

Twister X 2XDCE Series Technical Information

Process For Successful Deep Hole Drilling:

- 1. Start by producing a 1.5 x diameter to 3 x diameter pilot hole using a coolant or non-coolant pilot drill. Typically this tool will have a point angle the same as or greater than the deep hole drill. Run this drill at 100% of the final drill speed and 1/2 the normal IPM (mm/min).
- 2. Retract and tool change to the final deep hole (2XDCE M.A. Ford® Series) drill.



- 3. Rapid to clearance plane and enter the pilot hole at 25% (don't exceed 400 to 500 RPM (n)) of the final speed and 1 to 2 IPM (25.4 to 50.8 mm/min). This will help with true position by eliminating drill whip. Once into the hole, turn on the coolant and advance to the material start. At this point, you can add a dwell to clear any chips that have been left from the previous drill and let the spindle get to full speed. Increase the speed and feed to final drilling parameters.
- 4. Drill one shot to the final hole depth or through.
- 5. Should you experience any squeaking you may need to retract the drill and increase your feed. Chip packing is occurring and will need to be addressed.
- 6. Once through the material, it may be necessary to reduce the RPM (n) to eliminate breakage of the drill due to drill whip. Then retract to the clearance plane.



Machine Requirements

High Pressure Pump System (1,000 psi/68.9 bar) Machine runout of .0003" (.008mm) Max.

Due to the conditions of equipment, tool holders, and conditions beyond M.A. Ford®'s control, your results may vary.

Should your application require more in depth discussion or a special tool, please contact M.A. Ford®'s Application Engineering Department at 563-391-6220 / 800-553-8024.

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

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2XDCE Series Recommended Cutting Data - Inch

12-17xD, Coolant-Fed Drilling

			т	D		Drill Diameter (Inch)						
Workpiece Material	I S	Hardness	Y	E P	vc - SFM	3/16	1/4	5/16	3/8	1/2		
Group			P E	т Н		f - IPR						
Free Machining & Low Carbon Steels 1006, 1008, 1015, 1018, 1020, 1022, 1025, 1117, 1140, 1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330	Ρ	up to 28 Rc	•	12-17x	345	.0030	.0040	.0080	.0090	.0100		
Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310	Ρ	28 to 35 Rc		12-17x	265	.0030	.0040	.0080	.0090	.0100		
Tool Steels & Die Steels O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, A2, A3, A6, A7, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A128, D2, D3, D4, D5, D7	Ρ	28 to 35 Rc		12-17x	265	.0030	.0040	.0080	.0090	.0100		
Hardened Steels		35-45 Rc	:	12-17x	115	.0006	.0009	.0020	.0024	.0030		
Hardened Steels	н	45-55 Rc			80							
Stainless Steel - Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430	м	up to 28 Rc	•	12-17x	300	.0030	.0040	.0080	.0090	.0100		
Stainless Steel - Moderately Difficult 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH	м	up to 28 Rc		12-17x	180	.0030	.0040	.0080	.0090	.0100		
Stainless Steel - Difficult to Machine 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics	м	over 28 Rc		12-17x	130	.0020	.0030	.0060	.0080	.0100		
High Temp Alloys Nimonics, Inconel, Monel, Hastelloy	s	up to 42 Rc	•	12-17x	65-80	.0009	.0014	.0025	.0030	.0033		
Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al	s	up to 42 Rc		12-17x	150	.0016	.0024	.0050	.0060	.0060		
Cast Iron - Gray CG, ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40	к	up to 240 HB	•	12-17x	400	.0030	.0050	.0080	.0090	.0100		
Cast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450	к	over 240 HB		12-17x	265	.0030	.0050	.0080	.0090	.0100		
Non-Ferrous - Al < 14% Si	Ν			12-17x	500	.0043	.0070	.0110	.0138	.0149		
Non-Ferrous - Al > 14% Si	N				350	.0043	.0070	.0110	.0138	.0149		
Non-Ferrous - Brass	Ν		• &		400	.0030	.0040	.0110	.0130	.0140		
Non-Ferrous - Cu/Cu Alloys/Magnesium	Ν				300	.0030	.0040	.0110	.0130	.0140		

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Drills - Technical Information Series 2XDCE



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Twister X D 2XDCE Series Recommended Cutting Data - Metric 12-17xD, Coolant-Fed Drilling

Workpiece Material Group	l S	Hardness	T Y P E	D E P T H	vc - m/min	Drill Diameter (mm)						
						5	6	7	8	9	10	12
	0					f - mm/Rev						
Free Machining & Low Carbon Steels 1006, 1008, 1015, 1018, 1020, 1022, 1025, 1117, 1140,1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330	Ρ	up to 28 Rc		12-17x	105	.088	.106	.127	.193	.215	.238	.254
Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310	р	28 to 35 Rc	•	12-17x	80	.088	.106	.127	.193	.215	.238	.254
Tool Steels & Die Steels O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, A2, A3, A6, A7, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, S2100, A128, D2, D3, D4, D5, D7	Ρ	28 to 35 Rc		12-17x	80	.088	.106	.127	.193	.215	.238	.254
Hardened Steels		35-45 Rc	:	12-17x	35			007	0.15	050	0.50	0.55
Hardened Steels	н	45-55 Rc			25	.020	.022	.027	.046	.053	.060	.066
Stainless Steel - Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430	м	up to 28 Rc	•	12-17x	90	.090	.105	.127	.193	.215	.238	.254
Stainless Steel - Moderately Difficult 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH	м	up to 28 Rc		12-17x	55	.090	.105	.127	.193	.215	.238	.254
Stainless Steel - Difficult to Machine 3028, 3048, 309, 310, 316, 3168, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics	м	over 28 Rc		12-17x	40	.090	.105	.127	.193	.215	.238	.254
High Temp Alloys Nimonics, Inconel, Monel, Hastelloy	s	up to 42 Rc	•	12-17x	20-25	.030	.035	.048	.051	.071	.078	.085
Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al	s	up to 42 Rc		12-17x	45	.050	.060	.071	.098	.127	.140	.152
Cast Iron - Gray CG, ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40	к	up to 240 HB	•	12-17x	120	.100	.120	.140	.200	.215	.240	.254
Cast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450	к	over 240 HB		12-17x	80	.100	.120	.140	.200	.215	.240	.254
Non-Ferrous - Al < 14% Si	Ν		•	12-17x	150	.140	.170	.195	.280	.314	.350	.378
Non-Ferrous - Al > 14% Si	N				105	.140	.170	.195	.280	.314	.350	.378
Non-Ferrous - Brass	N				120	.088	.106	.127	.279	.314	.350	.378
Non- Ferrous - Cu/Cu Alloys/Magnesium	Ν				90	.088	.106	.127	.279	.314	.350	.378

Safety Note

Always wear the appropriate personal protective equipment such as safety glasses and protective clothing when using solid carbide or HSS cutting tools. Machines should be fully guarded. Technical data provided should be considered advisory only as variations may be necesary depending on the particular application.

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