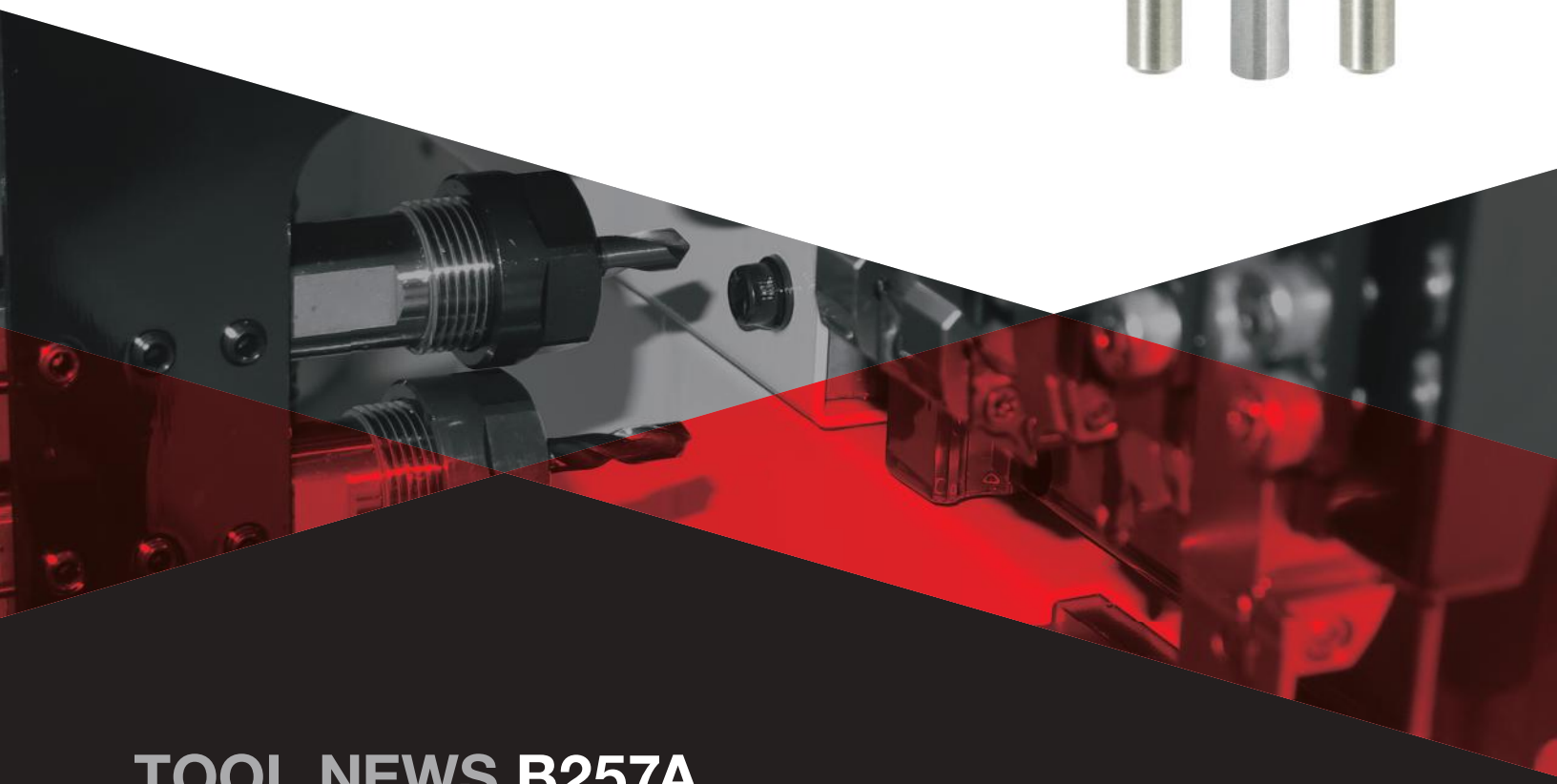
MITSUBISHI MATERIALS

DWAE

WSTAR Drill Series

SOLID CARBIDE DRILL FOR
SWISS-TYPE AUTOMATIC &
SMALL CNC LATHES





TOOL NEWS **B257A**

Solid Carbide Drill for Swiss-type Automatic & Small CNC Lathes

WSTAR Drill Series

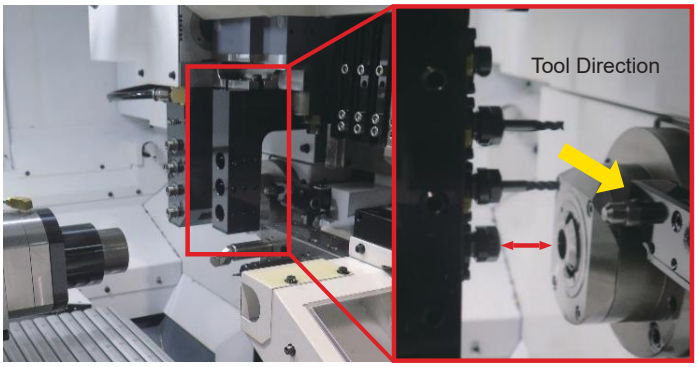
DWAE

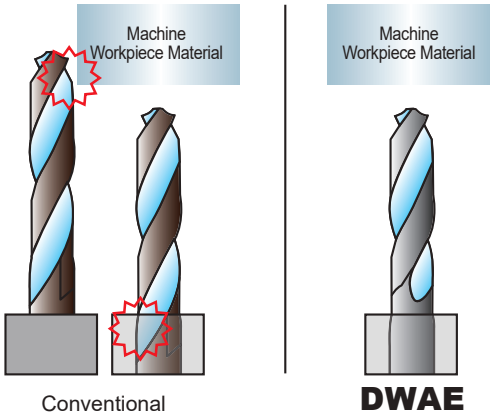
3.0mm–14.0mm (.1181"–.5512")

Features

Optimal Flute Length

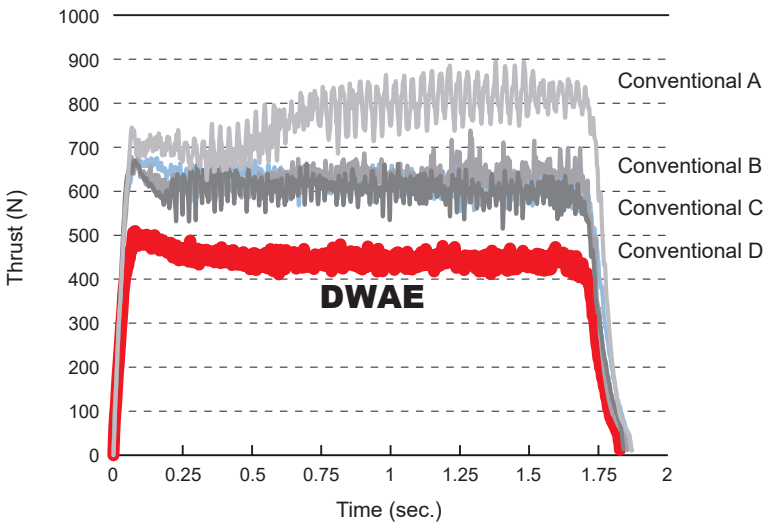
External coolant type carbide drill with ideal tool length for Swiss-type automatic and small CNC lathes.



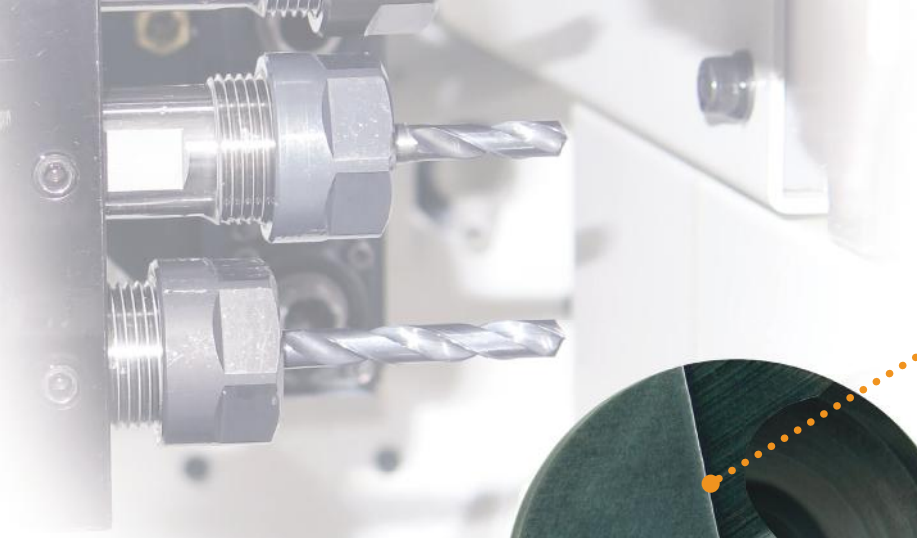


Low Cutting Resistance Design

Low cutting resistance design provides for highly stable drilling even in situations where rigidity of workpiece material and or clamping is difficult to secure.

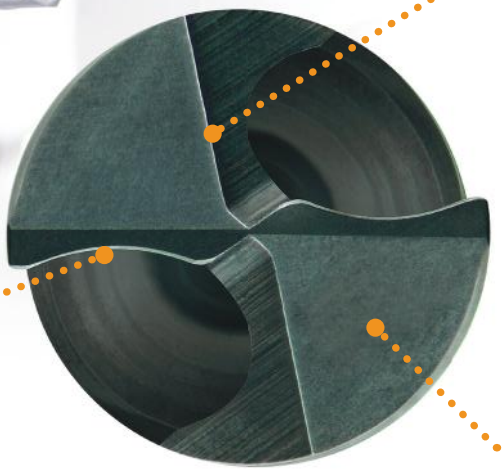


<Cutting Conditions>
Workpiece Material : AISI 1010
Tool : DWAE0600X04S060
Cutting Speed : vc= 260 SFM
Feed per Rev. : fr= .008 IPR
Hole Depth : .945"
Cutting Mode : Wet Cutting
External Coolant
(Water-soluble Coolants)



Z Thinning

The proprietary web thinning geometry ensures wide space for chip evacuation and offers low cutting resistance.



Wave Cutting Edge

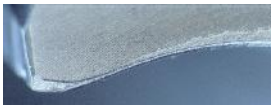
The wave cutting edge provides both sharpness and cutting edge strength, resisting wear to outer cutting edge, which is easily damaged with conventional drills, while efficiently cutting chips into smaller pieces.

Coated Grade DP102A

DP102A coated grade provides excellent lubricity and long-term durability, achieving excellent wear resistance at low-medium cutting speeds.

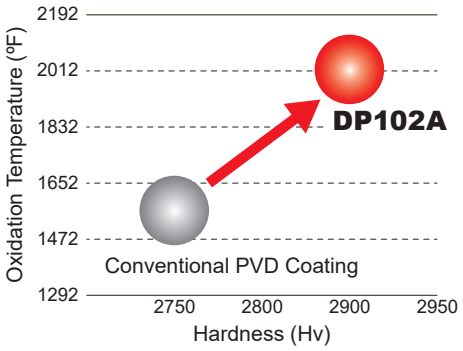
Wear comparison when drilling AISI 1050

DWAE



Conventional







Flute Shape

Specially designed flute shape breaks up chips into smaller pieces preventing them from clogging during drilling operations.

Optimal Flute Length for Swiss-type Automatic and Small CNC Lathes

The flute length has been specifically engineered to meet the compact needs and limited machining space requirements of small CNC lathes with a lineup of shanks compatible with ER collet mounting available.

DCON(Connection Diameter) .197 inch=ER8
DCON .276 inch=ER11

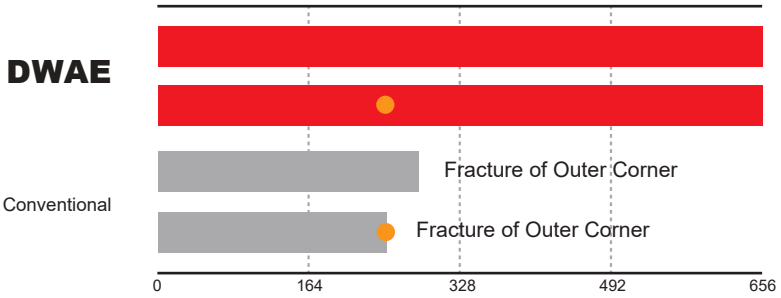
ZERO-μ Surface

A smoothing surface treatment is applied to the drill surface further reducing cutting resistance while facilitating excellent chip evacuation.

Cutting Performance

AISI 1050 Fracture Resistance Comparison

DP102A offers excellent lubricity and heat resistance, providing more fracture resistance and achieving longer tool life than conventional drills under medium cutting speed conditions making stable machining possible even with external coolant.





DWAE

Conventional

<Cutting Conditions>
Workpiece Material : AISI 1050
Tool : DWAE0600X04S060
Cutting Speed : vc= 260 SFM
Feed per Rev. : fr= .008 IPR
Hole Depth : .945"
Cutting Mode : Wet Cutting
External Coolant
(Water-soluble Coolants)

AISI1010 Chips Comparison

DWAE specially designed to break up chips into smaller pieces to prevent flutes from clogging during machining operations.



DWAE

<Cutting Conditions>
Workpiece Material : AISI 1010
Tool : DWAE0600X04S060
Cutting Speed : vc= 195 SFM
Feed per Rev. : fr= .012 IPR
Hole Depth : .945"
Cutting Mode : Wet Cutting
External Coolant
(Water-soluble Coolants)



Conventional A



Conventional B

Solid Carbide Drills for Swiss-type Automatic & Small CNC Lathes

WSTAR Drill Series

DWAE

NEW

Mini Size 1.0mm–2.9mm (.0394"– .1142")

Featuring High Precision and Long Tool Life for Small Diameter Drilling



New Cutting Edge Treatment That Achieves Both Sharpness and Durability

Mitsubishi's new proprietary cutting edge treatment maintains the stability of the cutting edge while exhibiting excellent fracture and wear resistance.

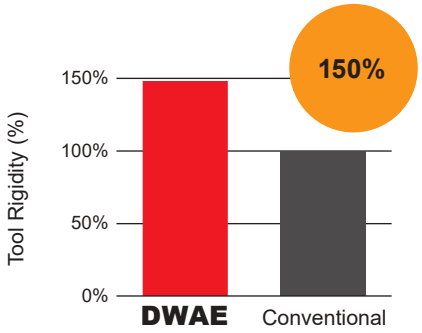
Coated Grade DP102A

DP102A coated grade provides excellent lubricity and long-term durability, achieving excellent wear resistance at low to medium cutting speeds.

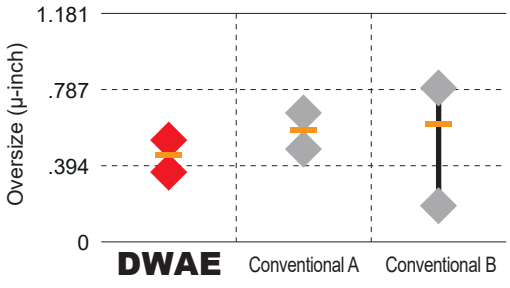
Unique Flute Form for Greater Rigidity

The Mini Size is uniquely designed for rigidity and good chip evacuation by minimizing the neck length. A chip discharge area is provided through the taper neck. This increases tool rigidity by 50% compared to conventional drills and also improves hole positional accuracy.





<Analysis Conditions>
Analysis Model : DC=2mm (.0787"), L/D=4
Overall Length : OAL = 50mm (1.969")
Load : Distributed load of 130N in Z axis direction.

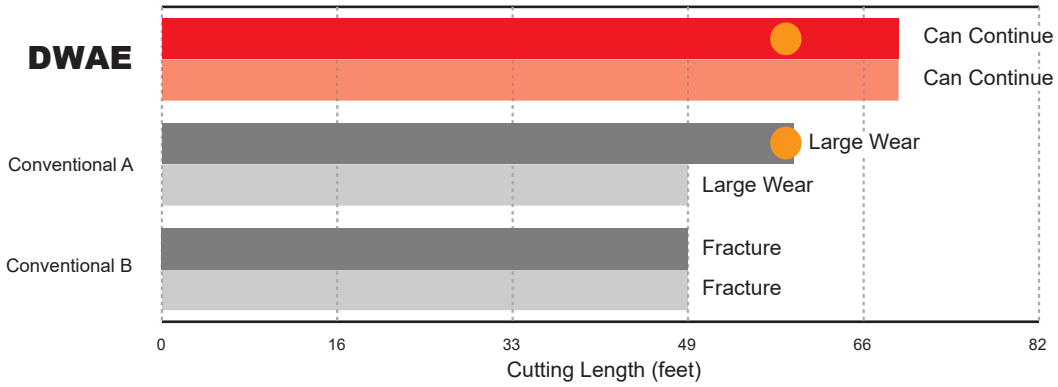


<Cutting Conditions>
Workpiece Material : AISI 1010
Tool : DC=2mm (.0787"), L/D=4
Cutting Speed : vc= 100 SFM
Feed per Rev. : fr= .0016 IPR
Hole Depth : .315 inch
Cutting Mode : Water-soluble Coolants

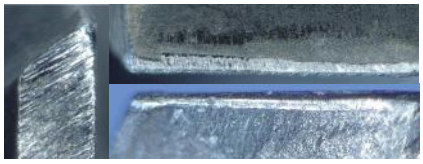
Cutting Performance

Wear Resistance Comparison when drilling AISI 420

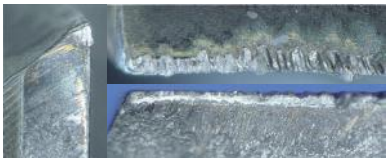
By combining DP102A and a new cutting edge treatment, durability and long tool life have been achieved when drilling with an external coolant supply.



Cutting Length 59 feet



DWAE

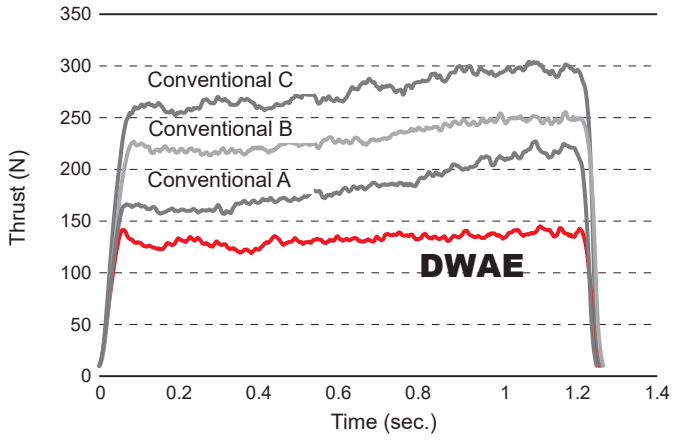


Conventional A

<Cutting Conditions>
Workpiece Material : AISI 420
Tool : DWAE0200X04S040
Cutting Speed : vc= 100 SFM
Feed per Rev. : fr= .0018 IPR
Hole Depth : .315 inch
Cutting Mode : Wet Cutting
External Coolant
(Water-soluble Coolants)

Cutting Resistance Comparison when drilling AISI 420

DWAE attains low thrust resistance compared to conventional products.



<Cutting Conditions>
Workpiece Material : AISI 420
Tool : DWAE0200X04S040
Cutting Speed : vc= 130 SFM
Feed per Rev. : fr= .0024 IPR
Hole Depth : .315 inch
Cutting Mode : Wet Cutting
External Coolant
(Water-soluble Coolants)

DWAE

Mini Size **NEW**

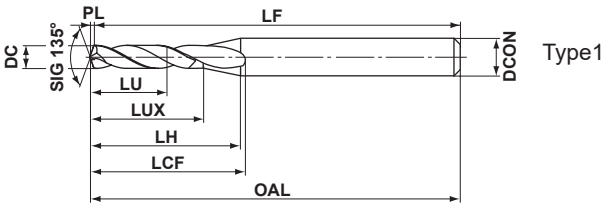
UWC | DP1A | 135° | XR DC<.0787 | X DC≥.0787

P **M** **K** N S H

External Coolant



DC<.0787 DC≥.0787



Type1

DC≤.1181				
$^{0}_{-}$.00055				
DCON=.1181	DCON=.1575			
$^{0}_{-}$.00024	$^{0}_{-}$.00031			

DC				L/D	Coolant (Int./Ext.)	Order Number	Stock	LU		LUX		LCF		LH		OAL		LF		PL		DCON		Type
Metric (mm)	Decimal (inch)	Wire / Letter	Thread Size				DP102A	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
1.0	.0394			2	Ext.	DWAE0100X02S030	●	2.2	.087	5.0	.197	7.7	.303	8.7	.343	45	1.772	44.8	1.764	0.2	.008	3	.118	1
				4	Ext.	DWAE0100X04S030	●	4.2	.165	7.0	.276	9.9	.390	10.7	.421	45	1.772	44.8	1.764	0.2	.008	3	.118	1
1.1	.0433			2	Ext.	DWAE0110X02S030	●	2.4	.094	5.4	.213	8.1	.319	8.9	.350	45	1.772	44.8	1.764	0.2	.008	3	.118	1
				4	Ext.	DWAE0110X04S030	●	4.6	.181	7.6	.299	10.5	.413	11.1	.437	45	1.772	44.8	1.764	0.2	.008	3	.118	1
1.2	.0472			2	Ext.	DWAE0120X02S030	●	2.6	.102	5.8	.228	8.5	.335	9.2	.362	45	1.772	44.8	1.764	0.2	.008	3	.118	1
				4	Ext.	DWAE0120X04S030	●	5.0	.197	8.2	.323	11.1	.437	11.6	.457	45	1.772	44.8	1.764	0.2	.008	3	.118	1
1.3	.0512			2	Ext.	DWAE0130X02S030	●	2.9	.114	6.3	.248	9.0	.354	9.5	.374	45	1.772	44.7	1.760	0.3	.012	3	.118	1
				4	Ext.	DWAE0130X04S030	●	5.5	.217	8.9	.350	11.9	.469	12.1	.476	45	1.772	44.7	1.760	0.3	.012	3	.118	1
1.4	.0551			2	Ext.	DWAE0140X02S030	●	3.1	.122	6.7	.264	9.4	.370	9.7	.382	45	1.772	44.7	1.760	0.3	.012	3	.118	1
				4	Ext.	DWAE0140X04S030	●	5.9	.232	9.5	.374	12.5	.492	12.5	.492	45	1.772	44.7	1.760	0.3	.012	3	.118	1
1.5	.0591		#1-64	2	Ext.	DWAE0150X02S030	●	3.3	.130	7.1	.280	9.8	.386	9.9	.390	45	1.772	44.7	1.760	0.3	.012	3	.118	1
				4	Ext.	DWAE0150X04S030	●	6.3	.248	10.1	.398	13.1	.516	12.9	.508	45	1.772	44.7	1.760	0.3	.012	3	.118	1
1.6	.0630			2	Ext.	DWAE0160X02S030	●	3.5	.138	7.5	.295	10.2	.402	10.1	.398	45	1.772	44.7	1.760	0.3	.012	3	.118	1
				4	Ext.	DWAE0160X04S030	●	6.7	.264	10.7	.421	13.7	.539	13.3	.524	45	1.772	44.7	1.760	0.3	.012	3	.118	1
1.7	.0669			2	Ext.	DWAE0170X02S030	●	3.8	.150	8.0	.315	10.7	.421	10.4	.409	45	1.772	44.6	1.756	0.4	.016	3	.118	1
				4	Ext.	DWAE0170X04S030	●	7.2	.283	11.4	.449	14.4	.567	13.8	.543	45	1.772	44.6	1.756	0.4	.016	3	.118	1
1.8	.0709			2	Ext.	DWAE0180X02S030	●	4.0	.157	8.4	.331	11.1	.437	10.6	.417	45	1.772	44.6	1.756	0.4	.016	3	.118	1
				4	Ext.	DWAE0180X04S030	●	7.6	.299	12.0	.472	15.1	.594	14.2	.559	45	1.772	44.6	1.756	0.4	.016	3	.118	1
1.9	.0748			2	Ext.	DWAE0190X02S030	●	4.2	.165	8.8	.346	11.5	.453	10.9	.429	45	1.772	44.6	1.756	0.4	.016	3	.118	1
				4	Ext.	DWAE0190X04S030	●	8.0	.315	12.6	.496	15.7	.618	14.7	.579	45	1.772	44.6	1.756	0.4	.016	3	.118	1
2.0	.0787		#3-48	2	Ext.	DWAE0200X02S040	●	4.4	.173	9.2	.362	12.8	.504	12.9	.508	50	1.969	49.6	1.953	0.4	.016	4	.157	1
				4	Ext.	DWAE0200X04S040	●	8.4	.331	13.2	.520	17.2	.677	16.9	.665	50	1.969	49.6	1.953	0.4	.016	4	.157	1
2.1	.0827			2	Ext.	DWAE0210X02S040	●	4.6	.181	9.6	.378	13.2	.520	13.1	.516	50	1.969	49.6	1.953	0.4	.016	4	.157	1
				4	Ext.	DWAE0210X04S040	●	8.8	.346	13.8	.543	17.8	.701	17.3	.681	50	1.969	49.6	1.953	0.4	.016	4	.157	1
2.2	.0866			2	Ext.	DWAE0220X02S040	●	4.9	.193	10.1	.398	13.7	.539	13.5	.531	50	1.969	49.5	1.949	0.5	.020	4	.157	1
				4	Ext.	DWAE0220X04S040	●	9.3	.366	14.5	.571	18.5	.728	17.9	.705	50	1.969	49.5	1.949	0.5	.020	4	.157	1
2.3	.0906			2	Ext.	DWAE0230X02S040	●	5.1	.201	10.5	.413	14.1	.555	13.7	.539	50	1.969	49.5	1.949	0.5	.020	4	.157	1
				4	Ext.	DWAE0230X04S040	●	9.7	.382	15.1	.594	19.2	.756	18.3	.720	50	1.969	49.5	1.949	0.5	.020	4	.157	1
2.4	.0945			2	Ext.	DWAE0240X02S040	●	5.3	.209	10.9	.429	14.5	.571	13.9	.547	50	1.969	49.5	1.949	0.5	.020	4	.157	1
				4	Ext.	DWAE0240X04S040	●	10.1	.398	15.7	.618	19.8	.780	18.7	.736	50	1.969	49.5	1.949	0.5	.020	4	.157	1
2.5	.0984			2	Ext.	DWAE0250X02S040	●	5.5	.217	11.3	.445	14.9	.587	14.1	.555	50	1.969	49.5	1.949	0.5	.020	4	.157	1
				4	Ext.	DWAE0250X04S040	●	10.5	.413	16.3	.642	20.4	.803	19.1	.752	50	1.969	49.5	1.949	0.5	.020	4	.157	1
2.6	.1024			2	Ext.	DWAE0260X02S040	●	5.7	.224	11.7	.461	15.3	.602	14.3	.563	50	1.969	49.5	1.949	0.5	.020	4	.157	1
				4	Ext.	DWAE0260X04S040	●	10.9	.429	16.9	.665	21.0	.827	19.5	.768	50	1.969	49.5	1.949	0.5	.020	4	.157	1
2.7	.1063	36	#6-32	2	Ext.	DWAE0270X02S040	●	6.0	.236	12.2	.480	15.8	.622	14.6	.575	50	1.969	49.4	1.945	0.6	.024	4	.157	1
				4	Ext.	DWAE0270X04S040	●	11.4	.449	17.6	.693	21.7	.854	20.0	.787	50	1.969	49.4	1.945	0.6	.024	4	.157	1
2.8	.1102	35		2	Ext.	DWAE0280X02S040	●	6.2	.244	12.6	.496	16.2	.638	14.8	.583	50	1.969	49.4	1.945	0.6	.024	4	.157	1
				4	Ext.	DWAE0280X04S040	●	11.8	.465	18.2	.717	22.4	.882	20.4	.803	50	1.969	49.4	1.945	0.6	.024	4	.157	1
2.9	.1142			2	Ext.	DWAE0290X02S040	●	6.4	.252	13.0	.512	16.6	.654	15.1	.594	50	1.969	49.4	1.945	0.6	.024	4	.157	1
				4	Ext.	DWAE0290X04S040	●	12.2	.480	18.8	.740	23.0	.906	20.9	.823	50	1.969	49.4	1.945	0.6	.024	4	.157	1

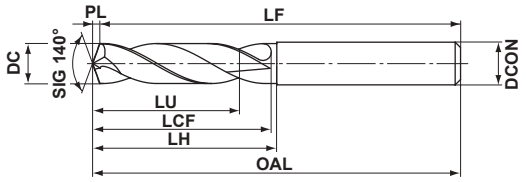
DC = Cutting Diameter **LCF** = Length Chip Flute **LF** = Functional Length
LU = Usable Length **LH** = Neck Length **PL** = Point Length
LUX = Max. Usable Length **OAL** = Overall Length **DCON** = Connection Diameter

● : USA Stock

DWAE

P M K N S H



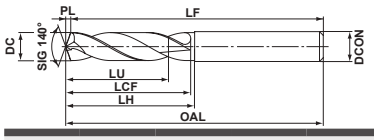


Type1

DC=.1181	.1181<DC≤.2362	.2362<DC≤.3937	.3937<DC≤.5512
0 −.00055	0 −.00071	0 −.00087	0 −.00106
DCON=.1181	.1181<DCON≤.2362	.2362<DCON≤.3937	.3937<DCON≤.5512
0 −.00024	0 −.00031	0 −.00035	0 −.00043

DC					L/D	Coolant (Int./Ext.)	Order Number	Stock	LU		LCF		LH		OAL		LF		PL		DCON		Type
Metric (mm)	Decimal (inch)	Fraction (inch)	Wire / Letter	Thread Size				DP102A	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
3.0	.1181				2	Ext.	DWAE0300X02S030	●	6.5	.256	12.5	.492	14.5	.571	45.5	1.791	45	1.772	0.5	.020	3	.118	1
					4	Ext.	DWAE0300X04S030	●	12.5	.492	21.5	.846	23.5	.925	55.5	2.185	55	2.165	0.5	.020	3	.118	1
3.1	.1220				2	Ext.	DWAE0310X02S040	●	6.8	.268	12.6	.496	14.6	.575	55.6	2.189	55	2.165	0.6	.024	4	.157	1
					4	Ext.	DWAE0310X04S040	●	13.0	.512	21.6	.850	23.6	.929	60.6	2.386	60	2.362	0.6	.024	4	.157	1
3.2	.1260				2	Ext.	DWAE0320X02S040	●	7.0	.276	13.6	.535	15.6	.614	55.6	2.189	55	2.165	0.6	.024	4	.157	1
					4	Ext.	DWAE0320X04S040	●	13.4	.528	22.6	.890	24.6	.969	60.6	2.386	60	2.362	0.6	.024	4	.157	1
3.3	.1299			M4x.7	2	Ext.	DWAE0330X02S040	●	7.2	.283	13.6	.535	15.6	.614	55.6	2.189	55	2.165	0.6	.024	4	.157	1
					4	Ext.	DWAE0330X04S040	●	13.8	.543	23.6	.929	25.6	1.008	60.6	2.386	60	2.362	0.6	.024	4	.157	1
3.4	.1339				2	Ext.	DWAE0340X02S040	●	7.4	.291	13.6	.535	15.6	.614	55.6	2.189	55	2.165	0.6	.024	4	.157	1
					4	Ext.	DWAE0340X04S040	●	14.2	.559	23.6	.929	25.6	1.008	60.6	2.386	60	2.362	0.6	.024	4	.157	1
3.5	.1378				2	Ext.	DWAE0350X02S040	●	7.6	.299	14.6	.575	16.6	.654	55.6	2.189	55	2.165	0.6	.024	4	.157	1
					4	Ext.	DWAE0350X04S040	●	14.6	.575	24.6	.969	26.6	1.047	60.6	2.386	60	2.362	0.6	.024	4	.157	1
3.6	.1417				2	Ext.	DWAE0360X02S040	●	7.9	.311	14.7	.579	16.7	.657	55.7	2.193	55	2.165	0.7	.028	4	.157	1
					4	Ext.	DWAE0360X04S040	●	15.1	.594	25.7	1.012	27.7	1.091	60.7	2.390	60	2.362	0.7	.028	4	.157	1
3.7	.1457			M4.5x.75	2	Ext.	DWAE0370X02S040	●	8.1	.319	14.7	.579	16.7	.657	55.7	2.193	55	2.165	0.7	.028	4	.157	1
					4	Ext.	DWAE0370X04S040	●	15.5	.610	25.7	1.012	27.7	1.091	60.7	2.390	60	2.362	0.7	.028	4	.157	1
3.8	.1496		25	#10-24	2	Ext.	DWAE0380X02S040	●	8.3	.327	15.7	.618	17.7	.697	55.7	2.193	55	2.165	0.7	.028	4	.157	1
					4	Ext.	DWAE0380X04S040	●	15.9	.626	26.7	1.051	28.7	1.130	60.7	2.390	60	2.362	0.7	.028	4	.157	1
3.9	.1535				2	Ext.	DWAE0390X02S040	●	8.5	.335	15.7	.618	17.7	.697	55.7	2.193	55	2.165	0.7	.028	4	.157	1
					4	Ext.	DWAE0390X04S040	●	16.3	.642	27.7	1.091	29.7	1.169	60.7	2.390	60	2.362	0.7	.028	4	.157	1
4.0	.1575				2	Ext.	DWAE0400X02S040	●	8.7	.343	15.7	.618	17.7	.697	55.7	2.193	55	2.165	0.7	.028	4	.157	1
					4	Ext.	DWAE0400X04S040	●	16.7	.657	27.7	1.091	29.7	1.169	60.7	2.390	60	2.362	0.7	.028	4	.157	1
4.1	.1614				2	Ext.	DWAE0410X02S050	●	8.9	.350	16.7	.657	18.7	.736	62.7	2.469	62	2.441	0.7	.028	5	.197	1
					4	Ext.	DWAE0410X04S050	●	17.1	.673	28.7	1.130	30.7	1.209	80.7	3.177	80	3.150	0.7	.028	5	.197	1
4.2	.1654			M5x.8	2	Ext.	DWAE0420X02S050	●	9.2	.362	16.8	.661	18.8	.740	62.8	2.472	62	2.441	0.8	.031	5	.197	1
					4	Ext.	DWAE0420X04S050	●	17.6	.693	29.8	1.173	31.8	1.252	80.8	3.181	80	3.150	0.8	.031	5	.197	1
4.3	.1693				2	Ext.	DWAE0430X02S050	●	9.4	.370	17.8	.701	19.8	.780	62.8	2.472	62	2.441	0.8	.031	5	.197	1
					4	Ext.	DWAE0430X04S050	●	18.0	.709	30.8	1.213	32.8	1.291	80.8	3.181	80	3.150	0.8	.031	5	.197	1
4.4	.1732		17		2	Ext.	DWAE0440X02S050	●	9.6	.378	17.8	.701	19.8	.780	62.8	2.472	62	2.441	0.8	.031	5	.197	1
					4	Ext.	DWAE0440X04S050	●	18.4	.724	30.8	1.213	32.8	1.291	80.8	3.181	80	3.150	0.8	.031	5	.197	1
4.5	.1772		16	#12-24	2	Ext.	DWAE0450X02S050	●	9.8	.386	17.8	.701	19.8	.780	62.8	2.472	62	2.441	0.8	.031	5	.197	1
					4	Ext.	DWAE0450X04S050	●	18.8	.740	31.8	1.252	33.8	1.331	80.8	3.181	80	3.150	0.8	.031	5	.197	1

● : USA Stock



Type1

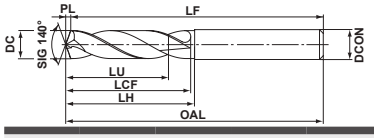
DC					L/D	Coolant (Int./Ext.)	Order Number	Stock	LU		LCF		LH		OAL		LF		PL		DCON		Type
Metric (mm)	Decimal (inch)	Fraction	Wire / Letter	Thread Size				DP102A	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
4.6	.1811				2	Ext.	DWAE0460X02S050	●	10.0	.394	18.8	.740	20.8	.819	62.8	2.472	62	2.441	0.8	.031	5	.197	1
					4	Ext.	DWAE0460X04S050	●	19.2	.756	32.8	1.291	34.8	1.370	80.8	3.181	80	3.150	0.8	.031	5	.197	1
4.7	.1850		13		2	Ext.	DWAE0470X02S050	●	10.3	.406	18.9	.744	20.9	.823	62.9	2.476	62	2.441	0.9	.035	5	.197	1
					4	Ext.	DWAE0470X04S050	●	19.7	.776	32.9	1.295	34.9	1.374	80.9	3.185	80	3.150	0.9	.035	5	.197	1
4.8	.1890		12		2	Ext.	DWAE0480X02S050	●	10.5	.413	18.9	.744	20.9	.823	62.9	2.476	62	2.441	0.9	.035	5	.197	1
					4	Ext.	DWAE0480X04S050	●	20.1	.791	33.9	1.335	35.9	1.413	80.9	3.185	80	3.150	0.9	.035	5	.197	1
4.9	.1929				2	Ext.	DWAE0490X02S050	●	10.7	.421	19.9	.783	21.9	.862	62.9	2.476	62	2.441	0.9	.035	5	.197	1
					4	Ext.	DWAE0490X04S050	●	20.5	.807	34.9	1.374	36.9	1.453	80.9	3.185	80	3.150	0.9	.035	5	.197	1
5.0	.1969			M6x1.0	2	Ext.	DWAE0500X02S050	●	10.9	.429	19.9	.783	21.9	.862	62.9	2.476	62	2.441	0.9	.035	5	.197	1
					4	Ext.	DWAE0500X04S050	●	20.9	.823	34.9	1.374	36.9	1.453	80.9	3.185	80	3.150	0.9	.035	5	.197	1
5.1	.2008		7	1/4-20	2	Ext.	DWAE0510X02S060	●	11.1	.437	21.9	.862	23.9	.941	66.9	2.634	66	2.598	0.9	.035	6	.236	1
					4	Ext.	DWAE0510X04S060	●	21.3	.839	35.9	1.413	37.9	1.492	80.9	3.185	80	3.150	0.9	.035	6	.236	1
5.2	.2047				2	Ext.	DWAE0520X02S060	●	11.3	.445	21.9	.862	23.9	.941	66.9	2.634	66	2.598	0.9	.035	6	.236	1
					4	Ext.	DWAE0520X04S060	●	21.7	.854	36.9	1.453	38.9	1.531	80.9	3.185	80	3.150	0.9	.035	6	.236	1
5.3	.2087		4		2	Ext.	DWAE0530X02S060	●	11.6	.457	22.0	.866	24.0	.945	67.0	2.638	66	2.598	1.0	.039	6	.236	1
					4	Ext.	DWAE0530X04S060	●	22.2	.874	37.0	1.457	39.0	1.535	81.0	3.189	80	3.150	1.0	.039	6	.236	1
5.4	.2126		3	1/4-28	2	Ext.	DWAE0540X02S060	●	11.8	.465	22.0	.866	24.0	.945	67.0	2.638	66	2.598	1.0	.039	6	.236	1
					4	Ext.	DWAE0540X04S060	●	22.6	.890	38.0	1.496	40.0	1.575	81.0	3.189	80	3.150	1.0	.039	6	.236	1
5.5	.2165				2	Ext.	DWAE0550X02S060	●	12.0	.472	22.0	.866	24.0	.945	67.0	2.638	66	2.598	1.0	.039	6	.236	1
					4	Ext.	DWAE0550X04S060	●	23.0	.906	39.0	1.535	41.0	1.614	81.0	3.189	80	3.150	1.0	.039	6	.236	1
5.6	.2205		2		2	Ext.	DWAE0560X02S060	●	12.2	.480	24.0	.945	26.0	1.024	67.0	2.638	66	2.598	1.0	.039	6	.236	1
					4	Ext.	DWAE0560X04S060	●	23.4	.921	39.0	1.535	41.0	1.614	81.0	3.189	80	3.150	1.0	.039	6	.236	1
5.7	.2244				2	Ext.	DWAE0570X02S060	●	12.4	.488	24.0	.945	26.0	1.024	67.0	2.638	66	2.598	1.0	.039	6	.236	1
					4	Ext.	DWAE0570X04S060	●	23.8	.937	39.0	1.535	41.0	1.614	81.0	3.189	80	3.150	1.0	.039	6	.236	1
5.8	.2283		1		2	Ext.	DWAE0580X02S060	●	12.7	.500	24.1	.949	26.1	1.028	67.1	2.642	66	2.598	1.1	.043	6	.236	1
					4	Ext.	DWAE0580X04S060	●	24.3	.957	41.1	1.618	43.1	1.697	81.1	3.193	80	3.150	1.1	.043	6	.236	1
5.9	.2323				2	Ext.	DWAE0590X02S060	●	12.9	.508	24.1	.949	26.1	1.028	67.1	2.642	66	2.598	1.1	.043	6	.236	1
					4	Ext.	DWAE0590X04S060	●	24.7	.972	41.1	1.618	43.1	1.697	81.1	3.193	80	3.150	1.1	.043	6	.236	1
6.0	.2362			M7x1.0	2	Ext.	DWAE0600X02S060	●	13.1	.516	24.1	.949	26.1	1.028	67.1	2.642	66	2.598	1.1	.043	6	.236	1
					4	Ext.	DWAE0600X04S060	●	25.1	.988	42.1	1.657	44.1	1.736	81.1	3.193	80	3.150	1.1	.043	6	.236	1
6.1	.2402				2	Ext.	DWAE0610X02S070	●	13.3	.524	26.1	1.028	28.1	1.106	75.1	2.957	74	2.913	1.1	.043	7	.276	1
					4	Ext.	DWAE0610X04S070	●	25.5	1.004	44.1	1.736	46.1	1.815	84.1	3.311	83	3.268	1.1	.043	7	.276	1
6.2	.2441				2	Ext.	DWAE0620X02S070	●	13.5	.531	26.1	1.028	28.1	1.106	75.1	2.957	74	2.913	1.1	.043	7	.276	1
					4	Ext.	DWAE0620X04S070	●	25.9	1.020	44.1	1.736	46.1	1.815	84.1	3.311	83	3.268	1.1	.043	7	.276	1
6.3	.2480				2	Ext.	DWAE0630X02S070	●	13.7	.539	26.1	1.028	28.1	1.106	75.1	2.957	74	2.913	1.1	.043	7	.276	1
					4	Ext.	DWAE0630X04S070	●	26.3	1.035	44.1	1.736	46.1	1.815	84.1	3.311	83	3.268	1.1	.043	7	.276	1
6.4	.2520				2	Ext.	DWAE0640X02S070	●	14.0	.551	26.2	1.031	28.2	1.110	75.2	2.961	74	2.913	1.2	.047	7	.276	1
					4	Ext.	DWAE0640X04S070	●	26.8	1.055	44.2	1.740	46.2	1.819	84.2	3.315	83	3.268	1.2	.047	7	.276	1
6.5	.2559				2	Ext.	DWAE0650X02S070	●	14.2	.559	26.2	1.031	28.2	1.110	75.2	2.961	74	2.913	1.2	.047	7	.276	1
					4	Ext.	DWAE0650X04S070	●	27.2	1.071	44.2	1.740	46.2	1.819	84.2	3.315	83	3.268	1.2	.047	7	.276	1
6.6	.2598				2	Ext.	DWAE0660X02S070	●	14.4	.567	28.2	1.110	30.2	1.189	75.2	2.961	74	2.913	1.2	.047	7	.276	1
					4	Ext.	DWAE0660X04S070	●	27.6	1.087	46.2	1.819	48.2	1.898	84.2	3.315	83	3.268	1.2	.047	7	.276	1
6.7	.2638				2	Ext.	DWAE0670X02S070	●	14.6	.575	28.2	1.110	30.2	1.189	75.2	2.961	74	2.913	1.2	.047	7	.276	1
					4	Ext.	DWAE0670X04S070	●	28.0	1.102	46.2	1.819	48.2	1.898	84.2	3.315	83	3.268	1.2	.047	7	.276	1
6.8	.2677				2	Ext.	DWAE0680X02S070	●	14.8	.583	28.2	1.110	30.2	1.189	75.2	2.961	74	2.913	1.2	.047	7	.276	1
					4	Ext.	DWAE0680X04S070	●	28.4	1.118	46.2	1.819	48.2	1.898	84.2	3.315	83	3.268	1.2	.047	7	.276	1
6.9	.2717		I	5/16-24	2	Ext.	DWAE0690X02S070	●	15.1	.594	28.3	1.114	30.3	1.193	75.3	2.965	74	2.913	1.3	.051	7	.276	1
					4	Ext.	DWAE0690X04S070	●	28.9	1.138	46.3	1.823	48.3	1.902	84.3	3.319	83	3.268	1.3	.051	7	.276	1
7.0	.2756			M8x1.0	2	Ext.	DWAE0700X02S070	●	15.3	.602	28.3	1.114	30.3	1.193	75.3	2.965	74	2.913	1.3	.051	7	.276	1
					4	Ext.	DWAE0700X04S070	●	29.3	1.154	46.3	1.823	48.3	1.902	84.3	3.319	83	3.268	1.3	.051	7	.276	1

DC = Cutting Diameter
LU = Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter

DWAE

DC					L/D	Coolant (Int./Ext.)	Order Number	Stock	LU		LCF		LH		OAL		LF		PL		DCON		Type
Metric (mm)	Decimal (inch)	Fraction (inch)	Wire / Letter	Thread Size				DP102A	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
7.1	.2795				2	Ext.	DWAE0710X02S080	●	15.5	.610	29.3	1.154	31.3	1.232	80.3	3.161	79	3.110	1.3	.051	8	.315	1
					4	Ext.	DWAE0710X04S080	●	29.7	1.169	51.3	2.020	53.3	2.098	91.3	3.594	90	3.543	1.3	.051	8	.315	1
7.2	.2835				2	Ext.	DWAE0720X02S080	●	15.7	.618	29.3	1.154	31.3	1.232	80.3	3.161	79	3.110	1.3	.051	8	.315	1
					4	Ext.	DWAE0720X04S080	●	30.1	1.185	51.3	2.020	53.3	2.098	91.3	3.594	90	3.543	1.3	.051	8	.315	1
7.3	.2874				2	Ext.	DWAE0730X02S080	●	15.9	.626	29.3	1.154	31.3	1.232	80.3	3.161	79	3.110	1.3	.051	8	.315	1
					4	Ext.	DWAE0730X04S080	●	30.5	1.201	51.3	2.020	53.3	2.098	91.3	3.594	90	3.543	1.3	.051	8	.315	1
7.4	.2913				2	Ext.	DWAE0740X02S080	●	16.1	.634	29.3	1.154	31.3	1.232	80.3	3.161	79	3.110	1.3	.051	8	.315	1
					4	Ext.	DWAE0740X04S080	●	30.9	1.217	51.3	2.020	53.3	2.098	91.3	3.594	90	3.543	1.3	.051	8	.315	1
7.5	.2953		M		2	Ext.	DWAE0750X02S080	●	16.4	.646	29.4	1.157	31.4	1.236	80.4	3.165	79	3.110	1.4	.055	8	.315	1
					4	Ext.	DWAE0750X04S080	●	31.4	1.236	51.4	2.024	53.4	2.102	91.4	3.598	90	3.543	1.4	.055	8	.315	1
7.6	.2992				2	Ext.	DWAE0760X02S080	●	16.6	.654	31.4	1.236	33.4	1.315	80.4	3.165	79	3.110	1.4	.055	8	.315	1
					4	Ext.	DWAE0760X04S080	●	31.8	1.252	53.4	2.102	55.4	2.181	91.4	3.598	90	3.543	1.4	.055	8	.315	1
7.7	.3031				2	Ext.	DWAE0770X02S080	●	16.8	.661	31.4	1.236	33.4	1.315	80.4	3.165	79	3.110	1.4	.055	8	.315	1
					4	Ext.	DWAE0770X04S080	●	32.2	1.268	53.4	2.102	55.4	2.181	91.4	3.598	90	3.543	1.4	.055	8	.315	1
7.8	.3071				2	Ext.	DWAE0780X02S080	●	17.0	.669	31.4	1.236	33.4	1.315	80.4	3.165	79	3.110	1.4	.055	8	.315	1
					4	Ext.	DWAE0780X04S080	●	32.6	1.283	53.4	2.102	55.4	2.181	91.4	3.598	90	3.543	1.4	.055	8	.315	1
7.9	.3110				2	Ext.	DWAE0790X02S080	●	17.2	.677	31.4	1.236	33.4	1.315	80.4	3.165	79	3.110	1.4	.055	8	.315	1
					4	Ext.	DWAE0790X04S080	●	33.0	1.299	53.4	2.102	55.4	2.181	91.4	3.598	90	3.543	1.4	.055	8	.315	1
8.0	.3150				2	Ext.	DWAE0800X02S080	●	17.5	.689	31.5	1.240	33.5	1.319	80.5	3.169	79	3.110	1.5	.059	8	.315	1
					4	Ext.	DWAE0800X04S080	●	33.5	1.319	53.5	2.106	55.5	2.185	91.5	3.602	90	3.543	1.5	.059	8	.315	1
8.1	.3189				2	Ext.	DWAE0810X02S090	●	17.7	.697	33.5	1.319	35.5	1.398	85.5	3.366	84	3.307	1.5	.059	9	.354	1
					4	Ext.	DWAE0810X04S090	●	33.9	1.335	57.5	2.264	59.5	2.343	99.5	3.917	98	3.858	1.5	.059	9	.354	1
8.2	.3228		P		2	Ext.	DWAE0820X02S090	●	17.9	.705	33.5	1.319	35.5	1.398	85.5	3.366	84	3.307	1.5	.059	9	.354	1
					4	Ext.	DWAE0820X04S090	●	34.3	1.350	57.5	2.264	59.5	2.343	99.5	3.917	98	3.858	1.5	.059	9	.354	1
8.3	.3268				2	Ext.	DWAE0830X02S090	●	18.1	.713	33.5	1.319	35.5	1.398	85.5	3.366	84	3.307	1.5	.059	9	.354	1
					4	Ext.	DWAE0830X04S090	●	34.7	1.366	57.5	2.264	59.5	2.343	99.5	3.917	98	3.858	1.5	.059	9	.354	1
8.4	.3307				2	Ext.	DWAE0840X02S090	●	18.3	.720	33.5	1.319	35.5	1.398	85.5	3.366	84	3.307	1.5	.059	9	.354	1
					4	Ext.	DWAE0840X04S090	●	35.1	1.382	57.5	2.264	59.5	2.343	99.5	3.917	98	3.858	1.5	.059	9	.354	1
8.5	.3346			M10x1.5	2	Ext.	DWAE0850X02S090	●	18.5	.728	33.5	1.319	35.5	1.398	85.5	3.366	84	3.307	1.5	.059	9	.354	1
					4	Ext.	DWAE0850X04S090	●	35.5	1.398	57.5	2.264	59.5	2.343	99.5	3.917	98	3.858	1.5	.059	9	.354	1
8.6	.3386		R		2	Ext.	DWAE0860X02S090	●	18.8	.740	34.6	1.362	36.6	1.441	85.6	3.370	84	3.307	1.6	.063	9	.354	1
					4	Ext.	DWAE0860X04S090	●	36.0	1.417	61.6	2.425	63.6	2.504	99.6	3.921	98	3.858	1.6	.063	9	.354	1
8.7	.3425			M10x1.25	2	Ext.	DWAE0870X02S090	●	19.0	.748	34.6	1.362	36.6	1.441	85.6	3.370	84	3.307	1.6	.063	9	.354	1
					4	Ext.	DWAE0870X04S090	●	36.4	1.433	61.6	2.425	63.6	2.504	99.6	3.921	98	3.858	1.6	.063	9	.354	1
8.8	.3465				2	Ext.	DWAE0880X02S090	●	19.2	.756	34.6	1.362	36.6	1.441	85.6	3.370	84	3.307	1.6	.063	9	.354	1
					4	Ext.	DWAE0880X04S090	●	36.8	1.449	61.6	2.425	63.6	2.504	99.6	3.921	98	3.858	1.6	.063	9	.354	1
8.9	.3504				2	Ext.	DWAE0890X02S090	●	19.4	.764	34.6	1.362	36.6	1.441	85.6	3.370	84	3.307	1.6	.063	9	.354	1
					4	Ext.	DWAE0890X04S090	●	37.2	1.465	61.6	2.425	63.6	2.504	99.6	3.921	98	3.858	1.6	.063	9	.354	1
9.0	.3543				2	Ext.	DWAE0900X02S090	●	19.6	.772	34.6	1.362	36.6	1.441	85.6	3.370	84	3.307	1.6	.063	9	.354	1
					4	Ext.	DWAE0900X04S090	●	37.6	1.480	61.6	2.425	63.6	2.504	99.6	3.921	98	3.858	1.6	.063	9	.354	1
9.1	.3583		T		2	Ext.	DWAE0910X02S100	●	19.9	.783	36.7	1.445	38.7	1.524	90.7	3.571	89	3.504	1.7	.067	10	.394	1
					4	Ext.	DWAE0910X04S100	●	38.1	1.500	63.7	2.508	65.7	2.587	106.7	4.201	105	4.134	1.7	.067	10	.394	1
9.2	.3622				2	Ext.	DWAE0920X02S100	●	20.1	.791	36.7	1.445	38.7	1.524	90.7	3.571	89	3.504	1.7	.067	10	.394	1
					4	Ext.	DWAE0920X04S100	●	38.5	1.516	63.7	2.508	65.7	2.587	106.7	4.201	105	4.134	1.7	.067	10	.394	1
9.3	.3661				2	Ext.	DWAE0930X02S100	●	20.3	.799	36.7	1.445	38.7	1.524	90.7	3.571	89	3.504	1.7	.067	10	.394	1
					4	Ext.	DWAE0930X04S100	●	38.9	1.531	63.7	2.508	65.7	2.587	106.7	4.201	105	4.134	1.7	.067	10	.394	1
9.4	.3701				2	Ext.	DWAE0940X02S100	●	20.5	.807	36.7	1.445	38.7	1.524	90.7	3.571	89	3.504	1.7	.067	10	.394	1
					4	Ext.	DWAE0940X04S100	●	39.3	1.547	63.7	2.508	65.7	2.587	106.7	4.201	105	4.134	1.7	.067	10	.394	1
9.5	.3740				2	Ext.	DWAE0950X02S100	●	20.7	.815	36.7	1.445	38.7	1.524	90.7	3.571	89	3.504	1.7	.067	10	.394	1
					4	Ext.	DWAE0950X04S100	●	39.7	1.563	63.7	2.508	65.7	2.587	106.7	4.201	105	4.134	1.7	.067	10	.394	1

● : USA Stock



Type1

DC					L/D	Coolant (Int./Ext.)	Order Number	Stock	LU		LCF		LH		OAL		LF		PL		DCON		Type
Metric (mm)	Decimal (inch)	Fraction	Wire / Letter	Thread Size				DP102A	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
9.6	.3780				2	Ext.	DWAE0960X02S100	●	20.9	.823	37.7	1.484	39.7	1.563	90.7	3.571	89	3.504	1.7	.067	10	.394	1
					4	Ext.	DWAE0960X04S100	●	40.1	1.579	66.7	2.626	68.7	2.705	106.7	4.201	105	4.134	1.7	.067	10	.394	1
9.7	.3819		Tube Sheet		2	Ext.	DWAE0970X02S100	●	21.2	.835	37.8	1.488	39.8	1.567	90.8	3.575	89	3.504	1.8	.071	10	.394	1
					4	Ext.	DWAE0970X04S100	●	40.6	1.598	66.8	2.630	68.8	2.709	106.8	4.205	105	4.134	1.8	.071	10	.394	1
9.8	.3858		W		2	Ext.	DWAE0980X02S100	●	21.4	.843	37.8	1.488	39.8	1.567	90.8	3.575	89	3.504	1.8	.071	10	.394	1
					4	Ext.	DWAE0980X04S100	●	41.0	1.614	66.8	2.630	68.8	2.709	106.8	4.205	105	4.134	1.8	.071	10	.394	1
9.9	.3898				2	Ext.	DWAE0990X02S100	●	21.6	.850	37.8	1.488	39.8	1.567	90.8	3.575	89	3.504	1.8	.071	10	.394	1
					4	Ext.	DWAE0990X04S100	●	41.4	1.630	66.8	2.630	68.8	2.709	106.8	4.205	105	4.134	1.8	.071	10	.394	1
10.0	.3937				2	Ext.	DWAE1000X02S100	●	21.8	.858	37.8	1.488	39.8	1.567	90.8	3.575	89	3.504	1.8	.071	10	.394	1
					4	Ext.	DWAE1000X04S100	●	41.8	1.646	66.8	2.630	68.8	2.709	106.8	4.205	105	4.134	1.8	.071	10	.394	1
10.1	.3976				2	Ext.	DWAE1010X02S110	●	22.0	.866	40.8	1.606	42.8	1.685	101.8	4.008	100	3.937	1.8	.071	11	.433	1
					4	Ext.	DWAE1010X04S110	●	42.2	1.661	71.8	2.827	73.8	2.906	115.8	4.559	114	4.488	1.8	.071	11	.433	1
10.2	.4016			M12x1.75	2	Ext.	DWAE1020X02S110	●	22.3	.878	40.9	1.610	42.9	1.689	101.9	4.012	100	3.937	1.9	.075	11	.433	1
					4	Ext.	DWAE1020X04S110	●	42.7	1.681	71.9	2.831	73.9	2.909	115.9	4.563	114	4.488	1.9	.075	11	.433	1
10.3	.4055				2	Ext.	DWAE1030X02S110	●	22.5	.886	40.9	1.610	42.9	1.689	101.9	4.012	100	3.937	1.9	.075	11	.433	1
					4	Ext.	DWAE1030X04S110	●	43.1	1.697	71.9	2.831	73.9	2.909	115.9	4.563	114	4.488	1.9	.075	11	.433	1
10.4	.4094				2	Ext.	DWAE1040X02S110	●	22.7	.894	40.9	1.610	42.9	1.689	101.9	4.012	100	3.937	1.9	.075	11	.433	1
					4	Ext.	DWAE1040X04S110	●	43.5	1.713	71.9	2.831	73.9	2.909	115.9	4.563	114	4.488	1.9	.075	11	.433	1
10.5	.4134		Z		2	Ext.	DWAE1050X02S110	●	22.9	.902	40.9	1.610	42.9	1.689	101.9	4.012	100	3.937	1.9	.075	11	.433	1
					4	Ext.	DWAE1050X04S110	●	43.9	1.728	71.9	2.831	73.9	2.909	115.9	4.563	114	4.488	1.9	.075	11	.433	1
10.6	.4173				2	Ext.	DWAE1060X02S110	●	23.1	.909	41.9	1.650	43.9	1.728	101.9	4.012	100	3.937	1.9	.075	11	.433	1
					4	Ext.	DWAE1060X04S110	●	44.3	1.744	72.9	2.870	74.9	2.949	115.9	4.563	114	4.488	1.9	.075	11	.433	1
10.7	.4213				2	Ext.	DWAE1070X02S110	●	23.3	.917	41.9	1.650	43.9	1.728	101.9	4.012	100	3.937	1.9	.075	11	.433	1
					4	Ext.	DWAE1070X04S110	●	44.7	1.760	72.9	2.870	74.9	2.949	115.9	4.563	114	4.488	1.9	.075	11	.433	1
10.8	.4252			M12x1.25	2	Ext.	DWAE1080X02S110	●	23.6	.929	42.0	1.654	44.0	1.732	102.0	4.016	100	3.937	2.0	.079	11	.433	1
					4	Ext.	DWAE1080X04S110	●	45.2	1.780	73.0	2.874	75.0	2.953	116.0	4.567	114	4.488	2.0	.079	11	.433	1
10.9	.4291				2	Ext.	DWAE1090X02S110	●	23.8	.937	42.0	1.654	44.0	1.732	102.0	4.016	100	3.937	2.0	.079	11	.433	1
					4	Ext.	DWAE1090X04S110	●	45.6	1.795	73.0	2.874	75.0	2.953	116.0	4.567	114	4.488	2.0	.079	11	.433	1
11.0	.4331				2	Ext.	DWAE1100X02S110	●	24.0	.945	42.0	1.654	44.0	1.732	102.0	4.016	100	3.937	2.0	.079	11	.433	1
					4	Ext.	DWAE1100X04S110	●	46.0	1.811	73.0	2.874	75.0	2.953	116.0	4.567	114	4.488	2.0	.079	11	.433	1
11.1	.4370				2	Ext.	DWAE1110X02S120	●	24.2	.953	45.0	1.772	47.0	1.850	102.0	4.016	100	3.937	2.0	.079	12	.472	1
					4	Ext.	DWAE1110X04S120	●	46.4	1.827	77.0	3.031	79.0	3.110	123.0	4.843	121	4.764	2.0	.079	12	.472	1
11.2	.4409				2	Ext.	DWAE1120X02S120	●	24.4	.961	45.0	1.772	47.0	1.850	102.0	4.016	100	3.937	2.0	.079	12	.472	1
					4	Ext.	DWAE1120X04S120	●	46.8	1.843	77.0	3.031	79.0	3.110	123.0	4.843	121	4.764	2.0	.079	12	.472	1
11.3	.4449				2	Ext.	DWAE1130X02S120	●	24.7	.972	45.1	1.776	47.1	1.854	102.1	4.020	100	3.937	2.1	.083	12	.472	1
					4	Ext.	DWAE1130X04S120	●	47.3	1.862	77.1	3.035	79.1	3.114	123.1	4.846	121	4.764	2.1	.083	12	.472	1
11.4	.4488				2	Ext.	DWAE1140X02S120	●	24.9	.980	45.1	1.776	47.1	1.854	102.1	4.020	100	3.937	2.1	.083	12	.472	1
					4	Ext.	DWAE1140X04S120	●	47.7	1.878	77.1	3.035	79.1	3.114	123.1	4.846	121	4.764	2.1	.083	12	.472	1
11.5	.4528				2	Ext.	DWAE1150X02S120	●	25.1	.988	45.1	1.776	47.1	1.854	102.1	4.020	100	3.937	2.1	.083	12	.472	1
					4	Ext.	DWAE1150X04S120	●	48.1	1.894	77.1	3.035	79.1	3.114	123.1	4.846	121	4.764	2.1	.083	12	.472	1
11.6	.4567				2	Ext.	DWAE1160X02S120	●	25.3	.996	47.1	1.854	49.1	1.933	102.1	4.020	100	3.937	2.1	.083	12	.472	1
					4	Ext.	DWAE1160X04S120	●	48.5	1.909	79.1	3.114	81.1	3.193	123.1	4.846	121	4.764	2.1	.083	12	.472	1
11.7	.4606				2	Ext.	DWAE1170X02S120	●	25.5	1.004	47.1	1.854	49.1	1.933	102.1	4.020	100	3.937	2.1	.083	12	.472	1
					4	Ext.	DWAE1170X04S120	●	48.9	1.925	79.1	3.114	81.1	3.193	123.1	4.846	121	4.764	2.1	.083	12	.472	1
11.8	.4646				2	Ext.	DWAE1180X02S120	●	25.7	1.012	47.1	1.854	49.1	1.933	102.1	4.020	100	3.937	2.1	.083	12	.472	1
					4	Ext.	DWAE1180X04S120	●	49.3	1.941	79.1	3.114	81.1	3.193	123.1	4.846	121	4.764	2.1	.083	12	.472	1
11.9	.4685				2	Ext.	DWAE1190X02S120	●	26.0	1.024	47.2	1.858	49.2	1.937	102.2	4.024	100	3.937	2.2	.087	12	.472	1
					4	Ext.	DWAE1190X04S120	●	49.8	1.961	79.2	3.118	81.2	3.197	123.2	4.850	121	4.764	2.2	.087	12	.472	1
12.0	.4724			M14x2.0	2	Ext.	DWAE1200X02S120	●	26.2	1.031	47.2	1.858	49.2	1.937	102.2	4.024	100	3.937	2.2	.087	12	.472	1
					4	Ext.	DWAE1200X04S120	●	50.2	1.976	79.2	3.118	81.2	3.197	123.2	4.850	121	4.764	2.2	.087	12	.472	1

DC = Cutting Diameter
LU = Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter

DWAE

DC					L/D	Coolant (Int./Ext.)	Order Number	Stock	LU		LCF		LH		OAL		LF		PL		DCON		Type
Metric (mm)	Decimal (inch)	Fraction (inch)	Wire / Letter	Thread Size				DP102A	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
12.1	.4764				2	Ext.	DWAE1210X02S130	●	26.4	1.039	49.2	1.937	51.2	2.016	102.2	4.024	100	3.937	2.2	.087	13	.512	1
					4	Ext.	DWAE1210X04S130	●	50.6	1.992	82.2	3.236	84.2	3.315	139.2	5.480	137	5.394	2.2	.087	13	.512	1
12.2	.4803				2	Ext.	DWAE1220X02S130	●	26.6	1.047	49.2	1.937	51.2	2.016	102.2	4.024	100	3.937	2.2	.087	13	.512	1
					4	Ext.	DWAE1220X04S130	●	51.0	2.008	82.2	3.236	84.2	3.315	139.2	5.480	137	5.394	2.2	.087	13	.512	1
12.3	.4843			9/16-12	2	Ext.	DWAE1230X02S130	●	26.8	1.055	49.2	1.937	51.2	2.016	102.2	4.024	100	3.937	2.2	.087	13	.512	1
					4	Ext.	DWAE1230X04S130	●	51.4	2.024	82.2	3.236	84.2	3.315	139.2	5.480	137	5.394	2.2	.087	13	.512	1
12.4	.4882				2	Ext.	DWAE1240X02S130	●	27.1	1.067	49.3	1.941	51.3	2.020	102.3	4.028	100	3.937	2.3	.091	13	.512	1
					4	Ext.	DWAE1240X04S130	●	51.9	2.043	82.3	3.240	84.3	3.319	139.3	5.484	137	5.394	2.3	.091	13	.512	1
12.5	.4921			M14x1.5	2	Ext.	DWAE1250X02S130	●	27.3	1.075	49.3	1.941	51.3	2.020	102.3	4.028	100	3.937	2.3	.091	13	.512	1
					4	Ext.	DWAE1250X04S130	●	52.3	2.059	82.3	3.240	84.3	3.319	139.3	5.484	137	5.394	2.3	.091	13	.512	1
12.6	.4961				2	Ext.	DWAE1260X02S130	●	27.5	1.083	52.3	2.059	54.3	2.138	102.3	4.028	100	3.937	2.3	.091	13	.512	1
					4	Ext.	DWAE1260X04S130	●	52.7	2.075	84.3	3.319	86.3	3.398	139.3	5.484	137	5.394	2.3	.091	13	.512	1
12.7	.5000	1/2			2	Ext.	DWAE1270X02S130	●	27.7	1.091	52.3	2.059	54.3	2.138	102.3	4.028	100	3.937	2.3	.091	13	.512	1
					4	Ext.	DWAE1270X04S130	●	53.1	2.091	84.3	3.319	86.3	3.398	139.3	5.484	137	5.394	2.3	.091	13	.512	1
12.8	.5039				2	Ext.	DWAE1280X02S130	●	27.9	1.098	52.3	2.059	54.3	2.138	102.3	4.028	100	3.937	2.3	.091	13	.512	1
					4	Ext.	DWAE1280X04S130	●	53.5	2.106	84.3	3.319	86.3	3.398	139.3	5.484	137	5.394	2.3	.091	13	.512	1
12.9	.5079				2	Ext.	DWAE1290X02S130	●	28.1	1.106	52.3	2.059	54.3	2.138	102.3	4.028	100	3.937	2.3	.091	13	.512	1
					4	Ext.	DWAE1290X04S130	●	53.9	2.122	84.3	3.319	86.3	3.398	139.3	5.484	137	5.394	2.3	.091	13	.512	1
13.0	.5118				2	Ext.	DWAE1300X02S130	●	28.4	1.118	52.4	2.063	54.4	2.142	102.4	4.031	100	3.937	2.4	.094	13	.512	1
					4	Ext.	DWAE1300X04S130	●	54.4	2.142	84.4	3.323	86.4	3.402	139.4	5.488	137	5.394	2.4	.094	13	.512	1
13.1	.5157			9/16-18	2	Ext.	DWAE1310X02S140	●	28.6	1.126	55.4	2.181	57.4	2.260	102.4	4.031	100	3.937	2.4	.094	14	.551	1
					4	Ext.	DWAE1310X04S140	●	54.8	2.157	92.4	3.638	94.4	3.717	149.4	5.882	147	5.787	2.4	.094	14	.551	1
13.2	.5197				2	Ext.	DWAE1320X02S140	●	28.8	1.134	55.4	2.181	57.4	2.260	102.4	4.031	100	3.937	2.4	.094	14	.551	1
					4	Ext.	DWAE1320X04S140	●	55.2	2.173	92.4	3.638	94.4	3.717	149.4	5.882	147	5.787	2.4	.094	14	.551	1
13.3	.5236				2	Ext.	DWAE1330X02S140	●	29.0	1.142	55.4	2.181	57.4	2.260	102.4	4.031	100	3.937	2.4	.094	14	.551	1
					4	Ext.	DWAE1330X04S140	●	55.6	2.189	92.4	3.638	94.4	3.717	149.4	5.882	147	5.787	2.4	.094	14	.551	1
13.4	.5276				2	Ext.	DWAE1340X02S140	●	29.2	1.150	55.4	2.181	57.4	2.260	102.4	4.031	100	3.937	2.4	.094	14	.551	1
					4	Ext.	DWAE1340X04S140	●	56.0	2.205	92.4	3.638	94.4	3.717	149.4	5.882	147	5.787	2.4	.094	14	.551	1
13.5	.5315			5/8-11	2	Ext.	DWAE1350X02S140	●	29.5	1.161	55.5	2.185	57.5	2.264	102.5	4.035	100	3.937	2.5	.098	14	.551	1
					4	Ext.	DWAE1350X04S140	●	56.5	2.224	92.5	3.642	94.5	3.720	149.5	5.886	147	5.787	2.5	.098	14	.551	1
13.6	.5354				2	Ext.	DWAE1360X02S140	●	29.7	1.169	57.5	2.264	59.5	2.343	102.5	4.035	100	3.937	2.5	.098	14	.551	1
					4	Ext.	DWAE1360X04S140	●	56.9	2.240	97.5	3.839	99.5	3.917	149.5	5.886	147	5.787	2.5	.098	14	.551	1
13.7	.5394				2	Ext.	DWAE1370X02S140	●	29.9	1.177	57.5	2.264	59.5	2.343	102.5	4.035	100	3.937	2.5	.098	14	.551	1
					4	Ext.	DWAE1370X04S140	●	57.3	2.256	97.5	3.839	99.5	3.917	149.5	5.886	147	5.787	2.5	.098	14	.551	1
13.8	.5433				2	Ext.	DWAE1380X02S140	●	30.1	1.185	57.5	2.264	59.5	2.343	102.5	4.035	100	3.937	2.5	.098	14	.551	1
					4	Ext.	DWAE1380X04S140	●	57.7	2.272	97.5	3.839	99.5	3.917	149.5	5.886	147	5.787	2.5	.098	14	.551	1
13.9	.5472				2	Ext.	DWAE1390X02S140	●	30.3	1.193	57.5	2.264	59.5	2.343	102.5	4.035	100	3.937	2.5	.098	14	.551	1
					4	Ext.	DWAE1390X04S140	●	58.1	2.287	97.5	3.839	99.5	3.917	149.5	5.886	147	5.787	2.5	.098	14	.551	1
14.0	.5512			M16x2.0	2	Ext.	DWAE1400X02S140	●	30.5	1.201	57.5	2.264	59.5	2.343	102.5	4.035	100	3.937	2.5	.098	14	.551	1
					4	Ext.	DWAE1400X04S140	●	58.5	2.303	97.5	3.839	99.5	3.917	149.5	5.886	147	5.787	2.5	.098	14	.551	1

DC = Cutting Diameter
LU = Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter

● : USA Stock

Recommended Cutting Conditions

(inch)

Workpiece Material			Mild Steels (≤180HB) AISI 1010 etc.		Carbon Steels, Alloy Steels (180—250HB) AISI 1045,4140 etc.	
DC		L/D	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)
mm	inch					
1.0	**.0394**	**2, 4**	100	.0012 (.0008—.0016)	100	.0012 (.0008—.0016)
1.5	**.0591**	**2, 4**	100	.0020 (.0012—.0024)	100	.0020 (.0012—.0024)
2.0	**.0787**	**2, 4**	180	.0024 (.0016—.0031)	180	.0024 (.0016—.0031)
2.5	**.0984**	**2, 4**	180	.0031 (.0020—.0039)	180	.0031 (.0020—.0039)
3.0	**.1181**	**2, 4**	210	.0035 (.0028—.0043)	195	.0035 (.0028—.0043)
4.0	**.1575**	**2, 4**	230	.0045 (.0035—.0055)	210	.0045 (.0035—.0055)
5.0	**.1969**	**2, 4**	230	.0057 (.0043—.0071)	210	.0057 (.0043—.0071)
6.0	**.2362**	**2, 4**	260	.0069 (.0055—.0083)	245	.0069 (.0055—.0083)
7.0	**.2756**	**2, 4**	260	.0081 (.0063—.0098)	245	.0081 (.0063—.0098)
8.0	**.3150**	**2, 4**	280	.0091 (.0071—.0110)	260	.0091 (.0071—.0110)
10.0	**.3937**	**2, 4**	295	.0104 (.0083—.0126)	280	.0104 (.0083—.0126)
12.0	**.4724**	**2, 4**	310	.0110 (.0087—.0134)	295	.0110 (.0087—.0134)
14.0	**.5512**	**2, 4**	310	.0114 (.0091—.0138)	295	.0114 (.0091—.0138)

Workpiece Material			Carbon Steels, Alloy Steels (280—350HB) AISI 4340 etc.		Austenitic Stainless Steels (≤200HB) Ferritic, Precipitation Hardening Stainless Steels (>200HB) with water-insoluble coolant AISI 304, 431 etc.	
DC		L/D	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)
mm	inch					
1.0	**.0394**	**2, 4**	80	.0008 (.0004—.0012)	100	.0008 (.0004—.0012)
1.5	**.0591**	**2, 4**	80	.0016 (.0008—.0020)	100	.0016 (.0008—.0020)
2.0	**.0787**	**2, 4**	165	.0020 (.0012—.0028)	115	.0016 (.0008—.0024)
2.5	**.0984**	**2, 4**	165	.0028 (.0016—.0035)	115	.0024 (.0012—.0031)
3.0	**.1181**	**2, 4**	180	.0030 (.0024—.0035)	130	.0028 (.0016—.0039)
4.0	**.1575**	**2, 4**	195	.0041 (.0031—.0051)	130	.0030 (.0020—.0039)
5.0	**.1969**	**2, 4**	195	.0051 (.0039—.0063)	130	.0039 (.0020—.0059)
6.0	**.2362**	**2, 4**	230	.0061 (.0047—.0075)	130	.0041 (.0024—.0059)
7.0	**.2756**	**2, 4**	230	.0071 (.0055—.0087)	130	.0047 (.0024—.0071)
8.0	**.3150**	**2, 4**	245	.0081 (.0063—.0098)	130	.0051 (.0024—.0079)
10.0	**.3937**	**2, 4**	260	.0094 (.0079—.0110)	130	.0055 (.0031—.0079)
12.0	**.4724**	**2, 4**	280	.0098 (.0079—.0118)	130	.0069 (.0039—.0098)
14.0	**.5512**	**2, 4**	280	.0098 (.0079—.0118)	130	.0069 (.0039—.0098)

Note 1) The above cutting conditions is with the water soluble coolant is used. For stainless steels, water-insoluble coolant is recommended.
Note 2) When using a water-insoluble coolant, reduce the cutting speed by 20% to ensure adequate lubrication.
Note 3) Check the condition of chips and perform step machining if necessary. * Reference of step length: .2 to 1.0 DC
Note 4) Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
Note 5) Machining depths exceeding flute length (LU) are not recommended.
Note 6) Clamp the drill so that the drill runout is within .0012”.
Note 7) Do not clamp the flute part of the drill.

DWAE

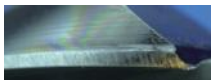
Recommended Cutting Conditions

(inch)

Workpiece Material			Gray Cast Irons (≤350MPa) AISI No.45B etc.		Ductile Cast Irons (≤450MPa) AISI 60-40-18 etc.	
DC		L/D	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)	Cutting Speed **vc** (SFM)	Feed **fr** (Min.—Max.) (IPR)
mm	inch					
1.0	**.0394**	**2, 4**	100	.0012 (.0008—.0016)	80	.0008 (.0004—.0012)
1.5	**.0591**	**2, 4**	100	.0020 (.0012—.0024)	80	.0016 (.0008—.0020)
2.0	**.0787**	**2, 4**	180	.0024 (.0016—.0031)	165	.0020 (.0012—.0028)
2.5	**.0984**	**2, 4**	180	.0031 (.0020—.0039)	165	.0028 (.0016—.0035)
3.0	**.1181**	**2, 4**	195	.0041 (.0024—.0059)	180	.0033 (.0020—.0047)
4.0	**.1575**	**2, 4**	210	.0051 (.0031—.0071)	195	.0047 (.0028—.0067)
5.0	**.1969**	**2, 4**	210	.0059 (.0039—.0079)	195	.0055 (.0031—.0079)
6.0	**.2362**	**2, 4**	245	.0069 (.0047—.0091)	230	.0059 (.0039—.0079)
7.0	**.2756**	**2, 4**	245	.0069 (.0047—.0091)	230	.0069 (.0047—.0091)
8.0	**.3150**	**2, 4**	260	.0083 (.0067—.0098)	245	.0079 (.0059—.0098)
10.0	**.3937**	**2, 4**	280	.0091 (.0071—.0110)	260	.0091 (.0071—.0110)
12.0	**.4724**	**2, 4**	295	.0098 (.0079—.0118)	280	.0098 (.0079—.0118)
14.0	**.5512**	**2, 4**	295	.0098 (.0079—.0118)	280	.0098 (.0079—.0118)

Note 1) The above cutting conditions is with the water soluble coolant is used. For stainless steels, water-insoluble coolant is recommended.
Note 2) When using a water-insoluble coolant, reduce the cutting speed by 20% to ensure adequate lubrication.
Note 3) Check the condition of chips and perform step machining if necessary. * Reference of step length: .2 to 1.0 DC
Note 4) Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
Note 5) Machining depths exceeding flute length (LU) are not recommended.
Note 6) Clamp the drill so that the drill runout is within .0012”.
Note 7) Do not clamp the flute part of the drill.

Application Example

		Conventional	DWAE1080X02S110
Drill			
Workpiece		KM-62F Electromagnetic Stainless Steel	
Cutting Conditions	Cutting Speed **vc**(SFM)	235	
	Feed per Rev. **fr**(IPR)	.010	
	Guide Hole Dia. (inch)	.425	
	Hole Depth (inch)	.551	
Cutting Mode		Wet Cutting Extarnal Coolant (Water-insoluble)	
Machine		CNC Automatic Lathe	
Number of Holes		4000 Holes	8000 Holes
Results		Rake Face  Flank  Material welded on the cutting edge  Margin 	Rake Face  Flank  Margin 
		As compared with conventional drill, the cutting resistance of DWAE was lower therefore it didn't have chipping on the cutting edge and achieved double long tool life.	

		Conventional	DWAE0300X04S030
Drill			
Workpiece		AISI 1010 Mild Steel	
Cutting Conditions	Cutting Speed **vc**(SFM)	155	170
	Feed per Rev. **fr**(IPR)	.0024	.0031
	Guide Hole Dia. (inch)	.118	
	Hole Depth (inch)	.276	
Cutting Mode		Wet Cutting Extarnal Coolant (Water-soluble)	
Machine		—	
Number of Holes		2000 Holes	4800 Holes
Results		Rake Face  Chipping Flank  Margin 	Rake Face  Flank  Margin 
		Compared to conventional drill, cutting resistance is lower and cutting conditions have been improved about 1.5 times more efficiently, while achieving a 2.4 times longer life.	

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

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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.

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Tools specifications subject to change without notice.

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