5xD 3-flute drills

Series no. **1452**

5xD Cutting depth | GS 200 U Type | 150° Point angle | h7 Tolerance on Ø | Without Internal coolant | Cyl Shank form | R Cutting direction | GUHRING QUALITY

Tool material: **Solid Carbide**

Surface: ○

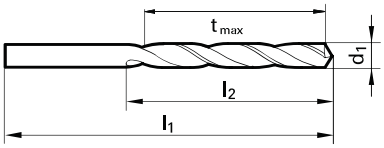
P	Steel	○
M	Stainless steel	
K	Cast iron	○
N	Aluminum	○
S	Titanium alloys	
H	Hardened steel	

●=Optimal
○=Limited

web thinning ≥ Ø 3.000 • facet point grinding • for holes with high alignment accuracy • very good surface quality of hole • suitable for interrupted cutting

cast steel • alloyed/unalloyed steels up to 1000 N/mm²

$t_{max} = l_2\text{-}1{,}5 \times d_1$



Speeds and feeds information on pg. 535

Shank diameter = cut diameter

Diameter (d1) inch	wire/ltr	mm	l1 mm	t_{max} mm	l2 mm	EDP #
0.1181		3.00	46.00	17.50	22.00	9014520030000
0.1201	#31	3.05	49.00	19.43	24.00	9014520030500
0.1220		3.10	49.00	19.35	24.00	9014520031000
0.1248	1/8	3.17	49.00	19.25	24.00	9014520031700
0.1260		3.20	49.00	19.20	24.00	9014520032000
0.1299		3.30	49.00	19.05	24.00	9014520033000
0.1339		3.40	52.00	21.90	27.00	9014520034000
0.1358	#29	3.45	52.00	21.83	27.00	9014520034500
0.1378		3.50	52.00	21.75	27.00	9014520035000
0.1406	9/64 #28	3.57	52.00	21.65	27.00	9014520035700
0.1417		3.60	52.00	21.60	27.00	9014520036000
0.1457		3.70	52.00	21.45	27.00	9014520037000
0.1496	#25	3.80	55.00	24.30	30.00	9014520038000
0.1535		3.90	55.00	24.15	30.00	9014520039000
0.1563	5/32	3.97	55.00	24.05	30.00	9014520039700
0.1575		4.00	55.00	24.00	30.00	9014520040000
0.1614		4.10	55.00	23.85	30.00	9014520041000
0.1654		4.20	55.00	23.70	30.00	9014520042000
0.1693	#18	4.30	58.00	25.55	32.00	9014520043000
0.1720	11/64	4.37	58.00	25.45	32.00	9014520043700
0.1732		4.40	58.00	25.40	32.00	9014520044000
0.1772	#16	4.50	58.00	25.25	32.00	9014520045000
0.1811		4.60	58.00	25.10	32.00	9014520046000
0.1850	#13	4.70	58.00	24.95	32.00	9014520047000
0.1874	3/16	4.76	62.00	27.86	35.00	9014520047600
0.1890	#12	4.80	62.00	27.80	35.00	9014520048000
0.1929		4.90	62.00	27.65	35.00	9014520049000
0.1969		5.00	62.00	27.50	35.00	9014520050000
0.2008		5.10	62.00	27.35	35.00	9014520051000
0.2031	13/64	5.16	62.00	27.26	35.00	9014520051600
0.2047		5.20	62.00	27.20	35.00	9014520052000
0.2087		5.30	62.00	27.05	35.00	9014520053000
0.2126		5.40	66.00	30.90	39.00	9014520054000
0.2165		5.50	66.00	30.75	39.00	9014520055000
0.2189	7/32	5.56	66.00	30.66	39.00	9014520055600
0.2205		5.60	66.00	30.60	39.00	9014520056000
0.2244		5.70	66.00	30.45	39.00	9014520057000
0.2283		5.80	66.00	30.30	39.00	9014520058000
0.2323		5.90	66.00	30.15	39.00	9014520059000
0.2343	15/64	5.95	66.00	30.08	39.00	9014520059500
0.2362		6.00	66.00	30.00	39.00	9014520060000
0.2402		6.10	70.00	32.85	42.00	9014520061000

Diameter (d1) inch	wire/ltr	mm	l1 mm	t_{max} mm	l2 mm	EDP #
0.2421	C	6.15	70.00	32.78	42.00	9014520061500
0.2441		6.20	70.00	32.70	42.00	9014520062000
0.2480		6.30	70.00	32.55	42.00	9014520063000
0.2500	1/4 E	6.35	70.00	32.48	42.00	9014520063500
0.2520		6.40	70.00	32.40	42.00	9014520064000
0.2559		6.50	70.00	32.25	42.00	9014520065000
0.2598		6.60	70.00	32.10	42.00	9014520066000
0.2638		6.70	70.00	31.95	42.00	9014520067000
0.2657	17/64 H	6.75	74.00	34.88	45.00	9014520067500
0.2677		6.80	74.00	34.80	45.00	9014520068000
0.2717	I	6.90	74.00	34.65	45.00	9014520069000
0.2756		7.00	74.00	34.50	45.00	9014520070000
0.2795		7.10	74.00	34.35	45.00	9014520071000
0.2811	9/32 K	7.14	74.00	34.29	45.00	9014520071400
0.2835		7.20	74.00	34.20	45.00	9014520072000
0.2874		7.30	74.00	34.05	45.00	9014520073000
0.2913		7.40	74.00	33.90	45.00	9014520074000
0.2953		7.50	74.00	33.75	45.00	9014520075000
0.2969	19/64	7.54	79.00	36.69	48.00	9014520075400
0.2992		7.60	79.00	36.60	48.00	9014520076000
0.3031		7.70	79.00	36.45	48.00	9014520077000
0.3071		7.80	79.00	36.30	48.00	9014520078000
0.3110		7.90	79.00	36.15	48.00	9014520079000
0.3126	5/16	7.94	79.00	36.09	48.00	9014520079400
0.3150		8.00	79.00	36.00	48.00	9014520080000
0.3189		8.10	79.00	35.85	48.00	9014520081000
0.3228	P	8.20	79.00	35.70	48.00	9014520082000
0.3268		8.30	79.00	35.55	48.00	9014520083000
0.3280	21/64	8.33	79.00	35.51	48.00	9014520083300
0.3307		8.40	79.00	35.40	48.00	9014520084000
0.3319	Q	8.43	79.00	35.36	48.00	9014520084300
0.3346		8.50	79.00	35.25	48.00	9014520085000
0.3386		8.60	84.00	39.10	52.00	9014520086000
0.3425		8.70	84.00	38.95	52.00	9014520087000
0.3437	11/32	8.73	84.00	38.91	52.00	9014520087300
0.3465		8.80	84.00	38.80	52.00	9014520088000
0.3504		8.90	84.00	38.65	52.00	9014520089000
0.3543		9.00	84.00	38.50	52.00	9014520090000
0.3583		9.10	84.00	38.35	52.00	9014520091000
0.3594	23/64	9.13	84.00	38.31	52.00	9014520091300
0.3622		9.20	84.00	38.20	52.00	9014520092000
0.3661		9.30	84.00	38.05	52.00	9014520093000

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Diameter (d1) inch	wire/ltr	mm	l1 mm	t_{max} mm	l2 mm	EDP #
0.3701		9.40	84.00	37.90	52.00	**9014520094000**
0.3740		9.50	84.00	37.75	52.00	**9014520095000**
0.3748	3/8	9.52	89.00	40.72	55.00	**9014520095200**
0.3780		9.60	89.00	40.60	55.00	**9014520096000**
0.3819		9.70	89.00	40.45	55.00	**9014520097000**
0.3858	W	9.80	89.00	40.30	55.00	**9014520098000**
0.3898		9.90	89.00	40.15	55.00	**9014520099000**
0.3906	25/64	9.92	89.00	40.12	55.00	**9014520099200**
0.3937		10.00	89.00	40.00	55.00	**9014520100000**
0.3976		10.10	89.00	39.85	55.00	**9014520101000**
0.4016		10.20	89.00	39.70	55.00	**9014520102000**
0.4055		10.30	89.00	39.55	55.00	**9014520103000**
0.4063	13/32	10.32	89.00	39.52	55.00	**9014520103200**
0.4094		10.40	89.00	39.40	55.00	**9014520104000**
0.4134		10.50	89.00	39.25	55.00	**9014520105000**
0.4173		10.60	89.00	39.10	55.00	**9014520106000**
0.4213		10.70	95.00	43.95	60.00	**9014520107000**
0.4220	27/64	10.72	95.00	43.92	60.00	**9014520107200**
0.4252		10.80	95.00	43.80	60.00	**9014520108000**
0.4291		10.90	95.00	43.65	60.00	**9014520109000**
0.4331		11.00	95.00	43.50	60.00	**9014520110000**
0.4370		11.10	95.00	43.35	60.00	**9014520111000**
0.4374	7/16	11.11	95.00	43.34	60.00	**9014520111100**
0.4409		11.20	95.00	43.20	60.00	**9014520112000**
0.4449		11.30	95.00	43.05	60.00	**9014520113000**
0.4488		11.40	95.00	42.90	60.00	**9014520114000**
0.4528		11.50	95.00	42.75	60.00	**9014520115000**
0.4531	29/64	11.51	95.00	42.74	60.00	**9014520115100**
0.4567		11.60	95.00	42.60	60.00	**9014520116000**
0.4606		11.70	95.00	42.45	60.00	**9014520117000**
0.4646		11.80	95.00	42.30	60.00	**9014520118000**
0.4685		11.90	102.00	47.15	65.00	**9014520119000**
0.4689	15/32	11.91	102.00	47.14	65.00	**9014520119100**
0.4724		12.00	102.00	47.00	65.00	**9014520120000**
0.4764		12.10	102.00	46.85	65.00	**9014520121000**
0.4803		12.20	102.00	46.70	65.00	**9014520122000**
0.4843	31/64	12.30	102.00	46.55	65.00	**9014520123000**
0.4882		12.40	102.00	46.40	65.00	**9014520124000**
0.4921		12.50	102.00	46.25	65.00	**9014520125000**
0.4961		12.60	102.00	46.10	65.00	**9014520126000**
0.5000	1/2	12.70	102.00	45.95	65.00	**9014520127000**
0.5039		12.80	102.00	45.80	65.00	**9014520128000**
0.5079		12.90	102.00	45.65	65.00	**9014520129000**
0.5118		13.00	102.00	45.50	65.00	**9014520130000**

Diameter (d1) inch	wire/ltr	mm	l1 mm	t_{max} mm	l2 mm	EDP #
0.5157	33/64	13.10	102.00	45.35	65.00	**9014520131000**
0.5197		13.20	102.00	45.20	65.00	**9014520132000**
0.5236		13.30	107.00	46.05	66.00	**9014520133000**
0.5276		13.40	107.00	45.90	66.00	**9014520134000**
0.5315		13.50	107.00	45.75	66.00	**9014520135000**
0.5354		13.60	107.00	45.60	66.00	**9014520136000**
0.5394		13.70	107.00	45.45	66.00	**9014520137000**
0.5433		13.80	107.00	45.30	66.00	**9014520138000**
0.5472		13.90	107.00	45.15	66.00	**9014520139000**
0.5512		14.00	107.00	45.00	66.00	**9014520140000**
0.5551		14.10	111.00	48.85	70.00	**9014520141000**
0.5591		14.20	111.00	48.70	70.00	**9014520142000**
0.5626	9/16	14.29	111.00	48.57	70.00	**9014520142900**
0.5630		14.30	111.00	48.55	70.00	**9014520143000**
0.5669		14.40	111.00	48.40	70.00	**9014520144000**
0.5709		14.50	111.00	48.25	70.00	**9014520145000**
0.5748		14.60	111.00	48.10	70.00	**9014520146000**
0.5787		14.70	111.00	47.95	70.00	**9014520147000**
0.5827		14.80	111.00	47.80	70.00	**9014520148000**
0.5866		14.90	111.00	47.65	70.00	**9014520149000**
0.5906		15.00	111.00	47.50	70.00	**9014520150000**
0.5945		15.10	115.00	50.35	73.00	**9014520151000**
0.5984		15.20	115.00	50.20	73.00	**9014520152000**
0.6024		15.30	115.00	50.05	73.00	**9014520153000**
0.6063		15.40	115.00	49.90	73.00	**9014520154000**
0.6102		15.50	115.00	49.75	73.00	**9014520155000**
0.6142		15.60	115.00	49.60	73.00	**9014520156000**
0.6181		15.70	115.00	49.45	73.00	**9014520157000**
0.6220		15.80	115.00	49.30	73.00	**9014520158000**
0.6248	5/8	15.87	115.00	49.20	73.00	**9014520158700**
0.6260		15.90	115.00	49.15	73.00	**9014520159000**
0.6299		16.00	115.00	49.00	73.00	**9014520160000**
0.6406	41/64	16.27	119.00	48.60	73.00	**9014520162700**
0.6496		16.50	119.00	48.25	73.00	**9014520165000**
0.6563	21/32	16.67	119.00	48.00	73.00	**9014520166700**
0.6693		17.00	119.00	47.50	73.00	**9014520170000**
0.6874	11/16	17.46	123.00	49.81	76.00	**9014520174600**
0.6890		17.50	123.00	49.75	76.00	**9014520175000**
0.7087		18.00	123.00	49.00	76.00	**9014520180000**
0.7283		18.50	127.00	48.25	76.00	**9014520185000**
0.7480		19.00	127.00	47.50	76.00	**9014520190000**
0.7500	3/4	19.05	131.00	50.43	79.00	**9014520190500**
0.7677		19.50	131.00	49.75	79.00	**9014520195000**
0.7874		20.00	131.00	49.00	79.00	**9014520200000**

Series # 1452

Material group	Hardness HRc	Hardness Bhn	SFM	Feed Rate - IPR 1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	-	≤ 150	280		0,0030	0,0050	0,0065	0,0080	0,0080				
	≤ 32	≤ 301	250		0,0025	0,0040	0,0050	0,0065	0,0065				
Free-cutting steels	≤ 25	≤ 255	300		0,0040	0,0065	0,0080	0,0100	0,0100				
	≤ 32	≤ 301	220		0,0030	0,0050	0,0065	0,0080	0,0080				
Unalloyed heat-treatable steels	≤ 20	≤ 220	195		0,0030	0,0050	0,0065	0,0080	0,0080				
	≤ 25	≤ 255	185		0,0030	0,0050	0,0065	0,0080	0,0080				
	≤ 32	≤ 301	170		0,0030	0,0050	0,0065	0,0080	0,0080				
Alloyed heat-treatable steels	≤ 32	≤ 301	170		0,0030	0,0050	0,0065	0,0080	0,0080				
	≤ 43	≤ 402	140		0,0025	0,0040	0,0050	0,0065	0,0065				
Unalloyed case hardened steels	≤ 25	≤ 255	195		0,0040	0,0065	0,0080	0,0100	0,0100				
Alloyed case hardened steels	≤ 32	≤ 301	170		0,0030	0,0050	0,0065	0,0080	0,0080				
	≤ 43	≤ 402	140		0,0025	0,0040	0,0050	0,0065	0,0065				
Nitriding steels	≤ 32	≤ 301	185		0,0025	0,0040	0,0050	0,0065	0,0065				
	≤ 43	≤ 402	155		0,0025	0,0040	0,0050	0,0065	0,0065				
Tool steels	≤ 25	≤ 255	95		0,0025	0,0040	0,0050	0,0065	0,0065				
	≤ 43	≤ 402	80		0,0025	0,0040	0,0050	0,0065	0,0065				
High speed steels	≤ 43	≤ 402	70		0,0020	0,0030	0,0040	0,0050	0,0050				
Spring steels	≤ 38	≤ 354											
Hardened steels	≤ 48	≤ 460											
	≤ 66	-											
Stainless steels, sulphured	≤ 28	≤ 273	55		0,0030	0,0050	0,0065	0,0080	0,0080				
austenitic	≤ 36	≤ 337	55		0,0030	0,0050	0,0065	0,0080	0,0080				
martensitic	≤ 46	≤ 435	40		0,0025	0,0040	0,0050	0,0065	0,0065				
Cast iron	≤ 23	≤ 242	360		0,0050	0,0080	0,0100	0,0125	0,0125				
	≤ 38	≤ 354	255		0,0050	0,0080	0,0100	0,0125	0,0125				
Spheroidal graphite iron and malleable cast iron	≤ 23	≤ 242	255		0,0050	0,0080	0,0100	0,0125	0,0125				
	≤ 38	≤ 354	230		0,0050	0,0080	0,0100	0,0125	0,0125				
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	50		0,0030	0,0050	0,0065	0,0080	0,0080				
	≤ 43	≤ 402	40		0,0025	0,0040	0,0050	0,0065	0,0065				
Aluminium and Al-alloys	-	≤ 120	435		0,0065	0,0100	0,0125	0,0160	0,0160				
Al wrought alloys	-	≤ 200	360		0,0050	0,0080	0,0100	0,0125	0,0125				
Al cast alloys ≤ 10 % Si	-	≤ 180	435		0,0065	0,0100	0,0125	0,0160	0,0160				
≤ 24 % Si	-	≤ 180	360		0,0050	0,0080	0,0100	0,0125	0,0125				
Magnesium alloys	-	≤ 120	510		0,0050	0,0080	0,0100	0,0125	0,0125				
Copper, low-alloyed	-	≤ 150											
Brass, short-chipping	-	≤ 180	535		0,0050	0,0080	0,0100	0,0125	0,0125				
long-chipping	-	≤ 180	500		0,0040	0,0065	0,0080	0,0100	0,0100				
Bronze, short-chipping	-	≤ 180											
	≤ 25	≤ 255											
Bronze, long-chipping	≤ 25	≤ 255											
	≤ 32	≤ 301											
Duroplastics													
Thermoplastics													
Reinforced plastics - Kevlar													
Reinforced plastics - GFK / CFK													

Series # 1662

Material group	Hardness HRc	Hardness Bhn	SFM	Feed Rate - IPR 1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	-	≤ 150	360		0,0050	0,0080	0,0100	0,0125	0,0125	0,0140	0,0160		
	≤ 32	≤ 301	295		0,0040	0,0065	0,0080	0,0100	0,0100	0,0110	0,0125		
Free-cutting steels	≤ 25	≤ 255	425		0,0065	0,0100	0,0125	0,0160	0,0160	0,0180	0,0200		
	≤ 32	≤ 301	360		0,0065	0,0100	0,0125	0,0160	0,0160	0,0180	0,0200		
Unalloyed heat-treatable steels	≤ 20	≤ 220	325		0,0065	0,0100	0,0125	0,0160	0,0160	0,0180	0,0200		
	≤ 25	≤ 255	310		0,0050	0,0080	0,0100	0,0125	0,0125	0,0140	0,0160		
	≤ 32	≤ 301	295		0,0050	0,0080	0,0100	0,0125	0,0125	0,0140	0,0160		
Alloyed heat-treatable steels	≤ 32	≤ 301	295		0,0050	0,0080	0,0100	0,0125	0,0125	0,0140	0,0160		
	≤ 43	≤ 402	260		0,0050	0,0080	0,0100	0,0125	0,0125	0,0140	0,0160		
Unalloyed case hardened steels	≤ 25	≤ 255	360		0,0065	0,0100	0,0125	0,0160	0,0160	0,0180	0,0200		
Alloyed case hardened steels	≤ 32	≤ 301	295		0,0050	0,0080	0,0100	0,0125	0,0125	0,0140	0,0160		
	≤ 43	≤ 402	210		0,0030	0,0050	0,0065	0,0080	0,0080	0,0090	0,0100		
Nitriding steels	≤ 32	≤ 301	260		0,0050	0,0080	0,0100	0,0125	0,0125	0,0140	0,0160		
	≤ 43	≤ 402	245		0,0030	0,0050	0,0065	0,0080	0,0080	0,0090	0,0100		
Tool steels	≤ 25	≤ 255	180		0,0040	0,0065	0,0080	0,0100	0,0100	0,0110	0,0125		
	≤ 43	≤ 402	130		0,0030	0,0050	0,0065	0,0080	0,0080	0,0090	0,0100		
High speed steels	≤ 43	≤ 402	145		0,0025	0,0040	0,0050	0,0065	0,0065	0,0070	0,0080		
Spring steels	≤ 38	≤ 354	145		0,0020	0,0030	0,0040	0,0050	0,0050	0,0055	0,0065		
Hardened steels	≤ 48	≤ 460	130		0,0020	0,0030	0,0040	0,0050	0,0050	0,0055	0,0065		
	≤ 66	-	80		0,0015	0,0025	0,0030	0,0040	0,0040	0,0045	0,0050		
Stainless steels, sulphured	≤ 28	≤ 273	145		0,0030	0,0050	0,0065	0,0080	0,0080	0,0090	0,0100		
austenitic	≤ 36	≤ 337	130		0,0030	0,0050	0,0065	0,0080	0,0080	0,0090	0,0100		
martensitic	≤ 46	≤ 435	110		0,0030	0,0050	0,0065	0,0080	0,0080	0,0090	0,0100		
Cast iron	≤ 23	≤ 242	620		0,0080	0,0125	0,0160	0,0200	0,0200	0,0220	0,0245		
	≤ 38	≤ 354	360		0,0080	0,0125	0,0160	0,0200	0,0200	0,0220	0,0245		
Spheroidal graphite iron and malleable cast iron	≤ 23	≤ 242	360		0,0080	0,0125	0,0160	0,0200	0,0200	0,0220	0,0245		
	≤ 38	≤ 354	310		0,0065	0,0100	0,0125	0,0160	0,0160	0,0180	0,0200		
Chilled cast iron	≤ 38	≤ 354	95		0,0020	0,0030	0,0040	0,0050	0,0050	0,0055	0,0065		
New cast materials GGV	≤ 20	≤ 220											
	≤ 32	≤ 301											
New cast materials ADI	≤ 32	≤ 301											
	≤ 43	≤ 402											
Special alloys	≤ 54	≤ 549	80		0,0025	0,0040	0,0050	0,0065	0,0065	0,0070	0,0080		
Ti and Ti-alloys	≤ 25	≤ 255	110		0,0025	0,0040	0,0050	0,0065	0,0065	0,0070	0,0080		
	≤ 43	≤ 402	95		0,0020	0,0030	0,0040	0,0050	0,0050	0,0055	0,0065		
Aluminium and Al-alloys	-	≤ 120	785		0,0080	0,0125	0,0160	0,0200	0,0200	0,0220	0,0245		
Al wrought alloys	-	≤ 200	785		0,0080	0,0125	0,0160	0,0200	0,0200	0,0220	0,0245		
Al cast alloys ≤ 10 % Si	-	≤ 180	655		0,0080	0,0125	0,0160	0,0200	0,0200	0,0220	0,0245		
≤ 24 % Si	-	≤ 180	555		0,0080	0,0125	0,0160	0,0200	0,0200	0,0220	0,0245		
Magnesium alloys	-	≤ 120	750		0,0065	0,0100	0,0125	0,0160	0,0160	0,0180	0,0200		
Copper, low-alloyed	-	≤ 150	310		0,0050	0,0080	0,0100	0,0125	0,0125	0,0140	0,0160		
Brass, short-chipping	-	≤ 180	820		0,0065	0,0100	0,0125	0,0160	0,0160	0,0180	0,0200		
long-chipping	-	≤ 180	555		0,0050	0,0080	0,0100	0,0125	0,0125	0,0140	0,0160		
Bronze, short-chipping	-	≤ 180	310		0,0050	0,0080	0,0100	0,0125	0,0125	0,0140	0,0160		
	≤ 25	≤ 255	260		0,0040	0,0065	0,0080	0,0100	0,0100	0,0110	0,0125		
Bronze, long-chipping	≤ 25	≤ 255	225		0,0040	0,0065	0,0080	0,0100	0,0100	0,0110	0,0125		
	≤ 32	≤ 301	195		0,0040	0,0065	0,0080	0,0100	0,0100	0,0110	0,0125		
Duroplastics													
Thermoplastics													
Reinforced plastics - Kevlar													
Reinforced plastics - GFK / CFK													