



Flat drills with coolant ducts, 3-fluted

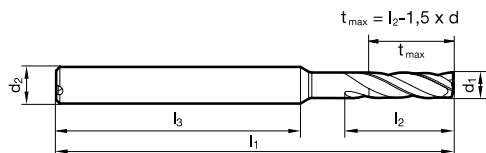
Article no. **6065**



cutting data see page 56

P	M	K	N	S	H
●	●	●	○	○	○

180° point geometry for flat bottomed holes • for piloting, drilling, finishing • low burr development • piloting in all positions and materials



Article no.

6065

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	Order no.
4.000		6.0	65.0	18.0	40.0	6065 4.000
4.100		6.0	65.0	18.0	40.0	6065 4.100
4.200		6.0	65.0	18.0	40.0	6065 4.200
4.300		6.0	65.0	21.0	40.0	6065 4.300
4.370	11/64	6.0	65.0	21.0	40.0	6065 4.370
4.400		6.0	65.0	21.0	40.0	6065 4.400
4.500		6.0	65.0	21.0	40.0	6065 4.500
4.600		6.0	65.0	21.0	40.0	6065 4.600
4.700		6.0	65.0	21.0	40.0	6065 4.700
4.760	3/16	6.0	65.0	26.0	36.0	6065 4.760
4.800		6.0	65.0	26.0	36.0	6065 4.800
4.900		6.0	65.0	26.0	36.0	6065 4.900
5.000		6.0	65.0	26.0	36.0	6065 5.000
5.100		6.0	65.0	26.0	36.0	6065 5.100
5.160	13/64	6.0	65.0	26.0	36.0	6065 5.160
5.200		6.0	65.0	26.0	36.0	6065 5.200
5.300		6.0	65.0	26.0	36.0	6065 5.300
5.400		6.0	65.0	26.0	36.0	6065 5.400
5.500		6.0	65.0	26.0	36.0	6065 5.500
5.560	7/32	6.0	65.0	26.0	36.0	6065 5.560
5.600		6.0	65.0	26.0	36.0	6065 5.600
5.700		6.0	65.0	26.0	36.0	6065 5.700
5.800		6.0	65.0	26.0	36.0	6065 5.800
5.900		6.0	65.0	26.0	36.0	6065 5.900
5.950	15/64	6.0	65.0	26.0	36.0	6065 5.950
6.000		6.0	65.0	26.0	36.0	6065 6.000
6.100		8.0	78.0	31.0	36.0	6065 6.100
6.200		8.0	78.0	31.0	36.0	6065 6.200
6.300		8.0	78.0	31.0	36.0	6065 6.300
6.350	1/4	8.0	78.0	31.0	36.0	6065 6.350
6.400		8.0	78.0	31.0	36.0	6065 6.400
6.500		8.0	78.0	31.0	36.0	6065 6.500
6.600		8.0	78.0	31.0	36.0	6065 6.600
6.700		8.0	78.0	31.0	36.0	6065 6.700
6.750	17/64	8.0	78.0	31.0	36.0	6065 6.750
6.800		8.0	78.0	31.0	36.0	6065 6.800
6.900		8.0	78.0	31.0	36.0	6065 6.900
7.000		8.0	78.0	31.0	36.0	6065 7.000
7.100		8.0	78.0	35.0	36.0	6065 7.100
7.140	9/32	8.0	78.0	35.0	36.0	6065 7.140
7.200		8.0	78.0	35.0	36.0	6065 7.200
7.300		8.0	78.0	35.0	36.0	6065 7.300
7.400		8.0	78.0	35.0	36.0	6065 7.400
7.500		8.0	78.0	35.0	36.0	6065 7.500
7.540	19/64	8.0	78.0	35.0	36.0	6065 7.540
7.600		8.0	78.0	35.0	36.0	6065 7.600
7.700		8.0	78.0	35.0	36.0	6065 7.700
7.800		8.0	78.0	35.0	36.0	6065 7.800
7.900		8.0	78.0	35.0	36.0	6065 7.900
7.940	5/16	8.0	78.0	35.0	36.0	6065 7.940
8.000		8.0	78.0	35.0	36.0	6065 8.000
8.100		10.0	87.0	43.0	40.0	6065 8.100
8.200		10.0	87.0	43.0	40.0	6065 8.200
8.300		10.0	87.0	43.0	40.0	6065 8.300
8.330	21/64	10.0	87.0	43.0	40.0	6065 8.330
8.400		10.0	87.0	43.0	40.0	6065 8.400
8.500		10.0	87.0	43.0	40.0	6065 8.500
8.600		10.0	87.0	43.0	40.0	6065 8.600
8.700		10.0	87.0	43.0	40.0	6065 8.700
8.730	11/32	10.0	87.0	43.0	40.0	6065 8.730
8.800		10.0	87.0	43.0	40.0	6065 8.800
8.900		10.0	87.0	43.0	40.0	6065 8.900
9.000		10.0	87.0	43.0	40.0	6065 9.000
9.100		10.0	87.0	43.0	40.0	6065 9.100
9.130	23/64	10.0	87.0	43.0	40.0	6065 9.130
9.200		10.0	87.0	43.0	40.0	6065 9.200

Article no.

6065

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	Order no.
9.300		10.0	87.0	43.0	40.0	6065 9.300
9.400		10.0	87.0	43.0	40.0	6065 9.400
9.500		10.0	87.0	43.0	40.0	6065 9.500
9.520	3/8	10.0	87.0	43.0	40.0	6065 9.520
9.600		10.0	87.0	43.0	40.0	6065 9.600
9.700		10.0	87.0	43.0	40.0	6065 9.700
9.800		10.0	87.0	43.0	40.0	6065 9.800
9.900		10.0	87.0	43.0	40.0	6065 9.900
9.920	25/64	10.0	87.0	43.0	40.0	6065 9.920
10.000		10.0	87.0	43.0	40.0	6065 10.000
10.100		12.0	100.0	52.0	45.0	6065 10.100
10.200		12.0	100.0	52.0	45.0	6065 10.200
10.300		12.0	100.0	52.0	45.0	6065 10.300
10.320	13/32	12.0	100.0	52.0	45.0	6065 10.320
10.400		12.0	100.0	52.0	45.0	6065 10.400
10.500		12.0	100.0	52.0	45.0	6065 10.500
10.600		12.0	100.0	52.0	45.0	6065 10.600
10.700		12.0	100.0	52.0	45.0	6065 10.700
10.800		12.0	100.0	52.0	45.0	6065 10.800
10.900		12.0	100.0	52.0	45.0	6065 10.900
11.000		12.0	100.0	52.0	45.0	6065 11.000
11.100		12.0	100.0	52.0	45.0	6065 11.100
11.110	7/16	12.0	100.0	52.0	45.0	6065 11.110
11.200		12.0	100.0	52.0	45.0	6065 11.200
11.300		12.0	100.0	52.0	45.0	6065 11.300
11.400		12.0	100.0	52.0	45.0	6065 11.400
11.500		12.0	100.0	52.0	45.0	6065 11.500
11.600		12.0	100.0	52.0	45.0	6065 11.600
11.700		12.0	100.0	52.0	45.0	6065 11.700
11.800		12.0	100.0	52.0	45.0	6065 11.800
11.900		12.0	100.0	52.0	45.0	6065 11.900
11.910	15/32	12.0	100.0	52.0	45.0	6065 11.910
12.000		12.0	100.0	52.0	45.0	6065 12.000
12.100		14.0	104.0	57.0	45.0	6065 12.100
12.200		14.0	104.0	57.0	45.0	6065 12.200
12.500		14.0	104.0	57.0	45.0	6065 12.500
12.600		14.0	104.0	57.0	45.0	6065 12.600
12.700	1/2	14.0	104.0	57.0	45.0	6065 12.700
12.800		14.0	104.0	57.0	45.0	6065 12.800
12.900		14.0	104.0	57.0	45.0	6065 12.900
13.000		14.0	104.0	57.0	45.0	6065 13.000
13.490	17/32	14.0	104.0	57.0	45.0	6065 13.490
13.500		14.0	104.0	57.0	45.0	6065 13.500
13.800		14.0	104.0	57.0	45.0	6065 13.800
14.000		14.0	104.0	57.0	45.0	6065 14.000
14.500		16.0	112.0	62.0	48.0	6065 14.500
14.800		16.0	112.0	62.0	48.0	6065 14.800
15.000		16.0	112.0	62.0	48.0	6065 15.000
15.500		16.0	112.0	62.0	48.0	6065 15.500
15.800		16.0	112.0	62.0	48.0	6065 15.800
16.000		16.0	112.0	62.0	48.0	6065 16.000
16.500		18.0	120.0	70.0	48.0	6065 16.500
17.000		18.0	120.0	70.0	48.0	6065 17.000
17.500		18.0	120.0	70.0	48.0	6065 17.500
18.000		18.0	120.0	70.0	48.0	6065 18.000
18.500		20.0	128.0	76.0	50.0	6065 18.500
19.000		20.0	128.0	76.0	50.0	6065 19.000
19.500		20.0	128.0	76.0	50.0	6065 19.500
20.000		20.0	128.0	76.0	50.0	6065 20.000



Flat drill with coolant ducts, 3-fluted, FB 200 U, 3xD



Cutting data

Machining group		f (mm/rev) with nom. Ø								
										
	v _c (m/min)	4	6	8	10	12	14	16	18	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	120	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	110	0.140	0.185	0.235	0.275	0.315	0.355	0.395	0.430	0.470
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	110	0.140	0.185	0.235	0.275	0.315	0.355	0.395	0.430	0.470
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	100	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	100	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	95	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.385	0.415
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	90	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.360	0.390
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	95	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	95	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	80	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	70	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.360	0.390
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	70	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.300	0.325
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	60	0.080	0.110	0.140	0.165	0.185	0.210	0.235	0.255	0.275
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	65	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.300	0.325
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	60	0.085	0.115	0.145	0.175	0.200	0.225	0.245	0.270	0.295
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	55	0.080	0.110	0.140	0.165	0.185	0.210	0.235	0.255	0.275
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	60	0.075	0.105	0.130	0.155	0.175	0.200	0.220	0.240	0.260
M2.2.1 Duplex steel, high-strength stainless steels	50	0.065	0.090	0.110	0.130	0.150	0.170	0.185	0.205	0.220
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	110	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	95	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	95	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	90	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.385	0.415
K1.3.1 Malleable cast iron, ferritic, 130 HB	90	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.385	0.415
K1.3.2 Malleable cast iron, pearlitic, 230 HB	75	0.105	0.145	0.180	0.215	0.245	0.280	0.305	0.335	0.365
K2.1.1 Vermicular graphite cast iron (GJV)	90	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	70	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.360	0.390
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	140	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	140	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	170	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	170	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	145	0.165	0.220	0.275	0.325	0.375	0.420	0.465	0.510	0.555
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	140	0.120	0.165	0.205	0.240	0.275	0.310	0.345	0.375	0.405
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	120	0.100	0.140	0.170	0.205	0.235	0.265	0.290	0.320	0.345
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	110	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.300	0.325
N4.1.1 Non-metallic materials: Duroplastics, fibre-reinforced plastics										
N4.1.2 Non-metallic materials: Hard rubber, wood, etc.										
N4.1.3 Non-metallic materials: Graphite										
S1.1.1 Heat-resistant alloys, Fe-based, annealed, 200 HB	35	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.050	0.065	0.080	0.095	0.110	0.125	0.140	0.150	0.165
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	30	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.130	0.145
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	20	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.130	0.145
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	40	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	30	0.050	0.065	0.080	0.095	0.110	0.125	0.140	0.150	0.165
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	40	0.050	0.065	0.080	0.095	0.110	0.125	0.135	0.150	0.165
H1.1.2 Hardened steel, hardened and tempered, < 60 HRC										
H1.1.3 Hardened steel, hardened and tempered, > 60 HRC										
H2.1.1 Chilled cast iron, 400 HB	30	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	20	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.130	0.145

FB 200 U





FB 200 U

Faster to the 180° hole base

Three-fluted flat drill
for efficient & high quality
180° holes

**Compared to conventional flat drills,
the FB 200 U can be used on flat surfaces
without any pre-drilling or feed rate reduction.**

As a result, you not only benefit from a significant
reduction in machining time: In terms of hole quality,
the FB 200 U is on a par with conventional
two-fluted flat drills.

In contrast: With the three-fluted design, you can create
significantly rounder holes with much greater dimensional
accuracy and up to 50 % higher cutting values.

- x Improved **chip formation**
 - x **Machining time** reduced by 47 %
-

- X** drilling on flat surfaces without pre-drilling or reducing the cutting values
- X** up to 50 % higher cutting values compared to two-fluted flat drills
- X** reduced process costs as inclined surfaces no longer need to be faced
- X** spot drilling without deflection on inclined & curved surfaces up to 45° with 3xD version



3 cutting edges with 180° point angle
for dimensionally accurate and round holes

available in the diameter range
~3xD | ~5xD, Ø 4.0–20.0 mm

reinforced shank transition
for greater stability

Application example

Component: Cog, 42CrMo4 surface-hardened to 60 HRC

Tool: #6065, Ø 4.2 mm

Customer target: Process-reliable drilling with short chips,
reduction of machining time

Difficulty: Chip formation, high hardness in the edge area of the
component with lower hardness inside the component

Cutting data: **Gühring**

v_c 50 m/min
f 0.06 mm/rev

Competition

v_c 39.6 m/min
f 0.04 mm/rev