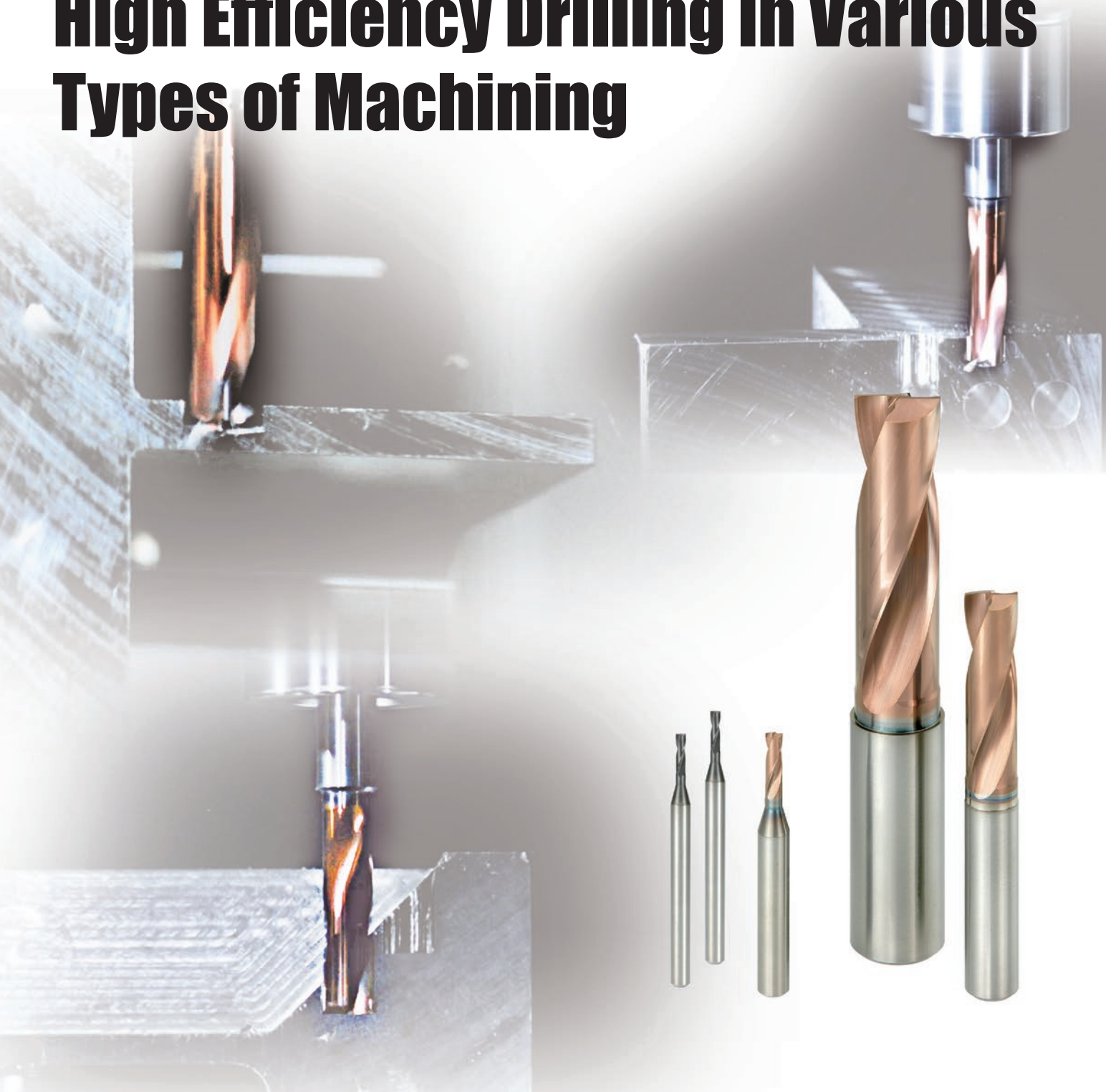


Solid Carbide Flat Bottom Drills

MIFE Series

Series
Expansion

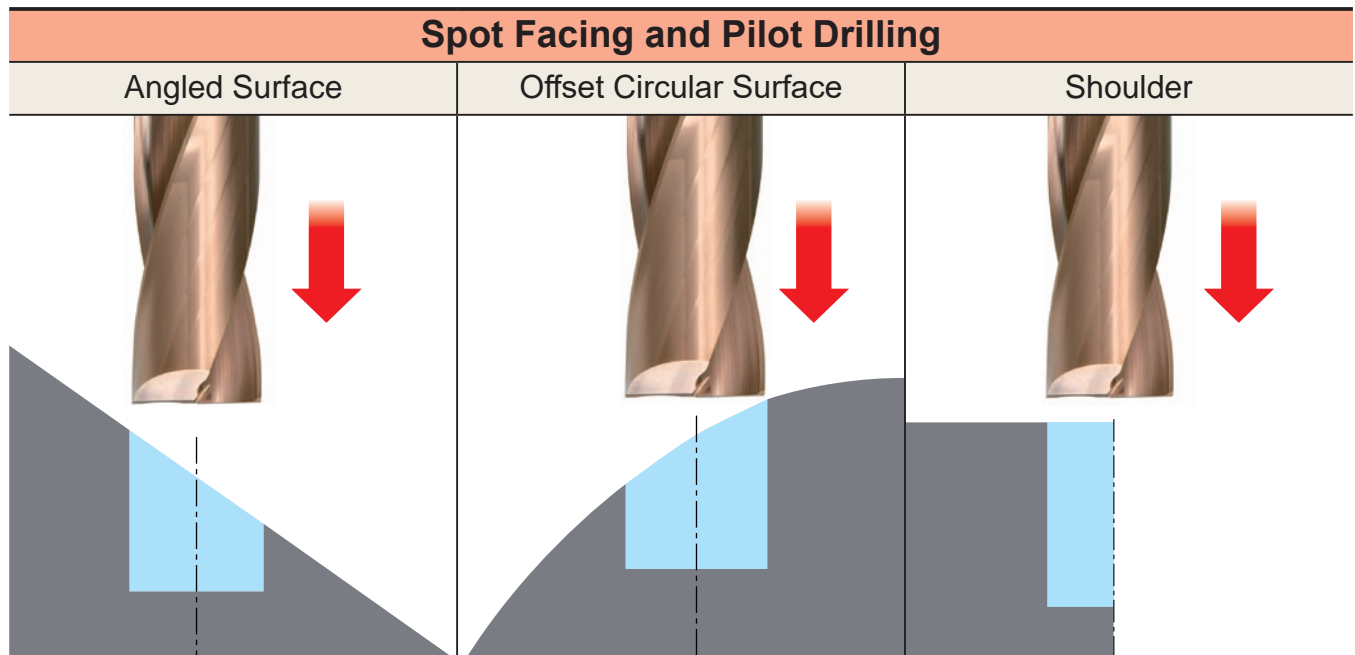
High Efficiency Drilling in Various Types of Machining



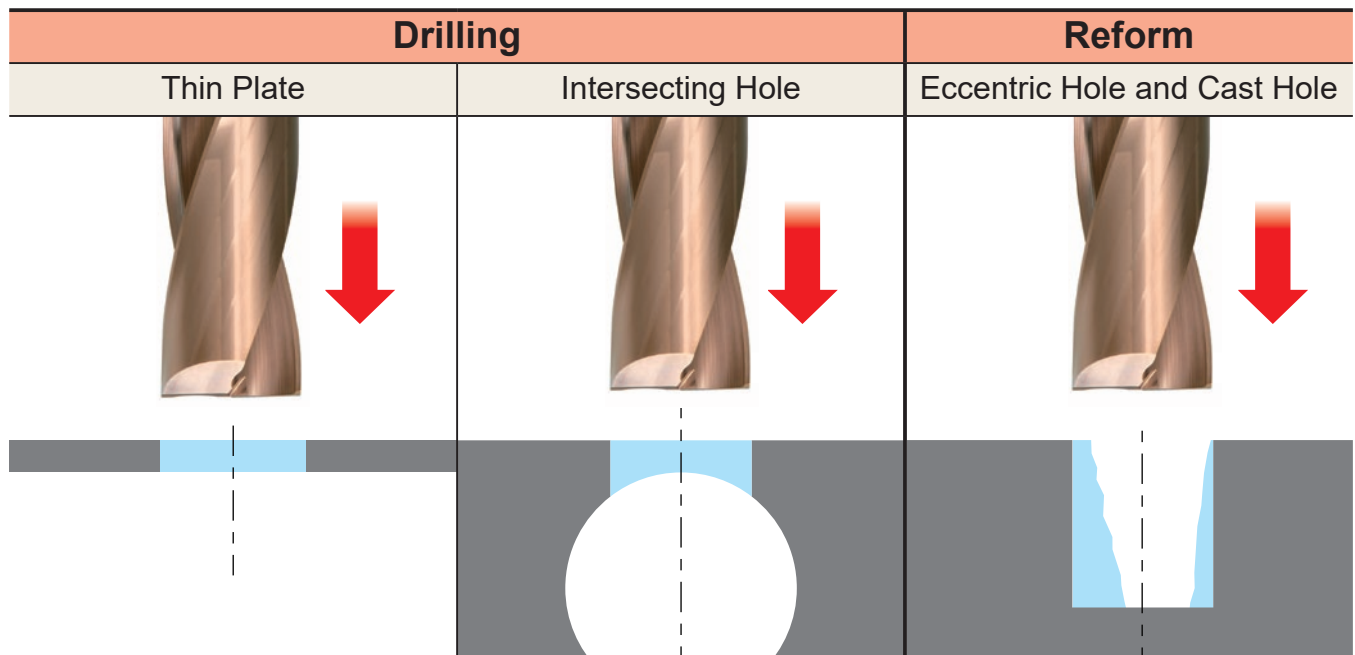
Solid Carbide Flat Bottom Drills

MIFE Series

High Efficiency Drilling in Various Types of Machining



High efficiency counter boring in various types of machining with excellent chipping resistance.

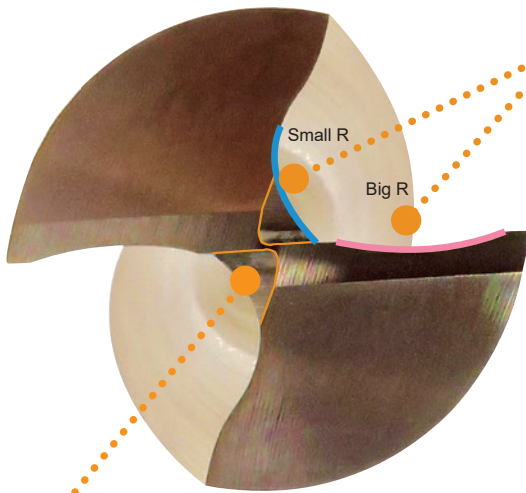


Low cutting force provides less burr.

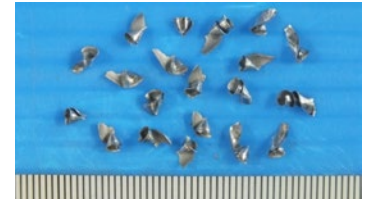
Excellent performance in correction of eccentric hole and cast hole due to high position accuracy.

Features DC \geq .1181"

Excellent Chip Control



Combination of different radius sizes provides strong cutting edge and excellent chip control.



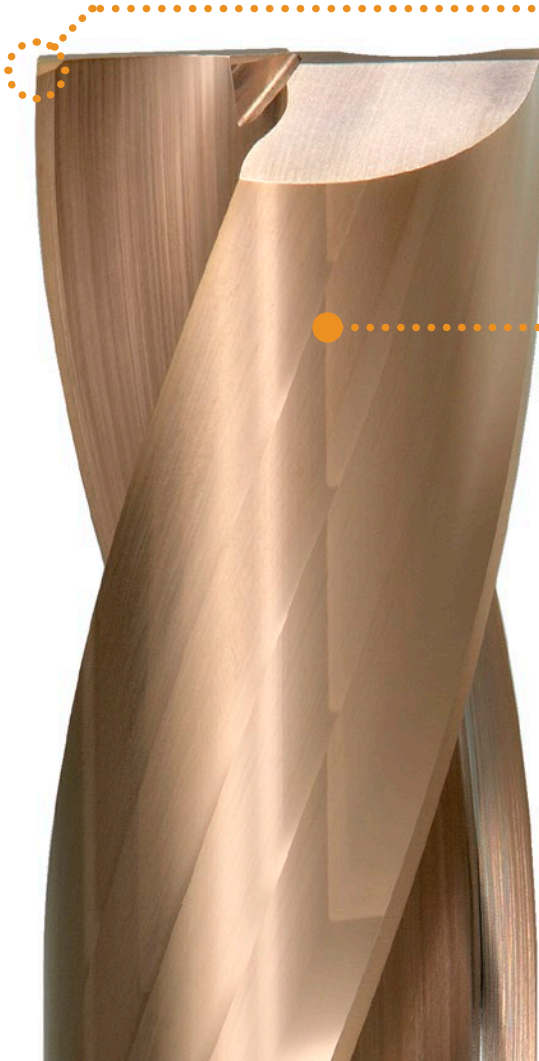
<Cutting Conditions>
Work Material : AISI 1050
Cutting Speed : vc=165 SFM
Feed per Rev. : fr=.0028 IPR

New "Z" Thinning with Lower Thrust Force

New thinning provides excellent chip evacuation.

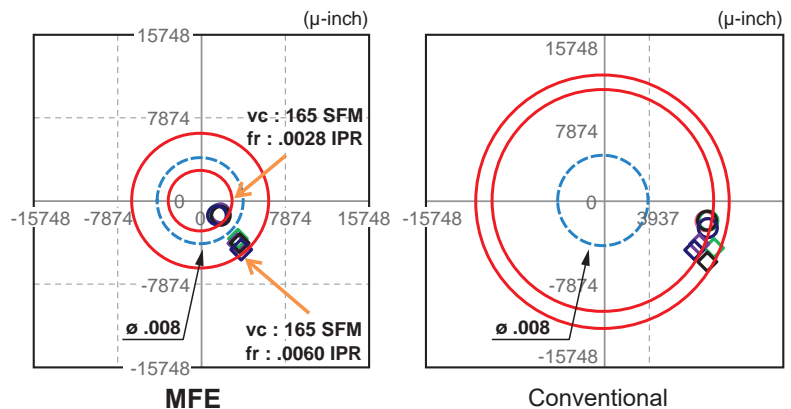
Gash Land for Stronger Corner

Gash land (0 degree rake) provides excellent chipping resistance.



ZERO- μ Surface

Smooth surface clearance provides reduced deflection and excellent position accuracy.

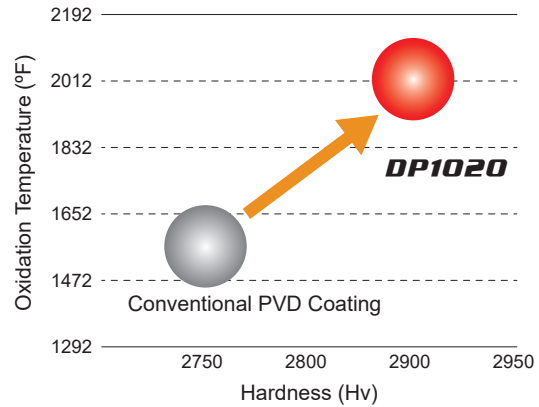
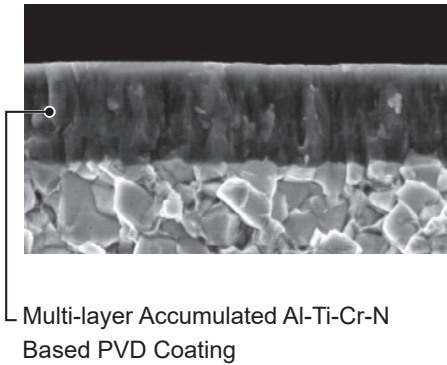


AISI 1050 45° angled surface DC \times 2

Longer Tool Life with Stable Cutting

Coated Grade **DP1020**

Newly developed coating for drills provides excellent wear resistance with low friction property, resulting in excellent versatility and extended tool life.



Cutting Performance

Comparison of Thin Plate Machining in AISI 4140

Flat tip geometry prevents burr formation in various types of applications.

	Conventional (Point Angle = 140°)	MFE (Point Angle = 180°)
vc = 165 SFM fr = .0020 IPR		
vc = 260 SFM fr = .0059 IPR	<p>Large Burr</p>	<p>Small Burr</p>

<Cutting Conditions>
 Drill : MFE0600X02S060
 Work Material : AISI 4140
 Hole Depth : .394" (Thin Plate)
 Cutting Mode : Wet Cutting
 External Coolant
 (Water-soluble)
 Machine : Vertical MC (BT40)

NEW

Features Small Dia. DC<.1181"

Excellent Chip Control

Combination of different radius sizes provides strong cutting edge and excellent chip control.

Thinning with Lower Thrust Force

Ideal chip shape formed by the radius form, securing the chip pocket on the center part, thereby dramatically reducing the cutting resistance.



MFE



Conventional

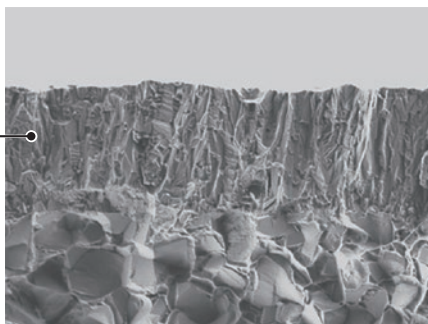
Unique Sharp Cutting Edges

The flat lands on the cutting edge corners provide greater strength and sharpness, which can substantially reduce the formation of burrs.

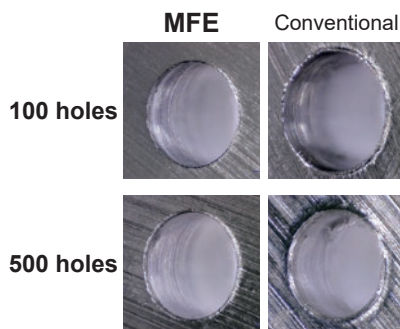
Sharp Cutting Edges with Long Tool Life

Coated Grade **DP102A**

DP102A is a PVD coated cemented carbide grade specialized for small diameter drills, with greatly improved wear resistance when drilling small-diameter holes at low speeds and low feed conditions. This provides high adhesion and stability even with sharp cutting edges.



Al-Cr-N Based PVD Coating



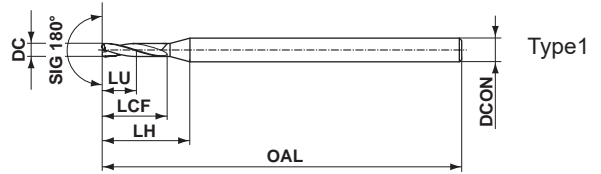
<Cutting Conditions>
Drill : MFE0100X02S030
Work Material : AISI 304
Hole Depth : .079"
Cutting Speed : **vc**=80 SFM
Feed per Rev. : **fr**=.0003 IPR
Machine : Vertical MC (BT40)

Solid Carbide Flat Bottom Drills

MFE **NEW** for Small Diameter



P M K N S H



	.0295 ≤ DC ≤ .1161				(inch)
h6	0	-.00055			
	DCON = .118		.118 < DCON ≤ .157		
	0	-.00024	0	-.00031	

External Coolant

(inch)

Metric (mm)	DC				L/D	Order Number	Stock DP102A	LU		LCF		LH		OAL		DCON		Type
	Decimal	Fraction	Wire / Letter	Thread Size				mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
	(inch)																	
0.750	.0295				2	MFE0075X02S030	●	1.5	.059	3.0	.118	7.7	.303	45	1.772	3	.118	1
0.800	.0315				2	MFE0080X02S030	●	1.6	.063	3.2	.126	7.8	.307	45	1.772	3	.118	1
0.850	.0335				2	MFE0085X02S030	●	1.7	.067	3.4	.134	7.9	.311	45	1.772	3	.118	1
0.900	.0354				2	MFE0090X02S030	●	1.8	.071	3.6	.142	8.0	.315	45	1.772	3	.118	1
0.950	.0374				2	MFE0095X02S030	●	1.9	.075	3.8	.150	8.1	.319	45	1.772	3	.118	1
1.000	.0394				2	MFE0100X02S030	●	2.0	.079	4.0	.157	8.2	.323	45	1.772	3	.118	1
1.050	.0413				2	MFE0105X02S030	●	2.1	.083	4.2	.165	8.3	.327	45	1.772	3	.118	1
1.100	.0433				2	MFE0110X02S030	●	2.2	.087	4.4	.173	8.4	.331	45	1.772	3	.118	1
1.150	.0453				2	MFE0115X02S030	●	2.3	.091	4.6	.181	8.6	.339	45	1.772	3	.118	1
1.200	.0472				2	MFE0120X02S030	●	2.4	.094	4.8	.189	8.7	.343	45	1.772	3	.118	1
1.250	.0492				2	MFE0125X02S030	●	2.5	.098	5.0	.197	8.8	.346	45	1.772	3	.118	1
1.300	.0512				2	MFE0130X02S030	●	2.6	.102	5.2	.205	8.9	.350	45	1.772	3	.118	1
1.350	.0531				2	MFE0135X02S030	●	2.7	.106	5.4	.213	9.0	.354	45	1.772	3	.118	1
1.400	.0551				2	MFE0140X02S030	●	2.8	.110	5.6	.220	9.1	.358	45	1.772	3	.118	1
1.450	.0571				2	MFE0145X02S030	●	2.9	.114	5.8	.228	9.2	.362	45	1.772	3	.118	1
1.500	.0591				2	MFE0150X02S030	●	3.0	.118	6.0	.236	9.3	.366	45	1.772	3	.118	1
1.550	.0610				2	MFE0155X02S030	●	3.1	.122	6.2	.244	9.4	.370	45	1.772	3	.118	1
1.600	.0630				2	MFE0160X02S030	●	3.2	.126	6.4	.252	9.5	.374	45	1.772	3	.118	1
1.650	.0650				2	MFE0165X02S030	●	3.3	.130	6.6	.260	9.6	.378	45	1.772	3	.118	1
1.700	.0669				2	MFE0170X02S030	●	3.4	.134	6.8	.268	9.7	.382	45	1.772	3	.118	1
1.750	.0689				2	MFE0175X02S030	●	3.5	.138	7.0	.276	9.8	.386	45	1.772	3	.118	1
1.800	.0709				2	MFE0180X02S030	●	3.6	.142	7.2	.283	9.9	.390	45	1.772	3	.118	1
1.850	.0728				2	MFE0185X02S030	●	3.7	.146	7.4	.291	10.0	.394	45	1.772	3	.118	1
1.900	.0748				2	MFE0190X02S030	●	3.8	.150	7.6	.299	10.2	.402	45	1.772	3	.118	1
1.950	.0768				2	MFE0195X02S030	●	3.9	.154	7.8	.307	10.3	.406	45	1.772	3	.118	1
2.000	.0787			#3-48	2	MFE0200X02S040	●	4.0	.157	8.0	.315	12.2	.480	50	1.969	4	.157	1
2.050	.0807				2	MFE0205X02S040	●	4.1	.161	8.2	.323	12.3	.484	50	1.969	4	.157	1
2.100	.0827				2	MFE0210X02S040	●	4.2	.165	8.4	.331	12.4	.488	50	1.969	4	.157	1
2.150	.0846				2	MFE0215X02S040	●	4.3	.169	8.6	.339	12.6	.496	50	1.969	4	.157	1
2.200	.0866				2	MFE0220X02S040	●	4.4	.173	8.8	.346	12.7	.500	50	1.969	4	.157	1
2.250	.0886				2	MFE0225X02S040	●	4.5	.177	9.0	.354	12.8	.504	50	1.969	4	.157	1
2.300	.0906				2	MFE0230X02S040	●	4.6	.181	9.2	.362	12.9	.508	50	1.969	4	.157	1
2.350	.0925				2	MFE0235X02S040	●	4.7	.185	9.4	.370	13.0	.512	50	1.969	4	.157	1
2.400	.0945				2	MFE0240X02S040	●	4.8	.189	9.6	.378	13.1	.516	50	1.969	4	.157	1

● : Inventory maintained.

External Coolant

(inch)

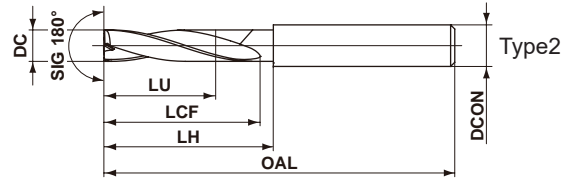
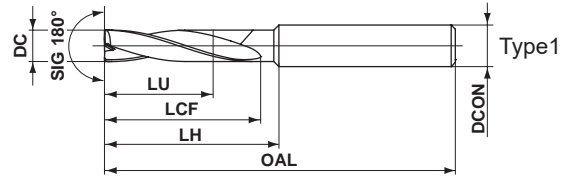
DC					L/D	Order Number	Stock	LU		LCF		LH		OAL		DCON		Type	
Metric (mm)	Decimal	Fraction	Wire / Letter	Thread Size			DP102A	●	mm	inch	mm	inch	mm	inch	mm	inch	mm		inch
	(inch)								mm	inch	mm	inch	mm	inch	mm	inch			
2.450	.0965				2	MFE0245X02S040	●	4.9	.193	9.8	.386	13.2	.520	50	1.969	4	.157	1	
2.500	.0984				2	MFE0250X02S040	●	5.0	.197	10.0	.394	13.3	.524	50	1.969	4	.157	1	
2.550	.1004				2	MFE0255X02S040	●	5.1	.201	10.2	.402	13.4	.528	50	1.969	4	.157	1	
2.600	.1024				2	MFE0260X02S040	●	5.2	.205	10.4	.409	13.5	.531	50	1.969	4	.157	1	
2.650	.1043				2	MFE0265X02S040	●	5.3	.209	10.6	.417	13.6	.535	50	1.969	4	.157	1	
2.700	.1063		36	#6-32	2	MFE0270X02S040	●	5.4	.213	10.8	.425	13.7	.539	50	1.969	4	.157	1	
2.750	.1083				2	MFE0275X02S040	●	5.5	.217	11.0	.433	13.8	.543	50	1.969	4	.157	1	
2.800	.1102		35		2	MFE0280X02S040	●	5.6	.220	11.2	.441	13.9	.547	50	1.969	4	.157	1	
2.850	.1122				2	MFE0285X02S040	●	5.7	.224	11.4	.449	14.0	.551	50	1.969	4	.157	1	
2.900	.1142				2	MFE0290X02S040	●	5.8	.228	11.6	.457	14.2	.559	50	1.969	4	.157	1	
2.950	.1161		32		2	MFE0295X02S040	●	5.9	.232	11.8	.465	14.3	.563	50	1.969	4	.157	1	

Solid Carbide Flat Bottom Drills

MFE



P M K N S H



(inch)				
.118 ≤ DC ≤ .236	.236 < DC ≤ .394	.394 < DC ≤ .709	.709 < DC ≤ .787	
⁰ -.00047	⁰ -.00059	⁰ -.00071	⁰ -.00083	
DCON = .236 .315 .394 .472 .551 .630 .709 .787				
⁰ -.00031	⁰ -.00035	⁰ -.00043	⁰ -.00051	

External Coolant

(inch)

Metric (mm)	DC				L/D	Order Number	Stock DP1020	LU		LCF		LH		OAL		DCON		Type
	Decimal	Fraction	Wire / Letter	Thread Size				mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
	(inch)																	
3.000	.1181				2	MFE0300X02S060	●	6.0	.236	12	.472	19.6	.772	55	2.165	6	.236	1
3.048	.1200		31		2	MFE0305X02S060	●	6.1	.240	14	.551	21.5	.846	55	2.165	6	.236	1
3.100	.1220				2	MFE0310X02S060	●	6.2	.244	14	.551	21.4	.843	55	2.165	6	.236	1
3.175	.1250	1/8			2	MFE0318X02S060	●	6.4	.252	14	.551	21.3	.839	55	2.165	6	.236	1
3.200	.1260				2	MFE0320X02S060	●	6.4	.252	14	.551	21.2	.835	55	2.165	6	.236	1
3.300	.1299			M4x.7	2	MFE0330X02S060	●	6.6	.260	14	.551	21.0	.827	55	2.165	6	.236	1
3.400	.1339				2	MFE0340X02S060	●	6.8	.268	14	.551	20.9	.823	55	2.165	6	.236	1
3.500	.1378				2	MFE0350X02S060	●	7.0	.276	14	.551	20.7	.815	55	2.165	6	.236	1
3.572	.1406	9/64			2	MFE0357X02S060	●	7.1	.280	16	.630	22.5	.886	55	2.165	6	.236	1
3.600	.1417				2	MFE0360X02S060	●	7.2	.283	16	.630	22.5	.886	55	2.165	6	.236	1
3.700	.1457			M4.5x.75	2	MFE0370X02S060	●	7.4	.291	16	.630	22.3	.878	55	2.165	6	.236	1
3.800	.1496			#10-24	2	MFE0380X02S060	●	7.6	.299	16	.630	22.1	.870	55	2.165	6	.236	1
3.900	.1535				2	MFE0390X02S060	●	7.8	.307	16	.630	21.9	.862	55	2.165	6	.236	1
3.969	.1563	5/32			2	MFE0397X02S060	●	7.9	.311	16	.630	21.8	.858	55	2.165	6	.236	1
4.000	.1575				2	MFE0400X02S060	●	8.0	.315	16	.630	21.7	.854	55	2.165	6	.236	1
4.039	.1590		21	#10-32	2	MFE0404X02S060	●	8.1	.319	18	.709	23.7	.933	62	2.441	6	.236	1
4.100	.1614				2	MFE0410X02S060	●	8.2	.323	18	.709	23.5	.925	62	2.441	6	.236	1
4.200	.1654			M5x.8	2	MFE0420X02S060	●	8.4	.331	18	.709	23.4	.921	62	2.441	6	.236	1
4.300	.1693				2	MFE0430X02S060	●	8.6	.339	18	.709	23.2	.913	62	2.441	6	.236	1
4.366	.1719	11/64			2	MFE0437X02S060	●	8.7	.343	18	.709	23.0	.906	62	2.441	6	.236	1
4.400	.1732				2	MFE0440X02S060	●	8.8	.346	18	.709	23.0	.906	62	2.441	6	.236	1
4.500	.1772		16	#12-24	2	MFE0450X02S060	●	9.0	.354	18	.709	22.8	.898	62	2.441	6	.236	1
4.600	.1811				2	MFE0460X02S060	●	9.2	.362	20	.787	23.7	.933	62	2.441	6	.236	1
4.700	.1850		13		2	MFE0470X02S060	●	9.4	.370	20	.787	23.7	.933	62	2.441	6	.236	1
4.763	.1875	3/16			2	MFE0476X02S060	●	9.5	.374	20	.787	23.6	.929	62	2.441	6	.236	1
4.800	.1890		12		2	MFE0480X02S060	●	9.6	.378	20	.787	23.6	.929	62	2.441	6	.236	1
4.900	.1929				2	MFE0490X02S060	●	9.8	.386	20	.787	23.6	.929	62	2.441	6	.236	1
5.000	.1969			M6x1.0	2	MFE0500X02S060	●	10.0	.394	20	.787	23.5	.925	62	2.441	6	.236	1
5.100	.2008		7	1/4-20	2	MFE0510X02S060	●	10.2	.402	22	.866	25.5	1.004	62	2.441	6	.236	1
5.159	.2031	13/64			2	MFE0516X02S060	●	10.3	.406	22	.866	25.4	1.000	62	2.441	6	.236	1
5.200	.2047				2	MFE0520X02S060	●	10.4	.409	22	.866	25.4	1.000	62	2.441	6	.236	1
5.300	.2087				2	MFE0530X02S060	●	10.6	.417	22	.866	25.4	1.000	62	2.441	6	.236	1
5.400	.2126		3	1/4-28	2	MFE0540X02S060	●	10.8	.425	22	.866	25.3	.996	62	2.441	6	.236	1
5.500	.2165				2	MFE0550X02S060	●	11.0	.433	22	.866	25.3	.996	62	2.441	6	.236	1

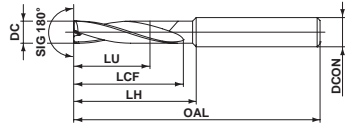
● : Inventory maintained. ★ : Inventory maintained in Japan.

External Coolant

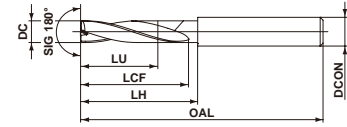
(inch)

DC					L/D	Order Number	Stock DP1020	LU		LCF		LH		OAL		DCON		Type		
Metric (mm)	Decimal	Fraction	Wire / Letter	Thread Size				mm	inch	mm	inch	mm	inch	mm	inch	mm	inch		mm	inch
	(inch)																			
5.557	.2188	7/32			2	MFE0556X02S060	●	11.1	.437	24	.945	27.2	1.071	62	2.441	6	.236	1		
5.600	.2205				2	MFE0560X02S060	●	11.2	.441	24	.945	27.2	1.071	62	2.441	6	.236	1		
5.700	.2244				2	MFE0570X02S060	●	11.4	.449	24	.945	27.2	1.071	62	2.441	6	.236	1		
5.800	.2283		1		2	MFE0580X02S060	●	11.6	.457	24	.945	27.1	1.067	62	2.441	6	.236	1		
5.900	.2323				2	MFE0590X02S060	●	11.8	.465	24	.945	27.1	1.067	62	2.441	6	.236	1		
5.953	.2344	15/64			2	MFE0595X02S060	●	11.9	.469	24	.945	27.0	1.063	62	2.441	6	.236	1		
6.000	.2362			M7x1.0	2	MFE0600X02S060	●	12.0	.472	24	.945	27.0	1.063	62	2.441	6	.236	1		
6.100	.2402				2	MFE0610X02S070	★	12.2	.480	26	1.024	29.5	1.161	74	2.913	7	.276	1		
6.100	.2402				2	MFE0610X02S080	●	12.2	.480	26	1.024	30.0	1.181	74	2.913	8	.315	1		
6.200	.2441				2	MFE0620X02S070	★	12.4	.488	26	1.024	29.4	1.157	74	2.913	7	.276	1		
6.200	.2441				2	MFE0620X02S080	●	12.4	.488	26	1.024	29.9	1.177	74	2.913	8	.315	1		
6.300	.2480				2	MFE0630X02S070	★	12.6	.496	26	1.024	29.4	1.157	74	2.913	7	.276	1		
6.300	.2480				2	MFE0630X02S080	●	12.6	.496	26	1.024	29.9	1.177	74	2.913	8	.315	1		
6.350	.2500	1/4	E		2	MFE0635X02S080	●	12.7	.500	26	1.024	29.8	1.173	74	2.913	8	.315	1		
6.400	.2520				2	MFE0640X02S070	★	12.8	.504	26	1.024	29.3	1.154	74	2.913	7	.276	1		
6.400	.2520				2	MFE0640X02S080	●	12.8	.504	26	1.024	29.8	1.173	74	2.913	8	.315	1		
6.500	.2559				2	MFE0650X02S070	★	13.0	.512	26	1.024	29.3	1.154	74	2.913	7	.276	1		
6.500	.2559				2	MFE0650X02S080	●	13.0	.512	26	1.024	29.8	1.173	74	2.913	8	.315	1		
6.528	.2570		F	5/16-18	2	MFE0653X02S080	●	13.1	.516	28	1.102	31.7	1.248	74	2.913	8	.315	1		
6.600	.2598				2	MFE0660X02S070	★	13.2	.520	28	1.102	31.2	1.228	74	2.913	7	.276	1		
6.600	.2598				2	MFE0660X02S080	●	13.2	.520	28	1.102	31.7	1.248	74	2.913	8	.315	1		
6.700	.2638			M8x1.25	2	MFE0670X02S070	★	13.4	.528	28	1.102	31.2	1.228	74	2.913	7	.276	1		
6.700	.2638			M8x1.25	2	MFE0670X02S080	●	13.4	.528	28	1.102	31.7	1.248	74	2.913	8	.315	1		
6.747	.2656	17/64			2	MFE0675X02S080	●	13.5	.531	28	1.102	31.6	1.244	74	2.913	8	.315	1		
6.800	.2677				2	MFE0680X02S070	★	13.6	.535	28	1.102	31.1	1.224	74	2.913	7	.276	1		
6.800	.2677				2	MFE0680X02S080	●	13.6	.535	28	1.102	31.6	1.244	74	2.913	8	.315	1		
6.900	.2717		I	5/16-24	2	MFE0690X02S070	★	13.8	.543	28	1.102	31.1	1.224	74	2.913	7	.276	1		
6.900	.2717		I	5/16-24	2	MFE0690X02S080	●	13.8	.543	28	1.102	31.6	1.244	74	2.913	8	.315	1		
7.000	.2756			M8x1.0	2	MFE0700X02S070	★	14.0	.551	28	1.102	31.0	1.220	74	2.913	7	.276	1		
7.000	.2756			M8x1.0	2	MFE0700X02S080	●	14.0	.551	28	1.102	31.5	1.240	74	2.913	8	.315	1		
7.100	.2795				2	MFE0710X02S080	●	14.2	.559	30	1.181	33.5	1.319	74	2.913	8	.315	1		
7.144	.2813	9/32	K		2	MFE0714X02S080	●	14.3	.563	30	1.181	33.4	1.315	74	2.913	8	.315	1		
7.200	.2835				2	MFE0720X02S080	●	14.4	.567	30	1.181	33.4	1.315	74	2.913	8	.315	1		
7.300	.2874				2	MFE0730X02S080	●	14.6	.575	30	1.181	33.4	1.315	74	2.913	8	.315	1		
7.400	.2913				2	MFE0740X02S080	●	14.8	.583	30	1.181	33.3	1.311	74	2.913	8	.315	1		
7.500	.2953				2	MFE0750X02S080	●	15.0	.591	30	1.181	33.3	1.311	74	2.913	8	.315	1		
7.541	.2969	19/64			2	MFE0754X02S080	●	15.1	.594	32	1.260	35.2	1.386	74	2.913	8	.315	1		
7.600	.2992				2	MFE0760X02S080	●	15.2	.598	32	1.260	35.2	1.386	74	2.913	8	.315	1		
7.700	.3031				2	MFE0770X02S080	●	15.4	.606	32	1.260	35.2	1.386	74	2.913	8	.315	1		
7.800	.3071				2	MFE0780X02S080	●	15.6	.614	32	1.260	35.1	1.382	74	2.913	8	.315	1		
7.900	.3110				2	MFE0790X02S080	●	15.8	.622	32	1.260	35.1	1.382	74	2.913	8	.315	1		
7.938	.3125	5/16		3/8-16	2	MFE0794X02S080	●	15.9	.626	32	1.260	35.0	1.378	74	2.913	8	.315	1		

Solid Carbide Flat Bottom Drills



Type1



Type2

External Coolant

(inch)

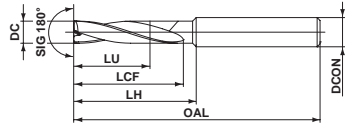
DC					L/D	Order Number	Stock DP1020	LU		LCF		LH		OAL		DCON		Type		
Metric (mm)	Decimal	Fraction	Wire / Letter	Thread Size				mm	inch	mm	inch	mm	inch	mm	inch	mm	inch		mm	inch
	(inch)																			
8.000	.3150				2	MFE0800X02S080	●	16.0	.630	32	1.260	35.0	1.378	74	2.913	8	.315	1		
8.100	.3189				2	MFE0810X02S100	●	16.2	.638	34	1.339	38.0	1.496	84	3.307	10	.394	1		
8.200	.3228				2	MFE0820X02S100	●	16.4	.646	34	1.339	37.9	1.492	84	3.307	10	.394	1		
8.300	.3268				2	MFE0830X02S100	●	16.6	.654	34	1.339	37.9	1.492	84	3.307	10	.394	1		
8.334	.3281	21/64			2	MFE0833X02S100	●	16.7	.657	34	1.339	37.8	1.488	84	3.307	10	.394	1		
8.400	.3307				2	MFE0840X02S100	●	16.8	.661	34	1.339	37.8	1.488	84	3.307	10	.394	1		
8.433	.3320		Q	3/8-24	2	MFE0843X02S100	●	16.9	.665	34	1.343	37.8	1.488	84	3.307	10	.394	1		
8.500	.3346			M10x1.5	2	MFE0850X02S100	●	17.0	.669	34	1.339	37.8	1.488	84	3.307	10	.394	1		
8.600	.3386				2	MFE0860X02S100	●	17.2	.677	36	1.417	39.7	1.563	84	3.307	10	.394	1		
8.700	.3425			M10x1.25	2	MFE0870X02S100	●	17.4	.685	36	1.417	39.7	1.563	84	3.307	10	.394	1		
8.731	.3438	11/32			2	MFE0873X02S100	●	17.5	.689	36	1.417	39.6	1.559	84	3.307	10	.394	1		
8.800	.3465				2	MFE0880X02S100	●	17.6	.693	36	1.417	39.6	1.559	84	3.307	10	.394	1		
8.900	.3504				2	MFE0890X02S100	●	17.8	.701	36	1.417	39.6	1.559	84	3.307	10	.394	1		
9.000	.3543				2	MFE0900X02S100	●	18.0	.709	36	1.417	39.5	1.555	84	3.307	10	.394	1		
9.100	.3583				2	MFE0910X02S100	●	18.2	.717	38	1.496	41.5	1.634	84	3.307	10	.394	1		
9.128	.3594	23/64			2	MFE0913X02S100	●	18.3	.720	38	1.496	41.4	1.630	84	3.307	10	.394	1		
9.200	.3622				2	MFE0920X02S100	●	18.4	.724	38	1.496	41.4	1.630	84	3.307	10	.394	1		
9.300	.3661				2	MFE0930X02S100	●	18.6	.732	38	1.496	41.4	1.630	84	3.307	10	.394	1		
9.347	.3680		U	7/16-14	2	MFE0935X02S100	●	18.7	.736	38	1.496	41.3	1.626	84	3.307	10	.394	1		
9.400	.3701				2	MFE0940X02S100	●	18.8	.740	38	1.496	41.3	1.626	84	3.307	10	.394	1		
9.500	.3740				2	MFE0950X02S100	●	19.0	.748	38	1.496	41.3	1.626	84	3.307	10	.394	1		
9.525	.3750	3/8			2	MFE0953X02S100	●	19.1	.752	40	1.575	43.2	1.701	84	3.307	10	.394	1		
9.600	.3780				2	MFE0960X02S100	●	19.2	.756	40	1.575	43.2	1.701	84	3.307	10	.394	1		
9.700	.3819		Tube Sheet		2	MFE0970X02S100	●	19.4	.764	40	1.575	43.2	1.701	84	3.307	10	.394	1		
9.800	.3858				2	MFE0980X02S100	●	19.6	.772	40	1.575	43.1	1.697	84	3.307	10	.394	1		
9.900	.3898				2	MFE0990X02S100	●	19.8	.780	40	1.575	43.1	1.697	84	3.307	10	.394	1		
9.922	.3906	25/64		7/16-20	2	MFE0992X02S100	●	19.8	.780	40	1.575	43.0	1.693	84	3.307	10	.394	1		
10.000	.3937				2	MFE1000X02S100	●	20.0	.787	40	1.575	43.0	1.693	84	3.307	10	.394	1		
10.100	.3976				2	MFE1010X02S120	●	20.2	.795	42	1.654	46.0	1.811	95	3.740	12	.472	1		
10.200	.4016			M12x1.75	2	MFE1020X02S120	●	20.4	.803	42	1.654	45.9	1.807	95	3.740	12	.472	1		
10.300	.4055				2	MFE1030X02S120	●	20.6	.811	42	1.654	45.9	1.807	95	3.740	12	.472	1		
10.319	.4063	13/32			2	MFE1032X02S120	●	20.6	.811	42	1.654	45.8	1.803	95	3.740	12	.472	1		
10.400	.4094				2	MFE1040X02S120	●	20.8	.819	42	1.654	45.8	1.803	95	3.740	12	.472	1		
10.500	.4134				2	MFE1050X02S120	●	21.0	.827	42	1.654	45.8	1.803	95	3.740	12	.472	1		
10.600	.4173				2	MFE1060X02S120	●	21.2	.835	44	1.732	47.7	1.878	95	3.740	12	.472	1		
10.700	.4213				2	MFE1070X02S120	●	21.4	.843	44	1.732	47.7	1.878	95	3.740	12	.472	1		
10.716	.4219	27/64		1/2-13	2	MFE1072X02S120	●	21.4	.843	44	1.732	47.6	1.874	95	3.744	12	.472	1		
10.800	.4252			M12x1.25	2	MFE1080X02S120	●	21.6	.850	44	1.732	47.6	1.874	95	3.740	12	.472	1		
10.900	.4291				2	MFE1090X02S120	●	21.8	.858	44	1.732	47.6	1.874	95	3.740	12	.472	1		
11.000	.4331				2	MFE1100X02S120	●	22.0	.866	44	1.732	47.5	1.870	95	3.740	12	.472	1		
11.100	.4370				2	MFE1110X02S120	●	22.2	.874	46	1.811	49.5	1.949	95	3.740	12	.472	1		
11.113	.4375	7/16			2	MFE1111X02S120	●	22.2	.874	46	1.811	49.4	1.945	95	3.740	12	.472	1		

● : Inventory maintained.

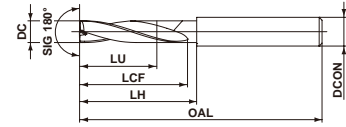
External Coolant

(inch)

DC					L/D	Order Number	Stock DP1020	LU		LCF		LH		OAL		DCON		Type		
Metric (mm)	Decimal	Fraction	Wire / Letter	Thread Size				mm	inch	mm	inch	mm	inch	mm	inch	mm	inch		mm	inch
	(inch)																			
11.200	.4409				2	MFE1120X02S120	●	22.4	.882	46	1.811	49.4	1.945	95	3.740	12	.472	1		
11.300	.4449				2	MFE1130X02S120	●	22.6	.890	46	1.811	49.4	1.945	95	3.740	12	.472	1		
11.400	.4488				2	MFE1140X02S120	●	22.8	.898	46	1.811	49.3	1.941	95	3.740	12	.472	1		
11.500	.4528				2	MFE1150X02S120	●	23.0	.906	46	1.811	49.3	1.941	95	3.740	12	.472	1		
11.509	.4531	29/64		1/2-20	2	MFE1151X02S120	●	23.0	.906	48	1.890	51.2	2.016	95	3.740	12	.472	1		
11.600	.4567				2	MFE1160X02S120	●	23.2	.913	48	1.890	51.2	2.016	95	3.740	12	.472	1		
11.700	.4606				2	MFE1170X02S120	●	23.4	.921	48	1.890	51.2	2.016	95	3.740	12	.472	1		
11.800	.4646				2	MFE1180X02S120	●	23.6	.929	48	1.890	51.1	2.012	95	3.740	12	.472	1		
11.900	.4685	15/32			2	MFE1190X02S120	●	23.8	.937	48	1.890	51.1	2.012	95	3.740	12	.472	1		
12.000	.4724			M14x2.0	2	MFE1200X02S120	●	24.0	.945	48	1.890	51.0	2.008	95	3.740	12	.472	1		
12.304	.4844	31/64		9/16-12	2	MFE1230X02S140	●	24.6	.969	50	1.969	53.0	2.087	102	4.016	14	.551	2		
12.500	.4921				2	MFE1250X02S140	●	25.0	.984	50	1.969	53.0	2.087	102	4.016	14	.551	2		
12.700	.5000	1/2			2	MFE1270X02S140	●	25.4	1.000	52	2.047	55.0	2.165	102	4.016	14	.551	2		
13.000	.5118				2	MFE1300X02S140	●	26.0	1.024	52	2.047	55.0	2.165	102	4.016	14	.551	2		
13.100	.5157	33/64		9/16-18	2	MFE1310X02S140	●	26.2	1.031	54	2.126	57.0	2.244	102	4.016	14	.551	2		
13.500	.5315			5/8-11	2	MFE1350X02S140	●	27.0	1.063	54	2.126	57.0	2.244	102	4.016	14	.551	2		
13.891	.5469	35/64			2	MFE1389X02S140	●	27.8	1.094	56	2.205	59.0	2.323	102	4.016	14	.551	2		
14.000	.5512			M16x2.0	2	MFE1400X02S140	●	28.0	1.102	56	2.205	59.0	2.323	102	4.016	14	.551	2		
14.288	.5625	9/16			2	MFE1429X02S160	●	28.6	1.126	58	2.283	61.0	2.402	111	4.370	16	.630	2		
14.500	.5709			M16x1.5	2	MFE1450X02S160	●	29.0	1.142	58	2.283	61.0	2.402	111	4.370	16	.630	2		
14.684	.5781	37/64		5/8-18	2	MFE1468X02S160	●	29.4	1.157	60	2.362	63.0	2.480	111	4.370	16	.630	2		
15.000	.5906				2	MFE1500X02S160	●	30.0	1.181	60	2.362	63.0	2.480	111	4.370	16	.630	2		
15.082	.5938	19/32			2	MFE1508X02S160	●	30.2	1.189	62	2.441	65.0	2.559	111	4.370	16	.630	2		
15.478	.6094	39/64			2	MFE1548X02S160	●	31.0	1.220	62	2.441	65.0	2.559	111	4.370	16	.630	2		
15.500	.6102			M18x2.5	2	MFE1550X02S160	●	31.0	1.220	62	2.441	65.0	2.559	111	4.370	16	.630	2		
15.875	.6250	5/8			2	MFE1588X02S160	●	31.8	1.252	64	2.520	67.0	2.638	111	4.374	16	.630	2		
16.000	.6299				2	MFE1600X02S160	●	32.0	1.260	64	2.520	67.0	2.638	111	4.370	16	.630	2		
16.272	.6406	41/64			2	MFE1627X02S180	●	32.5	1.280	66	2.598	69.0	2.717	119	4.685	18	.709	2		
16.500	.6496			M18x1.5	2	MFE1650X02S180	●	33.0	1.299	66	2.598	69.0	2.717	119	4.685	18	.709	2		
16.669	.6563	21/32		3/4-10	2	MFE1667X02S180	●	33.3	1.311	68	2.677	71.0	2.795	119	4.685	18	.709	2		
17.000	.6693		Tube Sheet		2	MFE1700X02S180	●	34.0	1.339	68	2.677	71.0	2.795	119	4.685	18	.709	2		
17.066	.6719	43/64			2	MFE1707X02S180	●	34.1	1.343	70	2.756	73.0	2.874	119	4.685	18	.709	2		
17.463	.6875	11/16		3/4-16	2	MFE1746X02S180	●	34.9	1.374	70	2.756	73.0	2.874	119	4.685	18	.709	2		
17.500	.6890			M20x2.5	2	MFE1750X02S180	●	35.0	1.378	70	2.756	73.0	2.874	119	4.685	18	.709	2		
17.860	.7031	45/64			2	MFE1786X02S180	●	35.7	1.406	72	2.835	75.0	2.953	119	4.685	18	.709	2		
18.000	.7087				2	MFE1800X02S180	●	36.0	1.417	72	2.835	75.0	2.953	119	4.685	18	.709	2		
18.257	.7188	23/32			2	MFE1826X02S200	●	36.5	1.437	74	2.913	77.0	3.031	127	5.000	20	.787	2		
18.500	.7283			M20x1.5	2	MFE1850X02S200	●	37.0	1.457	74	2.913	77.0	3.031	127	5.000	20	.787	2		
18.654	.7344	47/64			2	MFE1865X02S200	●	37.3	1.469	76	2.992	79.0	3.110	127	5.000	20	.787	2		
19.000	.7480				2	MFE1900X02S200	●	38.0	1.496	76	2.992	79.0	3.110	127	5.000	20	.787	2		
19.050	.7500	3/4			2	MFE1905X02S200	●	38.1	1.500	78	3.071	81.0	3.189	127	5.000	20	.787	2		
19.250	.7579		Tube Sheet		2	MFE1925X02S200	●	38.5	1.516	78	3.071	81.0	3.189	127	5.000	20	.787	2		



Type1



Type2

External Coolant

(inch)

DC					L/D	Order Number	Stock DP1020	LU		LCF		LH		OAL		DCON		Type
Metric (mm)	Decimal	Fraction	Wire / Letter	Thread Size				mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
	(inch)																	
19.447	.7656	49/64		7/8-9	2	MFE1945X02S200	●	38.9	1.531	78	3.071	81.0	3.189	127	5.000	20	.787	2
19.500	.7677			M22x2.5	2	MFE1950X02S200	●	39.0	1.535	78	3.071	81.0	3.189	127	5.000	20	.787	2
19.844	.7813	25/32			2	MFE1984X02S200	●	39.7	1.563	80	3.150	83.0	3.268	127	5.000	20	.787	2
20.000	.7874				2	MFE2000X02S200	●	40.0	1.575	80	3.150	83.0	3.268	127	5.000	20	.787	2

● : Inventory maintained.

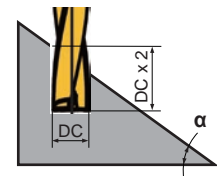
Recommended Cutting Conditions

(inch)

Work Material		Mild Steels ($\leq 180\text{HB}$)		Carbon Steels, Alloy Steels (180–280HB)		Carbon Steels, Alloy Steels (280–350HB)	
DC		Cutting Speed (SFM)	Feed (Min.—Max.) (IPR)	Cutting Speed (SFM)	Feed (Min.—Max.) (IPR)	Cutting Speed (SFM)	Feed (Min.—Max.) (IPR)
inch	mm						
.0295	0.75	180	.0012 (.0004—.0020)	150	.0012 (.0004—.0020)	130	.0012 (.0004—.0020)
.0394	1.0	180	.0012 (.0004—.0020)	150	.0012 (.0004—.0020)	130	.0012 (.0004—.0020)
.0591	1.5	190	.0014 (.0006—.0022)	155	.0014 (.0006—.0022)	130	.0014 (.0006—.0020)
.0787	2.0	195	.0016 (.0008—.0024)	165	.0016 (.0008—.0024)	140	.0016 (.0008—.0024)
.0984	2.5	205	.0020 (.0012—.0028)	170	.0020 (.0012—.0028)	150	.0020 (.0012—.0028)
.1181	3.0	245	.0024 (.0016—.0031)	245	.0024 (.0016—.0031)	210	.0024 (.0016—.0031)
.1575	4.0	245	.0031 (.0024—.0039)	245	.0031 (.0024—.0039)	210	.0031 (.0024—.0039)
.1969	5.0	245	.0039 (.0031—.0051)	245	.0039 (.0031—.0051)	210	.0039 (.0031—.0051)
.2362	6.0	245	.0051 (.0039—.0059)	245	.0051 (.0039—.0059)	210	.0051 (.0039—.0059)
.3150	8.0	245	.0059 (.0051—.0067)	245	.0059 (.0051—.0067)	210	.0059 (.0051—.0067)
.3937	10.0	245	.0067 (.0059—.0079)	245	.0067 (.0059—.0079)	210	.0067 (.0059—.0079)
.4724	12.0	245	.0079 (.0067—.0098)	245	.0079 (.0067—.0098)	210	.0079 (.0067—.0098)
.6299	16.0	245	.0098 (.0079—.0118)	245	.0098 (.0079—.0118)	210	.0098 (.0079—.0118)
.7874	20.0	245	.0118 (.0098—.0138)	245	.0118 (.0098—.0138)	210	.0118 (.0098—.0138)

Work Material		Austenitic Stainless Steels ($\leq 200\text{HB}$)		Gray Cast Irons ($\leq 350\text{MPa}$)		Ductile Cast Irons ($\leq 450\text{MPa}$)	
DC		Cutting Speed (SFM)	Feed (Min.—Max.) (IPR)	Cutting Speed (SFM)	Feed (Min.—Max.) (IPR)	Cutting Speed (SFM)	Feed (Min.—Max.) (IPR)
inch	mm						
.0295	0.75	80	.0003 (.0001—.0004)	180	.0012 (.0004—.0020)	130	.0004 (.0002—.0006)
.0394	1.0	80	.0003 (.0001—.0004)	180	.0012 (.0004—.0020)	130	.0004 (.0002—.0006)
.0591	1.5	80	.0004 (.0002—.0006)	190	.0014 (.0006—.0022)	155	.0008 (.0004—.0012)
.0787	2.0	100	.0006 (.0004—.0008)	195	.0016 (.0008—.0024)	180	.0012 (.0006—.0018)
.0984	2.5	100	.0006 (.0004—.0008)	205	.0020 (.0012—.0028)	190	.0018 (.0010—.0026)
.1181	3.0	100	.0008 (.0004—.0012)	245	.0024 (.0016—.0031)	210	.0020 (.0016—.0024)
.1575	4.0	100	.0012 (.0008—.0016)	245	.0031 (.0024—.0039)	230	.0024 (.0020—.0031)
.1969	5.0	100	.0016 (.0012—.0020)	245	.0039 (.0031—.0047)	230	.0031 (.0024—.0039)
.2362	6.0	100	.0020 (.0016—.0024)	245	.0047 (.0039—.0055)	230	.0039 (.0031—.0047)
.3150	8.0	100	.0024 (.0020—.0031)	245	.0055 (.0047—.0063)	230	.0047 (.0039—.0059)
.3937	10.0	100	.0031 (.0024—.0039)	245	.0063 (.0055—.0071)	230	.0059 (.0047—.0071)
.4724	12.0	100	.0039 (.0031—.0047)	245	.0071 (.0063—.0079)	230	.0071 (.0059—.0079)
.6299	16.0	100	.0047 (.0039—.0059)	245	.0079 (.0071—.0094)	230	.0079 (.0071—.0098)
.7874	20.0	100	.0059 (.0047—.0079)	245	.0094 (.0079—.0110)	230	.0098 (.0079—.0118)

Work Material		Aluminum Alloys (Si<5%)	
DC		Cutting Speed (SFM)	Feed (Min.—Max.) (IPR)
inch	mm		
.0295	0.75	330	.0008 (.0004—.0012)
.0394	1.0	330	.0008 (.0004—.0012)
.0591	1.5	330	.0008 (.0004—.0012)
.0787	2.0	360	.0020 (.0012—.0028)
.0984	2.5	360	.0024 (.0016—.0035)
.1181	3.0	360	.0024 (.0016—.0035)
.1575	4.0	360	.0031 (.0024—.0039)
.1969	5.0	360	.0039 (.0031—.0051)
.2362	6.0	360	.0051 (.0039—.0063)
.3150	8.0	360	.0063 (.0051—.0079)
.3937	10.0	360	.0079 (.0063—.0094)
.4724	12.0	360	.0094 (.0079—.0110)
.6299	16.0	360	.0110 (.0094—.0126)
.7874	20.0	360	.0126 (.0110—.0142)



(Note 1) The recommended hole depth is DCx2. This should be the depth from the uppermost surface of the work material when machining on an angled surface. (Refer to diagram)

(Note 2) The above cutting table assumes drilling on a flat surface.

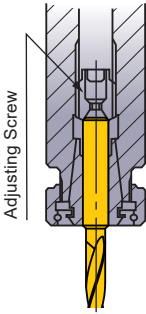
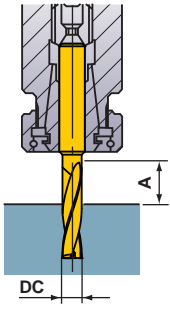
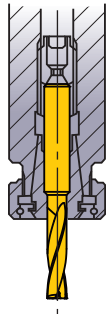
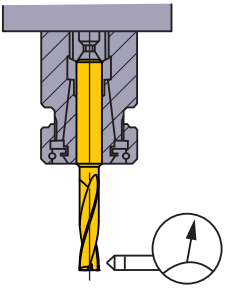
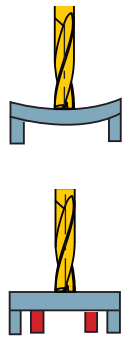
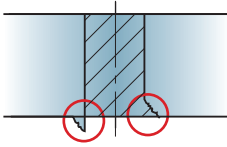
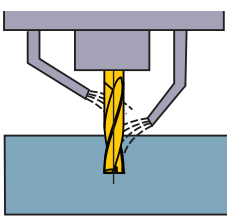
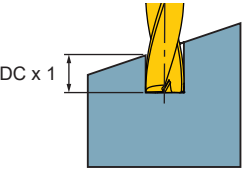
For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.

When the inclination angle α is 30° or less, adjust the feed rate to 70% or lower as a guideline.

When the inclination angle α is greater than 30° , adjust the feed rate to 50% or lower as a guideline.

(Note 3) This product is a tool intended for hole drilling. It cannot be used for cross-feed machining or helical machining.

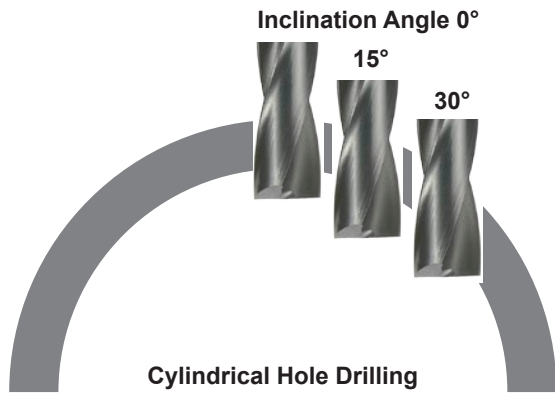
Operational Guidance

<p>Drill Holding</p>  <p>Adjusting Screw</p> <p>Thrust bearing type collet chuck holds the drill securely.</p>	<p>Drill Length</p>  <p>$A > DC \times 1.5$</p>	<p>Drill Installation</p>  <p>NG</p> <p>Do not clamp on the flutes.</p>	<p>Installation Tolerance</p>  <p>Run-out $\leq .0012$ inch</p>
<p>Thin Workpiece</p>  <p>NG If Bending Occurs</p> <p>OK Support the Workpiece</p>	<p>Burring and Workpiece Chipping</p>  <p>① Lower the feed rate by 50% at the end of through cutting. ② Add a chamfer.</p>	<p>Coolant Method (MFE)</p>  <p>Two coolant positions, at the end and at the center are ideal.</p>	<p>Inclined Face Drilling</p>  <p>① When machining a deep hole into an inclined surface, use MFE drill (L/D=2) as a drill for a guide hole. ② Set the drill depth at approx. DC x 1 to obtain an accurate guide hole.</p>

Cutting Performance

Comparison of Exit Burrs Generated in AISI 304

The unique cutting edge shape suppresses the formation of exit burrs.

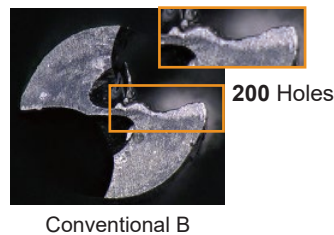
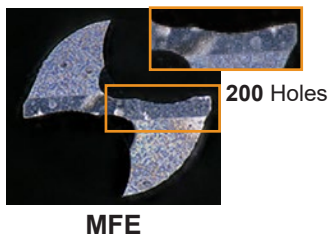
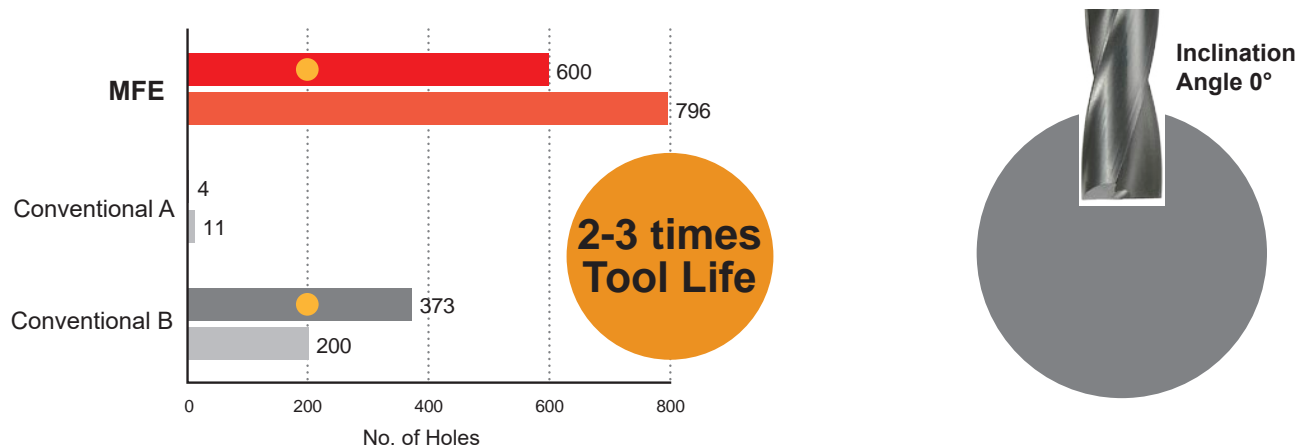


	MFE	Conventional A	Conventional B
Inclination Angle 0° Hole Depth = .158"			
Inclination Angle 15° Hole Depth = .197"			
Inclination Angle 30° Hole Depth = .276"			

<Cutting Conditions>
 Drill : MFE0200X02S040
 Work Material : AISI 304
 Cutting Speed : **vc**=100 SFM
 Feed per Rev. : **fr**=.0004 IPR
 Cutting Mode : Wet Cutting
 External Coolant (Water-soluble)
 Machine : Vertical MC (BT40)

Comparison of Tool Life when Used on AISI 304

Excellent fracture resistance is achieved even when hole drilling cylindrical surfaces using small automatic lathes.

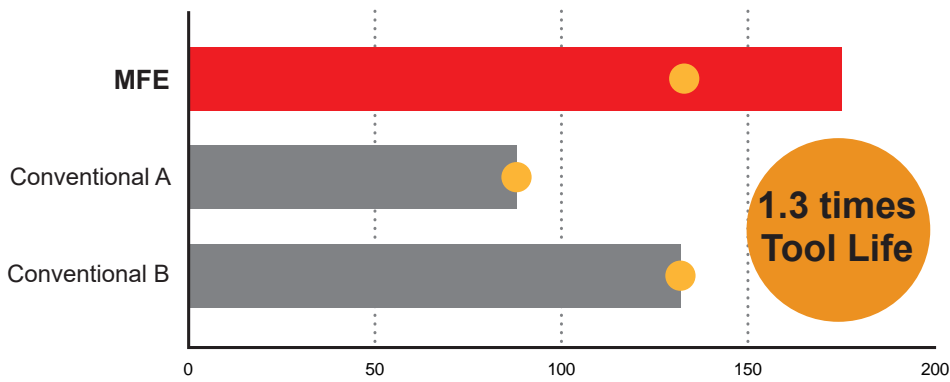


<Cutting Conditions>
 Drill : MFE0080X02S030
 Work Material : AISI 304
 Cutting Speed : **vc**=50 SFM
 Feed per Rev. : **fr**=.0004 IPR
 Cutting Mode : Wet Cutting
 External Coolant (Water-insoluble)
 Machine : Small Automatic Lathes

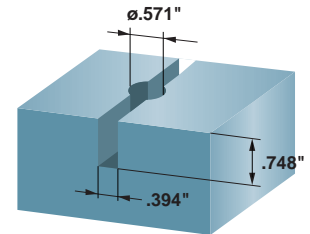
Cutting Performance

Comparison of Fracture Resistance in AISI 1050

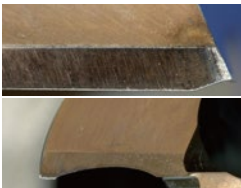
Achieved 1.3 times longer tool life compared to conventional products because of increased stability.



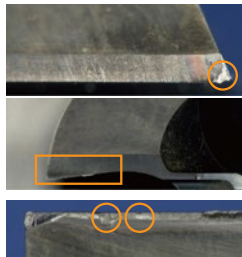
Cutting Mode
Drilling of $\phi.571$ " in groove with a width of $.394$ ".



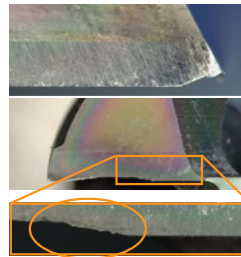
MFE 132 holes



Conventional A 88 holes



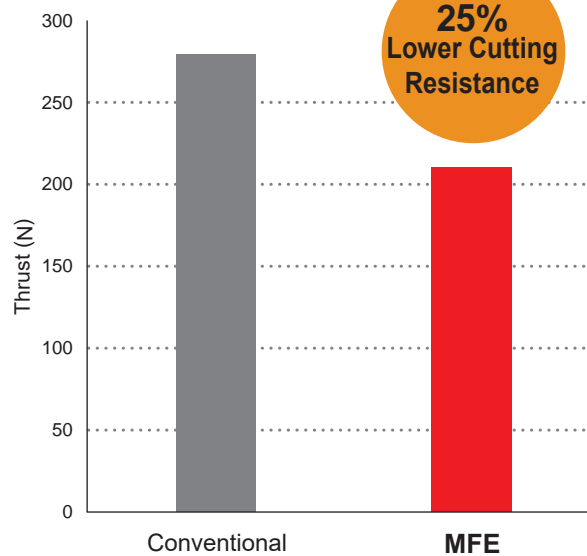
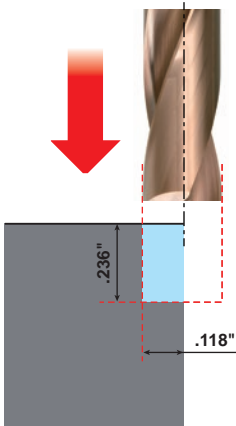
Conventional B 132 holes



<Cutting Conditions>
 Drill : MFE1450X02S160
 Work Material : AISI 1050
 Hole Depth : $.945$ "
 Cutting Speed : $vc=115$ SFM
 Feed per Rev. : $fr=.0010$ IPR
 Cutting Mode : Wet Cutting
 External Coolant (Water-soluble)
 Machine : Vertical MC (BT50)

Thrust Force Comparison in Shoulder Drilling

New "Z" thinning with lower thrust force.

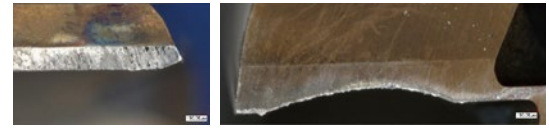
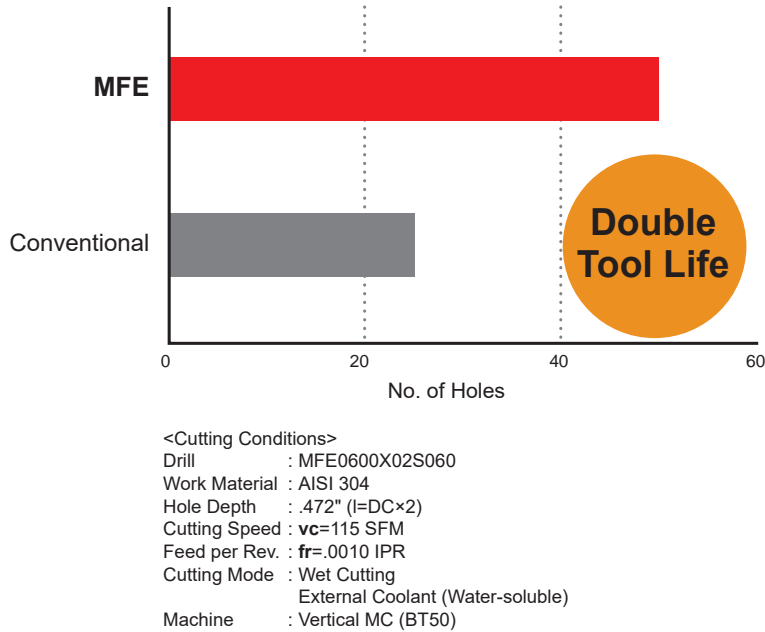


25% Lower Cutting Resistance

<Cutting Conditions>
 Drill : MFE0600X02S060
 Work Material : AISI 1050
 Hole Depth : $.236$ " (I=DC \times 1)
 Cutting Speed : $vc=165$ SFM
 Feed per Rev. : $fr=.0028$ IPR

Comparison of Fracture Resistance in AISI 304

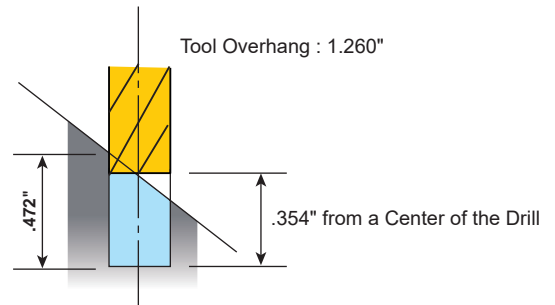
Achieved double tool life compared to conventional products because of the outstanding fracture resistance properties.



MFE After 50 holes Machining



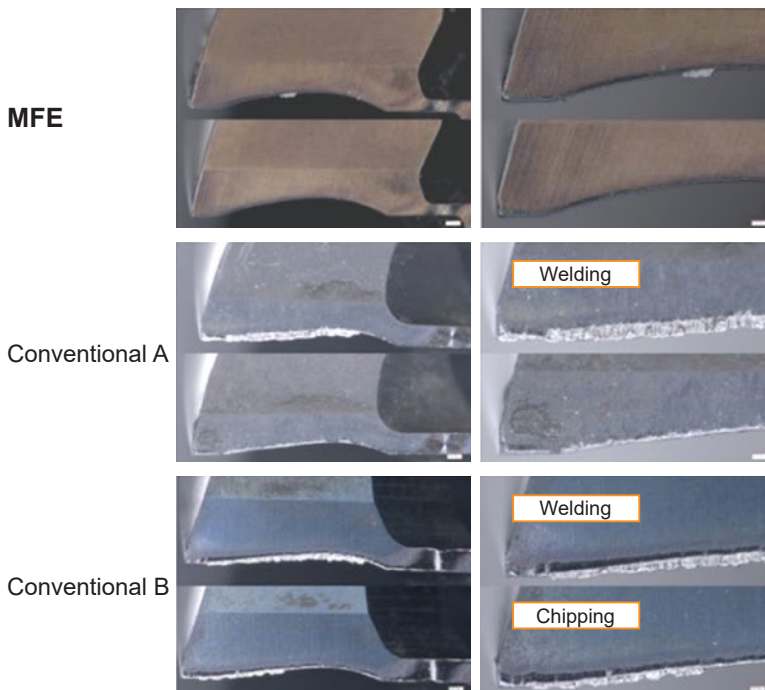
Conventional After 25 holes Machining



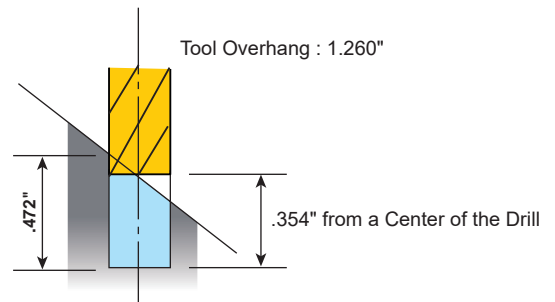
Comparison of Machining for Angled Surface with 45° Angle in AISI 1045

Controlled abnormal fracturing because of the excellent welding resistance properties.

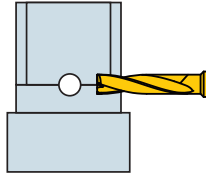
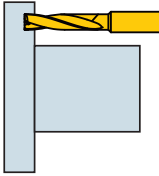
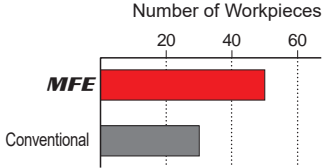
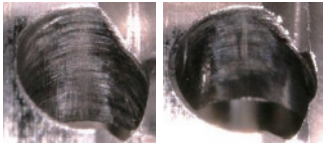
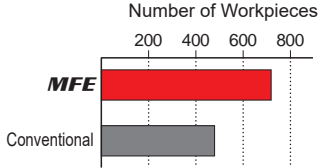
No. of Holes : Comparison of the cutting edge after 200 holes machining.



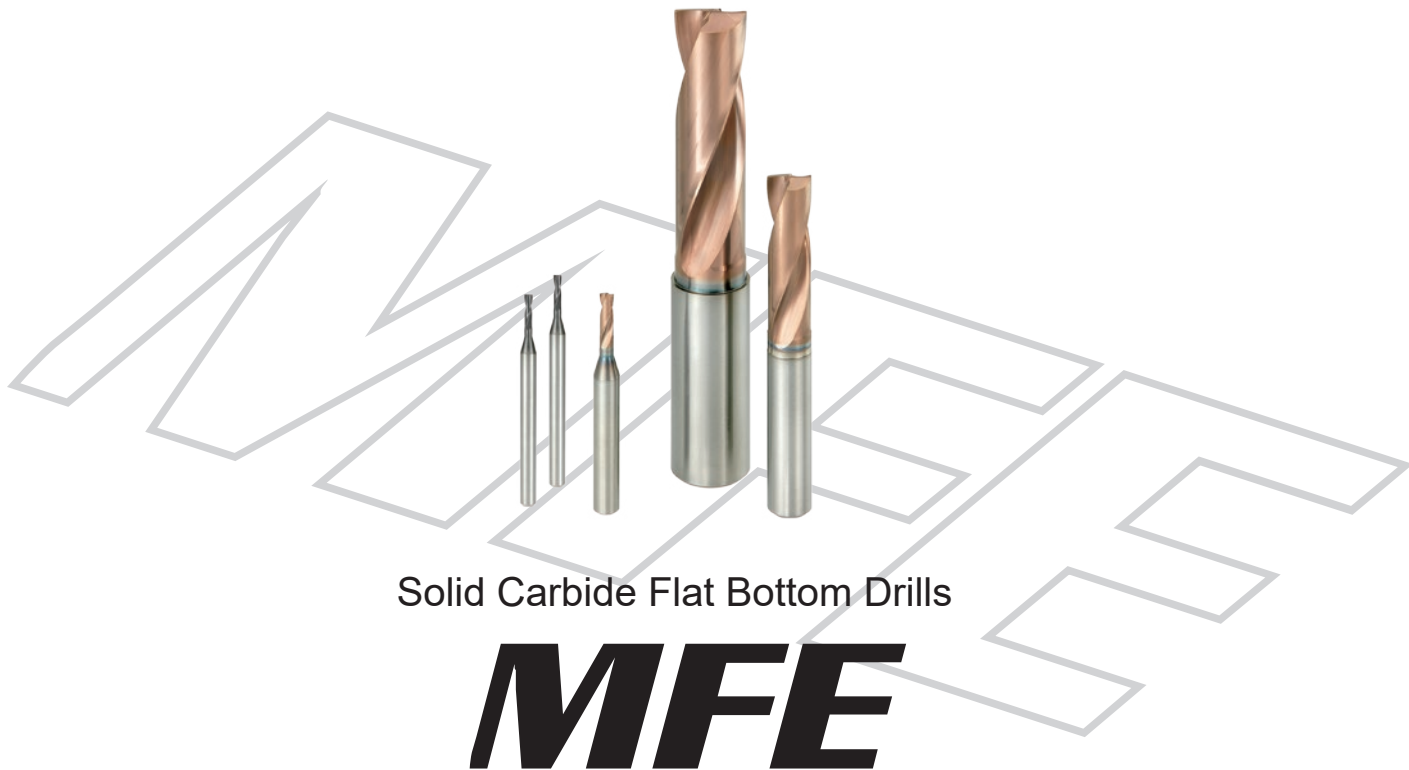
<Cutting Conditions>
 Drill : MFE0600X02S060
 Work Material : AISI 1045
 Hole Depth : .472" (l=DC×2)
 Cutting Speed : **vc**=165 SFM
 Feed per Rev. : **fr**=.0028 IPR
 Cutting Mode : Wet Cutting
 External Coolant (Water-soluble)



Application Example

Drill	MFE1010X02S120	MFE0180X02S030	MFE0160X02S030	
Workpiece	JIS SCM415 No Image	AISI 303 	AISI 440 Pilot Drilling 	
Component	Ball Nut	Bolt	Nut	
Cutting Conditions	Cutting Speed <i>vc</i> (SFM)	205	70	130
	Feed per Rev. <i>fr</i> (IPR)	.0016	.0006	.0004 – .0005
	Hole Depth (inch)	–	–	.197
Cutting Mode	Wet Cutting External Coolant (Water-soluble)	Wet Cutting External Coolant	Wet Cutting External Coolant	
Machine	Vertical MC	Small Automatic Lathes	Horizontal MC	
Results	<p>Number of Workpieces</p>  <p>The amount of hole curving has been reduced from .005" to .001" compared to conventional products, with a tool life which is 1.5 or more times longer.</p>	<p>Large Burr</p>  <p>With the MFE, there will be no accuracy errors even if used for continuous hole drilling on small automatic lathes, and the tool life will be double or more times longer.</p>	<p>Number of Workpieces</p>  <p>The MFE is excellent at maintaining accuracy and the tool life becomes 1.5 times longer than conventional products.</p>	

The above application examples are customer's applications, so it can be different from the recommended conditions.



Solid Carbide Flat Bottom Drills

MIFE

For your safety

●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc. ●Grinding or heating of cutting tools produces dust and mist. Inhaling large amount of dust or contacting with eyes and skins may harm your body.

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