DFAS

RECOMMENDED CUTTING CONDITIONS

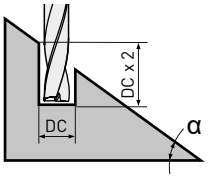
	Material	DC	L/D	n	α = 0° fr (Min. – Max.) (mm/rev.)
P	Mild steels (<180HB) C10E etc.	0.75	≤2	23300	0.030 (0.010 – 0.050)
		1.0	≤2	17500	0.030 (0.010 – 0.050)
		1.5	≤2	12200	0.035 (0.015 – 0.055)
		2.0	≤2	9500	0.040 (0.020 – 0.060)
		2.5	≤2	7900	0.050 (0.030 – 0.070)
		3.0	≤2	7900	0.060 (0.040 – 0.080)
		4.0	≤2	5900	0.080 (0.060 – 0.100)
		5.0	≤2	4700	0.100 (0.080 – 0.130)
		6.0	≤2	3900	0.130 (0.100 – 0.150)
		8.0	≤2	2900	0.150 (0.130 – 0.170)
		10.0	≤2	2300	0.170 (0.150 – 0.200)
		12.0	≤2	1900	0.200 (0.170 – 0.250)
		16.0	≤2	1400	0.250 (0.200 – 0.300)
		20.0	≤2	1100	0.300 (0.250 – 0.350)
	Carbon steels, Alloy steels (180 – 280HB) DIN Ck45, 41CrMo4 etc.	0.75	≤2	19000	0.030 (0.010 – 0.050)
		1.0	≤2	14300	0.030 (0.010 – 0.050)
		1.5	≤2	10000	0.035 (0.015 – 0.055)
		2.0	≤2	7900	0.040 (0.020 – 0.060)
		2.5	≤2	6600	0.050 (0.030 – 0.070)
		3.0	≤2	7900	0.060 (0.040 – 0.080)
		4.0	≤2	5900	0.080 (0.060 – 0.100)
		5.0	≤2	4700	0.100 (0.080 – 0.130)
		6.0	≤2	3900	0.130 (0.100 – 0.150)
		8.0	≤2	2900	0.150 (0.130 – 0.170)
		10.0	≤2	2300	0.170 (0.150 – 0.200)
		12.0	≤2	1900	0.200 (0.170 – 0.250)
		16.0	≤2	1400	0.250 (0.200 – 0.300)
		20.0	≤2	1100	0.300 (0.250 – 0.350)
	Carbon steels, Alloy steels (280 – 350HB) DIN 40CrNiMoA etc.	0.75	≤2	16900	0.030 (0.010 – 0.050)
		1.0	≤2	12700	0.030 (0.010 – 0.050)
		1.5	≤2	8400	0.035 (0.015 – 0.050)
		2.0	≤2	6700	0.040 (0.020 – 0.060)
		2.5	≤2	5700	0.050 (0.030 – 0.070)
		3.0	≤2	6800	0.060 (0.040 – 0.080)
		4.0	≤2	5100	0.080 (0.060 – 0.100)
		5.0	≤2	4100	0.100 (0.080 – 0.130)
		6.0	≤2	3400	0.130 (0.100 – 0.150)
		8.0	≤2	2500	0.150 (0.130 – 0.170)
		10.0	≤2	2000	0.170 (0.150 – 0.200)
		12.0	≤2	1700	0.200 (0.170 – 0.250)
		16.0	≤2	1200	0.250 (0.200 – 0.300)
		20.0	≤2	1000	0.300 (0.250 – 0.350)
M	Austenitic stainless steels (<200HB) DIN X5CrNi189, X5CrNiMo1810 etc.	0.75	≤2	10600	0.007 (0.003 – 0.011)
		1.0	≤2	7900	0.007 (0.003 – 0.011)
		1.5	≤2	5300	0.010 (0.005 – 0.015)
		2.0	≤2	4700	0.015 (0.010 – 0.020)
		2.5	≤2	3800	0.015 (0.010 – 0.020)
		3.0	≤2	3100	0.020 (0.010 – 0.030)
		4.0	≤2	2300	0.030 (0.020 – 0.040)
		5.0	≤2	1900	0.040 (0.030 – 0.050)
		6.0	≤2	1500	0.050 (0.040 – 0.060)
		8.0	≤2	1100	0.060 (0.050 – 0.080)
		10.0	≤2	950	0.080 (0.060 – 0.100)
		12.0	≤2	790	0.100 (0.080 – 0.120)
		16.0	≤2	590	0.120 (0.100 – 0.150)
		20.0	≤2	470	0.150 (0.120 – 0.200)

DFAS

RECOMMENDED CUTTING CONDITIONS

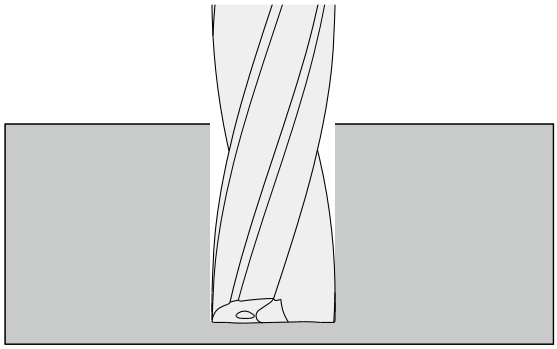
	Material	DC	L/D	n	α = 0° fr (Min. – Max.) (mm/rev.)
K	Gray cast irons (<350MPa) DIN GG30 etc.	0.75	≤2	23300	0.030 (0.010–0.050)
		1.0	≤2	17500	0.030 (0.010–0.050)
		1.5	≤2	12200	0.035 (0.015–0.055)
		2.0	≤2	9500	0.040 (0.020–0.060)
		2.5	≤2	7900	0.050 (0.030–0.070)
		3.0	≤2	7900	0.060 (0.040–0.080)
		4.0	≤2	5900	0.030 (0.020–0.040)
		5.0	≤2	4700	0.040 (0.030–0.050)
		6.0	≤2	3900	0.050 (0.040–0.060)
		8.0	≤2	2900	0.060 (0.050–0.080)
		10.0	≤2	2300	0.080 (0.060–0.100)
		12.0	≤2	1900	0.100 (0.080–0.120)
		16.0	≤2	1400	0.120 (0.100–0.150)
		20.0	≤2	1100	0.150 (0.120–0.200)
	Ductile cast irons (<450MPa) DIN GGG40.3 etc.	0.75	≤2	16900	0.010 (0.005–0.015)
		1.0	≤2	12700	0.010 (0.005–0.015)
		1.5	≤2	10000	0.020 (0.010–0.030)
		2.0	≤2	8700	0.030 (0.015–0.045)
		2.5	≤2	7300	0.045 (0.025–0.065)
		3.0	≤2	6800	0.050 (0.040–0.060)
		4.0	≤2	5500	0.030 (0.020–0.040)
		5.0	≤2	4400	0.040 (0.030–0.050)
		6.0	≤2	3700	0.050 (0.040–0.060)
		8.0	≤2	2700	0.060 (0.050–0.080)
		10.0	≤2	2200	0.080 (0.060–0.100)
		12.0	≤2	1800	0.100 (0.080–0.120)
		16.0	≤2	1300	0.120 (0.100–0.150)
		20.0	≤2	1100	0.150 (0.120–0.200)
N	Aluminium alloys (Si<5 %) JIS A6061, A7075 etc.	0.75	≤2	42400	0.020 (0.010–0.030)
		1.0	≤2	31800	0.020 (0.010–0.030)
		1.5	≤2	21200	0.020 (0.010–0.030)
		2.0	≤2	17500	0.050 (0.030–0.070)
		2.5	≤2	14000	0.060 (0.040–0.090)
		3.0	≤2	11600	0.060 (0.040–0.090)
		4.0	≤2	8700	0.080 (0.060–0.100)
		5.0	≤2	7000	0.100 (0.080–0.130)
		6.0	≤2	5800	0.130 (0.100–0.160)
		8.0	≤2	4300	0.160 (0.130–0.200)
		10.0	≤2	3500	0.200 (0.160–0.240)
		12.0	≤2	2900	0.240 (0.200–0.280)
		16.0	≤2	2100	0.280 (0.240–0.320)
		20.0	≤2	1700	0.320 (0.280–0.360)
S	Titanium alloy (Ti-6Al-4V, Ti-5Al-5V-5Mo-3Cr)	3.0	≤3	3710	0.030 (0.010–0.050)
		4.0	≤3	2790	0.040 (0.010–0.070)
		5.0	≤3	2230	0.050 (0.020–0.080)
		6.0	≤3	1860	0.060 (0.020–0.100)
		7.0	≤3	1590	0.070 (0.020–0.120)
		8.0	≤3	1390	0.080 (0.030–0.130)
		9.0	≤3	1240	0.090 (0.030–0.150)
		10.0	≤3	1110	0.100 (0.030–0.170)
		11.0	≤3	1010	0.110 (0.040–0.180)
		12.0	≤3	930	0.120 (0.040–0.200)
		13.0	≤3	860	0.130 (0.040–0.220)
		14.0	≤3	800	0.140 (0.050–0.230)

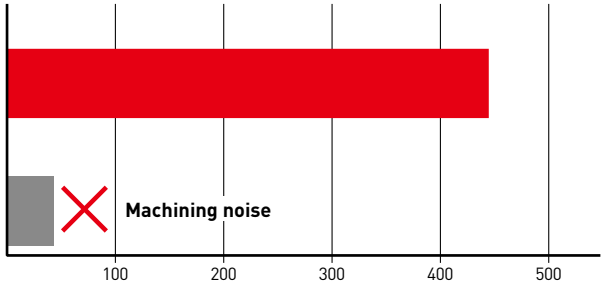
1. The recommended hole depth is DCx2. This should be the depth from the uppermost surface of the work material when machining on angled surfaces. (Refer to diagram)
2. The table above assumes drilling on a flat surface. For drilling on angled surfaces, adjust the feed rate accordingly. When the inclination angle α is 30° or less, as a guide adjust the feed rate to 70 % or lower and when the inclination angle α is greater than 30° adjust the feed rate to 50 % or lower.
3. This tool is for hole drilling only. It cannot be used for cross-feed or helical machining.



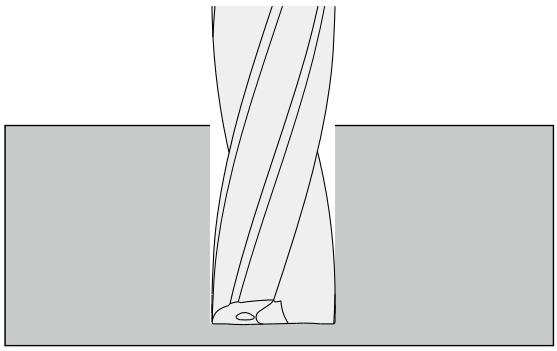
APPLICATION EXAMPLE

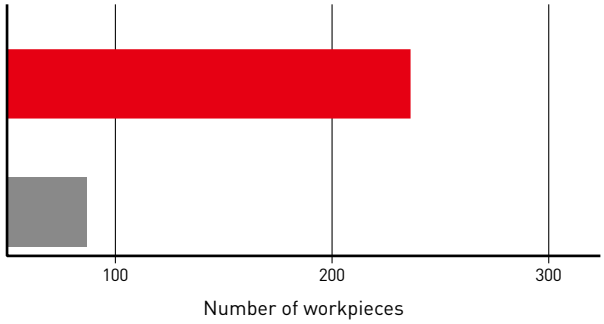
Material	DIN 1.1213 / Cf 53
Tool / Drill	DFAS0800X03S080
Component	Machine parts
Vc (m / min)	100
fr (mm / rev.)	0.12
L/D (mm)	4.5
Cutting mode	Wet cutting
Coolant	Internal coolant (Water-soluble)
Machine	MC
Results	Cutting noise was reduced and the number of holes drilled was increased by 700 % when compared to a conventional product. The quality of the machined surface finish was also improved.





Material	DIN 1.0038 / St 37-2
Tool / Drill	DFAS1100X03S110
Component	Machine parts
Vc (m / min)	104
fr (mm / rev.)	0.12
L/D (mm)	27
Cutting mode	Wet cutting
Coolant	Internal coolant (Water-soluble)
Machine	MC
Results	Cutting noise was reduced and the number of holes drilled was increased by 300 % when compared to a conventional product. The quality of the machined surface finish was also improved.

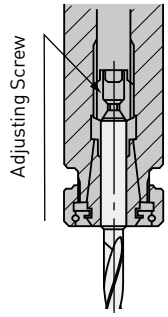
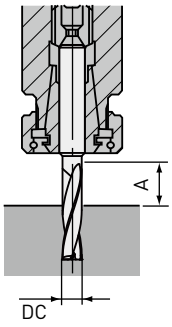
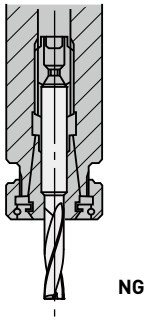
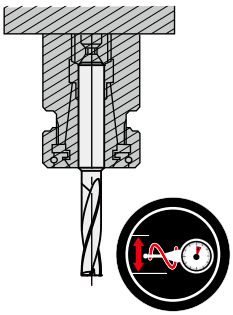


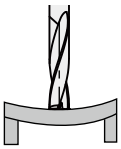
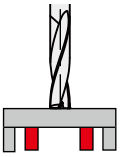
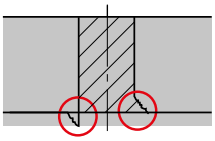
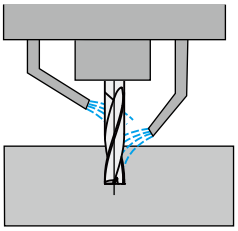
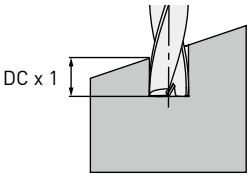


DFAS Conventional

The above examples are actual applications, therefore can differ from the recommended conditions.

OPERATIONAL GUIDANCE

Drill holding	Drill length	Drill installation	Installation tolerance
			
Thrust bearing type collet chuck holds the drill securely.	A > DC x 1.5	Do not clamp on the flutes.	Run-out < 0.03mm

Thin workpiece	Burring and workpiece chipping	Coolant method (MFE)	Inclined face drilling
 **NG** If bending occurs  **OK** Support the workpiece			
Lower the feed rate by 50 % at the end of through cutting. Add a chamfer.		Two coolant positions, at the end and at the centre are ideal.	When machining a deep hole into an inclined surface, use MFE drill (L/D=2) as a drill for a guide hole. Set the drill depth at approx. DC x 1 to obtain an accurate guide hole.