

DRILLING (SOLID CARBIDE)

DLE

Leading Drill Series

Point Angle SIG 60°

RECOMMENDED CUTTING CONDITIONS

Work Material	P					
	Mild Steels ($\leq 180\text{HB}$)		Carbon Steels, Alloy Steels (180–280HB)		Carbon Steels, Alloy Steels (280–350HB)	
	DIN C10E etc.		DIN Ck45, 41CrMo4 etc.		DIN 40CrNiMoA etc.	
Drill Dia. DC (mm)	Revolution (min^{-1})	Feed rate (Min. – Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min. – Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min. – Max.) (mm/rev)
3.0	7900	0.05 (0.03–0.07)	6800	0.05 (0.03–0.07)	6300	0.04 (0.02–0.06)
4.0	5900	0.05 (0.03–0.07)	5100	0.05 (0.03–0.07)	4700	0.04 (0.02–0.06)
5.0	5000	0.06 (0.04–0.08)	4400	0.06 (0.04–0.08)	4100	0.05 (0.03–0.07)
6.0	4200	0.06 (0.04–0.08)	3700	0.06 (0.04–0.08)	3400	0.05 (0.03–0.07)
7.0	3600	0.07 (0.04–0.09)	3100	0.07 (0.04–0.09)	2900	0.05 (0.03–0.07)
8.0	3100	0.07 (0.04–0.09)	2700	0.07 (0.04–0.09)	2500	0.05 (0.03–0.07)
10.0	2700	0.08 (0.04–0.10)	2300	0.08 (0.04–0.10)	2200	0.06 (0.03–0.08)
12.0	2200	0.08 (0.04–0.10)	1900	0.08 (0.04–0.10)	1800	0.06 (0.03–0.08)

Work Material	M		K			
	Austenitic Stainless Steels ($\leq 200\text{HB}$)		Gray Cast Irons ($\leq 350\text{MPa}$)		Ductile Cast Irons ($\leq 450\text{MPa}$)	
	DIN X5CrNi189, X5CrNiMo1810 etc.		DIN GG30 etc.		DIN GGG40.3 etc.	
Drill Dia. DC (mm)	Revolution (min^{-1})	Feed rate (Min. – Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min. – Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min. – Max.) (mm/rev)
3.0	1500	0.03 (0.01–0.05)	7900	0.05 (0.03–0.07)	5800	0.05 (0.03–0.07)
4.0	1100	0.03 (0.01–0.05)	5900	0.05 (0.03–0.07)	4300	0.05 (0.03–0.07)
5.0	1200	0.04 (0.02–0.06)	5000	0.06 (0.04–0.08)	3800	0.06 (0.04–0.08)
6.0	1000	0.04 (0.02–0.06)	4200	0.06 (0.04–0.08)	3100	0.06 (0.04–0.08)
7.0	900	0.04 (0.02–0.06)	3600	0.07 (0.04–0.09)	2700	0.06 (0.04–0.08)
8.0	790	0.04 (0.02–0.06)	3100	0.07 (0.04–0.09)	2300	0.06 (0.04–0.08)
10.0	630	0.04 (0.02–0.06)	2700	0.08 (0.04–0.10)	1900	0.07 (0.04–0.09)
12.0	530	0.04 (0.02–0.06)	2200	0.08 (0.04–0.10)	1500	0.07 (0.04–0.09)

Note 1) Use a tool larger (DC) than the centre hole required but less than 2 x DC.


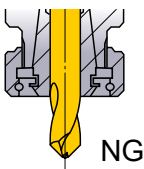
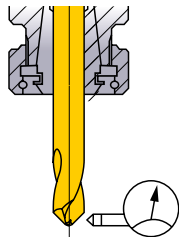
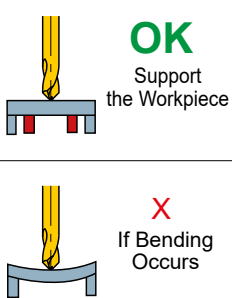
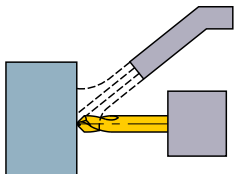
Note 2) When centering into curved or inclined surfaces, please reduce the feed rate.

Note 3) When V-grooving and chamfering, please reduce cutting conditions.

Note 4) When chatter vibration or abnormal noise is generated, please shorten the dwell time or reduce the revolutions.

Note 5) When centering, please do not exceed the LU (usable length).

OPERATIONAL GUIDANCE

<p>Drill Holding</p>  <p>Collet chuck holds the drill securely.</p>	<p>Drill Length</p>  <p>Do not clamp on the flutes.</p>	<p>Installation Tolerance</p>  <p>Run-out $\leq 0.03\text{ mm}$</p>	<p>Thin Workpiece</p>  <p>OK Support the Workpiece</p> <p>X If Bending Occurs</p>	<p>Coolant Method</p>  <p>Coolant positions, at the end at the centre are ideal.</p>
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Point Angle SIG 90°, 120° and 145°

RECOMMENDED CUTTING CONDITIONS

Work Material	P					
	Mild Steels ($\leq 180\text{HB}$) DIN C10E etc.		Carbon Steels, Alloy Steels (180–280HB) DIN Ck45, 41CrMo4 etc.		Carbon Steels, Alloy Steels (280–350HB) DIN 40CrNiMoA etc.	
Drill Dia. DC (mm)	Revolution (min^{-1})	Feed rate (Min.–Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.–Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.–Max.) (mm/rev)
1.0	9500	0.02 (0.01–0.03)	6300	0.02 (0.01–0.03)	4700	0.02 (0.01–0.03)
1.5	9500	0.02 (0.01–0.03)	7400	0.02 (0.01–0.03)	6300	0.02 (0.01–0.03)
2.0	9500	0.04 (0.03–0.05)	7900	0.04 (0.03–0.05)	7100	0.04 (0.03–0.05)
2.5	9500	0.04 (0.03–0.05)	8200	0.04 (0.03–0.05)	7600	0.04 (0.03–0.05)
3.0	7900	0.06 (0.04–0.08)	6800	0.06 (0.04–0.08)	6300	0.05 (0.03–0.07)
4.0	5900	0.06 (0.04–0.08)	5100	0.06 (0.04–0.08)	4700	0.05 (0.03–0.07)
5.0	5000	0.07 (0.05–0.09)	4400	0.07 (0.05–0.09)	4100	0.06 (0.04–0.08)
6.0	4200	0.07 (0.05–0.09)	3700	0.07 (0.05–0.09)	3400	0.06 (0.04–0.08)
7.0	3600	0.08 (0.05–0.10)	3100	0.08 (0.05–0.10)	2900	0.06 (0.04–0.08)
8.0	3100	0.08 (0.05–0.10)	2700	0.08 (0.05–0.10)	2500	0.06 (0.04–0.08)
10.0	2700	0.09 (0.05–0.11)	2300	0.09 (0.05–0.11)	2200	0.07 (0.04–0.09)
12.0	2200	0.09 (0.05–0.11)	1900	0.09 (0.05–0.11)	1800	0.07 (0.04–0.09)
16.0	1700	0.12 (0.10–0.14)	1500	0.12 (0.10–0.14)	1400	0.08 (0.06–0.10)

Work Material	M		K			
	Austenitic Stainless Steels ($\leq 200\text{HB}$) DIN X5CrNi189, X5CrNiMo1810 etc.		Gray Cast Irons ($\leq 350\text{MPa}$) DIN GG30 etc.		Ductile Cast Irons ($\leq 450\text{MPa}$) DIN GGG40.3 etc.	
Drill Dia. DC (mm)	Revolution (min^{-1})	Feed rate (Min.–Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.–Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.–Max.) (mm/rev)
1.0	6300	0.01 (0.005–0.015)	9500	0.02 (0.01–0.03)	3100	0.02 (0.01–0.03)
1.5	4200	0.01 (0.005–0.015)	9500	0.02 (0.01–0.03)	5300	0.02 (0.01–0.03)
2.0	3100	0.04 (0.03–0.05)	9500	0.04 (0.03–0.05)	6300	0.04 (0.03–0.05)
2.5	2500	0.04 (0.03–0.05)	9500	0.04 (0.03–0.05)	7000	0.04 (0.03–0.05)
3.0	2100	0.04 (0.02–0.06)	7900	0.06 (0.04–0.08)	5800	0.06 (0.04–0.08)
4.0	1600	0.04 (0.02–0.06)	5900	0.06 (0.04–0.08)	4300	0.06 (0.04–0.08)
5.0	1200	0.06 (0.04–0.08)	5000	0.07 (0.05–0.09)	3800	0.07 (0.05–0.09)
6.0	1000	0.06 (0.04–0.08)	4200	0.07 (0.05–0.09)	3100	0.07 (0.05–0.09)
7.0	900	0.06 (0.04–0.08)	3600	0.08 (0.05–0.10)	2700	0.07 (0.05–0.09)
8.0	790	0.06 (0.04–0.08)	3100	0.08 (0.05–0.10)	2300	0.07 (0.05–0.09)
10.0	630	0.06 (0.04–0.08)	2700	0.09 (0.05–0.11)	1900	0.08 (0.05–0.10)
12.0	530	0.06 (0.04–0.08)	2200	0.09 (0.05–0.11)	1500	0.08 (0.05–0.10)
16.0	390	0.08 (0.06–0.10)	1700	0.12 (0.10–0.14)	1100	0.11 (0.09–0.13)

Note 1) Use a tool larger (DC) than the centre hole required but less than 2 x DC.

Note 2) When centering into curved or inclined surfaces, please reduce the feed rate.

Note 3) When V-grooving and chamfering, please reduce cutting conditions.

Note 4) When chatter vibration or abnormal noise is generated, please shorten the dwell time or reduce the revolutions.

Note 5) When centering, please do not exceed the LU (usable length).