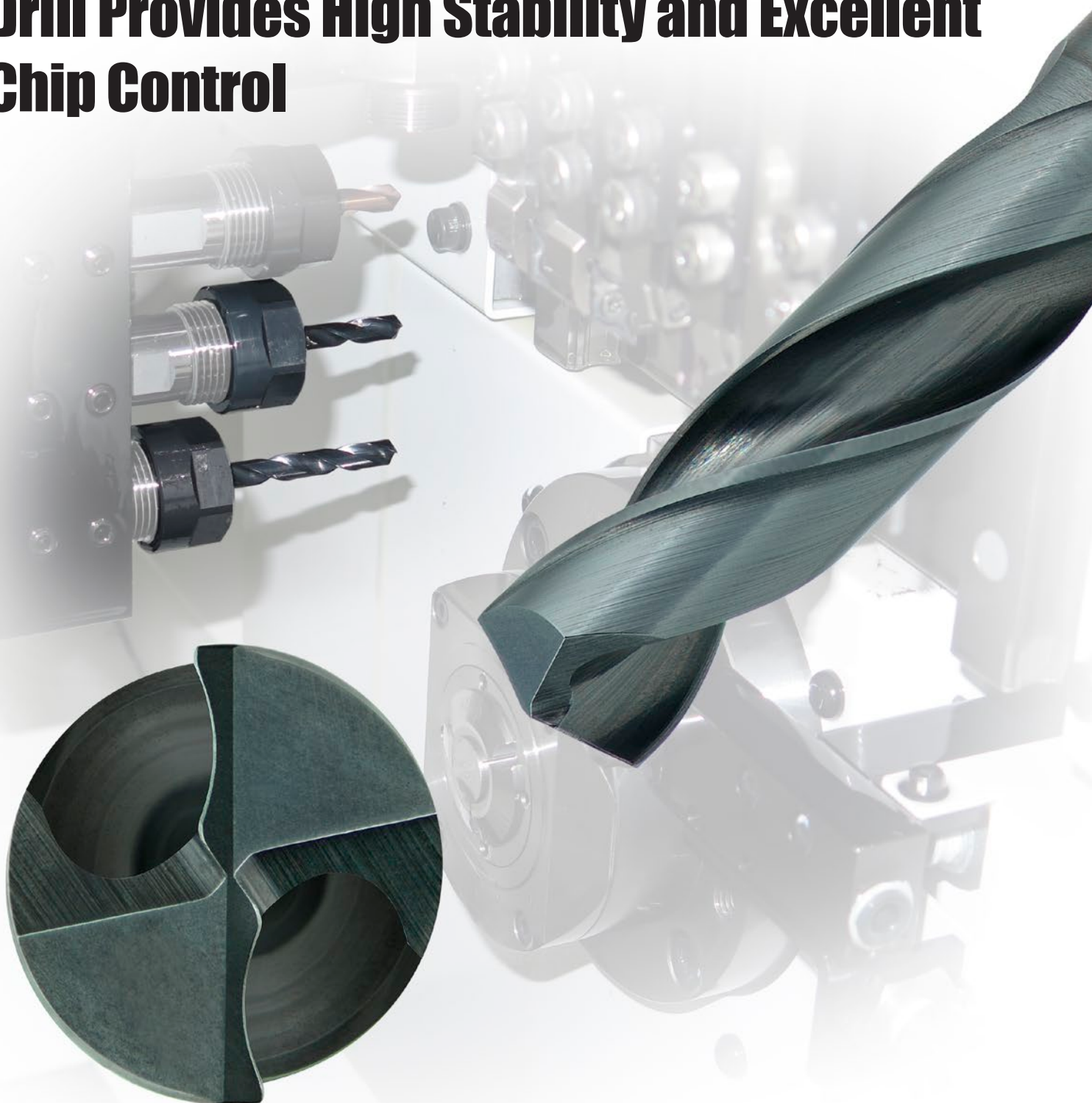


Solid Carbide Drill for Swiss-type Automatic & Small CNC Lathes
WSTAR Drill Series

DWAE

New
Products

Optimal Length-Low Cutting Resistance Drill Provides High Stability and Excellent Chip Control



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

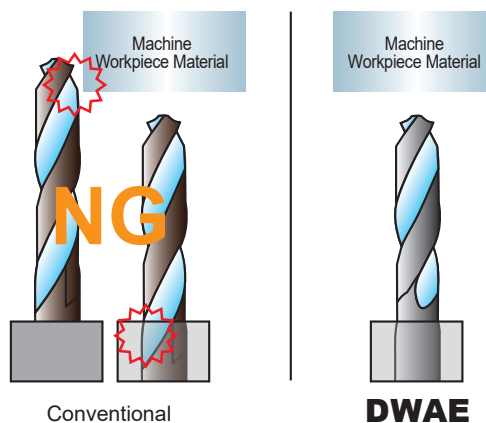
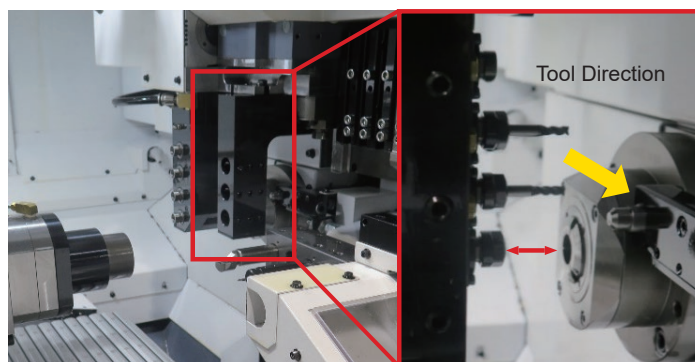
WSTAR Drill Series

DWAE

Features

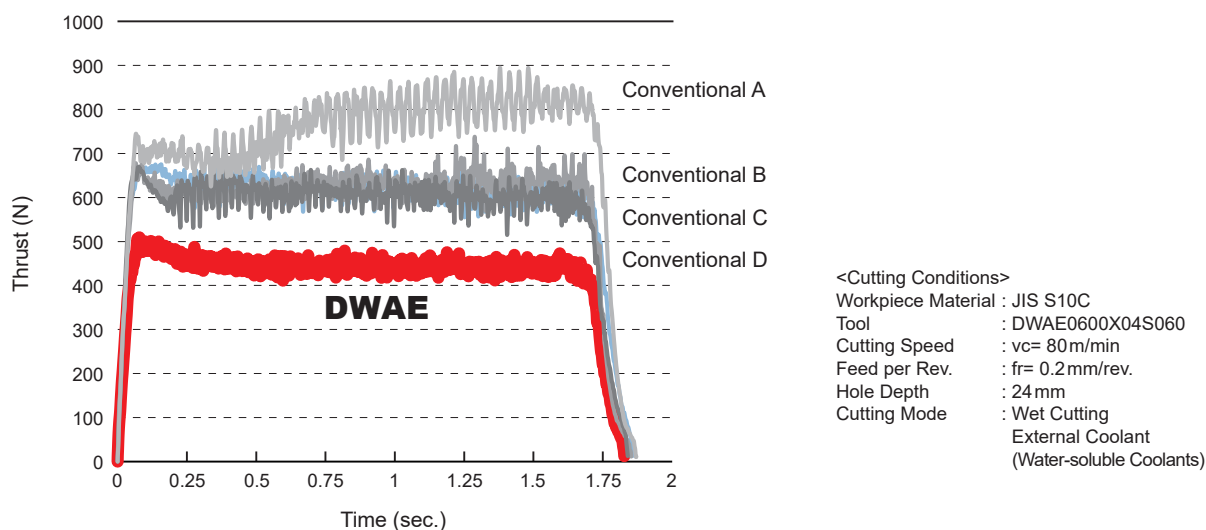
Optimal Flute Length

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 clamp is difficult to secure.



Z Thinning

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

Wave Cutting Edge

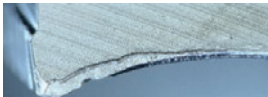
The wave cutting edge provides both sharpness and cutting edge strength, resisting wear to outer cutting edge, which is easily damaged with conventional drills, while efficiently cutting chips into smaller pieces.

Wear comparison when drilling JIS S50C

DWAE



Conventional



Flute Shape

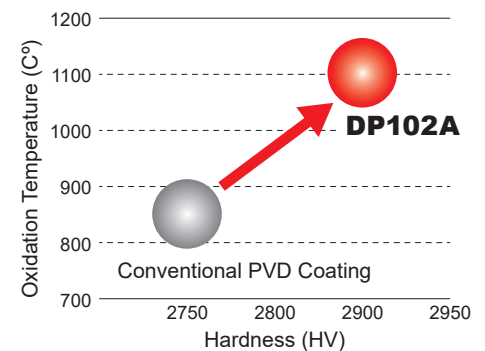
Specially designed flute shape breaks up chips into smaller pieces preventing them from clogging during drilling operations.

ZERO- μ Surface

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

Coated Grade DP102A

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



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

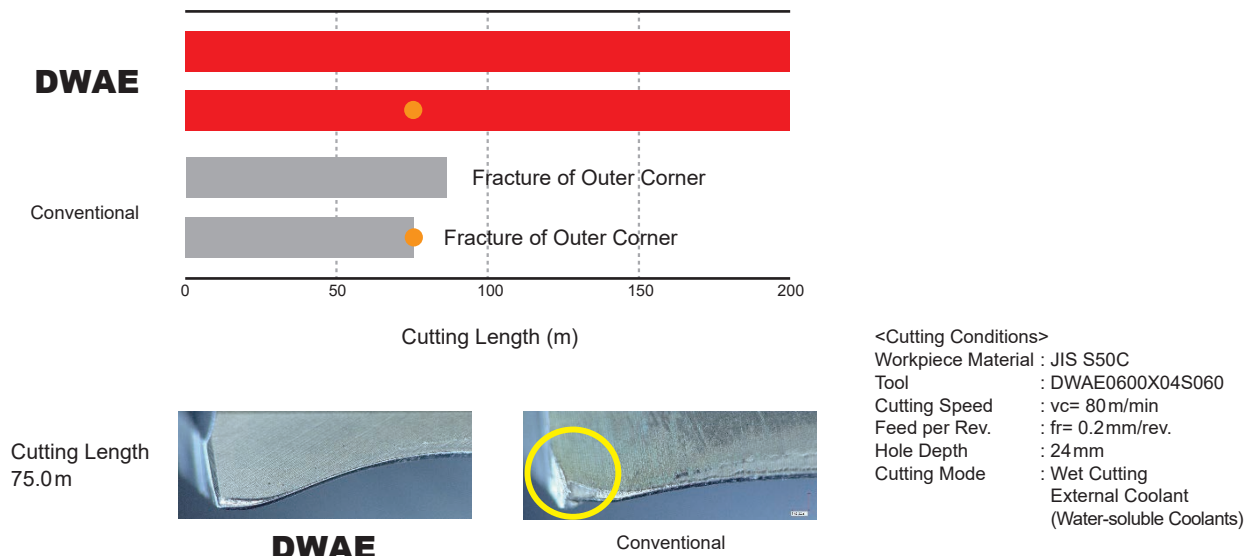
The flute length has been specifically engineered to meet the compact needs and limited machining space requirements of small CNC lathes with a lineup of shanks compatible with ER collet mounting available.

DCON(Connection Diameter) $\phi 5\text{mm}$ =ER8
DCON $\phi 7\text{mm}$ =ER11

Cutting Performance

JIS S50C 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.



JIS S10C Chips Comparison

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

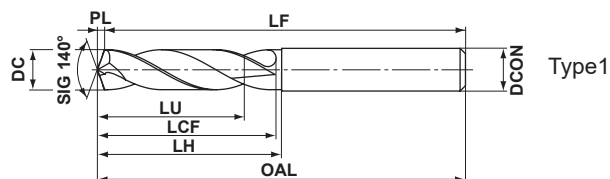


<Cutting Conditions>
 Workpiece Material : JIS S10C
 Tool : DWAE0600X04S060
 Cutting Speed : $vc = 60 \text{ m/min}$
 Feed per Rev. : $fr = 0.3 \text{ mm/rev.}$
 Hole Depth : 24 mm
 Cutting Mode : Wet Cutting
 External Coolant (Water-soluble Coolants)



P M K N S H

External Coolant



DC=3	3<DC≤6	6<DC≤10	10<DC≤14
$\begin{smallmatrix} 0 \\ -0.014 \end{smallmatrix}$	$\begin{smallmatrix} 0 \\ -0.018 \end{smallmatrix}$	$\begin{smallmatrix} 0 \\ -0.022 \end{smallmatrix}$	$\begin{smallmatrix} 0 \\ -0.027 \end{smallmatrix}$
DCON=3	3<DCON≤6	6<DCON≤10	10<DCON≤14
$\begin{smallmatrix} 0 \\ -0.006 \end{smallmatrix}$	$\begin{smallmatrix} 0 \\ -0.008 \end{smallmatrix}$	$\begin{smallmatrix} 0 \\ -0.009 \end{smallmatrix}$	$\begin{smallmatrix} 0 \\ -0.011 \end{smallmatrix}$



DC	L/D	DP102A	Order Number	LU	LCF	LH	OAL	LF	PL	DCON	Type
3.0	2	●	DWAE0300X02S030	6.5	12.5	14.5	45.5	45	0.5	3	1
3.0	4	●	DWAE0300X04S030	12.5	21.5	23.5	55.5	55	0.5	3	1
3.1	2	●	DWAE0310X02S040	6.8	12.6	14.6	55.6	55	0.6	4	1
3.1	4	●	DWAE0310X04S040	13.0	21.6	23.6	60.6	60	0.6	4	1
3.2	2	●	DWAE0320X02S040	7.0	13.6	15.6	55.6	55	0.6	4	1
3.2	4	●	DWAE0320X04S040	13.4	22.6	24.6	60.6	60	0.6	4	1
3.3	2	●	DWAE0330X02S040	7.2	13.6	15.6	55.6	55	0.6	4	1
3.3	4	●	DWAE0330X04S040	13.8	23.6	25.6	60.6	60	0.6	4	1
3.4	2	●	DWAE0340X02S040	7.4	13.6	15.6	55.6	55	0.6	4	1
3.4	4	●	DWAE0340X04S040	14.2	23.6	25.6	60.6	60	0.6	4	1
3.5	2	●	DWAE0350X02S040	7.6	14.6	16.6	55.6	55	0.6	4	1
3.5	4	●	DWAE0350X04S040	14.6	24.6	26.6	60.6	60	0.6	4	1
3.6	2	●	DWAE0360X02S040	7.9	14.7	16.7	55.7	55	0.7	4	1
3.6	4	●	DWAE0360X04S040	15.1	25.7	27.7	60.7	60	0.7	4	1
3.7	2	●	DWAE0370X02S040	8.1	14.7	16.7	55.7	55	0.7	4	1
3.7	4	●	DWAE0370X04S040	15.5	25.7	27.7	60.7	60	0.7	4	1
3.8	2	●	DWAE0380X02S040	8.3	15.7	17.7	55.7	55	0.7	4	1
3.8	4	●	DWAE0380X04S040	15.9	26.7	28.7	60.7	60	0.7	4	1
3.9	2	●	DWAE0390X02S040	8.5	15.7	17.7	55.7	55	0.7	4	1
3.9	4	●	DWAE0390X04S040	16.3	27.7	29.7	60.7	60	0.7	4	1
4.0	2	●	DWAE0400X02S040	8.7	15.7	17.7	55.7	55	0.7	4	1
4.0	4	●	DWAE0400X04S040	16.7	27.7	29.7	60.7	60	0.7	4	1
4.1	2	●	DWAE0410X02S050	8.9	16.7	18.7	62.7	62	0.7	5	1
4.1	4	●	DWAE0410X04S050	17.1	28.7	30.7	80.7	80	0.7	5	1
4.2	2	●	DWAE0420X02S050	9.2	16.8	18.8	62.8	62	0.8	5	1
4.2	4	●	DWAE0420X04S050	17.6	29.8	31.8	80.8	80	0.8	5	1
4.3	2	●	DWAE0430X02S050	9.4	17.8	19.8	62.8	62	0.8	5	1
4.3	4	●	DWAE0430X04S050	18.0	30.8	32.8	80.8	80	0.8	5	1
4.4	2	●	DWAE0440X02S050	9.6	17.8	19.8	62.8	62	0.8	5	1
4.4	4	●	DWAE0440X04S050	18.4	30.8	32.8	80.8	80	0.8	5	1

DC = Cutting Diameter
LU = Usable Length
LCF = Length Chip Flute

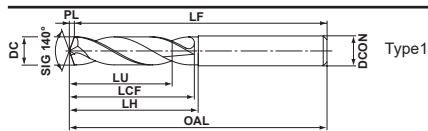
LH = Neck Length
OAL = Overall Length
LF = Functional Length

PL = Point Length
DCON = Connection Diameter

DWAE

(mm)

DC	L/D	DP102A	Order Number	LU	LCF	LH	OAL	LF	PL	DCON	Type
4.5	2	●	DWAE0450X02S050	9.8	17.8	19.8	62.8	62	0.8	5	1
4.5	4	●	DWAE0450X04S050	18.8	31.8	33.8	80.8	80	0.8	5	1
4.6	2	●	DWAE0460X02S050	10.0	18.8	20.8	62.8	62	0.8	5	1
4.6	4	●	DWAE0460X04S050	19.2	32.8	34.8	80.8	80	0.8	5	1
4.7	2	●	DWAE0470X02S050	10.3	18.9	20.9	62.9	62	0.9	5	1
4.7	4	●	DWAE0470X04S050	19.7	32.9	34.9	80.9	80	0.9	5	1
4.8	2	●	DWAE0480X02S050	10.5	18.9	20.9	62.9	62	0.9	5	1
4.8	4	●	DWAE0480X04S050	20.1	33.9	35.9	80.9	80	0.9	5	1
4.9	2	●	DWAE0490X02S050	10.7	19.9	21.9	62.9	62	0.9	5	1
4.9	4	●	DWAE0490X04S050	20.5	34.9	36.9	80.9	80	0.9	5	1
5.0	2	●	DWAE0500X02S050	10.9	19.9	21.9	62.9	62	0.9	5	1
5.0	4	●	DWAE0500X04S050	20.9	34.9	36.9	80.9	80	0.9	5	1
5.1	2	●	DWAE0510X02S060	11.1	21.9	23.9	66.9	66	0.9	6	1
5.1	4	●	DWAE0510X04S060	21.3	35.9	37.9	80.9	80	0.9	6	1
5.2	2	●	DWAE0520X02S060	11.3	21.9	23.9	66.9	66	0.9	6	1
5.2	4	●	DWAE0520X04S060	21.7	36.9	38.9	80.9	80	0.9	6	1
5.3	2	●	DWAE0530X02S060	11.6	22.0	24.0	67.0	66	1.0	6	1
5.3	4	●	DWAE0530X04S060	22.2	37.0	39.0	81.0	80	1.0	6	1
5.4	2	●	DWAE0540X02S060	11.8	22.0	24.0	67.0	66	1.0	6	1
5.4	4	●	DWAE0540X04S060	22.6	38.0	40.0	81.0	80	1.0	6	1
5.5	2	●	DWAE0550X02S060	12.0	22.0	24.0	67.0	66	1.0	6	1
5.5	4	●	DWAE0550X04S060	23.0	39.0	41.0	81.0	80	1.0	6	1
5.6	2	●	DWAE0560X02S060	12.2	24.0	26.0	67.0	66	1.0	6	1
5.6	4	●	DWAE0560X04S060	23.4	39.0	41.0	81.0	80	1.0	6	1
5.7	2	●	DWAE0570X02S060	12.4	24.0	26.0	67.0	66	1.0	6	1
5.7	4	●	DWAE0570X04S060	23.8	39.0	41.0	81.0	80	1.0	6	1
5.8	2	●	DWAE0580X02S060	12.7	24.1	26.1	67.1	66	1.1	6	1
5.8	4	●	DWAE0580X04S060	24.3	41.1	43.1	81.1	80	1.1	6	1
5.9	2	●	DWAE0590X02S060	12.9	24.1	26.1	67.1	66	1.1	6	1
5.9	4	●	DWAE0590X04S060	24.7	41.1	43.1	81.1	80	1.1	6	1
6.0	2	●	DWAE0600X02S060	13.1	24.1	26.1	67.1	66	1.1	6	1
6.0	4	●	DWAE0600X04S060	25.1	42.1	44.1	81.1	80	1.1	6	1
6.1	2	●	DWAE0610X02S070	13.3	26.1	28.1	75.1	74	1.1	7	1
6.1	4	●	DWAE0610X04S070	25.5	44.1	46.1	84.1	83	1.1	7	1
6.2	2	●	DWAE0620X02S070	13.5	26.1	28.1	75.1	74	1.1	7	1
6.2	4	●	DWAE0620X04S070	25.9	44.1	46.1	84.1	83	1.1	7	1
6.3	2	●	DWAE0630X02S070	13.7	26.1	28.1	75.1	74	1.1	7	1
6.3	4	●	DWAE0630X04S070	26.3	44.1	46.1	84.1	83	1.1	7	1
6.4	2	●	DWAE0640X02S070	14.0	26.2	28.2	75.2	74	1.2	7	1
6.4	4	●	DWAE0640X04S070	26.8	44.2	46.2	84.2	83	1.2	7	1
6.5	2	●	DWAE0650X02S070	14.2	26.2	28.2	75.2	74	1.2	7	1
6.5	4	●	DWAE0650X04S070	27.2	44.2	46.2	84.2	83	1.2	7	1



DC	L/D	DP102A	Order Number	LU	LCF	LH	OAL	LF	PL	DCON	Type
6.6	2	●	DWAE0660X02S070	14.4	28.2	30.2	75.2	74	1.2	7	1
6.6	4	●	DWAE0660X04S070	27.6	46.2	48.2	84.2	83	1.2	7	1
6.7	2	●	DWAE0670X02S070	14.6	28.2	30.2	75.2	74	1.2	7	1
6.7	4	●	DWAE0670X04S070	28.0	46.2	48.2	84.2	83	1.2	7	1
6.8	2	●	DWAE0680X02S070	14.8	28.2	30.2	75.2	74	1.2	7	1
6.8	4	●	DWAE0680X04S070	28.4	46.2	48.2	84.2	83	1.2	7	1
6.9	2	●	DWAE0690X02S070	15.1	28.3	30.3	75.3	74	1.3	7	1
6.9	4	●	DWAE0690X04S070	28.9	46.3	48.3	84.3	83	1.3	7	1
7.0	2	●	DWAE0700X02S070	15.3	28.3	30.3	75.3	74	1.3	7	1
7.0	4	●	DWAE0700X04S070	29.3	46.3	48.3	84.3	83	1.3	7	1
7.1	2	●	DWAE0710X02S080	15.5	29.3	31.3	80.3	79	1.3	8	1
7.1	4	●	DWAE0710X04S080	29.7	51.3	53.3	91.3	90	1.3	8	1
7.2	2	●	DWAE0720X02S080	15.7	29.3	31.3	80.3	79	1.3	8	1
7.2	4	●	DWAE0720X04S080	30.1	51.3	53.3	91.3	90	1.3	8	1
7.3	2	●	DWAE0730X02S080	15.9	29.3	31.3	80.3	79	1.3	8	1
7.3	4	●	DWAE0730X04S080	30.5	51.3	53.3	91.3	90	1.3	8	1
7.4	2	●	DWAE0740X02S080	16.1	29.3	31.3	80.3	79	1.3	8	1
7.4	4	●	DWAE0740X04S080	30.9	51.3	53.3	91.3	90	1.3	8	1
7.5	2	●	DWAE0750X02S080	16.4	29.4	31.4	80.4	79	1.4	8	1
7.5	4	●	DWAE0750X04S080	31.4	51.4	53.4	91.4	90	1.4	8	1
7.6	2	●	DWAE0760X02S080	16.6	31.4	33.4	80.4	79	1.4	8	1
7.6	4	●	DWAE0760X04S080	31.8	53.4	55.4	91.4	90	1.4	8	1
7.7	2	●	DWAE0770X02S080	16.8	31.4	33.4	80.4	79	1.4	8	1
7.7	4	●	DWAE0770X04S080	32.2	53.4	55.4	91.4	90	1.4	8	1
7.8	2	●	DWAE0780X02S080	17.0	31.4	33.4	80.4	79	1.4	8	1
7.8	4	●	DWAE0780X04S080	32.6	53.4	55.4	91.4	90	1.4	8	1
7.9	2	●	DWAE0790X02S080	17.2	31.4	33.4	80.4	79	1.4	8	1
7.9	4	●	DWAE0790X04S080	33.0	53.4	55.4	91.4	90	1.4	8	1
8.0	2	●	DWAE0800X02S080	17.5	31.5	33.5	80.5	79	1.5	8	1
8.0	4	●	DWAE0800X04S080	33.5	53.5	55.5	91.5	90	1.5	8	1
8.1	2	●	DWAE0810X02S090	17.7	33.5	35.5	85.5	84	1.5	9	1
8.1	4	●	DWAE0810X04S090	33.9	57.5	59.5	99.5	98	1.5	9	1
8.2	2	●	DWAE0820X02S090	17.9	33.5	35.5	85.5	84	1.5	9	1
8.2	4	●	DWAE0820X04S090	34.3	57.5	59.5	99.5	98	1.5	9	1
8.3	2	●	DWAE0830X02S090	18.1	33.5	35.5	85.5	84	1.5	9	1
8.3	4	●	DWAE0830X04S090	34.7	57.5	59.5	99.5	98	1.5	9	1
8.4	2	●	DWAE0840X02S090	18.3	33.5	35.5	85.5	84	1.5	9	1
8.4	4	●	DWAE0840X04S090	35.1	57.5	59.5	99.5	98	1.5	9	1
8.5	2	●	DWAE0850X02S090	18.5	33.5	35.5	85.5	84	1.5	9	1
8.5	4	●	DWAE0850X04S090	35.5	57.5	59.5	99.5	98	1.5	9	1
8.6	2	●	DWAE0860X02S090	18.8	34.6	36.6	85.6	84	1.6	9	1
8.6	4	●	DWAE0860X04S090	36.0	61.6	63.6	99.6	98	1.6	9	1
8.7	2	●	DWAE0870X02S090	19.0	34.6	36.6	85.6	84	1.6	9	1
8.7	4	●	DWAE0870X04S090	36.4	61.6	63.6	99.6	98	1.6	9	1

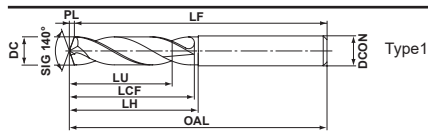
DC = Cutting Diameter
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LF = Functional Length

PL = Point Length
DCON = Connection Diameter

DWAE

DC	L/D	DP102A	Order Number	LU	LCF	LH	OAL	LF	PL	DCON	Type
8.8	2	●	DWAE0880X02S090	19.2	34.6	36.6	85.6	84	1.6	9	1
8.8	4	●	DWAE0880X04S090	36.8	61.6	63.6	99.6	98	1.6	9	1
8.9	2	●	DWAE0890X02S090	19.4	34.6	36.6	85.6	84	1.6	9	1
8.9	4	●	DWAE0890X04S090	37.2	61.6	63.6	99.6	98	1.6	9	1
9.0	2	●	DWAE0900X02S090	19.6	34.6	36.6	85.6	84	1.6	9	1
9.0	4	●	DWAE0900X04S090	37.6	61.6	63.6	99.6	98	1.6	9	1
9.1	2	●	DWAE0910X02S100	19.9	36.7	38.7	90.7	89	1.7	10	1
9.1	4	●	DWAE0910X04S100	38.1	63.7	65.7	106.7	105	1.7	10	1
9.2	2	●	DWAE0920X02S100	20.1	36.7	38.7	90.7	89	1.7	10	1
9.2	4	●	DWAE0920X04S100	38.5	63.7	65.7	106.7	105	1.7	10	1
9.3	2	●	DWAE0930X02S100	20.3	36.7	38.7	90.7	89	1.7	10	1
9.3	4	●	DWAE0930X04S100	38.9	63.7	65.7	106.7	105	1.7	10	1
9.4	2	●	DWAE0940X02S100	20.5	36.7	38.7	90.7	89	1.7	10	1
9.4	4	●	DWAE0940X04S100	39.3	63.7	65.7	106.7	105	1.7	10	1
9.5	2	●	DWAE0950X02S100	20.7	36.7	38.7	90.7	89	1.7	10	1
9.5	4	●	DWAE0950X04S100	39.7	63.7	65.7	106.7	105	1.7	10	1
9.6	2	●	DWAE0960X02S100	20.9	37.7	39.7	90.7	89	1.7	10	1
9.6	4	●	DWAE0960X04S100	40.1	66.7	68.7	106.7	105	1.7	10	1
9.7	2	●	DWAE0970X02S100	21.2	37.8	39.8	90.8	89	1.8	10	1
9.7	4	●	DWAE0970X04S100	40.6	66.8	68.8	106.8	105	1.8	10	1
9.8	2	●	DWAE0980X02S100	21.4	37.8	39.8	90.8	89	1.8	10	1
9.8	4	●	DWAE0980X04S100	41.0	66.8	68.8	106.8	105	1.8	10	1
9.9	2	●	DWAE0990X02S100	21.6	37.8	39.8	90.8	89	1.8	10	1
9.9	4	●	DWAE0990X04S100	41.4	66.8	68.8	106.8	105	1.8	10	1
10.0	2	●	DWAE1000X02S100	21.8	37.8	39.8	90.8	89	1.8	10	1
10.0	4	●	DWAE1000X04S100	41.8	66.8	68.8	106.8	105	1.8	10	1
10.1	2	●	DWAE1010X02S110	22.0	40.8	42.8	101.8	100	1.8	11	1
10.1	4	●	DWAE1010X04S110	42.2	71.8	73.8	115.8	114	1.8	11	1
10.2	2	●	DWAE1020X02S110	22.3	40.9	42.9	101.9	100	1.9	11	1
10.2	4	●	DWAE1020X04S110	42.7	71.9	73.9	115.9	114	1.9	11	1
10.3	2	●	DWAE1030X02S110	22.5	40.9	42.9	101.9	100	1.9	11	1
10.3	4	●	DWAE1030X04S110	43.1	71.9	73.9	115.9	114	1.9	11	1
10.4	2	●	DWAE1040X02S110	22.7	40.9	42.9	101.9	100	1.9	11	1
10.4	4	●	DWAE1040X04S110	43.5	71.9	73.9	115.9	114	1.9	11	1
10.5	2	●	DWAE1050X02S110	22.9	40.9	42.9	101.9	100	1.9	11	1
10.5	4	●	DWAE1050X04S110	43.9	71.9	73.9	115.9	114	1.9	11	1
10.6	2	●	DWAE1060X02S110	23.1	41.9	43.9	101.9	100	1.9	11	1
10.6	4	●	DWAE1060X04S110	44.3	72.9	74.9	115.9	114	1.9	11	1
10.7	2	●	DWAE1070X02S110	23.3	41.9	43.9	101.9	100	1.9	11	1
10.7	4	●	DWAE1070X04S110	44.7	72.9	74.9	115.9	114	1.9	11	1
10.8	2	●	DWAE1080X02S110	23.6	42.0	44.0	102.0	100	2.0	11	1
10.8	4	●	DWAE1080X04S110	45.2	73.0	75.0	116.0	114	2.0	11	1



DC	L/D	DP102A	Order Number	LU	LCF	LH	OAL	LF	PL	DCON	Type
10.9	2	●	DWAE1090X02S110	23.8	42.0	44.0	102.0	100	2.0	11	1
10.9	4	●	DWAE1090X04S110	45.6	73.0	75.0	116.0	114	2.0	11	1
11.0	2	●	DWAE1100X02S110	24.0	42.0	44.0	102.0	100	2.0	11	1
11.0	4	●	DWAE1100X04S110	46.0	73.0	75.0	116.0	114	2.0	11	1
11.1	2	●	DWAE1110X02S120	24.2	45.0	47.0	102.0	100	2.0	12	1
11.1	4	●	DWAE1110X04S120	46.4	77.0	79.0	123.0	121	2.0	12	1
11.2	2	●	DWAE1120X02S120	24.4	45.0	47.0	102.0	100	2.0	12	1
11.2	4	●	DWAE1120X04S120	46.8	77.0	79.0	123.0	121	2.0	12	1
11.3	2	●	DWAE1130X02S120	24.7	45.1	47.1	102.1	100	2.1	12	1
11.3	4	●	DWAE1130X04S120	47.3	77.1	79.1	123.1	121	2.1	12	1
11.4	2	●	DWAE1140X02S120	24.9	45.1	47.1	102.1	100	2.1	12	1
11.4	4	●	DWAE1140X04S120	47.7	77.1	79.1	123.1	121	2.1	12	1
11.5	2	●	DWAE1150X02S120	25.1	45.1	47.1	102.1	100	2.1	12	1
11.5	4	●	DWAE1150X04S120	48.1	77.1	79.1	123.1	121	2.1	12	1
11.6	2	●	DWAE1160X02S120	25.3	47.1	49.1	102.1	100	2.1	12	1
11.6	4	●	DWAE1160X04S120	48.5	79.1	81.1	123.1	121	2.1	12	1
11.7	2	●	DWAE1170X02S120	25.5	47.1	49.1	102.1	100	2.1	12	1
11.7	4	●	DWAE1170X04S120	48.9	79.1	81.1	123.1	121	2.1	12	1
11.8	2	●	DWAE1180X02S120	25.7	47.1	49.1	102.1	100	2.1	12	1
11.8	4	●	DWAE1180X04S120	49.3	79.1	81.1	123.1	121	2.1	12	1
11.9	2	●	DWAE1190X02S120	26.0	47.2	49.2	102.2	100	2.2	12	1
11.9	4	●	DWAE1190X04S120	49.8	79.2	81.2	123.2	121	2.2	12	1
12.0	2	●	DWAE1200X02S120	26.2	47.2	49.2	102.2	100	2.2	12	1
12.0	4	●	DWAE1200X04S120	50.2	79.2	81.2	123.2	121	2.2	12	1
12.1	2	●	DWAE1210X02S130	26.4	49.2	51.2	102.2	100	2.2	13	1
12.1	4	●	DWAE1210X04S130	50.6	82.2	84.2	139.2	137	2.2	13	1
12.2	2	●	DWAE1220X02S130	26.6	49.2	51.2	102.2	100	2.2	13	1
12.2	4	●	DWAE1220X04S130	51.0	82.2	84.2	139.2	137	2.2	13	1
12.3	2	●	DWAE1230X02S130	26.8	49.2	51.2	102.2	100	2.2	13	1
12.3	4	●	DWAE1230X04S130	51.4	82.2	84.2	139.2	137	2.2	13	1
12.4	2	●	DWAE1240X02S130	27.1	49.3	51.3	102.3	100	2.3	13	1
12.4	4	●	DWAE1240X04S130	51.9	82.3	84.3	139.3	137	2.3	13	1
12.5	2	●	DWAE1250X02S130	27.3	49.3	51.3	102.3	100	2.3	13	1
12.5	4	●	DWAE1250X04S130	52.3	82.3	84.3	139.3	137	2.3	13	1
12.6	2	●	DWAE1260X02S130	27.5	52.3	54.3	102.3	100	2.3	13	1
12.6	4	●	DWAE1260X04S130	52.7	84.3	86.3	139.3	137	2.3	13	1
12.7	2	●	DWAE1270X02S130	27.7	52.3	54.3	102.3	100	2.3	13	1
12.7	4	●	DWAE1270X04S130	53.1	84.3	86.3	139.3	137	2.3	13	1
12.8	2	●	DWAE1280X02S130	27.9	52.3	54.3	102.3	100	2.3	13	1
12.8	4	●	DWAE1280X04S130	53.5	84.3	86.3	139.3	137	2.3	13	1
12.9	2	●	DWAE1290X02S130	28.1	52.3	54.3	102.3	100	2.3	13	1
12.9	4	●	DWAE1290X04S130	53.9	84.3	86.3	139.3	137	2.3	13	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	DP102A	Order Number	LU	LCF	LH	OAL	LF	PL	DCON	Type
13.0	2	●	DWAE1300X02S130	28.4	52.4	54.4	102.4	100	2.4	13	1
13.0	4	●	DWAE1300X04S130	54.4	84.4	86.4	139.4	137	2.4	13	1
13.1	2	●	DWAE1310X02S140	28.6	55.4	57.4	102.4	100	2.4	14	1
13.1	4	●	DWAE1310X04S140	54.8	92.4	94.4	149.4	147	2.4	14	1
13.2	2	●	DWAE1320X02S140	28.8	55.4	57.4	102.4	100	2.4	14	1
13.2	4	●	DWAE1320X04S140	55.2	92.4	94.4	149.4	147	2.4	14	1
13.3	2	●	DWAE1330X02S140	29.0	55.4	57.4	102.4	100	2.4	14	1
13.3	4	●	DWAE1330X04S140	55.6	92.4	94.4	149.4	147	2.4	14	1
13.4	2	●	DWAE1340X02S140	29.2	55.4	57.4	102.4	100	2.4	14	1
13.4	4	●	DWAE1340X04S140	56.0	92.4	94.4	149.4	147	2.4	14	1
13.5	2	●	DWAE1350X02S140	29.5	55.5	57.5	102.5	100	2.5	14	1
13.5	4	●	DWAE1350X04S140	56.5	92.5	94.5	149.5	147	2.5	14	1
13.6	2	●	DWAE1360X02S140	29.7	57.5	59.5	102.5	100	2.5	14	1
13.6	4	●	DWAE1360X04S140	56.9	97.5	99.5	149.5	147	2.5	14	1
13.7	2	●	DWAE1370X02S140	29.9	57.5	59.5	102.5	100	2.5	14	1
13.7	4	●	DWAE1370X04S140	57.3	97.5	99.5	149.5	147	2.5	14	1
13.8	2	●	DWAE1380X02S140	30.1	57.5	59.5	102.5	100	2.5	14	1
13.8	4	●	DWAE1380X04S140	57.7	97.5	99.5	149.5	147	2.5	14	1
13.9	2	●	DWAE1390X02S140	30.3	57.5	59.5	102.5	100	2.5	14	1
13.9	4	●	DWAE1390X04S140	58.1	97.5	99.5	149.5	147	2.5	14	1
14.0	2	●	DWAE1400X02S140	30.5	57.5	59.5	102.5	100	2.5	14	1
14.0	4	●	DWAE1400X04S140	58.5	97.5	99.5	149.5	147	2.5	14	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

● : Inventory maintained in Japan.

Recommended Cutting Conditions

(mm)

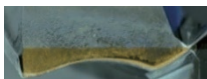
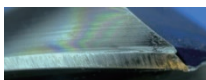
Workpiece Material	Mild Steels (≤180HB), JIS SS400, S10C,etc				Carbon Steels, Alloy Steels (180—250HB) JIS S45C, SCM440 etc				
	DC	Cutting Speed vc (m/min)	Revolution n (min ⁻¹)	Feed fr (Min.—Max.) (mm/rev.)	Table Feed (mm/min)	Cutting Speed vc (m/min)	Revolution n (min ⁻¹)	Feed fr (Min.—Max.) (mm/rev.)	Table Feed (mm/min)
	3.0	65	6800	0.090 (0.07—0.11)	610	60	6300	0.090 (0.07—0.11)	565
	4.0	70	5500	0.115 (0.09—0.14)	630	65	5100	0.115 (0.09—0.14)	585
	5.0	70	4400	0.145 (0.11—0.18)	635	65	4100	0.145 (0.11—0.18)	590
	6.0	80	4200	0.175 (0.14—0.21)	735	75	3900	0.175 (0.14—0.21)	680
	7.0	80	3600	0.205 (0.16—0.25)	735	75	3400	0.205 (0.16—0.25)	695
	8.0	85	3300	0.230 (0.18—0.28)	755	80	3100	0.230 (0.18—0.28)	710
	10.0	90	2800	0.265 (0.21—0.32)	740	85	2700	0.265 (0.21—0.32)	715
	12.0	95	2500	0.280 (0.22—0.34)	700	90	2300	0.280 (0.22—0.34)	640
	14.0	95	2100	0.290 (0.23—0.35)	605	90	2000	0.290 (0.23—0.35)	580

Workpiece Material	Carbon Steels, Alloy Steels (280—350HB) JIS SNCM439 etc				Austenitic Stainless Steel (≤200HB) Ferritic, Precipitation Hardening Stainless Steels (>200HB) with water-insoluble coolant JIS SUS431, SUS420J2 etc				
	DC	Cutting Speed vc (m/min)	Revolution n (min ⁻¹)	Feed fr (Min.—Max.) (mm/rev.)	Table Feed (mm/min)	Cutting Speed vc (m/min)	Revolution n (min ⁻¹)	Feed fr (Min.—Max.) (mm/rev.)	Table Feed (mm/min)
	3.0	55	5800	0.075 (0.06—0.09)	435	40	4200	0.070 (0.04—0.10)	290
	4.0	60	4700	0.105 (0.08—0.13)	490	40	3100	0.075 (0.05—0.10)	230
	5.0	60	3800	0.130 (0.10—0.16)	490	40	2500	0.100 (0.05—0.15)	250
	6.0	70	3700	0.155 (0.12—0.19)	570	40	2100	0.105 (0.06—0.15)	220
	7.0	70	3100	0.180 (0.14—0.22)	555	40	1800	0.120 (0.06—0.18)	215
	8.0	75	2900	0.205 (0.16—0.25)	590	40	1500	0.130 (0.06—0.20)	195
	10.0	80	2500	0.240 (0.20—0.28)	600	40	1200	0.140 (0.08—0.20)	165
	12.0	85	2200	0.250 (0.20—0.30)	550	40	1000	0.175 (0.10—0.25)	175
	14.0	85	1900	0.250 (0.20—0.30)	475	40	900	0.175 (0.10—0.25)	155

Workpiece Material	Gray Cast Iron (≤350MPa)				Ductile Cast Iron (≤450MPa)			
	JIS FC300 etc				JIS FCD450 etc			
DC	Cutting Speed vc (m/min)	Revolution n (min ⁻¹)	Feed fr (Min.—Max.) (mm/rev.)	Table Feed (mm/min)	Cutting Speed vc (m/min)	Revolution n (min ⁻¹)	Feed fr (Min.—Max.) (mm/rev.)	Table Feed (mm/min)
3.0	60	6300	0.105 (0.06—0.15)	660	55	5800	0.085 (0.05—0.12)	490
4.0	65	5100	0.130 (0.08—0.18)	660	60	4700	0.120 (0.07—0.17)	560
5.0	65	4100	0.150 (0.10—0.20)	615	60	3800	0.140 (0.08—0.20)	530
6.0	75	3900	0.175 (0.12—0.23)	680	70	3700	0.150 (0.10—0.20)	555
7.0	75	3400	0.175 (0.12—0.23)	595	70	3100	0.175 (0.12—0.23)	540
8.0	80	3100	0.210 (0.17—0.25)	650	75	2900	0.200 (0.15—0.25)	580
10.0	85	2700	0.230 (0.18—0.28)	620	80	2500	0.230 (0.18—0.28)	575
12.0	90	2300	0.250 (0.20—0.30)	575	85	2200	0.250 (0.20—0.30)	550
14.0	90	2000	0.250 (0.20—0.30)	500	85	1900	0.250 (0.20—0.30)	475

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: 0.2 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 0.03mm.
 Note 7) Do not clamp the flute part of the drill.

Application Example

Drill		Conventional	DWAE1080X02S110	
Workpiece		KM-62F Electromagnetic Stainless Steel		
Cutting Conditions	Cutting Speed vc (m/min)	71.3		
	Feed per Rev. fr (mm/rev)	0.25		
	Guide Hole Dia. (mm)	10.8		
	Hole Depth (mm)	14		
Cutting Mode		Wet Cutting External Coolant (Water-insoluble)		
Machine		CNC Automatic Lathe		
Number of Holes		4000 Holes	8000 Holes	
Results	Rake Face	Flank	Rake Face	Flank
				
	Material welded on the cutting edge	Margin	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.				

Drill		Conventional	DWAE0300X04S030	
Workpiece		JIS S10C Mild Steel		
Cutting Conditions	Cutting Speed vc (m/min)	47.1	51.8	
	Feed per Rev. fr (mm/rev)	0.06	0.08	
	Guide Hole Dia. (mm)	3.0		
	Hole Depth (mm)	7		
Cutting Mode		Wet Cutting External Coolant (Water-soluble)		
Machine		—		
Number of Holes		2000 Holes	4800 Holes	
Results	Rake Face	Flank	Rake Face	Flank
				
	Chipping	Margin	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.

For Your Safety

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

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(Tools specifications subject to change without notice.)

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