0031	0.0039	0.0049	0.0049	0.0063	0.0079
Magnesium alloys	-	≤ 120	195	0.0005	0.0007	0.0025	0.0031	0.0039	0.0049	0.0049	0.0063	0.0079
Copper, low-alloyed	-	≤ 150	165	0.0004	0.0006	0.0020	0.0025	0.0031	0.0039	0.0039	0.0049	0.0063
Brass, short-chipping	-	≤ 180	195	0.0004	0.0006	0.0020	0.0025	0.0031	0.0039	0.0039	0.0049	0.0063
long-chipping	-	≤ 180	130	0.0004	0.0006	0.0020	0.0025	0.0031	0.0039	0.0039	0.0049	0.0063
Bronze, short-chipping	-	≤ 180	100	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
	≤ 25	≤ 255	80	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
Bronze, long-chipping	≤ 25	≤ 255	50	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
	≤ 32	≤ 301	50	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
Duroplastics			50	0.0003	0.0006	0.0016	0.0020	0.0025	0.0031	0.0031	0.0039	0.0049
Thermoplastics			80	0.0004	0.0006	0.0020	0.0025	0.0031	0.0039	0.0039	0.0049	0.0063
Reinforced plastics - Kevlar												
Reinforced plastics - GFK / CFK												

Series # 301

Material group	Hardness HRc	Hardness Bhn	SFM	Feed Rate - IPR .0039 in. .10 mm	.0063 in. .16 mm	.0098 in .25 mm	.0118 in. .30 mm	.0197 in. .50 mm	.0248 in. .63 mm	.0315 in. .8 mm	.0394 in. 1.0 mm	.0591 in. 1.5 mm	.0787 in. 2.0 mm
Common structural steels	-	≤ 150	70	0.0003	0.0004	0.0004	0.0006	0.0007	0.0010	0.0012	0.0020	0.0024	0.0031
	≤ 32	≤ 301	60	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0009	0.0016	0.0020	0.0028
Free-cutting steels	≤ 25	≤ 255	60	0.0003	0.0004	0.0004	0.0006	0.0007	0.0010	0.0012	0.0020	0.0024	0.0031
	≤ 32	≤ 301	50	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0009	0.0016	0.0020	0.0028
Unalloyed heat-treatable steels	≤ 20	≤ 220	65	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0009	0.0016	0.0020	0.0028
	≤ 25	≤ 255	60	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0009	0.0016	0.0020	0.0028
	≤ 32	≤ 301	45	0.0002	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0014	0.0018	0.0024
Alloyed heat-treatable steels	≤ 32	≤ 301	45	0.0002	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0014	0.0018	0.0024
	≤ 43	≤ 402	40	0.0001	0.0002	0.0002	0.0003	0.0003	0.0005	0.0006	0.0011	0.0016	0.0021
Unalloyed case hardened steels	≤ 25	≤ 255	60	0.0003	0.0004	0.0004	0.0006	0.0007	0.0010	0.0012	0.0020	0.0024	0.0031
Alloyed case hardened steels	≤ 32	≤ 301	45	0.0002	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0014	0.0018	0.0024
	≤ 43	≤ 402	40	0.0001	0.0002	0.0002	0.0003	0.0003	0.0005	0.0006	0.0011	0.0016	0.0021
Nitriding steels	≤ 32	≤ 301	45	0.0002	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0014	0.0018	0.0024
	≤ 43	≤ 402	40	0.0001	0.0002	0.0002	0.0003	0.0003	0.0005	0.0006	0.0011	0.0016	0.0021
Tool steels	≤ 25	≤ 255	50	0.0002	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0014	0.0018	0.0024
	≤ 43	≤ 402	45	0.0001	0.0002	0.0002	0.0003	0.0003	0.0005	0.0006	0.0011	0.0016	0.0021
High speed steels	≤ 43	≤ 402	45	0.0001	0.0002	0.0002	0.0003	0.0003	0.0005	0.0006	0.0011	0.0016	0.0021
Spring steels	≤ 38	≤ 354	25	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	0.0009	0.0014	0.0018
Hardened steels	≤ 48	≤ 460											
	≤ 66	-											
Stainless steels, sulphured	≤ 28	≤ 273	60	0.0002	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0014	0.0018	0.0024
austenitic	≤ 36	≤ 337	45	0.0001	0.0002	0.0002	0.0003	0.0003	0.0005	0.0006	0.0011	0.0016	0.0021
martensitic	≤ 46	≤ 435	50	0.0001	0.0002	0.0002	0.0003	0.0003	0.0005	0.0006	0.0011	0.0016	0.0021
Cast iron	≤ 23	≤ 242	85	0.0003	0.0004	0.0004	0.0006	0.0007	0.0010	0.0012	0.0020	0.0024	0.0031
	≤ 38	≤ 354	70	0.0003	0.0004	0.0004	0.0006	0.0007	0.0010	0.0012	0.0020	0.0024	0.0031
Spheroidal graphite iron and malleable cast iron	≤ 23	≤ 242	60	0.0003	0.0004	0.0004	0.0006	0.0007	0.0010	0.0012	0.0020	0.0024	0.0031
	≤ 38	≤ 354	70	0.0003	0.0004	0.0004	0.0006	0.0007	0.0010	0.0012	0.0020	0.0024	0.0031
Chilled cast iron	≤ 38	≤ 354											
New cast materials GGV	≤ 20	≤ 220											
	≤ 32	≤ 301											
New cast materials ADI	≤ 32	≤ 301											
	≤ 43	≤ 402											
Special alloys	≤ 54	≤ 549											
Ti and Ti-alloys	≤ 25	≤ 255											
	≤ 43	≤ 402											
Aluminium and Al-alloys	-	≤ 120											
Al wrought alloys	-	≤ 200											
Al cast alloys ≤ 10 % Si	-	≤ 180	85	0.0004	0.0005	0.0006	0.0007	0.0009	0.0013	0.0015	0.0024	0.0027	0.0037
≤ 24 % Si	-	≤ 180	60	0.0003	0.0004	0.0004	0.0006	0.0007	0.0010	0.0012	0.0020	0.0024	0.0031
Magnesium alloys	-	≤ 120	245	0.0003	0.0004	0.0004	0.0006	0.0007	0.0010	0.0012	0.0020	0.0024	0.0031
Copper, low-alloyed	-	≤ 150	140	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0009	0.0016	0.0020	0.0028
Brass, short-chipping	-	≤ 180											
long-chipping	-	≤ 180	70	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0009	0.0016	0.0020	0.0028
Bronze, short-chipping	-	≤ 180	70	0.0002	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0014	0.0018	0.0024
	≤ 25	≤ 255	60	0.0002	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0014	0.0018	0.0024
Bronze, long-chipping	≤ 25	≤ 255	45	0.0002	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0014	0.0018	0.0024
	≤ 32	≤ 301											
Duroplastics			50	0.0002	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0014	0.0018	0.0024
Thermoplastics			60	0.0002	0.0002	0.0003	0.0004	0.0004	0.0006	0.0008	0.0014	0.0018	0.0024
Reinforced plastics - Kevlar													
Reinforced plastics - GFK / CFK													