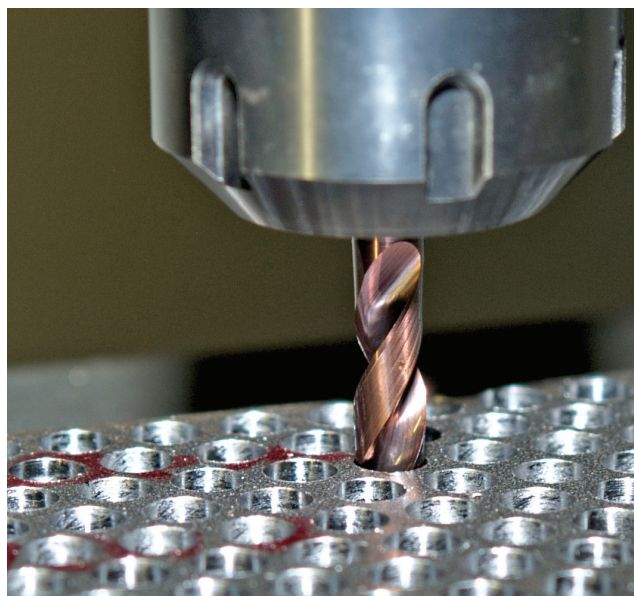
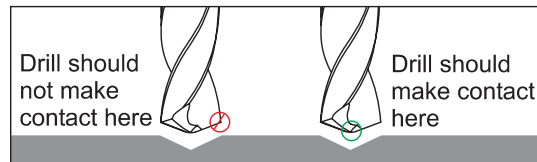


CYCLONE CXDCE Series Technical Information

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 (CXDCE 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.



Recommended Machine Requirements

500-1,000 PSI through-spindle coolant pressure
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.





CXDCE Series Recommended Cutting Data - Inch 15xD, Coolant-Fed Drilling

Material Group	ISO	Hardness	Vc - SFM			Drill Diameter (inch)			
						1/8	3/16	1/4	5/16
			Low	Mid	High	Feed (in/rev)			
Low Carbon Steels 12L14, 1018, A36	P	≤ 180 HB	280	350	420	.0025 - .0038	.0038 - .0056	.0050 - .0075	.0063 - .0094
Med Carbon / Alloy Steels 1045, 1050, 4140, 4340		≤ 38 HRC	220	270	320	.0025 - .0038	.0038 - .0056	.0050 - .0075	.0063 - .0094
Die / Tool Steels A2, D2, H13, P20		≤ 45 HRC	130	165	200	.0013 - .0019	.0019 - .0028	.0025 - .0038	.0031 - .0047
Ferritic / Martensitic Stainless 400 Series	M	≤ 28 HRC	240	300	360	.0019 - .0031	.0028 - .0047	.0038 - .0063	.0047 - .0078
Austenitic Stainless 300 Series			140	180	220	.0019 - .0031	.0028 - .0047	.0038 - .0063	.0047 - .0078
PH Stainless 15-5 PH, 17-4 PH, 17-7 PH		≤ 45 HRC	100	120	140	.0013 - .0025	.0019 - .0038	.0025 - .0050	.0031 - .0063
Cast Iron - Gray	K	≤ 240 HB	320	400	480	.0031 - .0044	.0047 - .0066	.0063 - .0088	.0078 - .0109
Cast Iron - Ductile & Malleable		> 240 HB	210	265	320	.0025 - .0038	.0038 - .0056	.0050 - .0075	.0063 - .0094
Aluminum - Wrought (≤ 10% Si)	N	≤ 100 HB	400	500	600	.0044 - .0063	.0066 - .0094	.0088 - .0125	.0109 - .0156
Aluminum - Cast (> 10% Si)			280	350	420	.0044 - .0063	.0066 - .0094	.0088 - .0125	.0109 - .0156

Material Group	ISO	Hardness	Vc - SFM			Drill Diameter (inch)	
						3/8	1/2
			Low	Mid	High	Feed (in/rev)	
Low Carbon Steels 12L14, 1018, A36	P	≤ 180 HB	280	350	420	.0075 - .0113	.0100 - .0150
Med Carbon / Alloy Steels 1045, 1050, 4140, 4340		≤ 38 HRC	220	270	320	.0075 - .0113	.0100 - .0150
Die / Tool Steels A2, D2, H13, P20		≤ 45 HRC	130	165	200	.0038 - .0056	.0050 - .0075
Ferritic / Martensitic Stainless 400 Series	M	≤ 28 HRC	240	300	360	.0056 - .0094	.0075 - .0125
Austenitic Stainless 300 Series			140	180	220	.0056 - .0094	.0075 - .0125
PH Stainless 15-5 PH, 17-4 PH, 17-7 PH		≤ 45 HRC	100	120	140	.0038 - .0075	.0050 - .0100
Cast Iron - Gray	K	≤ 240 HB	320	400	480	.0094 - .0131	.0125 - .0175
Cast Iron - Ductile & Malleable		> 240 HB	210	265	320	.0075 - .0113	.0100 - .0150
Aluminum - Wrought (≤ 10% Si)	N	≤ 100 HB	400	500	600	.0131 - .0188	.0175 - .0250
Aluminum - Cast (> 10% Si)			280	350	420	.0131 - .0188	.0175 - .0250

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



CXDCE Series Recommended Cutting Data - Metric

15xD, Coolant-Fed Drilling

Material Group	I S O	Hardness	Vc - M/Min			Drill Diameter (mm)			
						3	5	6	8
			Low	Mid	High	Feed (mm/rev)			
Low Carbon Steels 12L14, 1018, A36	P	≤ 180 HB	85	105	125	0.060 - 0.090	0.100 - 0.150	0.120 - 0.180	0.160 - 0.240
Med Carbon / Alloy Steels 1045, 1050, 4140, 4340		≤ 38 HRC	65	80	95	0.060 - 0.090	0.100 - 0.150	0.120 - 0.180	0.160 - 0.240
Die / Tool Steels A2, D2, H13, P20		≤ 45 HRC	40	50	60	0.030 - 0.045	0.050 - 0.075	0.060 - 0.090	0.080 - 0.120
Ferritic / Martensitic Stainless 400 Series	M	≤ 28 HRC	70	90	110	0.045 - 0.075	0.075 - 0.125	0.090 - 0.150	0.120 - 0.200
Austenitic Stainless 300 Series			45	55	65	0.045 - 0.075	0.075 - 0.125	0.090 - 0.150	0.120 - 0.200
PH Stainless 15-5 PH, 17-4 PH, 17-7 PH		≤ 45 HRC	30	35	40	0.030 - 0.060	0.050 - 0.100	0.060 - 0.120	0.080 - 0.160
Cast Iron - Gray	K	≤ 240 HB	95	120	145	0.075 - 0.105	0.125 - 0.175	0.150 - 0.210	0.200 - 0.280
Cast Iron - Ductile & Malleable		> 240 HB	65	80	95	0.060 - 0.090	0.100 - 0.150	0.120 - 0.180	0.160 - 0.240
Aluminum - Wrought (≤ 10% Si)	N	≤ 100 HB	120	150	180	0.105 - 0.150	0.175 - 0.250	0.210 - 0.300	0.280 - 0.400
Aluminum - Cast (> 10% Si)			85	105	125	0.105 - 0.150	0.175 - 0.250	0.210 - 0.300	0.280 - 0.400

Material Group	I S O	Hardness	Vc - M/Min			Drill Diameter (mm)	
						10	12
			Low	Mid	High	Feed (mm/rev)	
Low Carbon Steels 12L14, 1018, A36	P	≤ 180 HB	85	105	125	0.200 - 0.300	0.240 - 0.360
Med Carbon / Alloy Steels 1045, 1050, 4140, 4340		≤ 38 HRC	65	80	95	0.200 - 0.300	0.240 - 0.360
Die / Tool Steels A2, D2, H13, P20		≤ 45 HRC	40	50	60	0.100 - 0.150	0.120 - 0.180
Ferritic / Martensitic Stainless 400 Series	M	≤ 28 HRC	70	90	110	0.150 - 0.250	0.180 - 0.300
Austenitic Stainless 300 Series			45	55	65	0.150 - 0.250	0.180 - 0.300
PH Stainless 15-5 PH, 17-4 PH, 17-7 PH		≤ 45 HRC	30	35	40	0.100 - 0.200	0.120 - 0.240
Cast Iron - Gray	K	≤ 240 HB	95	120	145	0.250 - 0.350	0.300 - 0.420
Cast Iron - Ductile & Malleable		> 240 HB	65	80	95	0.200 - 0.300	0.240 - 0.360
Aluminum - Wrought (≤ 10% Si)	N	≤ 100 HB	120	150	180	0.350 - 0.500	0.420 - 0.600
Aluminum - Cast (> 10% Si)			85	105	125	0.350 - 0.500	0.420 - 0.600

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