

# 2 Flutes UNIMAX FLAT DRILL



Size  $\phi 2 \sim \phi 12$

# UTDF

Super  
MG

UT  
COAT

30°

Flatland

Shank Dia  
0/-0.005

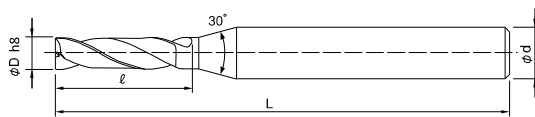
Patented in Japan

Material Applications (★ Highly Recommended ● Recommended ○ Suggested)

Work Material																	
Structural Steels SS400	Carbon Steels S45C S55C	Alloy Steels SK / SCM SUS	Prehardened Steels NAK HPM	Hardened Steels				Cast Iron	Aluminum Alloys	Graphite	Copper	Plastics	Glass Filled Plastics	Titanium Alloys	Heat Resistant Alloys	Cemented Carbide	Hard Brittle (Non-Metallic) Materials
				~50HRC~55HRC	~60HRC	~65HRC	~70HRC										
●	●	●	○					●	●								

## Features

Available to a wide variety of applications by the 180° point angle.  
 The helix angle of 30° offers excellent chip evacuation, stable and highly efficient pilot hole drilling.  
 New web-thinning design for improved chip evacuation and sharpness.  
 Double-margin will guide the tool into inner wall and achieve high-straightness drilling to non-planar surface.  
 Size M4 - M12 for drilling pilot holes before tapping.



Outside Diameter	Diameter Tolerance (h8)
$\phi D \leq 3$	0/-0.014
$3 < \phi D \leq 6$	0/-0.018
$6 < \phi D \leq 10$	0/-0.022
$10 < \phi D \leq 12$	0/-0.027

Feature 1 : Helix angle 30°



Excellent chip evacuation with 30° helix angle

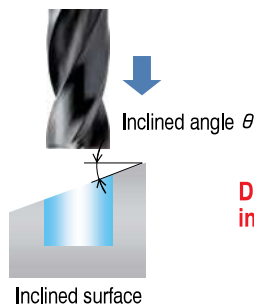
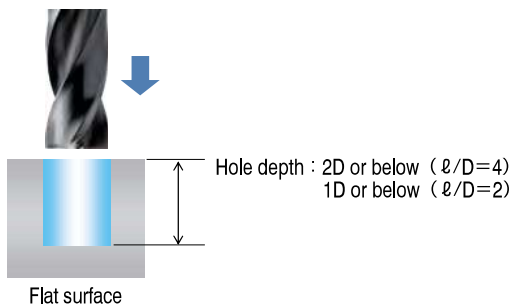
Feature 2 : Double-margin



Double-margin

High-straightness drilling

Feature 3 : A wide variety of applications



Designed for drilling on flat, inclined or curved surfaces.

- φ3mm Shark V Series
- UDC-PCD Series
- CBN Series
- Square
- Long Neck Square
- Radius
- Long Neck Radius
- Taper Neck Radius
- Ball / Long Shank Ball
- Long Neck Ball
- Taper Neck Ball
- Taper
- Barrel
- Spiral V Cutter
- Drill
- Technical Data

Total 21 models

Unit (mm)


Model Number	Diameter $\phi D$	Flute Length $\ell$	Overall Length L	Shank Diameter $\phi d$	Suggested Retail Price ¥
UTDF 2200-080	2	8	50	4	6,500
UTDF 2250-100	2.5	10	50	4	6,500
UTDF 2300-120	3	12	60	6	6,500
UTDF 2330-132	3.3	13.2	60	6	7,000
UTDF 2400-160	4	16	60	6	7,200
UTDF 2420-168	4.2	16.8	60	6	7,500
UTDF 2500-200	5	20	60	6	7,800
UTDF 2510-204	5.1	20.4	60	6	7,800
UTDF 2600-240	6	24	60	6	8,000
UTDF 2650-130	6.5	13	70	8	9,700
UTDF 2680-272	6.8	27.2	70	8	9,700
UTDF 2700-280	7	28	80	8	9,700
UTDF 2800-320	8	32	80	8	10,500
UTDF 2850-340	8.5	34	80	10	11,500
UTDF 2860-344	8.6	34.4	80	10	11,500
UTDF 2900-360	9	36	80	10	13,500
UTDF 2950-190	9.5	19	90	10	13,500
UTDF 21000-400	10	40	90	10	13,500
UTDF 21030-412	10.3	41.2	90	12	14,000
UTDF 21100-220	11	22	100	12	15,500
UTDF 21200-480	12	48	100	12	15,500

\*Contact our sales for the custom size tool.


 3mm Shank  
V Series


 UDC-PCD  
Series


 CBN  
Series


 Square  
Long Neck  
Square


 Radius  
Long Neck  
Radius  
Taper Neck  
Radius


 Ball / Long  
Shank Ball  
Long Neck  
Ball  
Taper Neck  
Ball


 Taper


 Barrel


 Spiral  
V Cutter


 Drill


 Technical Data

## 2 Flutes UNIMAX FLAT DRILL

### Drilling Conditions for UTDF

Flat Surface

WORK MATERIAL			CARBON STEELS STRUCTURAL STEELS GRAY CAST IRON S50C / SS400 / FC250		ALLOY STEELS SCM415		PREHARDENED STEELS NAK80		DUCTILE IRON FCD		ALUMINUM ALLOYS A5052 / A7075		ALUMINUM CAST ADC12	
Model Number	Diameter $\phi$ D (mm)	Flute Length $l_f$ (mm)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)
<b>2200-080</b>	<b>2</b>	<b>8</b>	15,000	900	12,900	740	6,000	160	12,900	660	25,200	2,070	18,900	1,340
<b>2250-100</b>	<b>2.5</b>	<b>10</b>	12,000	880	10,320	730	4,800	160	10,320	660	20,160	2,070	15,120	1,340
<b>2300-120</b>	<b>3</b>	<b>12</b>	10,000	860	8,600	710	4,000	150	8,600	630	16,800	1,970	12,600	1,280
<b>2330-132</b>	<b>3.3</b>	<b>13.2</b>	9,090	860	7,820	710	3,640	150	7,820	630	15,280	1,970	11,460	1,280
<b>2400-160</b>	<b>4</b>	<b>16</b>	7,500	830	6,450	690	3,000	150	6,450	610	12,600	1,900	9,450	1,230
<b>2420-168</b>	<b>4.2</b>	<b>16.8</b>	7,150	830	6,150	690	2,860	150	6,150	610	12,000	1,900	9,000	1,230
<b>2500-200</b>	<b>5</b>	<b>20</b>	6,000	800	5,160	660	2,400	140	5,160	590	10,080	1,840	7,560	1,190
<b>2510-204</b>	<b>5.1</b>	<b>20.4</b>	5,880	800	5,060	660	2,350	140	5,060	590	9,880	1,840	7,400	1,190
<b>2600-240</b>	<b>6</b>	<b>24</b>	5,000	770	4,300	640	2,000	140	4,300	560	8,400	1,770	6,300	1,140
<b>2650-130</b>	<b>6.5</b>	<b>13</b>	4,620	770	3,970	640	1,850	140	3,970	560	7,750	1,770	5,820	1,140
<b>2680-272</b>	<b>6.8</b>	<b>27.2</b>	4,420	770	3,800	640	1,770	140	3,800	560	7,420	1,770	5,560	1,140
<b>2700-280</b>	<b>7</b>	<b>28</b>	4,290	760	3,680	630	1,710	140	3,680	560	7,200	1,770	5,400	1,140
<b>2800-320</b>	<b>8</b>	<b>32</b>	3,750	730	3,230	600	1,500	130	3,230	540	6,300	1,670	4,730	1,080
<b>2850-340</b>	<b>8.5</b>	<b>34</b>	3,530	730	3,040	600	1,420	130	3,040	540	5,930	1,670	4,450	1,080
<b>2860-344</b>	<b>8.6</b>	<b>34.4</b>	3,490	720	3,000	600	1,400	130	3,000	540	5,860	1,670	4,400	1,080
<b>2900-360</b>	<b>9</b>	<b>36</b>	3,330	720	2,870	590	1,330	120	2,870	530	5,600	1,670	4,200	1,080
<b>2950-190</b>	<b>9.5</b>	<b>19</b>	3,160	700	2,720	580	1,260	120	2,720	520	5,300	1,620	3,980	1,050
<b>21000-400</b>	<b>10</b>	<b>40</b>	3,000	690	2,580	570	1,200	120	2,580	510	5,040	1,580	3,780	1,020
<b>21030-412</b>	<b>10.3</b>	<b>41.2</b>	2,920	690	2,510	570	1,170	120	2,510	510	4,900	1,580	3,670	1,020
<b>21100-220</b>	<b>11</b>	<b>22</b>	2,730	670	2,350	550	1,090	110	2,350	500	4,580	1,540	3,440	1,000
<b>21200-480</b>	<b>12</b>	<b>48</b>	2,500	650	2,150	540	1,000	110	2,150	480	4,200	1,490	3,150	960

- $\phi$ 3mm Shank V Series
- UDC-PCD Series
- CBN Series
- Square
- Long Neck Square
- Radius
- Long Neck Radius
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- Barrel
- Spiral V Cutter
- Drill
- Technical Data

## Drilling Conditions for UTDF

Inclined Surface ( $\theta \leq 30^\circ$ )

WORK MATERIAL			CARBON STEELS STRUCTURAL STEELS GRAY CAST IRON S50C / SS400 / FC250		ALLOY STEELS SCM415		PREHARDENED STEELS NAK80		DUCTILE IRON FCD		ALUMINUM ALLOYS A5052 / A7075		ALUMINUM CAST ADC12	
Model Number	Diameter $\phi D$ (mm)	Flute Length $l$ (mm)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)
2200-080	2	8	15,000	270	12,900	220	6,000	48	12,900	190	25,200	620	18,900	400
2250-100	2.5	10	12,000	260	10,320	220	4,800	48	10,320	190	20,160	620	15,120	400
2300-120	3	12	10,000	250	8,600	210	4,000	45	8,600	180	16,800	590	12,600	380
2330-132	3.3	13.2	9,090	250	7,820	210	3,640	45	7,820	180	15,280	590	11,460	380
2400-160	4	16	7,500	240	6,450	200	3,000	45	6,450	180	12,600	570	9,450	360
2420-168	4.2	16.8	7,150	240	6,150	200	2,860	45	6,150	180	12,000	570	9,000	360
2500-200	5	20	6,000	240	5,160	190	2,400	42	5,160	170	10,080	550	7,560	350
2510-204	5.1	20.4	5,880	230	5,060	190	2,350	42	5,060	170	9,880	550	7,400	350
2600-240	6	24	5,000	230	4,300	190	2,000	42	4,300	160	8,400	530	6,300	340
2650-130	6.5	13	4,620	230	3,970	190	1,850	42	3,970	160	7,750	530	5,820	340
2680-272	6.8	27.2	4,420	230	3,800	190	1,770	42	3,800	160	7,420	530	5,560	340
2700-280	7	28	4,290	230	3,680	190	1,710	42	3,680	160	7,200	530	5,400	340
2800-320	8	32	3,750	210	3,230	180	1,500	39	3,230	160	6,300	500	4,730	320
2850-340	8.5	34	3,530	210	3,040	180	1,420	39	3,040	160	5,930	500	4,450	320
2860-344	8.6	34.4	3,490	210	3,000	180	1,400	39	3,000	160	5,860	500	4,400	320
2900-360	9	36	3,330	210	2,870	180	1,330	38	2,870	160	5,600	500	4,200	320
2950-190	9.5	19	3,160	210	2,720	170	1,260	36	2,720	150	5,300	490	3,980	310
21000-400	10	40	3,000	200	2,580	170	1,200	36	2,580	150	5,040	470	3,780	300
21030-412	10.3	41.2	2,920	200	2,510	170	1,170	36	2,510	150	4,900	470	3,670	300
21100-220	11	22	2,730	200	2,350	160	1,090	34	2,350	140	4,580	460	3,440	290
21200-480	12	48	2,500	190	2,150	160	1,000	33	2,150	140	4,200	440	3,150	280

$\phi 3mm$  Shank  
V Series

UDC-PCD  
Series

CBN  
Series

Square  
Square  
Long Neck  
Square

Radius  
Radius  
Long Neck  
Radius  
Taper Neck  
Radius

Ball / Long  
Shank Ball  
Ball  
Long Neck  
Ball  
Taper Neck  
Ball

Taper  
Taper

Barrel

Spiral  
V Cutter

Drill

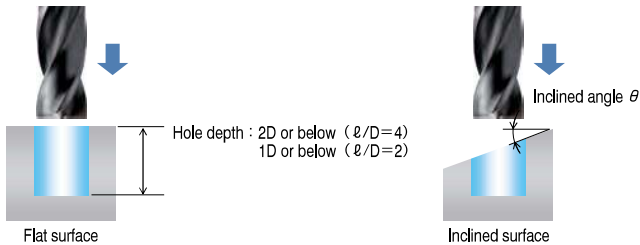
Technical Data

## 2 Flutes UNIMAX FLAT DRILL

### Drilling Conditions for UTDF

Inclined Surface ( $\theta > 30^\circ$ )

WORK MATERIAL			CARBON STEELS STRUCTURAL STEELS GRAY CAST IRON S50C / SS400 / FC250		ALLOY STEELS SCM415		PREHARDENED STEELS NAK80		DUCTILE IRON FCD		ALUMINUM ALLOYS A5052 / A7075		ALUMINUM CAST ADC12	
Model Number	Diameter $\phi D$ (mm)	Flute Length $\ell$ (mm)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)
2200-080	2	8	10,500	90	9,030	74	4,200	16	9,030	66	17,640	200	13,230	130
2250-100	2.5	10	8,400	90	7,220	74	3,360	16	7,220	66	14,110	200	10,580	130
2300-120	3	12	7,000	86	6,020	71	2,800	15	6,020	63	11,760	190	8,820	120
2330-132	3.3	13.2	6,370	86	5,480	71	2,550	15	5,480	63	10,700	190	8,030	120
2400-160	4	16	5,250	83	4,520	69	2,100	15	4,520	61	8,820	190	6,620	120
2420-168	4.2	16.8	5,010	83	4,310	69	2,010	15	4,310	61	8,400	190	6,300	120
2500-200	5	20	4,200	80	3,620	66	1,680	14	3,620	59	7,060	180	5,300	110
2510-204	5.1	20.4	4,120	80	3,540	66	1,650	14	3,540	59	6,920	180	5,190	110
2600-240	6	24	3,500	77	3,010	64	1,400	14	3,010	56	5,880	170	4,410	110
2650-130	6.5	13	3,230	77	2,780	64	1,290	14	2,780	56	5,430	170	4,070	110
2680-272	6.8	27.2	3,100	77	2,660	64	1,240	14	2,660	56	5,200	170	3,900	110
2700-280	7	28	3,000	77	2,580	64	1,200	14	2,580	56	5,040	170	3,780	110
2800-320	8	32	2,630	73	2,270	60	1,050	13	2,270	54	4,410	160	3,320	100
2850-340	8.5	34	2,480	73	2,130	60	1,000	13	2,130	54	4,160	160	3,120	100
2860-344	8.6	34.4	2,440	73	2,100	60	980	13	2,100	54	4,100	160	3,080	100
2900-360	9	36	2,330	73	2,010	60	930	13	2,010	54	3,920	160	2,940	100
2950-190	9.5	19	2,210	71	1,900	58	880	12	1,900	53	3,710	150	2,790	100
21000-400	10	40	2,100	69	1,810	57	840	12	1,810	51	3,530	150	2,650	100
21030-412	10.3	41.2	2,050	69	1,760	57	820	12	1,760	51	3,430	150	2,570	100
21100-220	11	22	1,910	67	1,640	55	760	11	1,640	49	3,210	140	2,400	90
21200-480	12	48	1,750	65	1,510	54	700	11	1,510	48	2,940	140	2,210	90

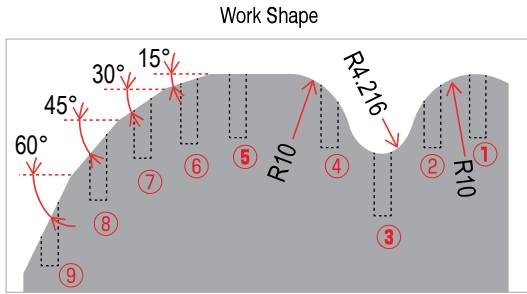


Note:

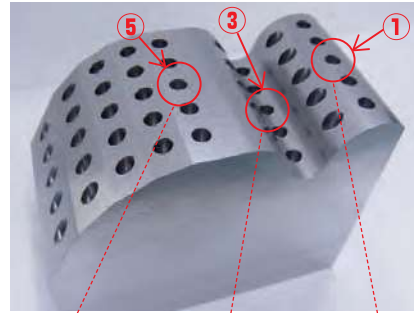
- These milling parameters are for reference only.
- Adjust the parameters in accordance with the machine rigidity, workpiece clamping condition and shape.
- Recommend water soluble or oil coolant.
- Step milling is recommended in case of clogging.

**UTDF Inclined Surface Drilling Example**  
 $\phi 3.5 \times$  Flute Length 14 mm (Prototype)

SS400



Coolant : Water Soluble (Nozzle)  
 Work Size :  $40 \times 75 \times 60$  mm



Each hole after drilling

**Excellent drilling performance with less burrs.**

UTDF  
 Inclined Surface  
 Drilling Video



Drilling spot	Surface	Spindle Speed (min <sup>-1</sup> )	Feed Rate (min/min)	Drilling Depth (The Deepest spot) (mm)
1	凸 Curved surface (Top)	7,000	450	7
2	Curved surface (45°)		270	
3	凹 Curved surface (Top)		450	
4	Curved surface (45°)		270	
5	Flat Surface		450	
6	Inclined Surface (15°)		320	
7	Inclined Surface (30°)		320	
8	Inclined Surface (45°)		270	
9	Inclined Surface (60°)		225	

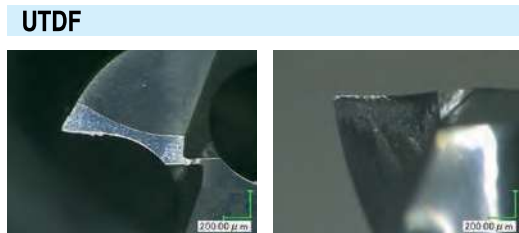
\*Contact our sales for the custom size tool.

**Tool After Drilling  $\phi 2 \times$  Flute Length 8 mm**

A5052

Surface	Spindle Speed	Feed Rate	Drilling Depth	Number of Holes	Coolant
Flat Surface	23,100 min <sup>-1</sup>	830 mm/min	4 mm	100 holes	Water Soluble (Nozzle)

**Comparison of Tip Damage after 100 hits**



**More tool-life left without adhesion after drilling 100 holes.**

Chip adhesion

$\phi 3$ mm Shank  
 V Series

UDC-PCD  
 Series

CBN  
 Series

Square  
 Long Neck  
 Square

Radius  
 Long Neck  
 Radius  
 Taper Neck  
 Radius

Ball / Long  
 Shank Ball

Ball  
 Long Neck  
 Ball  
 Taper Neck  
 Ball

Taper  
 Taper

Barrel

Spiral  
 V Cutter

Drill

Technical Data