KORLOY
TECH-NEWS

Mach Solid Flat Drill

MSFD

Mach Solid Flat Drill for Hole Making on Various Surface Types

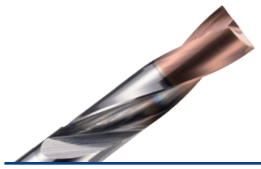
The best tool for ramped, curved or flat workpieces

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

KORLOY

Mach Solid Flat Drill for Hole Making on Various Surface Types

MSFD

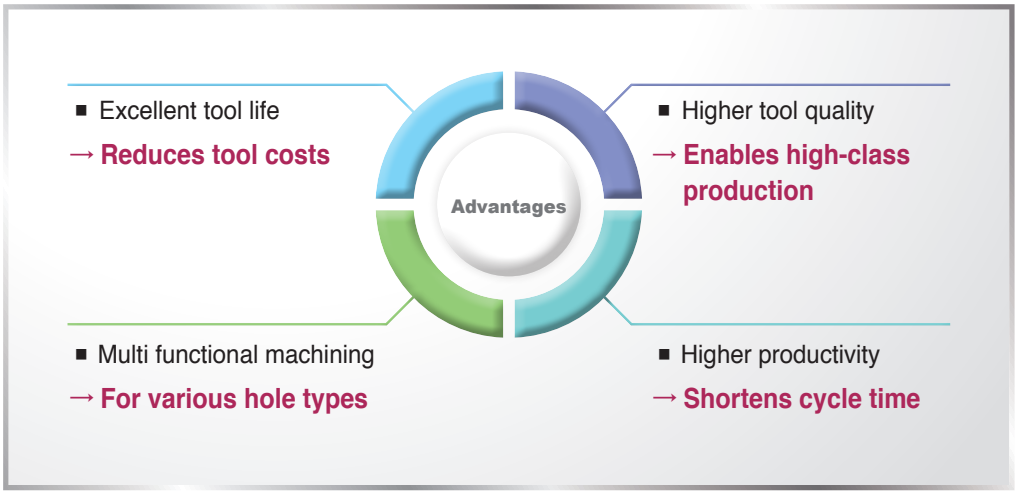


MSFD For various types of holes

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.



Code System

Special Type

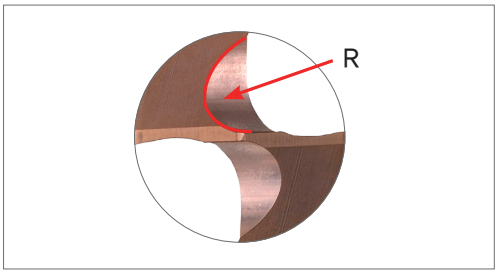
MSFD(H)	060	-	2	P	-	100L	-	6S
Oil hole	**Drill dia.**		**Standard type**			**Overall length**		**Shank dia.**
None : MSFD With oil holes : MSFDH	060 : Ø6.0		Aspect (L/D) 2D, 3D			100L : 100mm		6S : Ø6
			Special type	**Machining area**				
			Flute length 100 : 100mm	P : General - Carbon steel, alloy steel				

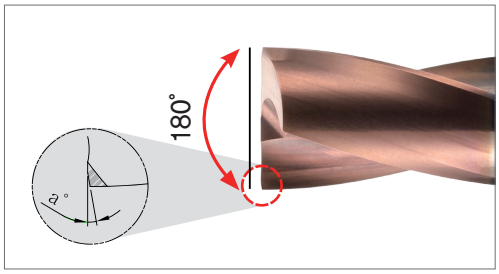
Features

- Excellent chip evacuation
- Higher rigidity on corner edges
- Longer tool life through higher resistance to chipping

Cutting edge design

- Excellent straightness with its 180° point angle when drilling on ramped surface
- Stronger resistance to chipping through corner chamfering
- Widened chip pockets by the use of 'R' shape on the thinning part

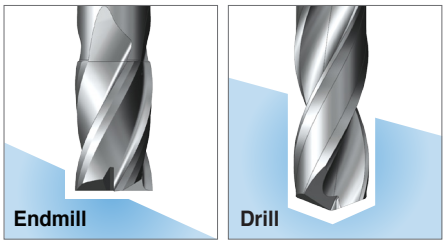




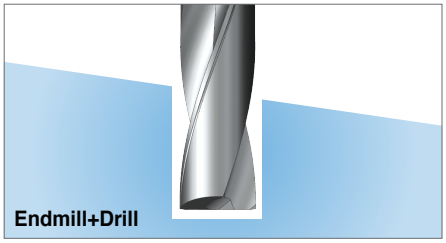
- Multi functional capability - end milling and drilling using a single MSFD

→ Higher productivity achieved through shorter process

Productivity



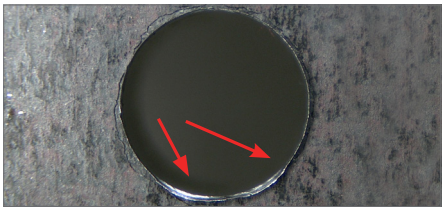
[Conventional tools used and their application]



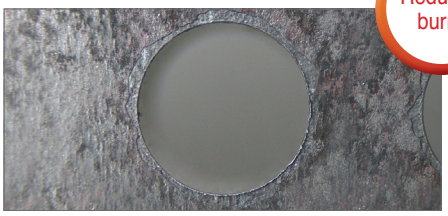
[MSFD]

Tool cost reduction, Higher productivity

Burrs



[Competitor]

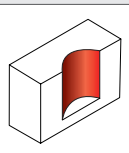
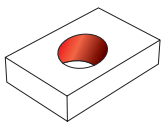
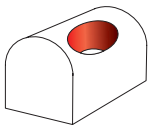
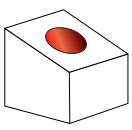


[MSFD]

Reduced burrs

Wide Applications

- A wide range of applications and improved cutting performance

Vertical	Flat surface	Curved surface	Ramped
			

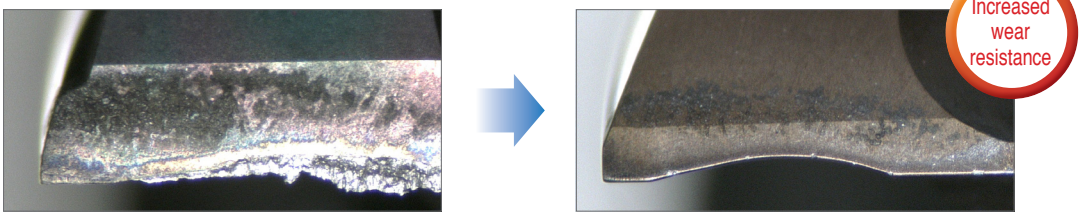
Cutting Performance

• Excellent resistance to wear and built up edge in machining carbon steels at low speed

→ Prolongs tool life

Wear resistance

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



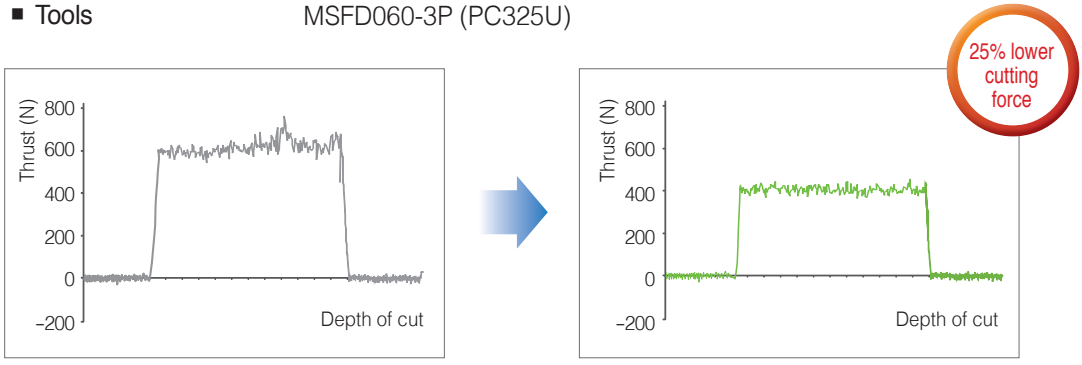
[Competitor] [MSFD]

• High precision hole making availability through lower cutting load

→ Stable hole size consistency and better surface finish

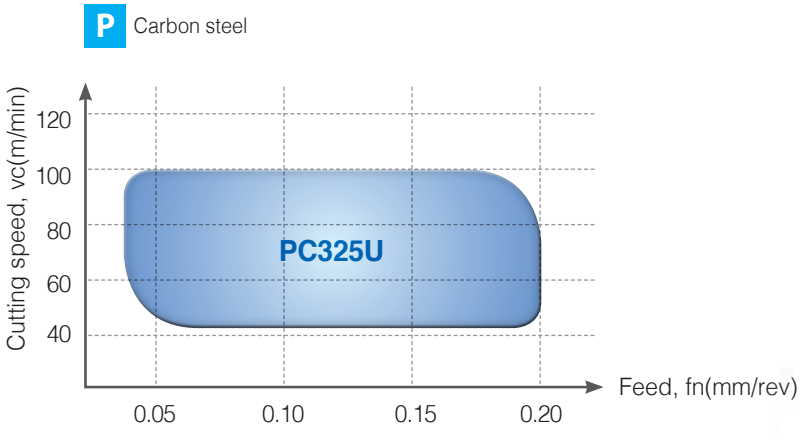
Cutting force

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

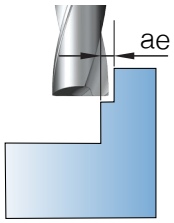
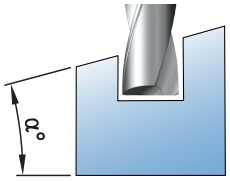
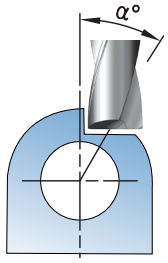
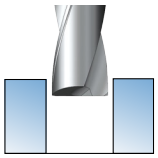


[Competitor (Average thrust of 214N)] [MSFD (Average thrust of 160N)]

Application Range



Application Methods

Application type	Recommended machining conditions
	• 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 (α°) / Performance / Applied (fn): ≤20° / ◎ / 100%; 20°<~40° / ○ / 80%; ≥40° / △ / 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(Ø) / Slope angle (α°) / Performance / Applied (fn): ≤Ø100 — ≤20° / ◎ / 100%; 20°<~40° / ○ / 80%; ≥40° / △ / 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

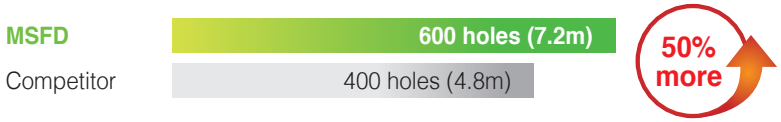
Recommended Cutting Conditions

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)			Ø2.5~Ø4.0	Ø4.1~Ø8.0	Ø8.1~Ø12.0
P	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)

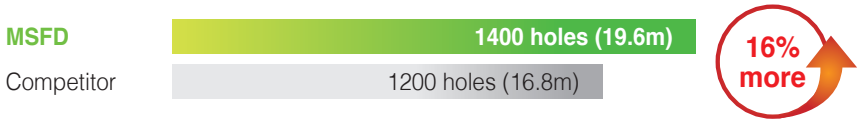
- Cutting conditions: vc(m/min) = 80, fn(mm/rev) = 0.1, ap(mm) = 12, wet
- Tool: MSFD060-2P (PC325U)



50% longer tool life compared to the competitor

Alloy steel (SCM440)

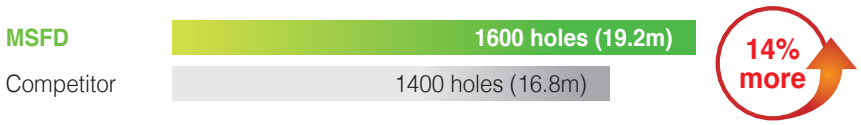
- Cutting conditions: vc(m/min) = 100, fn(mm/rev) = 0.1, ap(mm) = 14, wet
- Tool: MSFDH060-3P (PC325U)



16% longer tool life compared to the competitor

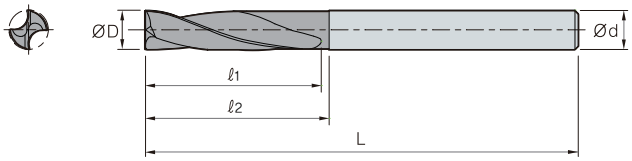
Carbon steel (SM45C)

- Cutting conditions: vc(m/min) = 80, fn(mm/rev) = 0.1, ap(mm) = 12, wet
- Tool: 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

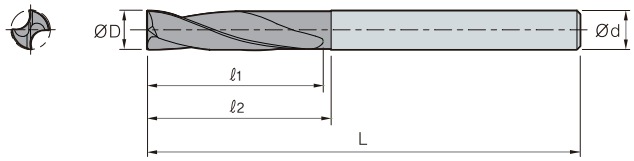
P Steel

(mm)

Designation		ØD	Ød	2P		
				ℓ_1	ℓ_2	L
MSFD	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
	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

MSFD

MSFD-2D



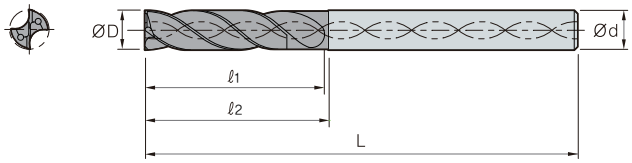
Specification	P
Grade	PC325U
Tolerance(Drill dia.)	H7
Tolerance(Shank dia.)	h6
Point angle(θ°)	180°
Twist angle	20°
Thinning	R Type
Coolant	External

P Steel

(mm)

Designation		ØD	Ød	2P		
				ℓ_1	ℓ_2	L
MSFD	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

MSFDH-3D



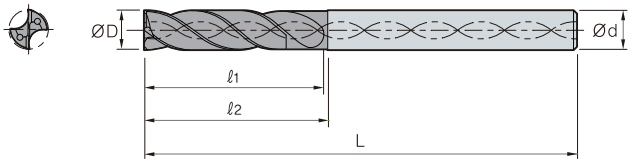
Specification	P
Grade	PC325U
Tolerance(Drill dia.)	H7
Tolerance(Shank dia.)	h6
Point angle(θ°)	180°
Twist angle	30°
Thinning	R Type
Coolant	Internal

P Steel

(mm)

Designation		ØD	Ød	3P		
				ℓ1	ℓ2	L
MSFDH	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-3D



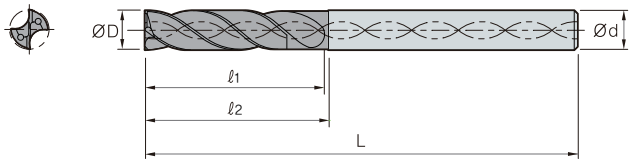
Specification	P
Grade	PC325U
Tolerance(Drill dia.)	H7
Tolerance(Shank dia.)	h6
Point angle(θ°)	180°
Twist angle	30°
Thinning	R Type
Coolant	Internal

P Steel

(mm)

Designation		ØD	Ød	3P		
				ℓ_1	ℓ_2	L
MSFDH	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-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		ØD	Ød	3P		
				ℓ_1	ℓ_2	L
MSFDH	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
	100-3P	10.0	10.0	47	48	89
	101-3P	10.1	12.0	55	56	102
	102-3P	10.2	12.0	55	56	102
	103-3P	10.3	12.0	55	56	102
	104-3P	10.4	12.0	55	56	102
	105-3P	10.5	12.0	55	56	102
	106-3P	10.6	12.0	55	56	102
	107-3P	10.7	12.0	55	56	102
	108-3P	10.8	12.0	55	56	102
	109-3P	10.9	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
	119-3P	11.9	12.0	55	56	102
	120-3P	12.0	12.0	55	56	102

www.korloy.com

KORLOY

Holystar B/D, 1350, Nambusunhwan-ro, Geumcheon-gu, Seoul, 08536, Korea
Tel : +82-2-522-3181 Fax : +82-2-522-3184, +82-2-3474-4744 Web : www.korloy.com E-mail : export@korloy.com

KORLOY AMERICA
620 Maple Avenue, Torrance, CA 90503, USA
Tel : +1-310-782-3800 Toll Free : +1-888-711-0001 Fax : +1-310-782-3885
www.korloyamerica.com E-mail : sales@korloy.us

KORLOY INDIA
Plot NO.415, Sector 8, IMT Manesar, Gurgaon 122051, Haryana, INDIA
Tel : +91-124-4391790 Fax : +91-124-4050032
www.korloyindia.com E-mail : sales.kip@korloy.com

KORLOY EUROPE
Gablonzer Str. 25-27, 61440 Oberursel, Germany
Tel : +49-6171-277-83-0 Fax : +49-6171-277-83-59
www.korloyeurope.com E-mail : sales@korloyeurope.com

KORLOY BRASIL
Av. Aruana 280, conj.12, WLC, Alphaville, Barueri,
CEP06460-010, SP, Brasil
Tel : +55-11-4193-3810 E-mail : vendas@korloy.com

TN52-EM-01 / 20170220