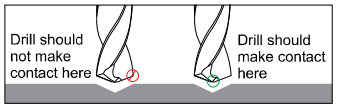
2XDCE

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.
2. Retract and tool change to the final deep hole (2XDCE MA Ford® Series) drill.
3. Rapid to clearance plane and enter the pilot hole at 25% (don't exceed 400 to 500 RPM) of the final speed and 1 to 2 IPM. 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 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)
Machine runout of .0003" (.008mm) Max.

Due to the conditions of equipment, tool holders, and conditions beyond MA 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.

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 necessary depending on the particular application.

2XDCE Inch

Workpiece Material Group		Examples	SFM	Tool Diameter								
				.1181	.1575	.1968	.2362	.2756	.3150	.3543	.3937	.4724
				IPR								
Steels	P	Low Carbon Steels 1018/12L14	350	.0020	.0028	.0035	.0042	.0050	.0076	.0085	.0094	.0100
		Medium Carbon Steels 4140	260									
		Tool & Die Steels A2/D2/P20/H13										
		Alloy Steels 4140/8620										
		Structural Steels	400									
		Steel Forgings	175	.0024	.0031	.0039	.0047	.0055	.0076	.0085	.0094	.0100
Cast Irons	K	Gray Cast Iron Class 20	400									
		Ductile Cast Iron 60-40-18	260									
		Malleable Iron Ferritic	260									
Austenitic	M	304/316	180	.0020	.0028	.0035	.0042	.0050	.0076	.0085	.0094	.0100
Precipitation Hardened Stainless Steels	M	17-4 PH 13-8 PH	125									
Martensitic	M	410/440	125									
Stainless	M	Ferritic	250									
Special Alloys	S	Titanium 6AL-4V	160	.0012	.0016	.0020	.0024	.0028	.0040	.0050	.0055	.0060
		Cobalt-Based Alloys Stellite, Haynes 25/188	80	.0007	.0009	.0012	.0014	.0019	.0025	.0028	.0031	.0034
		Nickel-Based Alloys Inconel 625/718	80									
		Iron-Based Alloys Incoloy 800-802/Multimet	60									
		High Nickel Alloys Monel	80									
Hardened Materials	H	Alloy Steels (36-45 Rc) A2/D2/P20/H13	260	.0005	.0006	.0008	.0009	.0011	.0019	.0021	.0024	.0026
		Alloy Steels (46-50 Rc) A2/D2/P20/H13	120									
Non-Ferrous	N	Aluminum < 14% Si 6061-T6	500	.0033	.0044	.0055	.0066	.0077	.0110	.0120	.0130	.0140
		Aluminum > 14% Si	350									
		Brass	400	.0021	.0028	.0035	.0042	.0050	.0110	.0125	.0135	.0150
		Copper/Copper Alloys Magnesium	300									

2XDCE Metric

Workpiece Material Group		Examples	SMM	Tool Diameter(mm)								
				3	4	5	6	7	8	9	10	12
				mm/rev.								
Steels	P	Low Carbon Steels 1018/12L14	105	.050	.071	.088	.106	.127	.193	.215	.238	.254
		Medium Carbon Steels 4140	80									
		Tool & Die Steels A2/D2/P20/H13										
		Alloy Steels 4140/8620										
		Structural Steels	120									
		Steel Forgings	55	.060	.078	.099	.119	.139	.193	.215	.238	.254
Cast Irons	K	Gray Cast Iron Class 20	120									
		Ductile Cast Iron 60-40-18	80									
		Malleable Iron Ferritic	80									
Austenitic	M	304/316	55	.050	.071	.088	.106	.127	.193	.215	.238	.254
Precipitation Hardened Stainless Steels	M	17-4 PH 13-8 PH	40									
Martensitic	M	410/440	40									
Stainless	M	Ferritic	75									
Special Alloys	S	Titanium 6AL-4V	45	.030	.040	.050	.060	.071	.120	.127	.139	.152
		Cobalt-Based Alloys Stellite, Haynes 25/188	25	.017	.022	.030	.035	.048	.063	.071	.078	.085
		Nickel-Based Alloys Inconel 625/718	25									
		Iron-Based Alloys Incoloy 800-802/Multimet	20									
		High Nickel Alloys Monel	25									
Hardened Materials	H	Alloy Steels (36-45 Rc) A2/D2/P20/H13	35	.012	.015	.020	.022	.027	.048	.053	.060	.066
		Alloy Steels (46-50 Rc) A2/D2/P20/H13	25									
Non-Ferrous	N	Aluminum < 14% Si 6061-T6	150	.083	.110	.139	.167	.195	.279	.314	.350	.378
		Aluminum > 14% Si	105									
		Brass	120	.053	.071	.088	.106	.127	.279	.314	.350	.378
		Copper/Copper Alloys Magnesium	90									

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

Series 200S - 2XD Spot Drill Inch

Workpiece Material Group		Examples	SFM	Tool Diameter				
				1/4	5/16	3/8	1/2	5/8
				IPR				
Steels	P	Low Carbon Steels 1018	325	.003	.004	.005	.006	.008
		Alloy Steels (up to 35 Rc) 4140	225					
		Alloy Steels (36-45 Rc) 4140	150					
Cast Irons	K	Gray Cast Iron A48 Class 20/G4000	350	.003	.004	.005	.006	.006
		Ductile Cast Iron A536/60-40-18	250					
Austenitic	M	304/316	150	.003	.004	.005	.006	.006
Precipitation Hardened Stainless Steels	M	17-4 PH	100					
Special Alloys	S	Titanium 6AL-4V	175	.003	.004	.005	.006	.006
		High Temp Alloys Inconel/Hasteloy/Waspelloy	75					

Series 200S - 2XD Spot Drill Metric

Workpiece Material Group		Examples	SMM	Tool Diameter(mm)				
				6	8	10	12	16
				mm/rev.				
Steels	P	Low Carbon Steels 1018	100	.0760	.1010	.1270	.1524	.1524
		Alloy Steels (up to 35 Rc) 4140	70					
		Alloy Steels (36-45 Rc) 4140	45					
Cast Irons	K	Gray Cast Iron A48 Class 20/G4000	110	.0760	.1010	.1270	.1524	.1524
		Ductile Cast Iron A536/60-40-18	80					
Austenitic	M	304/316	45	.0760	.1010	.1270	.1524	.1524
Precipitation Hardened Stainless Steels	M	17-4 PH	30					
Special Alloys	S	Titanium 6AL-4V	55	.0760	.1010	.1270	.1524	.1524
		High Temp Alloys Inconel/Hasteloy/Waspelloy	20					

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