

List Number: L9622, L9623

Drilling Conditions - Wet

L9622, L9623

Work Material		Structural Steels Carbon Steels (~200HB)		Alloy Steels Heat Treated Steels (20~30 HRC)		Mold Steels Hardened Steels (30~40 HRC)		Hardened Steels		Ductile Cast Irons		Stainless Steels		Nickel Alloys Titanium Alloys (30~40 HRC)		
Drilling Dia.																
Drill Dia. (mm/Inches)	Metric	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
	1.015	0.0400	15700	0.0010	14100	0.0010	12500	0.0008	9400	0.0006	12550	0.0010	9400	0.0005	3150	0.0004
	1.515	0.0596	10500	0.0015	9450	0.0015	8400	0.0012	6300	0.0009	8400	0.0015	6300	0.0007	2100	0.0006
	2.015	0.0793	7900	0.0020	4100	0.0030	6300	0.0020	4750	0.0012	6300	0.0020	4750	0.0010	1550	0.0008
	2.515	0.0990	7600	0.0030	6950	0.0030	6300	0.0020	4400	0.0020	6300	0.0030	4400	0.0015	1650	0.0012
	3.03	0.1193	10500	0.0040	7600	0.0040	6800	0.0030	4200	0.0030	8400	0.0040	6800	0.0030	2650	0.0020
	4.03	0.1587	7900	0.0050	6300	0.0050	5100	0.0040	3150	0.0030	6300	0.0050	5100	0.0040	2000	0.0030
	5.03	0.1980	6350	0.0060	5050	0.0060	4100	0.0050	2550	0.0040	5050	0.0060	4100	0.0050	1600	0.0040
	6.03	0.2374	5300	0.0070	4200	0.0070	3400	0.0060	2100	0.0050	4200	0.0070	3400	0.0060	1300	0.0050
	7.03	0.2768	4550	0.0080	3600	0.0080	2950	0.0060	1800	0.0050	3600	0.0080	2950	0.0070	1150	0.0050
	8.03	0.3161	4000	0.0090	3150	0.0090	2600	0.0070	1600	0.0060	3150	0.0090	2600	0.0080	1000	0.0060
	9.03	0.3555	3550	0.0090	2800	0.0090	2300	0.0070	1400	0.0060	2800	0.0090	2300	0.0090	900	0.0060
	10.03	0.3949	3200	0.0100	2550	0.0100	2050	0.0080	1250	0.0070	2550	0.0100	2050	0.0090	800	0.0070
	11.03	0.4343	2900	0.0110	2300	0.0110	1900	0.0090	1150	0.0080	2300	0.0110	1900	0.0090	720	0.0080
12.03	0.4736	2650	0.0100	2100	0.0100	1700	0.0090	1050	0.0070	2100	0.0100	1700	0.0090	650	0.0080	

Warnings on using the drilling condition tables

- Adjust drilling condition according to the rigidity of machine or work clamp state.
- Wet condition are for drilling with water soluble cutting fluid.
- In non water soluble cutting fluid, reduce the rotation and feed by 20%.
- Use on internal coolant.

Drilling Conditions - MQL

L9622, L9623

Work Material		Structural Steels Carbon Steels (~200HB)		Alloy Steels Heat Treated Steels (20~30 HRC)		Mold Steels Hardened Steels (30~40 HRC)		Hardened Steels (40~50 HRC)		Ductile Cast Irons		
Drilling Dia.												
Drill Dia. (mm/Inches)	Metric	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
	3.03	0.1193	6800	0.003	7600	0.003	5250	0.003	2600	0.002	5800	0.003
	4.03	0.1587	5100	0.004	4350	0.004	3950	0.004	2000	0.003	4350	0.005
	5.03	0.1980	4100	0.005	3500	0.005	3150	0.004	1600	0.004	3500	0.006
	6.03	0.2374	3400	0.006	2900	0.006	2650	0.005	1300	0.004	2900	0.006
	7.03	0.2768	2950	0.007	2500	0.007	2250	0.006	1150	0.005	2500	0.007
	8.03	0.3161	2600	0.008	2200	0.008	2000	0.006	1000	0.006	2200	0.008
	9.03	0.3555	2300	0.008	1950	0.008	1750	0.007	900	0.006	1950	0.008
	10.03	0.3949	2050	0.009	1750	0.009	1600	0.007	800	0.006	1750	0.009
	11.03	0.4343	1900	0.010	1600	0.010	1450	0.008	700	0.007	1600	0.010
	12.03	0.4736	1700	0.009	1450	0.009	1300	0.008	650	0.007	1450	0.010

Warnings on using the drilling condition tables

- Adjust drilling condition according to the rigidity of machine or work clamp state.
- The table values condition are for drilling with MQL.
- Non-step drilling is possible. However, a work material and drilling condition to chip removal may be worse. In that case, add step feed or review the drilling condition.

List Number: L9826, L9820

Standard Drilling Conditions

LIST 9826, 9820

Work Material		Cast Irons/Carbon Steel		Alloy Steels/Pre-Hardened (20-30 HRC)		Mold Steels/Hardened Steels (30-40 HRC)		Hardened Steels (40-50 HRC)		Cast Irons		Stainless Steel (300-Series Stainless)		Cast Aluminum		
Speed (SFM)		325-330 SFM		260-265 SFM		225-230 SFM		170-175 SFM		260-265 SFM		160-165 SFM		260-450 SFM		
Drilling Diameter																
Metric	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	
Drill Dia. (mm / inch)	3	0.118	10,700	0.005	8,500	0.005	7,450	0.004	5,600	0.005	6,500	0.005	5,300	0.004	14,800	0.007
	4	0.157	8,000	0.006	6,400	0.006	5,600	0.005	4,200	0.007	6,400	0.006	4,000	0.006	11,200	0.009
	6	0.236	5,300	0.010	4,250	0.009	3,750	0.008	2,800	0.011	4,250	0.009	2,650	0.008	7,400	0.010
	8	0.315	4,000	0.013	3,200	0.013	2,800	0.011	2,100	0.015	3,200	0.013	2,000	0.011	5,600	0.013
	10	0.394	3,200	0.016	2,550	0.016	2,250	0.014	1,700	0.018	2,550	0.016	1,600	0.014	4,500	0.016
	12	0.472	2,650	0.019	2,100	0.019	1,850	0.017	1,400	0.022	2,100	0.019	1,350	0.016	3,700	0.019
	14	0.551	2,250	0.020	1,800	0.020	1,600	0.016	1,200	0.022	1,800	0.019	1,150	0.016	3,200	0.022
	16	0.630	2,000	0.022	1,600	0.022	1,400	0.019	1,050	0.025	1,600	0.022	1,000	0.019	2,200	0.032

Note:

- 1) Adjust drilling conditions according to the rigidity of machine or work clamp state.
- 2) Use the table values as starting parameters. Adjust per your machine & set up as required.
- 3) Above table values are for drilling water soluble cutting fluid. For non-water soluble cutting fluid, reduce the RPM and feed rates by 20%.
- 4) Use Internal Coolant. If drilling more than 3xD or 5xD use peck drill cycle (G83).
- 5) Peck Depth interval = 1xD

Formulas: $RPM = \frac{SFM \times 3.82}{\text{Drill Dia.}}$
 Feed rate(in/min): $RPM \times IPR$

List Number: L9544

Standard Drilling Conditions

L9544

Workpiece Material		Carbon Steels Cast Irons			Alloy Steels			Die Steels Hardened Steels (30-40HRC)			Hardened Steels (40-50HRC)			Hardened Steels (50-55HRC)			Ductile Cast Irons			Stainless Steels			
Drill Diameter																							
Metric mm	Decimal	RPM	Feed (IPR)	Step Feed(mm)	RPM	Feed (IPR)	Step Feed(mm)	RPM	Feed (IPR)	Step Feed(mm)	RPM	Feed (IPR)	Step Feed(mm)	RPM	Feed (IPR)	Step Feed(mm)	RPM	Feed (IPR)	Step Feed(mm)	RPM	Feed (IPR)	Step Feed(mm)	
0.2	0.0079	31,800	0.0001		28,500	0.0001		21,200	0.0001		12,700	0.0001		10,800	0.0001		31,800	0.0001		10,800	0.0001		
0.3	0.0118	31,800	0.0001	0.1D	28,500	0.0001	0.1D	21,200	0.0001	0.1D	12,700	0.0001		10,800	0.0001		31,800	0.0001	0.1D	10,800	0.0001		
0.4	0.0157	31,800	0.0002		25,900	0.0002		19,900	0.0002		12,700	0.0002		9,900	0.0002		31,800	0.0002		9,500	0.0002		
0.5	0.0197	31,800	0.0002		25,900	0.0002		19,100	0.0002		12,700	0.0002	0.1D	9,500	0.0002	0.1D	31,800	0.0002		9,500	0.0002		0.1D
1.0	0.0394	23,900	0.0008		15,900	0.0008		12,700	0.0008		8,000	0.0005		5,600	0.0004		19,100	0.0008		5,600	0.0008		
1.5	0.0591	21,200	0.0011	0.2D	13,800	0.0011	0.2D	9,500	0.0011	0.2D	6,400	0.0009		4,200	0.0006		17,000	0.0011	0.2D	4,200	0.0012		
1.99	0.0783	19,200	0.0019		12,800	0.0020		8,000	0.0020		5,600	0.0015		3,600	0.0008		16,000	0.0014		3,600	0.0015		

Note:

- 1) Utilize the standard drilling conditions shown in the catalogs just a general guide when starting operation.
- 2) Adjust drilling conditions if required if any vibration or unusual sound occurs when cutting.
- 3) When using low speed machines, use the maximum speed and adjust the feed rate.
- 4) Use of water soluble cutting fluid is recommended.
- 5) In case of drying drilling - use Air blow and reduce feeds/speeds by 30%

Formulas: $RPM = \frac{SFM \times 3.82}{\text{Drill Dia.}}$ Feed rate (in/min) : $RPM \times IPR$