

Mach Solid Flat Drill for hole making on various surface Types

# MSFD

**KORLOY**  
TECH-NEWS



- High quality hole making capability with 180° point angle
- Improved anti chipping and welding resistance by edge honing and chamfering
- Minimized creation of burrs compared to general drills

Mach Solid Flat Drill for Hole Making on Various Surface Types

# MSFD

When it comes to hole making on surfaces that are ramped, curved or flat, there have been frequent issues such as poor straightness, burr creation, short tool life and many other machining troubles. It is why there continues to be requests for solutions for such problems.

The **MSFD's** flat point shape enables high quality hole making on uneven workpiece surfaces. It additionally features stronger resistance to chipping and built up edge which provides longer tool life.

Strengthened cutting edges through honing and chamfering were factored into its development.

We assure our customers that the **MSFD** will boost productivity and save tool costs with multi functional machining availability.



#### **Excellent tool life**

- Reduces tool costs

#### **Higher tool quality**

- Enables high-class production

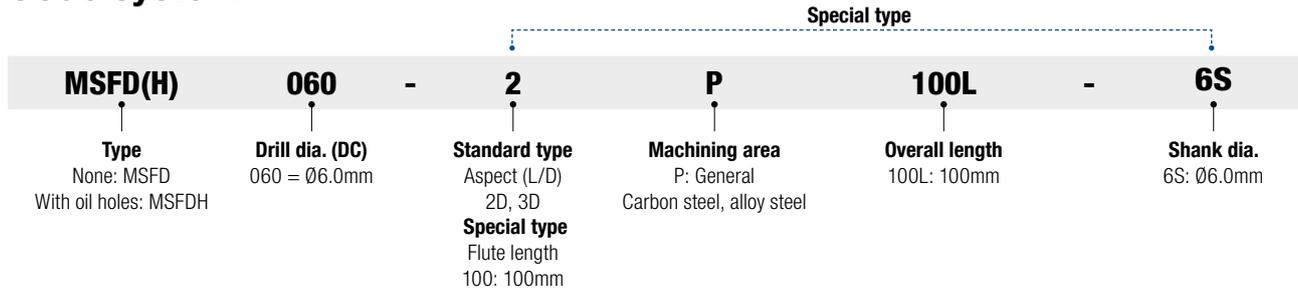
#### **Multi functional machining**

- For various hole types

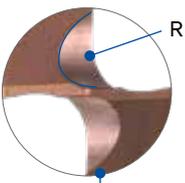
#### **Higher productivity**

- Shortens cycle time

# Code system

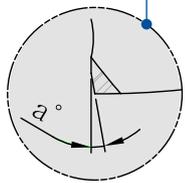


## Features



### Cutting edge design

- Stronger resistance to chipping through corner chamfering
- Widened chip pockets by the use of 'R' shape on the thinning part



### Excellent chip evacuation

- Excellent straightness with its 180° point angle when drilling on ramped surface



## Tool cost reduction and higher productivity



Conventional tools used and their application



MSFD

### Productivity

- Multi functional capability
- end milling and drilling using a single MSFD
- Higher productivity achieved through shorter process

## Burrs



Competitor

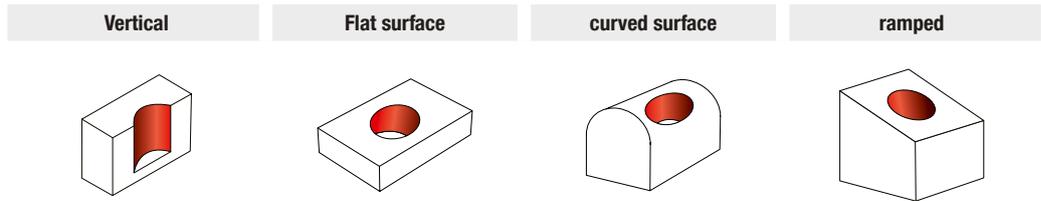


MSFD



# Wide Applications

A wide range of applications and improved cutting performance



# Cutting Performance

## Wear resistance

<b>Workpiece</b>	SM48C
<b>Cutting conditions</b>	Cutting length = 7.2 m (600 holes) · vc = 80 m/min · fn = 0.10 mm/rev · ap = 12 mm · wet
<b>Tools</b>	MSFD060-2P (PC325U)

**Prolongs tool life**  
Excellent resistance to wear and built up edge in machining carbon steels at low speed.



Competitor



MSFD

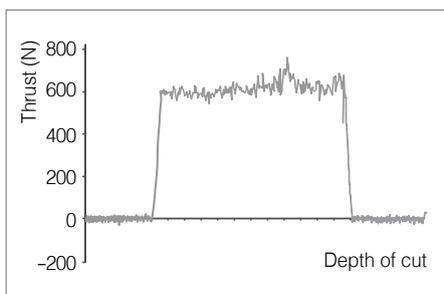


## Cutting force

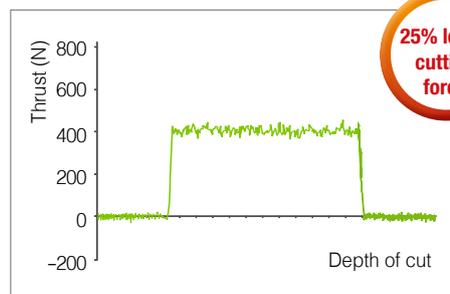
<b>Workpiece</b>	SM45C
<b>Cutting conditions</b>	vc = 70 m/min · fn = 0.10 mm/rev · ap = 15 mm · wet
<b>Tools</b>	MSFD060-3P (PC325U)

**Stable hole size consistency and better surface finish**

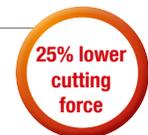
High precision hole making availability through lower cutting load.



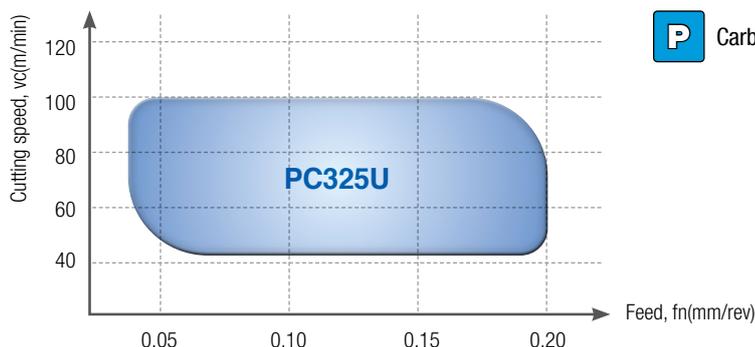
Competitor (Average thrust of 214N)



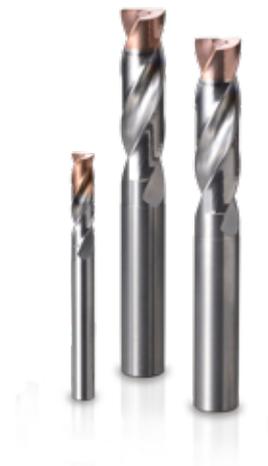
MSFD (Average thrust of 160N)



# Application Range

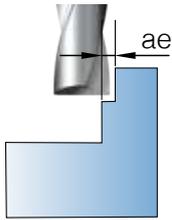


**P** Carbon steel

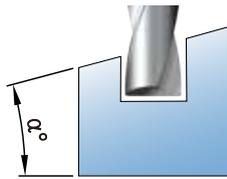


# Application Methods

Application type	Recommended machining conditions
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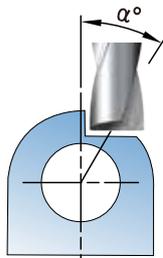


- Radial depth of cuts should be less than half the drill radius
- In case of increasing depth of cuts, divide the machining process into two passes



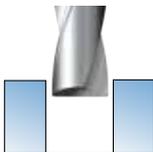
- Recommended slope angle range is under 30°
- In case of machining at slope angle over 30°, reduce the feed rate when the tool enters the workpiece

Slope angle ( $\alpha^\circ$ )	Performance	Applied (fn)
$\leq 20^\circ$	◎	100%
$20^\circ < -40^\circ$	○	80%
$\geq 40^\circ$	△	60%



- Use the tool within 30° from the center of the curve
- Reduce the feed rate when the tool penetrates the workpiece to the end part

Workpiece( $\varnothing$ )	Slope angle ( $\alpha^\circ$ )	Performance	Applied (fn)
$\leq \varnothing 100$	$\leq 20^\circ$	◎	100%
	$20^\circ < -40^\circ$	○	80%
	$\geq 40^\circ$	△	60%



- Reduce the feed rate by half the recommended condition when the tool enters the workpiece
- Reduce the feed rate by half the recommended condition when the tool penetrates the workpiece to the end part
- Recommended depth of cut is under 2D

# Recommended Cutting Conditions

Workpiece		Grade	Cutting speed, vc (m/min)	Feed (Depth of cut = 2D-3D)				
				Feed rate (mm/rev) per drill dia. (mm)				
ISO	Workpiece materials	Hardness (HB)	$\varnothing 2.5 - \varnothing 4.0$	$\varnothing 4.1 - \varnothing 8.0$	$\varnothing 8.1 - \varnothing 12.0$			
<b>P</b>	Carbon steel	Low carbon steel	80-120	PC325U	75 (60-90)	0.03 - 0.10	0.05 - 0.15	0.10 - 0.20
		High carbon steel	180-280	PC325U	75 (60-80)	0.03 - 0.10	0.05 - 0.15	0.10 - 0.20
	Alloy steel	Low alloy steel	140-260	PC325U	65 (50-80)	0.03 - 0.10	0.05 - 0.15	0.10 - 0.20
		High alloy steel	50-260	PC325U	65 (50-80)	0.03 - 0.10	0.05 - 0.15	0.10 - 0.20

# Application Examples

## Carbon steel (SM45C)

**Cutting conditions**  $vc = 80 \text{ m/min} \cdot fn = 0.1 \text{ mm/rev} \cdot ap = 12 \text{ mm} \cdot \text{wet}$

**Tools** MSFD060-2P (PC325U)

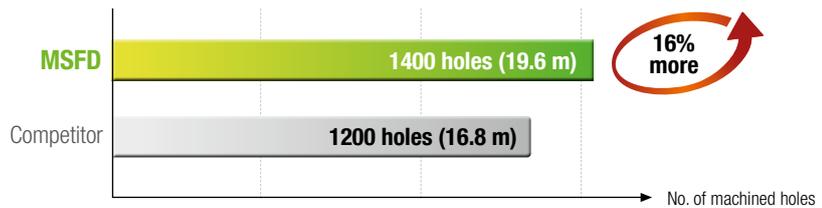


► 50 % longer tool life compared to the competitor

## Alloy steel (SCM440)

**Cutting conditions**  $vc = 100 \text{ m/min} \cdot fn = 0.1 \text{ mm/rev} \cdot ap = 14 \text{ mm} \cdot \text{wet}$

**Tools** MSFDH060-3P (PC325U)



► 16 % longer tool life compared to the competitor

## Carbon steel (SM45C)

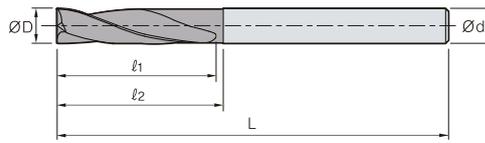
**Cutting conditions**  $vc = 80 \text{ m/min} \cdot fn = 0.1 \text{ mm/rev} \cdot ap = 12 \text{ mm} \cdot \text{wet}$

**Tools** MSFD060-2P (PC325U)



► 14 % longer tool life compared to the competitor

# MSFD-2D



Specification	P
Grade	PC325U
Tolerance (Drill dia.)	H7
Tolerance (Shank dia.)	h6
Point angle (θ°)	180°
Twist angle	20°
Thinning	R Type
Coolant	External

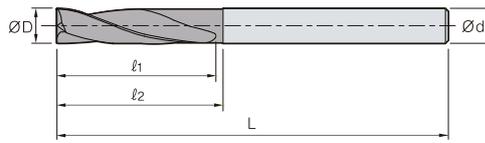
**P** Steel

(mm)

Designation	Stock	ØD	Ød	2P		
				l1	l2	L
025-2P	▲	2.5	4.0	10.5	11.5	50
026-2P	▲	2.6	4.0	10.9	11.9	50
027-2P	▲	2.7	4.0	11.3	12.3	50
028-2P	▲	2.8	4.0	11.8	12.8	50
029-2P	▲	2.9	4.0	12.2	13.2	50
030-2P	▲	3.0	6.0	12.6	13.6	50
031-2P	▲	3.1	6.0	13.0	14.0	50
032-2P	▲	3.2	6.0	13.4	14.4	50
033-2P	▲	3.3	6.0	13.9	14.9	50
034-2P	▲	3.4	6.0	14.3	15.3	50
035-2P	▲	3.5	6.0	14.7	15.7	50
036-2P	▲	3.6	6.0	15.1	16.1	50
037-2P	▲	3.7	6.0	15.5	16.5	50
038-2P	▲	3.8	6.0	16.0	17.0	50
039-2P	▲	3.9	6.0	16.4	17.4	50
040-2P	▲	4.0	6.0	16.8	17.8	50
041-2P	▲	4.1	6.0	17.2	18.2	60
042-2P	▲	4.2	6.0	17.6	18.6	60
043-2P	▲	4.3	6.0	18.1	19.1	60
044-2P	▲	4.4	6.0	18.5	19.5	60
045-2P	▲	4.5	6.0	18.9	19.9	60
046-2P	▲	4.6	6.0	19.3	20.3	60
MSFD 047-2P	▲	4.7	6.0	19.7	20.7	60
048-2P	▲	4.8	6.0	20.2	21.2	60
049-2P	▲	4.9	6.0	20.6	21.6	60
050-2P	▲	5.0	6.0	21.0	22.0	60
051-2P	▲	5.1	6.0	21.4	22.4	60
052-2P	▲	5.2	6.0	21.8	22.8	60
053-2P	▲	5.3	6.0	22.3	23.3	60
054-2P	▲	5.4	6.0	22.7	23.7	60
055-2P	▲	5.5	6.0	23.1	24.1	60
056-2P	▲	5.6	6.0	23.5	24.5	60
057-2P	▲	5.7	6.0	23.9	24.9	60
058-2P	▲	5.8	6.0	24.4	25.4	60
059-2P	▲	5.9	6.0	24.8	25.8	60
060-2P	▲	6.0	6.0	25.2	26.2	60
061-2P	▲	6.1	8.0	25.6	26.6	70
062-2P	▲	6.2	8.0	26.0	27.0	70
063-2P	▲	6.3	8.0	26.5	27.5	70
064-2P	○	6.4	8.0	26.9	27.9	70
065-2P	▲	6.5	8.0	27.3	28.3	70
066-2P	▲	6.6	8.0	27.7	28.7	70
067-2P	▲	6.7	8.0	28.1	29.1	70
068-2P	▲	6.8	8.0	28.6	29.6	70
069-2P	▲	6.9	8.0	29.0	30.0	70

▲ : Stock item Europe ● : Stock item Korea ○ : Production on demand

# MSFD-2D



Specification	P
Grade	PC325U
Tolerance (Drill dia.)	H7
Tolerance (Shank dia.)	h6
Point angle (θ°)	180°
Twist angle	20°
Thinning	R Type
Coolant	External

**P** Steel

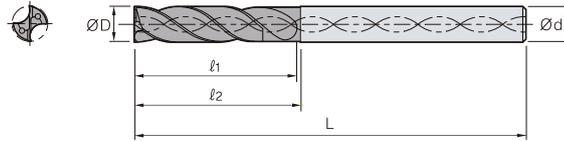
(mm)

Designation	Stock	ØD	Ød	2P		
				l1	l2	L
070-2P	▲	7.0	8.0	29.4	30.4	70
071-2P	▲	7.1	8.0	29.8	30.8	70
072-2P	▲	7.2	8.0	30.2	31.2	70
073-2P	▲	7.3	8.0	30.7	31.7	70
074-2P	▲	7.4	8.0	31.1	32.1	70
075-2P	▲	7.5	8.0	31.5	32.5	70
076-2P	▲	7.6	8.0	31.9	32.9	70
077-2P	▲	7.7	8.0	32.3	33.3	70
078-2P	▲	7.8	8.0	32.8	33.8	70
079-2P	▲	7.9	8.0	33.2	34.2	70
080-2P	▲	8.0	8.0	33.6	34.6	70
081-2P	▲	8.1	10.0	34.0	35.0	80
082-2P	▲	8.2	10.0	34.4	35.4	80
083-2P	▲	8.3	10.0	34.9	35.9	80
084-2P	▲	8.4	10.0	35.3	36.3	80
085-2P	▲	8.5	10.0	35.7	36.7	80
086-2P	▲	8.6	10.0	36.1	37.1	80
087-2P	▲	8.7	10.0	36.5	37.5	80
088-2P	▲	8.8	10.0	37.0	38.0	80
089-2P	▲	8.9	10.0	37.4	38.4	80
090-2P	▲	9.0	10.0	37.8	38.8	80
091-2P	▲	9.1	10.0	38.2	39.2	80
092-2P	▲	9.2	10.0	38.6	39.6	80
093-2P	▲	9.3	10.0	39.1	40.1	80
094-2P	▲	9.4	10.0	39.5	40.5	80
095-2P	▲	9.5	10.0	39.9	40.9	80
096-2P	▲	9.6	10.0	40.3	41.3	80
097-2P	▲	9.7	10.0	40.7	41.7	80
098-2P	▲	9.8	10.0	41.2	42.2	80
099-2P	▲	9.9	10.0	41.6	42.6	80
100-2P	▲	10.0	10.0	42.0	43	80
101-2P	▲	10.1	12.0	42.4	43.4	90
102-2P	▲	10.2	12.0	42.8	43.8	90
103-2P	▲	10.3	12.0	43.3	44.3	90
104-2P	▲	10.4	12.0	43.7	44.7	90
105-2P	▲	10.5	12.0	44.1	45.1	90
106-2P	▲	10.6	12.0	44.5	45.5	90
107-2P	▲	10.7	12.0	44.9	45.9	90
108-2P	▲	10.8	12.0	45.4	46.4	90
109-2P	▲	10.9	12.0	45.8	46.8	90
110-2P	▲	11.0	12.0	46.2	47.2	90
111-2P	▲	11.1	12.0	46.6	47.6	90
112-2P	▲	11.2	12.0	47.0	48.0	90
113-2P	▲	11.3	12.0	47.5	48.5	90
114-2P	▲	11.4	12.0	47.9	48.9	90
115-2P	▲	11.5	12.0	48.3	49.3	90
116-2P	▲	11.6	12.0	48.7	49.7	90
117-2P	▲	11.7	12.0	49.1	50.1	90
118-2P	▲	11.8	12.0	49.6	50.6	90
119-2P	▲	11.9	12.0	50.0	51.0	90
120-2P	▲	12.0	12.0	50.4	51.4	90

MSFD

▲: Stock item Europe ●: Stock item Korea ○: Production on demand

# MSFDH-3D



Specification	P
Grade	PC325U
Tolerance (Drill dia.)	H7
Tolerance (Shank dia.)	h6
Point angle (θ°)	180°
Twist angle	30°
Thinning	R Type
Coolant	Internal

**P** Steel

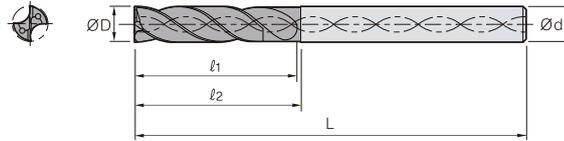
(mm)

Designation	Stock	ØD	Ød	3P		
				l1	l2	L
025-3P	▲	2.5	3.0	17	18	58
026-3P	▲	2.6	3.0	17	18	58
027-3P	▲	2.7	3.0	17	18	58
028-3P	▲	2.8	3.0	17	18	58
029-3P	▲	2.9	3.0	17	18	58
030-3P	▲	3.0	6.0	20	21	62
031-3P	▲	3.1	6.0	20	21	62
032-3P	▲	3.2	6.0	20	21	62
033-3P	▲	3.3	6.0	20	21	62
034-3P	▲	3.4	6.0	20	21	62
035-3P	▲	3.5	6.0	20	21	62
036-3P	▲	3.6	6.0	20	21	62
037-3P	▲	3.7	6.0	20	21	62
038-3P	▲	3.8	6.0	24	25	66
039-3P	▲	3.9	6.0	24	25	66
040-3P	▲	4.0	6.0	24	25	66
041-3P	▲	4.1	6.0	24	25	66
042-3P	▲	4.2	6.0	24	25	66
043-3P	▲	4.3	6.0	24	25	66
044-3P	▲	4.4	6.0	24	25	66
045-3P	▲	4.5	6.0	24	25	66
046-3P	▲	4.6	6.0	24	25	66
047-3P	▲	4.7	6.0	24	25	66
048-3P	▲	4.8	6.0	28	29	66
049-3P	▲	4.9	6.0	28	29	66
050-3P	▲	5.0	6.0	28	29	66
051-3P	▲	5.1	6.0	28	29	66
052-3P	▲	5.2	6.0	28	29	66
053-3P	▲	5.3	6.0	28	29	66
054-3P	▲	5.4	6.0	28	29	66
055-3P	▲	5.5	6.0	28	29	66
056-3P	▲	5.6	6.0	28	29	66
057-3P	▲	5.7	6.0	28	29	66
058-3P	▲	5.8	6.0	28	29	66
059-3P	▲	5.9	6.0	28	29	66
060-3P	▲	6.0	6.0	28	29	66

MSFDH

▲: Stock item Europe ●: Stock item Korea ○: Production on demand

# MSFDH-3D



Specification	P
Grade	PC325U
Tolerance (Drill dia.)	H7
Tolerance (Shank dia.)	h6
Point angle (θ°)	180°
Twist angle	30°
Thinning	R Type
Coolant	Internal

**P** Steel

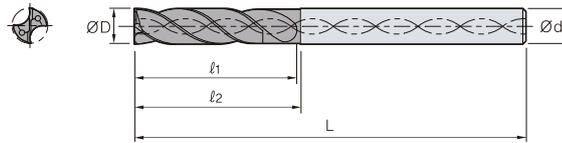
(mm)

Designation	Stock	ØD	Ød	3P		
				l1	l2	L
061-3P	▲	6.1	8.0	34	35	79
062-3P	▲	6.2	8.0	34	35	79
063-3P	▲	6.3	8.0	34	35	79
064-3P	▲	6.4	8.0	34	35	79
065-3P	▲	6.5	8.0	34	35	79
066-3P	▲	6.6	8.0	34	35	79
067-3P	▲	6.7	8.0	34	35	79
068-3P	▲	6.8	8.0	34	35	79
069-3P	▲	6.9	8.0	34	35	79
070-3P	▲	7.0	8.0	34	35	79
071-3P	▲	7.1	8.0	41	42	79
072-3P	▲	7.2	8.0	41	42	79
073-3P	▲	7.3	8.0	41	42	79
074-3P	▲	7.4	8.0	41	42	79
075-3P	▲	7.5	8.0	41	42	79
076-3P	▲	7.6	8.0	41	42	79
077-3P	▲	7.7	8.0	41	42	79
078-3P	▲	7.8	8.0	41	42	79
079-3P	▲	7.9	8.0	41	42	79
080-3P	▲	8.0	8.0	41	42	79
081-3P	▲	8.1	10.0	47	48	89
082-3P	▲	8.2	10.0	47	48	89
083-3P	▲	8.3	10.0	47	48	89
084-3P	▲	8.4	10.0	47	48	89
085-3P	▲	8.5	10.0	47	48	89
086-3P	▲	8.6	10.0	47	48	89
087-3P	▲	8.7	10.0	47	48	89
088-3P	▲	8.8	10.0	47	48	89
089-3P	▲	8.9	10.0	47	48	89
090-3P	▲	9.0	10.0	47	48	89

MSFDH

▲: Stock item Europe ●: Stock item Korea ○: Production on demand

# MSFDH-3D



Specification	P
Grade	PC325U
Tolerance (Drill dia.)	H7
Tolerance (Shank dia.)	h6
Point angle (θ°)	180°
Twist angle	30°
Thinning	R Type
Coolant	Internal

**P** Steel

(mm)

Designation	Stock	ØD	Ød	3P		
				I1	I2	L
091-3P	▲	9.1	10.0	47	48	89
092-3P	▲	9.2	10.0	47	48	89
093-3P	▲	9.3	10.0	47	48	89
094-3P	▲	9.4	10.0	47	48	89
095-3P	▲	9.5	10.0	47	48	89
096-3P	▲	9.6	10.0	47	48	89
097-3P	▲	9.7	10.0	47	48	89
098-3P	▲	9.8	10.0	47	48	89
099-3P	▲	9.9	10.0	47	48	89
105-3P	▲	10.5	12.0	55	56	102
110-3P	▲	11.0	12.0	55	56	102
111-3P	▲	11.1	12.0	55	56	102
112-3P	▲	11.2	12.0	55	56	102
113-3P	▲	11.3	12.0	55	56	102
114-3P	▲	11.4	12.0	55	56	102
115-3P	▲	11.5	12.0	55	56	102
116-3P	▲	11.6	12.0	55	56	102
117-3P	▲	11.7	12.0	55	56	102
118-3P	▲	11.8	12.0	55	56	102
120-3P	▲	12.0	12.0	55	56	102

MSFDH

▲: Stock item Europe ●: Stock item Korea ○: Production on demand

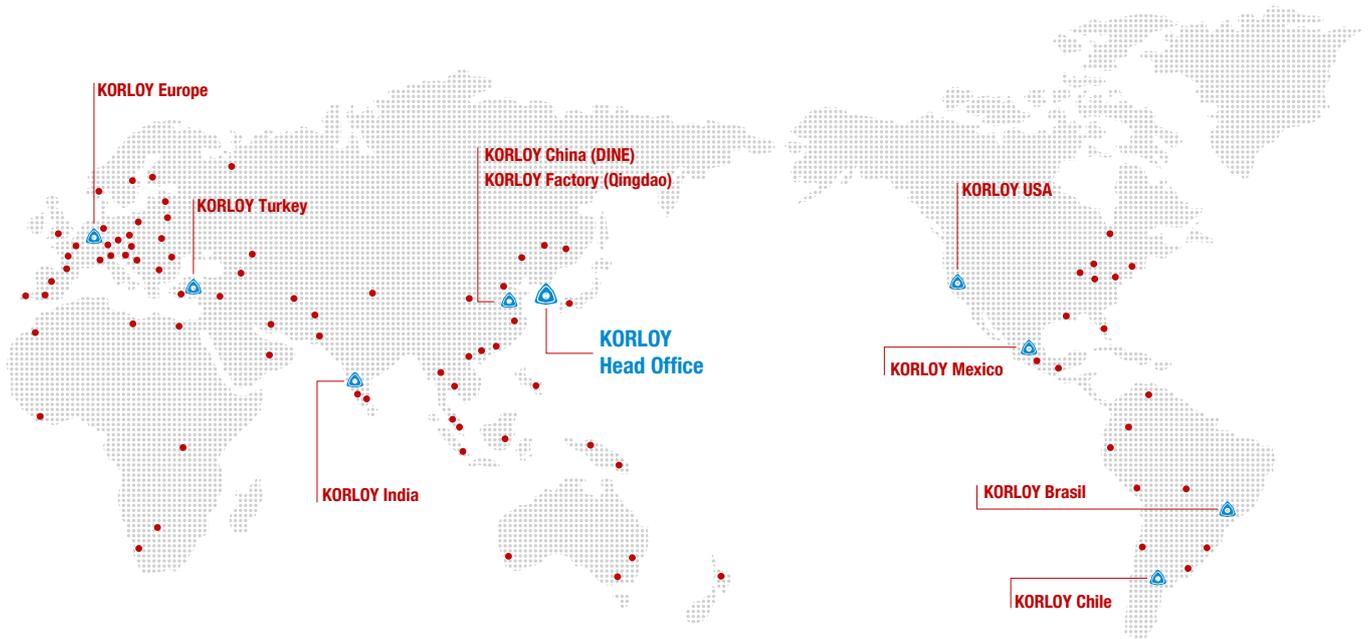
## ⚠ For the safe metalcutting

- Use safety supplies such as protective gloves to prevent possible injury while touching the edge of tools.
- Use safety glasses or safety cover to hedge possible dangers. Inappropriate usage or excessive cutting condition may lead tool's breakage or even the fragment's scattering.
- Clamp the workpiece tightly enough to prevent its movement while its machining.

Properly manage the tool change phase because the inordinately used tool can be easily broken under the excessive cutting load or severe wear, and it may threaten the operator's safety.

- Use safety cover because chips evacuated during cutting are hot and sharp and may cause burns and cuts. To remove chips safely, stop machining, put on protective gloves, and use a hook or other tools.

- Prepare for fire prevention measures as the use of the non-water soluble cutting oil may cause fire.
- Use safety cover and other safety supplies because the spare parts or the inserts can be pulled out due to centrifugal force while high speed machining.



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