NEW

DFAS

MFE

DIA EDGE

DFAS/MFE

SOLID CARBIDE FLAT BOTTOM DRILLS

ABOUT OUR BRAND

Your manufacturing success is our success.

It's simple. We want to provide high-quality cutting tool products that help deliver unparalleled performance and control for you to manufacture precisely perfect products every day.

Our long heritage of building partnerships through cutting tool solutions to metal working manufacturers, like yours, has given Mitsubishi Materials USA a solid reputation as an industry leader. We understand the importance of getting it right the first time by delivering high-quality cutting tool product brands to help overcome machining challenges to improve machining processes.

Your success is our success and is the driving force behind our innovative products. Our product brands, DIAEDGE and MOLDINO, are trusted globally in the metal manufacturing and die & mold industries for delivering expertly-designed manufactured tools of the trade for highly specialized industries like yours.

With the acquisition of MOLDINO Tool Engineering, Ltd, our traditional Mitsubishi Materials USA cutting tool product line is now sold under the DIAEDGE product brand name.

Brands you can trust:

MITSUBISHI MATERIALS U.S.A.

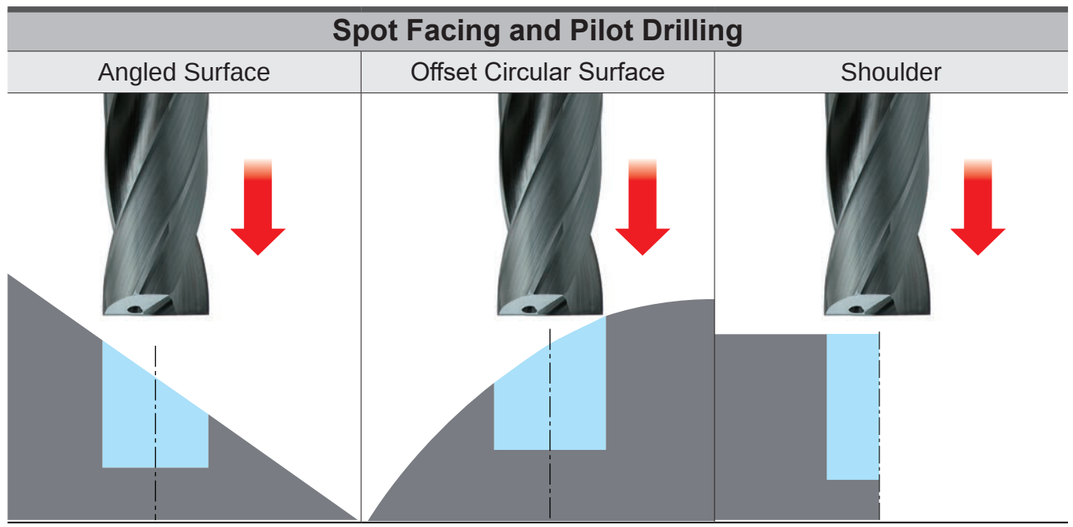
TRUSTED PRODUCT BRANDS

DIAEDGE MOLDINO

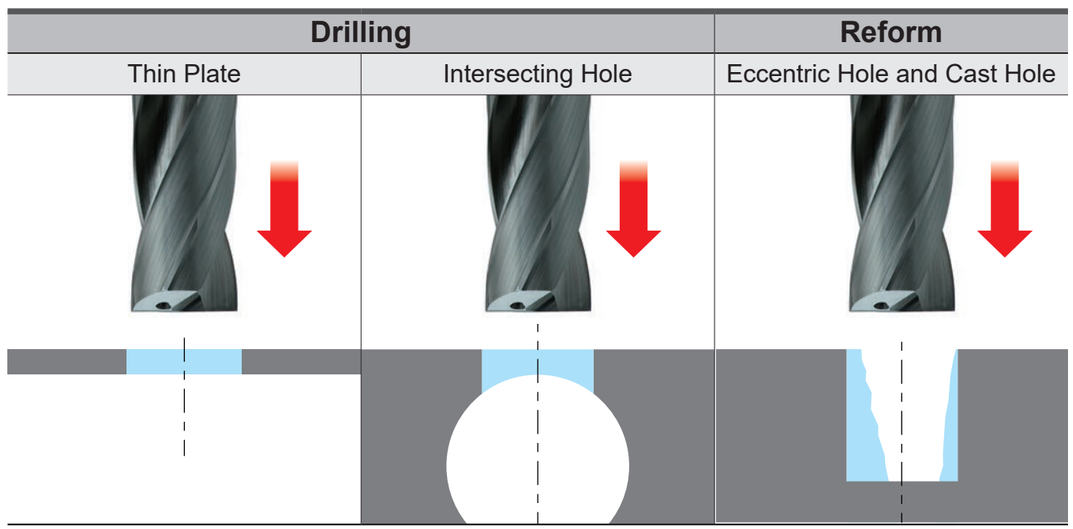
Solid Carbide Flat Bottom Drills

DFAS/MFE

High Efficiency Drilling in Various Types of Machining



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

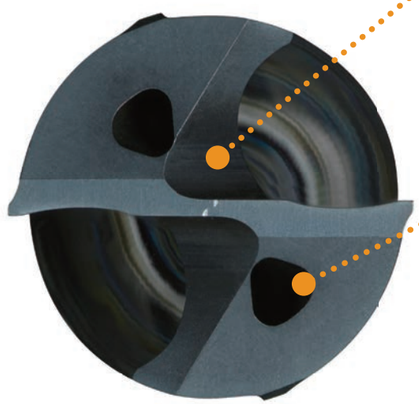


Low cutting force provides less burr.
Excellent performance in correction of eccentric hole and cast hole due to high position accuracy.

Internal Coolant

DFAS NEW

Features



"XR" Point Thinning

Optimized chip control and load reduction

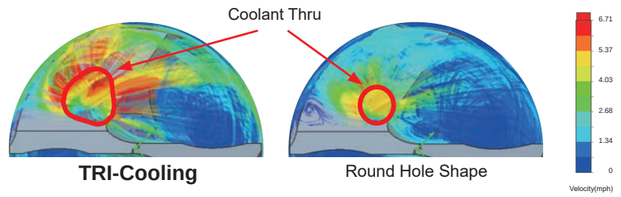
The thinned center cutting edge generates a low resistance and thereby creates an optimum chip geometry for a smoother chip flow.

TRI-Cooling Technology for All Dia.

For machining stainless steel and titanium

Coolant flow is increased without reducing the rigidity of the drill. The extra coolant flow dramatically improves chip evacuation and dissipates cutting heat. This enables stable machining of stainless steel and titanium alloys.

Coolant Flow Speed Increase



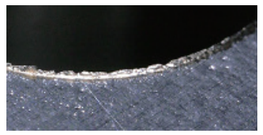
TRI-Cooling Round Hole Shape

Original Sharp Cutting Edge Shape

Suppression of Burrs

Strength is ensured by providing a flat land (gash) at the corner of the cutting edge, and by adopting a sharp cutting edge over the cutting edge, burrs are suppressed.

Comparison of burrs when machining titanium alloy



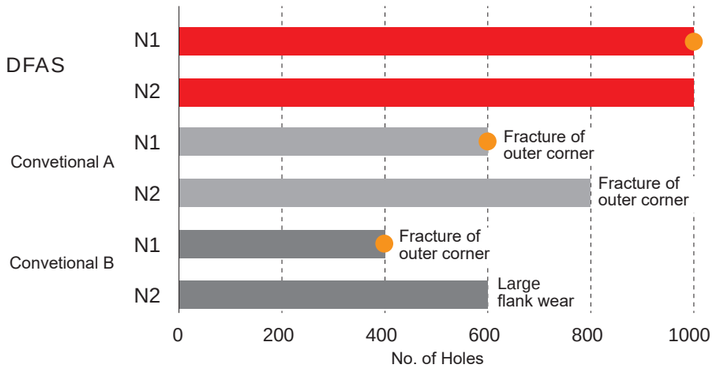
DFAS .003 inch

Conventional .005 inch

Cutting Performance

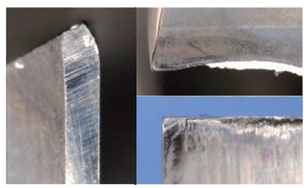
Tool Life Comparison When Machining Carbon Steel AISI 1050

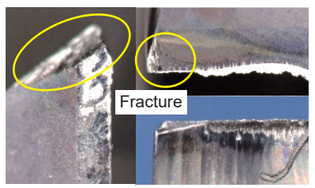
20% more holes machined than conventional tools.



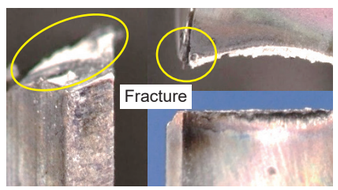
<Cutting Conditions>
Workpiece Material : AISI 1050
Tool : DFAS0600X03S060 (L/D=3)
Cutting Speed : vc = 330 SFM
Feed per Rev. : fr = .0047 IPR
Hole Depth : .709" Tthrough Hole
Cutting Mode : Internal Coolant (Water-soluble) 1MPa

● : Photographed point


DFAS After drilling 1000 hole



Convetional A After drilling 600 hole

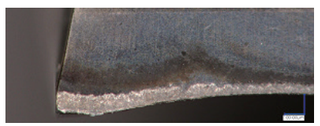


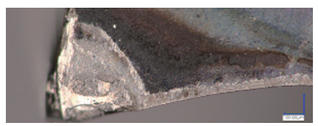
Convetional B After drilling 400 hole

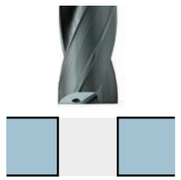
Cutting Edge Comparison When Machining Titanium Alloy Ti-6Al-4V

Provides stability even during high efficiency, continuous machining.

Continuous Machining
Assessment after drilling 100 holes


DFAS

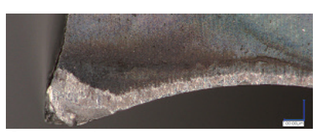

Convetional



<Cutting Conditions>
Workpiece Material : Ti-6Al-4V
Tool : DFAS0600X03S060 (L/D=3)
Cutting Speed : vc = 115 SFM
Feed per Rev. : fr = .0024 IPR
Hole Depth : .709" Tthrough Hole
Cutting Mode : Internal Coolant (Water-soluble) 1MPa

High Efficiency Machining
Assessment after drilling 30 holes

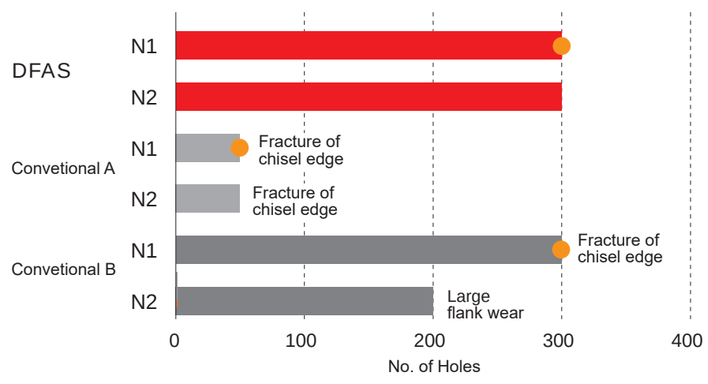

DFAS

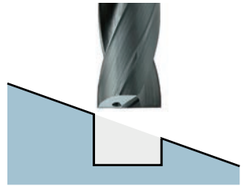

Convetional

<Cutting Conditions>
Workpiece Material : Ti-6Al-4V
Tool : DFAS0600X03S060 (L/D=3)
Cutting Speed : vc = 165 SFM
Feed per Rev. : fr = .0039 IPR
Hole Depth : .709" Tthrough Hole
Cutting Mode : Internal Coolant (Water-soluble) 1MPa

Comparision of Quantity of Holes on an Inclined Surface When Machining Stainless Steel AISI 304

No tool wear even in the center where the cutting speed is low. Tool life can be extended.

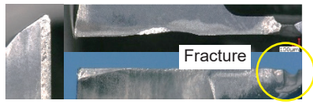




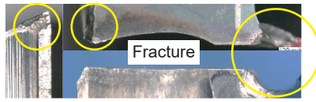
<Cutting Conditions>
Workpiece Material : AISI 304
Tool : DFAS0600X03S060 (L/D=3)
Cutting Speed : vc = 130 SFM
Feed per Rev. : fr = .0016 IPR
Hole Depth :.709"
Blind hole with 30° angled surface
Cutting Mode : Internal Coolant (Water-soluble) 1MPa

● : Photographed point


DFAS After drilling 300 holes



Convetional A After drilling 50 holes



Convetional B After drilling 300 holes

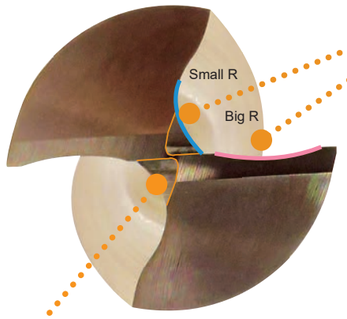
External Coolant

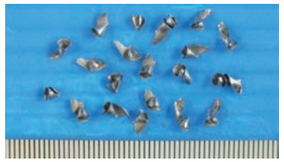
MFE

Features DC≥.1181"

Excellent Chip Control

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





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

New “Z” Thinning with Lower Thrust Force

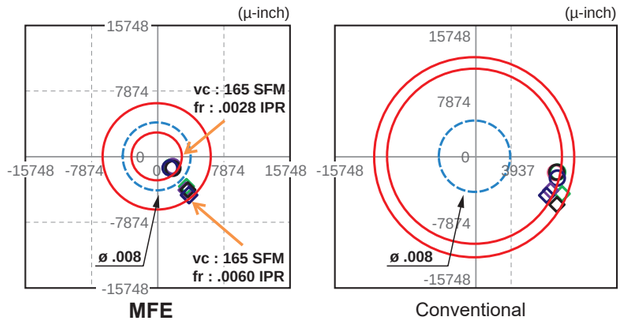
New thinning provides excellent chip evacuation.

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.



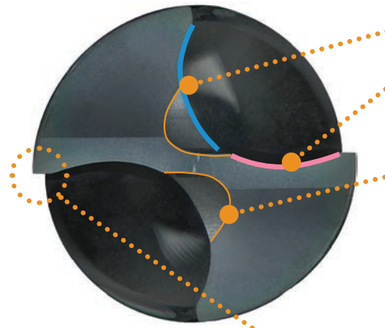
AISI 1050 45° angled surface DC×2

External Coolant

MFE

Micro Size DC< .0394"
Mini Size .0394"≤DC< .1181"

Features



Excellent Chip Control

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

Point Thinning with Lower Thrust Force

Ideal chips are formed by the radius geometry, thereby feeding chips away from the center to dramatically reduce cutting resistance.

MFE Conventional

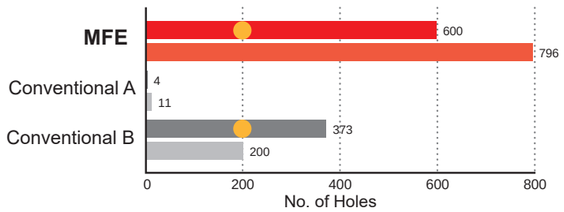
Unique Sharp Cutting Edges

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

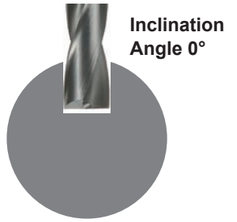
Cutting Performance

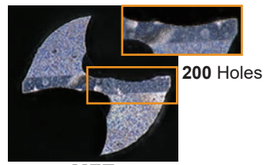
Comparison of Tool Life when Used on AISI 304

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



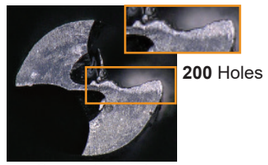
2-3 times Tool Life





200 Holes

MFE



200 Holes

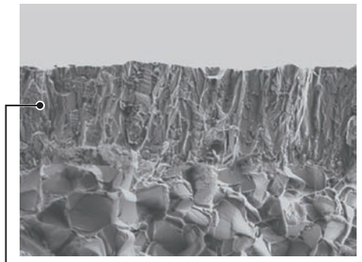
Conventional B

<Cutting Conditions>
Drill : MFE0080X02S030
Workpiece 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

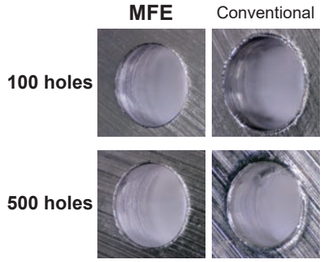
Sharp Cutting Edges with Long Tool Life

Coated Grade DP102A

DP102A is a special grade for drills that has excellent lubricity, heat resistance and greatly improved wear resistance, especially under low to medium speed cutting conditions. It realizes stable machining with high adhesion strength of the coating to the substrate, even when the cutting edge is sharp.



Al-Cr-N Based PVD Coating



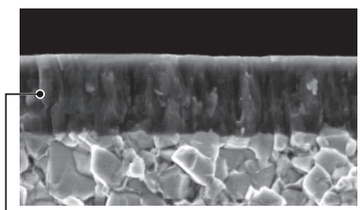
<Cutting Conditions>

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

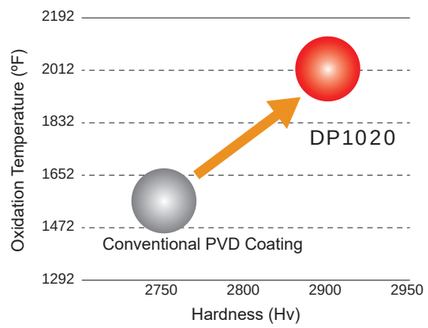
Longer Tool Life with Stable Cutting

Coated Grade DP1020

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



Multi-layer Accumulated Al-Ti-Cr-N Based PVD Coating



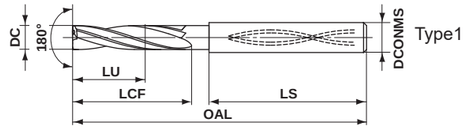
DFAS NEW

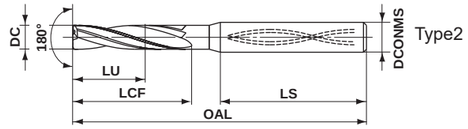
SOLID CARBIDE FLAT BOTTOM DRILLS

UWC DP1A 180° XR

P M K N S H

Internal Coolant





(inch)

DC= .118	.118 < DC ≤ .236	.236 < DC ≤ .394	.394 < DC ≤ .551
0 −.00055	0 −.00071	0 −.00087	0 −.00106
.157 ≤ DCONMS ≤ .236	.236 < DCONMS ≤ .394	.394 < DCONMS ≤ .551	
0 −.00031	0 −.00035	0 −.00043	

(inch)

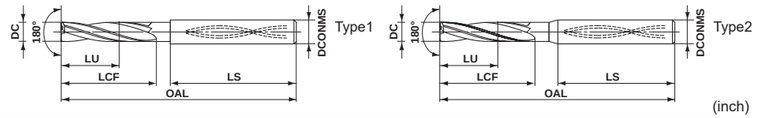
DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Stock DP102A	Order Number	LU mm	LU inch	LCF mm	LCF inch	LS mm	LS inch	OAL mm	OAL inch	DCONMS mm	DCONMS inch	Type
3.000	**.1181**				3	●	**DFAS0300X03S040**	9.0	.354	14	.551	39.0	1.535	55	2.165	4	.157	1
3.048	**.1200**		**31**		3	●	**DFAS0305X03S060**	9.1	.360	16	.630	37.5	1.477	61	2.402	6	.236	2
3.100	**.1220**				3	●	**DFAS0310X03S040**	9.3	.366	16	.630	37.0	1.456	55	2.165	4	.157	1
3.175	**.1250**	**1/8**			3	●	**DFAS0318X03S060**	9.5	.375	16	.630	37.7	1.485	61	2.402	6	.236	2
3.200	**.1260**				3	●	**DFAS0320X03S040**	9.6	.378	16	.630	37.0	1.456	55	2.165	4	.157	1
3.300	**.1299**			**M4x.7**	3	●	**DFAS0330X03S040**	9.9	.390	16	.630	37.0	1.456	55	2.165	4	.157	1
3.400	**.1339**				3	●	**DFAS0340X03S040**	10.2	.402	16	.630	37.0	1.456	55	2.165	4	.157	1
3.500	**.1378**				3	●	**DFAS0350X03S040**	10.5	.413	16	.630	37.0	1.456	55	2.165	4	.157	1
3.572	**.1407**	**9/64**			3	●	**DFAS0357X03S060**	10.7	.422	18	.709	40.5	1.594	65	2.559	6	.236	2
3.600	**.1417**				3	●	**DFAS0360X03S040**	10.8	.425	18	.709	35.0	1.378	55	2.165	4	.157	1
3.700	**.1457**			**M4.5x.75**	3	●	**DFAS0370X03S040**	11.1	.437	18	.709	35.0	1.378	55	2.165	4	.157	1
3.800	**.1496**		**25**	**#10-24**	3	●	**DFAS0380X03S040**	11.4	.449	18	.709	35.0	1.378	55	2.165	4	.157	1
3.900	**.1535**				3	●	**DFAS0390X03S040**	11.7	.461	18	.709	35.0	1.378	55	2.165	4	.157	1
3.969	**.1563**	**5/32**			3	●	**DFAS0397X03S060**	11.9	.469	18	.709	41.2	1.622	65	2.559	6	.236	2
4.000	**.1575**				3	●	**DFAS0400X03S040**	12.0	.472	18	.709	35.0	1.378	55	2.165	4	.157	1
4.039	**.1590**		**21**	**#10-32**	3	●	**DFAS0404X03S060**	12.1	.477	20	.787	39.3	1.547	65	2.559	6	.236	2
4.100	**.1614**				3	●	**DFAS0410X03S050**	12.3	.484	20	.787	40.0	1.575	62	2.441	5	.197	1
4.200	**.1654**			**M5x.8**	3	●	**DFAS0420X03S050**	12.6	.496	20	.787	40.0	1.575	62	2.441	5	.197	1
4.300	**.1693**				3	●	**DFAS0430X03S050**	12.9	.508	20	.787	40.0	1.575	62	2.441	5	.197	1
4.366	**.1719**	**11/64**			3	●	**DFAS0437X03S060**	13.1	.516	20	.787	40.0	1.575	65	2.559	6	.236	2
4.400	**.1732**		**17**		3	●	**DFAS0440X03S050**	13.2	.520	20	.787	40.0	1.575	62	2.441	5	.197	1
4.500	**.1772**		**16**		3	●	**DFAS0450X03S050**	13.5	.531	20	.787	40.0	1.575	62	2.441	5	.197	1
4.600	**.1811**				3	●	**DFAS0460X03S050**	13.8	.543	23	.906	37.0	1.457	62	2.441	5	.197	1
4.700	**.1850**		**13**		3	●	**DFAS0470X03S050**	14.1	.555	23	.906	37.0	1.457	62	2.441	5	.197	1
4.763	**.1875**	**3/16**			3	●	**DFAS0476X03S060**	14.3	.563	23	.906	39.4	1.551	65	2.559	6	.236	2
4.800	**.1890**		**12**		3	●	**DFAS0480X03S050**	14.4	.567	23	.906	37.0	1.457	62	2.441	5	.197	1
4.900	**.1929**				3	●	**DFAS0490X03S050**	14.7	.579	23	.906	37.0	1.457	62	2.441	5	.197	1
5.000	**.1969**			**M6x1.0**	3	●	**DFAS0500X03S050**	15.0	.591	23	.906	37.0	1.457	62	2.441	5	.197	1
5.100	**.2008**		**7**	**1/4-20**	3	●	**DFAS0510X03S060**	15.3	.602	25	.984	39.0	1.535	66	2.598	6	.236	1
5.160	**.2032**	**13/64**			3	●	**DFAS0516X03S060**	15.5	.609	25	.984	38.6	1.519	66	2.598	6	.236	2
5.200	**.2047**				3	●	**DFAS0520X03S060**	15.6	.614	25	.984	39.0	1.535	66	2.598	6	.236	1
5.300	**.2087**				3	●	**DFAS0530X03S060**	15.9	.626	25	.984	39.0	1.535	66	2.598	6	.236	1

DC = Cutting Dia. **LCF** = Length Chip Flute **OAL** = Overall Length
LU = Usable Length **LS** = Shank Length **DCONMS** = Connection Dia. Machine Side

● : **USA Stock**

DFAS

SOLID CARBIDE FLAT BOTTOM DRILLS



(inch)

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Stock DP102A	Order Number	LU mm	LU inch	LCF mm	LCF inch	LS mm	LS inch	OAL mm	OAL inch	DCONMS mm	DCONMS inch	Type
5.400	.2126		3	1/4-28	3	●	DFAS0540X03S060	16.2	.638	25	.984	39.0	1.535	66	2.598	6	.236	1
5.500	.2165				3	●	DFAS0550X03S060	16.5	.650	25	.984	39.0	1.535	66	2.598	6	.236	1
5.557	.2188	7/32			3	●	DFAS0556X03S060	16.7	.656	27	1.063	36.8	1.448	66	2.598	6	.236	2
5.600	.2205		2		3	●	DFAS0560X03S060	16.8	.661	27	1.063	37.0	1.456	66	2.598	6	.236	1
5.700	.2244				3	●	DFAS0570X03S060	17.1	.673	27	1.063	37.0	1.456	66	2.598	6	.236	1
5.800	.2283		1		3	●	DFAS0580X03S060	17.4	.685	27	1.063	37.0	1.456	66	2.598	6	.236	1
5.900	.2323				3	●	DFAS0590X03S060	17.7	.697	27	1.063	37.0	1.456	66	2.598	6	.236	1
5.954	.2344	15/64	A		3	●	DFAS0595X03S060	17.9	.703	27	1.063	37.0	1.456	66	2.598	6	.236	2
6.000	.2362			M7x1.0	3	●	DFAS0600X03S060	18.0	.709	27	1.063	37.0	1.456	66	2.598	6	.236	1
6.100	.2402				3	★	DFAS0610X03S070	18.3	.720	29	1.142	44.0	1.733	75	2.953	7	.276	1
6.200	.2440				3	★	DFAS0620X03S070	18.6	.732	29	1.142	44.0	1.733	75	2.953	7	.276	1
6.300	.2480				3	●	DFAS0630X03S070	18.9	.744	29	1.142	44.0	1.733	75	2.953	7	.276	1
6.350	.2500	1/4	E		3	●	DFAS0635X03S080	19.1	.750	29	1.142	43.2	1.701	75	2.953	8	.315	2
6.400	.2520				3	●	DFAS0640X03S070	19.2	.756	29	1.142	44.0	1.733	75	2.953	7	.276	1
6.500	.2559				3	★	DFAS0650X03S070	19.5	.768	29	1.142	44.0	1.733	75	2.953	7	.276	1
6.528	.2570		F	5/16-18	3	●	DFAS0653X03S080	19.6	.771	32	1.260	40.3	1.587	75	2.953	8	.315	2
6.600	.2598				3	★	DFAS0660X03S070	19.8	.780	32	1.260	41.0	1.614	75	2.953	7	.276	1
6.700	.2638			M8x1.25	3	★	DFAS0670X03S070	20.1	.791	32	1.260	41.0	1.614	75	2.953	7	.276	1
6.747	.2657	17/64			3	●	DFAS0675X03S080	20.2	.797	32	1.260	40.4	1.591	75	2.953	8	.315	2
6.800	.2677				3	★	DFAS0680X03S070	20.4	.803	32	1.260	41.0	1.614	75	2.953	7	.276	1
6.900	.2717		I	5/16-24	3	★	DFAS0690X03S070	20.7	.815	32	1.260	41.0	1.614	75	2.953	7	.276	1
7.000	.2756			M8x1.0	3	★	DFAS0700X03S070	21.0	.827	32	1.260	41.0	1.614	75	2.953	7	.276	1
7.100	.2795				3	●	DFAS0710X03S080	21.3	.839	34	1.339	44.0	1.733	80	3.150	8	.315	1
7.144	.2813	9/32	K		3	●	DFAS0714X03S080	21.4	.844	34	1.339	43.6	1.717	80	3.150	8	.315	2
7.200	.2835				3	●	DFAS0720X03S080	21.6	.850	34	1.339	44.0	1.733	80	3.150	8	.315	1
7.300	.2874				3	●	DFAS0730X03S080	21.9	.862	34	1.339	44.0	1.733	80	3.150	8	.315	1
7.400	.2913				3	●	DFAS0740X03S080	22.2	.874	34	1.339	44.0	1.733	80	3.150	8	.315	1
7.500	.2953		M		3	●	DFAS0750X03S080	22.5	.886	34	1.339	44.0	1.733	80	3.150	8	.315	1
7.541	.2969	19/64			3	●	DFAS0754X03S080	22.6	.891	36	1.417	41.8	1.646	80	3.150	8	.315	2
7.600	.2992				3	●	DFAS0760X03S080	22.8	.898	36	1.417	42.0	1.654	80	3.150	8	.315	1
7.700	.3031				3	●	DFAS0770X03S080	23.1	.909	36	1.417	42.0	1.654	80	3.150	8	.315	1
7.800	.3071				3	●	DFAS0780X03S080	23.4	.921	36	1.417	42.0	1.654	80	3.150	8	.315	1
7.900	.3110				3	●	DFAS0790X03S080	23.7	.933	36	1.417	42.0	1.654	80	3.150	8	.315	1
7.938	.3125	5/16		3/8-16	3	●	DFAS0794X03S080	23.8	.938	36	1.417	42.0	1.654	80	3.150	8	.315	2

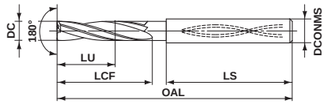
(inch)

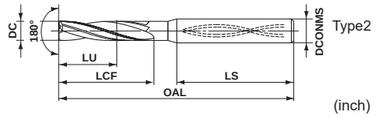
DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Stock DP102A	Order Number	LU mm	LU inch	LCF mm	LCF inch	LS mm	LS inch	OAL mm	OAL inch	DCONMS mm	DCONMS inch	Type
8.000	.3150				3	●	DFAS0800X03S080	24.0	.945	36	1.417	42.0	1.654	80	3.150	8	.315	1
8.100	.3189				3	●	DFAS0810X03S090	24.3	.957	38	1.496	45.0	1.771	85	3.346	9	.354	1
8.200	.3228		P		3	●	DFAS0820X03S090	24.6	.969	38	1.496	45.0	1.771	85	3.346	9	.354	1
8.300	.3268				3	●	DFAS0830X03S090	24.9	.980	38	1.496	45.0	1.771	85	3.346	9	.354	1
8.335	.3268	21/64			3	●	DFAS0833X03S100	25.0	.984	38	1.496	44.2	1.740	85	3.346	10	.394	2
8.400	.3307				3	●	DFAS0840X03S090	25.2	.992	38	1.496	45.0	1.771	85	3.346	9	.354	1
8.433	.3320		Q	3/8-24	3	●	DFAS0843X03S100	25.3	.996	38	1.496	44.2	1.740	85	3.346	10	.394	2
8.500	.3346			M10x1.5	3	●	DFAS0850X03S090	25.5	1.004	38	1.496	45.0	1.771	85	3.346	9	.354	1
8.600	.3386		R		3	●	DFAS0860X03S090	25.8	1.016	41	1.614	42.0	1.653	85	3.346	9	.354	1
8.700	.3425			M10x1.25	3	●	DFAS0870X03S090	26.1	1.028	41	1.614	42.0	1.653	85	3.346	9	.354	1
8.732	.3438	11/32			3	●	DFAS0873X03S100	26.2	1.031	41	1.614	41.4	1.629	85	3.346	10	.394	2
8.800	.3465				3	●	DFAS0880X03S090	26.4	1.039	41	1.614	42.0	1.653	85	3.346	9	.354	1
8.900	.3504				3	●	DFAS0890X03S090	26.7	1.051	41	1.614	42.0	1.653	85	3.346	9	.354	1
9.000	.3543				3	●	DFAS0900X03S090	27.0	1.063	41	1.614	42.0	1.653	85	3.346	9	.354	1
9.100	.3583		T		3	●	DFAS0910X03S100	27.3	1.075	43	1.693	45.0	1.771	90	3.543	10	.394	1
9.129	.3594	23/64			3	●	DFAS0913X03S100	27.4	1.078	43	1.693	44.6	1.756	90	3.543	10	.394	2
9.200	.3622				3	●	DFAS0920X03S100	27.6	1.087	43	1.693	45.0	1.771	90	3.543	10	.394	1
9.300	.3661				3	●	DFAS0930X03S100	27.9	1.098	43	1.693	45.0	1.771	90	3.543	10	.394	1
9.348	.3680		U	7/16-14	3	●	DFAS0935X03S100	28.0	1.104	43	1.693	44.7	1.760	90	3.543	10	.394	2
9.400	.3701				3	●	DFAS0940X03S100	28.2	1.110	43	1.693	45.0	1.771	90	3.543	10	.394	1
9.500	.3740				3	●	DFAS0950X03S100	28.5	1.122	43	1.693	45.0	1.771	90	3.543	10	.394	1
9.525	.3750	3/8			3	●	DFAS0953X03S100	28.6	1.125	45	1.772	42.8	1.685	90	3.543	10	.394	2
9.600	.3780				3	●	DFAS0960X03S100	28.8	1.134	45	1.772	43.0	1.693	90	3.543	10	.394	1
9.700	.3819		Tube Sheet		3	★	DFAS0970X03S100	29.1	1.146	45	1.772	43.0	1.693	90	3.543	10	.394	1
9.800	.3858		W		3	●	DFAS0980X03S100	29.4	1.157	45	1.772	43.0	1.693	90	3.543	10	.394	1
9.900	.3898				3	●	DFAS0990X03S100	29.7	1.169	45	1.772	43.0	1.693	90	3.543	10	.394	1
9.922	.3907	25/64		7/16-20	3	●	DFAS0992X03S100	29.8	1.172	45	1.772	43.0	1.693	90	3.543	10	.394	2
10.000	.3937				3	●	DFAS1000X03S100	30.0	1.181	45	1.772	43.0	1.693	90	3.543	10	.394	1
10.100	.3976				3	●	DFAS1010X03S110	30.3	1.193	47	1.850	52.0	2.047	101	3.976	11	.433	1
10.200	.4016			M12x1.75	3	●	DFAS1020X03S110	30.6	1.205	47	1.850	52.0	2.047	101	3.976	11	.433	1
10.300	.4055				3	●	DFAS1030X03S110	30.9	1.217	47	1.850	52.0	2.047	101	3.976	11	.433	1
10.319	.4063	13/32			3	●	DFAS1032X03S120	31.0	1.219	47	1.850	51.2	2.015	101	3.976	12	.472	2
10.400	.4094				3	●	DFAS1040X03S110	31.2	1.228	47	1.850	52.0	2.047	101	3.976	11	.433	1
10.500	.4134		Z		3	●	DFAS1050X03S110	31.5	1.240	47	1.850	52.0	2.047	101	3.976	11	.433	1
10.600	.4173				3	●	DFAS1060X03S110	31.8	1.252	50	1.969	49.0	1.929	101	3.976	11	.433	1
10.700	.4213				3	★	DFAS1070X03S110	32.1	1.264	50	1.969	49.0	1.929	101	3.976	11	.433	1
10.716	.4219	27/64		1/2-13	3	●	DFAS1072X03S120	32.1	.911	50	1.969	48.4	1.905	101	3.976	12	.472	2
10.800	.4252			M12x1.25	3	●	DFAS1080X03S110	32.4	1.276	50	1.969	49.0	1.929	101	3.976	11	.433	1
10.900	.4291				3	●	DFAS1090X03S110	32.7	1.287	50	1.969	49.0	1.929	101	3.976	11	.433	1
11.000	.4331				3	●	DFAS1100X03S110	33.0	1.299	50	1.969	49.0	1.929	101	3.976	11	.433	1
11.100	.4370				3	●	DFAS1110X03S120	33.3	1.311	52	2.047	51.0	2.008	105	4.134	12	.472	1
11.113	.4375	7/16			3	●	DFAS1111X03S120	33.3	1.313	52	2.047	50.6	1.992	105	4.134	12	.472	2
11.200	.4409				3	★	DFAS1120X03S120	33.6	1.323	52	2.047	51.0	2.008	105	4.134	12	.472	1
11.300	.4449				3	●	DFAS1130X03S120	33.9	1.335	52	2.047	51.0	2.008	105	4.134	12	.472	1

● : USA Stock ★ : Stocked in Japan

DC = Cutting Dia. **LCF** = Length Chip Flute **OAL** = Overall Length
LU = Usable Length **LS** = Shank Length **DCONMS** = Connection Dia. Machine Side

Solid Carbide Flat Bottom Drills





(inch)

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Stock DP102A	Order Number	LU mm	LU inch	LCF mm	LCF inch	LS mm	LS inch	OAL mm	OAL inch	DCONMS mm	DCONMS inch	Type
11.400	**.4488**				3	★	**DFAS1140X03S120**	34.2	1.346	52	2.047	51.0	2.008	105	4.134	12	.472	1
11.500	**.4528**				3	●	**DFAS1150X03S120**	34.5	1.358	52	2.047	51.0	2.008	105	4.134	12	.472	1
11.510	**.4532**	**29/64**		**1/2-20**	3	●	**DFAS1151X03S120**	34.5	1.359	54	2.126	48.8	1.921	105	4.134	12	.472	2
11.600	**.4567**				3	★	**DFAS1160X03S120**	34.8	1.370	54	2.126	49.0	1.929	105	4.134	12	.472	1
11.700	**.4606**				3	★	**DFAS1170X03S120**	35.1	1.382	54	2.126	49.0	1.929	105	4.134	12	.472	1
11.800	**.4646**				3	●	**DFAS1180X03S120**	35.4	1.394	54	2.126	49.0	1.929	105	4.134	12	.472	1
11.900	**.4685**				3	●	**DFAS1190X03S120**	35.7	1.406	54	2.126	49.0	1.929	105	4.134	12	.472	1
12.000	**.4724**			**M14x2.0**	3	●	**DFAS1200X03S120**	36.0	1.417	54	2.126	49.0	1.929	105	4.134	12	.472	1
12.304	**.4844**	**31/64**		**9/16-12**	3	●	**DFAS1230X03S140**	36.9	1.453	56	2.205	52.0	2.048	110	4.331	14	.551	1
12.500	**.4921**			**M14x1.5**	3	●	**DFAS1250X03S130**	37.5	1.476	56	2.205	52.0	2.048	110	4.331	13	.512	1
12.700	**.5000**	**1/2**			3	●	**DFAS1270X03S140**	38.1	1.500	59	2.323	49.0	1.929	110	4.331	14	.551	1
13.000	**.5118**				3	●	**DFAS1300X03S130**	39.0	1.535	59	2.323	49.0	1.929	110	4.331	13	.512	1
13.100	**.5157**			**9/16-18**	3	●	**DFAS1310X03S140**	39.3	1.547	61	2.402	51.0	2.008	114	4.488	14	.551	1
13.500	**.5315**			**5/8-11**	3	●	**DFAS1350X03S140**	40.5	1.594	61	2.402	51.0	2.008	114	4.488	14	.551	1
13.891	**.5469**	**35/64**			3	●	**DFAS1389X03S140**	41.7	1.641	63	2.480	49.0	1.929	114	4.488	14	.551	1
14.000	**.5512**			**M16x2.0**	3	●	**DFAS1400X03S140**	42.0	1.654	63	2.480	49.0	1.929	114	4.488	14	.551	1

DC = Cutting Dia. **LCF** = Length Chip Flute **OAL** = Overall Length
LU = Usable Length **LS** = Shank Length **DCONMS** = Connection Dia. Machine Side

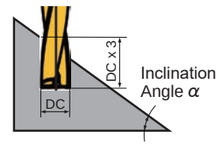
● : USA Stock ★ : Stocked in Japan

RECOMMENDED CUTTING CONDITIONS

(inch)

Workpiece Material	Mild Steel, Carbon Steel, Alloy Steel AISI 1010, 1045, 4140, 4340 etc.		Stainless Steel, Precipitation-Hardening Stainless Steel AISI 304, 316 etc.		Gray Cast Iron, Ductile Cast Iron AISI No45B, 60-40-18 etc.	
DC inch	**DC** mm	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)
.1181	3.0	330	.0028 (.0016—.0039)	100	.0020 (.0016—.0024)	330	.0016 (.0008—.0028)
.1575	4.0	330	.0031 (.0016—.0043)	100	.0024 (.0020—.0031)	330	.0020 (.0012—.0035)
.1969	5.0	330	.0039 (.0020—.0055)	100	.0031 (.0024—.0039)	330	.0028 (.0012—.0043)
.2362	6.0	330	.0047 (.0024—.0067)	100	.0039 (.0031—.0047)	330	.0031 (.0016—.0051)
.2756	7.0	330	.0051 (.0028—.0079)	100	.0043 (.0035—.0055)	330	.0035 (.0020—.0059)
.3150	8.0	330	.0063 (.0031—.0091)	100	.0051 (.0039—.0063)	330	.0043 (.0020—.0067)
.3543	9.0	330	.0067 (.0035—.0102)	100	.0059 (.0047—.0071)	330	.0047 (.0024—.0079)
.3937	10.0	330	.0079 (.0039—.0114)	100	.0063 (.0051—.0079)	330	.0051 (.0028—.0087)
.4331	11.0	330	.0087 (.0043—.0126)	100	.0071 (.0055—.0087)	330	.0059 (.0028—.0094)
.4724	12.0	330	.0094 (.0047—.0138)	100	.0079 (.0063—.0094)	330	.0063 (.0031—.0102)
.5118	13.0	330	.0102 (.0051—.0154)	100	.0087 (.0067—.0102)	330	.0067 (.0035—.0110)
.5512	14.0	330	.0110 (.0055—.0165)	100	.0091 (.0075—.0110)	330	.0075 (.0035—.0118)

Workpiece Material	Aluminum Alloys AISI6061, 7075 etc.		Titanium Alloys Ti-6Al-4V, Ti-5Al-5V-5Mo-3Cr etc.	
DC inch	**DC** mm	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)
.1181	3.0	425	.0016 (.0008—.0028)	115	.0012 (.0004—.0020)
.1575	4.0	425	.0020 (.0012—.0035)	115	.0016 (.0004—.0028)
.1969	5.0	425	.0028 (.0012—.0043)	115	.0020 (.0008—.0031)
.2362	6.0	425	.0031 (.0016—.0051)	115	.0024 (.0008—.0039)
.2756	7.0	425	.0035 (.0020—.0059)	115	.0028 (.0008—.0047)
.3150	8.0	425	.0043 (.0020—.0067)	115	.0031 (.0012—.0051)
.3543	9.0	425	.0047 (.0024—.0079)	115	.0035 (.0012—.0059)
.3937	10.0	425	.0051 (.0028—.0087)	115	.0039 (.0012—.0067)
.4331	11.0	425	.0059 (.0028—.0094)	115	.0043 (.0016—.0071)
.4724	12.0	425	.0063 (.0031—.0102)	115	.0047 (.0016—.0079)
.5118	13.0	425	.0067 (.0035—.0110)	115	.0051 (.0016—.0087)
.5512	14.0	425	.0075 (.0035—.0118)	115	.0055 (.0020—.0091)



Note 1) The recommended hole depth is DCx3. This should be the depth from the uppermost surface of the workpiece material when machining on an angled surface. (Refer to diagram)
Note 2) The cutting table above 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, reduce the feed rate by 30% or more as a guideline.
When the inclination angle α is greater than 30°, reduce the feed rate by 50% or more as a guideline.
Note 3) For flat surface machining of stainless steel, first drill a pilot hole with the same diameter or machine a countersink.
Note 4) This product is a tool intended for hole drilling. It cannot be used for cross-feed or helical machining.

MFE for Small Diameter
SOLID CARBIDE FLAT BOTTOM DRILLS

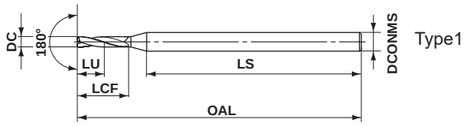
- Sharp cutting edges with long tool life
- Combination of different radius sizes provides strong cutting edge and excellent chip control

UWC | DP1A | 180° | XR

DP102A

P | M | K | N | S | H

External Coolant



Type1

(inch)

.0295≤DC≤.1161			
0 −.00055			
DCONMS=.118	DCONMS=.157		
0 −.00024	0 −.00031		

(inch)

DC					L/D	Stock	Order Number	LU		LCF		LS		OAL		DCONMS		Type
Metric (mm)	Decimal	Fraction	Wire / Letter	Thread Size		DP102A		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
	(inch)																	
0.750	.0295				2	●	MFE0075X02S030	1.5	.059	3.0	.118	37.3	1.469	45	1.772	3	.118	1
0.800	.0315				2	●	MFE0080X02S030	1.6	.063	3.2	.126	37.2	1.465	45	1.772	3	.118	1
0.850	.0335				2	●	MFE0085X02S030	1.7	.067	3.4	.134	37.1	1.461	45	1.772	3	.118	1
0.900	.0354				2	●	MFE0090X02S030	1.8	.071	3.6	.142	37.0	1.457	45	1.772	3	.118	1
0.950	.0374				2	●	MFE0095X02S030	1.9	.075	3.8	.150	36.9	1.453	45	1.772	3	.118	1
1.000	.0394				2	●	MFE0100X02S030	2.0	.079	4.0	.157	36.8	1.449	45	1.772	3	.118	1
1.050	.0413				2	●	MFE0105X02S030	2.1	.083	4.2	.165	36.7	1.445	45	1.772	3	.118	1
1.100	.0433				2	●	MFE0110X02S030	2.2	.087	4.4	.173	36.6	1.441	45	1.772	3	.118	1
1.150	.0453				2	●	MFE0115X02S030	2.3	.091	4.6	.181	36.4	1.433	45	1.772	3	.118	1
1.200	.0472				2	●	MFE0120X02S030	2.4	.094	4.8	.189	36.3	1.429	45	1.772	3	.118	1
1.250	.0492				2	●	MFE0125X02S030	2.5	.098	5.0	.197	36.2	1.426	45	1.772	3	.118	1
1.300	.0512				2	●	MFE0130X02S030	2.6	.102	5.2	.205	36.1	1.422	45	1.772	3	.118	1
1.350	.0531				2	●	MFE0135X02S030	2.7	.106	5.4	.213	36.0	1.418	45	1.772	3	.118	1
1.400	.0551				2	●	MFE0140X02S030	2.8	.110	5.6	.220	35.9	1.414	45	1.772	3	.118	1
1.450	.0571				2	●	MFE0145X02S030	2.9	.114	5.8	.228	35.8	1.410	45	1.772	3	.118	1
1.500	.0591			#1-64	2	●	MFE0150X02S030	3.0	.118	6.0	.236	35.7	1.406	45	1.772	3	.118	1
1.550	.0610				2	●	MFE0155X02S030	3.1	.122	6.2	.244	35.6	1.402	45	1.772	3	.118	1
1.600	.0630				2	●	MFE0160X02S030	3.2	.126	6.4	.252	35.5	1.398	45	1.772	3	.118	1
1.650	.0650				2	●	MFE0165X02S030	3.3	.130	6.6	.260	35.4	1.394	45	1.772	3	.118	1
1.700	.0669				2	●	MFE0170X02S030	3.4	.134	6.8	.268	35.3	1.390	45	1.772	3	.118	1
1.750	.0689				2	●	MFE0175X02S030	3.5	.138	7.0	.276	35.2	1.386	45	1.772	3	.118	1
1.800	.0709				2	●	MFE0180X02S030	3.6	.142	7.2	.283	35.1	1.382	45	1.772	3	.118	1
1.850	.0728				2	●	MFE0185X02S030	3.7	.146	7.4	.291	35.0	1.378	45	1.772	3	.118	1
1.900	.0748				2	●	MFE0190X02S030	3.8	.150	7.6	.299	34.8	1.370	45	1.772	3	.118	1
1.950	.0768				2	●	MFE0195X02S030	3.9	.154	7.8	.307	34.7	1.366	45	1.772	3	.118	1
2.000	.0787			#3-48	2	●	MFE0200X02S040	4.0	.157	8.0	.315	37.8	1.489	50	1.969	4	.157	1
2.050	.0807				2	●	MFE0205X02S040	4.1	.161	8.2	.323	37.7	1.485	50	1.969	4	.157	1
2.100	.0827				2	●	MFE0210X02S040	4.2	.165	8.4	.331	37.6	1.481	50	1.969	4	.157	1
2.150	.0846				2	●	MFE0215X02S040	4.3	.169	8.6	.339	37.4	1.473	50	1.969	4	.157	1
2.200	.0866				2	●	MFE0220X02S040	4.4	.173	8.8	.346	37.3	1.469	50	1.969	4	.157	1
2.250	.0886				2	●	MFE0225X02S040	4.5	.177	9.0	.354	37.2	1.465	50	1.969	4	.157	1
2.300	.0906				2	●	MFE0230X02S040	4.6	.181	9.2	.362	37.1	1.461	50	1.969	4	.157	1

● : USA Stock

(inch)

DC					L/D	Stock	Order Number	LU		LCF		LS		OAL		DCONMS		Type
Metric (mm)	Decimal	Fraction	Wire / Letter	Thread Size		DP102A		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
	(inch)																	
2.350	.0925				2	●	MFE0235X02S040	4.7	.185	9.4	.370	37.0	1.457	50	1.969	4	.157	1
2.400	.0945				2	●	MFE0240X02S040	4.8	.189	9.6	.378	36.9	1.453	50	1.969	4	.157	1
2.450	.0965				2	●	MFE0245X02S040	4.9	.193	9.8	.386	36.8	1.449	50	1.969	4	.157	1
2.500	.0984				2	●	MFE0250X02S040	5.0	.197	10.0	.394	36.7	1.445	50	1.969	4	.157	1
2.550	.1004				2	●	MFE0255X02S040	5.1	.201	10.2	.402	36.6	1.441	50	1.969	4	.157	1
2.600	.1024				2	●	MFE0260X02S040	5.2	.205	10.4	.409	36.5	1.438	50	1.969	4	.157	1
2.650	.1043				2	●	MFE0265X02S040	5.3	.209	10.6	.417	36.4	1.434	50	1.969	4	.157	1
2.700	.1063		36	#6-32	2	●	MFE0270X02S040	5.4	.213	10.8	.425	36.3	1.430	50	1.969	4	.157	1
2.750	.1083				2	●	MFE0275X02S040	5.5	.217	11.0	.433	36.2	1.426	50	1.969	4	.157	1
2.800	.1102		35		2	●	MFE0280X02S040	5.6	.220	11.2	.441	36.1	1.422	50	1.969	4	.157	1
2.850	.1122				2	●	MFE0285X02S040	5.7	.224	11.4	.449	36.0	1.418	50	1.969	4	.157	1
2.900	.1142				2	●	MFE0290X02S040	5.8	.228	11.6	.457	35.8	1.410	50	1.969	4	.157	1
2.950	.1161		32		2	●	MFE0295X02S040	5.9	.232	11.8	.465	35.7	1.406	50	1.969	4	.157	1

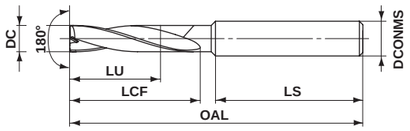
DC = Cutting Dia.
LU = Usable Length
LCF = Length Chip Flute
LS = Shank Length
OAL = Overall Length
DCONMS = Connection Dia. Machine Side

MFE
SOLID CARBIDE FLAT BOTTOM DRILLS

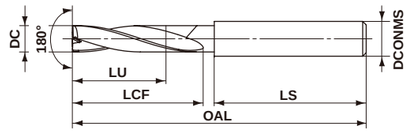
- Sharp cutting edges with long tool life
- Combination of different radius sizes provides strong cutting edge and excellent chip control

P | M | K | N | S | H

External Coolant



Type1



Type2

(inch)

.118≤DC≤.236	.236 < DC≤.394	.394 < DC≤.709	.709 < DC≤.787
0 −.00047	0 −.00059	0 −.00071	0 −.00083
DCONMS=.236	.315, .394	.472, .551, .630, .709	.787
0 −.00031	0 −.00035	0 −.00043	0 −.00051

(inch)

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LS mm	LS inch	OAL mm	OAL inch	DCONMS mm	DCONMS inch	Type
3.000	.1181				2	●	MFE0300X02S060	6.0	.236	12	.472	35.4	1.393	55	2.165	6	.236	1
3.048	.1200		31		2	●	MFE0305X02S060	6.1	.240	14	.551	33.5	1.319	55	2.165	6	.236	1
3.100	.1220				2	●	MFE0310X02S060	6.2	.244	14	.551	33.6	1.322	55	2.165	6	.236	1
3.175	.1250	1/8			2	●	MFE0318X02S060	6.4	.252	14	.551	33.7	1.326	55	2.165	6	.236	1
3.200	.1260				2	●	MFE0320X02S060	6.4	.252	14	.551	33.8	1.330	55	2.165	6	.236	1
3.300	.1299			M4x.7	2	●	MFE0330X02S060	6.6	.260	14	.551	34.0	1.338	55	2.165	6	.236	1
3.400	.1339				2	●	MFE0340X02S060	6.8	.268	14	.551	34.1	1.342	55	2.165	6	.236	1
3.500	.1378				2	●	MFE0350X02S060	7.0	.276	14	.551	34.3	1.350	55	2.165	6	.236	1
3.572	.1407	9/64			2	●	MFE0357X02S060	7.1	.280	16	.630	32.5	1.279	55	2.165	6	.236	1
3.600	.1417				2	●	MFE0360X02S060	7.2	.283	16	.630	32.5	1.279	55	2.165	6	.236	1
3.700	.1457			M4.5x.75	2	●	MFE0370X02S060	7.4	.291	16	.630	32.7	1.287	55	2.165	6	.236	1
3.800	.1496		25	#10-24	2	●	MFE0380X02S060	7.6	.299	16	.630	32.9	1.295	55	2.165	6	.236	1
3.900	.1535				2	●	MFE0390X02S060	7.8	.307	16	.630	33.1	1.303	55	2.165	6	.236	1
3.969	.1563	5/32			2	●	MFE0397X02S060	7.9	.311	16	.630	33.2	1.307	55	2.165	6	.236	1
4.000	.1575				2	●	MFE0400X02S060	8.0	.315	16	.630	33.3	1.311	55	2.165	6	.236	1
4.039	.1590		21	#10-32	2	●	MFE0404X02S060	8.1	.319	18	.709	38.3	1.508	62	2.441	6	.236	1
4.100	.1614				2	●	MFE0410X02S060	8.2	.323	18	.709	38.5	1.516	62	2.441	6	.236	1
4.200	.1654			M5x0.8	2	●	MFE0420X02S060	8.4	.331	18	.709	38.6	1.520	62	2.441	6	.236	1
4.300	.1693				2	●	MFE0430X02S060	8.6	.339	18	.709	38.8	1.528	62	2.441	6	.236	1
4.366	.1719	11/64			2	●	MFE0437X02S060	8.7	.343	18	.709	39.0	1.535	62	2.441	6	.236	1
4.400	.1732		17		2	●	MFE0440X02S060	8.8	.346	18	.709	39.0	1.535	62	2.441	6	.236	1
4.500	.1772		16	#12-24	2	●	MFE0450X02S060	9.0	.354	18	.709	39.2	1.543	62	2.441	6	.236	1
4.600	.1811				2	●	MFE0460X02S060	9.2	.362	20	.787	38.3	1.508	62	2.441	6	.236	1
4.700	.1850		13		2	●	MFE0470X02S060	9.4	.370	20	.787	38.3	1.508	62	2.441	6	.236	1
4.763	.1875	3/16			2	●	MFE0476X02S060	9.5	.374	20	.787	38.4	1.512	62	2.441	6	.236	1
4.800	.1890		12		2	●	MFE0480X02S060	9.6	.378	20	.787	38.4	1.512	62	2.441	6	.236	1
4.900	.1929				2	●	MFE0490X02S060	9.8	.386	20	.787	38.4	1.512	62	2.441	6	.236	1
5.000	.1969			M6x1.0	2	●	MFE0500X02S060	10.0	.394	20	.787	38.5	1.516	62	2.441	6	.236	1
5.100	.2008		7	1/4-20	2	●	MFE0510X02S060	10.2	.402	22	.866	36.5	1.437	62	2.441	6	.236	1
5.160	.2032	13/64			2	●	MFE0516X02S060	10.3	.406	22	.866	36.6	1.441	62	2.441	6	.236	1
5.200	.2047				2	●	MFE0520X02S060	10.4	.409	22	.866	36.6	1.441	62	2.441	6	.236	1
5.300	.2087				2	●	MFE0530X02S060	10.6	.417	22	.866	36.6	1.441	62	2.441	6	.236	1
5.400	.2126		3	1/4-28	2	●	MFE0540X02S060	10.8	.425	22	.866	36.7	1.445	62	2.441	6	.236	1
5.500	.2165				2	●	MFE0550X02S060	11.0	.433	22	.866	36.7	1.445	62	2.441	6	.236	1

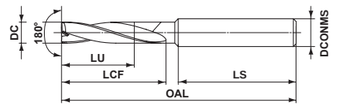
● : USA Stock ★ : Stocked in Japan

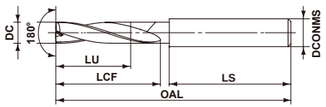
(inch)

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LS mm	LS inch	OAL mm	OAL inch	DCONMS mm	DCONMS inch	Type
5.557	.2188	7/32			2	●	MFE0556X02S060	11.1	.437	24	.945	34.8	1.370	62	2.441	6	.236	1
5.600	.2205		2		2	●	MFE0560X02S060	11.2	.441	24	.945	34.8	1.370	62	2.441	6	.236	1
5.700	.2244				2	●	MFE0570X02S060	11.4	.449	24	.945	34.8	1.370	62	2.441	6	.236	1
5.800	.2283		1		2	●	MFE0580X02S060	11.6	.457	24	.945	34.9	1.374	62	2.441	6	.236	1
5.900	.2323				2	●	MFE0590X02S060	11.8	.465	24	.945	34.9	1.374	62	2.441	6	.236	1
5.954	.2344	15/64	A		2	●	MFE0595X02S060	11.9	.469	24	.945	35.0	1.378	62	2.441	6	.236	1
6.000	.2362			M7x1.0	2	●	MFE0600X02S060	12.0	.472	24	.945	35.0	1.378	62	2.441	6	.236	1
6.100	.2402				2	★	MFE0610X02S070	12.2	.480	26	1.024	44.5	1.752	74	2.913	7	.276	1
6.100	.2402				2	●	MFE0610X02S080	12.2	.480	26	1.024	44.0	1.732	74	2.913	8	.315	1
6.200	.2441				2	★	MFE0620X02S070	12.4	.488	26	1.024	44.6	1.756	74	2.913	7	.276	1
6.200	.2441				2	●	MFE0620X02S080	12.4	.488	26	1.024	44.1	1.736	74	2.913	8	.315	1
6.300	.2480				2	★	MFE0630X02S070	12.6	.496	26	1.024	44.6	1.756	74	2.913	7	.276	1
6.300	.2480				2	●	MFE0630X02S080	12.6	.496	26	1.024	44.1	1.736	74	2.913	8	.315	1
6.350	.2500	1/4	E		2	●	MFE0635X02S080	12.7	.500	26	1.024	44.2	1.740	74	2.913	8	.315	1
6.400	.2520				2	★	MFE0640X02S070	12.8	.504	26	1.024	44.7	1.759	74	2.913	7	.276	1
6.400	.2520				2	●	MFE0640X02S080	12.8	.504	26	1.024	44.2	1.740	74	2.913	8	.315	1
6.500	.2559				2	★	MFE0650X02S070	13.0	.512	26	1.024	44.7	1.759	74	2.913	7	.276	1
6.500	.2559				2	●	MFE0650X02S080	13.0	.512	26	1.024	44.2	1.740	74	2.913	8	.315	1
6.528	.2570		F	5/16-18	2	●	MFE0653X02S080	13.1	.516	28	1.102	42.3	1.665	74	2.913	8	.315	1
6.600	.2598				2	★	MFE0660X02S070	13.2	.520	28	1.102	42.8	1.685	74	2.913	7	.276	1
6.600	.2598				2	●	MFE0660X02S080	13.2	.520	28	1.102	42.3	1.665	74	2.913	8	.315	1
6.700	.2638			M8x1.25	2	★	MFE0670X02S070	13.4	.528	28	1.102	42.8	1.685	74	2.913	7	.276	1
6.700	.2638			M8x1.25	2	●	MFE0670X02S080	13.4	.528	28	1.102	42.3	1.665	74	2.913	8	.315	1
6.747	.2657	17/64			2	●	MFE0675X02S080	13.5	.531	28	1.102	42.4	1.669	74	2.913	8	.315	1
6.800	.2677				2	★	MFE0680X02S070	13.6	.535	28	1.102	42.9	1.689	74	2.913	7	.276	1
6.800	.2677				2	●	MFE0680X02S080	13.6	.535	28	1.102	42.4	1.669	74	2.913	8	.315	1
6.900	.2717		I	5/16-24	2	★	MFE0690X02S070	13.8	.543	28	1.102	42.9	1.689	74	2.913	7	.276	1
6.900	.2717		I	5/16-24	2	●	MFE0690X02S080	13.8	.543	28	1.102	42.4	1.669	74	2.913	8	.315	1
7.000	.2756			M8x1.0	2	★	MFE0700X02S070	14.0	.551	28	1.102	43.0	1.693	74	2.913	7	.276	1
7.000	.2756			M8x1.0	2	●	MFE0700X02S080	14.0	.551	28	1.102	42.5	1.673	74	2.913	8	.315	1
7.100	.2795				2	●	MFE0710X02S080	14.2	.559	30	1.181	40.5	1.594	74	2.913	8	.315	1
7.144	.2813	9/32	K		2	●	MFE0714X02S080	14.3	.563	30	1.181	40.6	1.598	74	2.913	8	.315	1
7.200	.2835				2	●	MFE0720X02S080	14.4	.567	30	1.181	40.6	1.598	74	2.913	8	.315	1
7.300	.2874				2	●	MFE0730X02S080	14.6	.575	30	1.181	40.6	1.598	74	2.913	8	.315	1
7.400	.2913				2	●	MFE0740X02S080	14.8	.583	30	1.181	40.7	1.602	74	2.913	8	.315	1
7.500	.2953				2	●	MFE0750X02S080	15.0	.591	30	1.181	40.7	1.602	74	2.913	8	.315	1
7.541	.2969	19/64			2	●	MFE0754X02S080	15.1	.594	32	1.260	38.8	1.527	74	2.913	8	.315	1
7.600	.2992				2	●	MFE0760X02S080	15.2	.598	32	1.260	38.8	1.527	74	2.913	8	.315	1
7.700	.3031				2	●	MFE0770X02S080	15.4	.606	32	1.260	38.8	1.527	74	2.913	8	.315	1
7.800	.3071				2	●	MFE0780X02S080	15.6	.614	32	1.260	38.9	1.531	74	2.913	8	.315	1
7.900	.3110				2	●	MFE0790X02S080	15.8	.622	32	1.260	38.9	1.531	74	2.913	8	.315	1
7.938	.3125	5/16		3/8-16	2	●	MFE0794X02S080	15.9	.626	32	1.260	39.0	1.535	74	2.913	8	.315	1

DC = Cutting Dia. **LCF** = Length Chip Flute **OAL** = Overall Length
LU = Usable Length **LS** = Shank Length **DCONMS** = Connection Dia. Machine Side

MFE





(inch)

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LS mm	LS inch	OAL mm	OAL inch	DCONMS mm	DCONMS inch	Type
8.000	.3150				2	●	MFE0800X02S080	16.0	.630	32	1.260	39.0	1.535	74	2.913	8	.315	1
8.100	.3189				2	●	MFE0810X02S100	16.2	.638	34	1.339	46.0	1.811	84	3.307	10	.394	1
8.200	.3228		P		2	●	MFE0820X02S100	16.4	.646	34	1.339	46.1	1.815	84	3.307	10	.394	1
8.300	.3268				2	●	MFE0830X02S100	16.6	.654	34	1.339	46.1	1.815	84	3.307	10	.394	1
8.335	.3282	21/64			2	●	MFE0833X02S100	16.7	.657	34	1.339	46.2	1.819	84	3.307	10	.394	1
8.400	.3307				2	●	MFE0840X02S100	16.8	.661	34	1.339	46.2	1.819	84	3.307	10	.394	1
8.433	.3320		Q	3/8-24	2	●	MFE0843X02S100	16.9	.665	34	1.343	46.2	1.819	84	3.307	10	.394	1
8.500	.3346			M10x1.5	2	●	MFE0850X02S100	17.0	.669	34	1.339	46.2	1.819	84	3.307	10	.394	1
8.600	.3386		R		2	●	MFE0860X02S100	17.2	.677	36	1.417	44.3	1.744	84	3.307	10	.394	1
8.700	.3425			M10x1.25	2	●	MFE0870X02S100	17.4	.685	36	1.417	44.3	1.744	84	3.307	10	.394	1
8.732	.3438	11/32			2	●	MFE0873X02S100	17.5	.689	36	1.417	44.4	1.748	84	3.307	10	.394	1
8.800	.3465				2	●	MFE0880X02S100	17.6	.693	36	1.417	44.4	1.748	84	3.307	10	.394	1
8.900	.3504				2	●	MFE0890X02S100	17.8	.701	36	1.417	44.4	1.748	84	3.307	10	.394	1
9.000	.3543				2	●	MFE0900X02S100	18.0	.709	36	1.417	44.5	1.752	84	3.307	10	.394	1
9.100	.3583		T		2	●	MFE0910X02S100	18.2	.717	38	1.496	42.5	1.673	84	3.307	10	.394	1
9.129	.3594	23/64			2	●	MFE0913X02S100	18.3	.720	38	1.496	42.6	1.677	84	3.307	10	.394	1
9.200	.3622				2	●	MFE0920X02S100	18.4	.724	38	1.496	42.6	1.677	84	3.307	10	.394	1
9.300	.3661				2	●	MFE0930X02S100	18.6	.732	38	1.496	42.6	1.677	84	3.307	10	.394	1
9.348	.3680		U	7/16-14	2	●	MFE0935X02S100	18.7	.736	38	1.496	42.7	1.681	84	3.307	10	.394	1
9.400	.3701				2	●	MFE0940X02S100	18.8	.740	38	1.496	42.7	1.681	84	3.307	10	.394	1
9.500	.3740				2	●	MFE0950X02S100	19.0	.748	38	1.496	42.7	1.681	84	3.307	10	.394	1
9.525	.3750	3/8			2	●	MFE0953X02S100	19.1	.752	40	1.575	40.8	1.606	84	3.307	10	.394	1
9.600	.3780				2	●	MFE0960X02S100	19.2	.756	40	1.575	40.8	1.606	84	3.307	10	.394	1
9.700	.3819		Tube Sheet		2	●	MFE0970X02S100	19.4	.764	40	1.575	40.8	1.606	84	3.307	10	.394	1
9.800	.3858		W		2	●	MFE0980X02S100	19.6	.772	40	1.575	40.9	1.610	84	3.307	10	.394	1
9.900	.3898				2	●	MFE0990X02S100	19.8	.780	40	1.575	40.9	1.610	84	3.307	10	.394	1
9.922	.3907	25/64		7/16-20	2	●	MFE0992X02S100	19.8	.780	40	1.575	41.0	1.614	84	3.307	10	.394	1
10.000	.3937				2	●	MFE1000X02S100	20.0	.787	40	1.575	41.0	1.614	84	3.307	10	.394	1
10.100	.3976				2	●	MFE1010X02S120	20.2	.795	42	1.654	49.0	1.929	95	3.740	12	.472	1
10.200	.4016			M12x1.75	2	●	MFE1020X02S120	20.4	.803	42	1.654	49.1	1.933	95	3.740	12	.472	1
10.300	.4055				2	●	MFE1030X02S120	20.6	.811	42	1.654	49.1	1.933	95	3.740	12	.472	1
10.319	.4063	13/32			2	●	MFE1032X02S120	20.6	.811	42	1.654	49.2	1.937	95	3.740	12	.472	1
10.400	.4094				2	●	MFE1040X02S120	20.8	.819	42	1.654	49.2	1.937	95	3.740	12	.472	1
10.500	.4134		Z		2	●	MFE1050X02S120	21.0	.827	42	1.654	49.2	1.937	95	3.740	12	.472	1
10.600	.4173				2	●	MFE1060X02S120	21.2	.835	44	1.732	47.3	1.862	95	3.740	12	.472	1
10.700	.4213				2	●	MFE1070X02S120	21.4	.843	44	1.732	47.3	1.862	95	3.740	12	.472	1
10.716	.4219	27/64		1/2-13	2	●	MFE1072X02S120	21.4	.843	44	1.732	47.5	1.870	95	3.744	12	.472	1
10.800	.4252			M12x1.25	2	●	MFE1080X02S120	21.6	.850	44	1.732	47.4	1.866	95	3.740	12	.472	1
10.900	.4291				2	●	MFE1090X02S120	21.8	.858	44	1.732	47.4	1.866	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	45.5	1.791	95	3.740	12	.472	1
11.113	.4375	7/16			2	●	MFE1111X02S120	22.2	.874	46	1.811	45.6	1.795	95	3.740	12	.472	1

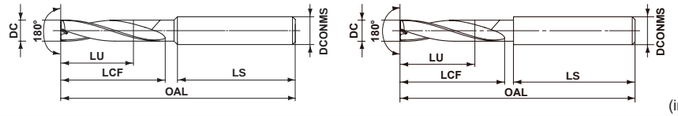
(inch)

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Stock DP1020	Order Number	LU mm	LU inch	LCF mm	LCF inch	LS mm	LS inch	OAL mm	OAL inch	DCONMS mm	DCONMS inch	Type
11.200	.4409				2	●	MFE1120X02S120	22.4	.882	46	1.811	45.6	1.795	95	3.740	12	.472	1
11.300	.4449				2	●	MFE1130X02S120	22.6	.890	46	1.811	45.6	1.795	95	3.740	12	.472	1
11.400	.4488				2	●	MFE1140X02S120	22.8	.898	46	1.811	45.7	1.799	95	3.740	12	.472	1
11.500	.4528				2	●	MFE1150X02S120	23.0	.906	46	1.811	45.7	1.799	95	3.740	12	.472	1
11.510	.4532	29/64		1/2-20	2	●	MFE1151X02S120	23.0	.906	48	1.890	43.8	1.724	95	3.740	12	.472	1
11.600	.4567				2	●	MFE1160X02S120	23.2	.913	48	1.890	43.8	1.724	95	3.740	12	.472	1
11.700	.4606				2	●	MFE1170X02S120	23.4	.921	48	1.890	43.8	1.724	95	3.740	12	.472	1
11.800	.4646				2	●	MFE1180X02S120	23.6	.929	48	1.890	43.9	1.728	95	3.740	12	.472	1
11.900	.4685				2	●	MFE1190X02S120	23.8	.937	48	1.890	43.9	1.728	95	3.740	12	.472	1
12.000	.4724			M14x2.0	2	●	MFE1200X02S120	24.0	.945	48	1.890	44.0	1.732	95	3.740	12	.472	1
12.304	.4844	31/64		9/16-12	2	●	MFE1230X02S140	24.6	.969	50	1.969	49.0	1.929	102	4.016	14	.551	2
12.500	.4921			M14x1.5	2	●	MFE1250X02S140	25.0	.984	50	1.969	49.0	1.929	102	4.016	14	.551	2
12.700	.5000	1/2			2	●	MFE1270X02S140	25.4	1.000	52	2.047	47.0	1.851	102	4.016	14	.551	2
13.000	.5118				2	●	MFE1300X02S140	26.0	1.024	52	2.047	47.0	1.851	102	4.016	14	.551	2
13.100	.5157			9/16-18	2	●	MFE1310X02S140	26.2	1.031	54	2.126	45.0	1.772	102	4.016	14	.551	2
13.500	.5315			5/8-11	2	●	MFE1350X02S140	27.0	1.063	54	2.126	45.0	1.772	102	4.016	14	.551	2
13.891	.5469	35/64			2	●	MFE1389X02S140	27.8	1.094	56	2.205	43.0	1.693	102	4.016	14	.551	2
14.000	.5512			M16x2.0	2	●	MFE1400X02S140	28.0	1.102	56	2.205	43.0	1.693	102	4.016	14	.551	2
14.288	.5625	9/16			2	●	MFE1429X02S160	28.6	1.126	58	2.283	50.0	1.968	111	4.370	16	.630	2
14.500	.5709			M16x1.5	2	●	MFE1450X02S160	29.0	1.142	58	2.283	50.0	1.968	111	4.370	16	.630	2
14.685	.5782	37/64		5/8-18	2	●	MFE1468X02S160	29.4	1.157	60	2.362	48.0	1.890	111	4.370	16	.630	2
15.000	.5906				2	●	MFE1500X02S160	30.0	1.181	60	2.362	48.0	1.890	111	4.370	16	.630	2
15.082	.5938	19/32			2	●	MFE1508X02S160	30.2	1.189	62	2.441	46.0	1.811	111	4.370	16	.630	2
15.479	.6094	39/64			2	●	MFE1548X02S160	31.0	1.220	62	2.441	46.0	1.811	111	4.370	16	.630	2
15.500	.6102			M18x2.5	2	●	MFE1550X02S160	31.0	1.220	62	2.441	46.0	1.811	111	4.370	16	.630	2
15.875	.6250	5/8			2	●	MFE1588X02S160	31.8	1.252	64	2.520	44.1	1.736	111	4.374	16	.630	2
16.000	.6299				2	●	MFE1600X02S160	32.0	1.260	64	2.520	44.0	1.732	111	4.370	16	.630	2
16.272	.6407	41/64			2	●	MFE1627X02S180	32.5	1.280	66	2.598	50.0	1.968	119	4.685	18	.709	2
16.500	.6496			M18x1.5	2	●	MFE1650X02S180	33.0	1.299	66	2.598	50.0	1.968	119	4.685	18	.709	2
16.669	.6563	21/32		3/4-10	2	●	MFE1667X02S180	33.3	1.311	68	2.677	48.0	1.890	119	4.685	18	.709	2
17.000	.6693		Tube Sheet		2	●	MFE1700X02S180	34.0	1.339	68	2.677	48.0	1.890	119	4.685	18	.709	2
17.066	.6719	43/64			2	●	MFE1707X02S180	34.1	1.343	70	2.756	46.0	1.811	119	4.685	18	.709	2
17.463	.6875	11/16		3/4-16	2	●	MFE1746X02S180	34.9	1.374	70	2.756	46.0	1.811	119	4.685	18	.709	2
17.500	.6890			M20x2.5	2	●	MFE1750X02S180	35.0	1.378	70	2.756	46.0	1.811	119	4.685	18	.709	2
17.860	.7032	45/64			2	●	MFE1786X02S180	35.7	1.406	72	2.835	44.0	1.732	119	4.685	18	.709	2
18.000	.7087				2	●	MFE1800X02S180	36.0	1.417	72	2.835	44.0	1.732	119	4.685	18	.709	2
18.257	.7188	23/32			2	●	MFE1826X02S200	36.5	1.437	74	2.913	50.0	1.969	127	5.000	20	.787	2
18.500	.7283			M20x1.5	2	●	MFE1850X02S200	37.0	1.457	74	2.913	50.0	1.969	127	5.000	20	.787	2
18.654	.7344	47/64			2	●	MFE1865X02S200	37.3	1.469	76	2.992	48.0	1.890	127	5.000	20	.787	2
19.000	.7480				2	●	MFE1900X02S200	38.0	1.496	76	2.992	48.0	1.890	127	5.000	20	.787	2
19.050	.7500	3/4			2	●	MFE1905X02S200	38.1	1.500	78	3.071	46.0	1.811	127	5.000	20	.787	2
19.254	.7580		Tube Sheet		2	●	MFE1925X02S200	38.5	1.516	78	3.071	46.0	1.811	127	5.000	20	.787	2

DC = Cutting Dia.
LU = Usable Length
LCF = Length Chip Flute
LS = Shank Length
OAL = Overall Length
DCONMS = Connection Dia. Machine Side

● : USA Stock

MFE



(inch)

DC					L/D	Stock	Order Number	LU		LCF		LS		OAL		DCONMS		Type
Metric (mm)	Decimal (inch)	Fraction (inch)	Wire / Letter	Thread Size		DP1020		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
19.447	**.7657**	**49/64**		**7/8-9**	2	●	**MFE1945X02S200**	38.9	1.531	78	3.071	46.0	1.811	127	5.000	20	.787	2
19.500	**.7677**			**M22x2.5**	2	●	**MFE1950X02S200**	39.0	1.535	78	3.071	46.0	1.811	127	5.000	20	.787	2
19.844	**.7813**	**25/32**			2	●	**MFE1984X02S200**	39.7	1.563	80	3.150	44.0	1.732	127	5.000	20	.787	2
20.000	**.7874**				2	●	**MFE2000X02S200**	40.0	1.575	80	3.150	44.0	1.732	127	5.000	20	.787	2

DC = Cutting Dia. **LCF** = Length Chip Flute **OAL** = Overall Length
LU = Usable Length **LS** = Shank Length **DCONMS** = Connection Dia. Machine Side

● : USA Stock

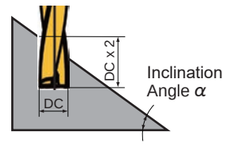
RECOMMENDED CUTTING CONDITIONS

(inch)

Workpiece Material		Mild Steel (≤180HB) AISI 1010 etc.		Carbon Steel, Alloy Steel (180—280HB) AISI 1045, 4140 etc.		Carbon Steel, Alloy Steel (280—350HB) AISI 4340 etc.	
DC inch	**DC** mm	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)
.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)

Workpiece Material		Austenitic Stainless Steel (≤200HB) AISI 304, 316 etc.		Gray Cast Iron (≤350MPa) AISI No45B etc.		Ductile Cast Iron (≤450MPa) AISI 60-40-18 etc.	
DC inch	**DC** mm	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)
.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)

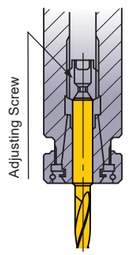
Workpiece Material		Aluminum Alloy (Si<5%) AISI 6061, 7075 etc.	
DC inch	**DC** mm	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)
.0295	0.75	330	.0008 (.0004—.0012)
.0394	1.0	330	.0008 (.0004—.0012)
.0591	1.5	330	.0008 (.0004—.0012)
.0787	2.0	360	.0020 (.0012—.0028)
.0984	2.5	360	.0024 (.0016—.0035)
.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 workpiece material when machining on an angled surface. (Refer to diagram)
Note 2) The cutting table above 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, reduce the feed rate by 30% or more as a guideline.
When the inclination angle α is greater than 30°, reduce the feed rate by 50% or more 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.

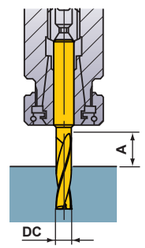
■Operational Guidance

Drill Holding



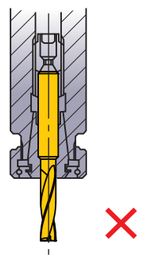
Thrust bearing type collet chuck holds the drill securely.

Drill Length



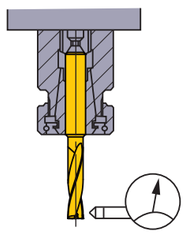
A > DC x 1.5

Drill Installation



Do not clamp on the flutes.

Installation Tolerance

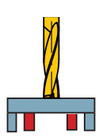


Run-out ≤ .0012 inch

Thin Workpiece

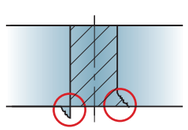
If Bending Occurs

OK



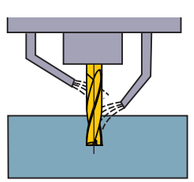
Support the Workpiece

Burring and Workpiece Chipping



①Lower the feed rate by 50% at the end of through cutting.
②Add a chamfer.

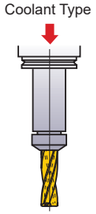
External Coolant Method



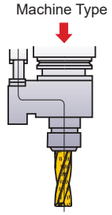
Two coolant positions, at the end and at the center are ideal.

Internal Coolant Method

Spindles Through Coolant Type

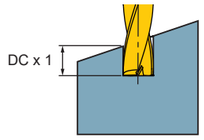


Revolving Coolant Machine Type



More than ø.118inch : 73-1015 PSI
More than 435 PSI is recommended.

Inclined Face Drilling



① When machining a deep hole into an inclined surface, use DFAS and MFE drill as a drill for a guide hole.
② Set the drill depth at approx. DC x 1 to obtain anaccurate guide hole.

Coolant Handling

<Internal Coolant Method>

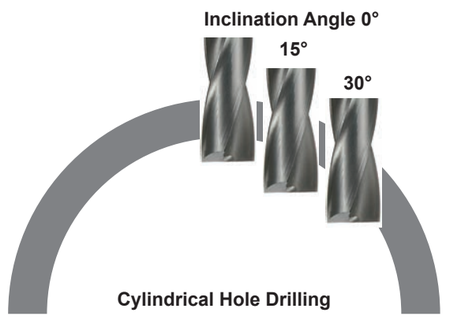
1) Small particles of swarf will jam in the oil hole of small diameter drills. Always use a fine mesh filter as a preventative measure.

2) Dirt and dust particles adhere to the oil in old coolant and prevent an efficient flow. Regular coolant exchange is recommended.

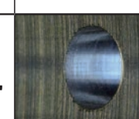
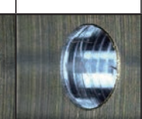
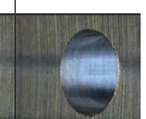
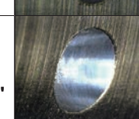
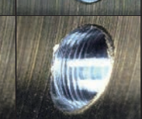
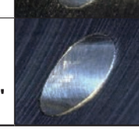
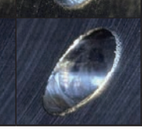
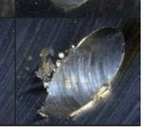
Cutting Performance

Comparison of Exit Burrs Generated in AISI 304

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

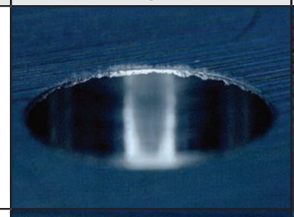
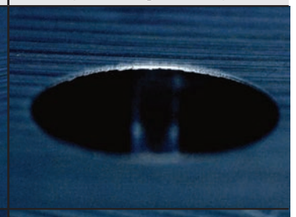
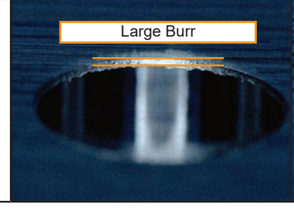


<Cutting Conditions>
Drill : MFE0200X02S040
Workpiece Material : AISI 304
Cutting Speed : **vc**=100 SFM
Feed per Rev. : **fr**=.0004 IPR
Cutting Mode : Wet Cutting
External Coolant (Water-soluble)
Machine : Vertical MC (BT40)

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

Comparison When Machining Thin Plates in AISI 4140

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

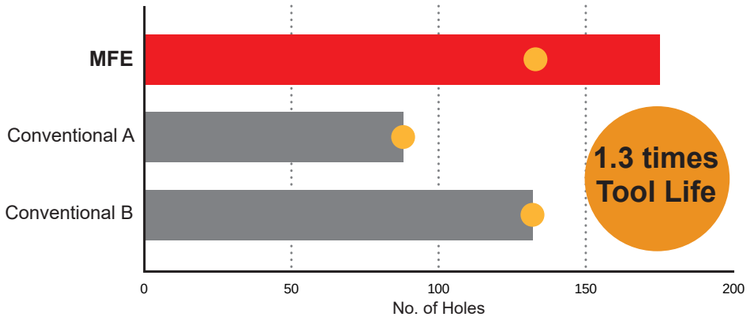
	Conventional (Point Angle = 140°)	MFE (Point Angle = 180°)
vc = 165 SFM **fr** = .0020 IPR		
vc = 260 SFM **fr** = .0059 IPR		

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

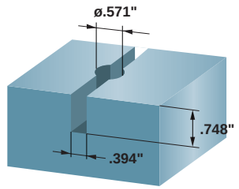
Cutting Performance

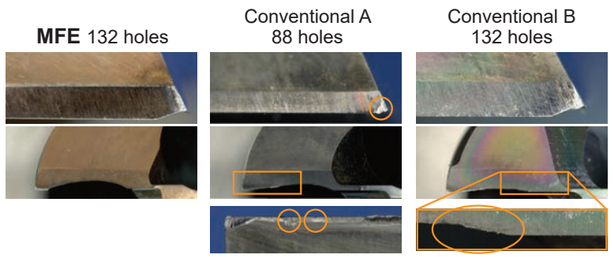
Comparison of Fracture Resistance in AISI 1050

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



Cutting Mode
Drilling of ø.571" in groove with a width of .394".



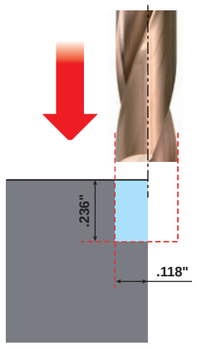


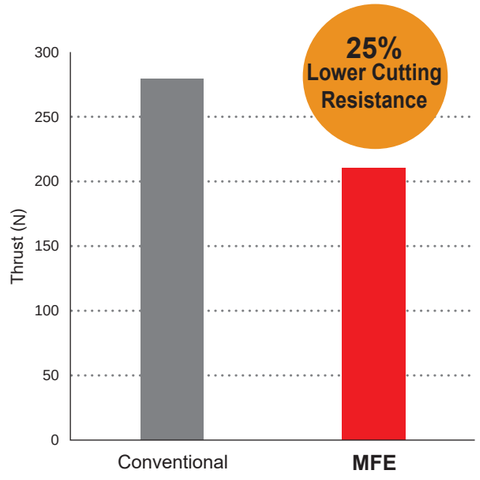
<Cutting Conditions>

Drill	: MFE1450X02S160
Workpiece 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.



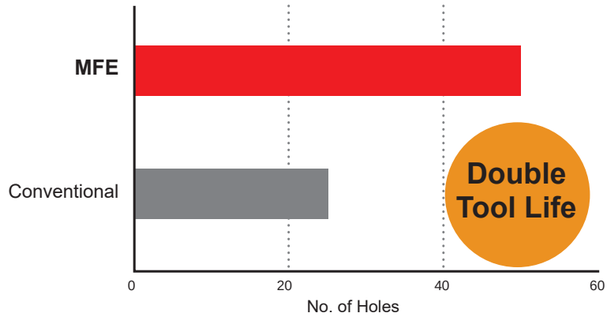


<Cutting Conditions>

Drill	: MFE0600X02S060
Workpiece Material	: AISI 1050
Hole Depth	: .236" (l=DC×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.

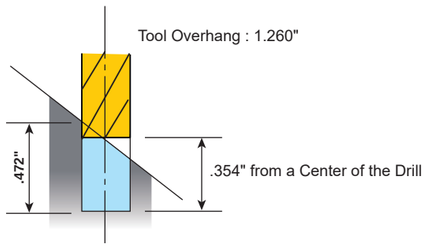


<Cutting Conditions>

Drill	: MFE0600X02S060
Workpiece Material	: AISI 304
Hole Depth	: .472" (l=DC×2)
Cutting Speed	: **vc**=115 SFM
Feed per Rev.	: **fr**=.0010 IPR
Cutting Mode	: Wet Cutting External Coolant (Water-soluble)
Machine	: Vertical MC (BT50)

MFE After **50** holes Machining

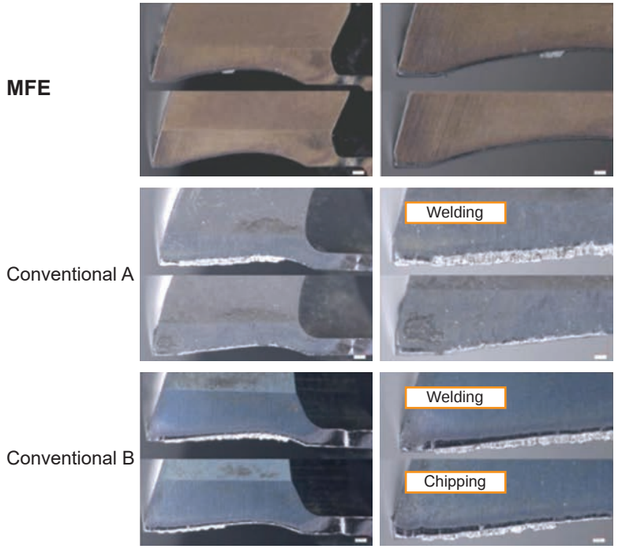
Conventional After **25** holes Machining



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

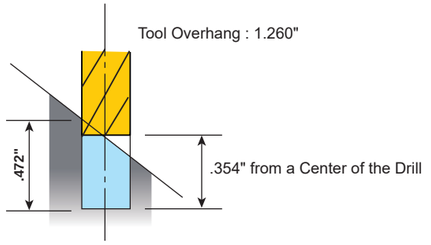
Controlled abnormal fracturing because of the excellent welding resistance properties.

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

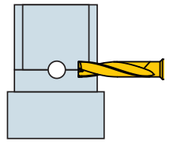
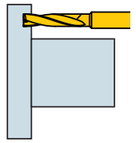
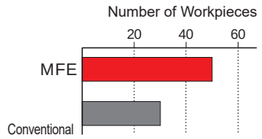
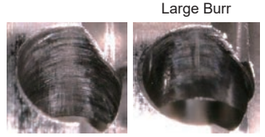
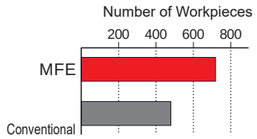


<Cutting Conditions>

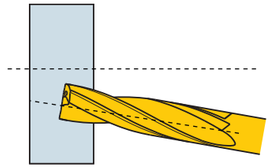
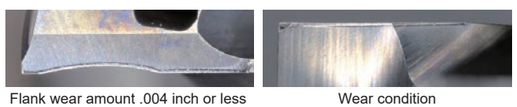
Drill	: MFE0600X02S060
Workpiece Material	: AISI 1045
Hole Depth	: .472" (l=DC×2)
Cutting Speed	: **vc**=165 SFM
Feed per Rev.	: **fr**=.0028 IPR
Cutting Mode	: Wet Cutting External Coolant (Water-soluble)



Application Example

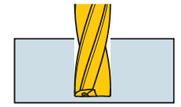
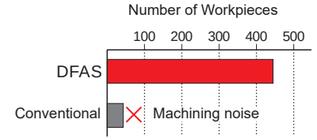
Drill		MFE1010X02S120	MFE0180X02S030	MFE0160X02S030
Workpiece		JIS SCM415 No Image	AISI 303 	AISI 440 Pilot Drilling 
Component		Ball Nut	Bolt	Nut
Cutting Conditions	Cutting Speed **vc** (SFM)	205	70	130
	Feed per Rev. **fr** (IPR)	.0016	.0006	.0004 – .0005
	Hole Depth (inch)	–	–	.197
Cutting Mode		Wet Cutting Extarnal Coolant (Water-soluble)	Wet Cutting Extarnal Coolant	Wet Cutting Extarnal Coolant
Machine		Vertical MC	Small Automatic Lathes	Horizontal MC
Results		 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.	Large Burr  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.	 The MFE is excellent at maintaining accuracy and the tool life becomes 1.5 times longer than conventional products.

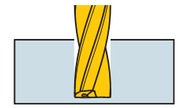
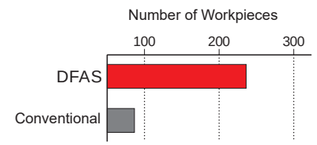
The above application examples are customer's applications, so it can be different from the recommended conditions.

Drill		DFAS0830X03S090
Workpiece		JIS FC250 
Component		Machine Parts
Cutting Conditions	Cutting Speed **vc** (SFM)	100
	Feed per Rev. **fr** (IPR)	.0020
	Hole Depth (inch)	.059
Cutting Mode		Wet Cutting Intarnal Coolant (Water-soluble) Blind hole with 10° angled surface
Machine		Horizontal MC
Results		After drilling the same number of holes (1230) as the conventional product, the wear damage was minimal thereby allowing machining to continue. After drilling 1230 holes  Flank wear amount .004 inch or less Wear condition

The above are customer's application examples, so can differ from the recommended conditions.

Application Example

Drill		DFAS0800X03S080
Workpiece		JIS S50C 
Component		Machine Parts
Cutting Conditions	Cutting Speed **vc** (SFM)	330
	Feed per Rev. **fr** (IPR)	.0047
	Hole Depth (inch)	.177
Cutting Mode		Wet Cutting Intarnal Coolant (Water-soluble) Step
Machine		MC
Results		Cutting noise was reduced and the number of holes drilled was increased by 700% when compared to a conventional product. The quality of the machined surface finish was also improved. 

Drill		DFAS1100X03S110
Workpiece		JIS SS400 
Component		Machine Parts
Cutting Conditions	Cutting Speed **vc** (SFM)	340
	Feed per Rev. **fr** (IPR)	.0047
	Hole Depth (inch)	1.063
Cutting Mode		Wet Cutting Intarnal Coolant (Water-soluble)
Machine		MC
Results		Cutting noise was reduced and the number of holes drilled was increased by 300% when compared to a conventional product. The quality of the machined surface finish was also improved. 

The above are customer's application examples, so can differ from the recommended conditions.

MTEC
MACHINING TECHNOLOGY & EDUCATION CENTER

Welcome to our new world-class Machining Technology and Education Center (MTEC) in Mooresville, NC providing year round support and services to North America.

ABOUT MTEC

TOOLING PROPOSALS & EVALUATION

We will review your current processes or outline a new process. From this review, we will improve productivity, analyze programming methods and output a solution with programming, tooling and time savings.

MACHINING SIMULATION

Using the latest CAD/CAM software and our cutting tool experience, we will outline a new process using proper machining techniques to maximize tool life and productivity.

TECHNICAL SUPPORT

Dedicated local professionals to answer any of your order, product or technical questions.

TRAINING

We are excited to offer several levels of training with goals to reach our highest level--Craftsman Machining Technology. At MTEC NC, we will train using a combination of classroom and hands-on machine time to develop skills and real-world understanding of materials, tools and applications. In addition to multi-day courses, we will have Machining Technology skills seminars, as well as seminars from our partners to complement our apprentice level courses, our journeyman courses, and up to our craftsman level courses.

PROCESS IMPROVEMENTS

Review of the complete part processing and recommend changes of speed, feed, new tooling, reduction of passes, modifying programming and other solutions to reduce cycle time, save money and be proactive.

ONLINE TRAINING

Our FREE e-learning program offers 11 courses in drilling, milling, turning, threading, tool grades and workpiece materials. Once each course is completed, you will be given the opportunity to print a certificate.

- Basic Drilling
- Basic Milling
- Basic Turning
- Advanced Drilling
- Advanced End Milling
- Advanced Turning
- Basic Threading
- Advanced Face Milling
- Basic Workpiece Materials
- Tool Grades
- Advanced Workpiece Materials

TRAINING COURSES

Programs are designed for several levels of skill development – from basic understanding to advance manufacturing with digital solutions, complementing to your valued experience in CNC machining environment. Participate in machining demonstrations with Mitsubishi Materials' skilled engineers. Discover methods to reduce setup and cycle time, optimize programs and enhance your knowledge base.

Information on course schedule, course description, and accommodations

MTECTRAINING.INFO

Follow the QR Code for a virtual facility tour

DIA EDGE

MITSUBISHI MATERIALS U.S.A. CORPORATION

California Office (Headquarters)

3535 Hyland Avenue, Suite 200
Costa Mesa, CA 92626
Customer Service: 800.523.0800
Technical Service: 800.486.2341

North Carolina-MTEC (Marketing & Technical Center)

105 Corporate Center Drive, Suite A
Mooresville, NC 28117
Main: 980.312.3100
Fax: 704.746.9292

Chicago Office (Engineering)

300 N. Martingale Road, Suite 500
Schaumburg, IL 60173
Main: 847.252.6300
Fax: 847.519.1732

Toronto Office (Canada Branch)

600 Matheson Blvd. Unit 5 (Office)
Mississauga, ON L5R 4C1
Main: 905.814.0240
Fax: 905.814.0245

MMC Metal de Mexico, S.A. DE C.V.

Av. La Cañada No.16,
Parque Industrial Bernardo
Quintana, El Marques,
Queretaro C.P. 76246 MEXICO
Main: +52.442.221.61.36
Fax: +52.442.221.61.34

Detroit Office (Moldino CS)

41700 Gardenbrook Road, Suite 120
Novi, MI 48375
Main: 248.308.2620
Fax: 248.308.2627

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 attaching inserts or spare parts, please use only the correct wrench or driver.
- When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

MITSUBISHI MATERIALS U.S.A.

Product Brands Crafted by Mitsubishi Materials U.S.A.

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Tools specifications subject to change without notice.

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