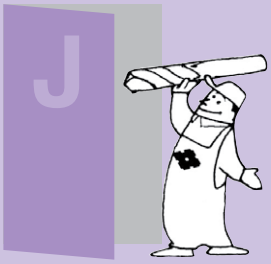
Drills J

J1 to J89



Stock Indications and Symbols

●● mark: Standard stocked item
● mark: To be replaced by a new item featured on the same page
▲ mark: To be replaced by new item
(Please confirm stock availability)

＊ mark: Semi-standard stock (Please confirm stock availability)
○○ mark: Stock or planned stock (Please confirm stock availability)
No mark: Made-to-order item
— mark: We cannot produce

Drill Selection Guide

Application	Work Material	Description	Cat. No.	Diameter (mm)	Appearance	Ref. Page
General Purpose	P	Super MultiDrill **GS** Type	MDW○○○○GS2	ø1.0 to 20.0		J8
			MDW○○○○GS4	ø1.0 to 20.0		
	P M S	Super MultiDrill **HGS** Type	MDW○○○○HGS3	ø1.5 to 20.0		J8
			MDW○○○○HGS5	ø1.5 to 20.0		
			MDW○○○○HGS8	ø1.5 to 16.0		
	K N	Super MultiDrill **G** Type	MDS○○○SG	ø1.0 to 20.0		J20
			MDS○○○MG	ø1.0 to 20.0		
High Efficiency	P K	Strong MultiDrill **HY** Type	MDW○○○○HY3	ø5.0 to 16.0		J14
			MDW○○○○HY5	ø5.0 to 16.0		
			MDW○○○○HY8	ø5.0 to 16.0		
Spot Facing	P	Flat MultiDrills **MDF** Type New	MDF○○○○S2D	ø2.0 to 12.0		J14
Deep Hole	P	Super MultiDrill **XHGS** Type	MDW○○○○XHGS12	ø2.5 to 16.0		J34
			MDW○○○○XHGS15	ø2.5 to 14.0		
			MDW○○○○XHGS20	ø2.5 to 12.0		
			MDW○○○○XHGS25	ø2.5 to 10.0		
			MDW○○○○XHGS30	ø2.5 to 9.0		
		Guide Drill for Long Drills **PHT** Type	MDW○○○○PHT	ø2.5 to 16.0		J34
Thin Sheet	P	Super MultiDrill **WGS** Type	MDW○○○○WGS2	ø6.8 to 16.0		J32
Cast Iron	K	Strong MultiDrill **HX** Type	MDW○○○○HX3	ø3.0 to 20.0		J14
			MDW○○○○HX5	ø3.0 to 20.0		
			MDW○○○○HX8	ø3.0 to 18.0		
Non-ferrous Metal	N	Super MultiDrill **NHGS** Type	MDW○○○○NHGS3	ø3.0 to 16.0		J28
			MDW○○○○NHGS5	ø3.0 to 16.0		
			MDW○○○○NHGS10	ø3.0 to 16.0		
	N	SUMIDIA Drill **DAL** Type	DAL○○○○H	ø5.0 to 12.0		J43
	N	SUMIDIA Drill **DDL** Type	DDL○○○○H	ø5.0 to 12.0		J43
Hardened Steel	H	Super MultiDrill **D** Type	MDS○○○MD	ø1.0 to 20.0		J22
Heat Resistant Alloy	S	Drill for Heat-Resistant Alloys **SGS** Type	MDW○○○○SGS3	ø3.0 to 12.0		J30
CFRP	CFRP	SUMIDIA Coated Drill **SDC** Type	MDS○○○○○SDC3	ø2.0 to 10.0		J42
Small Diameter Deep Hole	P M K	Micro Long Drill **MLDH** Type	MLDH○○○○L5	ø0.8 to 2.0		J38
			MLDH○○○○L12	ø0.8 to 2.0		
			MLDH○○○○L20	ø0.8 to 2.0		
			MLDH○○○○L30	ø0.8 to 2.0		
		Guide Drill for MLDH Type **MLDH-P** Type	MLDH○○○○P	ø0.8 to 2.0		J38
Very Small Diameter	P M K H	MINI-MultiDrill **MDSS** Type	MDSS○○○○	ø0.2 to 1.0		J40
	P M N	Micro MultiDrill **MDUS** Type	MDUS○○○○-30C	ø0.03 to 0.19		J40
		Micro Multi Pointing Drill **MDUP** Type	MDUP○○○○-30C	ø0.03 to 0.18		J40

Drill Selection Guide

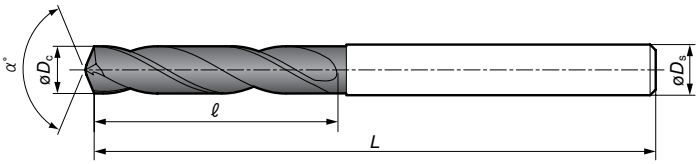
Exchangeable Head Type	Drilling Depth (L/D)	Coat	Coolant Supply	P			H		M	S		K		N			Ref. Page
				Carbon Steel, Alloy Steel Up to 35HRC		Tempered Steel	Hardened Steel		Stainless Steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite	
				C Up to 0.28%	C From 0.29%	SKD SKS	Up to 45 HRC	From 46 HRC	SUS	Ti	Inconel	FC	FCD	Al	Cu	CFRP	
GS Type	2D 4D	DEX Coat	External	○	◎	◎	○		○		○	○	○				J8
HGS Type	3D 5D 8D	DEX Coat	Internal	◎	◎	◎	○		◎	◎	○	○	○		○		J8
G Type	2D	—	External									○	○	○	○		J20
HY Type	3D 5D 8D	DEX Coat	Internal	◎	◎							◎	◎				J14
MDF Type	2D	PVD Coat	External	◎	◎	○	○		○			◎	◎	○			J26
XHGS Type	12D 15D 20D 25D 30D	DEX Coat	Internal	○	◎	◎	○		○			○	○				J34
PHT Type	3D	DEX Coat	Internal	○	◎	◎	○		○			○	○				J34
WGS Type	2D	DEX Coat	External	○	◎	◎	○		○			○	○	○			J32
HX Type	3D 5D 8D	DEX Coat	Internal									◎	◎				J14
NHGS Type	3D 5D 10D	Aurora DLC Coat	Internal									○	○	◎	◎		J28
DAL Type	3D	—	External											◎		○	J43
DDL Type	3D	—	External											◎		○	J43
D Type	3D	ZX Coat	External				◎	◎			○						J22
SGS Type	3D	PVD Coat	External							○	◎						J30
SDC Type	3D	SUMIDIA Coat	Dry											○		◎	J42
MLDH Type	5D 12D 20D 30D	PVD Coat	Internal	◎	◎	○	○		◎			◎	◎	○			J38
MLDH-P Type	3D	PVD Coat	Internal	◎	◎	○	○		◎			◎	◎	○			J38
MDSS Type	10D	FB Coat	External	◎	◎	◎	◎	○	◎		○	◎	◎	○			J40
MDUS Type	10D	PVD Coat	External	◎	◎				◎					○	◎		J40
MDUP Type	10D	PVD Coat	External	◎	◎				◎					○	◎		J40

Drill Selection Guide

Application · Specifications	Work Material	Description	Cat. No.	Diameter (mm)	Appearance	Ref. Page
Exchangeable Head Type High Efficiency	P K	SEC-MultiDrill **SMD-MTL** Type Head	SMDH○○○M	ø12.0 to 42.5		J8
			SMDH○○○L	ø12.0 to 42.5		
			SMDH○○○D	ø13.5 to 42.5		
Exchangeable Head Type Low Cutting Forces	P M K	SEC-MultiDrill **SMD-MEL** Type Head	SMDH○○○M	ø12.0 to 30.5		J8
			SMDH○○○L	ø12.0 to 30.5		
			SMDH○○○D	ø12.0 to 30.5		
Exchangeable Head Type Structural Steel	P	SEC-MultiDrill **SMD-MB** Type Head	SMDH○○○B3	ø24.5 to 26.7		J20
Exchangeable Inserts	P M K N	SumiDrill **WDX** Type	WDX○○○D2S○○	ø13.0 to 68.0		J14
			WDX○○○D3S○○	ø13.0 to 68.0		
			WDX○○○D4S○○	ø13.0 to 63.0		
			WDX○○○D5S○○	ø13.0 to 55.0		
	P K S N	SEC- Plunge Drill **PDL** Type	PDL○○○D2S○○	ø16.0 to 40.0		J14
			PDL○○○D3S○○	ø16.0 to 40.0		
	P K S N	SEC-Plunge Mill **PCT** Type	PCL○○○D3S○○	ø16.0 to 40.0		J26
			PCL○○○D5S○○	ø16.0 to 40.0		
Exchangeable Reamers	P M K	SumiReamer **SR** Type	SRG○○.○H7-○○○-○○○12R1	ø11.9 to 140.6		J34
			SRL○○.○H7-○○○-○○○12R1	ø11.9 to 140.6		
Special (With Chamfer Blade)	P K	Super MultiDril **SK** Type	MDW○○○○S2K	ø4.3 to 10.3		J34
			MDW○○○○S3K	ø4.3 to 10.3		
	P K	Super MultiDril **SHK** Type	MDW○○○○S2HK	ø4.3 to 10.3		J32
			MDW○○○○S3HK	ø4.3 to 10.3		
	K N	Super MultiDril **SG** Type	MDW○○○○S2G	ø4.3 to 10.3		J28
			MDW○○○○S3G	ø4.3 to 10.3		
	K N	Super MultiDril **SHG** Type	MDW○○○○S2HG	ø4.3 to 10.3		J43
			MDW○○○○S3HG	ø4.3 to 10.3		
Brazed	P K	Super MultiDril **AK** Type	KDS○○○MAK	ø13.6 to 40.5		J43
			KDS○○○LAK	ø13.6 to 40.5		
			KDS○○○DAK	ø13.0 to 40.5		
	P	Super MultiDril **BAK** Type	KDS○○○BAK	ø13.6 to 30.5		J22
HSS	P K	H's (HSS) MultiDrill **HMD** Type	HMD○○○S	ø1.0 to 20.0		J22
			HMD○○○M	ø2.0 to 20.0		

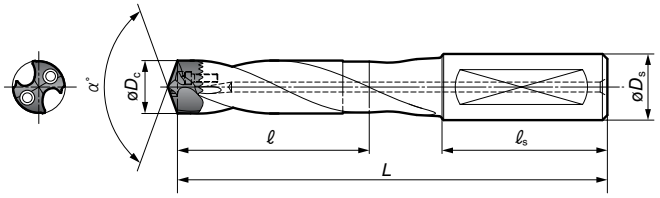
■ Legend

$øD_c$	Diameter
ℓ	Flute Length
L	Total Length
$øD_s$	Shank Diameter
$\alpha°$	Point angle



■ Legend

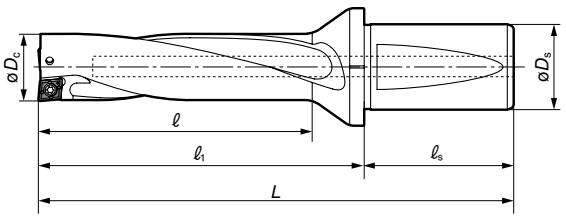
$øD_c$	Diameter
ℓ	Effective flute length
ℓ_s	Shank Length
L	Total Length
$øD_s$	Shank Diameter
$\alpha°$	Point angle



Exchangeable Head Type	Drilling Depth (L/D)	Coat	Coolant Supply	P			H		M	S		K		N			Ref. Page
				Carbon Steel, Alloy Steel Up to 35HRC		Tempered Steel	Hardened Steel		Stainless Steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite	
				C Up to 0.28%	C From 0.29%	SKD SKS	Up to 45 HRC	From 46 HRC	SUS	Ti	Inconel	FC	FCD	Al	Cu	CFRP	
SMD -MTL Type Head	3D 5D 8D	DEX Coat	Internal	◎	◎		○		○			◎	◎				J44
SMD -MEL Type Head	3D 5D 8D	DEX Coat	Internal	◎	○		○		◎	○	○	◎	◎	○			J44
SMD -MB Type Head	3D	DEX Coat	Internal	◎	◎												J50
WDX Type	2D 3D 4D 5D	PVD Coat / Aurora DLC Coat	Internal	◎	◎		○		◎			◎	◎	◎			J52
PDL Type	2D 3D	PVD Coat / Aurora DLC Coat	Internal	◎	◎		○		○	◎		◎	◎	◎	○		J64
PCT Type	3D 5D	PVD Coat / Aurora DLC Coat	Internal	◎	◎		○		○	◎		◎	◎	◎	○		J64
SR Type		PVD Coat / Aurora DLC Coat	Internal	◎	◎	◎	○		◎			◎	◎	○	○		J68
SK Type	2D 3D	ZX Coat	External	○	○	○						○	○				J24
SHK Type	2D 3D	ZX Coat	Internal	○	○	○						○	○				J24
SG Type	2D 3D	—	External									○	○	○	○		J24
SHG Type	2D 3D	—	Internal									○	○	○	○		J24
AK Type	3D 5D 7D	ZX Coat	Internal	◎	◎				○			○	◎	○			J79
BAK Type	3D	ZX Coat	Internal	◎	◎												J79
HMD Type	5D	PVD Coat	External	○	○				○			○	○	○			J82

■ Legend

$øD_c$	Diameter
ℓ	Flute Length
ℓ_1	Length Below Neck
ℓ_s	Shank Length
L	Total Length
$øD_s$	Shank Diameter



DEX Coating

DEX Coat

■ General Features

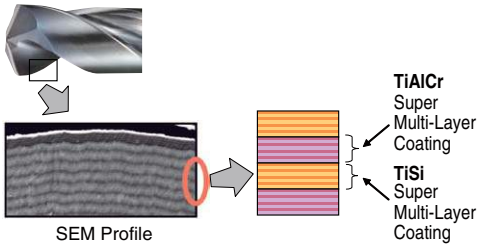
Sumitomo Electric Hardmetal's next-generation drill coating utilises nano-coating technology to provide more than double the tool life of conventional coatings.

- ●Silicon and chrome improve wear, heat, and adhesion resistance.
- ●New super multi-layered structure offers significantly improved chip resistance (coating strength).

■ Characteristics

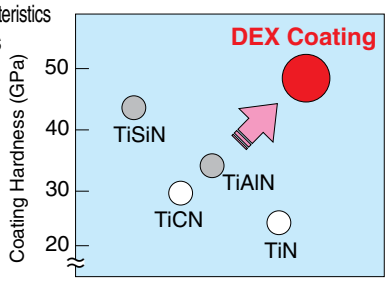
● Coating Design

World's first combined super multi-layered coating is made from alternate layers of super multilayered substrates.



SEM Profile

●Characteristics of Films



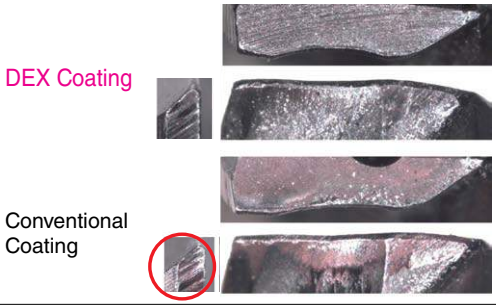
■ DEX Coat Application Examples

● MultiDrill GS Type Drilling Examples

Comparison of Wear Resistance	Comparison of Adhesion Resistance
Edge Wear Comparison for 70m Drilling	Edge Wear Comparison for 100m Drilling
Shoulder and rake face feature improved wear resistance enabling long tool life.	Offers significantly improved fracture resistance to counter problems caused by shoulder and flute adhesion in soft steel drilling.
DEX Coating MultiDrill GS Type / Comp. A Drill	DEX Coating MultiDrill GS Type / Comp. B Drill
GS Type MultiDrill with DEX Coating / Company A's Drill: 0 20 40 60 80 100 120 (m) Drilling Length	GS Type MultiDrill with DEX Coating: Able to continue / Company B's Drill: Breakage; 0 20 40 60 80 100 120 140 160 180 (m) Drilling Length
Tool: MDW0800GS4 Work Material: S50C (200HB) Cutting Conditions: v_c=70m/min f=0.25mm/rev H=32mm External Coolant (Water Soluble)	Tool: MDW0600GS4 Work Material: SCM415 (120HB) Cutting Conditions: v_c=60m/min f=0.18mm/rev H=18mm External Coolant (Water Soluble)

● Long MultiDrill XHT Type Drilling Examples

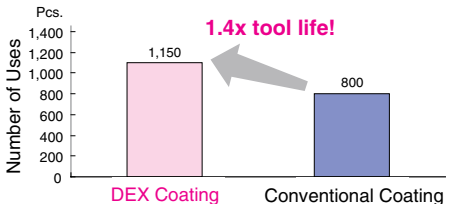
Reduced margin wear during deep hole MQL drilling increases number of regrinds.



Tool: MDW0497XHT20 (ø4.97 L/D=20)
Work Material: SCM440 Equivalent Material (HB275) Crank Shaft
Cutting Conditions: v_c=70m/min f=0.23mm/rev H=75mm
MQL

● SEC MultiDrill SMD Type Drilling Examples

Offers longer tool life with SEC MultiDrills as well.



Tool: SMDH210M (ø21.0)
Work Material: SMnB (HB350) Construction Machine Component
Cutting Conditions: v_c=65m/min f=0.25mm/rev H=25mm
Water-soluble Coolant

Drill Coating

AURORA COAT

Aurora DLC Coat

■ General Features

Sumitomo Electric Hardmetal's AURORA COAT is a high hardness, low friction layer of DLC (Diamond Like Carbon).
AURORA COAT is a thin-layer coating that provides greatly improved adhesion resistance when drilling aluminium alloys and non-ferrous metals and ensures long, stable tool life when used in combination with specially designed drill shapes.

■ Characteristics

- ●Ultra-smooth DLC thin-layer coating with low coefficient of friction
  High resistance to adhesion and significantly reduced cutting resistance when drilling aluminium alloys and non-ferrous metals.
- ●High coating strength withstands tough cutting conditions
  Special coating technique improves coating adhesion and is world's first application on cutting tools.
- ●Employed on Super MultiDrill NHGS type and SumiDrill WDX type
- ●A spectrum of colours
  Sparkling colours are a result of the special coating technique.

■ AURORA COAT Application Examples

AURORA COAT Super MultiDrill NHGS Type (After 100 Holes)	 Clean Cutting Edge With No Adhesion
Comp. Drill (After 20 Holes)	 Extensive Adhesion

Drill : ø8 (5D)
Work Material : ADC12
Cutting Conditions : v_c=200m/min f=1.0mm/rev H=32mm Internal Coolant

SUMIDIA Coat

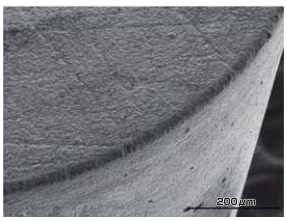
SUMIDIA Coat

■ General Features

Sumitomo Electric Hardmetal's proprietary crystalline diamond coating technology achieves wear resistance over 10 times that of uncoated carbide.
Special diamond coating alloy and proprietary coating pre-treatment technology ensure superior diamond layer adhesion.

■ Characteristics

- ●Provides ultra-flat surfaces required for cutting CFRP as well as a fine diamond layer with high strength and wear resistance.



■ SUMIDIA Coat Application Examples

SUMIDIA Coated Drill	Competitor's Diamond Coated Drill
	
After 600 Holes Able To Continue 	After 50 Holes Peeling And Burrs 

Work Material: CFRP
Tool : SUMIDIA Coated Drill ø6.35mm
Competitor's Diamond Coated Drill ø6.35mm
Cutting Conditions : v_c=130m/min f=0.075mm/rev H=15mm
Through Hole Dry

GS / HGS Type

Excellent Chip Evacuation and Stable and Long Tool Life

■ General Features

Super MultiDrill GS and HGS types are solid carbide drills that employ a new flute design and wide chip pocket to achieve excellent chip management and evacuation.
DEX coating enables stable and long tool life over a wide range of work materials and applications.

■ Characteristics and Applications

●Long tool life
New cutting edge design and special DEX coating provide long tool life with a wide variety of work materials.

●Stable chip evacuation
New flute shape significantly improves chip management and evacuation.

●Quiet cutting and stable cutting resistance
Stable drilling with little wobble even in small machine applications.

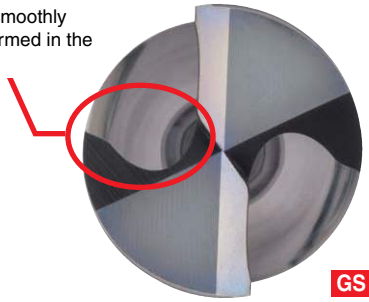
●Environmentally-friendly
Compatible with the MQL (Minimum Quantity Lubrication) system.

J flute

* J flute is a registered trademark.

HGS Type

Wide chip pocket smoothly evacuates chips formed in the centre.



GS Type

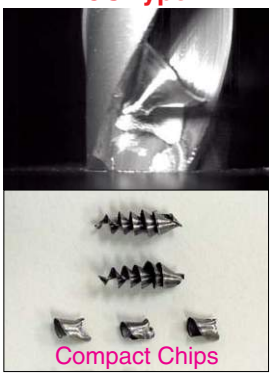
■ Series

Coolant Supply	Type	Diameter Range (mm)	Hole Depth (L/D)
External (GS Type)	MDW□□□□GS2	ø1.0 to ø20.0	Up to 2
	MDW□□□□GS4		Up to 4
Internal (HGS Type)	MDW□□□□HGS3	ø1.5 to ø20.0	Up to 3
	MDW□□□□HGS5		Up to 5
	MDW□□□□HGS8	ø1.5 to ø16.0	Up to 8

■ Performance

Chip Management

GS Type

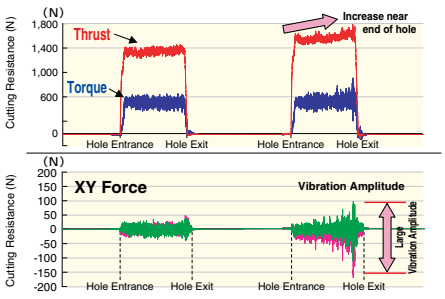


Compact Chips

Conventional Tool

Performance Comparison

GS Type Conventional Tool



GS type provides stable drill behaviour throughout the drilling process.

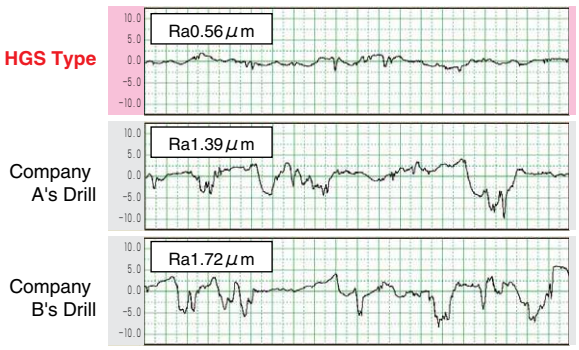
Tool: MDW0800GS4
Work Material: S50C (200HB)
Cutting Conditions: v_c=80m/min f=0.25mm/rev H=24mm
External Coolant (Water Soluble)

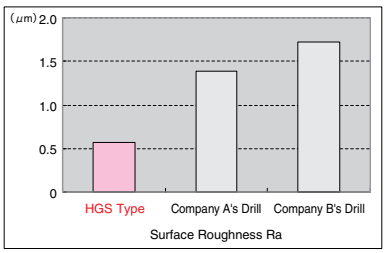
GS / HGS Type

■ Employs Double Margin (HGS Type) *Except for ø1.5 to ø2.4 mm sizes

HGS type employs double margin design for improved stability and accuracy during deep hole drilling.

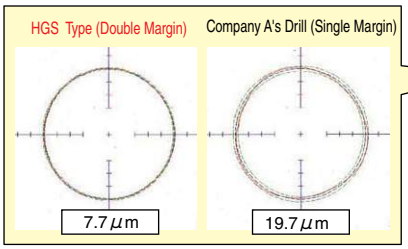
●Surface Roughness Comparison

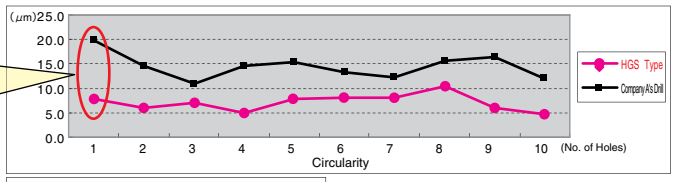




Work Material : SCM415 (120HB)
Tool : MDW0800HGS5
Cutting Conditions : v_c=80m/min f=0.25mm/rev H=38mm
Internal Coolant (Water Soluble)

●Circularity Comparison



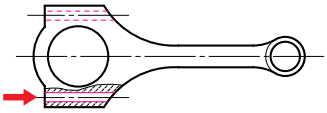


Work Material : S50C (200HB)
Tool : MDW0800HGS8
Cutting Conditions: v_c=80m/min f=0.25mm/rev
H=64mm Internal Coolant (Water Soluble)

4-point guide design reduces runout for improved stability. Good surface roughness and circularity

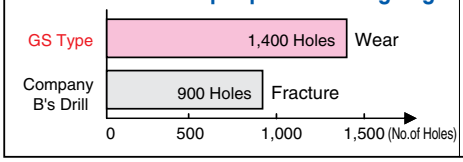
■ Application Examples (Super MultiDrill GS Type)

● S43C (250HB) Automotive Component

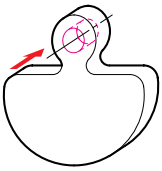


· Tool: MDW0970GS4
· Cutting Conditions: v_c=80m/min f=0.25mm/rev H=25mm
External Coolant (Water Soluble)

Achieving 1.5x tool life!
Reduced wear on peripheral cutting edge

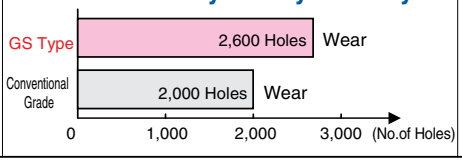


● Boron Steel (30HRC) Machine Component

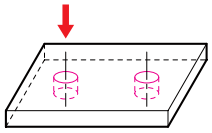


· Tool: MDW0980GS2
· Cutting Conditions: v_c=70m/min f=0.15mm/rev H=7mm
External Coolant (Water Soluble)

1.3x tool life of conventional tools!
Good circularity and cylindricity.

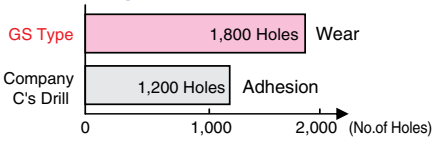


● SS400 Machine Component



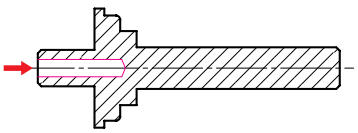
· Tool: MDW1050GS4
· Cutting Conditions: v_c=150m/min f=0.3mm/rev H=12mm
External Coolant (Water Soluble)

Achieving 1.5x tool life!
Good chip control



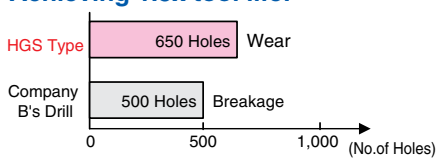
■ Application Examples (Super MultiDrill HGS Type)

● SCR440H Automotive Component

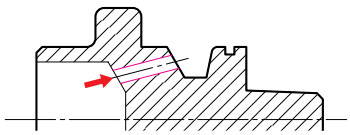


· Tool: MDW0600HGS8
· Cutting Conditions: v_c=80m/min f=0.25mm/rev H=48mm
Internal Coolant (Oil based)

Achieving 1.3x tool life!

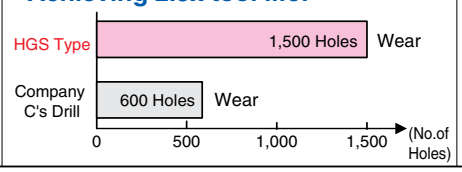


● SUJ2 Automotive Component

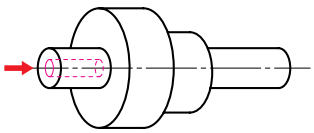


· Tool: MDW0570HGS5
· Cutting Conditions: v_c=80m/min f=0.1mm/rev H=35mm
Internal Coolant (Water Soluble)

Achieving 2.5x tool life!

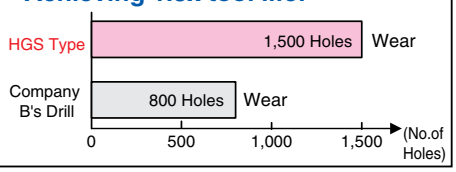


● SCM415 Machine Component



· Tool: MDW0860HGS3
· Cutting Conditions: v_c=52m/min f=0.2mm/rev H=25mm
Internal Coolant (Water Soluble)

Achieving 1.8x tool life!



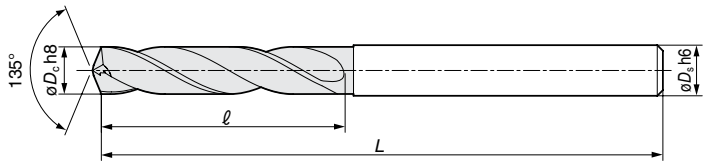
GS Type

External Coolant Supply (GS Type)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
○	◎	◎	○	○	○		○	○	○			

DEX Coat | 2D | 4D

● GS Type



● Diameter ø1.0 to ø6.5mm

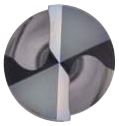
Diameter øDc (mm)	Shank øDs (mm)	Cat. No. 2,4	2D Type Stock [2]	2D Type Dimensions (mm) L	2D Type Dimensions (mm) ℓ	4D Type Stock [4]	4D Type Dimensions (mm) L	4D Type Dimensions (mm) ℓ
1.0	3.0	MDW 0100GS□	●	45	6	●	49	12
1.1		0110GS□	●			●		
1.2		0120GS□	●			●		
1.3		0130GS□	●			●		
1.4		0140GS□	●			●		
1.5		0150GS□	●			●		
1.6		MDW 0160GS□	●	45	8	●	49	15
1.7		0170GS□	●			●		
1.8		0180GS□	●			●		
1.9		0190GS□	●			●		
2.0		0200GS□	●			●		
2.1		MDW 0210GS□	●	45	10	●	49	17
2.2		0220GS□	●			●		
2.3		0230GS□	●			●		
2.4		0240GS□	●			●		
2.5		0250GS□	●			●		
2.6		MDW 0260GS□	●	45	13	●	49	19
2.7		0270GS□	●			●		
2.8		0280GS□	●			●		
2.9		0290GS□	●			●		
3.0		0300GS□	●			●		
3.1	4.0	MDW 0310GS□	●	54	19	●	60	24
3.2		0320GS□	●			●		
3.3		0330GS□	●			●		
3.4		0340GS□	●			●		
3.5		0350GS□	●			●		
3.6		MDW 0360GS□	●	54	21	●	60	27
3.7		0370GS□	●			●		
3.8		0380GS□	●			●		
3.9		0390GS□	●			●		
4.0		0400GS□	●			●		
4.1	5.0	MDW 0410GS□	●	61	23	●	76	31
4.2		0420GS□	●			●		
4.3		0430GS□	●			●		
4.4		0440GS□	●			●		
4.5		0450GS□	●			●		
4.6		MDW 0460GS□	●	61	25	●	76	38
4.7		0470GS□	●			●		
4.8		0480GS□	●			●		
4.9		0490GS□	●			●		
5.0		0500GS□	●			●		
5.1	6.0	MDW 0510GS□	●	65	25	●	81	39
5.2		0520GS□	●			●		
5.3		0530GS□	●			●		
5.4		0540GS□	●			●		
5.5		0550GS□	●			●		
5.6		MDW 0560GS□	●	65	27	●	81	41
5.7		0570GS□	●			●		
5.8		0580GS□	●			●		
5.9		0590GS□	●			●		
6.0		0600GS□	●			●		
6.1	7.0	MDW 0610GS□	●	73	31	●	83	42
6.2		0620GS□	●			●		
6.3		0630GS□	●			●		
6.4		0640GS□	●			●		
6.5		0650GS□	●			●		

● Diameter ø6.6 to ø12.0mm

Diameter øDc (mm)	Shank øDs (mm)	Cat. No. 2,4	2D Type Stock [2]	2D Type Dimensions (mm) L	2D Type Dimensions (mm) ℓ	4D Type Stock [4]	4D Type Dimensions (mm) L	4D Type Dimensions (mm) ℓ
6.6	7.0	MDW 0660GS□	●	73	33	●	83	43
6.7		0670GS□	●			●		
6.8		0680GS□	●			●		
6.9		0690GS□	●			●		
7.0		0700GS□	●			●		
7.1	8.0	MDW 0710GS□	●	78	33	●	90	45
7.2		0720GS□	●			●		
7.3		0730GS□	●			●		
7.4		0740GS□	●			●		
7.5		0750GS□	●			●		
7.6		MDW 0760GS□	●	78	36	●	90	48
7.7		0770GS□	●			●		
7.8		0780GS□	●			●		
7.9		0790GS□	●			●		
8.0		0800GS□	●			●		
8.1	9.0	MDW 0810GS□	●	82	36	●	98	53
8.2		0820GS□	●			●		
8.3		0830GS□	●			●		
8.4		0840GS□	●			●		
8.5		0850GS□	●			●		
8.6		MDW 0860GS□	●	82	38	●	98	55
8.7		0870GS□	●			●		
8.8		0880GS□	●			●		
8.9		0890GS□	●			●		
9.0		0900GS□	●			●		
9.1	10.0	MDW 0910GS□	●	87	38	●	105	58
9.2		0920GS□	●			●		
9.3		0930GS□	●			●		
9.4		0940GS□	●			●		
9.5		0950GS□	●			●		
9.6		MDW 0960GS□	●	87	41	●	105	60
9.7		0970GS□	●			●		
9.8		0980GS□	●			●		
9.9		0990GS□	●			●		
10.0		1000GS□	●			●		
10.1	11.0	MDW 1010GS□	●	93	41	●	114	66
10.2		1020GS□	●			●		
10.3		1030GS□	●			●		
10.4		1040GS□	●			●		
10.5		1050GS□	●			●		
10.6		MDW 1060GS□	●	93	45	●	114	68
10.7		1070GS□	●			●		
10.8		1080GS□	●			●		
10.9		1090GS□	●			●		
11.0		1100GS□	●			●		
11.1	12.0	MDW 1110GS□	●	100	45	●	121	71
11.2		1120GS□	●			●		
11.3		1130GS□	●			●		
11.4		1140GS□	●			●		
11.5		1150GS□	●			●		
11.6		MDW 1160GS□	●	100	47	●	121	73
11.7		1170GS□	●			●		
11.8		1180GS□	●			●		
11.9		1190GS□	●			●		
12.0		1200GS□	●			●		

Grade: ACX70

Please indicate 2 or 4 in the □ when ordering.
(Example: MDW 0200GS2)



External Coolant Supply (GS Type)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.26%	From 0.29%		Up to 45HRC	From 46HRC								
○	◎	◎	○	○	○		○	○	○			

DEX Coat 2D 4D

● Diameter ø12.1 to ø16.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No. 2,4	2D Type Stock 2	2D Type Dimensions (mm) L	2D Type Dimensions (mm) ℓ	4D Type Stock 4	4D Type Dimensions (mm) L	4D Type Dimensions (mm) ℓ
12.1	13.0	MDW 1210GS□	●	100	47	●	137	76
12.2		1220GS□	●			●		
12.3		1230GS□	●			●		
12.4		1240GS□	●			●		
12.5		1250GS□	●			●		
12.6		MDW 1260GS□	●	100	49	●	137	78
12.7		1270GS□	●			●		
12.8		1280GS□	●			●		
12.9		1290GS□	●			●		
13.0		1300GS□	●			●		
13.1	14.0	MDW 1310GS□	●	105	50	●	147	84
13.2		1320GS□	●			●		
13.3		1330GS□	●			●		
13.4		1340GS□	●			●		
13.5		1350GS□	●			●		
13.6		MDW 1360GS□	●	105	52	●	147	86
13.7		1370GS□	●			●		
13.8		1380GS□	●			●		
13.9		1390GS□	●			●		
14.0		1400GS□	●			●		
14.1	15.0	MDW 1410GS□	●	108	52	●	153	89
14.2		1420GS□	●			●		
14.3		1430GS□	●			●		
14.4		1440GS□	●			●		
14.5		1450GS□	●			●		
14.6		MDW 1460GS□	●	108	53	●	153	91
14.7		1470GS□	●			●		
14.8		1480GS□	●			●		
14.9		1490GS□	●			●		
15.0		1500GS□	●			●		
15.1	16.0	MDW 1510GS□	●	112	53	●	160	94
15.2		1520GS□	●			●		
15.3		1530GS□	●			●		
15.4		1540GS□	●			●		
15.5		1550GS□	●			●		
15.6		MDW 1560GS□	●	112	55	●	160	96
15.7		1570GS□	●			●		
15.8		1580GS□	●			●		
15.9		1590GS□	●			●		
16.0		1600GS□	●			●		

● Diameter ø16.1 to ø20.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No. 2,4	2D Type Stock 2	2D Type Dimensions (mm) L	2D Type Dimensions (mm) ℓ	4D Type Stock 4	4D Type Dimensions (mm) L	4D Type Dimensions (mm) ℓ
16.1	17.0	MDW 1610GS□		116	56		167	98
16.2		1620GS□						
16.3		1630GS□						
16.4		1640GS□						
16.5		1650GS□	●			●		
16.6		MDW 1660GS□		116	57		167	98
16.7		1670GS□						
16.8		1680GS□						
16.9		1690GS□						
17.0		1700GS□	●			●		
17.1	18.0	MDW 1710GS□		120	58		167	100
17.2		1720GS□						
17.3		1730GS□						
17.4		1740GS□						
17.5		1750GS□	●			●		
17.6		MDW 1760GS□		120	59		167	102
17.7		1770GS□						
17.8		1780GS□						
17.9		1790GS□						
18.0		1800GS□	●			●		
18.1	19.0	MDW 1810GS□		123	59		179	104
18.2		1820GS□						
18.3		1830GS□						
18.4		1840GS□						
18.5		1850GS□	●			●		
18.6		MDW 1860GS□		123	60		179	106
18.7		1870GS□						
18.8		1880GS□						
18.9		1890GS□						
19.0		1900GS□	●			●		
19.1	20.0	MDW 1910GS□		127	61		179	110
19.2		1920GS□						
19.3		1930GS□						
19.4		1940GS□						
19.5		1950GS□	●			●		
19.6		MDW 1960GS□		127	62		179	114
19.7		1970GS□						
19.8		1980GS□						
19.9		1990GS□						
20.0		2000GS□	●			●		

Grade: ACX70

Please indicate 2 or 4 in the □ when ordering
(Example: MDW 1210GS4)

■ Recommended Cutting Conditions

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

Drill Diameter $øD_c$ (mm)	Cutting Conditions	Soft Steel/General Steel (Up to 300HB)	Hardened Steel (Up to 45HRC)	Hardened Steel (Up to 60HRC)	Stainless Steel (Up to 200HB)	Grey Cast Iron FC250	Ductile Cast Iron FCD450
ø3.0	v_c	30 - **60** - 70	20 - **30** - 40	10 - **15** - 20	10 - **25** - 40	40 - **50** - 70	35 - **45** - 60
	f	0.1 - **0.15** - 0.2	0.06 - **0.07** - 0.08	0.05 - **0.07** - 0.08	0.06 - **0.08** - 0.12	0.15 - **0.2** - 0.25	0.12 - **0.15** - 0.2
ø4.0	v_c	30 - **60** - 80	20 - **30** - 40	10 - **15** - 20	10 - **25** - 45	40 - **50** - 70	35 - **45** - 60
	f	0.12 - **0.17** - 0.22	0.07 - **0.08** - 0.09	0.05 - **0.07** - 0.08	0.07 - **0.09** - 0.13	0.15 - **0.2** - 0.27	0.13 - **0.17** - 0.22
ø5.0	v_c	40 - **60** - 100	20 - **30** - 40	10 - **15** - 20	15 - **30** - 55	40 - **50** - 70	40 - **50** - 60
	f	0.15 - **0.2** - 0.25	0.08 - **0.09** - 0.1	0.05 - **0.07** - 0.08	0.08 - **0.1** - 0.15	0.15 - **0.2** - 0.3	0.15 - **0.2** - 0.25
ø8.0	v_c	40 - **80** - 120	20 - **40** - 40	10 - **15** - 20	15 - **35** - 55	40 - **50** - 80	50 - **60** - 70
	f	0.18 - **0.23** - 0.3	0.09 - **0.1** - 0.13	0.06 - **0.08** - 0.1	0.09 - **0.12** - 0.17	0.18 - **0.23** - 0.33	0.18 - **0.23** - 0.3
ø10.0	v_c	50 - **80** - 130	20 - **40** - 40	10 - **15** - 20	15 - **40** - 60	50 - **60** - 80	50 - **60** - 70
	f	0.2 - **0.25** - 0.35	0.1 - **0.12** - 0.15	0.06 - **0.08** - 0.1	0.1 - **0.15** - 0.2	0.2 - **0.3** - 0.35	0.2 - **0.25** - 0.35
ø12.0	v_c	50 - **80** - 130	20 - **40** - 40	10 - **15** - 20	15 - **40** - 60	50 - **65** - 80	50 - **60** - 70
	f	0.2 - **0.25** - 0.35	0.1 - **0.12** - 0.15	0.06 - **0.08** - 0.1	0.1 - **0.15** - 0.2	0.2 - **0.3** - 0.35	0.2 - **0.25** - 0.35
ø16.0	v_c	50 - **90** - 130	20 - **40** - 40	10 - **15** - 20	20 - **40** - 60	60 - **80** - 90	50 - **60** - 75
	f	0.22 - **0.26** - 0.35	0.1 - **0.12** - 0.15	0.07 - **0.09** - 0.11	0.1 - **0.15** - 0.2	0.22 - **0.3** - 0.35	0.22 - **0.28** - 0.35
ø20.0	v_c	60 - **100** - 140	20 - **40** - 40	10 - **15** - 20	20 - **40** - 60	60 - **80** - 100	50 - **60** - 80
	f	0.25 - **0.3** - 0.35	0.1 - **0.12** - 0.15	0.08 - **0.1** - 0.12	0.1 - **0.15** - 0.2	0.25 - **0.3** - 0.35	0.25 - **0.3** - 0.35

Min. - **Optimum** - Max.

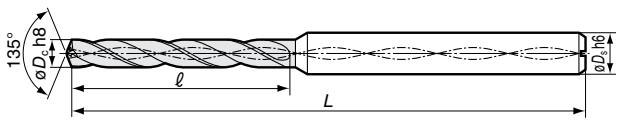
HGS Type

Internal Coolant Supply (HGS Type)

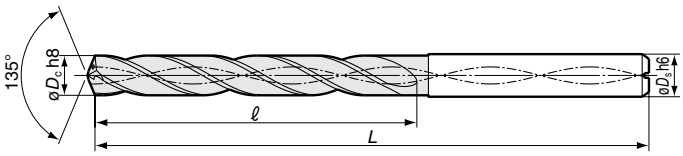
Carbon Steel Up to 0.28%	Alloy Steel From 0.29%	Tempered Steel	Hardened Steel Up to 45HRC	Hardened Steel From 46HRC	Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
◎	◎	◎	○	○	◎	◎	○	○	○			

DEX Coat | W/ Oil Hole | 3D | 5D | 8D

● HGS Type Diameter ø1.5 to ø2.4mm Single Margin



● HGS Type Diameter ø2.5 to ø20.0mm Double Margin



● Diameter ø1.5 to ø7.0mm

Diameter øDc (mm)	Shank øDs (mm)	Cat. No. 3,5,8	3D Type Stock [3]	3D Type Dimensions (mm) L	3D Type Dimensions (mm) ℓ	5D Type Stock [5]	5D Type Dimensions (mm) L	5D Type Dimensions (mm) ℓ	8D Type Stock [8]	8D Type Dimensions (mm) L	8D Type Dimensions (mm) ℓ
1.5	3.0	MDW 0150HGS□	●	63	10	●	70	14	●	76	18.5
1.6		MDW 0160HGS□	●			●			●		
1.7		0170HGS□	●			●			●		
1.8		0180HGS□	●	63	12.5	●	70	19	●	76	24
1.9		0190HGS□	●			●			●		
2.0		0200HGS□	●			●			●		
2.1		MDW 0210HGS□	●			●			●		
2.2		0220HGS□	●			●			●		
2.3		0230HGS□	●	68	15	●	78	24	●	81	27.5
2.4		0240HGS□	●			●			●		
2.5		0250HGS□	●			●			●		
2.6		MDW 0260HGS□	●			●			●		
2.7		0270HGS□	●			●			●		
2.8		0280HGS□	●	68	17.5	●	78	28	●	81	33
2.9		0290HGS□	●			●			●		
3.0		0300HGS□	●			●			●		
3.1	4.0	MDW 0310HGS□	●			●			●		
3.2		0320HGS□	●			●			●		
3.3		0330HGS□	●	72	20	●	86	32	●	92	38.5
3.4		0340HGS□	●			●			●		
3.5		0350HGS□	●			●			●		
3.6		MDW 0360HGS□	●			●			●		
3.7		0370HGS□	●			●			●		
3.8		0380HGS□	●	72	22.5	●	86	36	●	92	44
3.9		0390HGS□	●			●			●		
4.0		0400HGS□	●			●			●		
4.1	5.0	MDW 0410HGS□	●			●			●		
4.2		0420HGS□	●			●			●		
4.3		0430HGS□	●	80	25	●	98	40	●	105	49.5
4.4		0440HGS□	●			●			●		
4.5		0450HGS□	●			●			●		
4.6		MDW 0460HGS□	●			●			●		
4.7		0470HGS□	●			●			●		
4.8		0480HGS□	●	80	27.5	●	98	44	●	105	55
4.9		0490HGS□	●			●			●		
5.0		0500HGS□	●			●			●		
5.1	6.0	MDW 0510HGS□	●			●			●		
5.2		0520HGS□	●			●			●		
5.3		0530HGS□	●	82	27.5	●	100	44	●	118	60.5
5.4		0540HGS□	●			●			●		
5.5		0550HGS□	●			●			●		
5.6		MDW 0560HGS□	●			●			●		
5.7		0570HGS□	●			●			●		
5.8		0580HGS□	●	82	30	●	100	48	●	118	66
5.9		0590HGS□	●			●			●		
6.0		0600HGS□	●			●			●		
6.1	7.0	MDW 0610HGS□	●			●			●		
6.2		0620HGS□	●			●			●		
6.3		0630HGS□	●	88	32.5	●	109	52	●	130	71.5
6.4		0640HGS□	●			●			●		
6.5		0650HGS□	●			●			●		
6.6		MDW 0660HGS□	●			●			●		
6.7		0670HGS□	●			●			●		
6.8		0680HGS□	●	88	35	●	109	56	●	130	77
6.9		0690HGS□	●			●			●		
7.0		0700HGS□	●			●			●		

● Diameter ø7.1 to ø12.0mm

Diameter øDc (mm)	Shank øDs (mm)	Cat. No. 3,5,8	3D Type Stock [3]	3D Type Dimensions (mm) L	3D Type Dimensions (mm) ℓ	5D Type Stock [5]	5D Type Dimensions (mm) L	5D Type Dimensions (mm) ℓ	8D Type Stock [8]	8D Type Dimensions (mm) L	8D Type Dimensions (mm) ℓ
7.1	8.0	MDW 0710HGS□	●			●			●		
7.2		0720HGS□	●			●			●		
7.3		0730HGS□	●	94	37.5	●	118	60	●	142	82.5
7.4		0740HGS□	●			●			●		
7.5		0750HGS□	●			●			●		
7.6		MDW 0760HGS□	●			●			●		
7.7		0770HGS□	●			●			●		
7.8		0780HGS□	●	94	40	●	118	64	●	142	88
7.9		0790HGS□	●			●			●		
8.0		0800HGS□	●			●			●		
8.1	9.0	MDW 0810HGS□	●			●			●		
8.2		0820HGS□	●			●			●		
8.3		0830HGS□	●	100	42.5	●	127	68	●	154	93.5
8.4		0840HGS□	●			●			●		
8.5		0850HGS□	●			●			●		
8.6		MDW 0860HGS□	●			●			●		
8.7		0870HGS□	●			●			●		
8.8		0880HGS□	●	100	45	●	127	72	●	154	99
8.9		0890HGS□	●			●			●		
9.0		0900HGS□	●			●			●		
9.1	10.0	MDW 0910HGS□	●			●			●		
9.2		0920HGS□	●			●			●		
9.3		0930HGS□	●	106	47.5	●	136	76	●	166	104.5
9.4		0940HGS□	●			●			●		
9.5		0950HGS□	●			●			●		
9.6		MDW 0960HGS□	●			●			●		
9.7		0970HGS□	●			●			●		
9.8		0980HGS□	●	106	50	●	136	80	●	166	110
9.9		0990HGS□	●			●			●		
10.0		1000HGS□	●			●			●		
10.1	11.0	MDW 1010HGS□	●			●			●		
10.2		1020HGS□	●			●			●		
10.3		1030HGS□	●	116	52.5	●	149	84	●	182	115.5
10.4		1040HGS□	●			●			●		
10.5		1050HGS□	●			●			●		
10.6		MDW 1060HGS□	●			●			●		
10.7		1070HGS□	●			●			●		
10.8		1080HGS□	●	116	55	●	149	88	●	182	121
10.9		1090HGS□	●			●			●		
11.0		1100HGS□	●			●			●		
11.1	12.0	MDW 1110HGS□	●			●			●		
11.2		1120HGS□	●			●			●		
11.3		1130HGS□	●	122	57.5	●	158	92	●	194	126.5
11.4		1140HGS□	●			●			●		
11.5		1150HGS□	●			●			●		
11.6		MDW 1160HGS□	●			●			●		
11.7		1170HGS□	●			●			●		
11.8		1180HGS□	●	122	60	●	158	96	●	194	132
11.9		1190HGS□	●			●			●		
12.0		1200HGS□	●			●			●		

Grade: ACX70

Please indicate 3, 5 or 8 in the □ when ordering.
(Example: MDW 0250HGS3)

Note : The size of small hole (ø1.5 to ø2.4) is consistent with single margin specification.

Super MultiDrills

HGS Type

Internal Coolant Supply (HGS Type)

Carbon Steel Up to 0.28%	Alloy Steel From 0.29%	Tempered Steel	Hardened Steel Up to 45HRC	Hardened Steel From 46HRC	Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
◎	◎	◎	○	○	◎	◎	○	○	○			

DEX Coat | W/ Oil Hole | 3D | 5D | 8D

● Diameter ø12.1 to ø16.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No. 3,5,8	3D Type Stock [3]	3D Type Dimensions (mm) L	ℓ	5D Type Stock [5]	5D Type Dimensions (mm) L	ℓ	8D Type Stock [8]	8D Type Dimensions (mm) L	ℓ
12.1	13.0	MDW 1210HGS□	●	128	62.5	●	167	100		206	137.5
12.2		1220HGS□	●			●					
12.3		1230HGS□	●			●					
12.4		1240HGS□	●			●					
12.5		1250HGS□	●			●			●		
12.6		MDW 1260HGS□	●	128	65	●	167	104		206	143
12.7		1270HGS□	●			●					
12.8		1280HGS□	●			●					
12.9		1290HGS□	●			●					
13.0		1300HGS□	●			●			●		
13.1	14.0	MDW 1310HGS□	●	134	67.5	●	176	108		218	148.5
13.2		1320HGS□	●			●					
13.3		1330HGS□	●			●					
13.4		1340HGS□	●			●					
13.5		1350HGS□	●			●			●		
13.6		MDW 1360HGS□	●	134	70	●	176	112		218	154
13.7		1370HGS□	●			●					
13.8		1380HGS□	●			●					
13.9		1390HGS□	●			●					
14.0		1400HGS□	●			●			●		
14.1	15.0	MDW 1410HGS□	●	140	72.5	●	185	116		230	159.5
14.2		1420HGS□	●			●					
14.3		1430HGS□	●			●					
14.4		1440HGS□	●			●					
14.5		1450HGS□	●			●			●		
14.6		MDW 1460HGS□	●	140	75	●	185	120		230	165
14.7		1470HGS□	●			●					
14.8		1480HGS□	●			●					
14.9		1490HGS□	●			●					
15.0		1500HGS□	●			●			●		
15.1	16.0	MDW 1510HGS□	●	146	77.5	●	194	124		242	170.5
15.2		1520HGS□	●			●					
15.3		1530HGS□	●			●					
15.4		1540HGS□	●			●					
15.5		1550HGS□	●			●			●		
15.6		MDW 1560HGS□	●	146	80	●	194	128		242	176
15.7		1570HGS□	●			●					
15.8		1580HGS□	●			●					
15.9		1590HGS□	●			●					
16.0		1600HGS□	●			●			●		

● Diameter ø16.1 to ø20.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No. 3,5	3D Type Stock [3]	3D Type Dimensions (mm) L	ℓ	5D Type Stock [5]	5D Type Dimensions (mm) L	ℓ	8D Type Stock [8]	8D Type Dimensions (mm) L	ℓ
16.1	17.0	MDW 1610HGS□		152	82.5		203	132			
16.2		1620HGS□									
16.3		1630HGS□									
16.4		1640HGS□									
16.5		1650HGS□	●			●					
16.6		MDW 1660HGS□		152	85		203	136			
16.7		1670HGS□									
16.8		1680HGS□									
16.9		1690HGS□									
17.0		1700HGS□	●			●					
17.1	18.0	MDW 1710HGS□		158	87.5		214	140			
17.2		1720HGS□									
17.3		1730HGS□									
17.4		1740HGS□									
17.5		1750HGS□	●			●					
17.6		MDW 1760HGS□		158	90		214	144			
17.7		1770HGS□									
17.8		1780HGS□									
17.9		1790HGS□									
18.0		1800HGS□	●			●					
18.1	19.0	MDW 1810HGS□		164	92.5		221	148			
18.2		1820HGS□									
18.3		1830HGS□									
18.4		1840HGS□									
18.5		1850HGS□	●			●					
18.6		MDW 1860HGS□		164	95		221	152			
18.7		1870HGS□									
18.8		1880HGS□									
18.9		1890HGS□									
19.0		1900HGS□	●			●					
19.1	20.0	MDW 1910HGS□		170	97.5		230	156			
19.2		1920HGS□									
19.3		1930HGS□									
19.4		1940HGS□									
19.5		1950HGS□	●			●					
19.6		MDW 1960HGS□		170	100		230	160			
19.7		1970HGS□									
19.8		1980HGS□									
19.9		1990HGS□									
20.0		2000HGS□	●			●					

Grade: ACX70

Please indicate 3, 5 or 8 in the □ when ordering.
(Example: MDW 1210HGS5)

■ Recommended Cutting Conditions

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

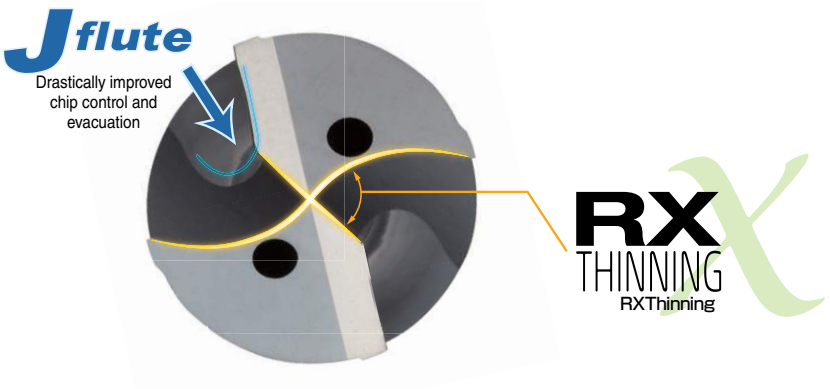
Drill Diameter $øD_c$ (mm)	Cutting Conditions	Soft Steel/General Steel (Up to 300HB)	Hardened Steel (Up to 45HRC)	Hardened Steel (Up to 60HRC)	Stainless Steel (Up to 200HB)	Grey Cast Iron FC250	Ductile Cast Iron FCD450	Ti-alloy 6Al-4V-Ti	Inconel Inco718
ø3.0	v_c	30 - **60** - 100	20 - **30** - 40	10 - **15** - 20	30 - **40** - 50	50 - **70** - 90	40 - **50** - 80	20 - **30** - 40	10 - **10** - 30
	f	0.1 - **0.15** - 0.2	0.06 - **0.07** - 0.08	0.05 - **0.07** - 0.08	0.06 - **0.08** - 0.12	0.15 - **0.2** - 0.25	0.12 - **0.15** - 0.2	0.08 - **0.09** - 0.1	0.05 - **0.06** - 0.08
ø4.0	v_c	40 - **70** - 110	20 - **30** - 40	10 - **15** - 20	30 - **40** - 55	50 - **70** - 90	40 - **50** - 80	20 - **30** - 40	10 - **10** - 30
	f	0.15 - **0.2** - 0.25	0.07 - **0.08** - 0.09	0.05 - **0.07** - 0.08	0.07 - **0.10** - 0.13	0.15 - **0.2** - 0.25	0.13 - **0.18** - 0.23	0.08 - **0.09** - 0.1	0.05 - **0.06** - 0.08
ø5.0	v_c	50 - **80** - 120	20 - **30** - 40	10 - **15** - 20	30 - **40** - 60	50 - **70** - 90	40 - **50** - 80	20 - **30** - 40	10 - **10** - 30
	f	0.15 - **0.2** - 0.25	0.08 - **0.09** - 0.1	0.05 - **0.07** - 0.08	0.08 - **0.12** - 0.15	0.15 - **0.2** - 0.3	0.15 - **0.2** - 0.25	0.08 - **0.09** - 0.1	0.05 - **0.06** - 0.08
ø8.0	v_c	60 - **90** - 140	20 - **40** - 40	10 - **15** - 20	30 - **45** - 70	60 - **80** - 100	50 - **60** - 90	20 - **30** - 40	15 - **15** - 30
	f	0.18 - **0.25** - 0.30	0.09 - **0.1** - 0.13	0.06 - **0.08** - 0.1	0.09 - **0.14** - 0.18	0.18 - **0.23** - 0.33	0.18 - **0.23** - 0.3	0.08 - **0.09** - 0.1	0.07 - **0.08** - 0.09
ø10.0	v_c	70 - **100** - 150	20 - **40** - 40	10 - **15** - 20	40 - **50** - 80	60 - **80** - 100	50 - **60** - 90	20 - **30** - 40	15 - **15** - 30
	f	0.2 - **0.25** - 0.35	0.1 - **0.12** - 0.15	0.06 - **0.08** - 0.1	0.1 - **0.15** - 0.2	0.2 - **0.3** - 0.35	0.2 - **0.25** - 0.35	0.08 - **0.1** - 0.12	0.08 - **0.09** - 0.1
ø12.0	v_c	70 - **100** - 150	20 - **40** - 40	10 - **15** - 20	40 - **50** - 80	60 - **80** - 100	50 - **60** - 90	20 - **30** - 40	15 - **15** - 30
	f	0.2 - **0.25** - 0.35	0.1 - **0.12** - 0.15	0.06 - **0.08** - 0.1	0.1 - **0.15** - 0.2	0.2 - **0.3** - 0.35	0.2 - **0.25** - 0.35	0.08 - **0.1** - 0.12	0.08 - **0.09** - 0.1
ø16.0	v_c	75 - **110** - 150	20 - **40** - 40	10 - **15** - 20	45 - **60** - 80	65 - **90** - 110	55 - **70** - 95	25 - **30** - 40	20 - **20** - 35
	f	0.22 - **0.22** - 0.35	0.1 - **0.12** - 0.15	0.07 - **0.09** - 0.11	0.1 - **0.15** - 0.2	0.25 - **0.3** - 0.35	0.22 - **0.27** - 0.37	0.09 - **0.11** - 0.13	0.08 - **0.09** - 0.1
ø20.0	v_c	80 - **120** - 160	20 - **40** - 40	10 - **15** - 20	45 - **60** - 80	70 - **100** - 120	60 - **80** - 100	25 - **30** - 40	20 - **20** - 35
	f	0.25 - **0.3** - 0.35	0.1 - **0.12** - 0.15	0.08 - **0.1** - 0.12	0.1 - **0.15** - 0.2	0.25 - **0.3** - 0.35	0.25 - **0.3** - 0.35	0.1 - **0.12** - 0.15	0.08 - **0.09** - 0.1

Min. - **Optimum** - Max.

HX Type

■ General Features

Strong MultiDrill HX type is a special drill for cast iron that combines reduced cutting resistance and improved strength to achieve stable, high efficiency drilling of cast iron.



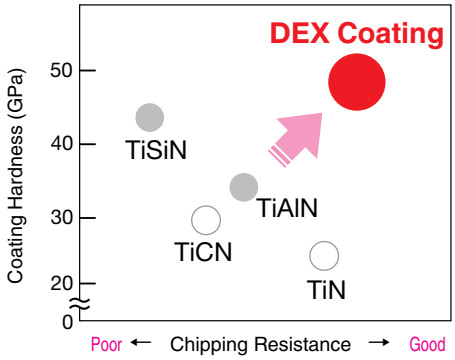
■ Characteristics and Applications

●High efficiency drilling of cast iron

Thick web and special double margin design ensure stable behavior even in high-efficiency drilling.
Furthermore, RX THINNING drastically reduces cutting resistance and ensures more stable and highly-efficient drilling.
Enables high-efficiency drilling at speeds of over v_f=1,000mm/min (for ø10mm sizes).

●Long tool life

DEX drill coating utilizing nano-coating technology provides more than double the tool life of conventional coatings. The guiding function is enhanced through optimization of the margin position to prevent fracturing due to hole bending.

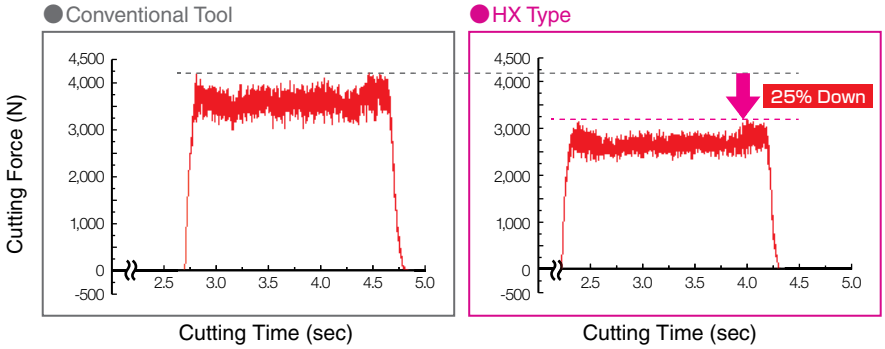


Low cutting forces Wide chip pocket reduces thrust resistance.

RX THINNING RXThinning

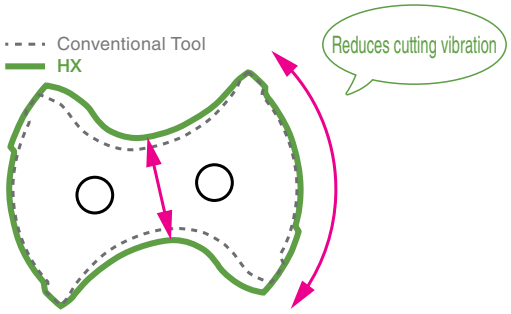
Improves tool load

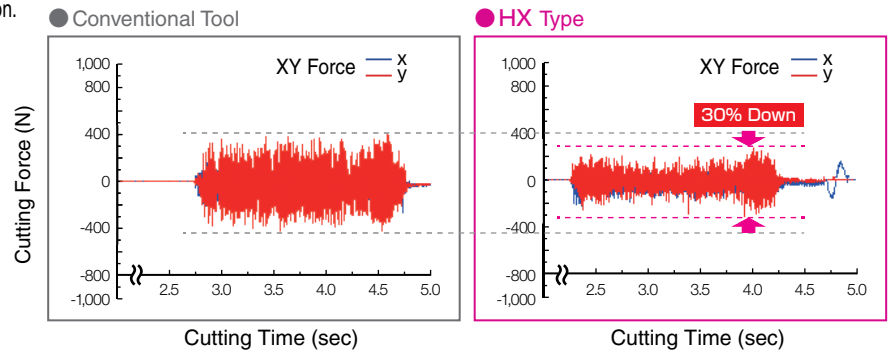
Suitable for small machining centers



Work Material : FC250 Tool : Conventional Tool, MDW1250HX5(ø12.5mm 5D)
Cutting Conditions : v_c=100m/min, f=0.60mm/rev, H=50mm, Internal Coolant (Water Soluble)

High Rigidity Large web thickness and wide land reduces vibration.





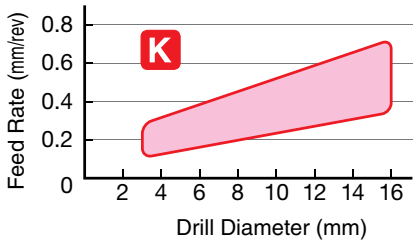
Work Material : FC250 Tool : Conventional Tool, MDW1250HX5(ø12.5mm 5D)
Cutting Conditions : v_c=100m/min, f=0.60mm/rev, H=50mm, Internal Coolant (Water Soluble)

HX Type

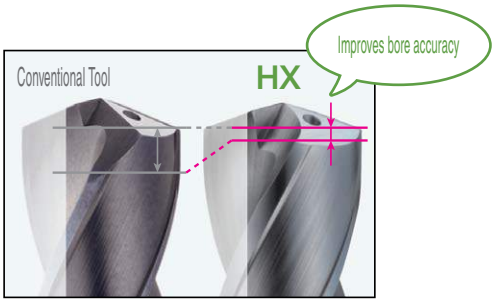
■ Series

Coolant Supply	Series	Diameter Range (mm)	Hole Depth (L/D)	Remarks
Internal	MDW□□□□HX3	ø3.0 to ø20.0	Up to 3	108 Models Stocked
	MDW□□□□HX5	ø3.0 to ø20.0	Up to 5	108 Models Stocked
	MDW□□□□HX8	ø3.0 to ø18.0	Up to 8	32 Models Stocked

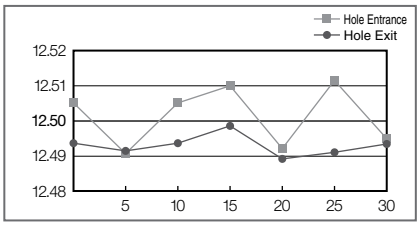
● Grey Cast Iron Drilling



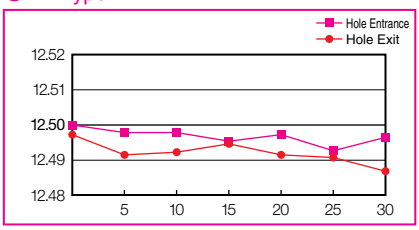
High precision Improved margin point provides improved drilling precision.



● Conventional Tool



● HX Type



Work Material : **FC250** Tool : Conventional Tool, MDW1250HX5(ø12.5mm 5D)
Cutting Conditions : v_c=**100**m/min, f =**0.60**mm/rev, H=**50**mm, Internal Coolant (Water Soluble)

Long tool life High feed cutting reduces cutting edge scratches and extends tool life.
→ Maintains replacement frequency (cutting time) and enables high efficiency drilling.

● Conventional Tool

Cutting Conditions : f =**0.30**mm/rev Cutting Length : **30**m Cutting Time (39min)

● HX Type

Cutting Conditions : f =**0.30**mm/rev Cutting Length : **30**m Cutting Time (39min)

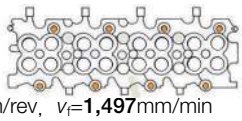
Cutting Conditions : f =**0.60**mm/rev Cutting Length : **60**m Cutting Time (39min)

Work Material : **FC250** Tool : Conventional Tool, MDW1250HX5(ø12.5mm 5D)
Cutting Conditions : v_c=**100**m/min, f =**0.60**mm/rev, H=**50**mm, Internal Coolant (Water Soluble)

Double the feed

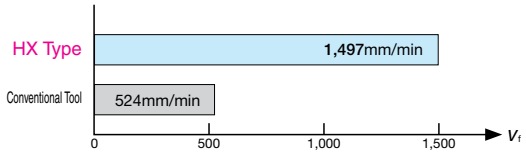
■ Application Examples

Engine Component (FC250)



·Tool : MDW0680HX5(ø6.8mm 5D)
·Drilling Distance : **80**m
·Cutting Conditions : v_c=**80**m/min, f =**0.40**mm/rev, v_f=**1,497**mm/min
H=**27**mm(Blind Hole) Internal Coolant (Water Soluble)

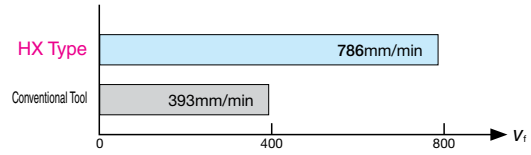
2.9x high efficiency, stable drilling compared to conventional tools.



Facility Component (FCD450)

·Tool : MDW0850HX5(ø8.5mm 5D)
·Drilling Distance : **60**m
·Cutting Conditions : v_c=**70**m/min, f =**0.30**mm/rev, v_f=**786**mm/min
H=**27**mm(Blind Hole) Internal Coolant (Water Soluble)

2x high efficiency drilling compared to conventional tools.



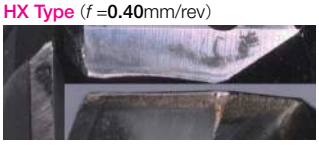
Engine Component (FCD700)

·Tool : MDW1200HX3(ø12.0mm 3D)
·Drilling Distance : **60**m
·Cutting Conditions : Conventional Tool: v_c=**50**m/min, f =**0.22**mm/rev, v_f=**291.7**mm/min
HX Type: v_c=**50**m/min, f =**0.40**mm/rev, v_f=**530.4**mm/min
H=**28**mm(Blind Hole) Internal Coolant (Water Soluble)

Stable cutting performance with 1.8x high efficiency drilling compared to conventional tools.

Edge Wear After Preset Tool Life Drilling
Conventional Tool (f =**0.22**mm/rev)

HX Type (f =**0.40**mm/rev)



Machine Component (FC250)

·Tool : MDW1850HX5(ø18.5mm 5D)
·Drilling Distance : **50**m
·Cutting Conditions : v_c=**70**m/min, f =**0.9**mm/rev
H=**27**mm(Blind Hole) Internal Coolant (Water Soluble)

Reduced edge wear in ultra-high-speed drilling.

After Preset Tool Life Edge Rake Face Condition
Comp. High-Efficiency Drill

HX Type

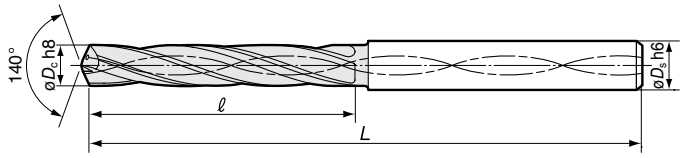
HX Type

Internal Coolant Supply (HX Type)

Carbon Steel Up to 0.28%	Alloy Steel From 0.29%	Tempered Steel	Hardened Steel Up to 45HRC	Hardened Steel From 46HRC	Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
								◎	◎			

DEX Coat | W/ Oil Hole | 3D | 5D | 8D

● HX Type



● Diameter ø3.0 to ø8.0mm

Diameter øDc (mm)	Shank øDs (mm)	Cat. No. 3,5,8	3D Type Stock [3]	3D Type Dimensions (mm) L	3D Type Dimensions (mm) ℓ	5D Type Stock [5]	5D Type Dimensions (mm) L	5D Type Dimensions (mm) ℓ	8D Type Stock [8]	8D Type Dimensions (mm) L	8D Type Dimensions (mm) ℓ
3.0	3.0	MDW 0300HX□	●	68	17.5	●	78	28	●	81	33
3.1	4.0	MDW 0310HX□	●	72	20	●	86	32		92	38.5
3.2		0320HX□	●			●					
3.3		0330HX□	●			●					
3.4		0340HX□	●			●					
3.5		0350HX□	●			●			●		
3.6		MDW 0360HX□	●	72	22.5	●	86	36		92	44
3.7		0370HX□	●			●					
3.8		0380HX□	●			●					
3.9		0390HX□	●			●					
4.0		0400HX□	●			●			●		
4.1	5.0	MDW 0410HX□	●	80	25	●	98	40		105	49.5
4.2		0420HX□	●			●					
4.3		0430HX□	●			●					
4.4		0440HX□	●			●					
4.5		0450HX□	●			●			●		
4.6		MDW 0460HX□	●	80	27.5	●	98	44		105	55
4.7		0470HX□	●			●					
4.8		0480HX□	●			●					
4.9		0490HX□	●			●					
5.0		0500HX□	●			●			●		
5.1	6.0	MDW 0510HX□	●	82	27.5	●	100	44	●	118	60.5
5.2		0520HX□	●			●					
5.3		0530HX□	●			●					
5.4		0540HX□	●			●					
5.5		0550HX□	●			●			●		
5.6		MDW 0560HX□	●	82	30	●	100	48	●	118	66
5.7		0570HX□	●			●					
5.8		0580HX□	●			●					
5.9		0590HX□	●			●			●		
6.0		0600HX□	●			●			●		
6.1	7.0	MDW 0610HX□	●	88	32.5	●	109	52		130	71.5
6.2		0620HX□	●			●					
6.3		0630HX□	●			●					
6.4		0640HX□	●			●					
6.5		0650HX□	●			●			●		
6.6		MDW 0660HX□	●	88	35	●	109	56	●	130	77
6.7		0670HX□	●			●			●		
6.8		0680HX□	●			●			●		
6.9		0690HX□	●			●			●		
7.0		0700HX□	●			●			●		
7.1	8.0	MDW 0710HX□	●	94	37.5	●	118	60		142	82.5
7.2		0720HX□	●			●					
7.3		0730HX□	●			●					
7.4		0740HX□	●			●					
7.5		0750HX□	●			●			●		
7.6		MDW 0760HX□	●	94	40	●	118	64		142	88
7.7		0770HX□	●			●					
7.8		0780HX□	●			●					
7.9		0790HX□	●			●					
8.0		0800HX□	●			●			●		

● Diameter ø8.1 to ø12.0mm

Diameter øDc (mm)	Shank øDs (mm)	Cat. No. 3,5,8	3D Type Stock [3]	3D Type Dimensions (mm) L	3D Type Dimensions (mm) ℓ	5D Type Stock [5]	5D Type Dimensions (mm) L	5D Type Dimensions (mm) ℓ	8D Type Stock [8]	8D Type Dimensions (mm) L	8D Type Dimensions (mm) ℓ
8.1	9.0	MDW 0810HX□	●	100	42.5	●	127	68		154	93.5
8.2		0820HX□	●			●					
8.3		0830HX□	●			●					
8.4		0840HX□	●			●					
8.5		0850HX□	●			●			●		
8.6		MDW 0860HX□	●	100	45	●	127	72		154	99
8.7		0870HX□	●			●					
8.8		0880HX□	●			●			●		
8.9		0890HX□	●			●					
9.0		0900HX□	●			●			●		
9.1	10.0	MDW 0910HX□	●	106	47.5	●	136	76		166	104.5
9.2		0920HX□	●			●					
9.3		0930HX□	●			●					
9.4		0940HX□	●			●					
9.5		0950HX□	●			●			●		
9.6		MDW 0960HX□	●	106	50	●	136	80		166	110
9.7		0970HX□	●			●					
9.8		0980HX□	●			●					
9.9		0990HX□	●			●					
10.0		1000HX□	●			●			●		
10.1	11.0	MDW 1010HX□	●	116	52.5	●	149	84		182	115.5
10.2		1020HX□	●			●					
10.3		1030HX□	●			●			●		
10.4		1040HX□	●			●					
10.5		1050HX□	●			●			●		
10.6		MDW 1060HX□	●	116	55	●	149	88		182	121
10.7		1070HX□	●			●					
10.8		1080HX□	●			●					
10.9		1090HX□	●			●					
11.0		1100HX□	●			●			●		
11.1	12.0	MDW 1110HX□	●	122	57.5	●	158	92		194	126.5
11.2		1120HX□	●			●					
11.3		1130HX□	●			●					
11.4		1140HX□	●			●					
11.5		1150HX□	●			●			●		
11.6		MDW 1160HX□	●	122	60	●	158	96		194	132
11.7		1170HX□	●			●					
11.8		1180HX□	●			●					
11.9		1190HX□	●			●					
12.0		1200HX□	●			●			●		

Grade: ACX70

Please indicate 3, 5 or 8 in the □ when ordering.
(Example: MDW 0300HX3)

HX Type

Internal Coolant Supply **(HX Type)**

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC				◎	◎			

DEX Coat | W/ Oil Hole | 3D | 5D | 8D

● HX Type

● Diameter ø12.1 to ø16.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No. 3,5,8	3D Type Stock [3]	3D Type L	3D Type ℓ	5D Type Stock [5]	5D Type L	5D Type ℓ	8D Type Stock [8]	8D Type L	8D Type ℓ
12.1	13.0	MDW 1210HX□		128	62.5		167	100		206	137.5
12.2		1220HX□									
12.3		1230HX□									
12.4		1240HX□									
12.5		1250HX□	●			●			●		
12.6		MDW 1260HX□		128	65		167	104		206	143
12.7		1270HX□									
12.8		1280HX□									
12.9		1290HX□									
13.0		1300HX□	●			●			●		
13.1	14.0	MDW 1310HX□		134	67.5		176	108		218	148.5
13.2		1320HX□									
13.3		1330HX□									
13.4		1340HX□									
13.5		1350HX□	●			●			●		
13.6		MDW 1360HX□		134	70		176	112		218	154
13.7		1370HX□									
13.8		1380HX□									
13.9		1390HX□									
14.0		1400HX□	●			●					
14.1	15.0	MDW 1410HX□		140	72.5		185	116		230	159.5
14.2		1420HX□									
14.3		1430HX□									
14.4		1440HX□									
14.5		1450HX□	●			●					
14.6		MDW 1460HX□		140	75		185	120		230	165
14.7		1470HX□									
14.8		1480HX□									
14.9		1490HX□									
15.0		1500HX□	●			●			●		
15.1	16.0	MDW 1510HX□		146	77.5		194	124		242	170.5
15.2		1520HX□									
15.3		1530HX□									
15.4		1540HX□									
15.5		1550HX□	●			●					
15.6		MDW 1560HX□		146	80		194	128		242	176
15.7		1570HX□									
15.8		1580HX□									
15.9		1590HX□									
16.0		1600HX□	●			●					

● Diameter ø16.1 to ø20.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No. 3,5,8	3D Type Stock [3]	3D Type L	3D Type ℓ	5D Type Stock [5]	5D Type L	5D Type ℓ	8D Type Stock [8]	8D Type L	8D Type ℓ
16.1	17.0	MDW 1610HX□		152	82.5		203	132		254	181.5
16.2		1620HX□									
16.3		1630HX□									
16.4		1640HX□									
16.5		1650HX□	●			●					
16.6		MDW 1660HX□		152	85		203	136		254	187
16.7		1670HX□									
16.8		1680HX□									
16.9		1690HX□									
17.0		1700HX□	●			●					
17.1	18.0	MDW 1710HX□	●	158	87.5	●	214	140	●	266	192.5
17.2		1720HX□									
17.3		1730HX□									
17.4		1740HX□									
17.5		1750HX□	●			●					
17.6		MDW 1760HX□		158	90		214	144		266	198
17.7		1770HX□									
17.8		1780HX□									
17.9		1790HX□									
18.0		1800HX□	●			●					
18.1	19.0	MDW 1810HX□		164	92.5		221	148			
18.2		1820HX□									
18.3		1830HX□									
18.4		1840HX□									
18.5		1850HX□	●			●					
18.6		MDW 1860HX□		164	95		221	152			
18.7		1870HX□									
18.8		1880HX□									
18.9		1890HX□									
19.0		1900HX□	●			●					
19.1	20.0	MDW 1910HX□		170	97.5		230	156			
19.2		1920HX□									
19.3		1930HX□									
19.4		1940HX□									
19.5		1950HX□	●			●					
19.6		MDW 1960HX□		170	100		230	160			
19.7		1970HX□									
19.8		1980HX□									
19.9		1990HX□									
20.0		2000HX□	●			●					

Grade: ACX70

Please indicate 3, 5 or 8 in the □ when ordering.
(Example: MDW 1210HX5)

■ Recommended Cutting Conditions

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

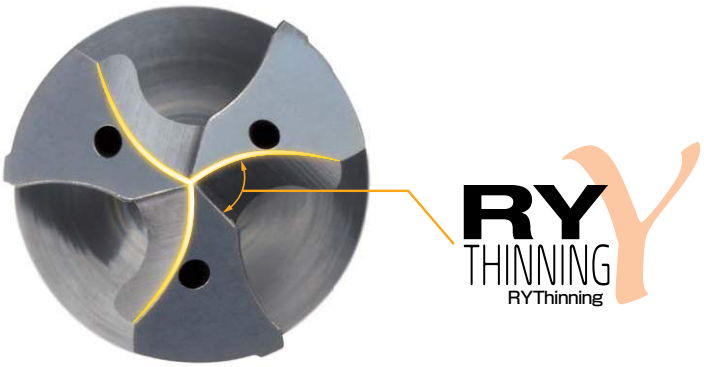
Drill Diameter $øD_c$ (mm)	Cutting Conditions	Grey Cast Iron FC250	Ductile Cast Iron FCD450
Up to ø3.0	v_c	50 - **70** - 90	40 - **50** - 80
	f	0.10 - **0.20** - 0.30	0.12 - **0.18** - 0.24
Up to ø5.0	v_c	50 - **70** - 90	40 - **50** - 80
	f	0.15 - **0.25** - 0.35	0.15 - **0.22** - 0.30
Up to ø10.0	v_c	60 - **80** - 100	50 - **60** - 90
	f	0.20 - **0.35** - 0.50	0.20 - **0.30** - 0.40
Up to ø20.0	v_c	70 - **100** - 120	60 - **80** - 100
	f	0.25 - **0.50** - 0.70	0.25 - **0.45** - 0.60

Min. - **Optimum** - Max.

HY Type

■ General Features

Strong MultiDrill HY type is a three-flute drill that provides stable, high-efficiency drilling of steel and cast iron, reducing the load placed on each cutting edge and ensuring long tool life.



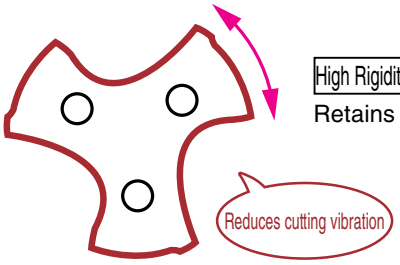
■ Characteristics · Applications

●High-efficiency drilling of steel and cast iron

Thick web and 3-point margin design ensure stable bore accuracy in high-efficiency drilling.
Furthermore, RY THINNING reduces cutting resistance in high-efficiency drilling.
Corresponds to cutting conditions exceeding v_f=800mm/min in steel drilling and v_f=1,000mm/min in cast iron drilling (for ø10mm sizes).

●Long tool life

DEX drill coating utilizing nano-coating technology provides more than double the tool life of conventional coatings.
Three-point margin design provides excellent guide performance to achieve vibration control and stable, extended tool life.



High Rigidity
Retains high rigidity with wide land.

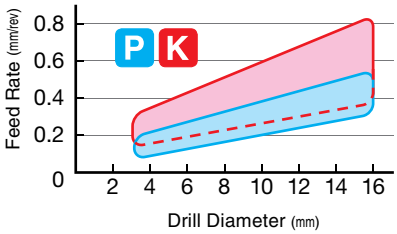
Jflute

Evacuation
Drastically improved chip control and evacuation

■ Series

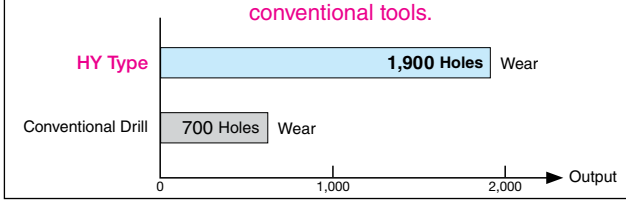
Coolant Supply	Series	Diameter Range (mm)	Hole Depth (L/D)	Remarks
Internal	MDW□□□□HY3	ø5.0 to ø16.0	Up to 3	23 Models Stocked
	MDW□□□□HY5		Up to 5	23 Models Stocked
	MDW□□□□HY8		Up to 8	6 Models Stocked

● General Steel·Grey Cast Iron Drilling

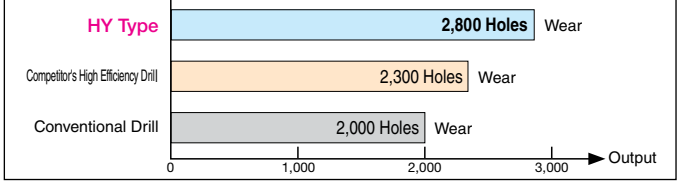


■ Application Examples

Machine Component (SCM420)
·Tool : MDW1250HY3(ø12.5mm 3D)
·Cutting Conditions : Conventional Tool : v_c=90m/min, f=0.25mm/rev, v_f=573mm/min
HY Type: v_c=70m/min, f=0.40mm/rev, v_f=713mm/min
H=12mm (Through) Internal Coolant (Water Soluble)
1.25x high efficiency drilling and 2.7x tool life compared to conventional tools.



Machine Component (FCD450)
·Tool : MDW1020HY3(ø10.2mm 3D)
·Cutting Conditions : Conventional Tool : v_c=70m/min, f=0.28mm/rev, v_f=610mm/min
HY Type: v_c=80m/min, f=0.60mm/rev, v_f=1,500mm/min
H=28mm (Through) Internal Coolant (Water Soluble)
2.5x high efficiency drilling and 1.4x tool life compared to conventional tools.
(1.2x tool life of competitor's high efficiency drill)



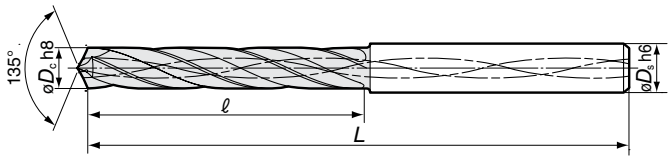
HY Type

Internal Coolant Supply **(HY Type)**

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
◎	◎							◎	◎			

DEX Coat | W/ Oil Hole | 3D | 5D | 8D

●HY Type



● Diameter ø5.0 to ø16.0mm

Diameter øDc (mm)	Shank øDs (mm)	Cat. No. 3,5,8	3D Type Stock [3]	3D Type Dimensions (mm) L	3D Type Dimensions (mm) ℓ	5D Type Stock [5]	5D Type Dimensions (mm) L	5D Type Dimensions (mm) ℓ	8D Type Stock [8]	8D Type Dimensions (mm) L	8D Type Dimensions (mm) ℓ
5.0	5.0	**MDW 0500HY□**	●	80	27.5	●	98	44	●	105	55.0
5.1	6.0	**MDW 0510HY□**	●	82	27.5	●	100	44		118	60.5
6.0		**0600HY□**	●		30.0	●		48	●		66.0
6.5	7.0	**MDW 0650HY□**	●	88	32.5	●	109	52		130	71.5
6.8		**0680HY□**	●		35.0	●		56	●		77.0
7.0		**0700HY□**	●		35.0	●		56			77.0
8.0	8.0	**MDW 0800HY□**	●	94	40.0	●	118	64		142	88.0
8.5	9.0	**MDW 0850HY□**	●	100	42.5	●	127	68	●	154	93.5
8.6		**0860HY□**	●		45.0	●		72			99.0
8.8		**0880HY□**	●		45.0	●		72			99.0
9.0		**0900HY□**	●		45.0	●		72			99.0
9.5	10.0	**MDW 0950HY□**	●	106	47.5	●	136	76		166	104.5
10.0		**1000HY□**	●		50.0	●		80			110.0
10.2	11.0	**MDW 1020HY□**	●	116	52.5	●	149	84		182	115.5
10.3		**1030HY□**	●		52.5	●		84	●		115.5
11.0		**1100HY□**	●		55.0	●		88			121.0
11.4	12.0	**MDW 1140HY□**	●	122	57.5	●	158	92		194	126.5
11.5		**1150HY□**	●		57.5	●		92			126.5
12.0		**1200HY□**	●		60.0	●		96			132.0
12.5	13.0	**MDW 1250HY□**	●	128	62.5	●	167	100	●	206	137.5
13.0		**1300HY□**	●		65.0	●		104			143.0
14.0	14.0	**MDW 1400HY□**	●	134	70.0	●	176	112		218	154.0
16.0	16.0	**MDW 1600HY□**	●	146	80.0	●	194	128		242	176.0

Grade: ACX70

Please indicate 3, 5 or 8 in the □ when ordering.
(Example: MDW 0500HY3)

■ Recommended Cutting Conditions

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

Drill Diameter øDc (mm)	Cutting Conditions	Soft Steel/General Steel (Up to 300HB)	Grey Cast Iron FC250	Ductile Cast Iron FCD450
Up to ø5.0	v_c	50 - **80** - 120	50 - **70** - 90	40 - **50** - 80
	f	0.15 - **0.20** - 0.25	0.20 - **0.30** - 0.45	0.18 - **0.24** - 0.30
Up to ø10.0	v_c	70 - **100** - 150	60 - **80** - 100	50 - **60** - 90
	f	0.20 - **0.30** - 0.40	0.30 - **0.45** - 0.60	0.30 - **0.40** - 0.50
Up to ø16.0	v_c	80 - **120** - 160	70 - **100** - 120	60 - **80** - 100
	f	0.35 - **0.45** - 0.55	0.40 - **0.60** - 0.80	0.40 - **0.55** - 0.70

Min. - **Optimum** - Max.

G Type

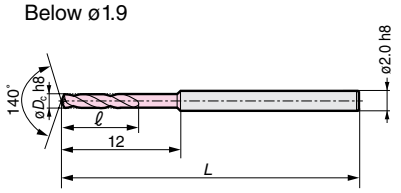
External Coolant Supply / Short type (SG Type)

Recommended Cutting Conditions J25

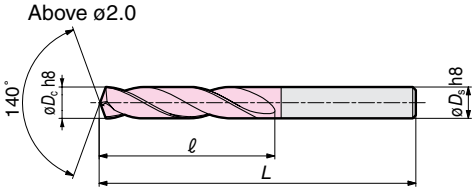
Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
								○	○	○	○	

Carbide **2D**

Below ø1.9



Above ø2.0



(For short drills, L, ℓ are measured from tip of the drill)

● Diameter ø1.0 to ø6.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No.	Short Type (2D) Stock	Dimensions (mm) L	ℓ
1.0	2.0	MDS 010SG		42	8
1.1		011SG			9
1.2		012SG			10
1.3		013SG			
1.4		014SG			11
1.5		015SG			
1.6		016SG			12
1.7		017SG			
1.8		018SG			
1.9		019SG			
2.0		020SG			
2.1	2.1	MDS 021SG		42	12
2.2	2.2	MDS 022SG		43	13
2.3	2.3	023SG			
2.4	2.4	MDS 024SG		44	14
2.5	2.5	025SG			
2.6	2.6	026SG			
2.7	2.7	MDS 027SG		46	16
2.8	2.8	028SG	▲		
2.9	2.9	029SG	▲		
3.0	3.0	030SG	▲		
3.1	3.1	MDS 031SG	▲	49	18
3.2	3.2	032SG	▲		
3.3	3.3	033SG	▲		
3.4	3.4	MDS 034SG	▲	52	20
3.5	3.5	035SG			
3.6	3.6	036SG			
3.7	3.7	037SG	▲		
3.8	3.8	MDS 038SG		55	22
3.9	3.9	039SG	▲		
4.0	4.0	040SG	▲		
4.1	4.1	041SG			
4.2	4.2	042SG	▲		
4.3	4.3	MDS 043SG	▲	58	24
4.4	4.4	044SG			
4.5	4.5	045SG	▲		
4.6	4.6	046SG	▲		
4.7	4.7	047SG			
4.8	4.8	MDS 048SG	▲	62	26
4.9	4.9	049SG			
5.0	5.0	050SG	▲		
5.1	5.1	051SG	▲		
5.2	5.2	052SG	▲		
5.3	5.3	053SG			
5.4	5.4	MDS 054SG		66	28
5.5	5.5	055SG	▲		
5.6	5.6	056SG			
5.7	5.7	057SG			
5.8	5.8	058SG	▲		
5.9	5.9	059SG			
6.0	6.0	060SG	▲		

● Diameter ø6.1 to ø11.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No.	Short Type (2D) Stock	Dimensions (mm) L	ℓ
6.1	6.1	MDS 061SG		70	31
6.2	6.2	062SG			
6.3	6.3	063SG			
6.4	6.4	064SG			
6.5	6.5	065SG	▲		
6.6	6.6	066SG			
6.7	6.7	067SG			
6.8	6.8	MDS 068SG	▲	74	34
6.9	6.9	069SG			
7.0	7.0	070SG	▲		
7.1	7.1	071SG			
7.2	7.2	072SG			
7.3	7.3	073SG			
7.4	7.4	074SG			
7.5	7.5	075SG			
7.6	7.6	MDS 076SG		79	38
7.7	7.7	077SG			
7.8	7.8	078SG			
7.9	7.9	079SG			
8.0	8.0	080SG	▲		
8.1	8.1	081SG			
8.2	8.2	082SG			
8.3	8.3	083SG			
8.4	8.4	084SG			
8.5	8.5	085SG	▲		
8.6	8.6	MDS 086SG	▲	84	40
8.7	8.7	087SG			
8.8	8.8	088SG			
8.9	8.9	089SG			
9.0	9.0	090SG	▲		
9.1	9.1	091SG			
9.2	9.2	092SG			
9.3	9.3	093SG			
9.4	9.4	094SG			
9.5	9.5	095SG			
9.6	9.6	MDS 096SG		89	43
9.7	9.7	097SG			
9.8	9.8	098SG	▲		
9.9	9.9	099SG			
10.0	10.0	100SG	▲		
10.1	10.1	101SG			
10.2	10.2	102SG			
10.3	10.3	103SG			
10.4	10.4	104SG			
10.5	10.5	105SG	▲		
10.6	10.6	106SG			
10.7	10.7	MDS 107SG		95	47
10.8	10.8	108SG			
10.9	10.9	109SG			
11.0	11.0	110SG	▲		

Grade: A1

▲ mark : To be replaced by new item (Please confirm stock availability)

External Coolant Supply / Short type (SG Type)

Recommended Cutting Conditions J25

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC				○	○	○	○	

Carbide 2D

● Diameter ø11.1 to ø16.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No.	Short Type (2D) Stock	Dimensions (mm) L	Dimensions (mm) ℓ
11.1	11.1	MDS 111SG		95	47
11.2	11.2	112SG			
11.3	11.3	113SG			
11.4	11.4	114SG			
11.5	11.5	115SG	▲		
11.6	11.6	116SG			
11.7	11.7	117SG			
11.8	11.8	118SG			
11.9	11.9	MDS 119SG		102	51
12.0	12.0	120SG	▲		
12.1	12.1	121SG			
12.2	12.2	122SG			
12.3	12.3	123SG			
12.4	12.4	124SG			
12.5	12.5	125SG			
12.6	12.6	126SG			
12.7	12.7	127SG			
12.8	12.8	128SG			
12.9	12.9	129SG			
13.0	13.0	130SG			
13.1	13.1	131SG			
13.2	13.2	132SG			
13.3	13.3	MDS 133SG		107	55
13.4	13.4	134SG			
13.5	13.5	135SG			
13.6	13.6	136SG			
13.7	13.7	137SG			
13.8	13.8	138SG			
13.9	13.9	139SG			
14.0	14.0	140SG	▲		
14.1	14.1	MDS 141SG		111	56
14.2	14.2	142SG			
14.3	14.3	143SG			
14.4	14.4	144SG			
14.5	14.5	145SG	▲		
14.6	14.6	146SG			
14.7	14.7	147SG			
14.8	14.8	148SG			
14.9	14.9	149SG			
15.0	15.0	150SG	▲		
15.1	15.1	MDS 151SG		115	58
15.2	15.2	152SG			
15.3	15.3	153SG			
15.4	15.4	154SG			
15.5	15.5	155SG	▲		
15.6	15.6	156SG			
15.7	15.7	157SG			
15.8	15.8	158SG			
15.9	15.9	159SG			
16.0	16.0	160SG	▲		

● Diameter ø16.1 to ø20.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No.	Short Type (2D) Stock	Dimensions (mm) L	Dimensions (mm) ℓ
16.1	16.1	MDS 161SG		119	60
16.2	16.2	162SG			
16.3	16.3	163SG			
16.4	16.4	164SG			
16.5	16.5	165SG			
16.6	16.6	166SG			
16.7	16.7	167SG			
16.8	16.8	168SG			
16.9	16.9	169SG			
17.0	17.0	170SG	▲		
17.1	17.1	MDS 171SG		123	62
17.2	17.2	172SG			
17.3	17.3	173SG			
17.4	17.4	174SG			
17.5	17.5	175SG			
17.6	17.6	176SG			
17.7	17.7	177SG			
17.8	17.8	178SG			
17.9	17.9	179SG			
18.0	18.0	180SG	▲		
18.1	18.1	MDS 181SG		127	64
18.2	18.2	182SG			
18.3	18.3	183SG			
18.4	18.4	184SG			
18.5	18.5	185SG	▲		
18.6	18.6	186SG			
18.7	18.7	187SG			
18.8	18.8	188SG			
18.9	18.9	189SG			
19.0	19.0	190SG	▲		
19.1	19.1	MDS 191SG		131	66
19.2	19.2	192SG			
19.3	19.3	193SG			
19.4	19.4	194SG			
19.5	19.5	195SG	▲		
19.6	19.6	196SG			
19.7	19.7	197SG			
19.8	19.8	198SG			
19.9	19.9	199SG			
20.0	20.0	200SG			

Grade: A1

▲ mark : To be replaced by new item (Please confirm stock availability)

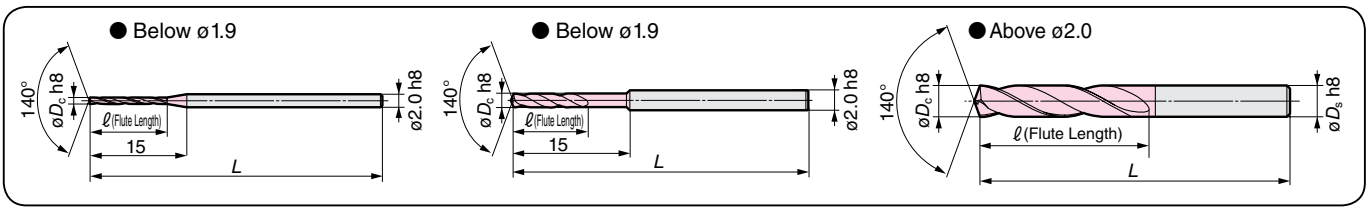
D / G Type

External Coolant Supply/Standard type (D Type / G Type)

Recommended Cutting Conditions J25

	Carbon Steel Up to 0.28%	Alloy Steel From 0.29%	Tempered Steel	Hardened Steel Up to 45HRC	Hardened Steel From 46HRC	Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
D				◎	◎			○					
G									○	○	○	○	

ZX Coat (D Type) / Carbide (G Type) / 3D



● Diameter ø1.0 to ø6.0mm

Diameter øDc (mm)	Shank øDs (mm)	Cat. No. D,G	Standard Type (3D) Stock D	G	Dimensions (mm) L	ℓ
1.0	2.0	MDS 010M□	●		45	12
1.1		011M□				13
1.2		012M□	●			14
1.3		013M□				
1.4		014M□	●			15
1.5		015M□	●			
1.6		016M□	●			
1.7		017M□				
1.8		018M□	●			
1.9		019M□				
2.0		020M□	●			
2.1	2.1	MDS 021M□			45	15
2.2	2.2	MDS 022M□	●		46	16
2.3	2.3	023M□				
2.4	2.4	MDS 024M□	●		47	17
2.5	2.5	025M□	●			
2.6	2.6	026M□	●			
2.7	2.7	MDS 027M□			49	19
2.8	2.8	028M□	●			
2.9	2.9	029M□				
3.0	3.0	030M□	●			
3.1	3.1	MDS 031M□			52	21
3.2	3.2	032M□	●			
3.3	3.3	033M□				
3.4	3.4	MDS 034M□	●		56	24
3.5	3.5	035M□	●			
3.6	3.6	036M□	●			
3.7	3.7	037M□				
3.8	3.8	MDS 038M□	●		60	27
3.9	3.9	039M□				
4.0	4.0	040M□	●			
4.1	4.1	041M□				
4.2	4.2	042M□	●			
4.3	4.3	MDS 043M□	●		65	31
4.4	4.4	044M□	●			
4.5	4.5	045M□	●			
4.6	4.6	046M□	●			
4.7	4.7	047M□				
4.8	4.8	MDS 048M□	●		69	33
4.9	4.9	049M□				
5.0	5.0	MDS 050M□	●	▲	76	38
5.1	5.1	051M□	●	▲		
5.2	5.2	052M□	●	▲		
5.3	5.3	053M□		▲		
5.4	5.4	054M□	●	▲		
5.5	5.5	055M□	●	▲		
5.6	5.6	MDS 056M□	●	▲	81	41
5.7	5.7	057M□				
5.8	5.8	058M□	●	▲		
5.9	5.9	059M□		▲		
6.0	6.0	060M□	●	▲		

● Diameter ø6.1 to ø11.0mm

Diameter øDc (mm)	Shank øDs (mm)	Cat. No. D,G	Standard Type (3D) Stock D	G	Dimensions (mm) L	ℓ
6.1	6.1	MDS 061M□		▲	81	41
6.2	6.2	062M□		▲		
6.3	6.3	063M□		▲		
6.4	6.4	064M□		▲		
6.5	6.5	065M□	●	▲		
6.6	6.6	MDS 066M□		▲	83	43
6.7	6.7	067M□		▲		
6.8	6.8	068M□	●	▲		
6.9	6.9	069M□		▲		
7.0	7.0	070M□	●	▲		
7.1	7.1	MDS 071M□		▲	87	45
7.2	7.2	072M□		▲		
7.3	7.3	073M□		▲		
7.4	7.4	074M□		▲		
7.5	7.5	075M□	●	▲		
7.6	7.6	MDS 076M□		▲	90	48
7.7	7.7	077M□		▲		
7.8	7.8	078M□		▲		
7.9	7.9	079M□		▲		
8.0	8.0	080M□	●	▲		
8.1	8.1	MDS 081M□		▲	96	53
8.2	8.2	082M□		▲		
8.3	8.3	083M□		▲		
8.4	8.4	084M□		▲		
8.5	8.5	085M□	●	▲		
8.6	8.6	MDS 086M□	●	▲	98	55
8.7	8.7	087M□		▲		
8.8	8.8	088M□		▲		
8.9	8.9	089M□		▲		
9.0	9.0	090M□	●	▲		
9.1	9.1	MDS 091M□		▲	102	58
9.2	9.2	092M□		▲		
9.3	9.3	093M□		▲		
9.4	9.4	094M□		▲		
9.5	9.5	095M□	●	▲		
9.6	9.6	MDS 096M□			105	60
9.7	9.7	097M□		▲		
9.8	9.8	098M□		▲		
9.9	9.9	099M□				
10.0	10.0	100M□	●	▲		
10.1	10.1	MDS 101M□		▲	112	66
10.2	10.2	102M□		▲		
10.3	10.3	103M□	●	▲		
10.4	10.4	104M□		▲		
10.5	10.5	105M□	●	▲		
10.6	10.6	MDS 106M□		▲	114	68
10.7	10.7	107M□		▲		
10.8	10.8	108M□		▲		
10.9	10.9	109M□				
11.0	11.0	110M□	●	▲		

Grade: D Type ACZ51S
G Type A1

Please indicate D, or G in the ☐ when ordering.
(Example: MDS010MD)

▲ mark : To be replaced by new item (Please confirm stock availability)

D / G Type

External Coolant Supply/Standard type (MD Type/MG Type)

Recommended Cutting Conditions J25

	Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
	Up to 0.28%	From 0.29%		Up to 45HRC	From 45HRC								
D				◎	◎			○					
G									○	○	○	○	

ZX Coat D Type | Carbide G Type | 3D

● D Type

● G Type

● Diameter ø11.1 to ø16.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No. D,G	Standard Type (3D) Stock D	G				Dimensions (mm) L	ℓ
11.1	11.1	MDS 111M□		▲					
11.2	11.2	112M□		▲					
11.3	11.3	113M□						118	71
11.4	11.4	114M□		▲					
11.5	11.5	115M□	●	▲					
11.6	11.6	MDS 116M□		▲					
11.7	11.7	117M□		▲					
11.8	11.8	118M□		▲				121	73
11.9	11.9	119M□							
12.0	12.0	120M□	●	▲					
12.1	12.1	MDS 121M□		▲					
12.2	12.2	122M□							
12.3	12.3	123M□		▲				135	76
12.4	12.4	124M□		▲					
12.5	12.5	125M□	●	▲					
12.6	12.6	MDS 126M□	●	▲					
12.7	12.7	127M□		▲					
12.8	12.8	128M□						137	78
12.9	12.9	129M□							
13.0	13.0	130M□	●	▲					
13.1	13.1	MDS 131M□		▲					
13.2	13.2	132M□		▲					
13.3	13.3	133M□						144	84
13.4	13.4	134M□							
13.5	13.5	135M□	●	▲					
13.6	13.6	MDS 136M□							
13.7	13.7	137M□		▲					
13.8	13.8	138M□						147	86
13.9	13.9	139M□							
14.0	14.0	140M□	●	▲					
14.1	14.1	MDS 141M□	●	▲					
14.2	14.2	142M□							
14.3	14.3	143M□						151	89
14.4	14.4	144M□							
14.5	14.5	145M□	●	▲					
14.6	14.6	MDS 146M□	●						
14.7	14.7	147M□							
14.8	14.8	148M□						153	91
14.9	14.9	149M□							
15.0	15.0	150M□	●	▲					
15.1	15.1	MDS 151M□							
15.2	15.2	152M□							
15.3	15.3	153M□		▲				157	94
15.4	15.4	154M□							
15.5	15.5	155M□	●						
15.6	15.6	MDS 156M□	●						
15.7	15.7	157M□		▲					
15.8	15.8	158M□		▲				160	96
15.9	15.9	159M□							
16.0	16.0	160M□	●	▲					

● Diameter ø16.1 to ø20.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No. D,G	Standard Type (3D) Stock D	G				Dimensions (mm) L	ℓ
16.1	16.1	MDS 161M□	●	▲					
16.2	16.2	162M□							
16.3	16.3	163M□							
16.4	16.4	164M□							
16.5	16.5	165M□		▲					
16.6	16.6	166M□							
16.7	16.7	167M□							
16.8	16.8	168M□							
16.9	16.9	169M□							
17.0	17.0	170M□		▲				167	102
17.1	17.1	171M□							
17.2	17.2	172M□							
17.3	17.3	173M□							
17.4	17.4	174M□							
17.5	17.5	175M□		▲					
17.6	17.6	176M□							
17.7	17.7	177M□							
17.8	17.8	178M□		▲					
17.9	17.9	179M□							
18.0	18.0	180M□		▲					
18.1	18.1	MDS 181M□							
18.2	18.2	182M□							
18.3	18.3	183M□							
18.4	18.4	184M□							
18.5	18.5	185M□		▲					
18.6	18.6	186M□							
18.7	18.7	187M□							
18.8	18.8	188M□							
18.9	18.9	189M□							
19.0	19.0	190M□		▲				179	114
19.1	19.1	191M□							
19.2	19.2	192M□							
19.3	19.3	193M□							
19.4	19.4	194M□							
19.5	19.5	195M□							
19.6	19.6	196M□							
19.7	19.7	197M□							
19.8	19.8	198M□							
19.9	19.9	199M□							
20.0	20.0	200M□		▲					

Grade: D Type ACZ51S
G Type A1

Please indicate D, or G in the □ when ordering.
(Example: MDS111MK)

▲ mark : To be replaced by new item (Please confirm stock availability)

S Type

SK Type
SG Type

SHK Type
SHG Type

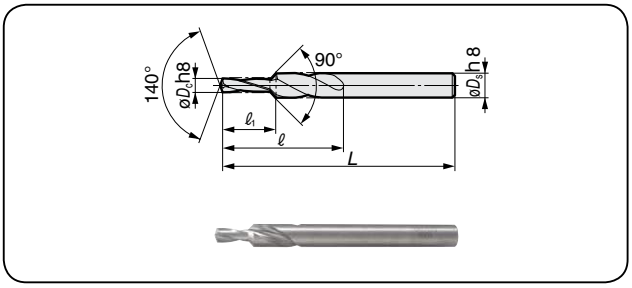
External Coolant Supply (S□K Type/S□G Type)

	Carbon Steel, Alloy Steel Up to 0.28%	Carbon Steel, Alloy Steel From 0.29%	Tempered Steel	Hardened Steel Up to 45HRC	Hardened Steel From 46HRC	Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
SK	○	○	○						○	○			
SG									○	○	○	○	

2D 3D ZX Coat Carbide

SK Type SG Type

Recommended Cutting Conditions J25



Tap Size	Drill Diameter øDc	Shank Diameter øDs	Cat. No. K, G	Steel (FC,Al) Stock K	Steel (FC,Al) Stock G	Dimensions (mm) L	ℓ	ℓ1
M5	4.3	7	MDW 043S2 □	●	●	78	25	10
			043S3 □	●	●	83	30	15
M6	5.1	8	MDW 051S2 □	●	●	84	30	12
			051S3 □	●	●	90	36	18
M8	6.8	10	MDW 068S2 □	●	●	96	40	16
			068S3 □	●	●	104	48	24
M10	8.5	12	MDW 085S2 □	●	●	112	50	20
			085S3 □	●	●	122	60	30
M12	10.3	14	MDW 103S2 □	●	●	124	60	24
			103S3 □	●	●	138	72	36

Grade: S□K Type ACZ70
S□G Type KH03

Please indicate K or G in the□ when ordering.
(Example: MDW043S2K)

Use the same conditions as the K type for the S□K type,
and the G type for the S□G type.
Non-standard sizes can be made to order. Please advise the required dimensions (total length, flute length, diameters etc.)

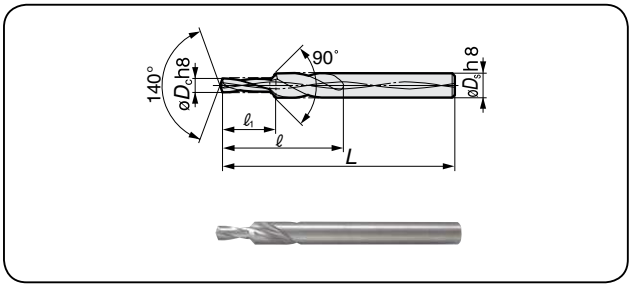
Internal Coolant Supply (S□HK Type/S□HG Type)

	Carbon Steel, Alloy Steel Up to 0.28%	Carbon Steel, Alloy Steel From 0.29%	Tempered Steel	Hardened Steel Up to 45HRC	Hardened Steel From 46HRC	Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
SHK	○	○	○						○	○			
SHG									○	○	○	○	

2D 3D ZX Coat Carbide W/ Oil Hole

SHK Type SHG Type

Recommended Cutting Conditions J25



Tap Size	Drill Diameter øDc	Shank Diameter øDs	Cat. No. K, G	Steel (FC,Al) Stock K	Steel (FC,Al) Stock G	Dimensions (mm) L	ℓ	ℓ1
M5	4.3	7	MDW 043S2H□	●	●	78	25	10
			043S3H□	●	●	83	30	15
M6	5.1	8	MDW 051S2H□	●	●	84	30	12
			051S3H□	●	●	90	36	18
M8	6.8	10	MDW 068S2H□	●	●	96	40	16
			068S3H□	●	●	104	48	24
M10	8.5	12	MDW 085S2H□	●	●	112	50	20
			085S3H□	●	●	122	60	30
M12	10.3	14	MDW 103S2H□	●	●	124	60	24
			103S3H□	●	●	138	72	36

Grade: S□HK Type ACZ70S
S□HG Type KH03

Please indicate K or G in the□ when ordering.
(Example: MDW043S2HK)

Use the same conditions as the HK type for the S□HK type,
and 70% of the cutting speed of the HGS type for the S□HG type.
Non-standard sizes can be made to order. Please advise the required dimensions (total length, flute length, diameters etc.)

Recommended Cutting Conditions

Recommended Cutting Conditions (D Type)

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

Drill Diameter øD_c (mm)	Cutting Conditions	Hardened Steel (Up to 45HRC)	Hardened Steel (Up to 60HRC)	Ti Alloy 6Al-4V-Ti	Inconel Inco718
Up to ø3.0	v_c	20 - **30** - 40	10 - **15** - 20	10 - **10** - 25	10 - **10** - 25
	f	0.06 - **0.07** - 0.08	0.05 - **0.06** - 0.08	0.05 - **0.06** - 0.08	0.05 - **0.06** - 0.08
Up to ø5.0	v_c	20 - **30** - 40	10 - **15** - 20	10 - **10** - 25	10 - **10** - 25
	f	0.08 - **0.09** - 0.10	0.05 - **0.06** - 0.08	0.05 - **0.06** - 0.08	0.05 - **0.06** - 0.08
Up to ø10.0	v_c	20 - **30** - 40	10 - **15** - 20	10 - **15** - 30	10 - **15** - 30
	f	0.10 - **0.12** - 0.15	0.06 - **0.08** - 0.10	0.07 - **0.09** - 0.10	0.07 - **0.09** - 0.10
Up to ø16.0	v_c	20 - **30** - 40	10 - **15** - 20	10 - **15** - 30	10 - **15** - 30
	f	0.10 - **0.13** - 0.15	0.08 - **0.10** - 0.12	0.07 - **0.09** - 0.10	0.07 - **0.09** - 0.10
Up to ø20.0	v_c	20 - **30** - 40	10 - **15** - 20	10 - **15** - 30	10 - **15** - 30
	f	0.10 - **0.13** - 0.15	0.08 - **0.10** - 0.12	0.07 - **0.09** - 0.10	0.07 - **0.09** - 0.10

Min. - **Optimum** - Max.

Recommended Cutting Conditions (G Type)

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

Drill Diameter øD_c (mm)	Cutting Conditions	Grey Cast Iron FC250	Aluminium Alloy
Up to ø3.0	v_c	30 - **50** - 70	50 - **70** - 90
	f	0.12 - **0.15** - 0.18	0.20 - **0.25** - 0.30
Up to ø5.0	v_c	30 - **50** - 70	60 - **80** - 100
	f	0.14 - **0.17** - 0.20	0.20 - **0.28** - 0.35
Up to ø10.0	v_c	40 - **60** - 80	70 - **90** - 110
	f	0.16 - **0.20** - 0.24	0.25 - **0.32** - 0.40
Up to ø20.0	v_c	50 - **70** - 90	80 - **100** - 120
	f	0.18 - **0.22** - 0.26	0.25 - **0.35** - 0.45

Min. - **Optimum** - Max.

Recommended Cutting Conditions (S□K Type)

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

Drill Diameter øD_c (mm)	Cutting Conditions	Soft Steel/General Steel (Up to 300HB)	Stainless Steel (Up to 200HB)	Grey Cast Iron FC250	Ductile Cast Iron FCD450
Up to ø3.0	v_c	30 - **50** - 60	10 - **25** - 40	40 - **50** - 70	35 - **45** - 60
	f	0.10 - **0.15** - 0.20	0.06 - **0.08** - 0.12	0.15 - **0.20** - 0.25	0.12 - **0.15** - 0.20
Up to ø5.0	v_c	40 - **60** - 80	15 - **30** - 55	40 - **50** - 70	40 - **50** - 60
	f	0.15 - **0.20** - 0.25	0.08 - **0.10** - 0.15	0.15 - **0.20** - 0.30	0.15 - **0.20** - 0.25
Up to ø10.0	v_c	50 - **80** - 110	15 - **40** - 60	50 - **60** - 80	50 - **60** - 70
	f	0.20 - **0.25** - 0.35	0.10 - **0.15** - 0.20	0.20 - **0.30** - 0.35	0.20 - **0.25** - 0.35
Up to ø16.0	v_c	60 - **80** - 120	20 - **40** - 60	60 - **80** - 100	50 - **60** - 80
	f	0.25 - **0.30** - 0.35	0.10 - **0.15** - 0.20	0.25 - **0.30** - 0.35	0.25 - **0.30** - 0.35
Up to ø25.0	v_c	60 - **90** - 120	20 - **40** - 60	60 - **80** - 100	50 - **60** - 80
	f	0.25 - **0.30** - 0.40	0.10 - **0.15** - 0.20	0.25 - **0.30** - 0.35	0.25 - **0.30** - 0.35

Min. - **Optimum** - Max.

Recommended Cutting Conditions (S□HK Type)

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

Drill Diameter øD_c (mm)	Cutting Conditions	Soft Steel/General Steel (Up to 300HB)	Stainless Steel (Up to 200HB)	Grey Cast Iron FC250	Ductile Cast Iron FCD450
Up to ø3.0	v_c	30 - **60** - 90	30 - **40** - 50	50 - **70** - 90	40 - **50** - 80
	f	0.10 - **0.15** - 0.20	0.06 - **0.08** - 0.12	0.15 - **0.20** - 0.25	0.12 - **0.15** - 0.20
Up to ø5.0	v_c	50 - **70** - 100	30 - **40** - 60	50 - **70** - 90	40 - **50** - 80
	f	0.15 - **0.20** - 0.25	0.08 - **0.10** - 0.15	0.15 - **0.20** - 0.30	0.15 - **0.20** - 0.25
Up to ø10.0	v_c	70 - **90** - 120	40 - **50** - 80	60 - **80** - 100	50 - **60** - 90
	f	0.20 - **0.25** - 0.35	0.10 - **0.15** - 0.20	0.20 - **0.30** - 0.35	0.20 - **0.25** - 0.35
Up to ø16.0	v_c	80 - **100** - 140	50 - **60** - 80	70 - **90** - 120	60 - **70** - 100
	f	0.25 - **0.30** - 0.35	0.10 - **0.15** - 0.20	0.25 - **0.30** - 0.35	0.25 - **0.30** - 0.35
Up to ø25.0	v_c	80 - **100** - 150	50 - **60** - 80	70 - **90** - 120	60 - **70** - 100
	f	0.25 - **0.30** - 0.40	0.10 - **0.15** - 0.20	0.25 - **0.30** - 0.35	0.25 - **0.30** - 0.35

Min. - **Optimum** - Max.

MDF Type

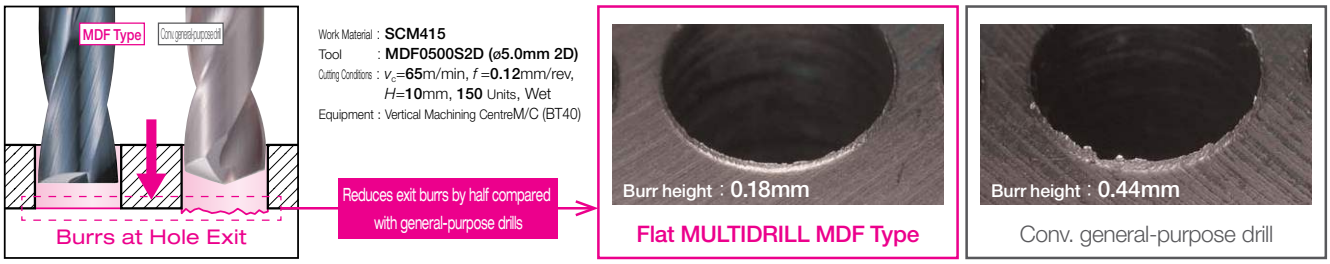
General Features

The flat multidrill MDF type is a solid carbide drill that can be used for various purposes including high-efficiency spot facing and drilling in inclined surfaces and curved surfaces.

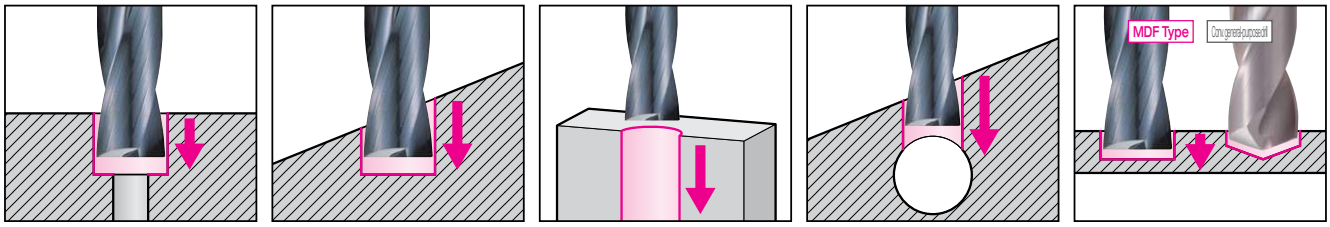
Characteristics and Applications

- **Applicable to various types of drilling thanks to a point angle of 180°**
  Applicable to high-efficiency spot facing, drilling in non-horizontal surfaces such as inclined and cylindrical surfaces, and interrupted drilling. Also reduces burrs at the hole exit.
- **Improves machining stability**
  Achieves high rigidity by employing RS THINNING, which ensures thick web at the bottom.
- **Excellent chip evacuation**
  Achieves excellent chip evacuation thanks to the wide chip pocket and a high-quality rake face shape.
- **Excellent cutting edge strength**
  Achieves excellent cutting edge strength through optimized cutting edge design.

Reduction of Burrs at Hole Exit



Application



High-efficiency spot facing | Drilling in non-horizontal surface (inclined Surface, cylindrical surface, etc.) | Interrupted drilling | Cross drilling | Pre-tap hole drilling in thin sheets

Recommended Cutting Conditions

1. The recommended hole depth is 2 x Dc. The depth is measured from the highest point of the hole in drilling in inclined surfaces.
2. The recommended cutting conditions are those for drilling in flat horizontal surfaces.
3. Adjust the feed rate according to the inclination angle when drilling in an inclined surface.
4. Set the feed rate at 70% or lower when the inclination angle is 30° or less.
5. Set the feed rate at 50% or lower when the inclination angle is larger than 30°.
6. This product is a drilling tool. Do not use it for traversing or helical milling.

v_c: Cutting Speed (m/min) f: Feed Rate (mm/rev)

Drill Diameter øD_c(mm)	Cutting Conditions	Soft Steel/General Steel (Up to 250HB)	Alloy Steel (Up to 300HB)	Hardened steel (Up to HRC50)	Stainless Steel (Up to 200HB)	Grey Cast Iron FC250	Ductile Cast Iron	Aluminum Alloy
Up to ø4	v_c	60 - **75** - 90	50 - **65** - 80	20 - **30** - 40	20 - **30** - 40	60 - **75** - 90	55 - **65** - 75	90 - **110** - 130
	f	0.06 - **0.08** - 0.1	0.05 - **0.08** - 0.10	0.01 - **0.02** - 0.03	0.01 - **0.02** - 0.03	0.06 - **0.08** - 0.10	0.04 - **0.06** - 0.08	0.06 - **0.08** - 0.10
Up to ø6	v_c	60 - **75** - 90	50 - **65** - 80	20 - **30** - 40	20 - **30** - 50	60 - **75** - 90	60 - **70** - 80	90 - **110** - 130
	f	0.05 - **0.10** - 0.15	0.05 - **0.10** - 0.15	0.04 - **0.06** - 0.08	0.03 - **0.04** - 0.05	0.05 - **0.10** - 0.15	0.06 - **0.09** - 0.12	0.05 - **0.10** - 0.15
Up to ø8	v_c	60 - **75** - 90	50 - **65** - 80	20 - **30** - 40	20 - **30** - 50	60 - **75** - 90	60 - **70** - 80	90 - **110** - 130
	f	0.10 - **0.15** - 0.20	0.10 - **0.15** - 0.20	0.06 - **0.08** - 0.10	0.04 - **0.06** - 0.08	0.10 - **0.15** - 0.20	0.10 - **0.12** - 0.15	0.10 - **0.15** - 0.20
Up to ø10	v_c	60 - **75** - 90	50 - **65** - 80	20 - **30** - 40	20 - **30** - 50	60 - **75** - 90	60 - **70** - 80	90 - **110** - 130
	f	0.12 - **0.17** - 0.22	0.12 - **0.17** - 0.22	0.08 - **0.10** - 0.12	0.06 - **0.08** - 0.10	0.12 - **0.17** - 0.22	0.12 - **0.15** - 0.18	0.12 - **0.17** - 0.22
Up to ø12	v_c	60 - **75** - 90	50 - **65** - 80	20 - **30** - 40	20 - **30** - 50	60 - **75** - 90	60 - **70** - 80	90 - **110** - 130
	f	0.15 - **0.20** - 0.25	0.15 - **0.20** - 0.25	0.12 - **0.15** - 0.18	0.08 - **0.10** - 0.12	0.15 - **0.20** - 0.25	0.15 - **0.18** - 0.20	0.15 - **0.20** - 0.25

Min. - **Optimum** - Max.

MDF Type

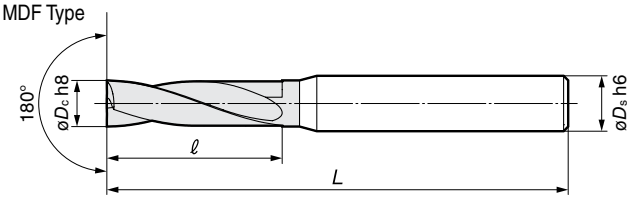
External Coolant Supply (MDF Type)

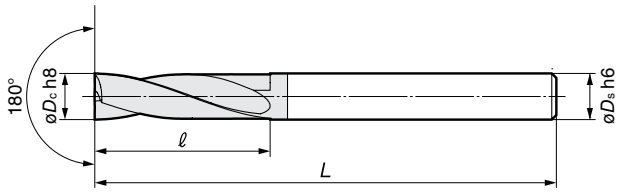
Carbon Steel Up to 0.28%	Alloy Steel From 0.29%	Tempered Steel	Hardened Steel Up to 45HRC	Hardened Steel From 46HRC	Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
◎	◎	◎	○		○			○	○	○		

PVD Coat

2D

● MDF Type





● Diameter ø2.0 to ø7.0mm

Diameter øDc (mm)	Shank øDs (mm)	Cat. No.	Stock	Dimensions (mm) L	Dimensions (mm) ℓ
2.0	4	MDF 0200S2D	●	50	8.0
2.1		0210S2D	●		8.4
2.2		0220S2D	●		8.8
2.3		0230S2D	●		9.2
2.4		0240S2D	●		9.6
2.5	4	MDF 0250S2D	●	50	10.0
2.6		0260S2D	●		10.4
2.7		0270S2D	●		10.8
2.8		0280S2D	●		11.2
2.9		0290S2D	●		11.6
3.0	6	MDF 0300S2D	●	50	12.0
3.1		0310S2D	●		12.4
3.2		0320S2D	●		12.8
3.3		0330S2D	●		13.2
3.4		0340S2D	●		13.6
3.5		0350S2D	●		14.0
3.6	6	MDF 0360S2D	●	50	14.4
3.7		0370S2D	●		14.8
3.8		0380S2D	●		15.2
3.9		0390S2D	●		15.6
4.0		0400S2D	●		16.0
4.1	6	MDF 0410S2D	●	60	16.4
4.2		0420S2D	●		16.8
4.3		0430S2D	●		17.2
4.4		0440S2D	●		17.6
4.5		0450S2D	●		18.0
4.6	6	MDF 0460S2D	●	60	18.4
4.7		0470S2D	●		18.8
4.8		0480S2D	●		19.2
4.9		0490S2D	●		19.6
5.0		0500S2D	●		20.0
5.1	6	MDF 0510S2D	●	60	20.4
5.2		0520S2D	●		20.8
5.3		0530S2D	●		21.2
5.4		0540S2D	●		21.6
5.5		0550S2D	●		22.0
5.6	6	MDF 0560S2D	●	60	22.4
5.7		0570S2D	●		22.8
5.8		0580S2D	●		23.2
5.9		0590S2D	●		23.6
6.0		0600S2D	●		24.0
6.1	8	MDF 0610S2D	●	70	24.4
6.2		0620S2D	●		24.8
6.3		0630S2D	●		25.2
6.4		0640S2D	●		25.6
6.5		0650S2D	●		26.0
6.6	8	MDF 0660S2D	●	70	26.4
6.7		0670S2D	●		26.8
6.8		0680S2D	●		27.2
6.9		0690S2D	●		27.6
7.0		0700S2D	●		28.0

● Diameter ø7.1 to ø12.0mm

Diameter øDc (mm)	Shank øDs (mm)	Cat. No.	Stock	Dimensions (mm) L	Dimensions (mm) ℓ
7.1	8	MDF 0710S2D	●	70	28.4
7.2		0720S2D	●		28.8
7.3		0730S2D	●		29.2
7.4		0740S2D	●		29.6
7.5		0750S2D	●		30.0
7.6	8	MDF 0760S2D	●	70	30.4
7.7		0770S2D	●		30.8
7.8		0780S2D	●		31.2
7.9		0790S2D	●		31.6
8.0		0800S2D	●		32.0
8.1	10	MDF 0810S2D	●	80	32.4
8.2		0820S2D	●		32.8
8.3		0830S2D	●		33.2
8.4		0840S2D	●		33.6
8.5		0850S2D	●		34.0
8.6	10	MDF 0860S2D	●	80	34.4
8.7		0870S2D	●		34.8
8.8		0880S2D	●		35.2
8.9		0890S2D	●		35.6
9.0		0900S2D	●		36.0
9.1	10	MDF 0910S2D	●	80	36.4
9.2		0920S2D	●		36.8
9.3		0930S2D	●		37.2
9.4		0940S2D	●		37.6
9.5		0950S2D	●		38.0
9.6	10	MDF 0960S2D	●	80	38.4
9.7		0970S2D	●		38.8
9.8		0980S2D	●		39.2
9.9		0990S2D	●		39.6
10.0		1000S2D	●		40.0
10.1	12	MDF 1010S2D	●	90	40.4
10.2		1020S2D	●		40.8
10.3		1030S2D	●		41.2
10.4		1040S2D	●		41.6
10.5		1050S2D	●		42.0
10.6	12	MDF 1060S2D	●	90	42.4
10.7		1070S2D	●		42.8
10.8		1080S2D	●		43.2
10.9		1090S2D	●		43.6
11.0		1100S2D	●		44.0
11.1	12	MDF 1110S2D	●	90	44.4
11.2		1120S2D	●		44.8
11.3		1130S2D	●		45.2
11.4		1140S2D	●		45.6
11.5		1150S2D	●		46.0
11.6	12	MDF 1160S2D	●	90	46.4
11.7		1170S2D	●		46.8
11.8		1180S2D	●		47.2
11.9		1190S2D	●		47.6
12.0		1200S2D	●		48.0

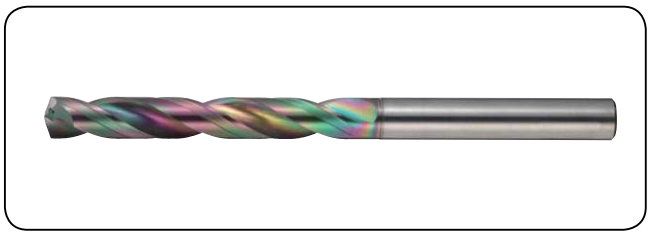
Grade: ACF75

NHGS Type

Internal Coolant Supply (NHGS Type)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 45HRC				○	○	◎	◎	

Aurora DLC Coat | W/ Oil Hole | 3D | 5D | 10D



■ Characteristics

●High efficiency drilling
AURORA COAT (DLC Coat) and low cutting resistance WL (Wide L) thinning drastically reduces cutting resistance.

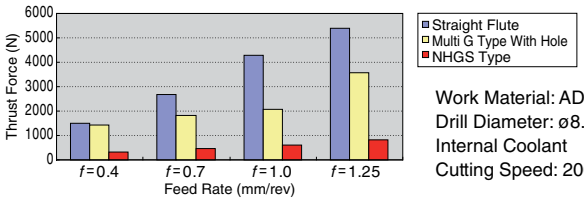
●Stable Drilling Performance
Special cutting edge design and WW (Wide W) margin improves hole quality.

●Longer tool life
With AURORA COAT coupled with the cutting edge design, long and stable tool life can be achieved.

●Deep hole drilling possible
Drills for deep hole drilling can be custom-made.
(Production range: Drill diameters: ø3.0 to ø16.0mm
Total length: Available on inquiry)

■ Comparison of Cutting Resistance (Thrust Force)

Drastic reduction in cutting resistance



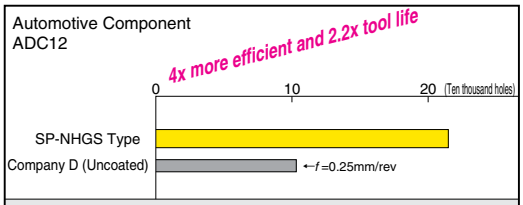
Work Material: ADC12
Drill Diameter: ø8.0mm
Internal Coolant
Cutting Speed: 200m/min

■ Application Examples

High Feed Drilling of Aluminium Alloy

● Automotive Component using SP-NHGS Type

Automotive Component
ADC12



· Drill
ø5.5 x ø9.0 x 120L
ø5.5mm
Flute Length 60mm

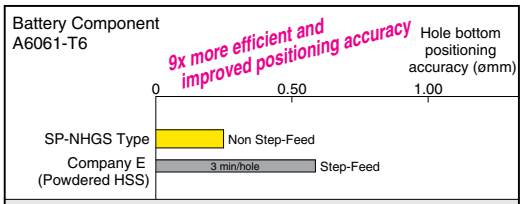
· Cutting Conditions
v_c=170m/min (n=9838min^{-1})
f=1.0mm/rev (v_f=9838mm/min)
H=19mm (Through)
Water Soluble Coolant (4MPa)

· Machine
Vertical Machining Centre
(BT30)

Deep Hole Drilling of Aluminium Alloy

● Battery Component using SP-NHGS Type

Battery Component
A6061-T6



· Drill
ø4.0 x 155 x 200L
ø4.0mm
Flute Length 150mm

· Cutting Conditions
v_c=60m/min (n=4775min^{-1})
f=0.2mm/rev (v_f=955mm/min)
H=146mm (Blind Hole)
Water Soluble Coolant (4MPa)

· Machine
Vertical Machining Centre
(BT40)

● Diameter ø3.0 to ø8.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No. 3, 5, 10	3D Type Stock [3]	3D Type Dimensions (mm) L	3D Type Dimensions (mm) ℓ	5D Type Stock [5]	5D Type Dimensions (mm) L	5D Type Dimensions (mm) ℓ	10D Type Stock [10]	10D Type Dimensions (mm) L	10D Type Dimensions (mm) ℓ
3.0	3.0	MDW 0300NHGS□□	●	68	17.5	●	78	28	●	92	42
3.1		MDW 0310NHGS□□				●					
3.2		0320NHGS□□	●			●			●		
3.3	4.0	0330NHGS□□	●	72	20	●	86	32		106	49
3.4		0340NHGS□□				●			●		
3.5		0350NHGS□□	●			●			●		
3.6		MDW 0360NHGS□□				●			●		
3.65		0365NHGS□□	●			●					
3.66		0366NHGS□□				●					
3.7	4.0	0370NHGS□□		72	22.5	●	86	36		106	56
3.8		0380NHGS□□				●					
3.9		0390NHGS□□				●			●		
4.0		0400NHGS□□	●			●			●		
4.1		MDW 0410NHGS□□	●			●					
4.2		0420NHGS□□	●			●					
4.3	5.0	0430NHGS□□		80	25	●	98	40		124	63
4.4		0440NHGS□□				●					
4.5		0450NHGS□□	●			●			●		
4.6		MDW 0460NHGS□□	●			●					
4.7		0470NHGS□□				●					
4.8	5.0	0480NHGS□□		80	27.5	●	98	44		124	70
4.9		0490NHGS□□				●			●		
5.0		0500NHGS□□	●			●			●		
5.1		MDW 0510NHGS□□				●			●		
5.2		0520NHGS□□	●			●					
5.3	6.0	0530NHGS□□	●	82	27.5	●	100	44		136	77
5.4		0540NHGS□□				●					
5.5		0550NHGS□□	●			●			●		
5.6		MDW 0560NHGS□□				●					
5.7		0570NHGS□□				●					
5.8	6.0	0580NHGS□□		82	30	●	100	48		136	84
5.9		0590NHGS□□	●			●					
6.0		0600NHGS□□	●			●			●		
6.1		MDW 0610NHGS□□				●			●		
6.2		0620NHGS□□				●					
6.3	7.0	0630NHGS□□		88	32.5	●	109	52		151	91
6.4		0640NHGS□□				●					
6.5		0650NHGS□□	●			●			●		
6.6		MDW 0660NHGS□□				●					
6.7		0670NHGS□□	●			●			●		
6.8	7.0	0680NHGS□□	●	88	35	●	109	56	●	151	98
6.9		0690NHGS□□				●					
7.0		0700NHGS□□	●			●			●		
7.1		MDW 0710NHGS□□				●					
7.2		0720NHGS□□				●			●		
7.3	8.0	0730NHGS□□		94	37.5	●	118	60		166	105
7.35		0735NHGS□□	●			●					
7.4		0740NHGS□□	●			●					
7.5		0750NHGS□□	●			●			●		
7.6		MDW 0760NHGS□□				●					
7.7		0770NHGS□□				●					
7.8	8.0	0780NHGS□□	●	94	40	●	118	64	●	166	112
7.9		0790NHGS□□				●					
8.0		0800NHGS□□	●			●			●		

Grade: DL1300

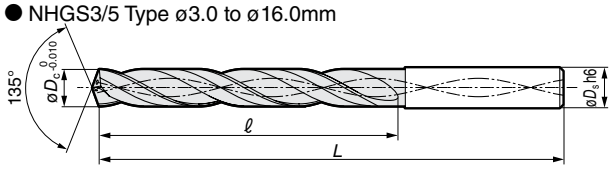
NHGS Type

Internal Coolant Supply (NHGS Type)

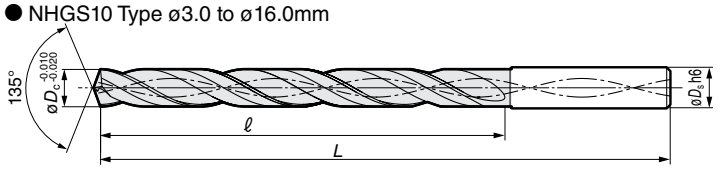
Carbon Steel	Alloy Steel	Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
								○	○	◎	◎	

Aurora DLC Coat | W/ Oil Hole | 3D | 5D | 10D

● NHGS3/5 Type ø3.0 to ø16.0mm



● NHGS10 Type ø3.0 to ø16.0mm



● Diameter ø8.1 to ø13.0mm

Diameter øDc (mm)	Shank øDs (mm)	Cat. No. 3, 5, 10	3D Type Stock [3]	3D Type Dimensions (mm) L	3D Type Dimensions (mm) ℓ	5D Type Stock [5]	5D Type Dimensions (mm) L	5D Type Dimensions (mm) ℓ	10D Type Stock [10]	10D Type Dimensions (mm) L	10D Type Dimensions (mm) ℓ
8.1		MDW 0810NHGS□□				●					
8.2		0820NHGS□□				●					
8.3	9.0	0830NHGS□□		100	42.5	●	127	68		181	119
8.4		0840NHGS□□				●					
8.5		0850NHGS□□	●			●			●		
8.6		MDW 0860NHGS□□	●			●					
8.7		0870NHGS□□				●					
8.8	9.0	0880NHGS□□	●	100	45	●	127	72		181	126
8.9		0890NHGS□□				●					
9.0		0900NHGS□□	●			●			●		
9.1		MDW 0910NHGS□□				●					
9.2		0920NHGS□□				●					
9.21	10.0	0921NHGS□□	●	106	47.5	●	136	76		196	133
9.3		0930NHGS□□				●					
9.4		0940NHGS□□	●			●					
9.5		0950NHGS□□	●			●			●		
9.6		MDW 0960NHGS□□				●					
9.7		0970NHGS□□				●					
9.8	10.0	0980NHGS□□		106	50	●	136	80	●	196	140
9.9		0990NHGS□□				●					
10.0		1000NHGS□□	●			●			●		
10.1		MDW 1010NHGS□□	●								
10.2		1020NHGS□□									
10.3	11.0	1030NHGS□□	●	116	52.5	●	149	84		215	147
10.4		1040NHGS□□				●					
10.5		1050NHGS□□	●			●			●		
10.6		MDW 1060NHGS□□	●			●					
10.7		1070NHGS□□									
10.8	11.0	1080NHGS□□		116	55		149	88		215	154
10.9		1090NHGS□□									
11.0		1100NHGS□□	●			●			●		
11.08		MDW 1108NHGS□□	●			●					
11.1		1110NHGS□□	●			●					
11.2	12.0	1120NHGS□□	●	122	57.5	●	158	92		230	161
11.3		1130NHGS□□									
11.4		1140NHGS□□	●			●					
11.5		1150NHGS□□	●			●			●		
11.6		MDW 1160NHGS□□									
11.7		1170NHGS□□									
11.8	12.0	1180NHGS□□		122	60		158	96		230	168
11.9		1190NHGS□□									
12.0		1200NHGS□□	●			●			●		
12.1		MDW 1210NHGS□□	●			●					
12.2		1220NHGS□□									
12.3	13.0	1230NHGS□□	●	128	62.5	●	167	100		245	175
12.4		1240NHGS□□									
12.5		1250NHGS□□	●			●			●		
12.6		MDW 1260NHGS□□									
12.7		1270NHGS□□									
12.8	13.0	1280NHGS□□		128	65		167	104		245	182
12.9		1290NHGS□□									
12.96		1296NHGS□□	●			●					
13.0		1300NHGS□□	●			●			●		

● Diameter ø13.1 to ø16 .0mm

Diameter øDc (mm)	Shank øDs (mm)	Cat. No. 3, 5, 10	3D Type Stock [3]	3D Type Dimensions (mm) L	3D Type Dimensions (mm) ℓ	5D Type Stock [5]	5D Type Dimensions (mm) L	5D Type Dimensions (mm) ℓ	10D Type Stock [10]	10D Type Dimensions (mm) L	10D Type Dimensions (mm) ℓ
13.1		MDW 1310NHGS□□									
13.2		1320NHGS□□									
13.3	14.0	1330NHGS□□		134	68		176	108		260	189
13.4		1340NHGS□□									
13.5		1350NHGS□□	●			●					
13.6		MDW 1360NHGS□□									
13.7		1370NHGS□□									
13.8	14.0	1380NHGS□□		134	70		176	112		260	196
13.9		1390NHGS□□									
14.0		1400NHGS□□	●			●					
14.1		MDW 1410NHGS□□	●			●					
14.2		1420NHGS□□									
14.3	15.0	1430NHGS□□		140	72.5		185	116		275	203
14.4		1440NHGS□□									
14.5		1450NHGS□□	●			●					
14.6		MDW 1460NHGS□□									
14.7		1470NHGS□□									
14.8	15.0	1480NHGS□□		140	75		185	120		275	210
14.9		1490NHGS□□	●			●					
14.96		1496NHGS□□	●			●					
15.0		1500NHGS□□	●			●					
15.1		MDW 1510NHGS□□									
15.2		1520NHGS□□									
15.3	16.0	1530NHGS□□		146	77.5		194	124		290	217
15.4		1540NHGS□□									
15.5		1550NHGS□□	●			●					
15.6		MDW 1560NHGS□□									
15.7		1570NHGS□□									
15.8	16.0	1580NHGS□□		146	80		194	128		290	224
15.9		1590NHGS□□									
16.0		1600NHGS□□	●			●					

Grade: DL1300

Please indicate 3, 5 or 10 in the □□ when ordering.
(Example: MDW0850NHGS10)

■ Recommended Cutting Conditions

(v_c: Cutting Speed (m/min) f: Feed Rate (mm/rev))

Drill Diameter øDc (mm)	Cutting Conditions	Aluminium Casting/ Die Cast Aluminium	Wrought Aluminium Alloy
Up to ø6.0	v_c	80 - **140** - 200	80 - **120** - 200
	f	0.2 - **0.4** - 0.6	0.2 - **0.3** - 0.4
Up to ø10.0	v_c	100 - **180** - 250	100 - **150** - 250
	f	0.4 - **0.6** - 0.8	0.2 - **0.35** - 0.5
Up to ø16.0	v_c	120 - **200** - 250	120 - **180** - 250
	f	0.4 - **0.7** - 1.0	0.3 - **0.45** - 0.6

Min. - **Optimum** - Max.

SGS Type

■ General Features

SGS type drills for heat-resistant alloys employ a sharp cutting edge to reduce heat during drilling (reduced cutting resistance) and provide stable and long tool life.

■ Characteristics · Applications

● Stable and long tool life

- · Combination of optimised cutting edge design and special grade significantly reduces wear.
- · Minute honing (edge treatment) amount and special thinning shape reduce cutting resistance. This reduces cutting edge breakage.
- · Perfect for drilling Ni-based heat resistant alloys (Inconel/Waspaloy/Hastelloy).

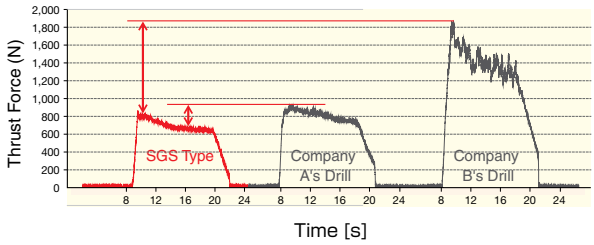
■ Series

Type	Diameter Range (mm)	Hole Depth ($^{L}/_{D}$)
MDW□□□□SGS3 Type	ø3.0 to 12.0	Up to 3

■ Performance

Comparison of Cutting Resistance (Thrust)

Low Resistance [Reduced Load On Cutting Edge]



Tool: ø6.0
Work Material: Inconel718
Cutting Conditions: v_c=10m/min f=0.08mm/rev H=8mm (Through)
External Coolant

Tool Life Comparison

Long Life [No Fracturing or Breakage]

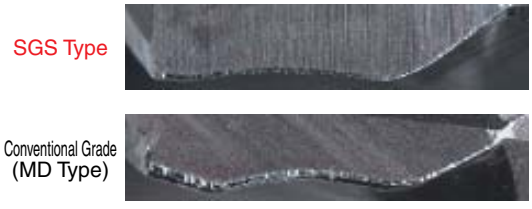
Tool	SGS Type	Company A's Drill	Company B's Drill
Output	Able To Continue After 50 Holes	Breakage After 30 Holes	Breakage After 5 Holes
Photo			

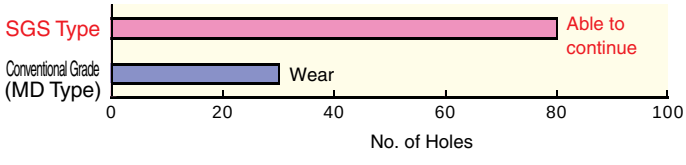
Tool: ø6.0
Work Material: Inconel718
Cutting Conditions: v_c=10m/min f=0.08mm/rev H=16mm (Stop Hole)
External Coolant

■ Application Examples

Comparison of Edge Wear After 30 Holes

Significantly Reduced Flank Wear





Tool: MDW0600SGS3
Work Material: Inconel718 (Aeronautic Components)
Cutting Conditions: v_c=10m/min f=0.06mm/rev H=3mm (Through)
External Coolant

SGS Type

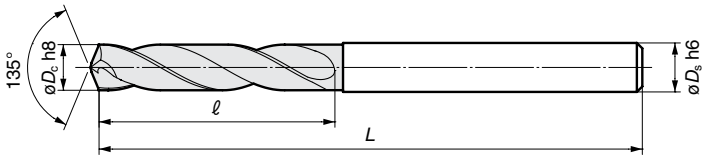
External Coolant Supply (SGS Type)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
						○	◎					

PVD Coat

3D

● SGS Type



● Diameter ø3.0 to ø12.0mm

Diameter øDc (mm)	Shank øDs (mm)	Cat. No.	Stock	Dimensions (mm) L	Dimensions (mm) ℓ
3.0	3.0	MDW 0300SGS3	●	49	17.5
3.5	4.0	MDW 0350SGS3	●	60	20.0
4.0		0400SGS3	●		22.5
4.5	5.0	MDW 0450SGS3	●	76	25.0
5.0		0500SGS3	●		27.5
5.5	6.0	MDW 0550SGS3	●	81	27.5
6.0		0600SGS3	●		30.0
6.5	7.0	MDW 0650SGS3	●	83	32.5
7.0		0700SGS3	●		35.0
7.5	8.0	MDW 0750SGS3	●	90	37.5
8.0		0800SGS3	●		40.0
8.5	9.0	MDW 0850SGS3	●	98	42.5
9.0		0900SGS3	●		45.0
9.5	10.0	MDW 0950SGS3	●	105	47.5
10.0		1000SGS3	●		50.0
10.5	11.0	MDW 1050SGS3	●	114	52.5
11.0		1100SGS3	●		55.0
11.5	12.0	MDW 1150SGS3	●	121	57.5
12.0		1200SGS3	●		60.0

■ Recommended Cutting Conditions

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

Drill Diameter øDc (mm)	Cutting Conditions	Ti Alloy Ti	Heat-Resistant Alloy Inconel
Up to ø6.0	v_c	10 - **20** - 30	10 - **10** - 30
	f	0.05 - **0.08** - 0.10	0.05 - **0.08** - 0.10
Up to ø10.0	v_c	10 - **20** - 30	10 - **15** - 30
	f	0.07 - **0.10** - 0.12	0.07 - **0.10** - 0.12
Up to ø12.0	v_c	10 - **20** - 30	15 - **20** - 30
	f	0.07 - **0.10** - 0.12	0.07 - **0.10** - 0.12

Min. - **Optimum** - Max.

WGS Type

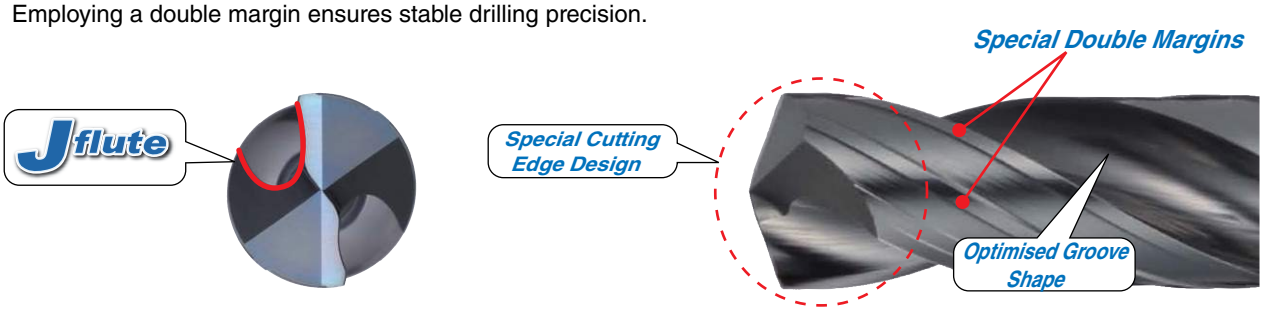
■ General Features

Super MultiDrill WGS type features a tuned J flute that improves chip size when machining thin sheets. Sharp edge minimises hardening from drilling.

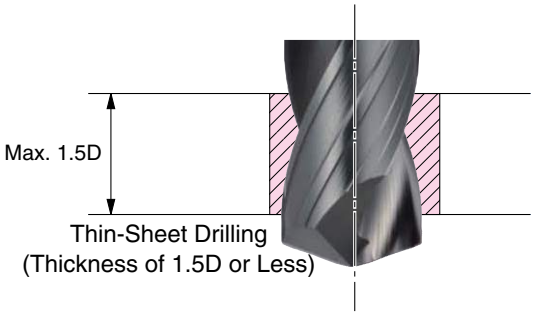
Special double margin design gives stable drilling precision.

■ Characteristics · Applications

Super MultiDrill WGS type features J flute (groove shape) specially adjusted for thin sheets.
Employing a double margin ensures stable drilling precision.



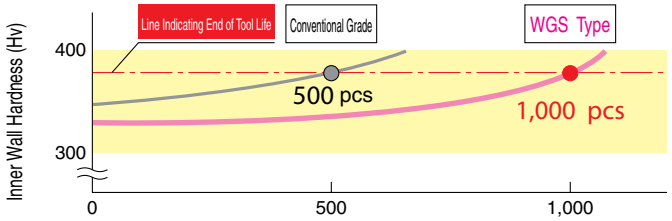
■ Applications



< Typical Automotive Components >
- Bearing Hubs (Inners/Outers)
- Knuckles
- Differential Rings
- Bolt Holes For Flanged Automotive Components

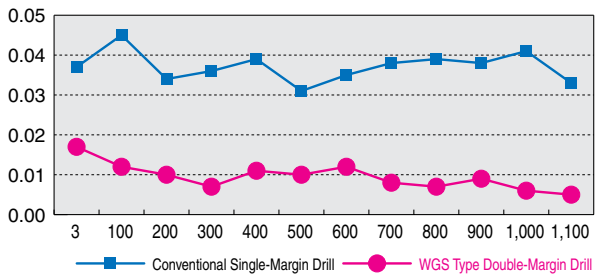
■ Performance

● Slowed Hardening of Work Surface from Drilling



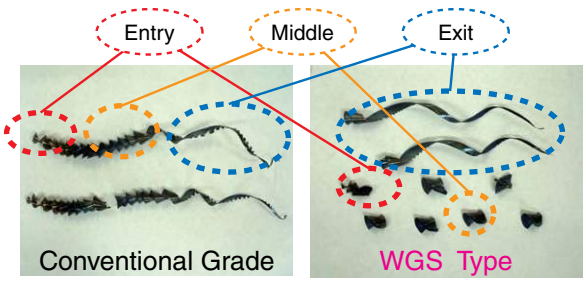
Work Material: S53C
Cutting Conditions: v_c=70m/min f=0.2mm/rev
H=13mm

● Stability Of Oversized Drilled Holes



Work Material: S50C
Cutting Conditions: v_c=80m/min f=0.25mm/rev
H=16mm

● Smaller Chip Size

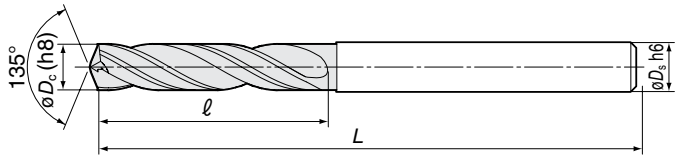


Work Material: SUJ2
Cutting Conditions: v_c=80m/min f=0.25mm/rev
H=13mm

External Coolant Supply (WGS Type)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
○	◎	◎	○		○			○	○			

DEX Coat 2D



● Diameter ø6.8 to ø16.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Cat. No.	Stock	2D Type Dimensions (mm) L	ℓ
6.8 to 7.0	7.0	**MDW 0680 to 0700WGS2**		73	33
7.1 to 7.5	8.0	**MDW 0710 to 0750WGS2**		78	36
7.6 to 8.0		**0760 to 0800WGS2**			
8.1 to 8.5	9.0	**MDW 0810 to 0850WGS2**		82	38
8.6 to 9.0		**0860 to 0900WGS2**			
9.1 to 9.5	10.0	**MDW 0910 to 0950WGS2**		87	41
9.6 to 10.0		**0960 to 1000WGS2**			
10.1 to 10.5	11.0	**MDW 1010 to 1050WGS2**		93	45
10.6 to 11.0		**1060 to 1100WGS2**			
11.1 to 11.5	12.0	**MDW 1110 to 1150WGS2**		100	47
11.6 to 12.0		**1160 to 1200WGS2**			
12.1 to 12.5	13.0	**MDW 1210 to 1250WGS2**		100	49
12.6 to 13.0		**1260 to 1300WGS2**			
13.1 to 13.5	14.0	**MDW 1310 to 1350WGS2**		105	50
13.6 to 14.0		**1360 to 1400WGS2**			52
14.1 to 14.5	15.0	**MDW 1410 to 1450WGS2**		108	
14.6 to 15.0		**1460 to 1500WGS2**			53
15.1 to 15.5	16.0	**MDW 1510 to 1550WGS2**		112	
15.6 to 16.0		**1560 to 1600WGS2**			55

Grade: ACX70

■ This is a made-to-order product. Please specify hole diameter (including tolerance) when ordering.

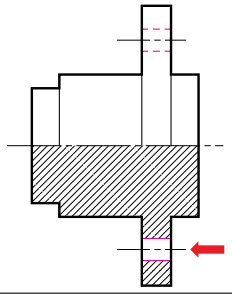
■ Recommended Cutting Conditions (v_c: Cutting Speed m/min f: Feed Rate mm/rev)

Drill Diameter $øD_c$ (mm)	Cutting Conditions	Soft Steel/General Steel (Up to 300HB)	Stainless Steel (Up to 200HB)	Grey Cast Iron FC250	Ductile Cast Iron FCD450
Up to ø10.0	v_c	50 - **80** - 130	15 - **40** - 60	50 - **60** - 80	50 - **60** - 70
	f	0.20 - **0.25** - 0.35	0.10 - **0.15** - 0.20	0.20 - **0.30** - 0.35	0.20 - **0.25** - 0.35
Up to ø16.0	v_c	60 - **100** - 140	20 - **40** - 60	60 - **80** - 100	50 - **60** - 80
	f	0.25 - **0.30** - 0.35	0.10 - **0.15** - 0.20	0.25 - **0.30** - 0.35	0.25 - **0.30** - 0.35

* Recommended cutting conditions are affected by machine rigidity, work clamps, and other factors, and must therefore be adjusted to suit the environment in question.
* If hardening from drilling occurs, we recommend that the lower speed indicated in the recommended cutting conditions is selected.

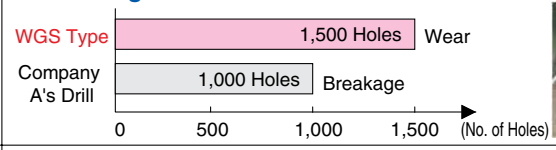
Min. - **Optimum** - Max.

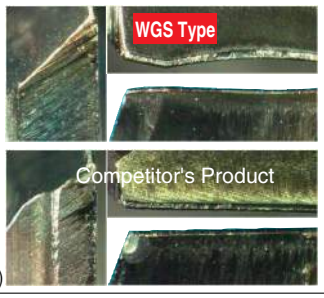
■ Application Examples (Super MultiDrill WGS Type)

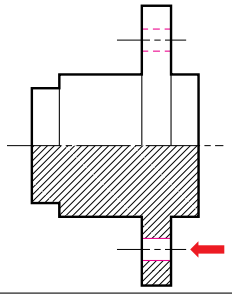


· Tool: MDW1110 WGS2
· Cutting Conditions: v_c=70m/min f=0.3mm/rev H=6mm
External Coolant (Water Soluble)
· Work Material: SUJ2

Achieving 1.5x tool life!

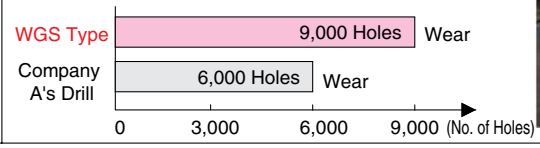






· Tool: MDW1370 WGS2
· Cutting Conditions: v_c=90m/min f=0.3mm/rev H=10mm
External Coolant (Water Soluble)
· Work Material: S53C

Achieving 1.5x tool life! Reduced wear in centre



XHGS / PHT Type

■ General Features

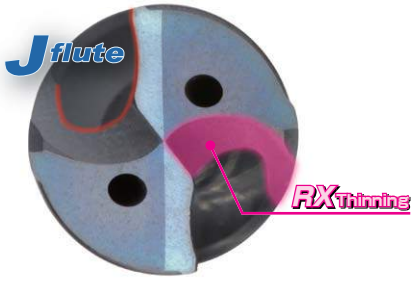
Super MultiDrill XHGS type, a next-generation drill special for deep hole drilling, features stable chip control and improved strength to further enhance efficiency of deep hole drilling.

■ Characteristics

● Deep hole drilling
- · New groove shape (J flute) with improved chip control stability when drilling deep holes
- · Drill to depths 20x drill diameter at high efficiency of v_f=1,000mm/min (ø5 equivalent to S48C)
- · The application of a special thinning shape (RX thinning) reduces cutting resistance during high efficiency drilling.

● Long tool life
- · Special DEX coating provides long tool life with a wide variety of work materials.
- · Improved chip evacuation makes it possible to reduce spindle load fluctuation, ensuring stable, long tool life.

● Environmentally-friendly
- · Compatible with the MQL (Minimum Quantity Lubrication) system.
- · Compatible with dual-fluid mist (simultaneous spray of oil and water)



■ Series

Application	Series	Diameter Range (mm)	Hole Depth ($^{L}/_{D}$)	Remarks
Deep Hole Drilling	MDW□□□□XHGS12 Type	ø2.5 to 16.0	Up to 12	28 items in stock
	MDW□□□□XHGS15 Type	ø2.5 to 14.0	Up to 15	68 items in stock
	MDW□□□□XHGS20 Type	ø2.5 to 12.0	Up to 20	64 items in stock
	MDW□□□□XHGS25 Type	ø2.5 to 10.0	Up to 25	16 items in stock
	MDW□□□□XHGS30 Type	ø2.5 to 9.0	Up to 30	14 items in stock
Guide Hole Drilling	MDW□□□□PHT Type	ø2.5 to 16.0	Up to 2	72 items in stock

■ Application Examples

● Automotive Component (Equivalent to S380)

Tool : ø5.0 x 115mm (PHT type) ø5.0 x 170mm (XHGS type)
Equipment : Horizontal single-axis NC machine
Coolant Supply : MQL (Air pressure 0.5MPa, Volume approx. 4cc/h)
Cutting Conditions : v_c=80m/min f=0.28mm/rev H=85mm/Holes (3 Per Unit)
Tool Life : 500 Units (113m/reg)

● Automotive Component (Equivalent to S43C)

Tool : ø6.0 x 170mm (PHT type) ø6.0 x 230mm (XHGS type)
Equipment : Horizontal single-axis NC machine
Coolant Supply : MQL (Air pressure 0.5MPa, Volume approx. 40cc/h)
Cutting Conditions : v_c=80m/min f=0.18mm/rev H=110mm/Holes (4 Per Unit)
Tool Life : 150 Units (113m/reg)

● Automotive Component (Equivalent to FCD700)

Tool : ø5.0 x 105mm (PHT type) ø5.0 x 155mm (XHGS type)
Equipment : Horizontal single-axis NC machine
Coolant Supply : MQL (Air pressure 0.4MPa, Volume approx. 4cc/h)
Cutting Conditions : v_c=50m/min f=0.18mm/rev H=60mm/Holes (5 Per Unit)
Tool Life : 400 Units (120m/reg)

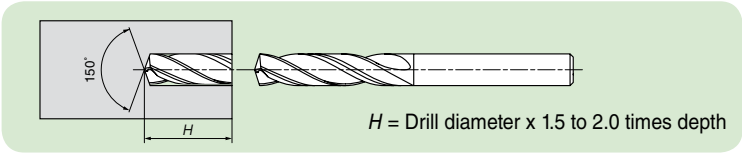
● Machine Component (Equivalent to S45C)

Tool : ø6.0 x 90mm (PHT type) ø6.0 x 145mm (XHGS type)
Equipment : Horizontal single-axis NC machine
Coolant Supply : MQL (Air pressure 0.5MPa, Volume approx. 60cc/h)
Cutting Conditions : v_c=80m/min f=0.20mm/rev H=62mm/Holes (3 Per Unit)
Tool Life : 550 Units (104m/reg)

■ Recommended Drilling Method

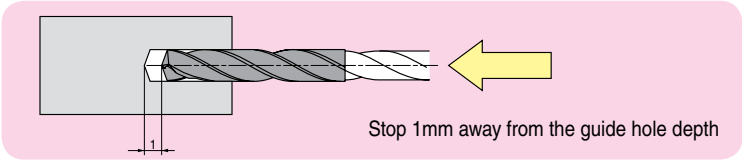
(1) Drill a guide hole using the dedicated PHT type

● Select the same nominal diameter for the dedicated guide hole drill PHT type as the deep hole drill XHGS type.
(The guide drill diameter is designed +0.02 mm to +0.05 mm larger than the long drill diameter)



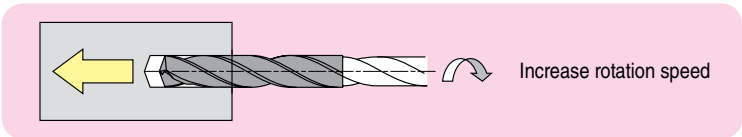
(2) Feed the deep hole drill XHGS type through the guide hole at low rotation speed

● Rotation Speed : 500min^{-1}
● Feed Rate : 1,000 to 2,000mm/min



* If the drill is inserted into the guide hole at the set cutting speed, peripheral run-out may cause shoulder damage to the drill.

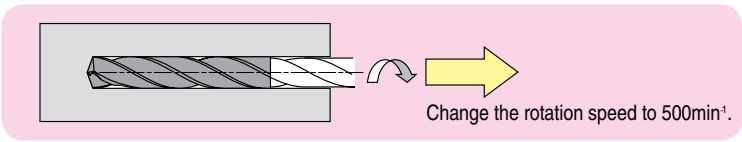
(3) Increase rotation speed until the set cutting speed is reached, and start normal drilling operation



* When using an NC machine, you may be instructed to begin normal drilling operation before the set rotation speed is reached, so it is recommended to enter a dwell instruction before normal drilling operation is instructed.

(4) After drilling, rotation speed is reduced and the drill is retracted from the work material

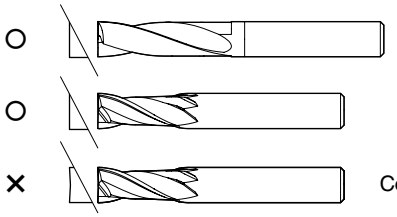
● Rotation Speed : 500min^{-1} Feed Rate : 1,000 to 2,000mm/min



* Retracting a drill from the work material at a high rotation speed is dangerous as doing so may result in breakage due to run-out.

(5) Other Notes

● A flat base should be prepared when the surface for the guide tool is slanted.



Spot facing using an endmill or flat multidrill MDF type (see page J26)

Concave endmills cannot be used

● When the deep hole drill exits through an angled surface, decrease the feed rate to *f*=0.05mm/rev just before drilling through.

■ Coolant

(1) Internal coolant supply

● Use JIS A1 class 1 oil or equivalent (emulsion).
● Pump pressure Steel: 1.5 to 2.0MPa (Cooling effect increases at higher pressures, affecting chips/wear)
Cast iron & aluminium alloy: 4.0 to 6.0MPa (Priority on cooling)

(2) Internal MQL

● Air pressure : 0.5MPa or higher
● Discharge volume : It is recommended to set the maximum discharge volume possible on the machine.
* Consult the manufacturer before using with aluminium alloy.

(3) Internal dual-liquid mist

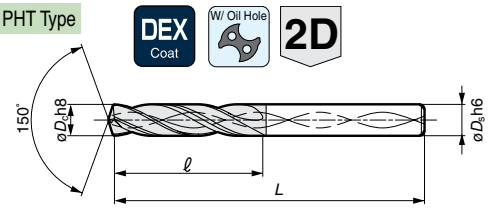
● Air pressure : 0.5MPa or higher
● Discharge volume : It is recommended to use the optimum value of the machine when drilling.

XHGS / PHT Type

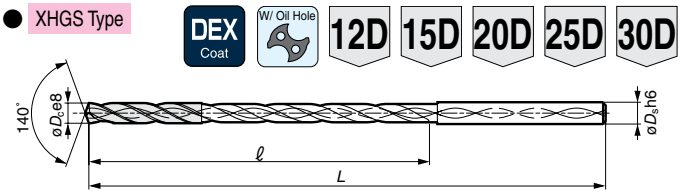
Internal Coolant Supply (XHGS Type / PHT Type)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
○	◎	◎	○		○			○	○			

● PHT Type



● XHGS Type



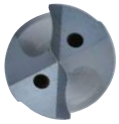
● Diameter ø2.5 to ø7.0mm

Diameter øDc (mm)	Shank øDs (mm)	Dedicated Guide Hole PHT Type				High Efficiency Deep Hole Drill XHGS Type															
		Cat. No.	Stock	Dimensions (mm)		Cat. No.	Hole Depth: 12D			Hole Depth: 15D			Hole Depth: 20D			Hole Depth: 25D			Hole Depth: 30D		
				L	ℓ	12, 15, 20, 25, 30 ↘	Stock 12	L	ℓ	Stock 15	L	ℓ	Stock 20	L	ℓ	Stock 25	L	ℓ	Stock 30	L	ℓ
2.5	3.0	MDW 0250PHT	●	68	15	MDW 0250XHGS□□	●	91	43	●	98	50	●	111	63	●	123	75	●	136	88
2.6		MDW 0260PHT	●			MDW 0260XHGS□□				●			●								
2.7		0270PHT	●			0270XHGS□□				●			●								
2.8	3.0	0280PHT	●	68	17.5	0280XHGS□□		99	51	●	108	60	●	123	75		138	90		153	105
2.9		0290PHT	●			0290XHGS□□				●			●								
3.0		0300PHT	●			0300XHGS□□	●			●			●			●			●		
3.1		MDW 0310PHT	●			MDW 0310XHGS□□				●			●								
3.2		0320PHT	●			0320XHGS□□				●			●								
3.3		0330PHT	●		20	0330XHGS□□		108	60	●	118	70	●	136	88		153	105		171	123
3.4		0340PHT	●			0340XHGS□□				●			●								
3.5	4.0	0350PHT	●	72		0350XHGS□□	●			●			●			●			●		
3.6		MDW 0360PHT	●			MDW 0360XHGS□□				●			●								
3.7		0370PHT	●			0370XHGS□□				●			●								
3.8		0380PHT	●		22.5	0380XHGS□□		116	68	●	128	80	●	148	100		168	120		188	140
3.9		0390PHT	●			0390XHGS□□				●			●								
4.0		0400PHT	●			0400XHGS□□	●			●			●			●			●		
4.1		MDW 0410PHT	●			MDW 0410XHGS□□				●			●								
4.2		0420PHT	●			0420XHGS□□				●			●								
4.3		0430PHT	●		25	0430XHGS□□		127	77	●	140	90	●	163	113		185	135		208	158
4.4		0440PHT	●			0440XHGS□□				●			●								
4.5	5.0	0450PHT	●	80		0450XHGS□□	●			●			●			●			●		
4.6		MDW 0460PHT	●			MDW 0460XHGS□□				●			●								
4.7		0470PHT	●			0470XHGS□□				●			●								
4.8		0480PHT	●		27.5	0480XHGS□□		135	85	●	150	100	●	175	125		200	150		225	175
4.9		0490PHT	●			0490XHGS□□				●			●								
5.0		0500PHT	●			0500XHGS□□	●			●			●			●			●		
5.1		MDW 0510PHT	●			MDW 0510XHGS□□				●			●								
5.2		0520PHT	●			0520XHGS□□				●			●								
5.3		0530PHT	●		27.5	0530XHGS□□		146	94	●	162	110	●	192	140		217	165		245	193
5.4		0540PHT	●			0540XHGS□□				●			●								
5.5	6.0	0550PHT	●	82		0550XHGS□□	●			●			●			●			●		
5.6		MDW 0560PHT	●			MDW 0560XHGS□□				●			●								
5.7		0570PHT	●			0570XHGS□□				●			●								
5.8		0580PHT	●		30	0580XHGS□□		154	102	●	172	120	●	202	150		232	180		262	210
5.9		0590PHT	●			0590XHGS□□				●			●								
6.0		0600PHT	●			0600XHGS□□	●			●			●			●			●		
6.1		MDW 0610PHT	●			MDW 0610XHGS□□				●			●								
6.2		0620PHT	●			0620XHGS□□				●			●								
6.3		0630PHT	●		32.5	0630XHGS□□		164	111	●	183	130	●	216	163		248	195		281	228
6.4		0640PHT	●			0640XHGS□□				●			●								
6.5	7.0	0650PHT	●	88		0650XHGS□□	●			●			●			●			●		
6.6		MDW 0660PHT	●			MDW 0660XHGS□□				●			●								
6.7		0670PHT	●			0670XHGS□□				●			●								
6.8		0680PHT	●		35	0680XHGS□□		172	119	●	193	140	●	228	175		263	210		298	245
6.9		0690PHT	●			0690XHGS□□				●			●								
7.0		0700PHT	●			0700XHGS□□	●			●			●			●			●		

Please indicate 12, 15, 20, 25 or 30 in the □□ when ordering. (Example: MDW 0600XHGS12)

Grade: XHGS Type ACX70
PHT Type ACX20


XHGS Type


PHT Type

Internal Coolant Supply (XHGS Type / PHT Type)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
○	◎	◎	○		○			○	○			

● PHT Type

● XHGS Type

● Diameter ø7.1 to ø16.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Dedicated Guide Hole PHT Type Cat. No.	Stock	Dimensions (mm) L	Dimensions (mm) ℓ	High Efficiency Deep Hole Drill XHGS Type Cat. No. 12,15,20,25,30	Hole Depth: 12D Stock 12	Hole Depth: 12D Dimensions (mm) L	Hole Depth: 12D Dimensions (mm) ℓ	Hole Depth: 15D Stock 15	Hole Depth: 15D Dimensions (mm) L	Hole Depth: 15D Dimensions (mm) ℓ	Hole Depth: 20D Stock 20	Hole Depth: 20D Dimensions (mm) L	Hole Depth: 20D Dimensions (mm) ℓ	Hole Depth: 25D Stock 25	Hole Depth: 25D Dimensions (mm) L	Hole Depth: 25D Dimensions (mm) ℓ	Hole Depth: 30D Stock 30	Hole Depth: 30D Dimensions (mm) L	Hole Depth: 30D Dimensions (mm) ℓ
7.1	8.0	MDW 0710PHT	●	94	37.5	MDW 0710XHGS□□		182	128	●	204	150	●	242	188		279	225		317	263
7.2		0720PHT	●			0720XHGS□□				●			●								
7.3		0730PHT	●			0730XHGS□□				●			●								
7.4		0740PHT	●			0740XHGS□□				●			●								
7.5		0750PHT	●			0750XHGS□□	●			●			●			●			●		
7.6	8.0	MDW 0760PHT	●	94	40.0	MDW 0760XHGS□□		190	136	●	214	160	●	254	200		294	240		334	280
7.7		0770PHT	●			0770XHGS□□				●			●								
7.8		0780PHT	●			0780XHGS□□				●			●								
7.9		0790PHT	●			0790XHGS□□				●			●								
8.0		0800PHT	●			0800XHGS□□	●			●			●			●			●		
8.5	9.0	MDW 0850PHT	●	100	42.5	MDW 0850XHGS□□	●	200	145	●	225	170	●	268	213	●	310	255	●	353	298
9.0		MDW 0900PHT	●		45.0	MDW 0900XHGS□□	●	208	153	●	235	180	●	280	225	●	325	270	●	370	315
9.5	10.0	MDW 0950PHT	●	106	47.5	MDW 0950XHGS□□	●	218	162	●	246	190	●	294	238	●	341	285			
10.0		MDW 1000PHT	●		50.0	MDW 1000XHGS□□	●	226	170	●	256	200	●	306	250	●	356	300			
10.5	11.0	MDW 1050PHT	●	116	52.5	MDW 1050XHGS□□	●	240	179	●	271	210	●	324	263						
11.0		MDW 1100PHT	●		55.0	MDW 1100XHGS□□	●	248	187	●	281	220	●	336	275						
11.5	12.0	MDW 1150PHT	●	122	57.5	MDW 1150XHGS□□	●	258	196	●	292	230	●	350	288						
12.0		MDW 1200PHT	●		60.0	MDW 1200XHGS□□	●	266	204	●	302	240	●	362	300						
12.5	13.0	MDW 1250PHT	●	128	62.5	MDW 1250XHGS□□	●	276	213	●	313	250									
13.0		MDW 1300PHT	●		65.0	MDW 1300XHGS□□	●	284	221	●	323	260									
13.5	14.0	MDW 1350PHT	●	134	67.5	MDW 1350XHGS□□	●	294	230	●	334	270									
14.0		MDW 1400PHT	●		70.0	MDW 1400XHGS□□	●	302	238	●	344	280									
14.5	15.0	MDW 1450PHT	●	140	72.5	MDW 1450XHGS□□	●	312	247												
15.0		MDW 1500PHT	●		75.0	MDW 1500XHGS□□	●	320	255												
15.5	16.0	MDW 1550PHT	●	146	77.5	MDW 1550XHGS□□	●	330	264												
16.0		MDW 1600PHT	●		80.0	MDW 1600XHGS□□	●	338	272												

Please indicate 12, 15, 20, 25 or 30 in the □□ when ordering. (Example: MDW 0710XHGS30)

Grade: XHGS Type ACX70
PHT Type ACX20
Greyed items: Inquire about production.

■ Made to Order Items: Inquire about production of drills in tool diameters and lengths not listed above or not in stock.

- Length: Can be made in lengths up to 400 mm (Some lengths are not possible due to drill diameter)
- Diameter: ø2.5 to ø20 mm
- Work material: Standard stocked items may be used for general steel and alloy steel but we recommend and provide optimized tools designed for the material.

■ Recommended Cutting Conditions

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

Drill Diameter $øD_c$ (mm)	Cutting Conditions	Soft Steel (Up to 200HB)	General Steel (Up to 250HB)	Alloy Steel (Up to 300HB)	Hardened Steel (Up to 40HRc)	Cast Iron FC·FCD
Up to ø3.0	v_c	50 - **60** - 80	60 - **80** - 100	40 - **55** - 70	30 - **40** - 50	40 - **55** - 70
	f	0.12 - **0.15** - 0.20	0.12 - **0.15** - 0.20	0.10 - **0.13** - 0.16	0.06 - **0.08** - 0.12	0.15 - **0.18** - 0.23
Up to ø5.0	v_c	50 - **60** - 80	60 - **80** - 100	50 - **60** - 70	30 - **45** - 55	50 - **60** - 70
	f	0.15 - **0.20** - 0.25	0.15 - **0.23** - 0.30	0.12 - **0.15** - 0.20	0.08 - **0.10** - 0.14	0.17 - **0.25** - 0.35
Up to ø10.0	v_c	50 - **70** - 90	60 - **80** - 110	50 - **65** - 80	30 - **50** - 60	50 - **65** - 80
	f	0.20 - **0.25** - 0.30	0.20 - **0.25** - 0.32	0.15 - **0.20** - 0.25	0.10 - **0.15** - 0.20	0.25 - **0.28** - 0.35
Up to ø16.0	v_c	60 - **80** - 100	60 - **90** - 120	50 - **65** - 80	40 - **55** - 70	50 - **65** - 80
	f	0.25 - **0.30** - 0.35	0.25 - **0.30** - 0.35	0.15 - **0.23** - 0.27	0.12 - **0.15** - 0.23	0.25 - **0.30** - 0.35

Note: Use lower speed when using MQL coolant, and higher speed when using internal coolant or dual-liquid mist.

Min. - **Optimum** - Max.

MLDH-L / MLDH-P Type

■ General Features

Micro Long Drills are oil-hole drills for high efficiency drilling that were developed for drilling deep, small-diameter holes. These next-generation, small-diameter hole drills feature improved strength - often a problem area with small-diameter drills.

■ Characteristics and Applications

● Deep-hole drilling

New groove shape ensures good drill rigidity and chip evacuation.
High efficiency drilling to depths of over 20x drill diameter at over v_f=500mm/min (drill diameter 1.3mm, SUS416 equivalent).
Optimal thinning and edge balance for stable chip control.

● Long tool life

Special coating provides long tool life with a wide variety of work materials.
Improved chip evacuation makes it possible to reduce spindle load fluctuation, ensuring stable tool life.

■ Series

Application	Series	Diameter Range (mm)	Hole Depth ($^{L}/_{D}$)	Remarks
Deep Hole Drilling	MLDH□□□□L5 Type	ø0.8 to 2.0	Up to 5	41 Models Stocked
	MLDH□□□□L12 Type	ø0.8 to 2.0	Up to 12	41 Models Stocked
	MLDH□□□□L20 Type	ø0.8 to 2.0	Up to 20	41 Models Stocked
	MLDH□□□□L30 Type	ø0.8 to 2.0	Up to 30	41 Models Stocked
Guide Hole Drilling	MLDH□□□□P Type	ø0.8 to 2.0	Up to 2	41 Models Stocked

■ Recommended Cutting Conditions

MLDH-P Type/MLDH-L5 Type

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

Drill Diameter øD_c (mm)	Cutting Conditions	Soft Steel Up to 200HB	General Steel Up to 250HB	Alloy Steel Up to 300HB	Stainless Steel Up to 200HB	Cast Iron FC/FCD	Aluminium Alloy	Heat-resistant steels
Up to 1.0	v_c	40 - **50** - 60	40 - **50** - 60	40 - **50** - 60	20 - **30** - 40	40 - **50** - 60	50 - **60** - 70	5 - **10** - 15
	f	0.01 - **0.02** - 0.03	0.01 - **0.02** - 0.03	0.01 - **0.02** - 0.03	0.01 - **0.02** - 0.03	0.02 - **0.03** - 0.04	0.03 - **0.04** - 0.06	0.005 - **0.01** - 0.02
Up to 1.5	v_c	40 - **50** - 60	40 - **50** - 60	40 - **50** - 60	20 - **30** - 40	40 - **50** - 60	50 - **60** - 70	5 - **10** - 15
	f	0.04 - **0.08** - 0.12	0.04 - **0.08** - 0.12	0.04 - **0.08** - 0.12	0.02 - **0.05** - 0.10	0.04 - **0.08** - 0.12	0.05 - **0.10** - 0.15	0.01 - **0.03** - 0.05
Up to 2.0	v_c	40 - **50** - 60	40 - **50** - 60	40 - **50** - 60	20 - **30** - 40	40 - **50** - 60	50 - **60** - 70	5 - **10** - 15
	f	0.06 - **0.08** - 0.12	0.06 - **0.08** - 0.12	0.06 - **0.08** - 0.12	0.04 - **0.06** - 0.10	0.06 - **0.08** - 0.12	0.08 - **0.12** - 0.15	0.01 - **0.03** - 0.05

Min. - **Optimum** - Max.

MLDH-L12 Type/MLDH-L20 Type/MLDH-L30 Type

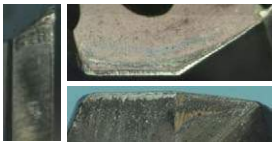
Drill Diameter øD_c (mm)	Cutting Conditions	Soft Steel Up to 200HB	General Steel Up to 250HB	Alloy Steel Up to 300HB	Stainless Steel Up to 200HB	Cast Iron FC/FCD	Aluminium Alloy	Heat-resistant steels
Up to 1.0	v_c	40 - **50** - 60	40 - **50** - 60	40 - **50** - 60	20 - **30** - 40	40 - **50** - 60	50 - **60** - 70	5 - **10** - 15
	f	0.01 - **0.02** - 0.03	0.01 - **0.02** - 0.03	0.01 - **0.02** - 0.03	0.01 - **0.02** - 0.03	0.02 - **0.03** - 0.04	0.03 - **0.04** - 0.06	0.005 - **0.01** - 0.02
Up to 1.5	v_c	40 - **50** - 60	40 - **50** - 60	40 - **50** - 60	20 - **30** - 40	40 - **50** - 60	50 - **60** - 70	5 - **10** - 15
	f	0.03 - **0.05** - 0.07	0.03 - **0.05** - 0.07	0.03 - **0.05** - 0.07	0.02 - **0.04** - 0.07	0.04 - **0.07** - 0.10	0.05 - **0.08** - 0.12	0.01 - **0.02** - 0.03
Up to 2.0	v_c	40 - **50** - 60	40 - **50** - 60	40 - **50** - 60	20 - **30** - 40	40 - **50** - 60	50 - **60** - 70	5 - **10** - 15
	f	0.04 - **0.06** - 0.08	0.04 - **0.06** - 0.08	0.04 - **0.06** - 0.08	0.04 - **0.06** - 0.08	0.04 - **0.07** - 0.10	0.05 - **0.08** - 0.12	0.01 - **0.02** - 0.03

Min. - **Optimum** - Max.

■ Application Examples

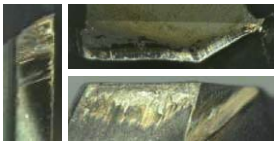
● Automotive Component Mould (Equivalent to SUS416)

Tool : MLDH1400L20 (Guide : MLDH1400P)
Equipment : Vertical Machining Centre (HSKA63)
Coolant Supply : Internal Coolant (Emulsion Type, Pump Pressure : 4MPa)
Cutting Conditions : v_c=60m/min f=0.03mm/rev H=21mm
Tool Life : 600 Units (11.4m/reg)



● Tooling Component (Equivalent to SKD11)

Tool : MLDH1900L20 (Guide : MLDH1900P)
Equipment : Vertical Machining Centre (HSKA63)
Coolant Supply : Internal Coolant (Emulsion Type, Pump Pressure : 4MPa)
Cutting Conditions : v_c=60m/min f=0.10mm/rev H=27mm
Tool Life : 600 Units (18m/reg)

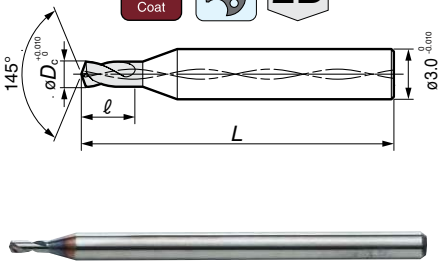


MLDH-P Type  MLDH-L Type 

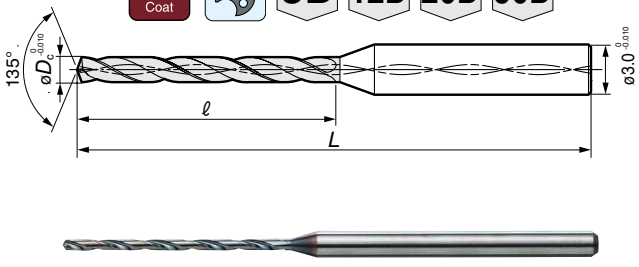
Internal Coolant Supply (MLDH-P Type / MLDH-L Type)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
◎	◎	○	○		◎			◎	◎	○		

● MLDH-P Type PVD Coat W/ Oil Hole 2D



● MLDH-L Type PVD Coat W/ Oil Hole 5D 12D 20D 30D



● MLDH-P Type/MLDH-L Type Dimensions and Stock Availability

Diameter øDc (mm)	Dedicated Guide Hole MLDH-P Type				Micro Long Drill MLDH-L Type											
						Hole Depth: 5D			Hole Depth: 12D			Hole Depth: 20D			Hole Depth: 30D		
	Cat. No.	Stock	Dimensions (mm)		Cat. No.	Stock	Dimensions (mm)		Stock	Dimensions (mm)		Stock	Dimensions (mm)		Stock	Dimensions (mm)	
			L	ℓ	5, 12, 20, 30 ↘	5	L	ℓ	12	L	ℓ	20	L	ℓ	30	L	ℓ
0.80	MLDH 0800P	●	45	3.2	MLDH 0800L□□	●	50	8	●	55	14	●	60	19	●	70	28
0.81	0810P	●			0810L□□	●			●			●			●		
0.82	0820P	●		3.3	0820L□□	●		9	●			●		20	●		
0.83	0830P	●			0830L□□	●			●			●			●		
0.84	0840P	●		3.4	0840L□□	●			●			●			●		29
0.85	MLDH 0850P	●	45	3.4	MLDH 0850L□□	●	50	9	●	55	14	●	60	20	●	70	29
0.86	0860P	●			0860L□□	●			●		15	●	65	21	●		
0.87	0870P	●		3.5	0870L□□	●			●			●			●		30
0.88	0880P	●			0880L□□	●			●			●			●		
0.89	0890P	●		3.6	0890L□□	●			●			●			●		
0.90	MLDH 0900P	●	45	3.6	MLDH 0900L□□	●	50	9	●	55	15	●	65	22	●	75	31
0.91	0910P	●			0910L□□	●		10	●			●			●		
0.92	0920P	●		3.7	0920L□□	●			●	60	16	●			●		
0.93	0930P	●			0930L□□	●			●			●			●		32
0.94	0940P	●		3.8	0940L□□	●			●			●		23	●		
0.95	MLDH 0950P	●	45	3.8	MLDH 0950L□□	●	50	10	●	60	16	●	65	23	●	75	32
0.96	0960P	●			0960L□□	●			●			●			●		33
0.97	0970P	●		3.9	0970L□□	●			●		17	●		24	●		
0.98	0980P	●			0980L□□	●			●			●			●		
0.99	0990P	●		4.0	0990L□□	●			●			●			●		34
1.00	MLDH 1000P	●	45	4.0	MLDH 1000L□□	●	50	10	●	60	17	●	65	24	●	75	34
1.05	1050P	●		4.2	1050L□□	●	55	12	●		18	●		25	●	80	36
1.10	1100P	●		4.4	1100L□□	●			●		19	●	70	26	●		37
1.15	1150P	●		4.6	1150L□□	●			●		20	●		28	●		39
1.20	1200P	●		4.8	1200L□□	●			●			●		29	●	85	41
1.25	MLDH 1250P	●	45	5.0	MLDH 1250L□□	●	55	14	●	65	21	●	70	30	●	85	43
1.30	1300P	●		5.2	1300L□□	●			●		22	●	75	31	●		44
1.35	1350P	●		5.4	1350L□□	●			●		23	●		32	●	90	46
1.40	1400P	●		5.6	1400L□□	●			●		24	●		34	●		48
1.45	1450P	●		5.8	1450L□□	●		16	●		25	●		35	●		49
1.50	MLDH 1500P	●	45	6.0	MLDH 1500L□□	●	55	16	●	65	26	●	75	36	●	90	51
1.55	1550P	●		6.2	1550L□□	●			●			●		37	●		53
1.60	1600P	●		6.4	1600L□□	●			●		27	●	80	38	●	95	54
1.65	1650P	●	50	6.6	1650L□□	●	60	18	●	70	28	●		40	●		56
1.70	1700P	●		6.8	1700L□□	●			●		29	●		41	●	100	58
1.75	MLDH 1750P	●	50	7.0	MLDH 1750L□□	●	60	18	●	70	30	●	85	42	●	100	60
1.80	1800P	●		7.2	1800L□□	●			●		31	●		43	●		61
1.85	1850P	●		7.4	1850L□□	●			●			●		44	●		63
1.90	1900P	●		7.6	1900L□□	●		20	●	75	32	●		46	●	103	65
1.95	1950P	●		7.8	1950L□□	●			●		33	●		47	●		66
2.00	MLDH 2000P	●	50	8.0	MLDH 2000L□□	●	60	20	●	75	34	●	90	48	●	103	68

Grade: ACV70

Please indicate 5, 12, 20 or 30 in the □□ when ordering.
(Example: MLDH 1000L20)

■ Made to Order Items: Inquire about production of drills in tool diameters and lengths not listed above or not in stock.

MDUS Type/MDSS Type

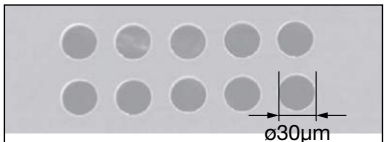
Very Small Diameter Drills for Very Small Hole Drilling & Telecom, Electronic Component, and Nozzle Applications

For Steel, Stainless Steel, and Other Metals

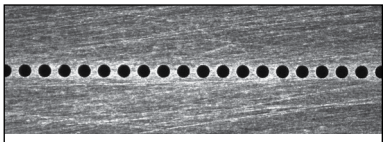
■ Micro MultiDrills MDUS Type ø0.03-ø0.19mm

- ●High-precision shank !
  Shank tolerance h3. Circularity 0.3 µm or less. Cylindricity of 0.5 µm or less.
- ●New ultra-thin TiAlN coating gives improved wear resistance.
- ●Perfect for steel, stainless steel, or copper machining.
- ●Available in sizes from ø0.03 mm to ø0.19 mm in 0.005 mm increments.

■ Application Examples



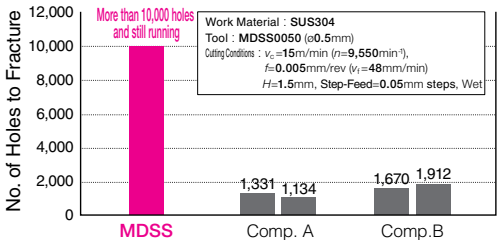
Work Material : **SUS304**
Tool : **MDUS0030-30C** (ø**0.03**mm)
Cutting Conditions : n=**15,000**min^{-1}, v_f=**3**mm/min
Step-Feed=**0.003**mm



Work Material : **SUS316**
Tool : **MDUS0100-30C** (ø**0.1**mm)
Cutting Conditions : n=**20,000**min^{-1}, v_f=**20**mm/min
Step-Feed=**0.01**mm

■ Solid Carbide MINI MULTIDRILLS MDSS Type ø0.20-ø1.00mm

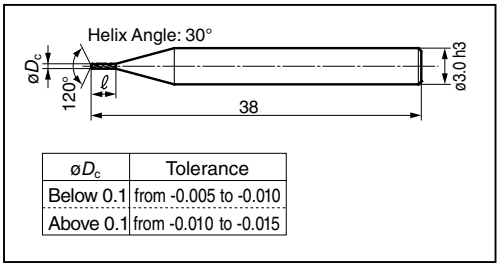
- ●The combination of a hard, tough carbide substrate and a high rigidity design (web thickness, web thickness ratio, helix angle) greatly improves fracture resistance.
- ●PVD coating specifically for small drills significantly extends tool life.
- ●Suitable for a wide range of materials including carbon steel, alloy steel, die steel, and stainless steel.
- ●Shanks standardised to 3-mm diameter, 38-mm total length for greater ease of use.



■ Micro Multi Pointing Drill MDUP Type ø0.03-ø0.18mm

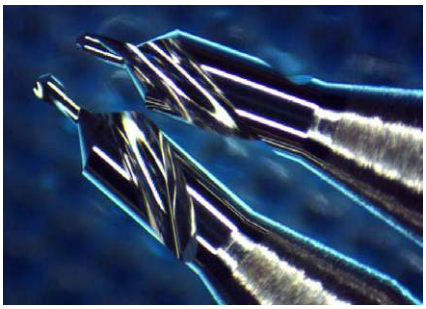
(mm)

●For drilling guide holes with MDUS type drills



øDc	Tolerance
Below 0.1	from -0.005 to -0.010
Above 0.1	from -0.010 to -0.015

Diameter øDc	Cat. No.	Stock	Flute Length ℓ	Pcs./ Pack
0.03	MDUP 0030 to 30C	●	0.06	1
0.04	0040 to 30C	●	0.08	
0.05	0050 to 30C	●	0.1	
0.08	MDUP 0080 to 30C	●	0.1	
0.10	0100 to 30C	●	0.2	
0.12	MDUP 0120 to 30C	●	0.2	
0.15	0150 to 30C	●	0.2	
0.18	MDUP 0180 to 30C	●	0.3	

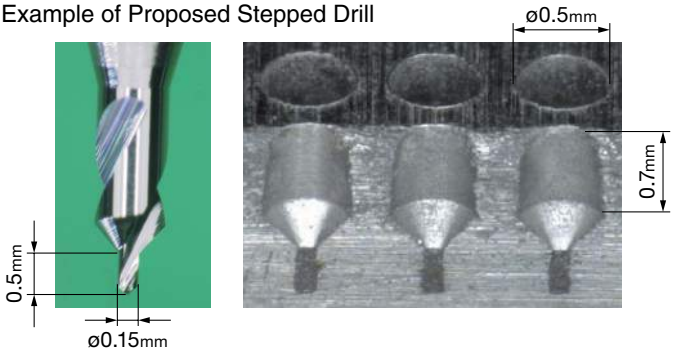


For Ceramics and Non-metals

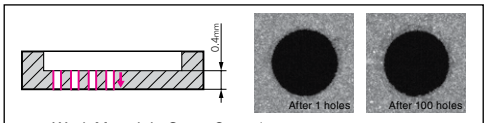
■Made-to-Order Fine Drill ø0.02mm-

- ●Exclusive cutting edges are available for various work materials including non-metals, ceramics, and resins.
- ●Customized designs are also available for the improvement of efficiency, such as through the integration of processes by using a stepped drill.
- ●Various drill diameters (from ø0.02) and LxDs are available to order.
  (Contact us for possible profiles.)

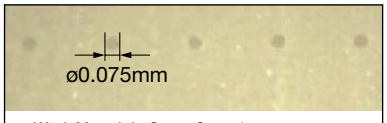
Example of Proposed Stepped Drill



■ Application Examples



Work Material : Green Ceramic
Tool : (Guide)ø**0.046**mm×ℓ **0.1**mm, H=**0.05**mm
(Main) ø**0.05**mm×ℓ **0.6**mm, H=**0.5**mm
Cutting Conditions : n=**10,000**min^{-1}, v_f=**8**mm/min
Step-Feed=**0.005**mm, Air blown



Work Material : Green Ceramic
Tool : **MDUP** (ø**0.07**mm)
MDUS0075-30C (ø**0.075**mm)
Cutting Conditions : n=**10,000**min^{-1}, f=**0.005**mm/rev
H=**0.5**mm, Step-Feed=**0.025**mm

MDUS Type/MDSS Type

MDSS Type

External Coolant Supply/Small Diameter (MDUS Type / MDSS Type)

	Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
	Up to 0.28%	From 0.29%		Up to 45HRC	From 49HRC								
MDUS	◎	◎				◎					○	◎	
MDSS	◎	◎	◎	◎	○	◎		○	◎	◎	○		

PVD Coat MDUS Type

FB Coat MDSS Type

10D

Fig 1

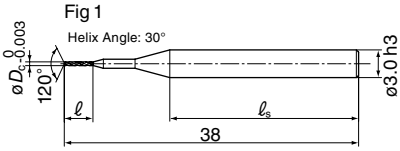


Fig 2

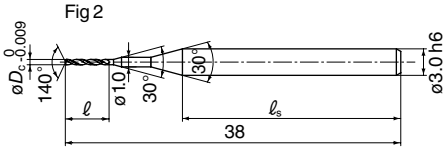
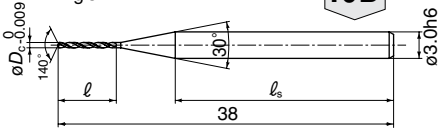
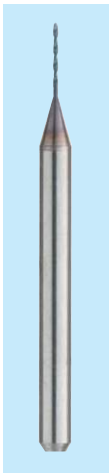


Fig 3



● Diameter ø0.03 to ø0.49mm (mm)

Description	Tool Diameter øDc	Cat. No.	Stock	Flute Length ℓ	Shank Length ℓs	Fig.	Pcs./ Pack
Micro MultiDrills MDUS Type 	0.030	MDUS 0030-30C	●	0.3	28	1	5
	0.035	MDUS 0035-30C		0.4			
	0.040	0040-30C	●				
	0.045	MDUS 0045-30C		0.5			
	0.050	0050-30C	●				
	0.055	MDUS 0055-30C		0.6			
	0.060	0060-30C					
	0.065	MDUS 0065-30C		0.7			
	0.070	0070-30C					
	0.075	MDUS 0075-30C		0.8			
	0.080	0080-30C	●				
	0.085	MDUS 0085-30C		1.0			
	0.090	0090-30C					
	0.095	0095-30C					
	0.100	0100-30C	●				
	0.110	MDUS 0110-30C		1.2			1
	0.120	0120-30C	●				
	0.130	MDUS 0130-30C		1.5			
	0.140	0140-30C					
	0.150	0150-30C	●				
	0.160	MDUS 0160-30C		1.8			
	0.170	0170-30C					
	0.180	0180-30C	●				
	0.190	MDUS 0190-30C		1.9			
MINI-MultiDrill MDSS Type 	0.20	MDSS 0020	●	2.5	28	2	1
	0.21	0021	●				
	0.22	0022	●				
	0.23	0023	●				
	0.24	0024	●				
	0.25	0025	●				
	0.26	0026	●				
	0.27	0027	●				
	0.28	0028	●				
	0.29	0029	●				
	0.30	MDSS 0030	●	3			
	0.31	0031	●				
	0.32	0032	●				
	0.33	0033	●				
	0.34	0034	●				
	0.35	MDSS 0035	●	4	28	3	
	0.36	0036	●				
	0.37	0037	●				
	0.38	0038	●				
	0.39	0039	●				
	0.40	MDSS 0040	●	5			
	0.41	0041	●				
	0.42	0042	●				
	0.43	0043	●				
	0.44	0044	●				
	0.45	0045	●				
	0.46	0046	●				
	0.47	0047	●				
	0.48	0048	●				
	0.49	0049	●				

● Diameter ø0.50 to ø1.00mm (mm)

Description	Tool Diameter øDc	Cat. No.	Stock	Flute Length ℓ	Shank Length ℓs	Fig.	Pcs./ Pack
MINI-MultiDrill MDSS Type 	0.50	MDSS 0050	●	6	27	3	1
	0.51	0051	●				
	0.52	0052	●				
	0.53	0053	●				
	0.54	0054	●				
	0.55	0055	●				
	0.56	0056	●				
	0.57	0057	●				
	0.58	0058	●				
	0.59	0059	●				
	0.60	MDSS 0060	●	7	26		
	0.61	0061	●				
	0.62	0062	●				
	0.63	0063	●				
	0.64	0064	●				
	0.65	0065	●				
	0.66	0066	●				
	0.67	0067	●				
	0.68	0068	●				
	0.69	0069	●				
	0.70	MDSS 0070	●	9	24		
	0.71	0071	●				
	0.72	0072	●				
	0.73	0073	●				
	0.74	0074	●				
	0.75	0075	●				
	0.76	0076	●				
	0.77	0077	●				
	0.78	0078	●				
	0.79	0079	●				
	0.80	MDSS 0080	●	10	23		
	0.81	0081	●				
	0.82	0082	●				
	0.83	0083	●				
	0.84	0084	●				
	0.85	0085	●				
	0.86	0086	●				
	0.87	0087	●				
	0.88	0088	●				
	0.89	0089	●				
	0.90	MDSS 0090	●	11	22		
	0.91	0091	●				
	0.92	0092	●				
	0.93	0093	●				
	0.94	0094	●				
	0.95	0095	●				
	0.96	0096	●				
	0.97	0097	●				
	0.98	0098	●				
	0.99	0099	●				
	1.00	MDSS 0100	●	12	21		

■ MDSS Recommended Cutting Conditions (Wet) (Inquire about cutting conditions for the MDUS type)

Work / Cond / Dia. øDc (mm)	Alloy Steel, Pre-hardened Steel SCM,NAK			Die Steel, Tempered Steel (30 to 40HRC)			Stainless Steel SUS		
	Rotation Speed min-1	Feed Rate mm/min	Step-feed (mm)	Rotation Speed min-1	Feed Rate mm/min	Step-feed (mm)	Rotation Speed min-1	Feed Rate mm/min	Step-feed (mm)
ø0.2	26,500	50	0.1D	21,200	40	0.1D	10,600	20	0.1D
ø0.3	26,500	80		21,200	60		10,600	30	
ø0.4	25,900	100		19,900	80		9,500	40	
ø0.5	25,500	150		19,100	110		9,500	50	
ø1.0	15,900	240	0.2D to 0.5D*	12,700	190	0.2D to 0.5D*	5,600	80	

1. The above conditions are recommended under wet conditions, using water-soluble coolant.
2. If machine noises and vibrations are present, please adjust the cutting conditions accordingly.
3. If the machine cannot achieve the standard spindle speed, please use the max. spindle speed available. In this case, lower the feed rate by the same ratio.

* Step feed is recommended for drilling of holes deeper than 3xD.

SDC Type

■ General Features

SUMIDIA Coated SDC type drills for Carbon Fibre Reinforced Plastic (CFRP) employ Sumitomo Electric Hardmetal's proprietary multi-step point angle. Combined with a diamond coating, this technology improves the quality of machined surfaces and extends tool life.

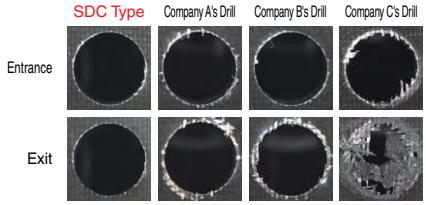
■ Characteristics · Applications

- ● Excellent drilled-hole quality
  - · Sharp cutting edge shape reduces delamination of fibre layers and burrs.
  - · Continuously changing point angle disperses load placed on cutting edge and prevents breakage.
- ● Long tool life
  - · Use of high-strength diamond coating with excellent adhesion delivers high quality and long tool life.

■ Performance

Comparison of Machined Surface Finish

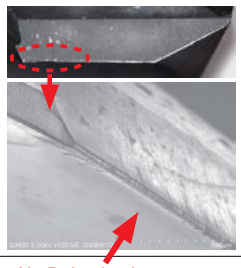
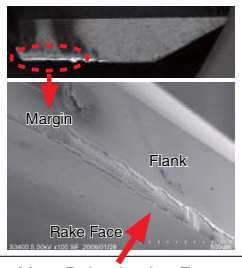
Excellent Machined Face Quality [Prevents Delamination And Burrs]



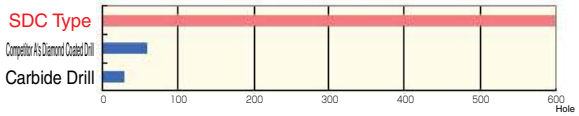
Tool: SUMIDIA Coated Drill SDC Type ø6.375, ø6.35, ø6.5
Work Material: CFRP
Cutting Conditions: n=6,000min^{-1} f=0.1mm/rev H=28mm (Through)
Dry

Tool Life Comparison

Effects of Diamond Coating

SDC Type (After Drilling 600 Holes)	Competitor's Product (After Drilling 50 Holes)
	
No Delamination Low Flank Wear	More Delamination From Cutting Edge To Flank

Stable diamond layer adhesion prevents delamination.
Excellent wear resistance enables high-quality drilling with long tool life.



Tool: SUMIDIA Coated Drill ø6.375, ø6.35, ø6.5
Work Material: CFRP
Cutting Conditions: n=6,000min^{-1} f=0.075mm/rev H=15mm (Through)
Dry

■ Series

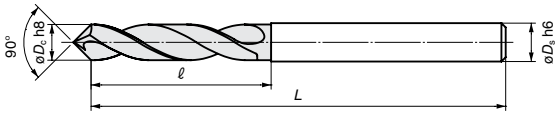
Type	Diameter Range (mm)	Point angle	Hole Depth (ℓ/D)
MDS□□□□□SDC3 Type	ø2.0 to ø4.0	90°	Up to 3
	ø4.851 to ø10.0	130°	

External Coolant Supply (SDC Type)

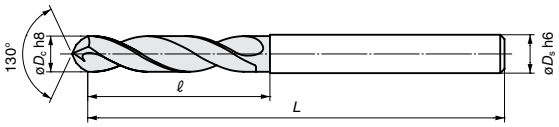
Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 45HRC						○		◎

SUMIDIA Coat 3D

● Diameter ø2.0 to ø4.0mm



● Diameter ø4.851 to ø10.0mm



● Diameter ø2.0 to ø10.0mm

Diameter øD_c (mm)	Shank øD_s (mm)	Cat. No.	3D Type Stock	3D Type Dimensions (mm) L	3D Type Dimensions (mm) ℓ
2.0	3.0	MDS 02000SDC3	●	49	12.5
2.489		02489SDC3	●		15.0
3.0		03000SDC3	●		17.5
3.3	3.3	MDS 03300SDC3	●	60	20.0
4.0	4.0	04000SDC3	●		22.5
4.851	4.851	MDS 04851SDC3	●	76	27.5
5.0	5.0	05000SDC3	●		
5.6	5.6	MDS 05600SDC3	●	81	30.0
6.0	6.0	06000SDC3	●		
6.375	6.375	MDS 06375SDC3	●	83	32.5
7.0	7.0	07000SDC3	●		35.0
7.938	7.938	MDS 07938SDC3	●	90	40.0
8.0	8.0	08000SDC3	●		
9.0	9.0	MDS 09000SDC3	●	98	45.0
9.550	9.550	MDS 09550SDC3	●	105	50.0
10.0	10.0	10000SDC3	●		

Grade: DCX20

■ Recommended Cutting Conditions

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

Drill Diameter øD_c (mm)	Conditions	CFRP Only (Dry Machining)	Stacked Plates of CFRP and Aluminium Alloys (Dry Machining)
Up to ø6.0	v_c	80 - **120** - 150	40 - **60** - 80
	f	0.05 - **0.08** - 0.10	0.05 - **0.05** - 0.10
Up to ø12.0	v_c	80 - **100** - 120	40 - **60** - 80
	f	0.05 - **0.08** - 0.10	0.05 - **0.05** - 0.10

Min. - **Optimum** - Max.

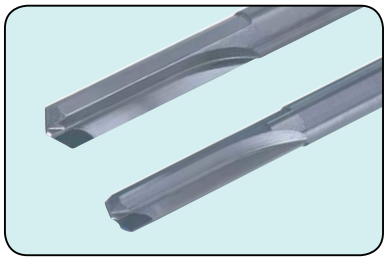
DAL / DDL Type


DAL Type


DDL Type

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
										◎		○

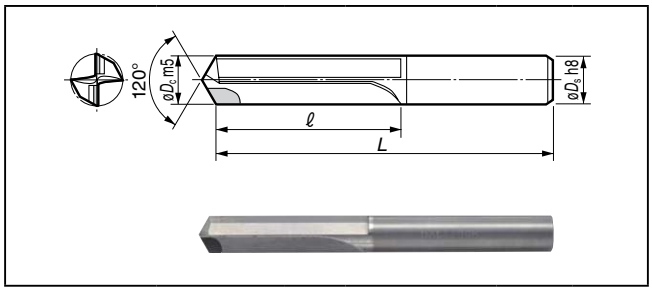
PCD 3D



From General to High Precision Drilling of Aluminium Alloys!

- High precision DAL type is able to produce holes of IT Class of 7 to 8.
- General DDL type is able to produce holes of IT class of 11 to 12, mainly for drilling of pre-tap holes.

■ DAL Type



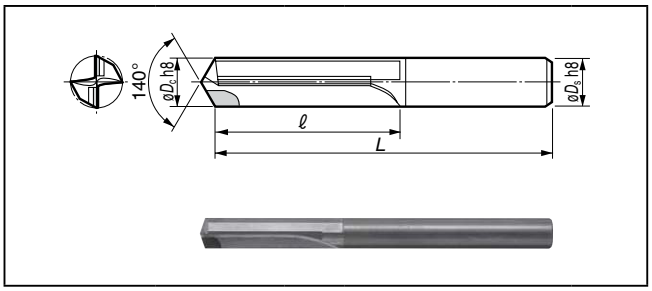
Grade		SUMIDIA
Application	High Speed/Light	N
	General Purpose	
	Roughing	

P Steel M Stainless Steel
K Cast Iron N Non-Ferrous Metal
S Exotic Alloy H Hardened Steel

Cat. No.	DA2200	øDc(øDs)	L	ℓ
DAL 0500H to 0600H		ø5 ≤ D_c ≤ ø6	80	30
0601H to 0700H		ø6 < D_c ≤ ø7	90	35
0701H to 0800H		ø7 < D_c ≤ ø8	90	35
0801H to 0900H		ø8 < D_c ≤ ø9	100	40
0901H to 1000H		ø9 < D_c ≤ ø10	100	40
1001H to 1100H		ø10 < D_c ≤ ø11	110	50
1101H to 1200H		ø11 < D_c ≤ ø12	110	50

Note: Ordering number for (ex.) ø6.05mm drill is DAL0605H.

■ DDL Type



Grade		SUMIDIA
Application	High Speed/Light	N
	General Purpose	
	Roughing	

P Steel M Stainless Steel
K Cast Iron N Non-Ferrous Metal
S Exotic Alloy H Hardened Steel

Cat. No.	DA2200	øDc(øDs)	L	ℓ
DDL 050V to 060V		ø5 ≤ D_c ≤ ø6	80	30
061V to 070V		ø6 < D_c ≤ ø7	90	35
071V to 080V		ø7 < D_c ≤ ø8	90	35
081V to 090V		ø8 < D_c ≤ ø9	100	40
091V to 100V		ø9 < D_c ≤ ø10	100	40
101V to 110V		ø10 < D_c ≤ ø11	110	50
111V to 120V		ø11 < D_c ≤ ø12	110	50

Note: Ordering number for (ex.) ø10.5mm drill is DDL105V.

■ Recommended Cutting Conditions

v_c: Cutting Speed (m/min) f: Feed Rate (mm/rev)

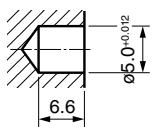
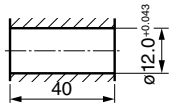
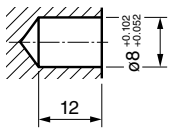
Diameter øD_c (mm)	Conditions	DAL Type	DDL Type	Depth	Oil
Up to ø8.0	v_c	80 – **100** – 150	150 – **200** – 250	L/D=Below 3	Emulsion
	f	0.05 – **0.1** – 0.15	0.1 – **0.15** – 0.25		
Up to ø12.0	v_c	80 – **100** – 150	150 – **200** – 250		
	f	0.08 – **0.13** – 0.2	0.15 – **0.2** – 0.3		

Min. - **Optimum** - Max.

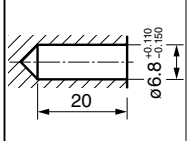
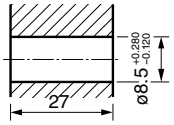
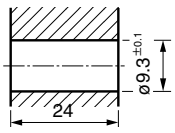
■ Important Notes

- Select a high rigidity machine and high precison holder for high precision DAL type.
- Enough coolant to drilled hole.

■ Application Examples (DAL Type)

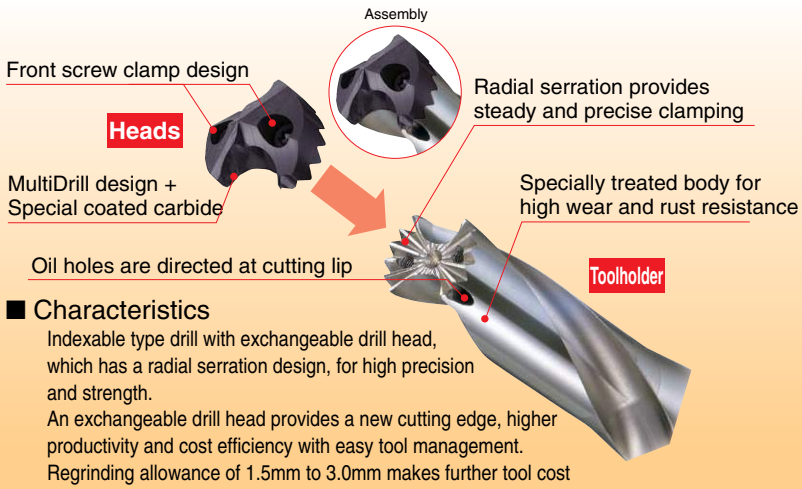
Work Shape	Work Material	Cutting Conditions	Results
	17%Si-Aℓ High Silicon Aluminum Alloy One pass finished hole	v_c=100m/min f =0.1mm/rev	· Holes by carbide drill were out of specifications after 2,000 holes/reg. · The SUMIDIA drill could drill up to 30,000 holes/reg. · 15 times tool life that of carbide drills.
	17%Si-Aℓ High Silicon Aluminum Alloy Pre-cast Hole of ø10	v_c=120m/min f =0.12mm/rev	· Average 40,000 holes/reg (1600m) · Surface roughness Ry = 1µm
	ADC10 Aluminum Alloy Die Cast One pass finished hole	v_c=90m/min f =0.08mm/rev	· More than 50,000 holes (600m) and still running

■ Application Examples (DDL Type)

Work Shape	Work Material	Cutting Conditions	Results
	ADC12 Aluminum Alloy Die Cast M8 Pre-tap Holes	v_c=214m/min f =0.14mm/rev	· Regrind after 100,000 holes
	ADC12 Aluminum Alloy Die Cast	v_c=200m/min f =0.17mm/rev	· Regrind after 74,000 holes (2,000m) (Preset tool change)
	AC2A Aluminium Casting	v_c=234m/min f =0.28mm/rev	· Regrind after 80,000 holes (Preset tool change)

SMD Type

The Standard in Indexable Head Drills, the Ultimate in Low Cost Drilling



Characteristics

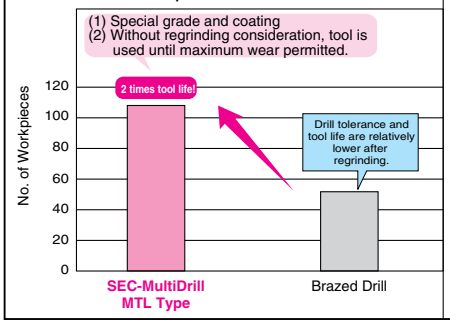
Indexable type drill with exchangeable drill head, which has a radial serration design, for high precision and strength.
An exchangeable drill head provides a new cutting edge, higher productivity and cost efficiency with easy tool management.
Regrinding allowance of 1.5mm to 3.0mm makes further tool cost reductions possible.

Series

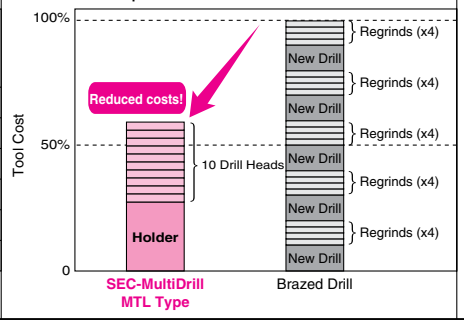
Heads	Toolholder(L/D)	Applications	ϕD_c range
MTLType	MType(3D)	General Steel	ø12.0 to ø42.5
	LType(5D)		ø12.0 to ø42.5
	DType(8D)		ø13.5 to ø42.5
MELType	MType(3D)	SUS SS FC	ø12.0 to ø30.5
	LType(5D)		ø12.0 to ø30.5
	DType(8D)		ø13.5 to ø30.5
MBType	B3Type(3D)	Structural Steel	ø24.5 to ø26.7

Tool Life And Cost Comparison

Tool Life Comparison



Cost Comparison

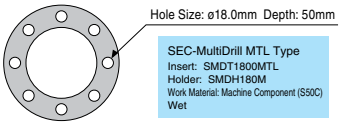


Results

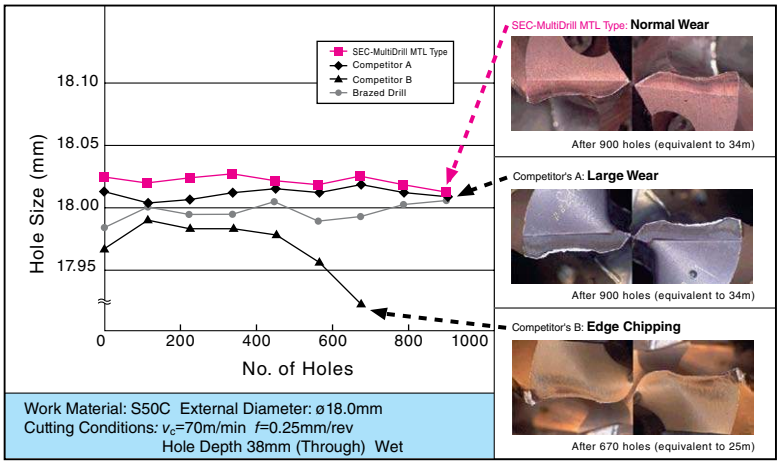
For regrinding purpose, brazed drill are used only up to 50-70% of its actual tool life potential.
SEC-MultiDrill MTL Type is used up to 100%

MTL Type SEC-MultiDrills offer:
Double the tool life of brazed drills!
Faster tool replacement!

Workpiece Example



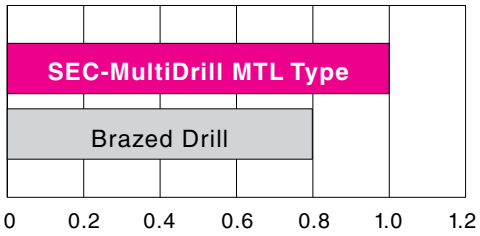
Drilling Precision



Work Material: S50C External Diameter: ø18.0mm
Cutting Conditions: v_c=70m/min f=0.25mm/rev
Hole Depth 38mm (Through) Wet

Tool Strength

Durability Comparison



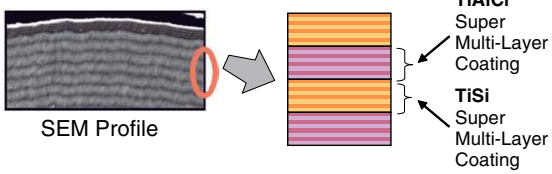
Work Material: S50C External Diameter: ø16.0mm
Cutting Conditions: v_c=80m/min
Hole Depth 38mm

Characteristics of Next Generation DEX Coating

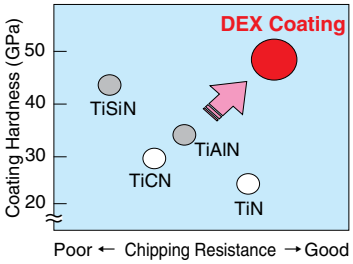
Sumitomo Electric Hardmetal's next-generation drill coating utilises nano-coating technology to provide more than double the tool life of conventional coatings.
Silicon and chrome improve wear, heat, and adhesion resistance.
New super multi-layered structure offers significantly improved chip resistance (coating strength).

Coating Design

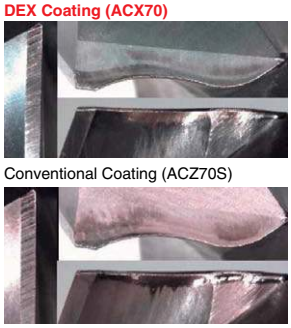
World's first combined super multi-layered coating is made from alternate layers of super multi-layered substrates.



Characteristics of Films



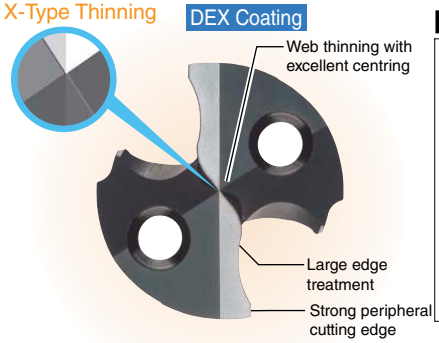
Drastically Reduced Rake Face Wear



Work Material: S50C
Cutting Conditions: v_c=80m/min f=0.25mm/rev
Hole Depth: 38mm Wet
Cutting Length: 32.8m

MTL Type Suitable for high efficiency drilling of general steel

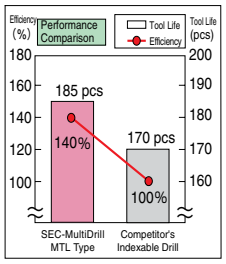
X-Type Thinning DEX Coating



■ Application Examples MTL Type

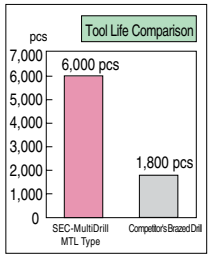
Improved tool life and efficiency

Work Material: Housing (S20C)
Drill size: For ø15×5D
Cutting Conditions: v_c=107m/min, f=0.3mm/rev
Hole Depth: 32mm×12 holes



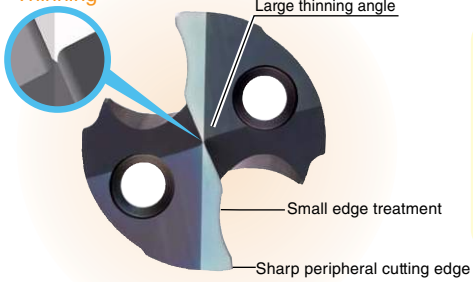
Tool life extended by 3.3x

Work Material: Bracket (S45C)
Drill size: For ø20×3D
Cutting Conditions: v_c=98m/min, f=0.18mm/rev
Hole Depth: 17mm



MEL Type Suitable for exotic metals such as stainless steel, soft steel, grey cast iron, and low rigidity setups.

Overlap Thinning DEX Coating



● **Cutting edges perform superbly with SUS and soft steel**
Large thinning angle solves the convex R part breakages peculiar to soft steel and reduces adhesion breakages with SUS.

● **Improved chipping resistance around hole openings in cast iron**
Edge sharpness improvements in peripheral areas prevent chipping around hole openings in cast iron.

■ Application Examples (MEL Type)

MEL (Cutting Length 15m)

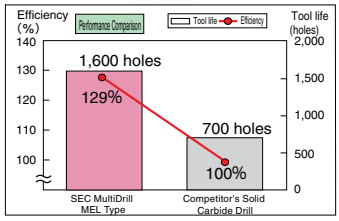
SEC-MultiDrill MEL type has excellent centring, produces no rifle marks and no edge breakage after 15m.

Competitor's Product (Cutting Length 11m)

Competitor's indexable drill exhibited poor centring and produced rifle marks. The centre of the drill broke after 11m of drilling.

Work Material: SUS304 Drill Size: ø14×5D
Cutting Conditions: v_c=60m/min, f=0.15m/rev Coolant: Emulsion Type

Work material: Hub (equivalent of S55C)
Hole Dia: ø14.0 +0.027
Hole depth: 10mm (through)
No. of holes: 4
Coolant: Emulsion type



MTL Type
Cutting Conditions : v_c=60m/min, f=0.3mm/rev (v_f=409mm/min)
Tool life : 1,600 holes
・Delivers stable drilling precision with negligible hardening from drilling. 1.3 x efficient, 2.3 times longer tool life the previous drills.

Competitor's Solid Carbide Drill
Cutting Conditions : v_c=70m/min, f=0.2mm/rev (v_f=318mm/min)
Tool life : 700 holes
・Inside of hole must be reground due to hardening from drilling.
It becomes unusable after recoated 3 times.

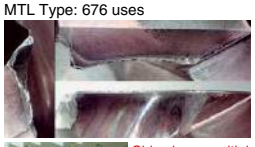
■ Stable Performance in Low Rigidity Conditions

● Stable and long tool life even when used with low rigidity work, jigs and equipment

MEL Type: 2000 uses

Smooth chips

MTL Type: 676 uses

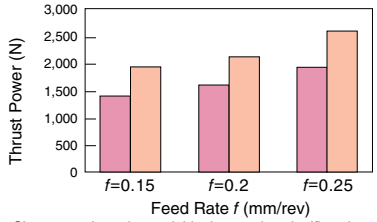


Chips have multiple straight edges

Work Material: S48C (Vehicle Chassis Component) External Diameter: ø28.0mm Equipment: Vertical Machine (BT40)
Cutting Conditions: v_c=80m/min, f=0.23mm/rev, ø28×30mm (Blind Hole), Wet

■ 25% Reduction in Cutting Resistance (Thrust Force)

● MEL type features 25% reduced thrust compared to MTL type!



Work Material: S50C
External Diameter: ø14.0mm
Cutting Conditions: v_c=80m/min

Sharper cutting edge and thinning overlap significantly reduce thrust power and improve chip management, allowing stable drilling in low rigidity set-ups.

■ Recommended Cutting Conditions (MTL Type / MEL Type)

v_c: Cutting Speed (m/min) f: Feed Rate (mm/rev)

Work Material		Soft Steel (Up to 250HB)	General Steel (250 to 320HB)	Hardened Steel (45HRC)	Stainless Steel (Up to 200HB)	Grey Cast Iron	Ductile Cast Iron	Aluminum Alloy*
Recommended Head		MTL Type / MEL Type	MTL Type / MEL Type	MTL Type	MEL Type	MTL Type / MEL Type	MTL Type / MEL Type	MEL Type
Drill Diameter øDc(mm)	Cutting Conditions	Min. - Optimum - Max.	Min. - Optimum - Max.	Min. - Optimum - Max.	Min. - Optimum - Max.	Min. - Optimum - Max.	Min. - Optimum - Max.	Min. - Optimum - Max.
Up to ø16.0	v_c	80-**100**-120 (50-**70**-80)	70-**100**-120 (50-**70**-80)	40-**60**-90 (30-**50**-70)	50-**60**-80 (40-**50**-60)	50-**70**-90 (40-**60**-80)	50-**60**-80 (40-**50**-70)	200-**240**-260 (180-**200**-240)
	f	*0.15-**0.20**-0.35*	*0.15-**0.20**-0.30*	*0.10-**0.15**-0.20*	*0.10-**0.15**-0.20*	*0.20-**0.25**-0.30*	*0.20-**0.25**-0.30*	*0.35-**0.45**-0.55*
Up to ø20.0	v_c	80-**100**-120 (50-**70**-80)	70-**100**-120 (50-**70**-80)	40-**60**-90 (30-**50**-70)	60-**70**-90 (40-**60**-70)	60-**80**-100 (50-**70**-90)	50-**70**-90 (40-**60**-80)	200-**240**-260 (180-**200**-240)
	f	*0.15-**0.25**-0.35*	*0.15-**0.25**-0.35*	*0.15-**0.20**-0.25*	*0.15-**0.20**-0.25*	*0.20-**0.30**-0.35*	*0.20-**0.25**-0.35*	*0.35-**0.50**-0.60*
Up to ø30.8	v_c	80-**100**-120 (50-**70**-80)	70-**100**-120 (50-**70**-80)	40-**60**-90 (30-**50**-70)	60-**70**-90 (40-**60**-70)	60-**80**-100 (50-**70**-90)	50-**70**-90 (40-**60**-80)	200-**240**-260 (180-**200**-240)
	f	*0.20-**0.30**-0.35*	*0.20-**0.25**-0.35*	*0.15-**0.20**-0.25*	*0.15-**0.20**-0.25*	*0.20-**0.30**-0.40*	*0.25-**0.30**-0.35*	*0.35-**0.50**-0.60*

Note: Where machine and work clamp rigidity are good, conditions may be increased up to the maximum.
For 8xD drills, please use feed rates stated within the ( ).
Before drilling 8xD holes, a guide hole of similar diameter must be made.

(*) Inquire about drills specifically for aluminum.

SMD Type

	Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
	Up to 0.28%	From 0.29%		Up to 45HRC	From 45HRC								
MTL	◎	◎		○		○			◎	◎			
MEL	◎	○		○		◎			◎	◎	○		

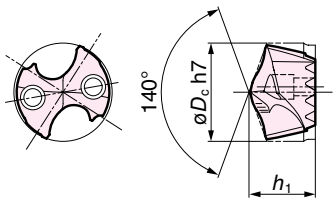
DEX Coat | W/ Oil Hole | Indexable | 3D | 5D | 8D

Recommended Cutting Conditions J45

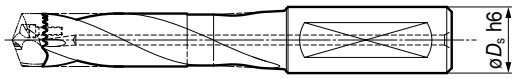
● Drill Heads

Indexable Head MTL Type

Indexable Head MEL Type



● Holder



■ Drill Head (ø12.0 to ø30.5)[Grade MTL Type: ACX70 / MEL Type: ACX80] ■ Holders M (3D), L (5D), D (8D)

Drill Diameter øDc (mm)	Heads					Holders						
	MTL Type		MEL Type		h1	Drill Diameter Range (øDc)	M (3D)		L (5D)		D (8D)	
	Cat. No	Stock	Cat. No	Stock			Cat. No	Stock	Cat. No	Stock	Cat. No	Stock
12.0	SMDT 1200MTL	●	SMDT 1200MEL	●	9.1	From 12.0 to below 12.5	SMDH 120M	●	SMDH 120L	●	—	—
12.1	1210MTL	●	1210MEL	●								
12.2	1220MTL	●	1220MEL	●								
12.3	1230MTL	●	1230MEL	●								
12.5	SMDT 1250MTL	●	SMDT 1250MEL	●	9.4	From 12.5 to below 13.0	SMDH 125M	●	SMDH 125L	●	—	—
12.6	1260MTL	●	1260MEL	●								
12.7	1270MTL	●	1270MEL	●								
13.0	SMDT 1300MTL	●	SMDT 1300MEL	●	9.7	From 13.0 to below 13.5	SMDH 130M	●	SMDH 130L	●	—	—
13.1	1310MTL	●	1310MEL	●								
13.5	SMDT 1350MTL	●	SMDT 1350MEL	●	10.3	From 13.5 to 14.5	SMDH 140M	●	SMDH 140L	●	SMDH 140D	●
14.0	1400MTL	●	1400MEL	●								
14.1	1410MTL	●	1410MEL	●								
14.2	1420MTL	●	1420MEL	●								
14.5	1450MTL	●	1450MEL	●								
15.0	SMDT 1500MTL	●	SMDT 1500MEL	●	11.0	Above 14.5 to 15.5	SMDH 150M	●	SMDH 150L	●	SMDH 150D	●
15.5	1550MTL	●	1550MEL	●								
15.6	SMDT 1560MTL	●	SMDT 1560MEL	●	11.6	Above 15.5 to 16.5	SMDH 160M	●	SMDH 160L	●	SMDH 160D	●
15.7	1570MTL	●	1570MEL	●								
16.0	1600MTL	●	1600MEL	●								
16.3	1630MTL	●	1630MEL	●								
16.5	1650MTL	●	1650MEL	●								
17.0	SMDT 1700MTL	●	SMDT 1700MEL	●	12.2	Above 16.5 to 17.5	SMDH 170M	●	SMDH 170L	●	SMDH 170D	●
17.5	1750MTL	●	1750MEL	●								
17.6	SMDT 1760MTL	●	SMDT 1760MEL	●	12.9	Above 17.5 to 18.5	SMDH 180M	●	SMDH 180L	●	SMDH 180D	●
17.7	1770MTL	●	1770MEL	●								
18.0	1800MTL	●	1800MEL	●								
18.5	1850MTL	●	1850MEL	●								
19.0	SMDT 1900MTL	●	SMDT 1900MEL	●	13.5	Above 18.5 to 19.5	SMDH 190M	●	SMDH 190L	●	SMDH 190D	●
19.5	1950MTL	●	1950MEL	●								
20.0	SMDT 2000MTL	●	SMDT 2000MEL	●	14.1	Above 19.5 to 20.5	SMDH 200M	●	SMDH 200L	●	SMDH 200D	●
20.5	2050MTL	●	2050MEL	●								
21.0	SMDT 2100MTL	●	SMDT 2100MEL	●	14.8	Above 20.5 to 21.5	SMDH 210M	●	SMDH 210L	●	SMDH 210D	●
21.2	2120MTL	●	2120MEL	●								
21.5	2150MTL	●	2150MEL	●								
22.0	SMDT 2200MTL	●	SMDT 2200MEL	●	15.0	Above 21.5 to 22.8	SMDH 220M	●	SMDH 220L	●	SMDH 220D	●
22.5	2250MTL	●	2250MEL	●								
23.0	SMDT 2300MTL	●	SMDT 2300MEL	●	15.1	Above 22.8 to 23.8	SMDH 230M	●	SMDH 230L	●	SMDH 230D	●
23.5	2350MTL	●	2350MEL	●								
24.0	SMDT 2400MTL	●	SMDT 2400MEL	●	15.4	Above 23.8 to 24.8	SMDH 240M	●	SMDH 240L	●	SMDH 240D	●
24.1	2410MTL	●	2410MEL	●								
24.5	2450MTL	●	2450MEL	●								
25.0	SMDT 2500MTL	●	SMDT 2500MEL	●	15.8	Above 24.8 to 25.8	SMDH 250M	●	SMDH 250L	●	SMDH 250D	●
25.5	2550MTL	●	2550MEL	●								
26.0	SMDT 2600MTL	●	SMDT 2600MEL	●	16.4	Above 25.8 to 26.8	SMDH 260M	●	SMDH 260L	●	SMDH 260D	●
26.5	2650MTL	●	2650MEL	●								
27.0	SMDT 2700MTL	●	SMDT 2700MEL	●	17.1	Above 26.8 to 27.8	SMDH 270M	●	SMDH 270L	●	SMDH 270D	●
27.5	2750MTL	●	2750MEL	●								
28.0	SMDT 2800MTL	●	SMDT 2800MEL	●	17.7	Above 27.8 to 28.8	SMDH 280M	●	SMDH 280L	●	SMDH 280D	●
28.5	2850MTL	●	2850MEL	●								
29.0	SMDT 2900MTL	●	SMDT 2900MEL	●	18.3	Above 28.8 to 29.8	SMDH 290M	●	SMDH 290L	●	SMDH 290D	●
29.5	2950MTL	●	2950MEL	●								
30.0	SMDT 3000MTL	●	SMDT 3000MEL	●	19.0	Above 29.8 to 30.8	SMDH 300M	●	SMDH 300L	●	SMDH 300D	●
30.5	3050MTL	●	3050MEL	●								

ø31.0 to ø42.5 J48

Inquire about production of holders not listed in stock.

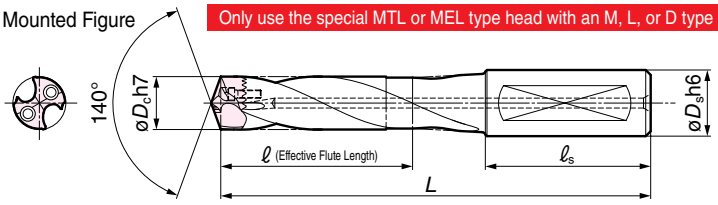
SMD Type

MTL Type

MEL Type

● Mounted Figure

Only use the special MTL or MEL type head with an M, L, or D type holder.



■ Dimensions of Assembled Drill with SMD Type

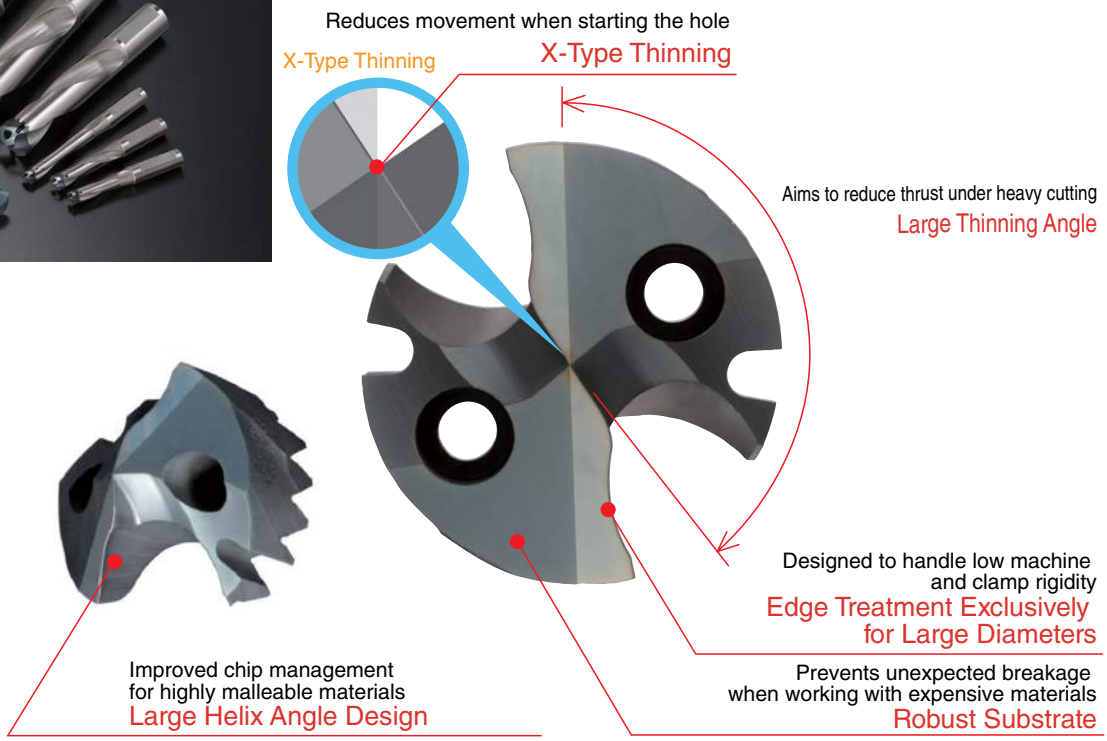
■ Spare Parts, Recommended Tightening Torque

Drill Diameter øDc (mm)	M (3D) Dimensions ℓ	M (3D) Dimensions L	L (5D) Dimensions ℓ	L (5D) Dimensions L	D (8D) Dimensions ℓ	D (8D) Dimensions L	Shank Dimensions ℓs	Shank Dimensions øDs	Cap Screw	Spanner	Recommended Tightening Torque (N·m)	Drill Diameter øDc
12.0	44	105	69	130	—	—	48	16	BXD02208IP	TRDR08IP	0.75 to 1.0	12.0
12.1												12.1
12.2												12.2
12.3												12.3
12.5	44	105	69	130	—	—	48	16				12.5
12.6												12.6
12.7												12.7
13.0	47	110	74	140	—	—	48	16				13.0
13.1												13.1
13.5	52.5	116.5	81.5	146.5	124.5	191.5	48	16				13.5
14.0												14.0
14.1												14.1
14.2												14.2
14.5												14.5
15.0	55.5	126.5	86.5	156.5	133.5	201.5	50	20				15.0
15.5												15.5
15.6	59.5	131.5	92.5	166.5	141.5	211.5	50	20	BXD02509IP	TRDR10IP	0.93 to 1.24	15.6
15.7												15.7
16.0												16.0
16.3												16.3
16.5												16.5
17.0	62.5	136.5	97.5	171.5	150.5	221.5	50	20				17.0
17.5												17.5
17.6	66.5	141.5	103.5	176.5	158.5	226.5	50	20				17.6
17.7												17.7
18.0												18.0
18.5												18.5
19.0	69.5	156.5	108.5	191.5	167.5	251.5	56	25	BXD03011IP	TRDR15IP	1.83 to 2.44	19.0
19.5												19.5
20.0	73.5	156.5	114.5	196.5	175.5	262	56	25				20.0
20.5												20.5
21.0	76.5	156.5	119.5	196.5	184.5	266.5	56	25				21.0
21.2												21.2
21.5												21.5
22.0	80.1	161.1	125.1	201.1	192.1	271.1	56	25	BXD03512IP	TRDR15IP	2.79 to 3.72	22.0
22.5												22.5
23.0	82.6	160.6	129.6	210.6	200.6	280.6	56	25				23.0
23.5												23.5
24.0	86.2	170.2	135.2	220.2	208.2	295.2	60	32				24.0
24.1												24.1
24.5												24.5
25.0	88	170	140	225	217	300	60	32	BXD04014IP	TRDR20IP	4.14 to 5.52	25.0
25.5												25.5
26.0	92	175	146	230	225	310	60	32				26.0
26.5												26.5
27.0	94	175	151	235	234	320	60	32				27.0
27.5												27.5
28.0	97	180	157	240	242	325	60	32	BXD04515IP	TRDR25IP	4.98 to 6.64	28.0
28.5												28.5
29.0	100	185	162	245	251	335	60	32				29.0
29.5												29.5
30.0	104	185	167	255	259	345	60	32				30.0
30.5												30.5

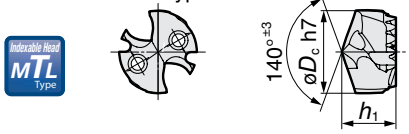
SMD Type (Large Holes)

Large Hole MTL Type

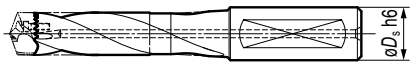
Tool edge design ideal for malleable material used for large casings, etc.
Edge design suitable for malleable material commonly used for large hole drilling.



● Indexable head MTL Type



● Toolholder



■ Drill Head (ø31.0 to ø42.5mm) [Grade MTL Type: ACX80]
■ Holders M (3D), L (5D), D (8D)

Diameter øDc (mm)	Heads MTLType Cat. No.	Stock	h1	Diameter Range (øDc)	Toolholder M (3D) Cat No	Stock	L (5D) Cat No	Stock	D (8D) Cat No	Stock
31.0	SMDT 3100MTL	●								
31.5	3150MTL		21.0	Above 30.8 to 32.0	SMDH 320M	●	SMDH 320L	●	SMDH 320D	●
32.0	3200MTL	●								
32.5	SMDT 3250MTL									
33.0	3300MTL	●	21.0	Above 32.0 to 33.5	SMDH 335M	●	SMDH 335L	●	SMDH 335D	●
33.5	3350MTL									
34.0	SMDT 3400MTL	●								
34.5	3450MTL		23.0	Above 33.5 to 35.0	SMDH 350M	●	SMDH 350L	●	SMDH 350D	●
35.0	3500MTL	●								
35.5	SMDT 3550MTL									
36.0	3600MTL	●	23.0	Above 35.0 to 36.5	SMDH 365M	●	SMDH 365L	●	SMDH 365D	●
36.5	3650MTL									
37.0	SMDT 3700MTL	●								
37.5	3750MTL	●	25.0	Above 36.5 to 38.0	SMDH 380M	●	SMDH 380L	●	SMDH 380D	●
38.0	3800MTL	●								
38.5	SMDT 3850MTL									
39.0	3900MTL	●	25.0	Above 38.0 to 39.5	SMDH 395M	●	SMDH 395L	●	SMDH 395D	●
39.5	3950MTL									
40.0	SMDT 4000MTL	●								
40.5	4050MTL	●	27.0	Above 39.5 to 41.0	SMDH 410M	●	SMDH 410L	●	SMDH 410D	●
41.0	4100MTL	●								
41.5	SMDT 4150MTL									
42.0	4200MTL	●	27.0	Above 41.0 to 42.5	SMDH 425M	●	SMDH 425L	●	SMDH 425D	●
42.5	4250MTL									

SMD Type (Large Holes)

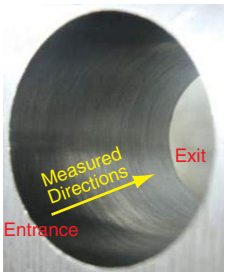
Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	Up to 0.28%		Up to 45HRC	From 46HRC								
◎	◎		○		○			◎	◎			

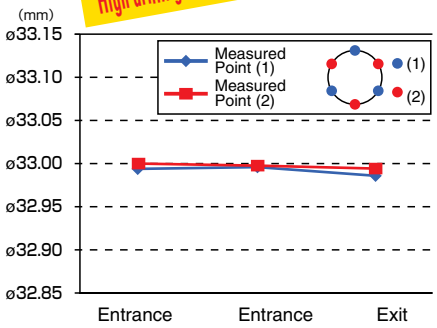
DEX Coat | W/ Oil Hole | Indexable | 3D | 5D | 8D

■ Machined Surface Accuracy

Work Material: SM490 (Base substrate for construction use)
Drill Size: ø33.0mm × 5D
Cutting Conditions: v_c=120m/min, f=0.25mm/rev
Cutting Environment: Emulsion Type

High drilling accuracy even with large diameters



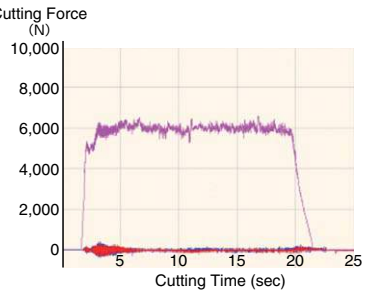


■ Cutting Force Comparison (Thrust)

Work Material: SS400 (Laminated plates)
Drill Size: ø37.5mm × 5D
Cutting Conditions: v_c=90m/min, f=0.35mm/rev
Cutting Environment: Emulsion Type

Stable even when machining laminated plates

Good Chip Control



■ Recommended Cutting Conditions (Large MTL Type)

v_c: Cutting Speed (m/min) f: Feed Rate (mm/rev)

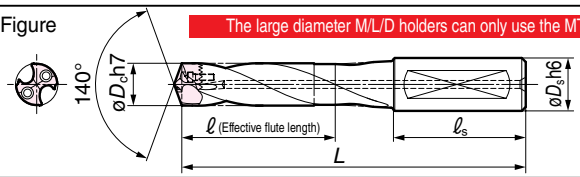
Work material		Soft Steel (Up to 250 HB)	General Steel (250 to 320 HB)	Hardened Steel (45HRC)	Stainless Steel (Up to 200HB)	Grey Cast Iron	Ductile Cast Iron	Aluminium Alloy*
Diameter øD_c (mm)	Cutting Conditions	Min. - Optimum - Max.	Min. - Optimum - Max.	Min. - Optimum - Max.	Min. - Optimum - Max.	Min. - Optimum - Max.	Min. - Optimum - Max.	Min. - Optimum - Max.
ø31.0 to ø42.5	v_c	40-**60**-120 (30-**50**-80)	60-**80**-120 (40-**50**-80)	40-**50**-80 (30-**40**-60)	40-**60**-80 (30-**40**-60)	50-**70**-100 (40-**60**-90)	50-**60**-90 (40-**50**-70)	200-**240**-260
	f	*0.25-**0.35**-0.45*	*0.25-**0.30**-0.40*	*0.15-**0.25**-0.30*	*0.20-**0.25**-0.30*	*0.25-**0.35**-0.45*	*0.25-**0.30**-0.35*	*0.35-**0.50**-0.60*

Note: Where machine and work clamp rigidity are good, conditions may be increased up to the maximum.
For 8D drills, please use feed rates stated within the ( ). Before drilling 8D holes, a guide hole of similar diameter must be made.

(*) Inquire about drills specifically for aluminium.

● Mounted Figure

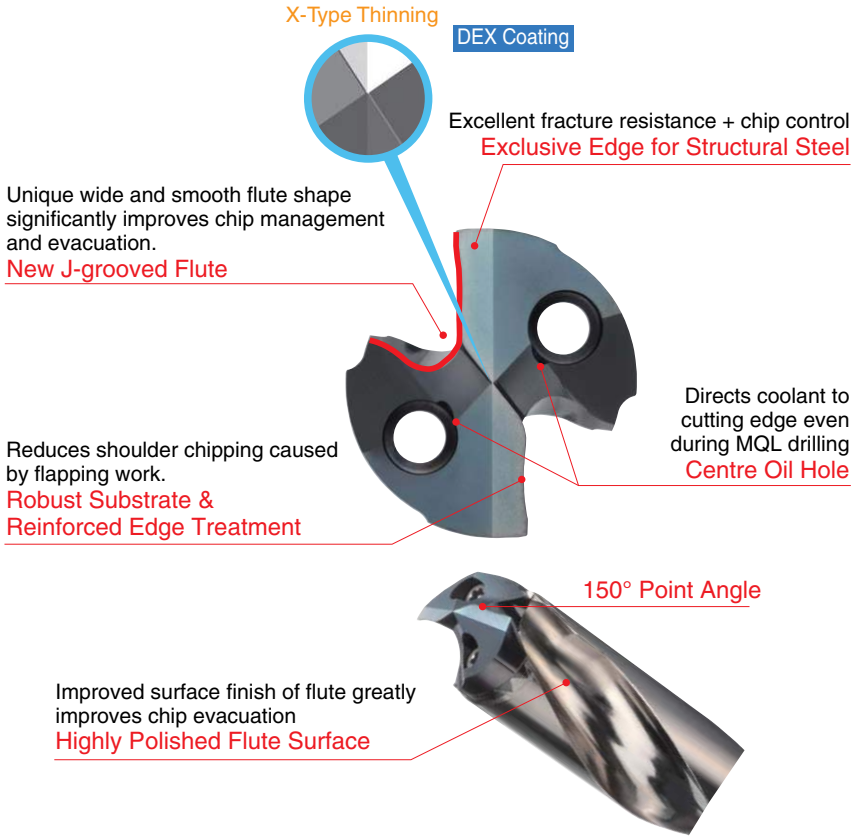
The large diameter M/L/D holders can only use the MTL type of tip.



Diameter øD_c (mm)	M (3D) Dimensions ℓ	M (3D) Dimensions L	L (5D) Dimensions ℓ	L (5D) Dimensions L	D (8D) Dimensions ℓ	D (8D) Dimensions L	Shank Dimensions ℓs	Shank Dimensions øD_s	Cap Screw	Wrench	Recommended Tightening Torque (N·m)
31.0	110	195	175	260	270	355	60	32.0	BXD04515IP	TRDR25IP	4.98 to 6.44
31.5											
32.0											
32.5	115	200	185	270	285	370					
33.0											
33.5											
34.0	120	215	195	290	300	395	70	40.0	BX0515	HD040	7.2
34.5											
35.0											
35.5	125	220	200	295	310	405					
36.0											
36.5											
37.0	130	225	210	305	325	420					
37.5											
38.0											
38.5	135	230	220	315	335	430					
39.0											
39.5											
40.0	145	245	225	325	350	450					
40.5											
41.0											
41.5	150	250	235	335	360	460					
42.0											
42.5											

SMD Type (Structural Steel)

MB Type — Ideal for Drilling Rolled Steels for Structural Weldments (Single layer and Laminate material)



■ Application Examples

MB Type for structural steel — Good chip control

Comp. Drill — Elongated chips

■ MB Type Cutting Length Comparison

Case	Current Tool	Tool Life Comparison (Cutting Length)		Cutting Conditions
Case. 1	Comp. A Indexable Head Model	Current Tool	17m	v_c=46m/min f=0.35mm/rev Coolant : MQL
		MB Type	42m (2.5x tool life)	
Case. 2	Comp. B Indexable Head	Current Tool	50m	v_c=56m/min f=0.30mm/rev Coolant : MQL
		MB Type	87m (1.7x tool life)	
Case. 3	Comp. C Brazed Head	Current Tool	32m	v_c=54m/min f=0.30mm/rev Coolant : MQL
		MB Type	95m (3.0x tool life)	
Case. 4	Comp. D Indexable Head Model	Current Tool	70m	v_c=60m/min f=0.30mm/rev Coolant : MQL
		MB Type	120m (1.7x tool life)	

Compared to current tool life

1.7x to 3x

Longer Tool Life

Tool Cost

Major Potential Savings

■ Recommended Cutting Conditions, MB Type for Structural Steel

v_c: Cutting Speed (m/min) f: Feed Rate (mm/rev)

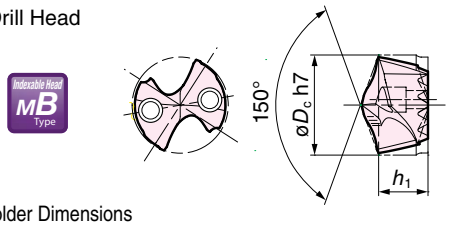
Work Material		Rolled Steel for Welded Structures SS400	Rolled Steel for Welded Structures SM490	Rolled Steel for Welded Structures SM520	Rolled Steel for Welded Structures SM570
Diameter øD_c (mm)	Cutting Conditions	Min. - **Optimum** - Max.	Min. - **Optimum** - Max.	Min. - **Optimum** - Max.	Min. - **Optimum** - Max.
ø24.5 to ø26.7	v_c	60-**70**-80	55-**65**-75	55-**65**-75	55-**65**-75
	f	*0.20-**0.30**-0.40*	*0.20-**0.30**-0.40*	*0.20-**0.25**-0.35*	*0.20-**0.25**-0.35*

SMD Type (Structural Steel)

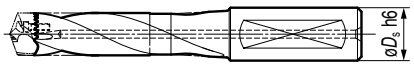
Carbon Steel, Alloy Steel Up to 0.28%	Carbon Steel, Alloy Steel From 0.29%	Tempered Steel	Hardened Steel Up to 45HRC	Hardened Steel From 46HRC	Stainless Steel	Ti-Alloy	Inconel	Grey Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
◎	◎											

DEX Coat | W/ Oil Hole | Indexable | 3D

● Drill Head

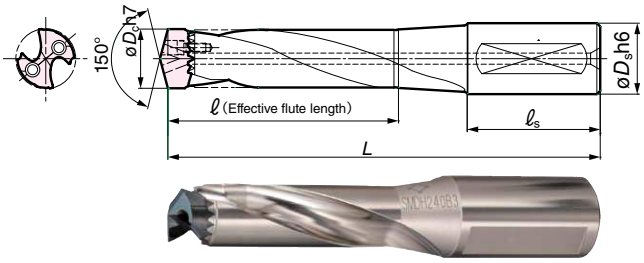


● Holder Dimensions



● Mounted Figure

Only use the special MB type head with a B3 type holder.

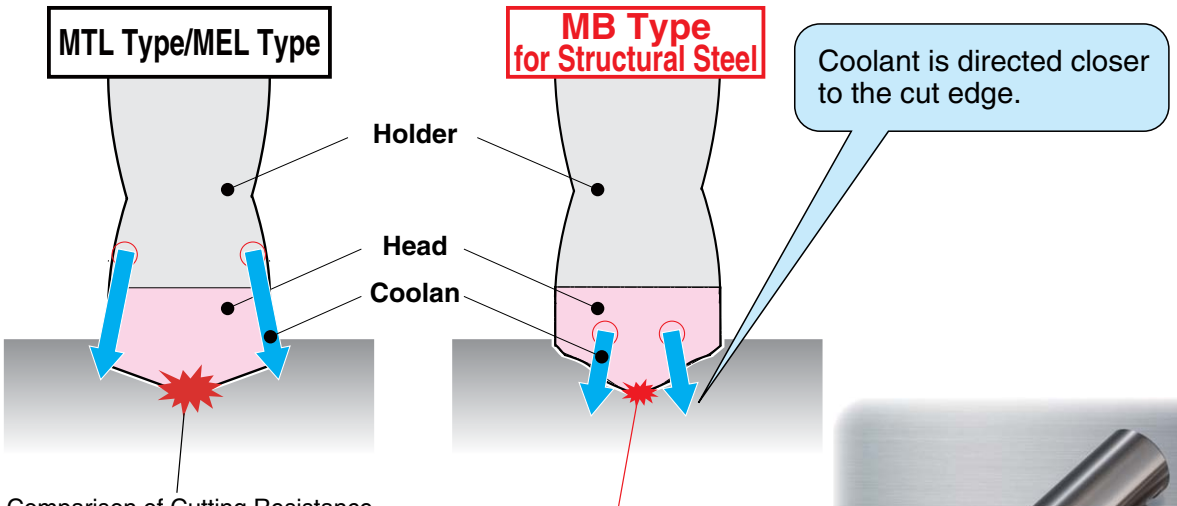


■ Drill Head (Insert) [Material MB Type: ACX80] ■ Toolholder B3 (3D) ■ Dimensions of Assembled Drill with SMD Type ■ Spare Parts, Recommended Tightening Torque

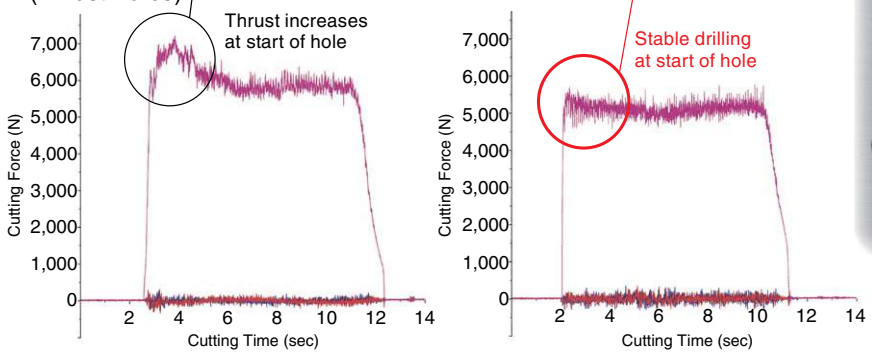
Diameter øDc (mm)	Heads			Toolholder				Shank		Cap Screw	Wrench	Recommended Tightening Torque (N·m)
	MB Type		h1	B3 (3D)		Dimensions		Dimensions				
	Cat No	Stock		Cat. No.	Stock	ℓ	L	ℓs	øDs			
24.5	SMDT 2450MB	●	14.1	SMDH 240B3	●	87	170	60	32	BXD03512IP	TRDR15IP	2.79 to 3.72
24.7	2470MB	●										
26.5	SMDT 2650MB	●	15.3	SMDH 260B3	●	92	175	60	32	BXD04014IP	TRDR20IP	4.14 to 5.52
26.7	2670MB	●										

Inquire about production of holders not listed in stock.

● Improved Lubrication Flow to Edge



■ Comparison of Cutting Resistance (Thrust Force)



Diameter: ø24.7 Cutting Conditions: v_c=70m/min f=0.35mm/rev
Work Material: SS400 Coolant: MQL

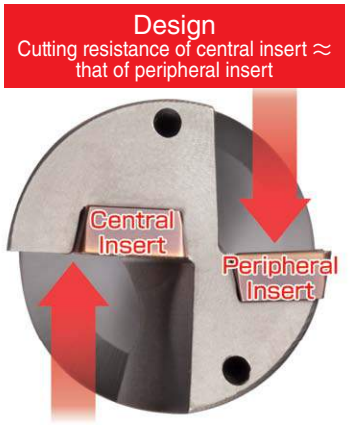
- Due to the position of the oil hole and the groove shapes, MB style heads cannot be used on normal holders, and MTL/MEL style heads cannot be used on B3 holders.

WDX Type

Balanced Design for Stable Drilling

■ General Features

SumiDrill WDX type has excellent cutting balance that provides stable hole drilling on a wide range of work materials from general steel to stainless steel and aluminium alloy.
Available in three original chipbreaker styles, the WDX type features improved chip management and reduced cutting resistance for use in low rigidity set ups.



■ Characteristics and Applications

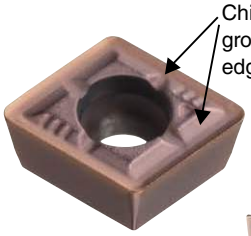
● Design
Cutting resistance during machining is balanced between central and peripheral inserts, and the relative position of each insert are optimised to provide stable drilling.

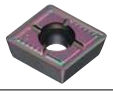
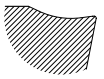
● Excellent Chip Management
A "chip control groove" in the centre of the breaker allows the direction of chip evacuation to be controlled. Three separate purpose-designed breakers drastically reduce chip troubles with a variety of different work materials in a variety of different conditions.

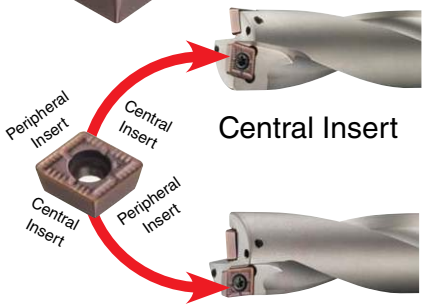
● Economical, Four-Cornered Insert
Inserts can be used in either central or peripheral positions, with two corners for each position - a total of four corners.

● Versatile Tool for a Variety of Machining Applications
A special hard surface treatment gives added durability, allowing stable, long-term drilling in a variety of applications including hole widening, spot facing, external turning, and internal boring.

● Supports Wide Range of Work Materials
Employs ACP300 with excellent fracture and wear resistance for steel and stainless steel, ACK300 for cast iron, and DL1500 with excellent adhesion resistance for non-ferrous metals.



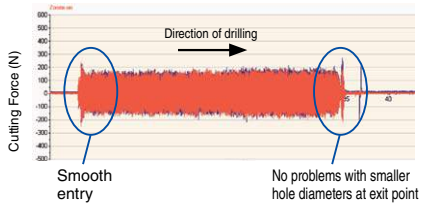
Series	L Type	G Type		H Type
Feature	Low Feed/ Chip Management	General Purpose	For Non-ferrous metal machining	Strong Edge Type
Appearance				
Figure				



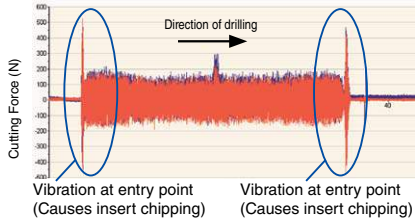
■ Performance

●Balanced Design (Comparison of Horizontal Component Values)
Balance is maintained at the entry and exit points, and drilling is stable.

SumiDrill WDX Type



Conventional and Competitor's Products



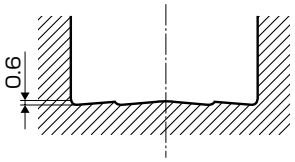
●**Improved Chip Management**
Drill : WDX200D3S25(ø20.0)
Work Material : SUS304
Cutting Conditions : v_c=130m/min, f=0.06mm/rev
H=50mm, Wet

SumiDrill WDX Type

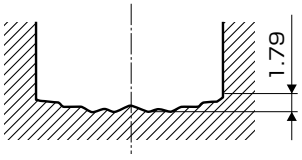
Conventional and Competitor's Products

● Finishing is easy because bottom of hole is almost flat

Bottom of hole after drilling with WDX200D3S25



Bottom of hole after drilling with conventional model (ø20)

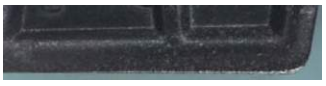


New Insert Material AURORA coat DL1500 for Machining Non-Ferrous Metal

■ Characteristics

New insert material for machining non-ferrous metal DL1500 offers greatly improved adhesion resistance compared to conventional tools. Ideal for drilling holes in copper alloys as well as aluminium allloys.

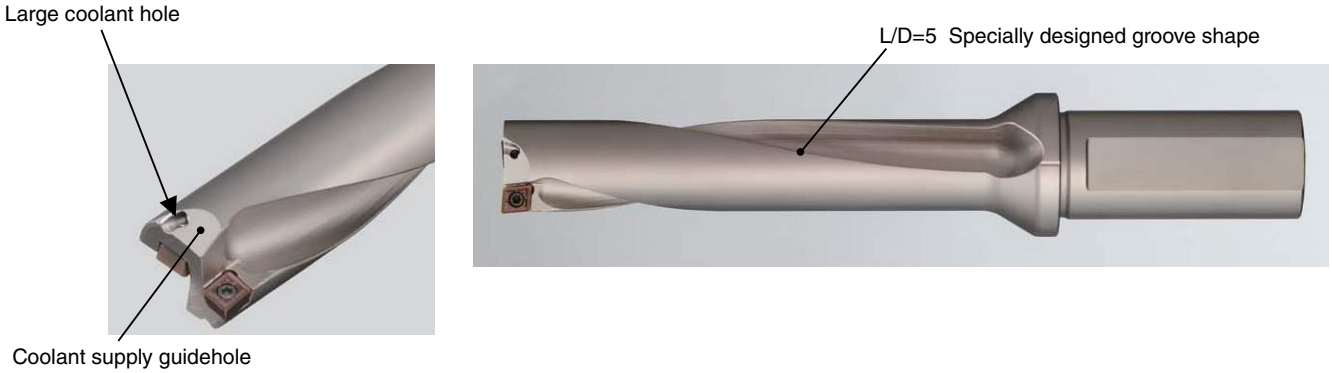
Holder: WDX250D3S25 Insert: WDXT073506-G (DL1500) Work Material: ADC52
Cutting Conditions: v_c=150m/min f=0.10mm/rev H=50mm (Through Hole) Wet

		ACK300	DL1500
Peripheral Insert	Rake Face		
	Relief Face		
Central Insert	Rake Face		
	Relief Face		

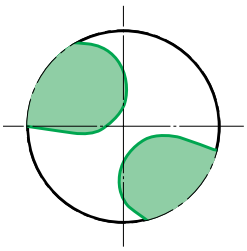
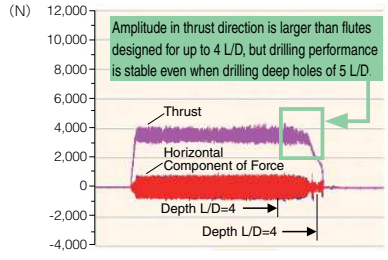
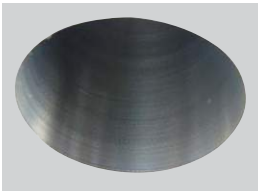
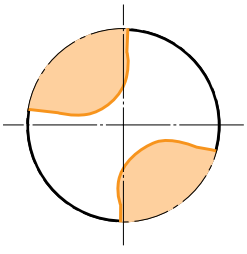
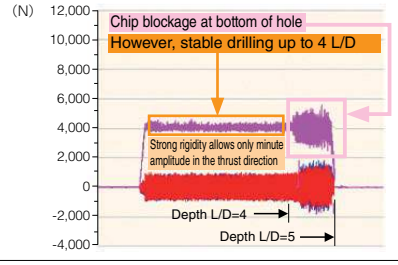
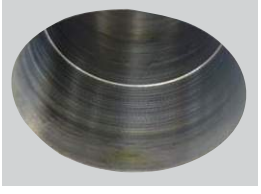
Drills for Deep Hole Drilling L/D = 5 (In stock from ø13.0 to ø55.0 mm)

■ Characteristics

SumiDrill WDX type for 5D drilling features a specially designed groove shape + enlarged coolant hole for excellent chip evacuation even during deep hole drilling.



■ Performance

Characteristics	Figure	Cutting Resistance	Machined Surface (Exit)
WDX260D5S32 **Special Groove Shape For L/D=5** * Designed with emphasis on chip evacuation Expanded flute design improves chip evacuation for stable drilling performance even with holes up to 5 L/D.			Good machined surface down to end of hole 
WDX260D4S32 **Groove Shape For L/D≤4** * Designed with emphasis on drill rigidity Flute design for greater rigidity of the drill enables stable drilling of deep holes up to 4 L/D.			Poor machined surface due to chip blockage at bottom of hole (near 5 L/D) 

Insert: WDXT073506-G Work Material: SUS304
Cutting Conditions: v_c=150m/min f=0.05mm/rev H=130mm (Through Hole) Wet

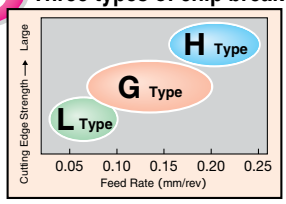
WDX Type

Insert Selection – WDX Type Insert Series Offers Wide Selection

3 Three material grades

Work Material \ Grade	ACP300	ACK300	DL1500
P Steel (General Machining)	○		
P Steel (High-Speed Machining)		○	
M Stainless Steel	○		
K Cast Iron		○	
N Non-Ferrous Metal			○

3 Three types of chip breakers

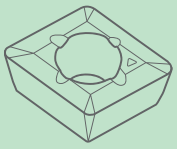


7 Seven possible combinations

ACP300	ACK300	DL1500
P M L Type	P K L Type	
P M G Type	P K G Type	N G Type
P H Type	K H Type	

2nd Recommendation (P)

P Steel — Low Feed, Chip Management Type

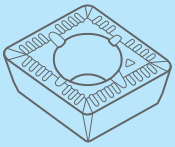


L type ACP300

- For machining SS400, SCM415, SCM420, etc.
- In case of chip control problem, high speed with low feed rate is recommended.
- In case of vibration due to burnt chips, reduce the feed rate.

P Steel — Improvement of chip control (low-carbon steel, etc.)

P Steel — Strong Edge Type

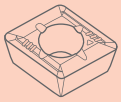


H type ACP300

- For interrupted machining (at entrance/exit) of angled surfaces, reduce the feed rate (to approximately f 0.05) at each interruption.
- Ideal to use when the cutting edge is weakened due to machining hardened material (heat treatment)

P Steel — Reduction of initial chipping (caused by interrupted machining, machining hard material, etc.)

P Steel — General Purpose



G type ACK300

- For application where sereve flank wear may be caused by machining general alloy or alloy steal

P Steel — Low Feed, Chip Management Type

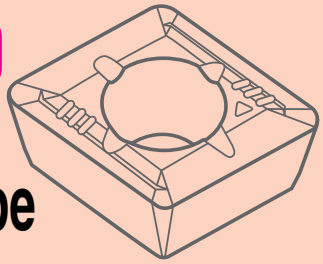
L type ACK300

- For low feed rate conditions

P Steel — Lack of wear resistance

1st Recommendation (P M K N)

Breaker: General Purpose



G type

Grade

P Steel / M Stainless Steel — For machining general steel, alloy steel or stainless steel — **ACP300**

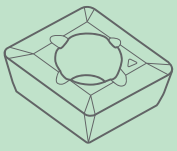
K Cast Iron — For machining cast iron — **ACK300**

N Non-Ferrous Metal — For machining non-ferrous metals — **DL1500**

2nd Recommendation (M K)

M Stainless Steel — Improvement of chip control

M Stainless Steel — Low feed, chip management type

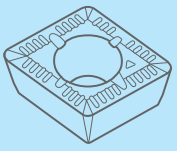


L type ACP300

- L Type ACP300 is ideal to solve chip evacuation problem caused by low cutting speed and low feed rate due to facility reasons.

K Cast Iron — Reduction of initial chipping (interrupted/high feed rate machining, etc.)

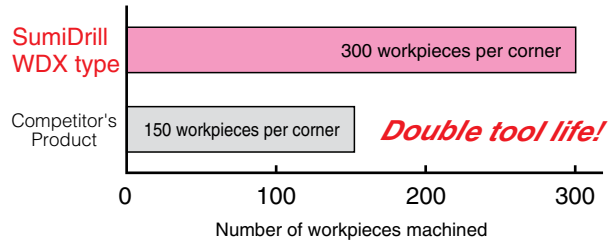
K Cast Iron — Strong Edge Type



H type ACK300

- Similar to steel machining, H Type ACK300 is ideal for interrupted machining on angled surfaces.
- With strong edges, it is ideal for machining workpieces at high feed rate.

■ Application Examples

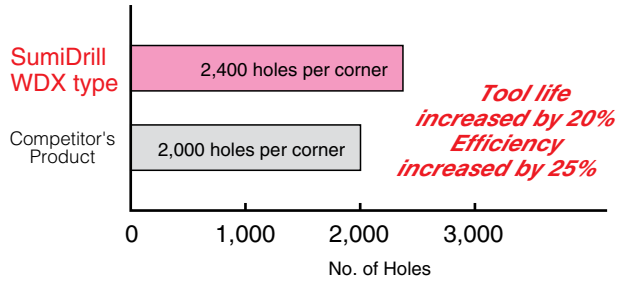


Work material : Machine component (FCD450)
Tool : WDX205D3S25
Insert : WDXT063006-G (ACK300)
Cutting conditions : v_c=122m/min f=0.15mm/rev H=33mm Through Wet

- Tool life has been extended twice longer than that of conventional types.
- More stable machining performance with less power used for machining.

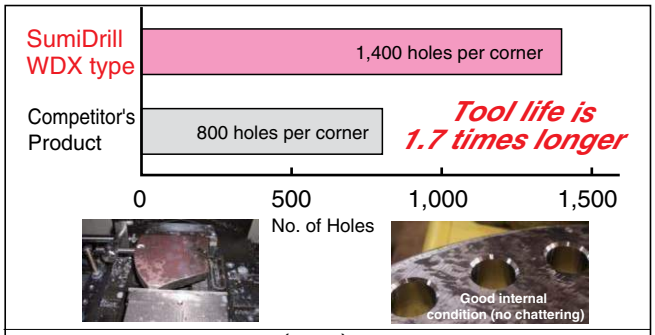
Work material : Automotive component (SUS304)
Tool : WDX220D2S25
Insert : WDXT063006-L (ACP300)
Cutting conditions : v_c=125m/min f=0.07mm/rev H=5mm Through Wet

Finish of the machined surface has been improved after having solved chipping issues and improved chip evaluation.



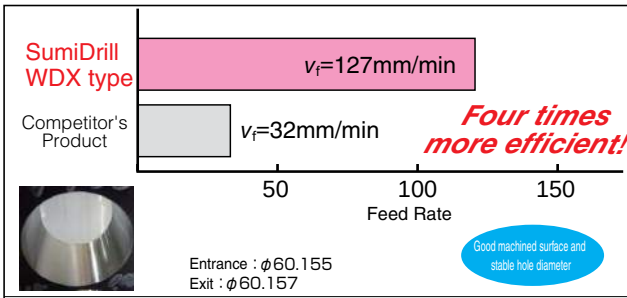
Work material : Machine component (SCM440)
Tool : WDX200D3S25 Insert : WDXT063006-G (ACP300)
Cutting conditions : v_c=157m/min f=0.19mm/rev H=19mm Through Wet
Competitor's product cutting conditions : v_c=157m/min f=0.15mm/rev H=19mm Through Wet

Chips are well controlled even under high-efficienct conditions.
Low vibration during machining provides stable performance.



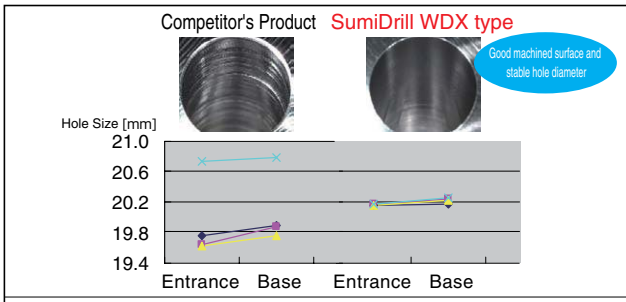
Work material : Steel plate (S15C)
Tool : WDX145D3S20 Insert : WDXT042004-L (ACP300)
Cutting conditions : v_c=205m/min f=0.042mm/rev H=15mm Through Wet

- Tool life has been extended 1.7 times longer than that of conventional types.
- No chattering on drilled surface even with low clamp rigidity.



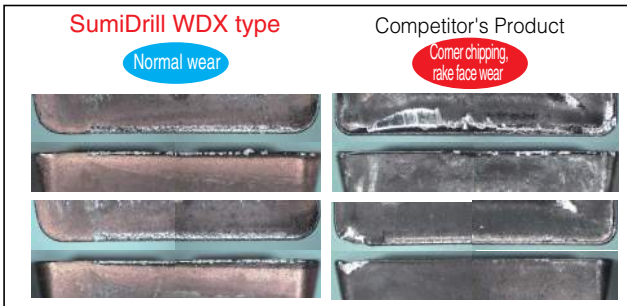
Work material : Steel plate (S48C)
Tool : WDX600D3S40 Insert : WDXT186012-G (ACP300)
Cutting conditions : v_c=150m/min f=0.16mm/rev H=60mm Through Wet
Competitor's product cutting conditions : v_c=30m/min f=0.20mm/rev H=60mm Through Wet

- Stable drilling of even large-diameter holes.
- Four times more efficient than conventional tools.



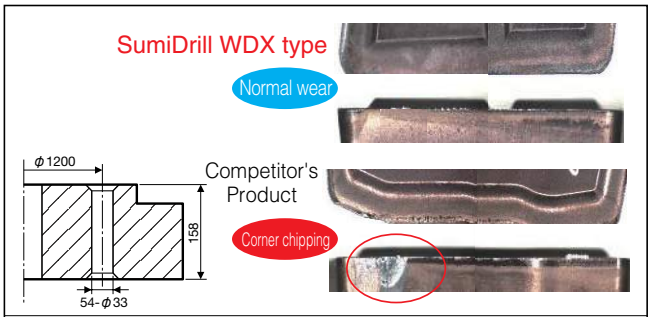
Work material : Machine component (SCM415)
Tool : WDX200D5S25
Insert : WDXT063006-G (ACP300)
Cutting conditions : v_c=185m/min f=0.12mm/rev H=87mm Through Wet

- Good machined surface.
- Size of hole diameter is stable



Work material : Tractor links (35MnBM)
Tool : WDX205D5D25
Insert : WDXT063006-G (ACP300)
Cutting conditions : v_c=100m/min f=0.11mm/rev H=60mm Through Wet

- Stable drilling even at L/D = 5.
- Insert chipping and wear have been reduced and tool life has been stabilized.



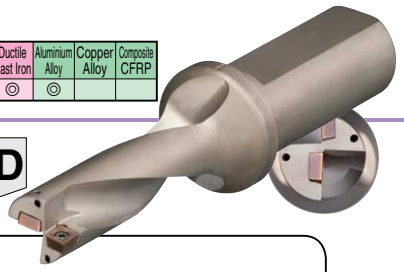
Work material : Bearing for wind power generation (42CrMo)
Tool : WDX330D5D40
Insert : WDXT094008-L (ACP300)
Cutting conditions : v_c=146m/min f=0.10mm/rev H=158mm Through Wet

- There are fewer defective workpieces caused by insert chipping.

SumiDrill

WDX Type (2D)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
◎	◎		○		◎			◎	◎	◎		



For 2D Boring Depth

Guide for machining tolerance:-0.05 to +0.15
Maximum depth ℓ 2 x øDc

PVD Coat | Aurora DLC Coat | W/ Oil Hole | Indexable | 2D

Recommended Cutting Conditions ☞ J62

Fig 1

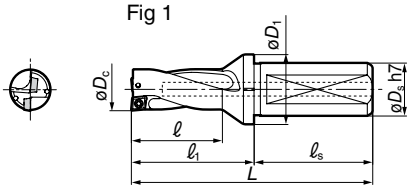


Fig 2

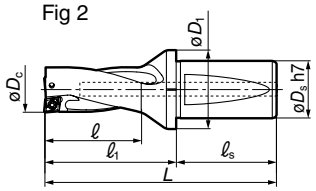
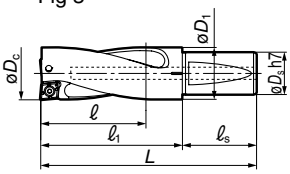


Fig 3



■ Holder Diameter ø13.0 to ø45.0mm

(Refer to J60)

(mm)

Diameter øDc	Shank Diameter øDs	Cat. No.	Stock	L	ℓ	ℓ1	ℓs	øD1	Radial Offset (Max)	Applicable Insert	Fig
13.0		WDX 130D2S20	●	88	29	44			0.35		
13.5		135D2S20	●	89	30	45			0.30		
14.0	20	140D2S20	●	90	31	46	44	28.0	0.25	WDXT 042004	
14.5		145D2S20	●	91	32	47			0.20		
15.0		150D2S20	●	92	33	48			0.15		
15.5		WDX 155D2S20	●	93	34	49			0.40		
16.0	20	160D2S20	●	94	35	50	44	30.0	0.40		
16.5		165D2S20	●	95	36	51			0.35	WDXT 052504	
17.0		170D2S20	●	96	37	52			0.30		
17.5	25	175D2S25	●	109	38	53	56	32.0	0.25		
18.0		180D2S25	●	110	39	54			0.20		
18.5		WDX 185D2S25	●	111	40	55			0.50		
19.0		190D2S25	●	112	41	56			0.45		
19.5		195D2S25	●	113	42	57			0.40		
20.0		200D2S25	●	114	43	58			0.30		
20.5	25	205D2S25	●	115	44	59	56	33.0	0.30	WDXT 063006	1
21.0		210D2S25	●	116	45	60			0.20		
21.5		215D2S25	●	117	46	61			0.15		
22.0		220D2S25	●	118	47	62			0.10		
22.5		225D2S25	●	119	48	63			0.05		
23.0		WDX 230D2S25	●	123	49	67			0.70		
23.5		235D2S25	●	124	50	68			0.70		
24.0	25	240D2S25	●	125	51	69	56	37.0	0.60		
24.5		245D2S25	●	126	52	70			0.50		
25.0		250D2S25	●	127	53	71			0.50		
25.5		WDX 255D2S32	●	134	54	74			0.45	WDXT 073506	
26.0		260D2S32	●	135	55	75			0.40		
26.5		265D2S32	●	136	56	76			0.35		
27.0	32	270D2S32	●	137	57	77	60	41.0	0.25		
27.5		275D2S32	●	138	58	78			0.20		
28.0		280D2S32	●	139	59	79			0.15		
28.5		285D2S32	●	140	60	80			0.10		
29.0		WDX 290D2S32	●	143	62	83		50.0	1.00		
29.5		295D2S32	●	144	63	84			0.95		
30.0	32	300D2S32	●	148	64	88	60		0.90		
31.0		310D2S32	●	150	66	90			0.80		
32.0		320D2S32	●	152	68	92			0.70		
30.0		WDX 300D2S40	●	158	64	88			0.90	WDXT 094008	2
31.0		310D2S40	●	160	66	90		54.0	0.80		
32.0		320D2S40	●	162	68	92			0.70		
33.0	40	330D2S40	●	164	70	94	70		0.55		
34.0		340D2S40	●	166	72	96			0.45		
35.0		350D2S40	●	168	74	98			0.35		
36.0		360D2S40	●	170	76	100			0.20		
37.0		WDX 370D2S40	●	179	79	109			1.00		
38.0		380D2S40	●	181	81	111			1.00		
39.0		390D2S40	●	183	83	113			0.90		
40.0		400D2S40	●	185	85	115			0.80		
41.0	40	410D2S40	●	187	87	117	70	49.5	0.70	WDXT 125012	
42.0		420D2S40	●	189	89	119			0.60		
43.0		430D2S40	●	191	91	121			0.50		
44.0		440D2S40	●	193	93	123			0.50		
45.0		450D2S40	●	195	95	125			0.40		

Diameters ø30, ø31, ø32 are available in stock with shank diameters ø32 and ø40.

■ Holder Diameter ø46.0 to ø68.0mm

(Refer to J60)

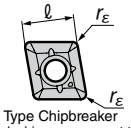
(mm)

Diameter øDc	Shank Diameter øDs	Cat. No.	Stock	L	ℓ	ℓ1	ℓs	øD1	Radial Offset (Max)	Applicable Insert	Fig
46.0		WDX 460D2S40	●	197	97	127			1.50		
47.0		470D2S40	●	199	99	129			1.40		
48.0		480D2S40	●	201	101	131		49.5	1.30		2
49.0		490D2S40	●	203	103	133			1.20		
50.0	40	500D2S40	●	205	105	135	70		1.10	WDXT 156012	
51.0		510D2S40	●	207	107	137			1.00		
52.0		520D2S40	●	209	109	139		50.5	0.90		
53.0		530D2S40	●	211	111	141		51.5	0.80		
54.0		540D2S40	●	213	113	143		52.5	0.60		
55.0		550D2S40	●	215	115	145		53.5	0.50		
56.0		WDX 560D2S40	●	222	120	152		54.0	2.00		
57.0		570D2S40	●	224	122	154		55.0	1.80		
58.0		580D2S40	●	226	124	156		56.0	1.70		
59.0		590D2S40	●	228	126	158		57.0	1.60		
60.0		600D2S40	●	230	128	160		58.0	1.50		3
61.0		610D2S40	●	232	130	162		59.0	1.40		
62.0	40	620D2S40	●	234	132	164	70.0	60.0	1.30	WDXT 186012	
63.0		630D2S40	●	236	134	166		61.0	1.20		
64.0		640D2S40	●	238	136	168		62.0	1.00		
65.0		650D2S40	●	240	138	170		63.0	0.90		
66.0		660D2S40	●	242	140	172		64.0	0.70		
67.0		670D2S40	●	244	142	174		65.0	0.60		
68.0		680D2S40	●	246	144	176		66.0	0.50		

■ Inserts

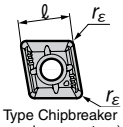
P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metal | S Exotic Alloy | H Hardened Steel

Fig 4



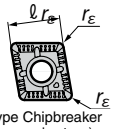
L Type Chipbreaker
(Low feed, chip management type)

Fig 5



G Type Chipbreaker
(General purpose type)

Fig 6



H Type Chipbreaker
(Strong edge type)

Grade		Coated Carbide		
Application	High Speed/Light			N
	General Purpose	M		
	Roughing	M	K	

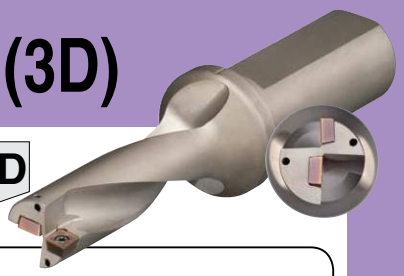
Cat. No.	ACP300	ACK300	DL1500	Fig	Dimensions (mm) ℓ	Thickness	rε	Applicable Holders
WDXT 042004-L	●	●		4	4.2	2.0	0.4	WDX130D2S20 to WDX150D2S20
042004-G	●	●	●	5				
042004-H	●	●		6				
WDXT 052504-L	●	●		4	5.0	2.5	0.4	WDX155D2S20 to WDX180D2S25
052504-G	●	●	●	5				
052504-H	●	●		6				
WDXT 063006-L	●	●		4	6.0	3.0	0.6	WDX185D2S25 to WDX225D2S25
063006-G	●	●	●	5				
063006-H	●	●		6				
WDXT 073506-L	●	●		4	7.5	3.5	0.6	WDX230D2S25 to WDX285D2S32
073506-G	●	●	●	5				
073506-H	●	●		6				
WDXT 094008-L	●	●		4	9.6	4.0	0.8	WDX290D2S32 to WDX360D2S40
094008-G	●	●	●	5				
094008-H	●	●		6				
WDXT 125012-L	●	●		4	12.4	5.0	1.2	WDX370D2S40 to WDX450D2S40
125012-G	●	●	●	5				
125012-H	●	●		6				
WDXT 156012-L	●	●		4	15.2	6.0	1.2	WDX460D2S40 to WDX550D2S40
156012-G	●	●	●	5				
156012-H	●	●		6				
WDXT 186012-L	●	●		4	18.0	6.0	1.2	WDX560D2S40 to WDX680D2S40
186012-G	●	●		5				
186012-H	●	●		6				

Insert Identification ☞ J59

■ Spare Parts

Screw	Spanner	Spanner	Recommended Tightening Torque (N·m)	Applicable Holders
BFTX01604N	TRX06		0.3	WDX130D2S20 to WDX150D2S20
BFTX0204N	TRX06		0.5	WDX155D2S20 to WDX180D2S25
BFTY02206		TRD07	1.0	WDX185D2S25 to WDX225D2S25
BFTX02506N		TRD08	1.5	WDX230D2S25 to WDX285D2S32
BFTX03584		TRD15	3.5	WDX290D2S32 to WDX360D2S40
BFTX0511N		TRD20	5.0	WDX370D2S40 to WDX450D2S40
BFTX0615N		TRD25	5.0	WDX460D2S40 to WDX680D2S40

WDX Type (3D)



Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminum Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
◎	◎		○		◎			◎	◎	◎		

For 3D Boring Depth

Guide for machining tolerance:0 to +0.20
Maximum depth ℓ 3 x $\varnothing D_c$

PVD Coat | Aurora DLC Coat | W/ Oil Hole | Indexable | 3D

Recommended Cutting Conditions ☞ J62

Fig 1

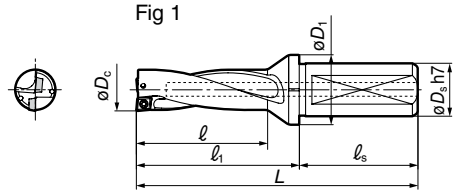


Fig 2

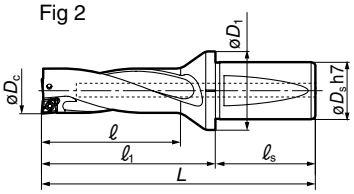
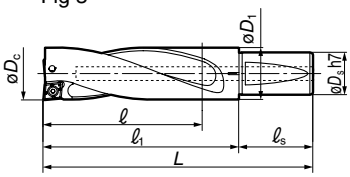


Fig 3



■ Holder Diameter ø13.0 to ø45.0mm

(Refer to J60) (mm)

Diameter øDc	Shank Diameter øDs	Cat. No.	Stock	L	ℓ	ℓ1	ℓs	øD1	Radial Offset (Max)	Applicable Insert	Fig
13.0		WDX 130D3S20	●	101.0	42.0	57.0			0.35		
13.5		135D3S20	●	102.5	43.5	58.5			0.30		
14.0	20	140D3S20	●	104.0	45.0	60.0	44	28.0	0.25	WDXT 042004	
14.5		145D3S20	●	105.5	46.5	61.5			0.20		
15.0		150D3S20	●	107.0	48.0	63.0			0.15		
15.5		WDX 155D3S20	●	108.5	49.5	64.5			0.40		
16.0	20	160D3S20	●	110.0	51.0	66.0	44	30.0	0.40		
16.5		165D3S20	●	111.5	52.5	67.5			0.35	WDXT 052504	
17.0		170D3S20	●	113.0	54.0	69.0			0.30		
17.5	25	175D3S25	●	126.5	55.5	70.5	56	32.0	0.25		
18.0		180D3S25	●	128.0	57.0	72.0			0.20		
18.5		WDX 185D3S25	●	129.5	58.5	73.5			0.50		
19.0		190D3S25	●	131.0	60.0	75.0			0.45		
19.5		195D3S25	●	132.5	61.5	76.5			0.40		
20.0		200D3S25	●	134.0	63.0	78.0			0.30		
20.5	25	205D3S25	●	135.5	64.5	79.5	56	33.0	0.30	WDXT 063006	1
21.0		210D3S25	●	137.0	66.0	81.0			0.20		
21.5		215D3S25	●	138.5	67.5	82.5			0.15		
22.0		220D3S25	●	140.0	69.0	84.0			0.10		
22.5		225D3S25	●	141.5	70.5	85.5			0.05		
23.0		WDX 230D3S25	●	146.0	72.0	90.0			0.70		
23.5		235D3S25	●	147.5	73.5	91.5			0.70		
24.0	25	240D3S25	●	149.0	75.0	93.0	56	37.0	0.60		
24.5		245D3S25	●	150.5	76.5	94.5			0.50		
25.0		250D3S25	●	152.0	78.0	96.0			0.50		
25.5		WDX 255D3S32	●	159.5	79.5	99.5			0.45	WDXT 073506	
26.0		260D3S32	●	161.0	81.0	101.0			0.40		
26.5		265D3S32	●	162.5	82.5	102.5			0.35		
27.0	32	270D3S32	●	164.0	84.0	104.0	60	41.0	0.25		
27.5		275D3S32	●	165.5	85.5	105.5			0.20		
28.0		280D3S32	●	167.0	87.0	107.0			0.15		
28.5		285D3S32	●	168.5	88.5	108.5			0.10		
29.0		WDX 290D3S32	●	172.0	91.0	112.0		50.0	1.00		
29.5		295D3S32	●	173.5	92.5	113.5			0.95		
30.0	32	300D3S32	●	178.0	94.0	118.0	60		0.90		
31.0		310D3S32	●	181.0	97.0	121.0			0.80		
32.0		320D3S32	●	184.0	100.0	124.0			0.70		
30.0		WDX 300D3S40	●	188.0	94.0	118.0			0.90	WDXT 094008	
31.0		310D3S40	●	191.0	97.0	121.0		54.0	0.80		
32.0		320D3S40	●	194.0	100.0	124.0			0.70		
33.0	40	330D3S40	●	197.0	103.0	127.0	70		0.55		2
34.0		340D3S40	●	200.0	106.0	130.0			0.45		
35.0		350D3S40	●	203.0	109.0	133.0			0.35		
36.0		360D3S40	●	206.0	112.0	136.0			0.20		
37.0		WDX 370D3S40	●	216.0	116.0	146.0			1.00		
38.0		380D3S40	●	219.0	119.0	149.0			1.00		
39.0		390D3S40	●	222.0	122.0	152.0			0.90		
40.0		400D3S40	●	225.0	125.0	155.0			0.80		
41.0	40	410D3S40	●	228.0	128.0	158.0	70	49.5	0.70	WDXT 125012	
42.0		420D3S40	●	231.0	131.0	161.0			0.60		
43.0		430D3S40	●	234.0	134.0	164.0			0.50		
44.0		440D3S40	●	237.0	137.0	167.0			0.50		
45.0		450D3S40	●	240.0	140.0	170.0			0.40		

Diameters ø30, ø31, ø32 are available in stock with shank diameters ø32 and ø40.

■ Holder Diameter ø46.0 to ø68.0mm

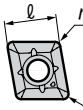
(Refer to J60) (mm)

Diameter øDc	Shank Diameter øDs	Cat. No.	Stock	L	ℓ	ℓ1	ℓs	øD1	Radial Offset (Max)	Applicable Insert	Fig
46.0		WDX 460D3S40	●	243.0	143.0	173.0			1.50		
47.0		470D3S40	●	246.0	146.0	176.0			1.40		
48.0		480D3S40	●	249.0	149.0	179.0		49.5	1.30		2
49.0		490D3S40	●	252.0	152.0	182.0			1.20		
50.0	40	500D3S40	●	255.0	155.0	185.0	70		1.10	WDXT 156012	
51.0		510D3S40	●	258.0	158.0	188.0			1.00		
52.0		520D3S40	●	261.0	161.0	191.0		50.5	0.90		
53.0		530D3S40	●	264.0	164.0	194.0		51.5	0.80		
54.0		540D3S40	●	267.0	167.0	197.0		52.5	0.60		
55.0		550D3S40	●	270.0	170.0	200.0		53.5	0.50		
56.0		WDX 560D3S40	●	278.0	176.0	208.0		54.0	2.00		
57.0		570D3S40	●	281.0	179.0	211.0		55.0	1.80		
58.0		580D3S40	●	284.0	182.0	214.0		56.0	1.70		
59.0		590D3S40	●	287.0	185.0	217.0		57.0	1.60		
60.0		600D3S40	●	290.0	188.0	220.0		58.0	1.50		3
61.0		610D3S40	●	293.0	191.0	223.0		59.0	1.40	WDXT 186012	
62.0	40	620D3S40	●	296.0	194.0	226.0	70	60.0	1.30		
63.0		630D3S40	●	299.0	197.0	229.0		61.0	1.20		
64.0		640D3S40	●	302.0	200.0	232.0		62.0	1.00		
65.0		650D3S40	●	305.0	203.0	235.0		63.0	0.90		
66.0		660D3S40	●	308.0	206.0	238.0		64.0	0.70		
67.0		670D3S40	●	311.0	209.0	241.0		65.0	0.60		
68.0		680D3S40	●	314.0	212.0	244.0		66.0	0.50		

■ Inserts

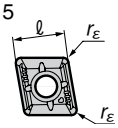
P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metal | S Exotic Alloy | H Hardened Steel

Fig 4



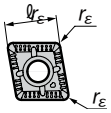
L Type Chipbreaker
(Low feed, chip management type)

Fig 5



G Type Chipbreaker
(General purpose type)

Fig 6



H Type Chipbreaker
(Strong edge type)

Application	Grade	Coated Carbide		
		ACP300	ACK300	DL1500
	High Speed/Light			N
	General Purpose	P M		
	Roughing	P M	K	

Cat. No.	Fig	Dimensions (mm) ℓ	Thickness	rε	Applicable Holders
WDXT 042004-L	4				
042004-G	5	4.2	2.0	0.4	WDX130D3S20 to WDX150D3S20
042004-H	6				
WDXT 052504-L	4				
052504-G	5	5.0	2.5	0.4	WDX155D3S20 to WDX180D3S25
052504-H	6				
WDXT 063006-L	4				
063006-G	5	6.0	3.0	0.6	WDX185D3S25 to WDX225D3S25
063006-H	6				
WDXT 073506-L	4				
073506-G	5	7.5	3.5	0.6	WDX230D3S25 to WDX285D3S32
073506-H	6				
WDXT 094008-L	4				
094008-G	5	9.6	4.0	0.8	WDX290D3S32 to WDX360D3S40
094008-H	6				
WDXT 125012-L	4				
125012-G	5	12.4	5.0	1.2	WDX370D3S40 to WDX450D3S40
125012-H	6				
WDXT 156012-L	4				
156012-G	5	15.2	6.0	1.2	WDX460D3S40 to WDX550D3S40
156012-H	6				
WDXT 186012-L	4				
186012-G	5	18.0	6.0	1.2	WDX560D3S40 to WDX680D3S40
186012-H	6				

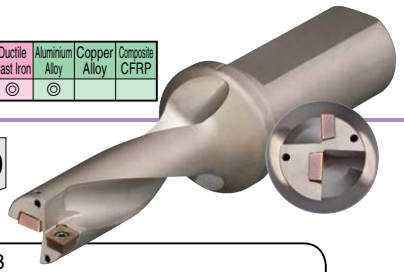
■ Spare Parts

Screw	Spanner	Spanner	Recommended Tightening Torque (N·m)	Applicable Holders
BFTX01604N	TRX06		0.3	WDX130D3S20 to WDX150D3S20
BFTX0204N	TRX06		0.5	WDX155D3S20 to WDX180D3S25
BFTY02206		TRD07	1.0	WDX185D3S25 to WDX225D3S25
BFTX02506N		TRD08	1.5	WDX230D3S25 to WDX285D3S32
BFTX03584		TRD15	3.5	WDX290D3S32 to WDX360D3S40
BFTX0511N		TRD20	5.0	WDX370D3S40 to WDX450D3S40
BFTX0615N		TRD25	5.0	WDX460D3S40 to WDX680D3S40

Insert Identification ☞ J59

WDX Type (4D)

Carbon Steel Up to 0.28%	Alloy Steel From 0.29%	Tempered Steel	Hardened Steel Up to 45HRC	Hardened Steel From 46HRC	Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
◎	◎		○		◎			◎	◎	◎		



For 4D Boring Depth

Guide for machining tolerance:0 to +0.25
Maximum depth ℓ 4 x øDc

PVD Coat | Aurora DLC Coat | W/ Oil Hole | Indexable | 4D

Recommended Cutting Conditions J63

Fig 1

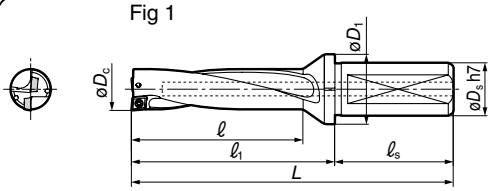


Fig 2

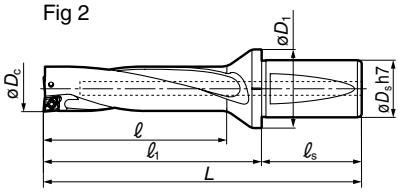
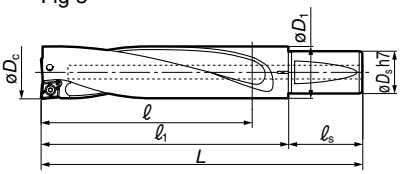


Fig 3



■ Holder Diameter ø13.0 to ø45.0mm

(Refer to J60) (mm)

Diameter øDc	Shank Diameter øDs	Cat. No.	Stock	L	ℓ	ℓ1	ℓs	øD1	Radial Offset (Max)	Applicable Insert	Fig
13.0		WDX 130D4S20	●	114	55	70			0.35		
13.5		135D4S20	●	116	57	72			0.30		
14.0	20	140D4S20	●	118	59	74	44	28.0	0.25	WDXT 042004	
14.5		145D4S20	●	120	61	76			0.20		
15.0		150D4S20	●	122	63	78			0.15		
15.5		WDX 155D4S20	●	124	65	80			0.40		
16.0	20	160D4S20	●	126	67	82	44	30.0	0.40		
16.5		165D4S20	●	128	69	84			0.35	WDXT 052504	
17.0		170D4S20	●	130	71	86			0.30		
17.5	25	175D4S25	●	144	73	88	56	32.0	0.25		
18.0		180D4S25	●	146	75	90			0.20		
18.5		WDX 185D4S25	●	148	77	92			0.50		1
19.0		190D4S25	●	150	79	94			0.45		
19.5		195D4S25	●	152	81	96			0.40		
20.0		200D4S25	●	154	83	98			0.30		
20.5	25	205D4S25	●	156	85	100	56	33.0	0.30	WDXT 063006	
21.0		210D4S25	●	158	87	102			0.20		
21.5		215D4S25	●	160	89	104			0.15		
22.0		220D4S25	●	162	91	106			0.10		
22.5		225D4S25	●	164	93	108			0.05		
23.0		WDX 230D4S25	●	169	95	113			0.70		
23.5		235D4S25	●	171	97	115			0.70		
24.0	25	240D4S25	●	173	99	117	56	37.0	0.60		
24.5		245D4S25	●	175	101	119			0.50		
25.0		250D4S25	●	177	103	121			0.50		
25.5		WDX 255D4S32	●	185	105	125			0.45	WDXT 073506	
26.0		260D4S32	●	187	107	127			0.40		
26.5		265D4S32	●	189	109	129			0.35		
27.0	32	270D4S32	●	191	111	131	60	41.0	0.25		
27.5		275D4S32	●	193	113	133			0.20		
28.0		280D4S32	●	195	115	135			0.15		
28.5		285D4S32	●	197	117	137			0.10		
29.0		WDX 290D4S32	●	201	120	141		50.0	1.00		
29.5		295D4S32	●	203	122	143			0.95		
30.0	32	300D4S32	●	208	124	148	60		0.90		
31.0		310D4S32	●	212	128	152			0.80		
32.0		320D4S32	●	216	132	156			0.70		
30.0		WDX 300D4S40	●	218	124	148			0.90	WDXT 094008	2
31.0		310D4S40	●	222	128	152		54.0	0.80		
32.0		320D4S40	●	226	132	156			0.70		
33.0	40	330D4S40	●	230	136	160	70		0.55		
34.0		340D4S40	●	234	140	164			0.45		
35.0		350D4S40	●	238	144	168			0.35		
36.0		360D4S40	●	242	148	172			0.20		
37.0		WDX 370D4S40	●	253	153	183			1.00		
38.0		380D4S40	●	257	157	187			1.00		
39.0		390D4S40	●	261	161	191			0.90		
40.0		400D4S40	●	265	165	195			0.80		
41.0	40	410D4S40	●	269	169	199	70	49.5	0.70	WDXT 125012	
42.0		420D4S40	●	273	173	203			0.60		
43.0		430D4S40	●	277	177	207			0.50		
44.0		440D4S40	●	281	181	211			0.50		
45.0		450D4S40	●	285	185	215			0.40		

Diameters ø30, ø31, ø32 are available in stock with shank diameters ø32 and ø40.

■ Holder Diameter ø46.0 to ø63.0mm

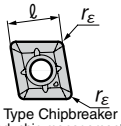
(Refer to J60) (mm)

Diameter øDc	Shank Diameter øDs	Cat. No.	Stock	L	ℓ	ℓ1	ℓs	øD1	Radial Offset (Max)	Applicable Insert	Fig
46.0		WDX 460D4S40	●	289	189	219			1.50		
47.0		470D4S40	●	293	193	223			1.40		
48.0		480D4S40	●	297	197	227		49.5	1.30		2
49.0		490D4S40	●	301	201	231			1.20		
50.0	40	500D4S40	●	305	205	235	70		1.10	WDXT 156012	
51.0		510D4S40	●	309	209	239			1.00		
52.0		520D4S40	●	313	213	243		50.5	0.90		
53.0		530D4S40	●	317	217	247		51.5	0.80		
54.0		540D4S40	●	321	221	251		52.5	0.60		
55.0		550D4S40	●	325	225	255		53.5	0.50		
56.0		WDX 560D4S40	●	334	232	264		54.0	2.00		3
57.0		570D4S40	●	338	236	268		55.0	1.80		
58.0		580D4S40	●	342	240	272		56.0	1.70		
59.0	40	590D4S40	●	346	244	276	70	57.0	1.60	WDXT 186012	
60.0		600D4S40	●	350	248	280		58.0	1.50		
61.0		610D4S40	●	354	252	284		59.0	1.40		
62.0		620D4S40	●	358	256	288		60.0	1.30		
63.0		630D4S40	●	362	260	292		61.0	1.20		

■ Inserts

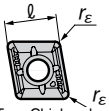
P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metal | S Exotic Alloy | H Hardened Steel

Fig 4



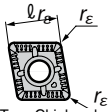
L Type Chipbreaker
(Low feed, chip management type)

Fig 5



G Type Chipbreaker
(General purpose type)

Fig 6



H Type Chipbreaker
(Strong edge type)

Grade		Coated Carbide		
Application	High Speed/Light			N
	General Purpose	P M		
	Roughing	P M	K	

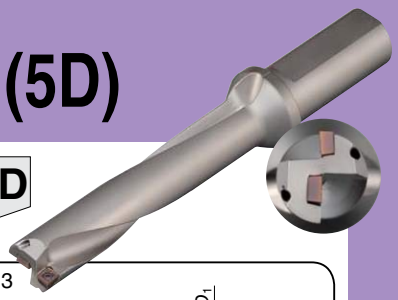
Cat. No.	ACP300	ACK300	DL1500	Fig	Dimensions (mm) ℓ	Thickness	rε	Applicable Holders
WDXT 042004-L	●	●		4	4.2	2.0	0.4	WDX130D4S20 to WDX150D4S20
042004-G	●	●	●	5				
042004-H	●	●		6				
WDXT 052504-L	●	●		4	5.0	2.5	0.4	WDX155D4S20 to WDX180D4S25
052504-G	●	●	●	5				
052504-H	●	●		6				
WDXT 063006-L	●	●		4	6.0	3.0	0.6	WDX185D4S25 to WDX225D4S25
063006-G	●	●	●	5				
063006-H	●	●		6				
WDXT 073506-L	●	●		4	7.5	3.5	0.6	WDX230D4S25 to WDX285D4S32
073506-G	●	●	●	5				
073506-H	●	●		6				
WDXT 094008-L	●	●		4	9.6	4.0	0.8	WDX290D4S32 to WDX360D4S40
094008-G	●	●	●	5				
094008-H	●	●		6				
WDXT 125012-L	●	●		4	12.4	5.0	1.2	WDX370D4S40 to WDX450D4S40
125012-G	●	●	●	5				
125012-H	●	●		6				
WDXT 156012-L	●	●		4	15.2	6.0	1.2	WDX460D4S40 to WDX550D4S40
156012-G	●	●	●	5				
156012-H	●	●		6				
WDXT 186012-L	●	●		4	18.0	6.0	1.2	WDX560D4S40 to WDX630D4S40
186012-G	●	●		5				
186012-H	●	●		6				

Insert Identification J59

■ Spare Parts

Screw	Spanner	Spanner	Recommended Tightening Torque (N·m)	Applicable Holders
BFTX01604N	TRX06		0.3	WDX130D4S20 to WDX150D4S20
BFTX0204N	TRX06		0.5	WDX155D4S20 to WDX180D4S25
BFTY02206		TRD07	1.0	WDX185D4S25 to WDX225D4S25
BFTX02506N		TRD08	1.5	WDX230D4S25 to WDX285D4S32
BFTX03584		TRD15	3.5	WDX290D4S32 to WDX360D4S40
BFTX0511N		TRD20	5.0	WDX370D4S40 to WDX450D4S40
BFTX0615N		TRD25	5.0	WDX460D4S40 to WDX630D4S40

WDX Type (5D)



Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
◎	◎		○		◎			◎	◎	◎		

Max.Depth: 5D

Guide for machining tolerance:0 to +0.25
Maximum depth ℓ 5 x øDc

PVD Coat | Aurora DLC Coat | W/ Oil Hole | Indexable | 5D

Recommended Cutting Conditions J63

Fig 1

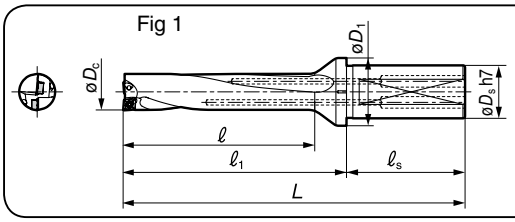


Fig 2

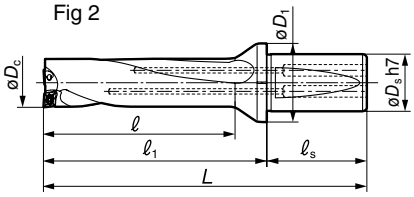
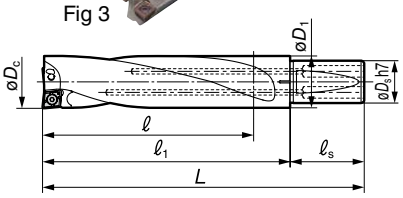


Fig 3



■ Holder Diameter ø13.0 to ø45.0mm

(Refer to J60) (mm)

Diameter øDc	Shank Diameter øDs	Cat. No.	Stock	L	ℓ	ℓ1	ℓs	øD1	Radial Offset (Max)	Applicable Insert	Fig
13.0		WDX 130D5S20	●	127.0	68.0	83.0			0.35		
13.5		135D5S20	●	129.5	70.5	85.5			0.30		
14.0	20.0	140D5S20	●	132.0	73.0	88.0	44	28.0	0.25	WDXT 042004	
14.5		145D5S20	●	134.5	75.5	90.5			0.20		
15.0		150D5S20	●	137.0	78.0	93.0			0.15		
15.5		WDX 155D5S20	●	139.5	80.5	95.5			0.40		
16.0	20.0	160D5S20	●	142.0	83.0	98.0	44	30.0	0.40		
16.5		165D5S20	●	144.5	85.5	100.5			0.35	WDXT 052504	
17.0		170D5S20	●	147.0	88.0	103.0			0.30		
17.5	25.0	175D5S25	●	161.5	90.5	105.5	56	32.0	0.25		
18.0		180D5S25	●	164.0	93.0	108.0			0.20		
18.5		WDX 185D5S25	●	166.5	95.5	110.5			0.50		1
19.0		190D5S25	●	169.0	98.0	113.0			0.45		
19.5		195D5S25	●	171.5	100.5	115.5			0.40		
20.0		200D5S25	●	174.0	103.0	118.0			0.30		
20.5	25.0	205D5S25	●	176.5	105.5	120.5	56	33.0	0.30	WDXT 063006	
21.0		210D5S25	●	179.0	108.0	123.0			0.20		
21.5		215D5S25	●	181.5	110.5	125.5			0.15		
22.0		220D5S25	●	184.0	113.0	128.0			0.10		
22.5		225D5S25	●	186.5	115.5	130.5			0.05		
23.0		WDX 230D5S25	●	192.0	118.0	136.0			0.70		
23.5		235D5S25	●	194.5	120.5	138.5			0.70		
24.0	25.0	240D5S25	●	197.0	123.0	141.0	56	37.0	0.60		
24.5		245D5S25	●	199.5	125.5	143.5			0.50	WDXT 073506	
25.0		250D5S25	●	202.0	128.0	146.0			0.50		
26.0		WDX 260D5S32	●	213.0	133.0	153.0			0.40		
27.0		270D5S32	●	218.0	138.0	158.0	60	41.0	0.25		
28.0		280D5S32	●	223.0	143.0	163.0			0.15		
29.0	32.0	WDX 290D5S32	●	230.0	149.0	170.0		50.0	1.00		
30.0		300D5S32	●	238.0	154.0	178.0	60		0.90		
31.0		310D5S32	●	243.0	159.0	183.0			0.80		
32.0		320D5S32	●	248.0	164.0	188.0			0.70		
30.0		300D5S40	●	248.0	154.0	178.0			0.90		
31.0		310D5S40	●	253.0	159.0	183.0			0.80	WDXT 094008	
32.0		320D5S40	●	258.0	164.0	188.0		54.0	0.70		
33.0	40.0	330D5S40	●	263.0	169.0	193.0	70		0.55		2
34.0		340D5S40	●	268.0	174.0	198.0			0.45		
35.0		350D5S40	●	273.0	179.0	203.0			0.35		
36.0		360D5S40	●	278.0	184.0	208.0			0.20		
37.0		WDX 370D5S40	●	290.0	190.0	220.0			1.00		
38.0		380D5S40	●	295.0	195.0	225.0			1.00		
39.0		390D5S40	●	300.0	200.0	230.0			0.90		
40.0		400D5S40	●	305.0	205.0	235.0			0.80		
41.0	40.0	410D5S40	●	310.0	210.0	240.0	70	49.5	0.70	WDXT 125012	
42.0		420D5S40	●	315.0	215.0	245.0			0.60		
43.0		430D5S40	●	320.0	220.0	250.0			0.50		
44.0		440D5S40	●	325.0	225.0	255.0			0.50		
45.0		450D5S40	●	330.0	230.0	260.0			0.40		

Diameters ø30, ø31, ø32 are available in stock with shank diameters ø32 and ø40.

■ Holder Diameter ø46.0 to ø55.0mm

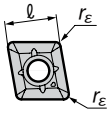
(Refer to J60) (mm)

Diameter øDc	Shank Diameter øDs	Cat. No.	Stock	L	ℓ	ℓ1	ℓs	øD1	Radial Offset (Max)	Applicable Insert	Fig
46.0		WDX 460D5S40	●	335.0	235.0	265.0			1.50		
47.0		470D5S40	●	340.0	240.0	270.0			1.40		
48.0		480D5S40	●	345.0	245.0	275.0		49.5	1.30		2
49.0		490D5S40	●	350.0	250.0	280.0			1.20		
50.0	40.0	500D5S40	●	355.0	255.0	285.0	70		1.10	WDXT 156012	
51.0		510D5S40	●	360.0	260.0	290.0			1.00		
52.0		520D5S40	●	365.0	265.0	295.0		50.5	0.90		
53.0		530D5S40	●	370.0	270.0	300.0		51.5	0.80		3
54.0		540D5S40	●	375.0	275.0	305.0		52.5	0.60		
55.0		550D5S40	●	380.0	280.0	310.0		53.5	0.50		

■ Inserts

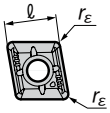
P Steel | M Stainless Steel | K Cast Iron | N Non-Ferrous Metal | S Exotic Alloy | H Hardened Steel

Fig 4



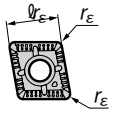
L Type Chipbreaker
(Low feed, chip management type)

Fig 5



G Type Chipbreaker
(General purpose type)

Fig 6



H Type Chipbreaker
(Strong edge type)

Grade		Coated Carbide		
Application	High Speed/Light			N
	General Purpose	PM		
	Roughing	PM	K	

Cat. No.	ACP300	ACK300	DL1500	Fig	Dimensions (mm) ℓ	Thickness	rε	Applicable Holders
WDXT 042004-L	●	●		4				
042004-G	●	●	●	5	4.2	2.0	0.4	WDX130D5S20 to WDX150D5S20
042004-H	●	●		6				
WDXT 052504-L	●	●		4				
052504-G	●	●	●	5	5.0	2.5	0.4	WDX155D5S20 to WDX180D5S25
052504-H	●	●		6				
WDXT 063006-L	●	●		4				
063006-G	●	●	●	5	6.0	3.0	0.6	WDX185D5S25 to WDX225D5S25
063006-H	●	●		6				
WDXT 073506-L	●	●		4				
073506-G	●	●	●	5	7.5	3.5	0.6	WDX230D5S25 to WDX285D5S32
073506-H	●	●		6				
WDXT 094008-L	●	●		4				
094008-G	●	●	●	5	9.6	4.0	0.8	WDX290D5S32 to WDX360D5S40
094008-H	●	●		6				
WDXT 125012-L	●	●		4				
125012-G	●	●	●	5	12.4	5.0	1.2	WDX370D5S40 to WDX450D5S40
125012-H	●	●		6				
WDXT 156012-L	●	●		4				
156012-G	●	●	●	5	15.2	6.0	1.2	WDX460D5S40 to WDX550D5S40
156012-H	●	●		6				

■ Spare Parts

Screw	Spanner	Spanner	Recommended Tightening Torque (N·m)	Applicable Holders
BFTX01604N	TRX06		0.3	WDX130D5S20 to WDX150D5S20
BFTX0204N	TRX06		0.5	WDX155D5S20 to WDX180D5S25
BFTY02206		TRD07	1.0	WDX185D5S25 to WDX225D5S25
BFTX02506N		TRD08	1.5	WDX230D5S25 to WDX285D5S32
BFTX03584		TRD15	3.5	WDX290D5S32 to WDX360D5S40
BFTX0511N		TRD20	5.0	WDX370D5S40 to WDX450D5S40
BFTX0615N		TRD25	5.0	WDX460D5S40 to WDX550D5S40

WDX Drill Identification

WDX 200 D5 S25

- 200: Drill Diameter (ø20.0)
- D5: Flute Length L/D (5D)
- S25: Shank Size (ø25.0)

WDX Drill Insert Identification

WDXT 06 30 06 -G

- 06: Width Across Flats (6.0)
- 30: Thickness x 10 (3.0)
- 06: Corner Radius x 10 (0.6)
- -G: Breaker Type

WDX Type

■ Lathe Machining Guidelines

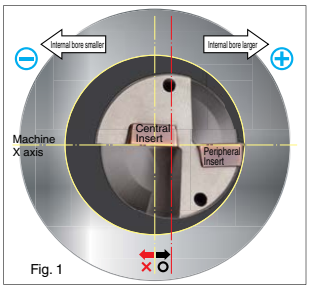


Fig. 1


Fig. 2

■ Drill installation

- Set the drill so that the outer insert is parallel to the machine X axis. (See Fig. 1)
- Press the end of the flanged of the drill tightly against the face of the holder when tightening the bolt.

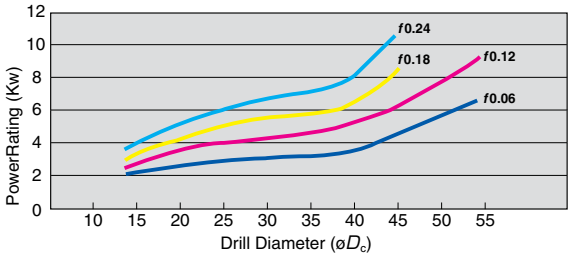
■ Adjusting work diameter (offset)

- The work diameter is adjustable by moving the machine X axis.
- Make the adjustment by moving the X axis positive (enlarge the bore diameter). Moving the X axis in the negative direction (to reduce the bore diameter) is not recommended as the holder may interfere with the hole. (See Fig. 1)
- The maximum allowable adjustment (offset) differs depending on the drill diameter.
  Refer to the Radial Offset (Max) in the Holders charts on pages J58 to J61.

■ Other notes

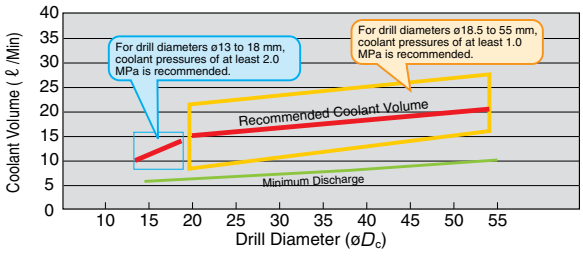
- When the drill is mounted on a lathe, the centre of the central insert is designed to be 0.15 to 0.2 mm below the centre of the spindle.
- If the spindle deviates off centre so far that the centre of the central insert lies above the spindle centre, the central insert will break.
- Set the depth of cut for turning or internal boring work to 1/5 or less of the drill diameter (Max 5 mm or less). (Ex: Set depth of cut to 4 mm or less for a drill diameter of ø20 mm)
- Install a cover to prevent injury from possible chip fly-out (see disc-shaped chip in Figure 2) when through boring on a lathe.

■ Typical Power Ratings



<CAUTIONS>
- Power ratings are subject to change based on conditions such as work material and cutting speed and should only be used for reference.
- Cutting Conditions (Reference)
  Work Material: S50C (230HB)
  Cutting Speed: v_c=150m/min

■ Typical Coolant Volume



<CAUTIONS>
- Coolant volume is a factor that affects drilling performance, particularly with respect to chip evacuation and lubricity.
- Coolant pressure should be set higher for smaller diameter drills. (ø18.0 mm or smaller)
- Coolant volume is usually adjusted by changing the coolant pressure provided on most CNC machines.
- This table provides guideline values only. More coolant may be required depending on the machine, coolant, and work material.

■ Notes on Attaching and Removing Inserts

- Before attaching the insert, remove all traces of foreign matter on the insert seat using air or other means.
- When using the wrench, align it to the axis of the screw and press while turning. (Figure 3) If the wrench is not aligned with the screw, the insert screw will be loose and the tip of the wrench and/or the Torx hole of the screw may become deformed.
- Do not allow clearance between the insert seat and drill when attaching the insert. (Figure 4, A) Figure 4 shows a properly attached insert.

* It is normal for the outer sides of the central insert to have clearance because it is clamped at its centre, butted to the rear.

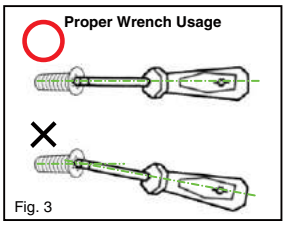


Fig. 3

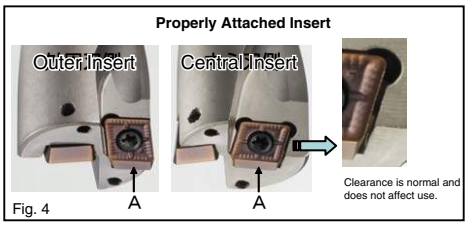


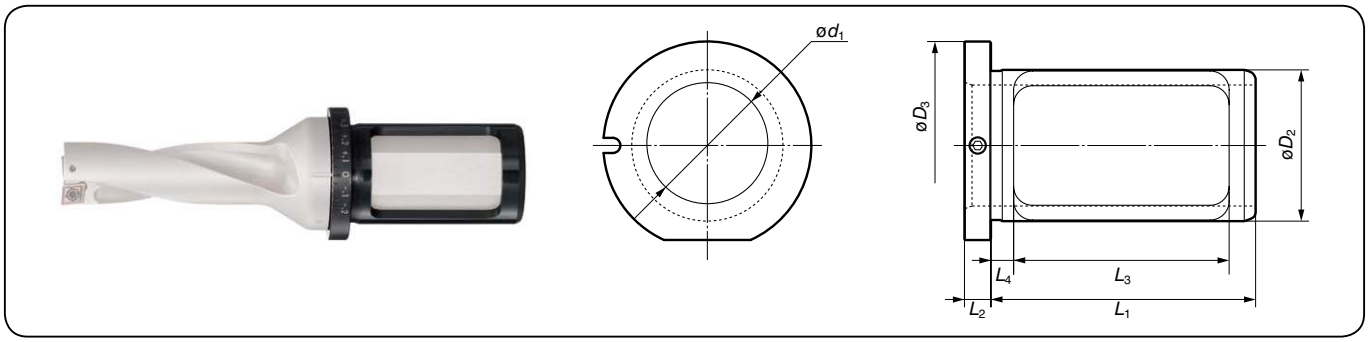
Fig. 4

■ Troubleshooting

Problem	Symptom	Cause	Countermeasures
Too much variation in hole diameter	Drilled hole is larger than desired	- Deflection of the holder due to high thrust force	- Decrease the feed rate to decrease the thrust force. - Make an adjustment on the X axis.
	Drilled hole is smaller than desired	- The cutting edge does not enter into the workpiece but backs off	- Increase the feed rate. - Make an adjustment on the X axis.
	Pronounced difference in hole size at entrance and bottom	- Packing of Chips	- Increase the feed rate to improve chip evacuation. - Use a chipbreaker L type insert.
Poor or rough drilled hole surface	Poor drilled surface from entrance to bottom of hole	- High cutting resistance - Low rigidity of workpiece	- Decrease the feed rate. - Review tooling to improve rigidity.
	Poor drilled surface at bottom of hole	- Machined surfaces damaged by chips	- Increase the feed rate to improve chip evacuation. - Use a chipbreaker L type insert.
Insert breakage	Breakage on central insert (centre)	- Improper adjustment of centre height - Insert too weak	- Adjust the height of the insert. - If the drill is being used on a lathe, try flipping the drill 180°. - Use a strong edge chipbreaker H type.
	Breakage on outer insert	- High cutting load in cutting edge	- Decrease the feed rate to decrease cutting load. - Use a strong edge chipbreaker H type.

Eccentric Sleeve WAS Type

The Eccentric Sleeve WAS Type, exclusively designed for SumiDrill WDX Type, provides ±0.3 mm of hole size adjustment.



■ Body (WAS Type) (mm)

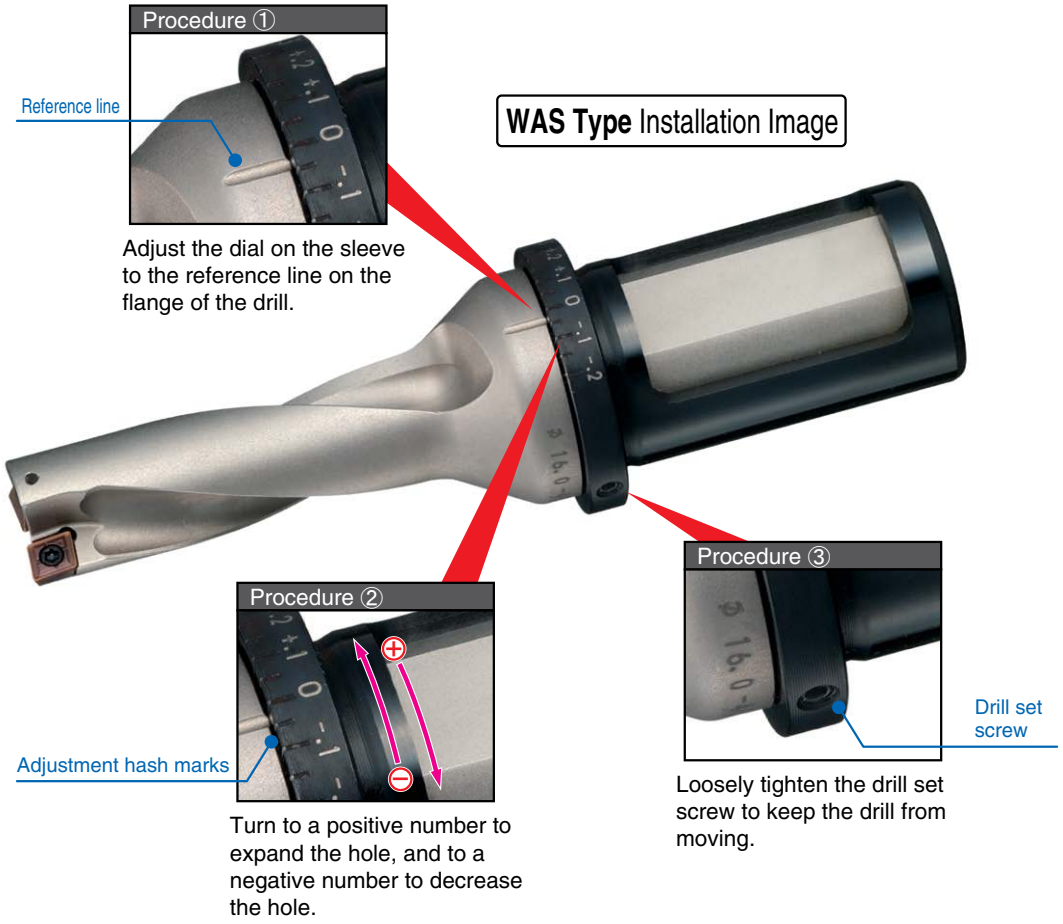
Cat. No.	Stock	ød1	øD2	øD3	L1	L2	L3	L4	Diameter Adjustment Range
WAS 2025-48	●	20	25	33	43	5	32	5	+0.3 to −0.2
2532-60	●	25	32	42	60	7	46	6	+0.3 to −0.3
3240-70	●	32	40	55	70	7	57	6	+0.3 to −0.3
4050-85	●	40	50	60	80	7	64	6	+0.3 to −0.3

*Diameter Adjustment Range indicates the range of adjustment of the diameter.

■ Important Notes

1. The dial is for reference purposes. Always measure the actual drilling diameter and adjust accordingly.
2. Not usable with collet chuck type holders. Use a side-locking holder.
3. Use this product for machining of highly rigid material.
   This product is not recommended for deep hole drilling such as 5D and machining of material with low rigidity.

■ Uses (Diameter Adjustment Range)



■ Recommended Cutting Conditions for 2D

		Work Material	Work Hardness HB	Recommended Breaker	Recommended Insert Grade	v_c Cutting Speed (m/min)	*f* Feed Rate (mm/rev) <Min.-**Optimum**-Max.> ø13.0 to ø18.0	ø18.5 to ø29.0	ø29.5 to ø36.0	ø37.0 to ø55.0	ø56.0 to ø68.0
2D	P	Steel, Carbon Steel SS400	125	G	ACP300	120-**180**-240	0.05-**0.08**-0.10	0.05-**0.08**-0.10	0.05-**0.08**-0.11	0.05-**0.08**-0.12	0.06-**0.09**-0.13
		S15C	125	L	ACP300	130-**170**-220	0.04-**0.08**-0.12	0.04-**0.08**-0.12	0.04-**0.08**-0.13	0.05-**0.10**-0.15	0.06-**0.11**-0.17
		S45C	190	G	ACP300	100-**150**-200	0.08-**0.13**-0.24	0.08-**0.13**-0.24	0.08-**0.14**-0.26	0.09-**0.16**-0.29	0.10-**0.17**-0.32
		S45C Hardened	250	G	ACP300	80-**120**-160	0.06-**0.11**-0.18	0.06-**0.11**-0.18	0.06-**0.12**-0.19	0.07-**0.13**-0.22	0.08-**0.14**-0.24
		S75C	270	G	ACP300	100-**130**-160	0.08-**0.13**-0.22	0.08-**0.13**-0.22	0.08-**0.14**-0.23	0.09-**0.16**-0.26	0.10-**0.17**-0.29
		S75C Hardened	300	G	ACP300	70-**100**-140	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20	0.08-**0.14**-0.22
		Low Alloy Steel SCM, SNCM	180	L	ACP300	100-**140**-180	0.05-**0.08**-0.14	0.05-**0.08**-0.14	0.05-**0.08**-0.16	0.06-**0.09**-0.17	0.07-**0.10**-0.19
		SCM, SNCM Hardened	275	G	ACP300	80-**120**-160	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20	0.08-**0.14**-0.22
		SCM, SNCM Hardened	300	G	ACP300	75-**110**-140	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20	0.08-**0.14**-0.22
		SCM, SNCM Hardened	350	G	ACP300	60-**85**-110	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20	0.08-**0.14**-0.22
		High Alloy Steel SKD, SKT, SKH	200	G	ACP300	100-**130**-160	0.08-**0.13**-0.24	0.08-**0.13**-0.24	0.08-**0.14**-0.26	0.09-**0.16**-0.29	0.10-**0.17**-0.32
		SKD, SKT, SKH Hardened	325	G	ACP300	80-**100**-120	0.06-**0.11**-0.18	0.06-**0.11**-0.18	0.06-**0.12**-0.19	0.07-**0.13**-0.22	0.08-**0.14**-0.24
	M	Stainless Steel SUS403, Others (Martensite/Ferrite)	200	G	ACP300	100-**140**-180	0.06-**0.11**-0.18	0.06-**0.11**-0.18	0.06-**0.12**-0.19	0.07-**0.13**-0.22	0.08-**0.14**-0.24
		SUS403, Others Martensitic (Hardened)	240	G	ACP300	90-**120**-150	0.06-**0.11**-0.18	0.06-**0.11**-0.18	0.06-**0.12**-0.19	0.07-**0.13**-0.22	0.08-**0.14**-0.24
		SUS304, SUS316 Austenitic	180	G	ACP300	100-**140**-180	0.06-**0.11**-0.18	0.06-**0.11**-0.18	0.06-**0.12**-0.19	0.07-**0.13**-0.22	0.08-**0.14**-0.24
	K	Cast Iron		H	ACK300	120-**160**-200	0.09-**0.20**-0.32	0.10-**0.22**-0.36	0.11-**0.24**-0.39	0.12-**0.26**-0.44	0.13-**0.29**-0.48
		Ductile Cast Iron		H	ACK300	90-**120**-150	0.09-**0.20**-0.32	0.10-**0.22**-0.36	0.11-**0.24**-0.39	0.12-**0.26**-0.44	0.13-**0.29**-0.48
	S	Exotic Alloy (Heat Resistant Alloy, Super Alloy, Ti Alloy, etc.)	200	G	ACP300	25-**50**-70	0.06-**0.11**-0.18	0.06-**0.11**-0.18	0.06-**0.12**-0.19	0.07-**0.13**-0.22	0.08-**0.14**-0.24
	N	Aluminium Alloy		G	DL1500	200-**260**-320	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20	0.08-**0.14**-0.22
		Copper Alloy		G	DL1500	180-**230**-280	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20	0.08-**0.14**-0.22

■ Recommended Cutting Conditions for 3D

		Work Material	Work Hardness HB	Recommended Breaker	Recommended Insert Grade	v_c Cutting Speed (m/min)	*f* Feed Rate (mm/rev) <Min.-**Optimum**-Max.> ø13.0 to ø18.0	ø18.5 to ø29.0	ø29.5 to ø36.0	ø37.0 to ø55.0	ø56.0 to ø68.0
3D	P	Steel, Carbon Steel SS400	125	G	ACP300	120-**180**-240	0.05-**0.07**-0.10	0.05-**0.07**-0.10	0.05-**0.08**-0.11	0.05-**0.08**-0.12	0.06-**0.09**-0.13
		S15C	125	L	ACP300	130-**170**-220	0.04-**0.07**-0.10	0.04-**0.07**-0.10	0.04-**0.08**-0.11	0.05-**0.09**-0.12	0.06-**0.10**-0.13
		S45C	190	G	ACP300	100-**150**-200	0.08-**0.12**-0.20	0.08-**0.12**-0.20	0.08-**0.13**-0.22	0.09-**0.14**-0.24	0.10-**0.16**-0.27
		S45C Hardened	250	G	ACP300	80-**120**-160	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18	0.08-**0.13**-0.20
		S75C	270	G	ACP300	100-**130**-160	0.08-**0.12**-0.18	0.08-**0.12**-0.18	0.08-**0.13**-0.19	0.09-**0.14**-0.22	0.10-**0.16**-0.24
		S75C Hardened	300	G	ACP300	70-**100**-140	0.06-**0.10**-0.14	0.06-**0.10**-0.14	0.06-**0.11**-0.15	0.07-**0.12**-0.17	0.08-**0.13**-0.19
		Low Alloy Steel SCM, SNCM	180	L	ACP300	100-**140**-180	0.05-**0.07**-0.12	0.05-**0.07**-0.12	0.05-**0.08**-0.13	0.06-**0.08**-0.15	0.07-**0.09**-0.16
		SCM, SNCM Hardened	275	G	ACP300	80-**120**-160	0.06-**0.10**-0.14	0.06-**0.10**-0.14	0.06-**0.11**-0.15	0.07-**0.12**-0.17	0.08-**0.13**-0.19
		SCM, SNCM Hardened	300	G	ACP300	75-**110**-140	0.06-**0.10**-0.14	0.06-**0.10**-0.14	0.06-**0.11**-0.15	0.07-**0.12**-0.17	0.08-**0.13**-0.19
		SCM, SNCM Hardened	350	G	ACP300	60-**85**-110	0.06-**0.10**-0.14	0.06-**0.10**-0.14	0.06-**0.11**-0.15	0.07-**0.12**-0.17	0.08-**0.13**-0.19
		High Alloy Steel SKD, SKT, SKH	200	G	ACP300	100-**130**-160	0.08-**0.12**-0.20	0.08-**0.12**-0.20	0.08-**0.13**-0.22	0.09-**0.14**-0.24	0.10-**0.16**-0.27
		SKD, SKT, SKH Hardened	325	G	ACP300	80-**100**-120	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18	0.08-**0.13**-0.20
	M	Stainless Steel SUS403, Others (Martensite/Ferrite)	200	G	ACP300	100-**140**-180	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18	0.08-**0.13**-0.20
		SUS403, Others Martensitic (Hardened)	240	G	ACP300	90-**120**-150	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18	0.08-**0.13**-0.20
		SUS304, SUS316 Austenitic	180	G	ACP300	100-**140**-180	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18	0.08-**0.13**-0.20
	K	Cast Iron		H	ACK300	120-**160**-200	0.09-**0.18**-0.27	0.10-**0.20**-0.30	0.11-**0.22**-0.32	0.12-**0.24**-0.36	0.13-**0.26**-0.40
		Ductile Cast Iron		H	ACK300	90-**120**-150	0.09-**0.18**-0.27	0.10-**0.20**-0.30	0.11-**0.22**-0.32	0.12-**0.24**-0.36	0.13-**0.26**-0.40
	S	Exotic Alloy (Heat Resistant Alloy, Super Alloy, Ti Alloy, etc.)	200	G	ACP300	25-**50**-70	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18	0.08-**0.13**-0.20
	N	Aluminium Alloy		G	DL1500	200-**260**-320	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20	0.08-**0.14**-0.22
		Copper Alloy		G	DL1500	180-**230**-280	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20	0.08-**0.14**-0.22

■ Recommended Cutting Conditions for 4D

		Work Material	Work Hardness HB	Recommended Breaker	Recommended Insert Grade	v_c Cutting Speed (m/min)	*f* Feed Rate (mm/rev) <Min.-**Optimum**-Max.> ø13.0 to ø18.0	ø18.5 to ø29.0	ø29.5 to ø36.0	ø37.0 to ø55.0	ø56.0 to ø68.0
4D	P	Steel, Carbon Steel SS400	125	G	ACP300	120-**180**-240	0.05-**0.07**-0.10	0.05-**0.07**-0.10	0.05-**0.07**-0.10	0.05-**0.08**-0.10	0.06-**0.09**-0.11
		S15C	125	L	ACP300	130-**170**-220	0.04-**0.07**-0.09	0.04-**0.07**-0.09	0.04-**0.07**-0.09	0.05-**0.08**-0.10	0.06-**0.09**-0.11
		S45C	190	G	ACP300	100-**150**-200	0.08-**0.11**-0.17	0.08-**0.11**-0.17	0.08-**0.12**-0.18	0.09-**0.14**-0.21	0.10-**0.15**-0.23
		S45C Hardened	250	G	ACP300	80-**120**-160	0.06-**0.10**-0.13	0.06-**0.10**-0.13	0.06-**0.10**-0.14	0.07-**0.11**-0.15	0.08-**0.12**-0.17
		S75C	270	G	ACP300	100-**130**-160	0.08-**0.11**-0.15	0.08-**0.11**-0.15	0.08-**0.12**-0.17	0.09-**0.14**-0.19	0.10-**0.15**-0.20
		S75C Hardened	300	G	ACP300	70-**100**-140	0.06-**0.10**-0.12	0.06-**0.10**-0.12	0.06-**0.10**-0.13	0.07-**0.11**-0.14	0.08-**0.12**-0.16
		Low Alloy Steel SCM, SNCM	180	L	ACP300	100-**140**-180	0.05-**0.07**-0.10	0.05-**0.07**-0.10	0.05-**0.07**-0.11	0.06-**0.08**-0.12	0.07-**0.09**-0.14
		SCM, SNCM Hardened	275	G	ACP300	80-**120**-160	0.06-**0.10**-0.12	0.06-**0.10**-0.12	0.06-**0.10**-0.13	0.07-**0.11**-0.14	0.08-**0.12**-0.16
		SCM, SNCM Hardened	300	G	ACP300	75-**110**-140	0.06-**0.10**-0.12	0.06-**0.10**-0.12	0.06-**0.10**-0.13	0.07-**0.11**-0.14	0.08-**0.12**-0.16
		SCM, SNCM Hardened	350	G	ACP300	60-**85**-110	0.06-**0.10**-0.12	0.06-**0.10**-0.12	0.06-**0.10**-0.13	0.07-**0.11**-0.14	0.08-**0.12**-0.16
		High Alloy Steel SKD, SKT, SKH	200	G	ACP300	100-**130**-160	0.08-**0.11**-0.17	0.08-**0.11**-0.17	0.08-**0.12**-0.18	0.09-**0.14**-0.21	0.10-**0.15**-0.23
		SKD, SKT, SKH Hardened	325	G	ACP300	80-**100**-120	0.06-**0.10**-0.13	0.06-**0.10**-0.13	0.06-**0.10**-0.14	0.07-**0.11**-0.15	0.08-**0.12**-0.17
	M	Stainless Steel SUS403, Others (Martensite/Ferrite)	200	G	ACP300	100-**140**-180	0.06-**0.10**-0.13	0.06-**0.10**-0.13	0.06-**0.10**-0.14	0.07-**0.11**-0.15	0.08-**0.12**-0.17
		SUS403, Others Martensitic (Hardened)	240	G	ACP300	90-**120**-150	0.06-**0.10**-0.13	0.06-**0.10**-0.13	0.06-**0.10**-0.14	0.07-**0.11**-0.15	0.08-**0.12**-0.17
		SUS304, SUS316 Austenitic	180	G	ACP300	100-**140**-180	0.06-**0.10**-0.13	0.06-**0.10**-0.13	0.06-**0.10**-0.14	0.07-**0.11**-0.15	0.08-**0.12**-0.17
	K	Cast Iron		H	ACK300	120-**160**-200	0.09-**0.17**-0.23	0.10-**0.19**-0.26	0.11-**0.21**-0.28	0.12-**0.23**-0.31	0.13-**0.25**-0.34
		Ductile Cast Iron		H	ACK300	90-**120**-150	0.09-**0.17**-0.23	0.10-**0.19**-0.26	0.11-**0.21**-0.28	0.12-**0.23**-0.31	0.13-**0.25**-0.34
	S	Exotic Alloy (Heat Resistant Alloy, Super Alloy, Ti Alloy, etc.)	200	G	ACP300	25-**50**-70	0.06-**0.10**-0.13	0.06-**0.10**-0.13	0.06-**0.10**-0.14	0.07-**0.11**-0.15	0.08-**0.12**-0.17
	N	Aluminium Alloy		G	DL1500	200-**260**-320	0.05-**0.10**-0.15	0.05-**0.10**-0.15	0.06-**0.11**-0.16	0.06-**0.12**-0.18	0.07-**0.13**-0.20
		Copper Alloy		G	DL1500	180-**230**-280	0.05-**0.10**-0.15	0.05-**0.10**-0.15	0.06-**0.11**-0.16	0.06-**0.12**-0.18	0.07-**0.13**-0.20

■ Recommended Cutting Conditions for 5D

		Work Material	Work Hardness HB	Recommended Breaker	Recommended Insert Grade	v_c Cutting Speed (m/min)	*f* Feed Rate (mm/rev) <Min.-**Optimum**-Max.> ø13.0 to ø18.0	ø18.5 to ø29.0	ø29.5 to ø36.0	ø37.0 to ø55.0	ø56.0 to ø68.0
5D	P	Steel, Carbon Steel SS400	125	G	ACP300	120-**180**-240	0.05-**0.06**-0.09	0.05-**0.06**-0.09	0.05-**0.06**-0.09	0.05-**0.07**-0.09	
		S15C	125	L	ACP300	130-**170**-220	0.04-**0.06**-0.08	0.04-**0.06**-0.08	0.04-**0.06**-0.08	0.05-**0.07**-0.09	
		S45C	190	G	ACP300	100-**150**-200	0.07-**0.10**-0.15	0.07-**0.10**-0.15	0.08-**0.11**-0.17	0.09-**0.12**-0.19	
		S45C Hardened	250	G	ACP300	80-**120**-160	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.14	
		S75C	270	G	ACP300	100-**130**-160	0.07-**0.10**-0.14	0.07-**0.10**-0.14	0.08-**0.11**-0.15	0.09-**0.12**-0.17	
		S75C Hardened	300	G	ACP300	70-**100**-140	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.13	
		Low Alloy Steel SCM, SNCM	180	L	ACP300	100-**140**-180	0.05-**0.06**-0.09	0.05-**0.06**-0.09	0.05-**0.06**-0.10	0.05-**0.07**-0.11	
		SCM, SNCM Hardened	275	G	ACP300	80-**120**-160	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.13	
		SCM, SNCM Hardened	300	G	ACP300	75-**110**-140	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.13	
		SCM, SNCM Hardened	350	G	ACP300	60-**85**-110	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.13	
		High Alloy Steel SKD, SKT, SKH	200	G	ACP300	100-**130**-160	0.07-**0.10**-0.15	0.07-**0.10**-0.15	0.08-**0.11**-0.17	0.09-**0.12**-0.19	
		SKD, SKT, SKH Hardened	325	G	ACP300	80-**100**-120	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.14	
	M	Stainless Steel SUS403, Others (Martensite/Ferrite)	200	G	ACP300	100-**140**-180	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.14	
		SUS403, Others Martensitic (Hardened)	240	G	ACP300	90-**120**-150	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.14	
		SUS304, SUS316 Austenitic	180	G	ACP300	100-**140**-180	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.14	
	K	Cast Iron		H	ACK300	120-**160**-200	0.08-**0.15**-0.21	0.09-**0.17**-0.23	0.09-**0.18**-0.25	0.11-**0.20**-0.28	
		Ductile Cast Iron		H	ACK300	90-**120**-150	0.08-**0.15**-0.21	0.09-**0.17**-0.23	0.09-**0.18**-0.25	0.11-**0.20**-0.28	
	S	Exotic Alloy (Heat Resistant Alloy, Super Alloy, Ti Alloy, etc.)	200	G	ACP300	25-**50**-70	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.14	
	N	Aluminium Alloy		G	DL1500	200-**260**-320	0.05-**0.10**-0.15	0.05-**0.10**-0.15	0.06-**0.11**-0.16	0.06-**0.12**-0.18	
		Copper Alloy		G	DL1500	180-**230**-280	0.05-**0.10**-0.15	0.05-**0.10**-0.15	0.06-**0.11**-0.16	0.06-**0.12**-0.18	

PDL Type/PCT Type

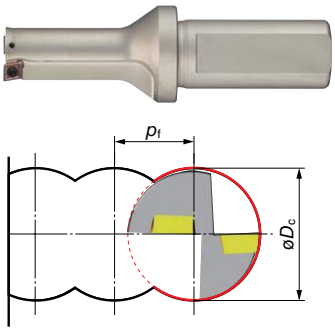
■ General Features

The tool cuts in the Z axis direction where tool rigidity is highest, allowing high efficiency roughing for aeronautic components and dies with long tool overhang must be used to machine deep holes and pockets.

■ Characteristics

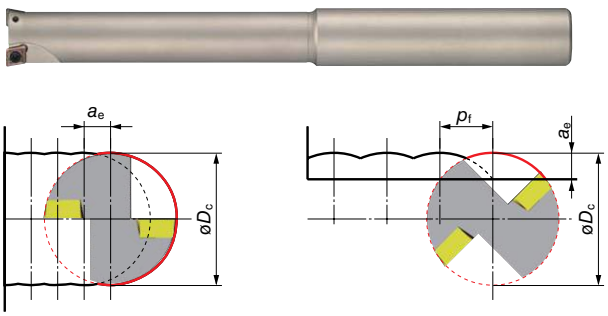
- The flat cutting edge design produces near-flat bottom profiles to reduce depth of cut variation during finishing.
- All sizes come with an air hole for supplying coolant internally to improve chip evacuation.
- Durable body with special surface treatment offers improved tool life and reliability.
- The tools use SumiDrill WDX type inserts for handling a wide range of work materials, from steel to non-ferrous metals and exotic alloys.

●The PDL type has a central insert making it possible to make radial cuts beyond the tool's radius, pitch feed cutting, and drilling. (Pocket milling, etc.)

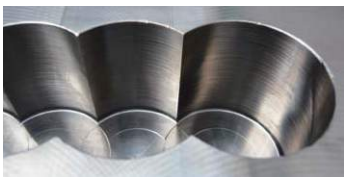


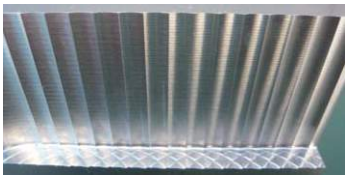
Keep the value of p_f for PDL type tools to less than 70% of the tool diameter (øDc).

●Although the PCT type has limited radial cutting ability, the tool has many effective teeth enabling it to perform high feed cutting. (Medium finishing of corners, hole expansion, deep grooving, etc.)



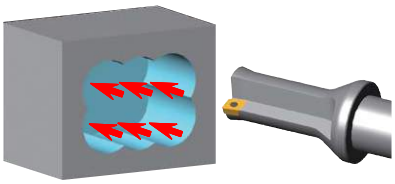
Keep the value of p_f for PCT type tools to less than 50% of the tool diameter (øDc). For a_e, refer to the dimension under "a_e max" in the stock/ dimensions tables titled "Holders Max. Depth: 3D/5D".





■ Application Examples

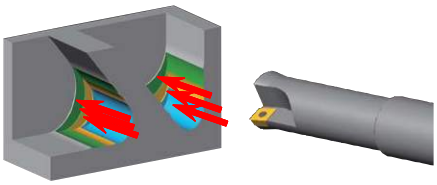
Pocketing PDL Work Material: Ti Alloy



Tool: PDL400D2S40 (ø40)
Insert: WDXT125012-G
Grade: ACK300

Cutting Speed: v_c=40m/min
Feed Rate: f=0.07mm/rev
(v_f=22.3mm/min)
Depth of Cut: a_e(p_f)=25mm

Corner Finishing PCT Work Material: Ti Alloy

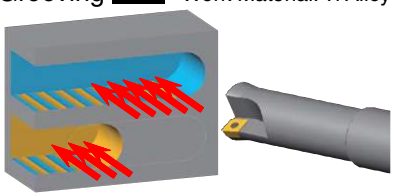


Tool:
PCT320D3S32 (ø32)
PCT250D3S25 (ø25)
PCT200D3S20 (ø20)
Grade: ACK300

Insert:
WDXT094008-G
WDXT073506-G
WDXT063006-G

Cutting Speed: v_c=50m/min
Feed Rate: f_z=0.08mm/t
(v_f=80 to 127mm/min)
Depth of Cut: a_e=3.2 to 6.5mm

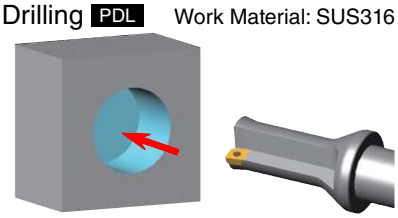
Grooving PCT Work Material: Ti Alloy



Tool: PCT320D5S32 (ø32)
Insert: WDXT094008-G
Grade: ACK300

Cutting Speed: v_c=40m/min
Feed Rate: f_z=0.07mm/t
(v_f =56mm/min)
Depth of Cut: a_e(p_f)=5.0mm

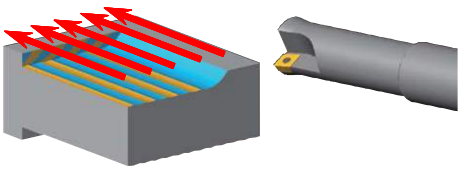
Drilling PDL Work Material: SUS316



Tool: PDL200D3S25 (ø20)
Insert: WDXT063006-G
Grade: ACP300

Cutting Speed: v_c=180m/min
Feed Rate: f =0.10mm/rev
(v_f =286mm/min)
Depth of Cut: a_e=20mm

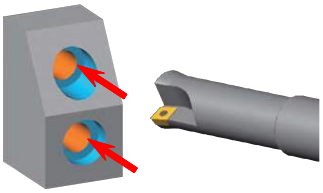
Aeronautic Components PCT Work Material: SUS304



Tool: PCT320D3S32
(ø32)
Insert: WDXT094008-G
Grade: ACP300

Cutting Speed: v_c=180m/min
Feed Rate: f_z=0.15mm/t
(v_f=537mm/min)
Depth of Cut: a_e=7.0mm
p_f=5.0mm

Machine Components PCT Work Material: SCM435



Tool: PCT200D5S20 (ø20)
Insert: WDXT063006-G
Grade: ACK300

Cutting Speed: v_c=150m/min
Feed Rate: f_z=0.15mm/t
(v_f =716mm/min)
Depth of Cut: a_e=3.5mm

SEC-Plunge Drill

PDL Type(2D,3D)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
◎	◎		○		○	◎		◎	◎	◎	○	

PVD Coat | Aurora DLC Coat | W/ Oil Hole | Indexable | 2D | 3D

Fig 1

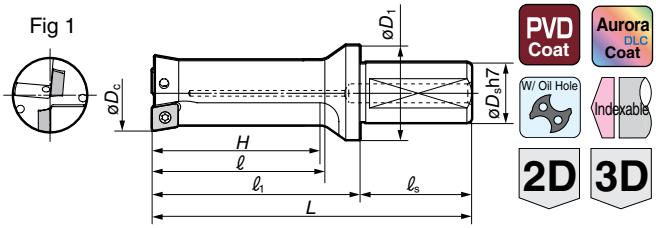
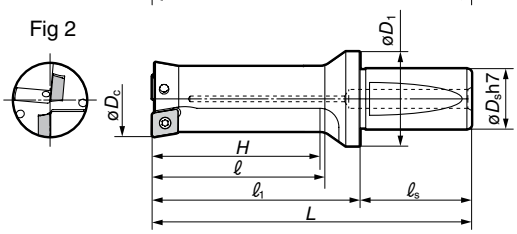


Fig 2



■ Holders Max. Depth : 2D

Cat. No.	Stock	Dimensions (mm)								Applicable Insert	Fig
		øDc	L	ℓ1	ℓ	øD1	øDs	ℓs	H		
PDL 160D2S20	●	16.0	94	50	35	28	20	44	32	WDXT052504	
200D2S25	●	20.0	114	58	43	33	25	56	40	WDXT063006	1
250D2S25	●	25.0	127	71	53	37	25	56	50	WDXT073506	
PDL 320D2S40	●	32.0	162	92	68	54	40	70	64	WDXT094008	2
400D2S40	●	40.0	185	115	85	54	40	70	80	WDXT125012	

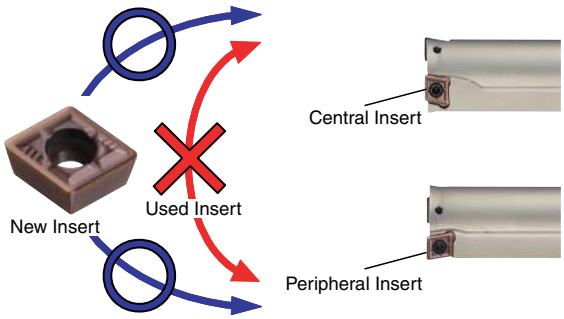
■ Holders Max. Depth : 3D

Cat. No.	Stock	Dimensions (mm)								Applicable Insert	Fig
		øDc	L	ℓ1	ℓ	øD1	øDs	ℓs	H		
PDL 160D3S20	●	16.0	110	66	51	28	20	44	48	WDXT052504	
200D3S25	●	20.0	134	78	63	33	25	56	60	WDXT063006	1
250D3S25	●	25.0	152	96	78	37	25	56	75	WDXT073506	
PDL 320D3S40	●	32.0	194	124	100	54	40	70	96	WDXT094008	2
400D3S40	●	40.0	225	155	125	54	40	70	120	WDXT125012	

■ Spare Parts (Common)

Screw	Spanner	Spanner	Recommended Tightening Torque (N·m)	Applicable Holders
BFTX0204N	TRX06	—	0.5	PDL160D2S20 PDL160D3S20 PCT160D3S16 PCT160D5S16
BFTY02206	—	TRD07	1.0	PDL200D2S25 PDL200D3S25 PCT200D3S20 PCT200D5S20
BFTX02506N	—	TRD08	1.5	PDL250D2S25 PDL250D3S25 PCT250D3S25 PCT250D5S25
BFTX03584	—	TRD15	3.5	PDL320D2S40 PDL320D3S40 PCT320D3S32 PCT320D5S32
BFTX0511N	—	TRD20	5.0	PDL400D2S40 PDL400D3S40 PCT400D3S42 PCT400D5S42

● Notes About Mounting Inserts (PDL type)



PDL type: Inserts can be used on either the centre or the outside.
Inserts used on the outside cannot be used in the centre. Similarly, inserts used in the centre cannot be used on the outside.

PCT type: 2 corners can be used only for the outer inserts.

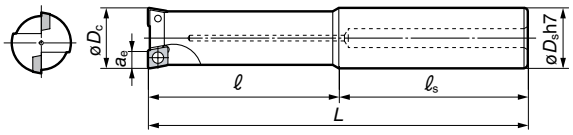
SEC-Plunge Mill

PCT Type(3D,5D)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
◎	◎		○		○	◎		◎	◎	◎	○	

PVD Coat | Aurora DLC Coat | W/ Oil Hole | Indexable | 3D | 5D

Fig 3



■ Holders Max. Depth : 3D

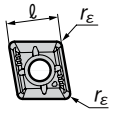
Cat. No.	Stock	Dimensions (mm)							Applicable Insert	Fig
		øDc	ae max	L	ℓ	ℓs	øDs	No.of flutes		
PCT 160D3S16	●	16.0	4.0	123	53	70	16	2	WDXT052504	
200D3S20	●	20.0	5.0	145	65	80	20	2	WDXT063006	
250D3S25	●	25.0	6.5	160	80	80	25	2	WDXT073506	3
320D3S32	●	32.0	8.5	191	101	90	32	2	WDXT094008	
400D3S42	●	40.0	11.0	225	125	100	42	3	WDXT125012	

■ Holders Max. Depth : 5D

Cat. No.	Stock	Dimensions (mm)							Applicable Insert	Fig
		øDc	ae max	L	ℓ	ℓs	øDs	No.of flutes		
PCT 160D5S16	●	16.0	4.0	155	85	70	16	2	WDXT052504	
200D5S20	●	20.0	5.0	185	105	80	20	2	WDXT063006	
250D5S25	●	25.0	6.5	210	130	80	25	2	WDXT073506	3
320D5S32	●	32.0	8.5	255	165	90	32	2	WDXT094008	
400D5S42	●	40.0	11.0	305	205	100	42	3	WDXT125012	

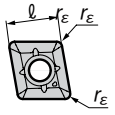
■ Common to Both Inserts P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metal S Exotic Alloy H Hardened Steel

Fig 4



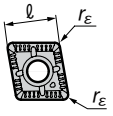
L Type Chipbreaker
(Low feed, chip management type)

Fig 5



G Type Chipbreaker
(General purpose type)

Fig 6



H Type Chipbreaker
(Strong edge type)

Application	Grade	Cutting Conditions		
	High Speed/Light			N
	General Purpose	P M		
	Roughing	P M	K	

Cat. No.	ACP300	ACK300	DL1500	Fig	Dimensions (mm) ℓ	Thickness	rε	Applicable Holders
WDXT 052504-L	●	●		4	5.0	2.5	0.4	PDL160D2S20 PDL160D3S20 PCT160D3S16 PCT160D5S16
052504-G	●	●	●	5				
052504-H	●	●		6				
WDXT 063006-L	●	●		4	6.0	3.0	0.6	PDL200D2S25 PDL200D3S25 PCT200D3S20 PCT200D5S20
063006-G	●	●	●	5				
063006-H	●	●		6				
WDXT 073506-L	●	●		4	7.5	3.5	0.6	PDL250D2S25 PDL250D3S25 PCT250D3S25 PCT250D5S25
073506-G	●	●	●	5				
073506-H	●	●		6				
WDXT 094008-L	●	●		4	9.6	4.0	0.8	PDL320D2S40 PDL320D3S40 PCT320D3S32 PCT320D5S32
094008-G	●	●	●	5				
094008-H	●	●		6				
WDXT 125012-L	●	●		4	12.4	5.0	1.2	PDL400D2S40 PDL400D3S40 PCT400D3S42 PCT400D5S42
125012-G	●	●	●	5				
125012-H	●	●		6				

(Insert is common with the WDX Type)

Recommended Cutting Conditions PDL Type ☞ J66 PCT Type ☞ J67

PCT, PDL Type Identification

PCT 250 D3 S25

- 250: Tool Diameter (ø25.0)
- D3: Max Depth L/D (3D)
- S25: Shank Size (ø25.0)

PCT, PDL Type Insert Identification

WDXT 07 35 06 -G

- 07: Width Across Flats (7.5)
- 35: Thickness x 10 (3.5)
- 06: Corner Radius x 10 (R0.6)
- -G: Breaker Type

Recommended Cutting Conditions

■ Recommended Cutting Conditions (2D)(PDL Type)

		Work Material		Work Hardness HB	Recommended Breaker	Recommended Insert Grade	v_c Cutting Speed (m/min)	*f* Feed Rate (mm/rev) <Min.-**Optimum**-Max.>			
								ø16.0	ø20.0,ø25.0	ø32.0	ø40.0
2D	P	Steel, Carbon Steel	SS400	125	G	ACP300	120-**180**-240	0.05-**0.08**-0.10	0.05-**0.08**-0.10	0.05-**0.08**-0.11	0.05-**0.08**-0.12
			S15C	125	L	ACP300	130-**170**-220	0.04-**0.08**-0.12	0.04-**0.08**-0.12	0.04-**0.08**-0.13	0.05-**0.10**-0.15
			S45C	190	G	ACP300	100-**150**-200	0.08-**0.13**-0.24	0.08-**0.13**-0.24	0.08-**0.14**-0.26	0.09-**0.16**-0.29
			S45C Hardened	250	G	ACP300	80-**120**-160	0.06-**0.11**-0.18	0.06-**0.11**-0.18	0.06-**0.12**-0.19	0.07-**0.13**-0.22
			S75C	270	G	ACP300	100-**130**-160	0.08-**0.13**-0.22	0.08-**0.13**-0.22	0.08-**0.14**-0.23	0.09-**0.16**-0.26
			S75C Hardened	300	G	ACP300	70-**100**-140	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20
		Low Alloy Steel	SCM, SNCM	180	L	ACP300	100-**140**-180	0.05-**0.08**-0.14	0.05-**0.08**-0.14	0.05-**0.08**-0.16	0.06-**0.09**-0.17
			SCM, SNCM Hardened	275	G	ACP300	80-**120**-160	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20
			SCM, SNCM Hardened	300	G	ACP300	75-**110**-140	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20
			SCM, SNCM Hardened	350	G	ACP300	60-**85**-110	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20
		High Alloy Steel	SKD, SKT, SKH	200	G	ACP300	100-**130**-160	0.08-**0.13**-0.24	0.08-**0.13**-0.24	0.08-**0.14**-0.26	0.09-**0.16**-0.29
			SKD, SKT, SKH Hardened	325	G	ACP300	80-**100**-120	0.06-**0.11**-0.18	0.06-**0.11**-0.18	0.06-**0.12**-0.19	0.07-**0.13**-0.22
	M	Stainless Steel	SUS403, Others (Martensite/Ferrite)	200	G	ACP300	100-**140**-180	0.06-**0.11**-0.18	0.06-**0.11**-0.18	0.06-**0.12**-0.19	0.07-**0.13**-0.22
			SUS403, Others Martensitic (Hardened)	240	G	ACP300	90-**120**-150	0.06-**0.11**-0.18	0.06-**0.11**-0.18	0.06-**0.12**-0.19	0.07-**0.13**-0.22
			SUS304, SUS316 Austenitic	180	G	ACP300	100-**140**-180	0.06-**0.11**-0.18	0.06-**0.11**-0.18	0.06-**0.12**-0.19	0.07-**0.13**-0.22
	K	Cast Iron			H	ACK300	120-**160**-200	0.09-**0.20**-0.32	0.10-**0.22**-0.36	0.11-**0.24**-0.39	0.12-**0.26**-0.44
		Ductile Cast Iron			H	ACK300	90-**120**-150	0.09-**0.20**-0.32	0.10-**0.22**-0.36	0.11-**0.24**-0.39	0.12-**0.26**-0.44
	S	Exotic Alloy (Heat Resistant Alloy, Super Alloy, Ti Alloy, etc.)		200	G	ACP300	25-**50**-70	0.06-**0.11**-0.18	0.06-**0.11**-0.18	0.06-**0.12**-0.19	0.07-**0.13**-0.22
	N	Aluminium Alloy			G	DL1500	200-**260**-320	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20
		Copper Alloy			G	DL1500	180-**230**-280	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20

■ Recommended Cutting Conditions (3D)(PDL Type)

		Work Material		Work Hardness HB	Recommended Breaker	Recommended Insert Grade	v_c Cutting Speed (m/min)	*f* Feed Rate (mm/rev) <Min.-**Optimum**-Max.>			
								ø16.0	ø20.0,ø25.0	ø32.0	ø40.0
3D	P	Steel, Carbon Steel	SS400	125	G	ACP300	120-**180**-240	0.05-**0.07**-0.10	0.05-**0.07**-0.10	0.05-**0.08**-0.11	0.05-**0.08**-0.12
			S15C	125	L	ACP300	130-**170**-220	0.04-**0.07**-0.10	0.04-**0.07**-0.10	0.04-**0.08**-0.11	0.05-**0.09**-0.12
			S45C	190	G	ACP300	100-**150**-200	0.08-**0.12**-0.20	0.08-**0.12**-0.20	0.08-**0.13**-0.22	0.09-**0.14**-0.24
			S45C Hardened	250	G	ACP300	80-**120**-160	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18
			S75C	270	G	ACP300	100-**130**-160	0.08-**0.12**-0.18	0.08-**0.12**-0.18	0.08-**0.13**-0.19	0.09-**0.14**-0.22
			S75C Hardened	300	G	ACP300	70-**100**-140	0.06-**0.10**-0.14	0.06-**0.10**-0.14	0.06-**0.11**-0.15	0.07-**0.12**-0.17
		Low Alloy Steel	SCM, SNCM	180	L	ACP300	100-**140**-180	0.05-**0.07**-0.12	0.05-**0.07**-0.12	0.05-**0.08**-0.13	0.06-**0.08**-0.15
			SCM, SNCM Hardened	275	G	ACP300	80-**120**-160	0.06-**0.10**-0.14	0.06-**0.10**-0.14	0.06-**0.11**-0.15	0.07-**0.12**-0.17
			SCM, SNCM Hardened	300	G	ACP300	75-**110**-140	0.06-**0.10**-0.14	0.06-**0.10**-0.14	0.06-**0.11**-0.15	0.07-**0.12**-0.17
			SCM, SNCM Hardened	350	G	ACP300	60-**85**-110	0.06-**0.10**-0.14	0.06-**0.10**-0.14	0.06-**0.11**-0.15	0.07-**0.12**-0.17
		High Alloy Steel	SKD, SKT, SKH	200	G	ACP300	100-**130**-160	0.08-**0.12**-0.20	0.08-**0.12**-0.20	0.08-**0.13**-0.22	0.09-**0.14**-0.24
			SKD, SKT, SKH Hardened	325	G	ACP300	80-**100**-120	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18
	M	Stainless Steel	SUS403, Others (Martensite/Ferrite)	200	G	ACP300	100-**140**-180	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18
			SUS403, Others Martensitic (Hardened)	240	G	ACP300	90-**120**-150	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18
			SUS304, SUS316 Austenitic	180	G	ACP300	100-**140**-180	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18
	K	Cast Iron			H	ACK300	120-**160**-200	0.09-**0.18**-0.27	0.10-**0.20**-0.30	0.11-**0.22**-0.32	0.12-**0.24**-0.36
		Ductile Cast Iron			H	ACK300	90-**120**-150	0.09-**0.18**-0.27	0.10-**0.20**-0.30	0.11-**0.22**-0.32	0.12-**0.24**-0.36
	S	Exotic Alloy (Heat Resistant Alloy, Super Alloy, Ti Alloy, etc.)		200	G	ACP300	25-**50**-70	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18
	N	Aluminium Alloy			G	DL1500	200-**260**-320	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20
		Copper Alloy			G	DL1500	180-**230**-280	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20

Recommended Cutting Conditions

■ Recommended Cutting Conditions (3D)(PCT Type)

		Work Material	Work Hardness HB	Recommended Breaker	Recommended Insert Grade	v_c Cutting Speed (m/min)	f_z Feed Rate (mm/t) <Min.-**Optimum**-Max.> ø16.0	ø20.0,ø25.0	ø32.0	ø40.0
3D	P	Steel, Carbon Steel SS400	125	G	ACP300	120-**180**-240	0.05-**0.07**-0.10	0.05-**0.07**-0.10	0.05-**0.08**-0.11	0.05-**0.08**-0.12
		S15C	125	L	ACP300	130-**170**-220	0.04-**0.07**-0.10	0.04-**0.07**-0.10	0.04-**0.08**-0.11	0.05-**0.09**-0.12
		S45C	190	G	ACP300	100-**150**-200	0.08-**0.12**-0.20	0.08-**0.12**-0.20	0.08-**0.13**-0.22	0.09-**0.14**-0.24
		S45C Hardened	250	G	ACP300	80-**120**-160	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18
		S75C	270	G	ACP300	100-**130**-160	0.08-**0.12**-0.18	0.08-**0.12**-0.18	0.08-**0.13**-0.19	0.09-**0.14**-0.22
		S75C Hardened	300	G	ACP300	70-**100**-140	0.06-**0.10**-0.14	0.06-**0.10**-0.14	0.06-**0.11**-0.15	0.07-**0.12**-0.17
		Low Alloy Steel SCM, SNCM	180	L	ACP300	100-**140**-180	0.05-**0.07**-0.12	0.05-**0.07**-0.12	0.05-**0.08**-0.13	0.06-**0.08**-0.15
		SCM, SNCM Hardened	275	G	ACP300	80-**120**-160	0.06-**0.10**-0.14	0.06-**0.10**-0.14	0.06-**0.11**-0.15	0.07-**0.12**-0.17
		SCM, SNCM Hardened	300	G	ACP300	75-**110**-140	0.06-**0.10**-0.14	0.06-**0.10**-0.14	0.06-**0.11**-0.15	0.07-**0.12**-0.17
		SCM, SNCM Hardened	350	G	ACP300	60-**85**-110	0.06-**0.10**-0.14	0.06-**0.10**-0.14	0.06-**0.11**-0.15	0.07-**0.12**-0.17
		High Alloy Steel SKD, SKT, SKH	200	G	ACP300	100-**130**-160	0.08-**0.12**-0.20	0.08-**0.12**-0.20	0.08-**0.13**-0.22	0.09-**0.14**-0.24
		SKD, SKT, SKH Hardened	325	G	ACP300	80-**100**-120	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18
	M	Stainless Steel SUS403, Others (Martensite/Ferrite)	200	G	ACP300	100-**140**-180	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18
		SUS403, Others Martensitic (Hardened)	240	G	ACP300	90-**120**-150	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18
		SUS304, SUS316 Austenitic	180	G	ACP300	100-**140**-180	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18
	K	Cast Iron		H	ACK300	120-**160**-200	0.09-**0.18**-0.27	0.10-**0.20**-0.30	0.11-**0.22**-0.32	0.12-**0.24**-0.36
		Ductile Cast Iron		H	ACK300	90-**120**-150	0.09-**0.18**-0.27	0.10-**0.20**-0.30	0.11-**0.22**-0.32	0.12-**0.24**-0.36
	S	Exotic Alloy (Heat Resistant Alloy, Super Alloy, Ti Alloy, etc.)	200	G	ACP300	25-**50**-70	0.06-**0.10**-0.15	0.06-**0.10**-0.15	0.06-**0.11**-0.16	0.07-**0.12**-0.18
	N	Aluminium Alloy		G	DL1500	200-**260**-320	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20
		Copper Alloy		G	DL1500	180-**230**-280	0.06-**0.11**-0.17	0.06-**0.11**-0.17	0.06-**0.12**-0.18	0.07-**0.13**-0.20

■ Recommended Cutting Conditions (5D)(PCT Type)

		Work Material	Work Hardness HB	Recommended Breaker	Recommended Insert Grade	v_c Cutting Speed (m/min)	f_z Feed Rate (mm/t) <Min.-**Optimum**-Max.> ø16.0	ø20.0,ø25.0	ø32.0	ø40.0
5D	P	Steel, Carbon Steel SS400	125	G	ACP300	120-**180**-240	0.05-**0.06**-0.09	0.05-**0.06**-0.09	0.05-**0.06**-0.09	0.05-**0.07**-0.09
		S15C	125	L	ACP300	130-**170**-220	0.04-**0.06**-0.08	0.04-**0.06**-0.08	0.04-**0.06**-0.08	0.05-**0.07**-0.09
		S45C	190	G	ACP300	100-**150**-200	0.07-**0.10**-0.15	0.07-**0.10**-0.15	0.08-**0.11**-0.17	0.09-**0.12**-0.19
		S45C Hardened	250	G	ACP300	80-**120**-160	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.14
		S75C	270	G	ACP300	100-**130**-160	0.07-**0.10**-0.14	0.07-**0.10**-0.14	0.08-**0.11**-0.15	0.09-**0.12**-0.17
		S75C Hardened	300	G	ACP300	70-**100**-140	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.13
		Low Alloy Steel SCM, SNCM	180	L	ACP300	100-**140**-180	0.05-**0.06**-0.09	0.05-**0.06**-0.09	0.05-**0.06**-0.10	0.05-**0.07**-0.11
		SCM, SNCM Hardened	275	G	ACP300	80-**120**-160	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.13
		SCM, SNCM Hardened	300	G	ACP300	75-**110**-140	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.13
		SCM, SNCM Hardened	350	G	ACP300	60-**85**-110	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.13
		High Alloy Steel SKD, SKT, SKH	200	G	ACP300	100-**130**-160	0.07-**0.10**-0.15	0.07-**0.10**-0.15	0.08-**0.11**-0.17	0.09-**0.12**-0.19
		SKD, SKT, SKH Hardened	325	G	ACP300	80-**100**-120	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.14
	M	Stainless Steel SUS403, Others (Martensite/Ferrite)	200	G	ACP300	100-**140**-180	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.14
		SUS403, Others Martensitic (Hardened)	240	G	ACP300	90-**120**-150	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.14
		SUS304, SUS316 Austenitic	180	G	ACP300	100-**140**-180	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.14
	K	Cast Iron		H	ACK300	120-**160**-200	0.08-**0.15**-0.21	0.09-**0.17**-0.23	0.09-**0.18**-0.25	0.11-**0.20**-0.28
		Ductile Cast Iron		H	ACK300	90-**120**-150	0.08-**0.15**-0.21	0.09-**0.17**-0.23	0.09-**0.18**-0.25	0.11-**0.20**-0.28
	S	Exotic Alloy (Heat Resistant Alloy, Super Alloy, Ti Alloy, etc.)	200	G	ACP300	25-**50**-70	0.05-**0.09**-0.11	0.05-**0.09**-0.11	0.06-**0.09**-0.12	0.06-**0.10**-0.14
	N	Aluminium Alloy		G	DL1500	200-**260**-320	0.05-**0.10**-0.15	0.05-**0.10**-0.15	0.06-**0.11**-0.16	0.06-**0.12**-0.18
		Copper Alloy		G	DL1500	180-**230**-280	0.05-**0.10**-0.15	0.05-**0.10**-0.15	0.06-**0.11**-0.16	0.06-**0.12**-0.18

SR Type

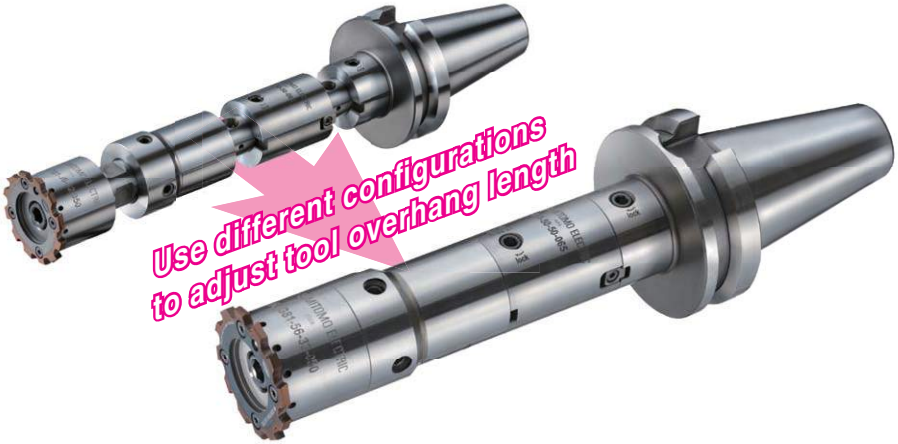
■ Characteristics

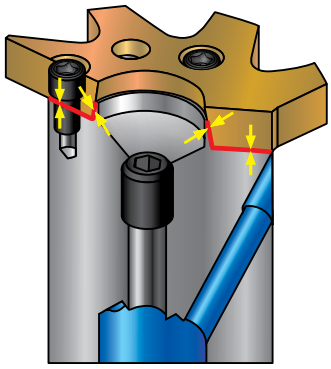
● Achieves efficiency through high speed, high feeding ability!!
(v_c=50 to 500m/min, f = 0.4 to 1.2mm/rev)

· Compatibility with a wide range of cutting conditions allows less strict cutting conditions and coolant control
· Minimal cut edge length design eliminates biting and tearing for improved quality and reliability
· Adoption of indexable cutting edge design improves reliability of quality and tool life, eliminating variability in tool life among reground inserts.
· Cut edge diameters available from ø11.9 to ø140.6 mm

●Easy insert replacement

●Flexible tool overhang lengths possible by combining the modular extension arbour and shank with insert run-out adjustment mechanism





A taper supports the insert by two faces (based on the HSK standard) for less-than 4 µm repeatability using random inserts

■ Application Examples

Work	 Cylinder barrel	 Connection rod	 Sliding yoke	 Front axle	 Special holder with guide pads Control valve
Work Material	FCD600	Forged S55C	S45C	Forged S58C	Forged S55C
Holder Identification Insert Identification	**SRD19-12-115** SRG17.0H7-A01-T1212R1	**SRD36-25-170** SRG29.0H7-A01-F0512R1	**SRD19-12-115** SRG16.02Q+3-3-C01-F0512R1	**SRD29-20-240** SRL28.0H7-B01-F0512R1	Special holder with guide pads SRL14.0H7-B01-F0512R1
Bore ø (mm)	ø17.0	ø29.0	ø16.02	ø28.0	ø14.0
Hole Diameter Tolerance	H7	H7	H7	H7	H7
Surface Roughness Ra/Rz	Rz10.0	Ra0.8	Ra3.2	Ra3.2	Ra1.6
Circularity (µm)	5	2	—	5	5
Cylindricity (µm)	5	4	—	5	5
No. of Teeth	6	8	6	8	6
v_c (m/min)	148	120	150	60	100
n (min^{-1})	2,772	1,318	2,982	682	2,230
f_z (mm/t)	0.20	0.15	0.10	0.075	0.10
v_f (m/min)	3,326	1,582	1,789	409	1,368
a_p (mm)	0.10	0.15	0.15	0.15	0.15
Wet / Dry	Wet	Wet	Wet	Wet	Wet
Life, etc	57.9m	30.52m	—	15.8m	—

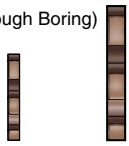
SR Type

■SumiReamer SR Type Configurations

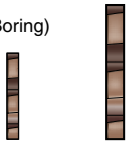
①

Insert ☞J70

●SRG Type
(For Stop/Through Boring)



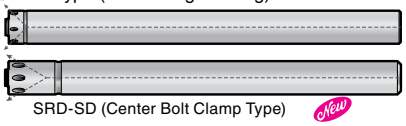
●SRL Type
(For Through Boring)



Diameter：ϕ11.900 to ϕ140.600mm

Toolholder ☞J72

●SRD Type (For Through Boring)



SRD-SD (Center Bolt Clamp Type) New

●SRB Type (For Stop Boring)

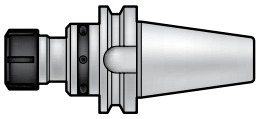
SRD-SD (Center Bolt Clamp Type) New

Applicable Diameter Range：ϕ11.900 to ϕ35.600mm
Shank Length：100 to 274mm

Insert Run-Out Adjustment Mechanism

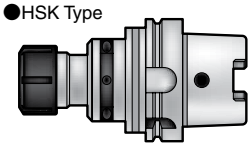
Arbour ☞J73

●BT/A Type



Taper Size：40 to 50

●HSK Type

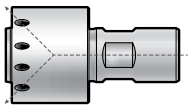


Taper Size：50 to 100

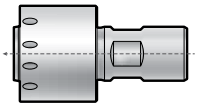
②

Head ☞J74

●SRKG Type (For Through Boring)



●SRKB Type (For Stop Boring)

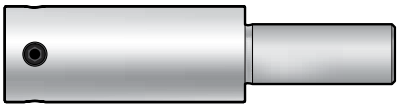


Applicable Diameter Range：
ϕ35.601 to ϕ140.600mm
Head Length：30 to 60mm

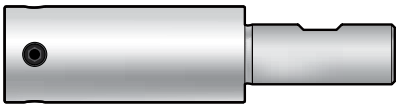
Insert Run-Out Adjustment Mechanism

Shank ☞J74

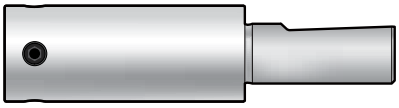
●SRA Type



ZS(Cylindrical Shank) Type : ZS-20/25/32/40



WD(Weldon Shank) Type : WD-20/25/32/40

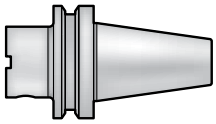


WN(Whistle Notch Shank) Type : WN-20/25/32/40

Applicable Diameter Range：ϕ35.601 to ϕ140.600mm
Shank Length：80 to 160mm

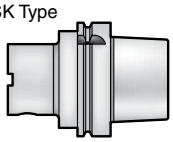
Arbour ☞J75

●BT/A Type



Taper Size：40 to 50

●HSK Type

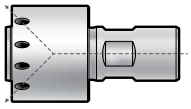


Taper Size：50 to 100

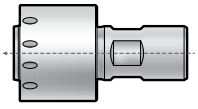
③

Head ☞J74

●SRKG Type (For Through Boring)



●SRKB Type (For Stop Boring)

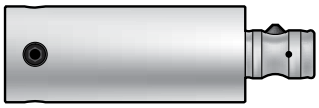


Applicable Diameter Range：
ϕ35.601 to ϕ140.600mm
Head Length：30 to 60mm

Insert Run-Out Adjustment Mechanism

Shank ☞J74

●SRA Type



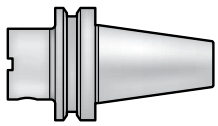
BM(Beta Module Shank) Type : BM-32/40/50/63

Applicable Diameter Range：ϕ35.601 to ϕ140.600mm
Shank Length：80 to 160mm

⚠ Check Sizes
When using a BM (Beta Module) type shank, choose a matching standard size.

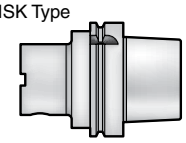
Arbour ☞J75

●BT/A Type



Taper Size：40 to 50

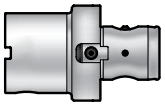
●HSK Type



Taper Size：50 to 100

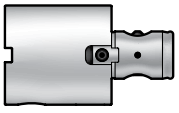
Extensions ☞J75

●For BT40 B12 Type



Shank Length：40 to 75mm

●For BT50 B13 Type



Shank Length：35 to 180mm

Multiple extensions can be connected together
When connecting multiple extensions, it is recommended to consider rigidity and use longer shank sizes so that the total number of extensions is as low as possible.

SR Type

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
◎	◎	◎	○		◎			◎	◎	○	○	

■ Sumi Reamer SR Type Insert

●SRG Type general purpose Straight Grooves : Stop Boring / Through Boring

Fig 1

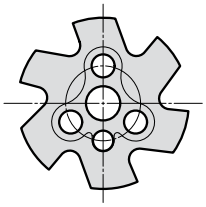
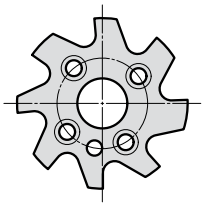
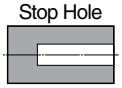
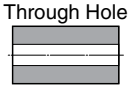
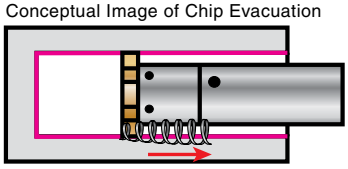


Fig 2

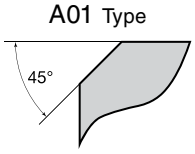




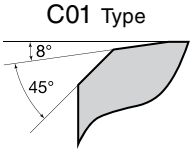




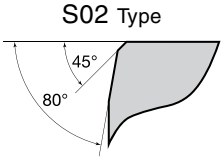
Chips Evacuated Toward Front



Standard Type



Emphasis on Surface Roughness



Emphasis on Direct Line

●Insert (SRG Type)

Diameter øDc (mm)	Cat. No.(A01 Type) F05, T12	Stock	Cat. No.(C01 Type) F05, T12	Stock	Cat. No.(S02 Type) F05, T12	Stock	Work Hole Diameter Tolerance	B (mm)	No. of Teeth	Fig
12.0	SRG 12.0H7-A01-□□□12R1	●	SRG 12.0H7-C01-□□□12R1	●	SRG 12.0H7-S02-□□□12R1	●				
13.0	13.0H7-A01-□□□12R1	●	13.0H7-C01-□□□12R1	●	13.0H7-S02-□□□12R1	●				
14.0	14.0H7-A01-□□□12R1	●	14.0H7-C01-□□□12R1	●	14.0H7-S02-□□□12R1	●				
15.0	15.0H7-A01-□□□12R1	●	15.0H7-C01-□□□12R1	●	15.0H7-S02-□□□12R1	●				
16.0	16.0H7-A01-□□□12R1	●	16.0H7-C01-□□□12R1	●	16.0H7-S02-□□□12R1	●				
17.0	17.0H7-A01-□□□12R1	●	17.0H7-C01-□□□12R1	●	17.0H7-S02-□□□12R1	●				
18.0	18.0H7-A01-□□□12R1	●	18.0H7-C01-□□□12R1	●	18.0H7-S02-□□□12R1	●	H7	4.3	6	1
19.0	19.0H7-A01-□□□12R1	●	19.0H7-C01-□□□12R1	●	19.0H7-S02-□□□12R1	●				
20.0	20.0H7-A01-□□□12R1	●	20.0H7-C01-□□□12R1	●	20.0H7-S02-□□□12R1	●				
21.0	21.0H7-A01-□□□12R1	●	21.0H7-C01-□□□12R1	●	21.0H7-S02-□□□12R1	●				
22.0	22.0H7-A01-□□□12R1	●	22.0H7-C01-□□□12R1	●	22.0H7-S02-□□□12R1	●				
23.0	23.0H7-A01-□□□12R1	●	23.0H7-C01-□□□12R1	●	23.0H7-S02-□□□12R1	●				
24.0	24.0H7-A01-□□□12R1	●	24.0H7-C01-□□□12R1	●	24.0H7-S02-□□□12R1	●				
25.0	SRG 25.0H7-A01-□□□12R1	●	SRG 25.0H7-C01-□□□12R1	●	SRG 25.0H7-S02-□□□12R1	●				
26.0	26.0H7-A01-□□□12R1	●	26.0H7-C01-□□□12R1	●	26.0H7-S02-□□□12R1	●				
27.0	27.0H7-A01-□□□12R1	●	27.0H7-C01-□□□12R1	●	27.0H7-S02-□□□12R1	●				
28.0	28.0H7-A01-□□□12R1	●	28.0H7-C01-□□□12R1	●	28.0H7-S02-□□□12R1	●	H7	4.3	8	2
29.0	29.0H7-A01-□□□12R1	●	29.0H7-C01-□□□12R1	●	29.0H7-S02-□□□12R1	●				
30.0	30.0H7-A01-□□□12R1	●	30.0H7-C01-□□□12R1	●	30.0H7-S02-□□□12R1	●				

Please indicate F05 (PVD) or T12 (Coated Cermet) in the □□□ when ordering.
(Example: SRG12.0H7-A01-F0512R1)
[It is also possible to order uncoated cermet/DLC grades.]

*Actual reamer diameter is near the upper limit of H7 tolerance.

■ SumiReamer SR Type Insert Identification Details

Specifying Inserts Using Work Hole Diameter Tolerance
The actual desired reamer diameter will be on the upper limit side of the median work tolerance, and will differ depending on diameter/tolerance range/grade. Please contact us for details.

SR ① G ② 18.2 ③ + 20 - 10 ④ - A01 ⑤ - F05 ⑥ 12R1 ⑦⑧

① SR Type
② G = Straight, L = Lefthand helix
③ Work Hole Diameter(mm)
④ Tolerance (μm) +/- or standard (ex. H7)
⑤ Approach Angle Code
⑥ Grade Symbol
⑦ Coating Code
⑧ Coating Thickness Code: 1 = Thin, 2 = Thick

Specifying Inserts Using Desired Reamer Diameter
By adding a "Q" after the diameter, it is possible to specify exact desired reamer dimensions. Uncoated types are available within ±2μ, thin-layer coated types within ±3μ, and thick-layer coated types within ±4μ.

SR ① L ② 18.2 ③ Q + 3 - 3 ④ - A01 ⑤ - F05 ⑥ 12R1 ⑦⑧

① SR Type
② G = Straight, L = Lefthand helix
③ Work Hole Diameter(mm)
④ Tolerance (μm) +/-
⑤ Approach Angle Code
⑥ Grade Symbol
⑦ Coating Code
⑧ Coating Thickness Code: 1 = Thin, 2 = Thick

SR Type

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
◎	◎	◎	○		◎			◎	◎	○	○	

■ SumiReamer SR Type Insert

●SRL Type Priority On Chip Evacuation Left Helix: Through Boring

Fig 1

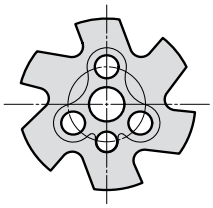
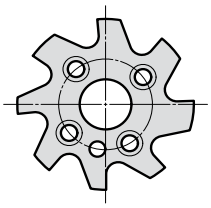
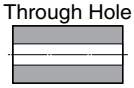


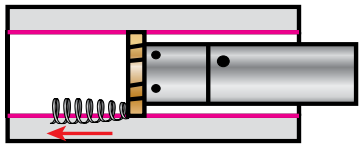
Fig 2



Through Hole

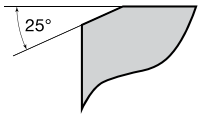


Conceptual Image of Chip Evacuation



Chips Evacuated Toward Back

B01 Type



For Steel Through-Holes

●Insert (SRL Type)

Diameter øDc (mm)	Cat. No. (B01Type) F05, T12	Stock	Work Hole Diameter Tolerance	B (mm)	No. of Teeth	Fig
12.0	SRL 12.0H7-B01-□□□12R1	●	H7	4.3	6	1
13.0	13.0H7-B01-□□□12R1	●				
14.0	14.0H7-B01-□□□12R1	●				
15.0	15.0H7-B01-□□□12R1	●				
16.0	16.0H7-B01-□□□12R1	●				
17.0	17.0H7-B01-□□□12R1	●				
18.0	18.0H7-B01-□□□12R1	●				
19.0	19.0H7-B01-□□□12R1	●				
20.0	20.0H7-B01-□□□12R1	●				
21.0	21.0H7-B01-□□□12R1	●				
22.0	22.0H7-B01-□□□12R1	●				
23.0	23.0H7-B01-□□□12R1	●				
24.0	24.0H7-B01-□□□12R1	●				
25.0	SRL 25.0H7-B01-□□□12R1	●	H7	4.3	8	2
26.0	26.0H7-B01-□□□12R1	●				
27.0	27.0H7-B01-□□□12R1	●				
28.0	28.0H7-B01-□□□12R1	●				
29.0	29.0H7-B01-□□□12R1	●				
30.0	30.0H7-B01-□□□12R1	●				

Please indicate F05 (PVD) or T12 (Coated Cermet) in the □□□ when ordering.
(Example: SRG12.0H7-A01-F0512R1)
[It is also possible to order uncoated cermet/DLC grades.]

*Actual reamer diameter is near the upper limit of H7 tolerance.

●Made-to-order item

Diameter øDc (mm)	B (mm)	No. of Teeth
ø11.900 to ø15.600	4.3	6
ø15.601 to ø18.600		
ø18.601 to ø23.600		
ø23.601 to ø28.600	4.3	8
ø28.601 to ø35.600		
ø35.601 to ø43.600		
ø43.601 to ø51.600	4.3	10
ø51.601 to ø60.600		
ø60.601 to ø80.600	4.3	12
ø80.601 to ø106.600		
ø106.601 to ø120.600	5.3	
ø126.601 to ø140.600		

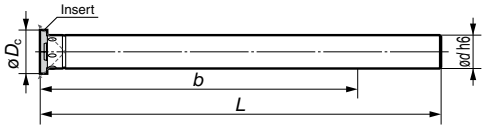
SRG type (Special) and SRL type (Special) are made-to-order items.
When ordering, refer to "SR Type Insert Identification Details" on page J70.
* Cermet grades (T1200A and T1212R1) are available only up to ø106.600mm.

■ Recommended Cutting Conditions

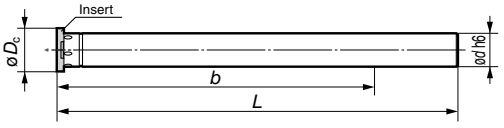
ISO	Work Material	Insert	Grade	Grade	Depth of Cut a_p (mm/radius)			Cutting Speed v_c (m/min)	Feed Rate f_z (mm/t)
					Below ø20	ø20 to ø35	ø35 or more		
P	Carbon Steel	SRG Type	F0512R1	Micro-Fine Grained Carbide + PVD	0.05 to 0.12	0.08 to 0.15	0.10 to 0.25	80 to 220	0.10 to 0.25
		SRL Type			0.05 to 0.12	0.08 to 0.15	0.10 to 0.25	100 to 220	0.15 to 0.35
		SRG Type	T1200A	Cermet	0.05 to 0.12	0.08 to 0.15	0.10 to 0.25	120 to 250	0.10 to 0.25
		SRL Type			0.05 to 0.12	0.08 to 0.15	0.10 to 0.25	120 to 250	0.15 to 0.35
	Aloy Steel	SRG Type	F0512R1	Micro-Fine Grained Carbide + PVD	0.05 to 0.12	0.08 to 0.15	0.10 to 0.25	60 to 180	0.06 to 0.20
		SRL Type			0.05 to 0.12	0.08 to 0.15	0.10 to 0.25	60 to 180	0.10 to 0.22
		SRG Type	T1200A	Cermet	0.05 to 0.12	0.08 to 0.15	0.10 to 0.25	70 to 200	0.08 to 0.20
		SRL Type			0.05 to 0.12	0.08 to 0.15	0.10 to 0.25	70 to 200	0.12 to 0.25
	Die Steel	SRG Type	F0512R1	Micro-Fine Grained Carbide + PVD	0.05 to 0.10	0.08 to 0.15	0.10 to 0.20	15 to 60	0.06 to 0.20
	Tool Steels	SRG Type	F0512R1	Micro-Fine Grained Carbide + PVD	0.05 to 0.10	0.08 to 0.15	0.10 to 0.20	15 to 30	0.04 to 0.15
M	Stainless Steel	SRG Type	F0512R1	Micro-Fine Grained Carbide + PVD	0.05 to 0.10	0.08 to 0.15	0.08 to 0.20	15 to 60	0.06 to 0.20
K	Cast Iron	SRG Type	T1212R1	Coated Cermet	0.05 to 0.12	0.08 to 0.15	0.10 to 0.25	80 to 250	0.10 to 0.30
	Cast Iron/Ductile		F0512R1	Micro-Fine Grained Carbide + PVD	0.05 to 0.18	0.08 to 0.20	0.10 to 0.25	80 to 250	0.10 to 0.30
N	Non-Ferrous Metal	SRG Type	F0510C	Micro-Fine Grained Carbide + DLC	0.05 to 0.12	0.08 to 0.15	0.10 to 0.25	250 to 500	0.10 to 0.30

SR Type

● SRD Type (For Through Boring)



● SRB Type (For Stop Boring)



Steel Shank Toolholder SRD/SRB Series

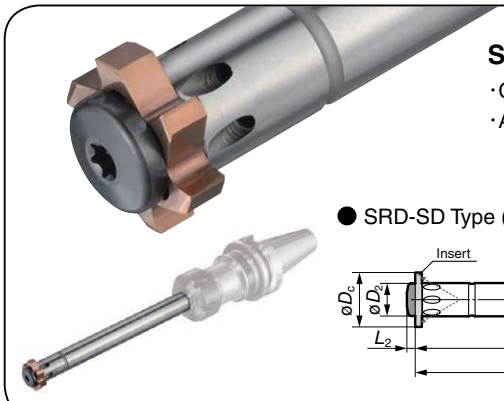
■ Spare Parts

Diameter øDc Range		Cat. No. SRD Type (For Through Boring)	Stock	Cat. No. SRB Type (For Stop Boring)	Stock	Dimensions(mm) ød	L	b	Cap Screw	Wrench
Short	ø11.900 to ø15.600	SRD 16-10-100	●	SRB 16-10-100	●	10	100	60	C00-90-00	G00-20-01
	ø15.601 to ø18.600	19-12-115	●	19-12-115	●	12	115	70		
	ø18.601 to ø23.600	24-16-128	●	24-16-128	●	16	128	80	C00-90-01	G00-20-02
	ø23.601 to ø28.600	29-20-145	●	29-20-145	●	20	145	95		
	ø28.601 to ø35.600	36-25-170	●	36-25-170	●	25	170	120		
Long	ø11.900 to ø15.600	SRD 16-10-160		SRB 16-10-160		10	160	120	C00-90-00	G00-20-01
	ø15.601 to ø18.600	19-12-185		19-12-185		12	185	140		
	ø18.601 to ø23.600	24-16-208		24-16-208		16	208	160	C00-90-01	G00-20-02
	ø23.601 to ø28.600	29-20-240		29-20-240		20	240	190		
	ø28.601 to ø35.600	36-25-274		36-25-274		25	274	224		

Carbide Shank Toolholder SRD/SRB Series

■ Spare Parts

Diameter øDc Range		Cat. No. SRD Type (For Through Boring)	Stock	Cat. No. SRB Type (For Stop Boring)	Stock	Dimensions(mm) ød	L	b	Cap Screw	Wrench
Long	ø11.900 to ø15.600	SRD 16-10-160HM		SRB 16-10-160HM		10	160	120	C00-90-00	G00-20-01
	ø15.601 to ø18.600	19-12-185HM		19-12-185HM		12	185	140		
	ø18.601 to ø23.600	24-16-208HM		24-16-208HM		16	208	160	C00-90-01	G00-20-02
	ø23.601 to ø28.600	29-20-240HM		29-20-240HM		20	240	190		
	ø28.601 to ø35.600	36-25-274HM		36-25-274HM		25	274	224		

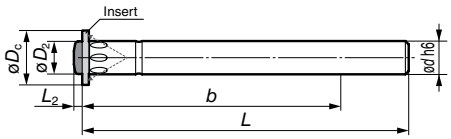


SD Typr (Center Bolt Clamp Type)

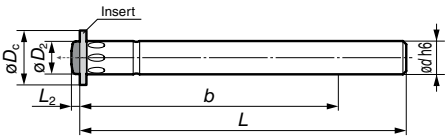
・Can be clamped using one center bolt to improve work efficiency
・Applicable to high-torque (high-load) machining

New

● SRD-SD Type (For Through Boring)



● SRB-SD Type (For Stop Boring)



Steel Shank Toolholder SRD-SD/SRB-SD Series (Center Bolt Clamp Type)

■ Spare Parts

Diameter øDc Range		Cat. No. SRD Type (For Through Boring)	Stock	Cat. No. SRB Type (For Stop Boring)	Stock	Dimensions(mm) ød	L	b	øD2	L2	Cap Screw (For SRD)	Cap Screw (For SRB)	Wrench
Short	ø11.900 to ø15.600	SRD 16-10-100SD		SRB 16-10-100SD		10	100	60	9.8	2.5	C00-90-22	C00-90-22B	G00-20-27
	ø15.601 to ø18.600	19-12-115SD		19-12-115SD		12	115	70	11.8	3.0	C00-90-23	C00-90-23B	G00-20-28
	ø18.601 to ø23.600	24-16-128SD		24-16-128SD		16	128	80	15.8	4.0	C00-90-24	C00-90-24B	G00-20-29
	ø23.601 to ø28.600	29-20-145SD		29-20-145SD		20	145	95	15.8	4.0			
	ø28.601 to ø35.600	36-25-170SD		36-25-170SD		25	170	120	24.5	4.0	C00-90-25	C00-90-25B	
Long	ø11.900 to ø15.600	SRD 16-10-160SD		SRB 16-10-160SD		10	160	120	9.8	2.5	C00-90-22	C00-90-22B	G00-20-27
	ø15.601 to ø18.600	19-12-185SD		19-12-185SD		12	185	140	11.8	3.0	C00-90-23	C00-90-23B	G00-20-28
	ø18.601 to ø23.600	24-16-208SD		24-16-208SD		16	208	160	15.8	4.0	C00-90-24	C00-90-24B	G00-20-29
	ø23.601 to ø28.600	29-20-240SD		29-20-240SD		20	240	190	15.8	4.0			
	ø28.601 to ø35.600	36-25-274SD		36-25-274SD		25	274	224	24.5	4.0	C00-90-25	C00-90-25B	

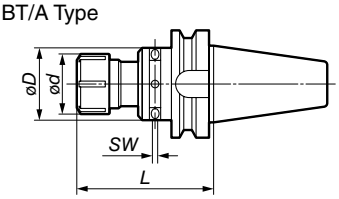
Carbide Shank Toolholder SRD-SD/SRB-SD Series (Center Bolt Clamp Type)

■ Spare Parts

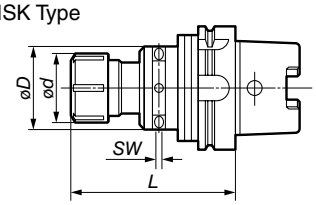
Diameter øDc Range		Cat. No. SRD Type (For Through Boring)	Stock	Cat. No. SRB Type (For Stop Boring)	Stock	Dimensions(mm) ød	L	b	øD2	L2	Cap Screw (For SRD)	Cap Screw (For SRB)	Wrench
Long	ø11.900 to ø15.600	SRD 16-10-160HMSD		SRB 16-10-160HMSD		10	160	120	9.8	2.5	C00-90-22	C00-90-22B	G00-20-27
	ø15.601 to ø18.600	19-12-185HMSD		19-12-185HMSD		12	185	140	11.8	3.0	C00-90-23	C00-90-23B	G00-20-28
	ø18.601 to ø23.600	24-16-208HMSD		24-16-208HMSD		16	208	160	15.8	4.0	C00-90-24	C00-90-24B	G00-20-29
	ø23.601 to ø28.600	29-20-240HMSD		29-20-240HMSD		20	240	190	15.8	4.0			
	ø28.601 to ø35.600	36-25-274HMSD		36-25-274HMSD		25	274	224	24.5	4.0	C00-90-25	C00-90-25B	

SR Type

● BT/A Type



● HSK Type



■ Arbour With Insert Run-Out Adjustment Mechanism

● BT/A Type

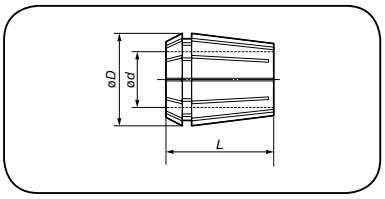
(Dimensions:mm)

Cat. No.	Stock	Taper Size	Size	Diameter Range	øD	ød	L	SW
AAT60-40A-25-090	●	**40**	ER25	2.0 to 16.0	50	42	90	4
32-100	●		ER32	2.0 to 20.0	50	50	100	4
40-105	●		ER40	3.0 to 26.0	60	63	105	4
AAT60-50A-32-110	●	**50**	ER32	2.0 to 20.0	50	50	110	4
40-115	●		ER40	3.0 to 26.0	60	63	115	4

● HSK Type (Coolant tube sold separately.)

Cat. No.	Stock	Taper Size	Size	Diameter Range	øD	ød	L	SW
AAH60-40A-25-100	●	**40**	ER25	2.0 to 16.0	50	42	105	4
32-100	●		ER32	2.0 to 20.0	50	50	110	4
AAH60-63A-25-090	●	**63**	ER25	2.0 to 16.0	50	42	90	4
32-095	●		ER32	2.0 to 20.0	50	50	95	4
40-125	●		ER40	3.0 to 26.0	60	63	125	4
AAH60-100A-40-110	●	**100**	ER40	3.0 to 26.0	60	63	110	4

■ Parts

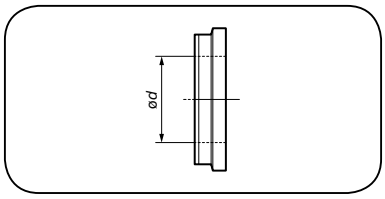


● Collet

(Dimensions:mm)

Cat. No.	Size	øD	L
62-25-□□	ER25	26	35
62-32-□□	ER32	33	40
62-40-□□	ER40	41	46

□□ = ød
Ex. 1: ER25, d=12 ⇒ 62-25-12
These items are in stock in increments of 1 mm:
62-25- □□ from ø12 to ø16 mm
62-32- □□ from ø12 to ø20 mm
62-40- □□ from ø12 to ø26 mm.

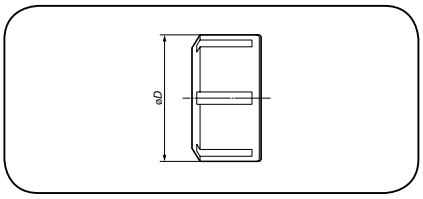


● Seal Disc

(Dimensions:mm)

Cat. No.	Size	ød
20.107.41-□□□	ER25	3.0~16.0
20.107.51-□□□	ER32	3.0~20.0
20.107.61-□□□	ER40	3.0~26.0

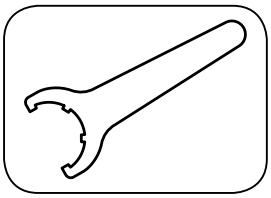
□□□ = ød
Ex. 1: ER25, d=12 ⇒ 20.107.41-120
These items are in stock in increments of 1 mm:
20.107.41- □□□ from ø12 to ø16 mm
20.107.51- □□□ from ø12 to ø20 mm
20.107.61- □□□ from ø12 to ø26 mm.



● Collet Cap

(Dimensions:mm)

Cat. No.	Size	øD	d
20.107.410	ER25	42	M32 x 1.5
20.107.510	ER32	50	M40 x 1.5
20.107.610	ER40	63	M50 x 1.5



● Tightening Wrench

Cat. No.	Size
00-05-05	ER25
00-05-02	ER32
00-05-03	ER40

● Torque Wrench

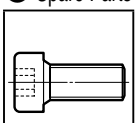
Cat. No.	Applicable Holder	Torx Hole	Torque Rating
G00-40-11	SR□ 16 / SR□ 19	T 6	0.9N·m
G00-40-12	SR□ 24 to SR□ 61	T 8	1.5N·m
G00-40-13	SR□ 81 / SR□ 101	T 15	3.5N·m

D, B, KG, A

● Coolant Tubes

Taper Size	
40	H00- 40-01
63	H00- 63-01
100	H00-100-01

● Spare Parts

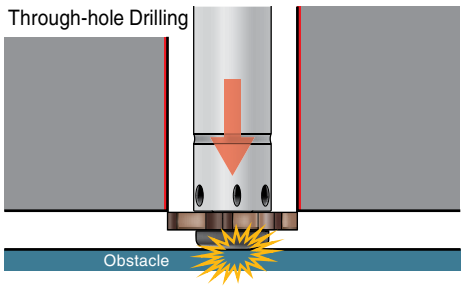


C00-96-16

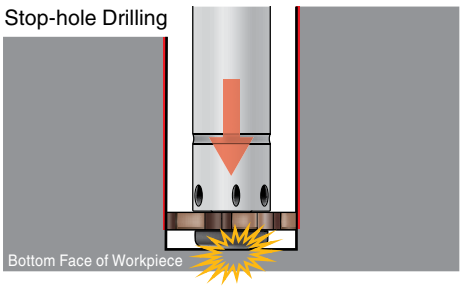
Important Notes About SD Type (Center Bolt Clamp Type)

This product can be used for both through-hole and stop-hole drilling. However, the head of the center bolt protrudes from the end of the body. Therefore, ensure clearance by referring to the protrusion amount of the center bolt (L_2) shown in the dimension table.

Through-hole Drilling

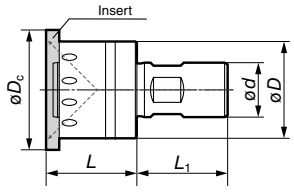


Stop-hole Drilling

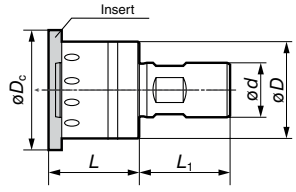


SR Type

● SRKG Type (For Through Boring)



● SRKB Type (For Stop Boring)



■ Head (ø35.601 to ø140.6mm)

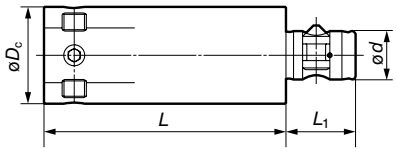
■ Spare Parts

Diameter øDc Range	Cat. No. SRKG Type	Stock	SRKB Type	Stock	Dimensions(mm) øD	ød	L	L1	Cap Screw	Wrench	Cap Screw		Wrench
ø35.601 to ø43.600	SRKG 44-32-18-030		SRKB 44-32-18-030		32	18	30	30	C00-90-02	G00-20-02	C00-26-23G*	C00-26-23B*	G00-02-07
ø43.601 to ø51.600	52-39-20-035		52-39-20-035		39	20	35	30	C00-90-02	G00-20-02	C00-26-38G*	C00-26-38B*	G00-02-07
ø51.601 to ø60.600	61-46-25-040		61-46-25-040		46	25	40	35	C00-90-02	G00-20-02	C00-24-26G*	C00-24-26B*	G00-02-08
ø60.601 to ø80.600	81-56-32-050		81-56-32-050		56	32	50	40	C00-90-04	G00-20-03	C00-26-37G*	C00-26-37B*	G00-02-09
ø80.601 to ø100.600	101-76-40-060		101-76-40-060		76	40	60	50	C00-90-04	G00-20-03	C00-24-31G*	C00-24-31B*	G00-02-16
ø100.601 to ø120.600	SRKG 121-76-40-060		SRKB 121-76-40-060		76	40	60	50	C00-90-04	G00-20-03	C00-24-31G*	C00-24-31B*	G00-02-16
ø120.601 to ø140.600	140-76-40-060		140-76-40-060		76	40	60	50	C00-90-04	G00-20-03	C00-24-31G*	C00-24-31B*	G00-02-16

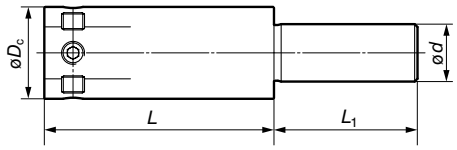
*: For SRKG Type ∗: For SRKB Type

● SRA Type

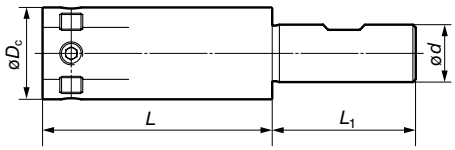
BM (Beta Module Shank) Type



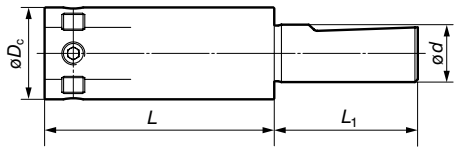
ZS (Cylindrical Shank) Type



WD (Weldon Shank) Type



WN(Whistle Notch Shank) Type



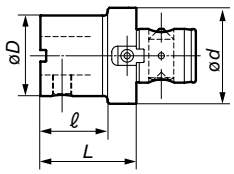
■ Shank (Insert Run-Out Adjustment Mechanism)

■ Spare Parts

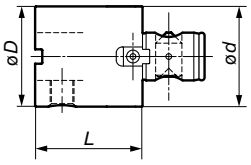
Diameter øDc Range	Cat. No. SRA Type	Stock	Dimensions(mm) øDC	ød	L	L1	Cap Screw	Wrench	Clamp	Screw
ø35.601 to ø43.600	SRA 44-32-BM32-080		32	BM-32	55/80	8.5	C00-90-08	G00-02-05	Z00-32-21	Z00-32-23
	SRA 44-32-ZS20-080		32	ZS-20	80	50.0				
	44-32-WD20-080			WD-20						
	44-32-WN20-080			WN-20						
ø43.601 to ø51.600	SRA 52-39-BM40-100		39	BM-40	60/100	26.0	C00-90-10	G00-02-06	Z00-40-21	Z00-40-23
	SRA 52-39-ZS25-100		39	ZS-25	100	56.0				
	52-39-WD25-100			WD-25						
	52-39-WN25-100			WN-25						
ø51.601 to ø60.600	SRA 61-46-BM50-120		46	BM-50	70/120	31.0	C00-90-10	G00-02-06	Z00-50-21	Z00-50-23
	SRA 61-46-ZS32-120		46	ZS-32	120	60.0				
	61-46-WD32-120			WD-32						
	61-46-WN32-120			WN-32						
ø60.601 to ø80.600	SRA 81-56-BM50-080		56	BM-50	80	31.0	C00-90-12	G00-02-07	Z00-50-21	Z00- 50-23
	81-56-BM50-140				140					
	SRA 81-56-ZS40-080		56	ZS-40	80	70.0				
	81-56-ZS40-140				140					
	81-56-WD40-080			WD-40	80					
	81-56-WD40-140				140					
	81-56-WN40-080			WN-40	80					
	81-56-WN40-140				140					
ø80.601 to ø140.600	SRA 101-76-BM63-100		76	BM-63	100	38.0	C00-90-16	G00-02-08	Z00-63-21	Z00-63-23
	101-76-BM63-160				160					
	SRA 101-76-ZS40-100		76	ZS-40	100	70.0				
	101-76-ZS40-160				160					
	101-76-WD40-100			WD-40	100					
	101-76-WD40-160				160					
	101-76-WN40-100			WN-40	100					
	101-76-WN40-160				160					

SR Type

● For BT40 (B12 Type)



● For BT50 (B13 Type)



■ Extensions ●For BT40 (B12 Type)

(Dimensions:mm)

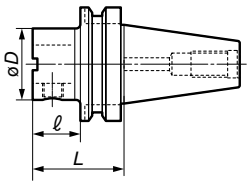
Cat. No.	Stock	øD	ød	L	ℓ	Weight(kg)
B12-32-25-040		25	32	40	25	0.2
B12-40-25-040		25	42	40	25	0.3
32-045		32	42	45	30	0.3
B12-50-40-050		42	50	50	35	0.5
B12-63-25-045		25	63	45	25	0.7
32-050		32	63	50	30	0.9
40-055		42	63	55	35	1.1
B12-80-40-060		42	80	60	35	2.2
63-060		63	80	60	35	2.4
B12-100-40-060		42	100	60	35	3.1
63-060		63	100	60	35	3.3
80-075		80	100	75	50	3.5

●For BT50 (B13 Type)

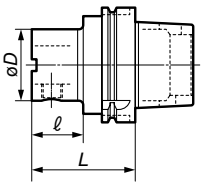
(Dimensions:mm)

Cat. No.	Stock	øD	ød	L	ℓ	Weight(kg)
B13-25-25-045		25	25	45	—	0.2
070		25	25	70	—	0.3
B13-32-32-035		32	32	35	—	0.2
070		32	32	70	—	0.4
B13-40-40-045		42	42	45	—	0.4
070		42	42	70	—	0.7
B13-50-50-065		50	50	65	—	1.0
100		50	50	100	—	1.5
B13-63-63-060		63	63	60	—	1.3
125		63	63	125	—	2.9
B13-80-80-080		80	80	80	—	2.9
160		80	80	160	—	4.9
B13-100-100-080		100	100	80	—	4.9
180		100	100	180	—	10.9

● BT/A Type



● HSK Type



■ Arbour BETA Module

● BT/A Type

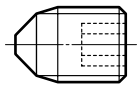
(Dimensions:mm)

Cat. No.	Stock	Taper Size	øD	L	ℓ	Weight(kg)
BT10-40A-25-060		**40**	25	60	33	0.8
32-060		**40**	32	60	33	0.9
40-028		**40**	42	28	1	0.9
40-060		**40**	42	60	33	1.2
50-060		**40**	50	60	33	1.3
63-055		**40**	63	55	28	1.4
63-070		**40**	63	70	43	1.7
BT10-50A-32-070		**50**	32	70	32	3.7
40-070		**50**	42	70	32	3.9
50-070		**50**	50	70	32	4.1
63-080		**50**	63	80	42	4.3
80-100		**50**	80	100	62	5.5
100-110		**50**	100	110	72	7.0

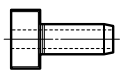
● HSK Type (Coolant tube sold separately.) (Dimensions:mm)

Cat. No.	Stock	Taper Size	øD	L	ℓ	Weight(kg)
BH10-50A-25-055		**50**	25	55	29	0.5
32-060		**50**	32	60	34	0.6
40-065		**50**	42	65	39	0.7
BH10-63A-25-055		**63**	25	55	29	0.9
32-060		**63**	32	60	34	1.0
40-065		**63**	42	65	23	1.1
50-070		**63**	50	70	44	1.5
63-080		**63**	63	80	38	1.5
BH10-100A-40-080		**100**	42	80	35	2.3
50-080		**100**	50	80	35	2.5
63-080		**100**	63	80	35	2.8
80-090		**100**	80	90	45	3.8
100-100		**100**	100	100	55	4.0

■ Spare Parts

Clamp Screw	
25	Z00-25-24
32	Z00-32-24
40	Z00-40-24
63	Z00-63-24
80	Z00-80-24
100	Z00-100-24

■ Coolant Tubes

Taper Size	
50	H00-50-01
63	H00-63-01
100	H00-100-01

SR Type

■ SR Type Usage Instructions (Adjusting Run-Out)

The run-out at the cut edge of a reamer should be zero to obtain optimum boring precision. To correct run-out in the holder or the machine's spindle, use of holders with a run-out adjustment mechanism, hydro chucks, and shrink-fitting is recommended. Various methods can be used to measure run-out on a SumiReamer SR type reamer. SumiReamer SR type reamers offer good run-out repeatability so it is recommended that inserts be replaced without removing the shank holder from the spindle.

(1) High-accurate cut edge runout measurement method (for measuring the arc land on the insert)
Measuring the lands immediately after the outer diameter of the insert has been chamfered eliminates all attachment errors. This allows for the most accurate runout measurement.

(2) Simplified measurement method (for measuring the short taper of the holder)
The short taper on the holder where the inserts are attached provides the easiest and most accurate measurement before attaching the inserts.

(3) Simplified measurement method (for measuring the outer diameter of the holder)
The high precision machined outer diameter of the shank holder provides a good estimate of the runout measurement.

* Runout accuracy is higher in order of (1), (2) and (3).

● Shank Holders with Correction Mechanism

Shank holders must have a correction mechanism when using reamers of ø35 mm or larger.

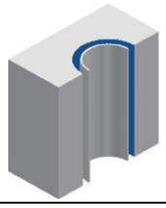
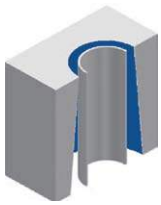
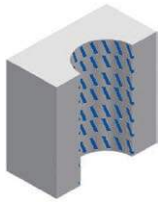
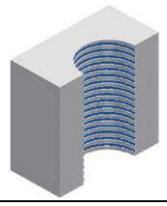
(Adjustment procedure)

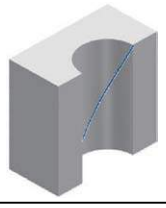
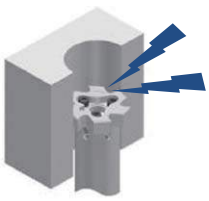
(1) Tighten the centre locking screw to torque value A in the table below, then attach the insert and measure the runout of the cut edge.
(2) Verify the tooth where runout peaks and adjust with the adjustment screw.
(3) Repeat this adjustment for each tooth as necessary.
(4) Remove the adjusted insert, tighten the centre locking screw to torque value B in the table below, then re-attach the insert.

Recommended Tightening Torque for Centre Locking Screw (N·m)

Size	A	B
SR044	25	32
SR052	25	32
SR061	40	55
SR081	65	85
SR101	95	120

■ Troubleshooting for Drilling

Failure	Countermeasures
Large Hole Diameter 	・Reduce the run-out as much as possible (use a holder with a diameter correction mechanism). ・Decrease the cutting speed. ・Increase the feed rate. ・Increase the coolant concentration. ・Reduce the machining allowance. ・Check the cutting edge for damage (the existence of built-up edges). ・Change the reamer diameter.
Tapered Hole 	・Reduce the run-out as much as possible (use a holder with a diameter correction mechanism). ・Decrease the cutting speed. ・Decrease the feed rate. ・Adjust the coolant concentration. ・Review the pre-machining process. ・Review the clamping method of the workpiece. ・Compare the hole size between when the workpiece is clamped and unclamped. ・Check and correct the direction of chip evacuation.
Chatter Mark on Machined Surface 	・Reduce the run-out as much as possible (use a holder with a diameter correction mechanism). ・Change the approach angle of the insert cutting edge. ・Review the clamping method of the workpiece. ・Decrease the cutting speed. ・Increase the feed rate.
Poor Surface Roughness 	・Check the cutting edge for damage. ・Reduce the run-out as much as possible (use a holder with a diameter correction mechanism). ・Check whether the cutting conditions are within the recommended range. ・Change to internal coolant supply. ・Increase the coolant concentration.

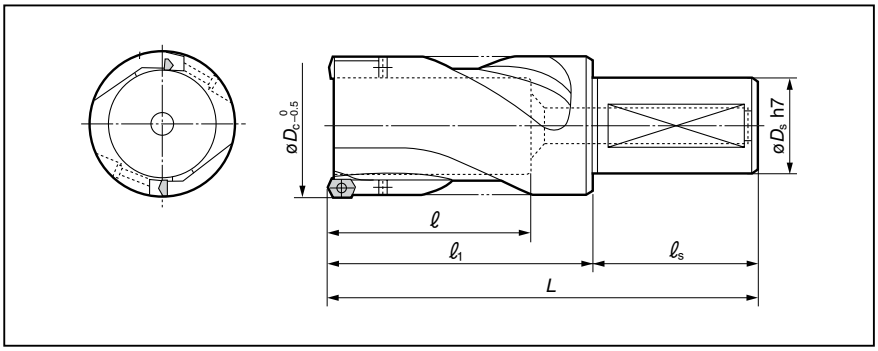
Failure	Countermeasures
Return Mark 	・Reduce the run-out as much as possible (use a holder with a diameter correction mechanism). ・Check the cutting edge for damage (the existence of built-up edges). ・Reduce the machining allowance. ・Change to an insert with a sharper cutting edge. ・Decrease the return (lifting) feed.
Irregular Cutting Noise 	・Decrease the coolant concentration. ・Increase the machining allowance. ・Check the cutting edge for damage. ・Change the approach angle of the insert cutting edge.
Small Hole Diameter 	・Replace the insert. ・Decrease the coolant concentration. ・Increase the machining allowance. ・Increase the cutting speed. ・Decrease the feed rate.

TCS Type

Medium To Large Sized Holes

Carbon Steel, Alloy Steel Up to 0.28%	Carbon Steel, Alloy Steel From 0.29%	Tempered Steel	Hardened Steel Up to 45HRC	Hardened Steel From 46HRC	Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
◎	◎	◎	○		◎	○	○	◎	◎		○	

Carbide | Coated Carbide | Indexable | 2D



Holders

Cat. No.	Stock	Tool øDc (mm)	Dimensions (mm)				
			L	øDs	ℓ	ℓ1	ℓs
TCS 050 to 065		50 to 65	205 to 245	40	115 to 145	140 to 180	65
066 to 080		66 to 80	245 to 280	40	145 to 175	180 to 215	65
081 to 085		81 to 85	290 to 305	50	175 to 185	215 to 230	75
086 to 095		86 to 95	305 to 330	50	185 to 205	230 to 255	75
096 to 105		96 to 105	330 to 355	50	205 to 225	255 to 280	75
106 to 110		106 to 110	355 to 365	50	225 to 235	280 to 290	75

Holders can be made for diameters as low as øDC=200mm. Specify all measurements and attachment shape when ordering.

Inserts

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metal S Exotic Alloy H Hardened Steel

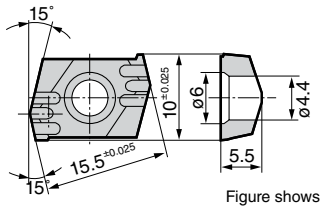


Figure shows WPG10R

Grade		Coated Carbide	Carbide
Application	High Speed/Light		
	General Purpose		P
	Roughing		

Cat. No.	AC325	A30N	Application
WPG 10R			Outer
WPG 10L			Inner

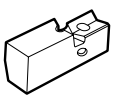
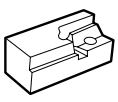
Recommended Cutting Conditions

v_c: Cutting Speed (m/min) *f*: Feed Rate (mm/rev)

Diameter øDc (mm)	Condi-tions	Soft Steel Alloy Steel (Below 320HB)	Soft Steel Alloy Steel General Steel (Below 250HB)	Die steel (About HB250)	Ductile Cast Iron	Cast Iron
Up to ø165	v_c	70 – **90** – 110	90 – **110** – 130	50 – **70** – 80	100 – **120** – 140	100 – **120** – 140
	f	0.05 – **0.1** – 0.15	0.05 – **0.1** – 0.15	0.05 – **0.1** – 0.15	0.1 – **0.15** – 0.2	0.15 – **0.2** – 0.25

Min. - **Optimum** - Max.

Spare Parts

Applicable Holder	Cartridges				Cap Screw		Set Screw (Outer)	Axial Adjustment Screw	Screw	Spanner (For Screw)	Recommended Tightening Torque (N·m)
	Stock	Outer	Stock	Inner	Outer	Inner					
											
TCS 050 to 055		TU050055K1		TU050055K2	BX 0408	BX 0408	BT 0306	AJM4FT	BFTX 0409N	TRX 15	3.0
TCS 056 to 065		TU055065K1		TU055065K2	BX 0410	BX 0410					
TCS 066 to 075		TU065075K1		TU065075K2	BX 0414	BX 0414					
TCS 076 to 085		TU075085K1		TU075085K2	BX 0418	BX 0418					
TCS 086 to 095		TU085095K1		TU085105K2	BX 0418	BX 0425					
TCS 096 to 105		TU095105K1			BX 0425	BX 0425					
TCS 106 to 115		TU105135K1		TU105125K2	BX 0430	BX 0425					

● MAK Type ● BAK Type ● LAK Type/DAK Type

■ General Features

The SUPER MULTIDRILL AK type, a brazed carbidetip drill with through-tool oil holes, utilises a tough carbide substrate coupled with the new ZX-coating. With double the conventional regrinding allowance provided, a lower running cost can be achieved.

■ Characteristics and Application

● **Stable tool life of up to 1.5 times**
Tough substrate with new ZX-coating improves fracture resistance and tool life.

● **Double the regrinding possibilities**
Longer carbide tip portion provides double the allowance for regrinding.

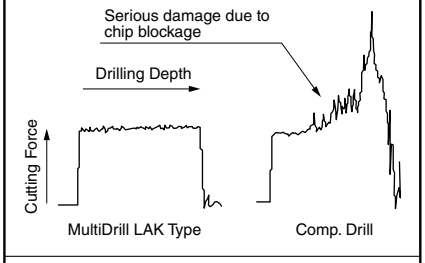
● **Unique flute design for using mist**
Both flute shape and flute surface quality is designed for drilling depths of L/D=5 using mist.

■ Series

Series Cat No.	Diameter Range (mm)	Drilling Depth (L/D)	Characteristics
Standard Type (MAK)	ø13.6 to ø40.5	Up to 3	Up to 3 times more total tool life expectancy resulting from 1.5 times better tool life and 2 times more regrinding possibility.
Long Type (LAK)	ø13.6 to ø40.5	Up to 5	
Deep Hole Type (DAK)	ø13.0 to ø40.5	Up to 7	
Standard Type (BAK)	ø13.6 to ø30.5	Up to 3	Designed for drilling stacked sheets.

■ Performance

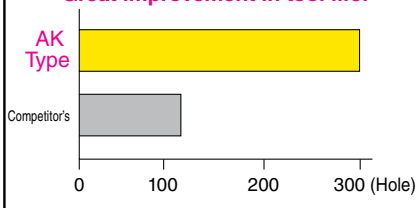
●Chip Removal Comparison
Drilling depth L/D=5 using mist



Drill: ø18 Work Material: S50C (230HB) Using Mist
v_c=50m/min f=0.3mm/rev H=90mm (L/D=5)

■ Application Examples

●Automotive Components SCM440 (250HB)
Great improvement in tool life!



Drill: KDS250MAK ø25
v_c=60m/min f=0.25mm/rev H=65mm (Through)

■ Recommended Cutting Conditions (Brazed Carbide Tip Type)

● General Purpose (L/D: Up to 5): MAK Type / LAK Type / BAK Type

v_c: Cutting Speed (m/min) f: Feed Rate (mm/rev)

Drill Diameter øD		Soft Steel (Up to 200HB)	General Steel (Up to 300HB)	Hardened Steel 45HRC	Structural Steel SM·SS	Stainless Steel (Up to 200HB)	Grey Cast Iron FC250	Ductile Cast Iron FCD450	Aluminium Alloy —	Ti-alloy 6Al-4V-Ti	Inconel Inco718
	Series	MAK Type LAK Type	MAK Type LAK Type	MAK Type LAK Type	BAK Type	MAK Type LAK Type	MAK Type LAK Type	MAK Type LAK Type	MAK Type LAK Type	MAK Type LAK Type	MAK Type LAK Type
Up to ø15.0	v_c	50 – **60** – 75	50 – **60** – 70	30 – **35** – 45	50 – **55** – 60	35 – **40** – 50	60 – **70** – 100	55 – **60** – 75	70 – **80** – 100	20 – **25** – 35	10 – **20** – 30
	f	0.15 – **0.20** – 0.30	0.15 – **0.20** – 0.30	0.10 – **0.15** – 0.20	0.20 – **0.22** – 0.25	0.10 – **0.12** – 0.20	0.20 – **0.25** – 0.30	0.15 – **0.20** – 0.30	0.25 – **0.30** – 0.35	0.10 – **0.12** – 0.15	0.05 – **0.08** – 0.10
Up to ø20.0	v_c	50 – **60** – 75	50 – **60** – 70	35 – **40** – 50	50 – **55** – 65	35 – **40** – 50	60 – **70** – 100	60 – **65** – 80	70 – **90** – 110	20 – **25** – 40	10 – **20** – 30
	f	0.15 – **0.25** – 0.35	0.15 – **0.20** – 0.35	0.15 – **0.20** – 0.25	0.20 – **0.22** – 0.25	0.15 – **0.17** – 0.25	0.20 – **0.25** – 0.35	0.15 – **0.20** – 0.35	0.25 – **0.32** – 0.40	0.10 – **0.12** – 0.15	0.05 – **0.08** – 0.10
Up to ø30.0	v_c	55 – **65** – 90	55 – **65** – 90	35 – **40** – 50	50 – **60** – 70	35 – **40** – 50	60 – **75** – 110	60 – **70** – 90	75 – **100** – 120	25 – **30** – 40	15 – **20** – 35
	f	0.20 – **0.30** – 0.40	0.20 – **0.25** – 0.35	0.15 – **0.20** – 0.25	0.20 – **0.25** – 0.35	0.15 – **0.20** – 0.25	0.25 – **0.30** – 0.40	0.20 – **0.25** – 0.40	0.30 – **0.35** – 0.45	0.10 – **0.14** – 0.20	0.08 – **0.10** – 0.12
Up to ø40.0	v_c	60 – **70** – 90	60 – **70** – 90	35 – **40** – 50	50 – **60** – 75	35 – **40** – 50	60 – **75** – 110	60 – **70** – 100	75 – **100** – 120	25 – **30** – 40	15 – **20** – 35
	f	0.20 – **0.30** – 0.40	0.20 – **0.25** – 0.30	0.15 – **0.50** – 0.25	0.25 – **0.30** – 0.35	0.15 – **0.20** – 0.25	0.25 – **0.35** – 0.45	0.20 – **0.25** – 0.40	0.30 – **0.35** – 0.45	0.10 – **0.14** – 0.20	0.08 – **0.10** – 0.12

Min. - **Optimum** - Max.

● Deep Hole (L/D: Up to 7): DAK Type

v_c: Cutting Speed (m/min) f : Feed Rate (mm/rev)

Drill Diameter øD		Soft Steel (Up to 200HB)	General Steel (Up to 300HB)	Hardened Steel 45HRC	Stainless Steel (Up to 200HB)	Grey Cast Iron FC250	Ductile Cast Iron FCD450	Aluminium Alloy —	Ti-alloy 6Al-4V-Ti	Inconel Inco718
Up to ø15.0	v_c	50 – **55** – 65	50 – **55** – 60	20 – **30** – 45	35 – **40** – 50	60 – **65** – 80	45 – **50** – 65	70 – **80** – 90	20 – **25** – 35	10 – **15** – 30
	f	0.15 – **0.20** – 0.25	0.15 – **0.20** – 0.25	0.10 – **0.15** – 0.15	0.10 – **0.12** – 0.15	0.20 – **0.22** – 0.25	0.15 – **0.20** – 0.25	0.25 – **0.27** – 0.30	0.08 – **0.10** – 0.12	0.05 – **0.08** – 0.10
Up to ø20.0	v_c	50 – **55** – 65	50 – **55** – 60	25 – **30** – 45	35 – **40** – 50	60 – **65** – 80	50 – **55** – 70	70 – **80** – 90	20 – **25** – 40	10 – **15** – 30
	f	0.15 – **0.20** – 0.25	0.15 – **0.20** – 0.25	0.15 – **0.17** – 0.20	0.12 – **0.15** – 0.20	0.20 – **0.22** – 0.25	0.15 – **0.17** – 0.25	0.25 – **0.27** – 0.35	0.08 – **0.10** – 0.12	0.05 – **0.08** – 0.10
Up to ø30.0	v_c	55 – **60** – 75	55 – **60** – 70	25 – **35** – 50	35 – **40** – 50	60 – **70** – 90	50 – **55** – 80	75 – **85** – 100	25 – **30** – 40	15 – **20** – 35
	f	0.20 – **0.25** – 0.30	0.20 – **0.25** – 0.30	0.15 – **0.17** – 0.20	0.15 – **0.17** – 0.20	0.25 – **0.27** – 0.30	0.20 – **0.25** – 0.30	0.30 – **0.32** – 0.35	0.10 – **0.12** – 0.15	0.08 – **0.10** – 0.12
Up to ø40.0	v_c	60 – **60** – 70	60 – **65** – 70	25 – **35** – 50	35 – **40** – 50	60 – **70** – 90	50 – **55** – 80	75 – **85** – 100	25 – **30** – 40	15 – **20** – 35
	f	0.20 – **0.25** – 0.30	0.20 – **0.25** – 0.30	0.15 – **0.17** – 0.20	0.15 – **0.17** – 0.20	0.25 – **0.27** – 0.30	0.20 – **0.25** – 0.30	0.30 – **0.35** – 0.40	0.10 – **0.12** – 0.15	0.08 – **0.10** – 0.12

Min. - **Optimum** - Max.

Brazed Series


MAK Type


BAK Type

Solid Type (With Oil Hole) (MAK Type/BAK Type/LAK Type/DAK Type)

Recommended Cutting Conditions J79

	Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
	Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
MAK	◎	◎		○		○			○	◎	○		
BAK	◎	◎											

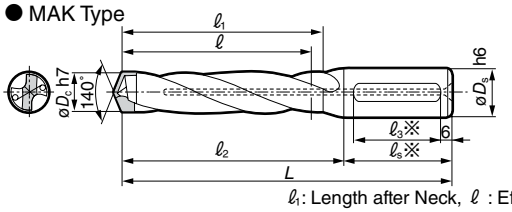
3D 5D 7D

ZX Coat

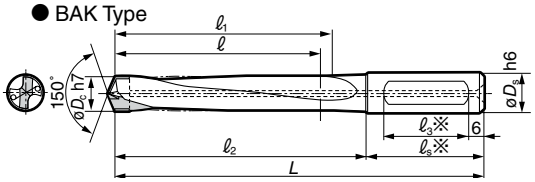
W/ Oil Hole

*See bottom right of page J81 for ℓ_s and ℓ_3.

● MAK Type



● BAK Type



ℓ_1: Length after Neck, ℓ : Effective Flute Length (Length of Web)

● Diameter ø13.0 to 23.5mm

Dimension indicated in ( ) is for BAK Type

MAK Type

BAK Type

LAK Type

DAK Type

Tool Diameter øDc (mm)	Shank Diameter øDs (mm)	Cat. No. M, B, L, D	Standard Series (3D) Stock M	Stock B	Dimensions (mm) L	ℓ	ℓ1	ℓ2	Long Series (5D) Stock L	Dimensions (mm) L	ℓ	ℓ1	ℓ2	Deep Hole Series (7D) Stock D	Dimensions (mm) L	ℓ	ℓ1	ℓ2
13.0	16	KDS 130 □AK	—	—	—	—	—	—	—	—	—	—	—	●	175	106	106	127
13.5		135 □AK	—	—	—	—	—	—		140	74	74	92	●				
13.7		KDS 137 □AK																
14.0		140 □AK	●		115	48	51	67	●	145	78	80	97	●	180	113	113	132
14.2		142 □AK	●		(118)	(56)	(56)	(70)	●									
14.5		145 □AK	●						●					●				
14.7	20	KDS 147 □AK																
14.8		148 □AK			125	55	54	75		155	85	85	105		195	122	122	145
15.0		150 □AK	●			(60)	(60)		●					●				
15.5		155 □AK	●						●					●				
15.7		KDS 157 □AK																
16.0		160 □AK	●		130	58	58	80	●	165	91	91	115	●	205	129	129	155
16.2		162 □AK	●			(64)	(64)		●									
16.3		163 □AK	●															
16.5		165 □AK	●						●					●				
16.7		KDS 167 □AK	●		135	61	61	85		170	96	96	120		215	138	138	165
17.0		170 □AK	●			(68)	(68)		●					●				
17.5		175 □AK	●						●					●				
17.6		KDS 176 □AK	●															
17.7		177 □AK	●		140	65	65	90	●	175	101	102	125		220	145	145	170
17.8		178 □AK				(72)	(72)											
18.0		180 □AK	●	●					●					●				
18.5		185 □AK	●						●					●				
18.7	25	KDS 187 □AK																
18.9		189 □AK																
19.0		190 □AK	●		155	68	68	99	●	190	107	107	134	●	240	154	154	184
19.1		191 □AK			(151)	(76)	(76)	(95)										
19.2		192 □AK																
19.4		194 □AK																
19.5		195 □AK	●						●					●				
19.7		KDS 197 □AK																
20.0		200 □AK	●						●					●				
20.2		202 □AK			155	72	72	99		195	112	113	139		245	161	161	189
20.3		203 □AK			(156)	(80)	(80)	(100)										
20.4		204 □AK																
20.5		205 □AK	●						●					●				
20.6		KDS 206 □AK																
20.7		207 □AK																
21.0		210 □AK	●		155	72	75	99	●	195	112	118	139	●	245	166	166	189
21.2		212 □AK	●		(161)	(84)	(84)	(105)	●									
21.5		215 □AK	●						●					●				
21.6		KDS 216 □AK																
22.0		220 □AK	●						●					●				
22.1		221 □AK			160	76	79	104		200	116	124	144		250	174	177	194
22.2		222 □AK			(166)	(88)	(88)	(110)										
22.4		224 □AK																
22.5		225 □AK	●						●					●				
23.0		KDS 230 □AK	●		160	74	82	104	●	210	124	129	154	●	270	186	186	214
23.5		235 □AK	●		(171)	(92)	(92)	(115)	●					●				

*Other than stocked items, sizes of ø0.1 increments can be produced.

Grade: ACZ70S

Please indicate M, B, L or D in the □ when ordering.
(Example: KDS130DAK)

Solid Type (With Oil Hole) (MAK Type / BAK Type / LAK Type / DAK Type)

Recommended Cutting Conditions J79

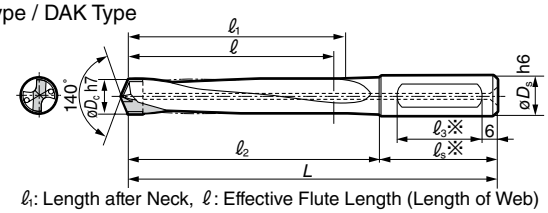
	Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
	Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
LAK	◎	◎				○			○	◎	○		
DAK	◎	◎		○		○			○	◎	○		

3D 5D 7D

ZX Coat W/ Oil Hole

*See bottom right for ℓ_s and ℓ_3.

● LAK Type / DAK Type



ℓ_1: Length after Neck, ℓ: Effective Flute Length (Length of Web)

● Diameter ø24.0 to 40.5mm

Dimension indicated in ( ) is for BAK Type

Tool Diameter øDc (mm)	Shank Diameter øDs (mm)	Cat. No. M,B,L,D	Standard Series (3D) Stock M	Stock B	Dimensions (mm) L	ℓ	ℓ1	ℓ2	Long Series (5D) Stock L	Dimensions (mm) L	ℓ	ℓ1	ℓ2	Deep Hole Series (7D) Stock D	Dimensions (mm) L	ℓ	ℓ1	ℓ2
24.0	32	KDS 240□AK	●	●	170 (180)	79 (96)	86 (96)	110 (120)	●	220	129	135	160	●	280	190	190	220
24.1		241□AK	●															
24.5		245□AK	●	●					●					●				
24.6		KDS 246□AK	●	●	170 (185)	78 (100)	88 (100)	110 (125)		225	133	140	165		290	200	200	230
24.7		247□AK	●	●														
25.0		250□AK	●						●					●				
25.5		255□AK	●						●					●				
26.0		KDS 260□AK	●		175 (190)	82 (104)	92 (104)	115 (130)	●	230	137	146	170	●	300	210	210	240
26.5		265□AK	●	●					●					●				
26.7		KDS 267□AK		●	175 (195)	81 (108)	94 (108)	115 (135)		235	141	151	175		305	215	215	245
27.0		270□AK	●						●					●				
27.5		275□AK	●						●									
28.0		KDS 280□AK	●		180 (200)	84 (112)	97 (112)	120 (140)	●	240	144	157	180	●	310	220	220	250
28.1		281□AK																
28.3		283□AK																
28.5		285□AK	●						●									
28.6		KDS 286□AK			185 (205)	88 (116)	100 (116)	125 (145)		245	148	162	185		320	230	230	260
28.7		287□AK																
29.0		290□AK	●						●					●				
29.4		294□AK																
29.5		295□AK	●						●									
29.8		KDS 298□AK			185 (210)	87 (120)	104 (120)	125 (150)		255	157	167	195		330	240	240	270
30.0		300□AK	●						●					●				
30.5		305□AK	●						●									
31.0	40	KDS 310□AK		—	205	95	112	135		275	166	187	205		345	245	245	275
31.5		315□AK		—														
32.0		KDS 320□AK		—	210	98	115	140		280	172	190	210		355	250	250	285
32.5		325□AK		—														
33.0		KDS 330□AK		—	215	101	119	145	●	285	172	194	215		365	260	260	295
33.5		335□AK		—														
34.0		KDS 340□AK		—	220	104	122	150		290	177	197	220		375	270	270	305
34.5		345□AK		—														
35.0		KDS 350□AK		—	225	107	125	155		295	180	200	225		385	275	275	315
35.5		355□AK		—														
36.0		KDS 360□AK		—	225	110	128	155		300	183	203	230		390	280	280	320
36.5		365□AK		—														
37.0		KDS 370□AK		—	230	113	132	160		305	188	207	235		400	290	290	330
37.5		375□AK		—														
38.0		KDS 380□AK		—	235	116	165	165		315	193	245	245		410	308	340	340
38.5		385□AK		—														
39.0		KDS 390□AK		—	240	119	170	170		320	198	250	250		415	312	345	345
39.5		395□AK		—														
40.0		KDS 400□AK		—	245	122	175	175		325	203	255	255		420	316	350	350
40.5		405□AK		—														

*Other than stocked items, sizes of ø0.1 increments can be produced.

Grade: ACZ70S

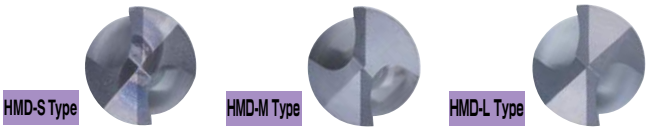
Please indicate M, B, L or D in the □ when ordering.
(Example: KDS240MAK)

■ Additional Dimensions *

Dimensions for Shank Length (ℓ_s) and Side Lock Flat (ℓ_3)

Shank Diameter øDs	ℓ_s	ℓ_3
16.0	48	35
20.0	50	40
25.0	56	45
32.0	60	50
40.0	70	60

HMD-S Type



Short Type

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
○	○				○			○	○	○		

PVD Coat

3D

Fig1 : Stepped Shank

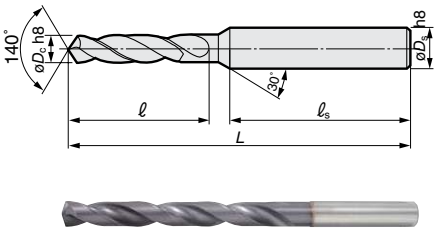


Fig2 : Straight Shank

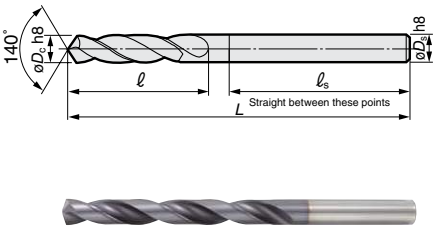
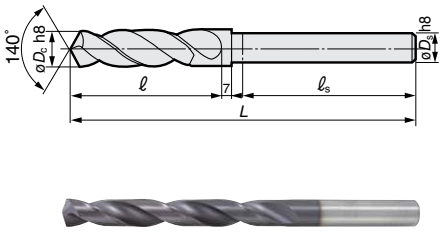


Fig3 : Relief Shank



● Diameter ø1.0 to 5.3mm

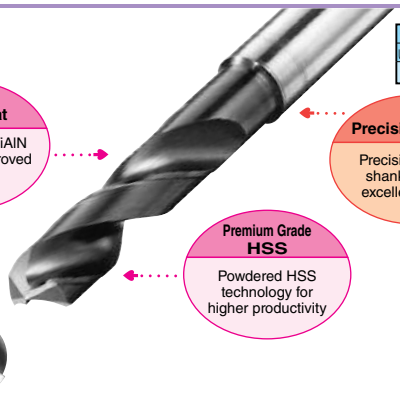
Tool Diameter øDc (mm)	Shank			Cat. No.	Stock	Dimensions (mm)	
	Diameter øDs (mm)	Length ℓs (mm)	Fig			Total Length L	Flute length ℓ
1.0	3	28	1	HMD 010S	●	38	6
1.1				HMD 011S	●	39	7
1.2				HMD 012S	●	40	8
1.3				013S	●		
1.4				HMD 014S	●	41	9
1.5				015S	●		
1.6				HMD 016S	●	42	10
1.7				017S	●		
1.8				HMD 018S	●	43	11
1.9				019S	●		
2.0				HMD 020S	●	44	12
2.1				021S	●		
2.2				HMD 022S	●	45	13
2.3				023S	●		
2.4				HMD 024S	●	46	14
2.5				025S	●		
2.6				026S	●		
2.7				HMD 027S	●	48	16
2.8				028S	●		
2.9				029S	●		
3.0			2	HMD 030S	●		
3.1	4	30	1	HMD 031S	●	50	18
3.2				032S	●		
3.3				033S	●		
3.4				HMD 034S	●	52	20
3.5				035S	●		
3.6				036S	●		
3.7				037S	●		
3.8				HMD 038S	●	54	22
3.9				039S	●		
4.0			2	HMD 040S	●		
4.1	6	38	1	HMD 041S	●	66	22
4.2				042S	●		
4.3				HMD 043S	●	68	24
4.4				044S	●		
4.5				045S	●		
4.6				046S	●		
4.7				047S	●		
4.8				HMD 048S	●	70	26
4.9				049S	●		
5.0				050S	●		
5.1				051S	●		
5.2				052S	●		
5.3				053S	●		

● Diameter ø5.4 to 10.0mm

Tool Diameter øDc (mm)	Shank			Cat. No.	Stock	Dimensions (mm)	
	Diameter øDs (mm)	Length ℓs (mm)	Fig			Total Length L	Flute length ℓ
5.4	6	38	1	HMD 054S	●	72	28
5.5				055S	●		
5.6				056S	●		
5.7				057S	●		
5.8				058S	●		
5.9				059S	●		
6.0			2	HMD 060S	●		
6.1	8	38	1	HMD 061S	●	75	31
6.2				062S	●		
6.3				063S	●		
6.4				064S	●		
6.5				065S	●		
6.6				066S	●		
6.7				067S	●		
6.8				HMD 068S	●	78	34
6.9				069S	●		
7.0				070S	●		
7.1				071S	●		
7.2				072S	●		
7.3				073S	●		
7.4				074S	●		
7.5				075S	●		
7.6				HMD 076S	●	81	37
7.7				077S	●		
7.8				078S	●		
7.9				079S	●		
8.0			2	HMD 080S	●		
8.1	10	43.5	1	HMD 081S	●	87	37
8.2				082S	●		
8.3				083S	●		
8.4				084S	●		
8.5				085S	●		
8.6				HMD 086S	●	90	40
8.7				087S	●		
8.8				088S	●		
8.9				089S	●		
9.0				090S	●		
9.1				091S	●		
9.2				092S	●		
9.3				093S	●		
9.4				094S	●		
9.5				095S	●		
9.6				HMD 096S	●	93	43
9.7				097S	●		
9.8				098S	●		
9.9				099S	●		
10.0			2	HMD 100S	●		

HMD-S Type

Short Type



TiAlN-Coat
Multi-layered TiAlN coating for improved tool life

Precision Shank
Precision ground shank ensures excellent rigidity

Premium Grade HSS
Powdered HSS technology for higher productivity

MultiDrill Design
Unique point geometry maximises drill penetration rates

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
○	○				○			○	○	○		

PVD Coat

3D

● Diameter ø10.1 to 12.2mm

Tool Diameter $øD_c$ (mm)	Shank Diameter $øD_s$ (mm)	Shank Length ℓ_s (mm)	Fig	Cat. No.	Stock	Dimensions (mm) Total Length L	Dimensions (mm) Flute Length ℓ
10.1	12	46	1	HMD 101S	●	100	43
10.2				102S	●		
10.3				103S	●		
10.4				104S	●		
10.5				105S	●		
10.6				106S	●		
10.7				HMD 107S	●	104	47
10.8				108S	●		
10.9				109S	●		
11.0				110S	●		
11.1				111S	●		
11.2				112S	●		
11.3				113S	●		
11.4				114S	●		
11.5				115S	●		
11.6				116S	●		
11.7				117S	●		
11.8				118S	●		
11.9				HMD 119S	●	108	51
12.0			2	HMD 120S	●		
12.1			3	HMD 121S	●		
12.2				122S	●		

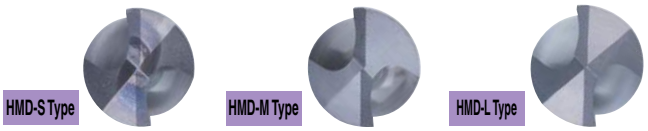
● Diameter ø12.3 to 20.0mm

Tool Diameter $øD_c$ (mm)	Shank Diameter $øD_s$ (mm)	Shank Length ℓ_s (mm)	Fig	Cat. No.	Stock	Dimensions (mm) Total Length L	Dimensions (mm) Flute Length ℓ
12.3	12	46	3	HMD 123S	●	108	51
12.4				124S	●		
12.5				125S	●		
12.6				126S	●		
12.7				127S	●		
12.8				128S	●		
12.9				129S	●		
13.0				130S	●		
13.5	16	50	1	HMD 135S	●	132	72
14.0				140S	●		
14.5				HMD 145S	●	136	76
15.0	20	52		HMD 150S	●	142	76
15.5				HMD 155S	●	146	80
16.0				160S	●		
16.5				HMD 165S	●	150	84
17.0				170S	●		
17.5				HMD 175S	●	153	87
18.0				180S	●		
18.5				HMD 185S	●	156	90
19.0	25	60		HMD 190S	●	164	90
19.5				HMD 195S	●	168	94
20.0				200S	●		

■ Recommended Cutting Conditions

Type	Tool Diameter $øD_c$ (mm)	Structural Steels (SS) Carbon Steel (SC) Rotation Speed (min^{-1})	Structural Steels (SS) Carbon Steel (SC) Feed Rate (mm/min)	Alloy Steel (SCM) Pre-hardened Steel (NAK) Rotation Speed (min^{-1})	Alloy Steel (SCM) Pre-hardened Steel (NAK) Feed Rate (mm/min)	Die Steel (SKD) Stainless Steel Tempered Steel (35 to 45HRC) Rotation Speed (min^{-1})	Die Steel (SKD) Stainless Steel Tempered Steel (35 to 45HRC) Feed Rate (mm/min)	Cast Iron (FC) Rotation Speed (min^{-1})	Cast Iron (FC) Feed Rate (mm/min)	Al Alloy Non-Ferrous Metal Rotation Speed (min^{-1})	Al Alloy Non-Ferrous Metal Feed Rate (mm/min)
Short	ø2.0	5,700	360	4,600	240	3,400	160	6,300	490	9,700	760
	ø3.0	4,200	460	3,400	320	2,500	200	4,700	640	7,200	980
	ø5.0	2,500	430	2,000	290	1,500	200	2,800	600	4,300	920
	ø8.0	1,600	370	1,300	250	960	170	1,800	530	2,700	790
	ø10.0	1,300	340	1,000	230	760	150	1,400	460	2,200	730
	ø12.0	1,100	310	850	210	640	140	1,200	430	1,800	670
	ø16.0	800	290	640	200	480	130	880	390	1,400	610
	ø20.0	640	260	510	180	380	120	700	350	1,100	550

HMD-M Type



Regular Type

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
○	○				○			○	○	○		

PVD Coat

5D

Fig. 1: Stepped Shank

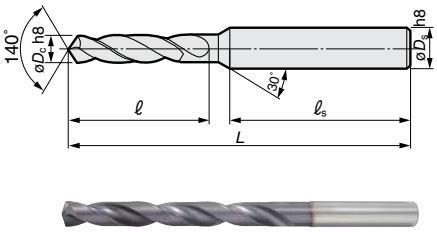


Fig. 2: Straight Shank

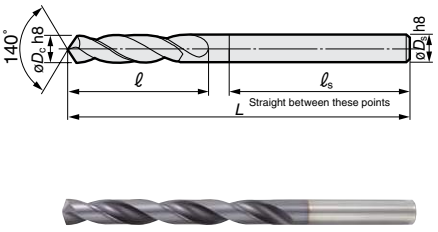
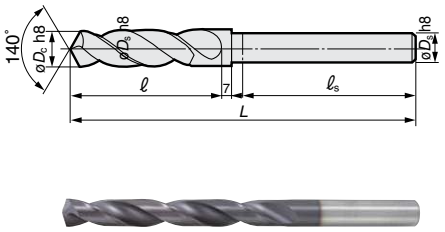


Fig. 3: Relief Shank



● Diameter ø2.0 to 6.0mm

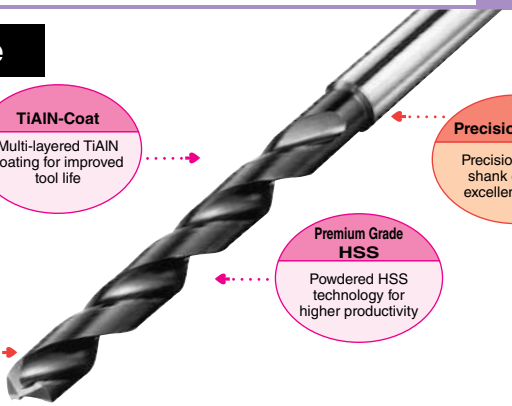
Tool Diameter øDc (mm)	Shank Diameter øDs (mm)	Shank Length ℓs (mm)	Fig	Cat. No.	Stock	Dimensions (mm) Total Length L	Dimensions (mm) Flute length ℓ
2.0	3	28	1	HMD 020M	●	56	24
2.1				021M	●		
2.2				HMD 022M	●	56	25
2.3				023M	●		
2.4				HMD 024M	●	61	30
2.5				025M	●		
2.6				026M	●		
2.7				HMD 027M	●	64	33
2.8				028M	●		
2.9				029M	●		
3.0			2	HMD 030M	●		
3.1	4	30	1	HMD 031M	●	68	36
3.2				032M	●		
3.3				033M	●		
3.4				HMD 034M	●	71	39
3.5				035M	●		
3.6				036M	●		
3.7				037M	●		
3.8				HMD 038M	●	75	43
3.9				039M	●		
4.0			2	HMD 040M	●		
4.1	6	38	1	HMD 041M	●	85	43
4.2				042M	●		
4.3				HMD 043M	●	89	47
4.4				044M	●		
4.5				045M	●		
4.6				046M	●		
4.7				047M	●		
4.8				HMD 048M	●	94	52
4.9				049M	●		
5.0				050M	●		
5.1				051M	●		
5.2				052M	●		
5.3				053M	●		
5.4				HMD 054M	●	99	57
5.5				055M	●		
5.6				056M	●		
5.7				057M	●		
5.8				058M	●		
5.9				059M	●		
6.0			2	HMD 060M	●		

● Diameter ø6.1 to 10.0mm

Tool Diameter øDc (mm)	Shank Diameter øDs (mm)	Shank Length ℓs (mm)	Fig	Cat. No.	Stock	Dimensions (mm) Total Length L	Dimensions (mm) Flute length ℓ
6.1	8	38	1	HMD 061M	●	107	63
6.2				062M	●		
6.3				063M	●		
6.4				064M	●		
6.5				065M	●		
6.6				066M	●		
6.7				067M	●		
6.8				HMD 068M	●	113	69
6.9				069M	●		
7.0				070M	●		
7.1				071M	●		
7.2				072M	●		
7.3				073M	●		
7.4				074M	●		
7.5				075M	●		
7.6				HMD 076M	●	119	75
7.7				077M	●		
7.8				078M	●		
7.9				079M	●		
8.0			2	HMD 080M	●		
8.1	10	43.5	1	HMD 081M	●	125	75
8.2				082M	●		
8.3				083M	●		
8.4				084M	●		
8.5				085M	●		
8.6				HMD 086M	●	131	81
8.7				087M	●		
8.8				088M	●		
8.9				089M	●		
9.0				090M	●		
9.1				091M	●		
9.2				092M	●		
9.3				093M	●		
9.4				094M	●		
9.5				095M	●		
9.6				HMD 096M	●	137	87
9.7				097M	●		
9.8				098M	●		
9.9				099M	●		
10.0			2	HMD 100M	●		

HMD-M Type

Regular Type



Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
○	○				○			○	○	○		

PVD Coat 5D

● Diameter ø10.1 to 12.2mm

Tool Diameter øDc (mm)	Shank Diameter øDs (mm)	Shank Length ℓs (mm)	Fig	Cat. No.	Stock	Dimensions (mm) Total Length L	Dimensions (mm) Flute length ℓ
10.1	12	46	1	HMD 101M	●	144	87
10.2				102M	●		
10.3				103M	●		
10.4				104M	●		
10.5				105M	●		
10.6				106M	●		
10.7				HMD 107M	●	151	94
10.8				108M	●		
10.9				109M	●		
11.0				110M	●		
11.1				111M	●		
11.2				112M	●		
11.3				113M	●		
11.4				114M	●		
11.5				115M	●		
11.6				116M	●		
11.7				117M	●		
11.8				118M	●		
11.9				HMD 119M	●	158	101
12.0			2	HMD 120M	●		
12.1			3	HMD 121M	●		
12.2				122M	●		

● Diameter ø12.3 to 20.0mm

Tool Diameter øDc (mm)	Shank Diameter øDs (mm)	Shank Length ℓs (mm)	Fig	Cat. No.	Stock	Dimensions (mm) Total Length L	Dimensions (mm) Flute length ℓ
12.3	12	46	3	HMD 123M	●	158	101
12.4				124M	●		
12.5				125M	●		
12.6				126M	●		
12.7				127M	●		
12.8				128M	●		
12.9				129M	●		
13.0				130M	●		
13.5	16	50	1	HMD 135M	●	168	108
14.0				140M	●		
14.5				HMD 145M	●	173	114
15.0	20	52		HMD 150M	●	180	114
15.5				HMD 155M	●	185	120
16.0				160M	●		
16.5				HMD 165M	●	189	125
17.0				170M	●		
17.5				HMD 175M	●	194	130
18.0				180M	●		
18.5				HMD 185M	●	198	135
19.0	25	60		HMD 190M	●	206	135
19.5				HMD 195M	●	210	140
20.0				200M	●		

■ Recommended Cutting Conditions

Type	Tool Diameter øDc (mm)	Structural Steels (SS) Carbon Steel (SC) Rotation Speed (min⁻¹)	Structural Steels (SS) Carbon Steel (SC) Feed Rate (mm/min)	Alloy Steel (SCM) Pre-hardened Steel (NAK) Rotation Speed (min⁻¹)	Alloy Steel (SCM) Pre-hardened Steel (NAK) Feed Rate (mm/min)	Die Steel (SKD) Stainless Steel Tempered Steel (35 to 45HRC) Rotation Speed (min⁻¹)	Die Steel (SKD) Stainless Steel Tempered Steel (35 to 45HRC) Feed Rate (mm/min)	Cast Iron (FC) Rotation Speed (min⁻¹)	Cast Iron (FC) Feed Rate (mm/min)	Al Alloy Non-Ferrous Metal Rotation Speed (min⁻¹)	Al Alloy Non-Ferrous Metal Feed Rate (mm/min)
Regular	ø2.0	5,700	300	4,600	200	3,400	130	6,300	410	9,700	630
	ø3.0	4,200	380	3,400	260	2,500	170	4,700	530	7,200	820
	ø5.0	2,500	360	2,000	240	1,500	160	2,800	500	4,300	770
	ø8.0	1,600	310	1,300	210	960	140	1,800	440	2,700	660
	ø10.0	1,300	280	1,000	190	760	130	1,400	390	2,200	610
	ø12.0	1,100	260	850	180	640	120	1,200	360	1,800	560
	ø16.0	800	240	640	160	480	110	880	330	1,400	500
	ø20.0	640	220	510	150	380	96	700	300	1,100	460

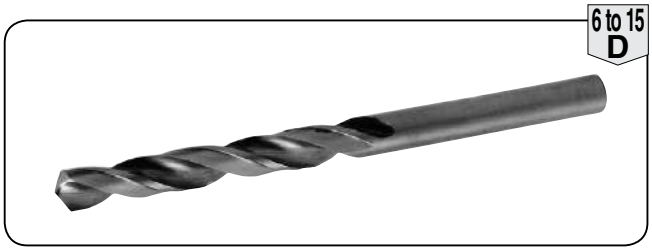
Solid Carbide Drills

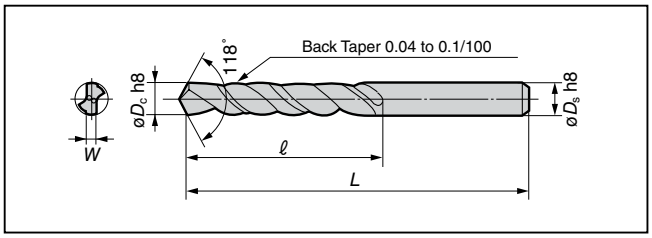
SD Type

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
								○	○	○		

Carbide

6 to 15 D





Cat. No.	Stock Size	Dimensions (mm)			
		øDc (øDs)	L	ℓ	W
SD 080 to 090		**0.80 to 0.89**	30	12	0.2
SD 091 to 140		**0.90 to 1.39**	30	16	0.2 to 0.3
SD 141 to 190		**1.40 to 1.90**	35	19	0.4
SD 191 to 240		**1.91 to 2.40**	40	22	0.5
SD 241 to 300		**2.41 to 3.00**	45	25	0.6
SD 301 to 350		**3.01 to 3.50**	50	28	0.7
SD 351 to 400		**3.51 to 4.00**	55	30	0.8
SD 401 to 450		**4.01 to 4.50**	60	34	0.9
SD 451 to 550		**4.51 to 5.50**	65	38	1.0
SD 551 to 600		**5.51 to 6.00**	70	40	1.1
SD 601 to 650		**6.01 to 6.50**	75	43	1.2
SD 651 to 700		**6.51 to 7.00**	80	46	1.3
SD 701 to 750		**7.01 to 7.50**	80	46	1.4
SD 751 to 800		**7.51 to 8.00**	85	50	1.5

Note: ordering number for (ex.) ø4.6mm drill is SD460.
Grade: H1

■ Recommended Cutting Conditions, SD Type, VSD Type

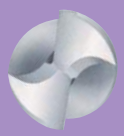
v_c: Cutting Speed (m/min) f: Feed Rate (mm/rev)

Tool Diameter øDc (mm)	Cond.	Die steel (About HB250)	Cast Iron	Non Ferrous Alloy
Up to ø5.0	v_c	5 – **8** – 10	10 – **30** – 40	20 – **50** – 80
	f	0.03 – **0.04** – 0.05	0.1 – **0.15** – 0.2	0.1 – **0.15** – 0.2
Up to ø13.0	v_c	10 – **15** – 20	20 – **40** – 60	30 – **80** – 100
	f	0.05 – **0.06** – 0.07	0.1 – **0.15** – 0.2	0.1 – **0.15** – 0.2

Min. - **Optimum** - Max.

VA Solid Carbide Drills

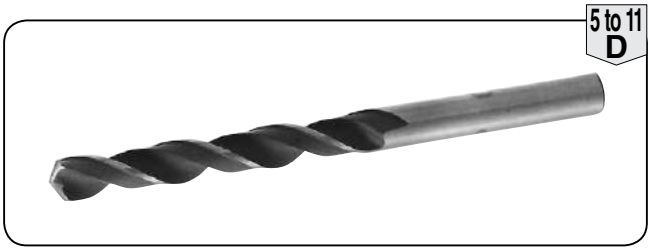
VSD Type

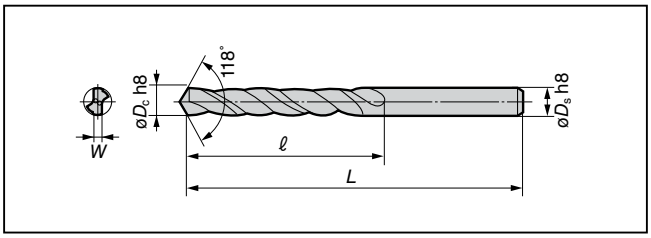


Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
		○	◎	◎				○	○			

Carbide

5 to 11 D





Cat. No.	Stock Size	Dimensions (mm)			
		øDc (øDs)	L	ℓ	W
VSD 020 to 024	From Dia. 2.0 to Dia. 10.0, in intervals of 0.1mm is stocked except **VSD 057(5.7) VSD 063(6.3) VSD 072(7.2) VSD 083(8.3) VSD 084(8.4) VSD 089(8.9) VSD 094(9.4) VSD 096(9.6) VSD 099(9.9)**	**2.0 to 2.4**	40	22	0.25×D
VSD 025 to 030		**2.5 to 3.0**	45	25	0.25×D
VSD 031 to 035		**3.1 to 3.5**	50	28	0.25×D
VSD 036 to 040		**3.6 to 4.0**	55	30	0.25×D
VSD 041 to 045		**4.1 to 4.5**	60	34	0.25×D
VSD 046 to 050		**4.6 to 5.0**	65	38	0.25×D
VSD 051 to 055		**5.1 to 5.5**	65	38	0.25×D
VSD 056 to 060		**5.6 to 6.0**	75	40	0.25×D
VSD 061 to 065		**6.1 to 6.5**	75	43	0.25×D
VSD 066 to 070		**6.6 to 7.0**	85	46	0.25×D
VSD 071 to 075		**7.1 to 7.5**	85	46	0.25×D
VSD 076 to 080		**7.6 to 8.0**	100	50	0.25×D
VSD 081 to 085		**8.1 to 8.5**	100	50	0.25×D
VSD 086 to 090		**8.6 to 9.0**	100	50	0.25×D
VSD 091 to 095		**9.1 to 9.5**	125	65	0.25×D
VSD 096 to 100		**9.6 to 10.0**	125	65	0.25×D
VSD 101 to 105	10.2, 10.3 10.5	**10.1 to 10.5**	125	65	0.25×D
VSD 106 to 110	11.0	**10.6 to 11.0**	125	65	0.25×D
VSD 111 to 115	11.5	**11.1 to 11.5**	125	65	0.25×D
VSD 116 to 120	12.0	**11.6 to 12.0**	150	75	0.25×D
VSD 121 to 125	12.5	**12.1 to 12.5**	150	75	0.25×D
VSD 126 to 130	13.0	**12.6 to 13.0**	150	75	0.25×D

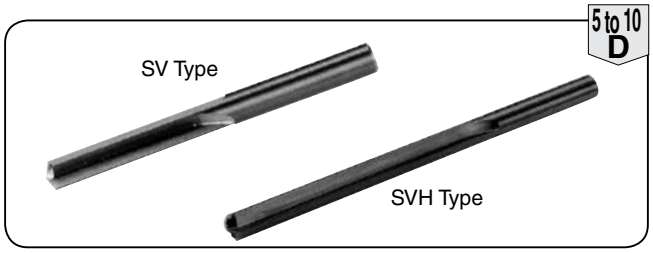
Note: Ordering number for (ex.) ø3.2mm drill is VSD032.
Grade: H1

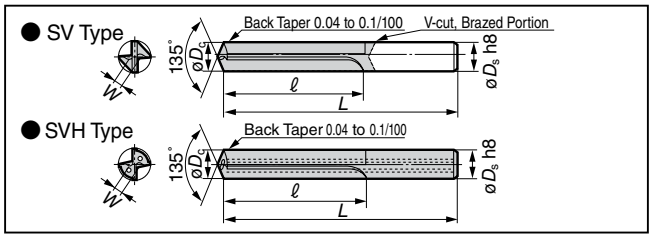
Solid Brazed Straight Flute Drills

SV / SVH Type

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP	Carbide
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC				◎	◎	◎			

5 to 10 D





SV Type

Cat. No.	Dimensions (mm)				Specifications
	øDc (øDs)	L	ℓ	W	
SV 200 to 250	2.0 ≤ øDc ≤ 2.5	50	20	0.6	Solid Type
251 to 300	2.5 < øDc ≤ 3.0	50	22	0.6	
301 to 350	3.0 < øDc ≤ 3.5	55	25	0.8	
351 to 400	3.5 < øDc ≤ 4.0	55	28	1.0	
401 to 450	4.0 < øDc ≤ 4.5	60	30	1.0	
SV 451 to 500	4.5 < øDc ≤ 5.0	65	33	1.2	
501 to 550	5.0 < øDc ≤ 5.5	70	35	1.2	
551 to 600	5.5 < øDc ≤ 6.0	75	40	1.4	
601 to 650	6.0 < øDc ≤ 6.5	80	43	1.4	
651 to 700	6.5 < øDc ≤ 7.0	85	46	1.6	
SV 701 to 800	7.0 < øDc ≤ 8.0	90	50	1.6	
801 to 900	8.0 < øDc ≤ 9.0	95	53	1.6	
901 to 1000	9.0 < øDc ≤ 10.0	100	55	2.0	
1001 to 1100	10.0 < øDc ≤ 11.0	115	65	2.0	
1101 to 1200	11.0 < øDc ≤ 12.0	115	65	2.3	
SV 1201 to 1400	12.0 < øDc ≤ 14.0	120	70	2.5	Brazed Type
1401 to 1600	14.0 < øDc ≤ 16.0	130	75	2.8	
1601 to 1800	16.0 < øDc ≤ 18.0	140	80	3.2	
1801 to 2000	18.0 < øDc ≤ 20.0	150	90	3.5	

SVH Type

SVH 400 to 500	4.0 ≤ øDc ≤ 5.0	100	60	1.2	Solid Type
501 to 600	5.0 < øDc ≤ 6.0	115	72	1.4	
601 to 700	6.0 < øDc ≤ 7.0	130	84	1.6	
701 to 800	7.0 < øDc ≤ 8.0	145	96	1.8	
801 to 900	8.0 < øDc ≤ 9.0	155	108	2.0	
SVH 901 to 1000	9.0 < øDc ≤ 10.0	170	120	2.2	
1001 to 1100	10.0 < øDc ≤ 11.0	182	132	2.4	
1101 to 1200	11.0 < øDc ≤ 12.0	194	144	2.8	
1201 to 1300	12.0 < øDc ≤ 13.0	206	156	3.0	
1301 to 1400	13.0 < øDc ≤ 14.0	218	168	3.2	
SVH 1401 to 1500	14.0 < øDc ≤ 15.0	230	180	3.5	
1501 to 1600	15.0 < øDc ≤ 16.0	242	192	3.8	

Recommended Cutting Conditions

SV Type

v_c: Cutting Speed (m/min) f: Feed Rate (mm/rev)

Tool Diameter øDc (mm)	Cond.	Ductile Cast Iron	Cast Iron	Aluminium Alloy
Up to ø10.0	v_c	20 – **40** – 60	20 – **35** – 50	50 – **80** – 100
	f	0.05 – **0.06** – 0.08	0.05 – **0.07** – 0.1	0.05 – **0.07** – 0.1
Up to ø20.0	v_c	30 – **50** – 70	30 – **60** – 80	80 – **100** – 120
	f	0.05 – **0.07** – 0.08	0.05 – **0.08** – 0.1	0.05 – **0.1** – 0.15

SVH Type

Up to ø10.0	v_c	40 – **70** – 100	50 – **70** – 100	50 – **100** – 150
	f	0.15 – **0.17** – 0.2	0.2 – **0.25** – 0.3	0.25 – **0.27** – 0.3
Up to ø20.0	v_c	60 – **90** – 120	100 – **130** – 160	100 – **150** – 200
	f	0.2 – **0.25** – 0.3	0.2 – **0.25** – 0.3	0.3 – **0.32** – 0.35

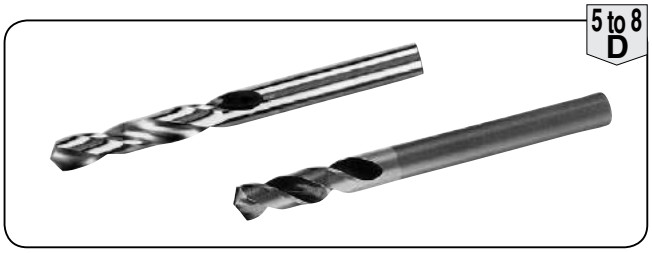
Min. - **Optimum** - Max.

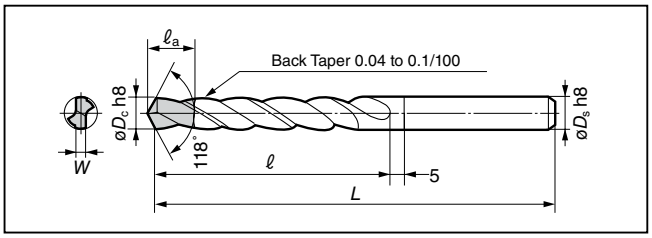
Solid Carbide-End Twist Drills

DLS Type

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP	Carbide
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC				◎	◎	◎	○		

5 to 8 D





Straight Shank (Cast Iron)

Cat. No.	Dimensions (mm)				
	øDc (øDs)	L	ℓa	ℓ	W
DLS 060 to 065	6.0 to 6.5	95	15	50	1.2
066 to 070	6.6 to 7.0	95	15	50	1.3
071 to 075	7.1 to 7.5	95	20	50	1.4
076 to 080	7.6 to 8.0	95	20	50	1.5
081 to 085	8.1 to 8.5	110	25	60	1.5
DLS 086 to 090	8.6 to 9.0	110	25	60	1.6
091 to 095	9.1 to 9.5	110	26	60	1.7
096 to 100	9.6 to 10.0	110	26	60	1.8
101 to 105	10.1 to 10.5	125	26	60	1.8
106 to 110	10.6 to 11.0	125	26	60	1.9
DLS 111 to 115	11.1 to 11.5	125	26	60	2.0
116 to 120	11.6 to 12.0	125	26	60	2.0

Note: • Ordering number for (ex.) ø10.5mm drill is DLS105. Please also advise work material.
• Tang type drills can be made-to-order. Please advise tang dimensions J and K.
• Helix angle 28°, Web thickness ratio 1.2:1.

Straight Shank (Aluminium Alloy)

Cat. No.	Dimensions (mm)				
	øDc	L	ℓa	ℓ	W
DLS 060A to 065A	6.0 to 6.5	95	15	50	1.2
066A to 070A	6.6 to 7.0	95	15	50	1.3
071A to 075A	7.1 to 7.5	95	20	50	1.4
076A to 080A	7.6 to 8.0	95	20	50	1.5
081A to 085A	8.1 to 8.5	110	25	60	1.5
DLS 086A to 090A	8.6 to 9.0	110	25	60	1.6
091A to 095A	9.1 to 9.5	110	26	60	1.7
096A to 100A	9.6 to 10.0	110	26	60	1.8
101A to 105A	10.1 to 10.5	125	26	70	1.8
106A to 110A	10.6 to 11.0	125	26	70	1.9
DLS 111A to 115A	11.1 to 11.5	125	26	70	2.0
116A to 120A	11.6 to 12.0	125	26	70	2.0

Grade: A1

Note: • Ordering number for (ex.) ø7.6mm drill is DLS076A. Please also advise work material.
• Tang type drills can be made-to-order. Please advise tang dimensions J and K.
• Helix angle 28°, Web thickness ratio 1.2:1.

Recommended Cutting Conditions

v_c: Cutting Speed (m/min) f: Feed Rate (mm/rev)

Tool Diameter øDc (mm)	Cond.	Ductile Cast Iron	Cast Iron	Aluminium Alloy
Up to ø10.0	v_c	20 – **35** – 55	20 – **40** – 60	50 – **100** – 150
	f	0.2 – **0.3** – 0.4	0.2 – **0.3** – 0.4	0.1 – **0.15** – 0.2
Up to ø15.0	v_c	30 – **50** – 70	30 – **60** – 80	70 – **130** – 200
	f	0.3 – **0.35** – 0.4	0.3 – **0.35** – 0.4	0.1 – **0.15** – 0.2
Up to ø25.0	v_c	50 – **60** – 90	50 – **75** – 100	100 – **150** – 250
	f	0.3 – **0.35** – 0.45	0.3 – **0.4** – 0.5	0.1 – **0.15** – 0.2

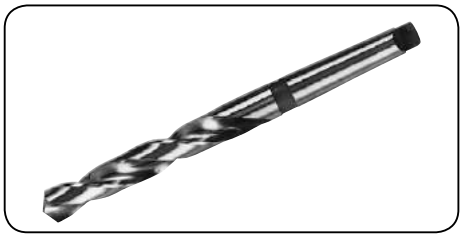
Min. - **Optimum** - Max.

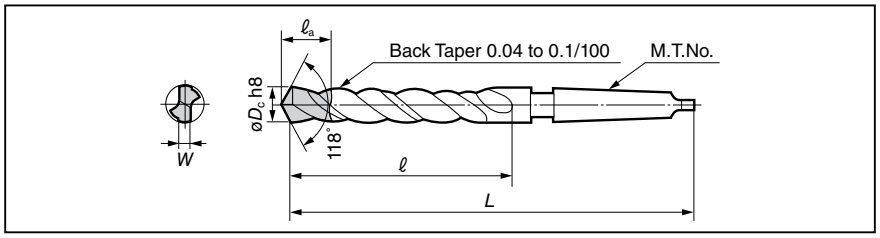
DLT Type

Cast Iron, Aluminium Alloy

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless Steel	Ti-Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper Alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC				◎	◎	○		

Carbide | 6 to 12 D





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Cat. No.	Stock Size	Dimensions (mm)					M.T. No.
		ϕD_c	L	ℓ_a	ℓ	W	
DLT 060 to 065	6.0, 6.5	**6.0 to 6.5**	152	15	72	1.2	1
DLT 066 to 070	6.8, 7.0	**6.6 to 7.0**	155	15	75	1.3	1
DLT 071 to 075	7.5	**7.1 to 7.5**	158	20	78	1.4	1
DLT 076 to 080	8.0	**7.6 to 8.0**	162	20	82	1.5	1
DLT 081 to 085	8.5	**8.1 to 8.5**	168	25	85	1.5	1
DLT 086 to 090	8.6, 8.7 9.0	**8.6 to 9.0**	172	25	88	1.6	1
DLT 091 to 095	9.5	**9.1 to 9.5**	175	26	92	1.7	1
DLT 096 to 100	10.0	**9.6 to 10.0**	178	26	95	1.8	1
DLT 101 to 105	10.2, 10.3 10.5	**10.1 to 10.5**	182	26	98	1.8	1
DLT 106 to 110	11.0	**10.6 to 11.0**	185	26	102	1.9	1
DLT 111 to 115	11.5	**11.1 to 11.5**	188	26	105	2.0	1
DLT 116 to 120	11.7, 12.0	**11.6 to 12.0**	192	26	108	2.0	1
DLT 121 to 125	12.5	**12.1 to 12.5**	195	26	112	2.2	1
DLT 126 to 130	13.0	**12.6 to 13.0**	198	26	115	2.2	1
DLT 131 to 135	13.5	**13.1 to 13.5**	202	27	118	2.3	1
DLT 136 to 140	14.0	**13.6 to 14.0**	205	27	122	2.3	1
DLT 141 to 145	14.5	**14.1 to 14.5**	222	27	122	2.5	2
DLT 146 to 150	15.0	**14.6 to 15.0**	225	27	125	2.5	2
DLT 151 to 155	15.5	**15.1 to 15.5**	228	27	125	2.6	2

Grade: A1

*

Cat. No.	Stock Size	Dimensions (mm)					M.T. No.
		ϕD_c	L	ℓ_a	ℓ	W	
DLT 156 to 160	16.0	**15.6 to 16.0**	230	27	130	2.6	2
DLT 161 to 165	16.5	**16.1 to 16.5**	232	27	132	2.7	2
DLT 166 to 170	17.0	**16.6 to 17.0**	235	27	135	2.7	2
DLT 171 to 175	17.5	**17.1 to 17.5**	240	27	140	2.9	2
DLT 176 to 180	18.0	**17.6 to 18.0**	240	27	140	2.9	2
DLT 181 to 185	18.5	**18.1 to 18.5**	245	30	145	3.0	2
DLT 186 to 190	19.0	**18.6 to 19.0**	245	30	145	3.0	2
DLT 191 to 195		**19.1 to 19.5**	250	30	150	3.1	2
DLT 196 to 200	20.0	**19.6 to 20.0**	250	30	150	3.1	2
DLT 201 to 205	20.5	**20.1 to 20.5**	255	30	155	3.3	2
DLT 206 to 210	21.0	**20.6 to 21.0**	255	30	155	3.3	2
DLT 211 to 215		**21.1 to 21.5**	260	30	160	3.4	2
DLT 216 to 220	22.0	**21.6 to 22.0**	260	30	160	3.4	2
DLT 221 to 225		**22.1 to 22.5**	265	30	165	3.5	2
DLT 226 to 230	23.0	**22.6 to 23.0**	265	30	165	3.5	2
DLT 231 to 235	23.5	**23.1 to 23.5**	285	34	165	3.7	3
DLT 236 to 240	24.0	**23.6 to 24.0**	285	34	165	3.7	3
DLT 241 to 245	24.5	**24.1 to 24.5**	285	34	165	3.8	3
DLT 246 to 250		**24.6 to 25.0**	285	34	165	3.8	3

Note: • Ordering number for (ex.) ø8.6mm drill is DLT086.
• Standard morse-taper shank JIS B4302 is used. The Length L and ℓ dimension of ø8mm drill is the same as that of ø8.1mm to ø8.5mm drill range.
• ø25.1mm to ø50.0mm drills can be made to order.

*Morse Taper No.

*Morse Taper No.

■ Recommended Cutting Conditions

v_c: Cutting Speed (m/min) f: Feed Rate (mm/rev)

Tool Diameter ϕD_c (mm)	Cond.	Die steel (About HB250)	Cast Iron	Aluminium Alloy
Up to ø10.0	v_c	20 – **35** – 55	20 – **40** – 60	50 – **100** – 150
	f	0.2 – **0.3** – 0.4	0.2 – **0.3** – 0.4	0.1 – **0.15** – 0.2
Up to ø15.0	v_c	30 – **50** – 70	30 – **60** – 80	70 – **130** – 200
	f	0.3 – **0.35** – 0.4	0.3 – **0.35** – 0.4	0.1 – **0.15** – 0.2
Up to ø25.0	v_c	50 – **60** – 90	50 – **75** – 100	100 – **150** – 250
	f	0.3 – **0.35** – 0.45	0.3 – **0.4** – 0.5	0.1 – **0.15** – 0.2

Min. - **Optimum** - Max.

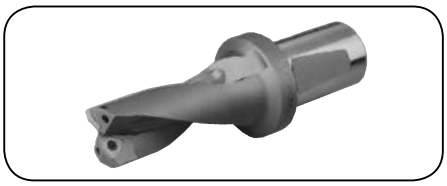
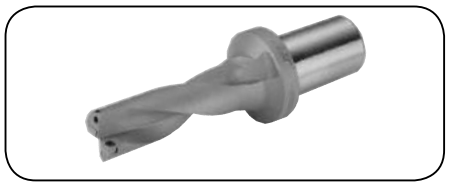
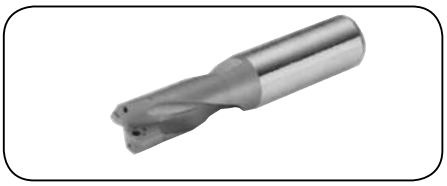
Work Material	Helix Angle	Web Thickness Ratio
Cast Iron	*28° to 30°	1.2 : 1
Aluminium Alloy	40°	1.6 : 1

*ø13mm - 28° , ø13mm and above - 30°

Full Cut Drill
BKS Type

*Production of this cutter body is on a made-to-order basis only.

Full Cut Drill Inserts only sold in Japan.

■ Inserts (JPW95 Type) Standard, Slim

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metal S Exotic Alloy H Hardened Steel

– A (Copper, Exotic Metal) – B (General Purpose) – BS (General Purpose – Strong Edge)

Grade		Coated Carbide		Carbide
Application	High Speed/Light			
	General Purpose			
	Roughing			

Cat. No.	AC225	AC2000	G10E	Dimensions (mm) Inscribed Circle	Thickness	Nose Radius
JPW 950504A	▲	▲		5.5	2.3	0.4
950704A	▲	▲		7.0	3.0	
JPW 950504B	▲	▲	▲	5.5	2.3	0.4
950704B	▲	▲	▲	7.0	3.0	
JPW 950504BS	▲			5.5	2.3	0.4
950704BS	▲			7.0	3.0	

■ Inserts (JPW84 Type) Standard

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metal S Exotic Alloy H Hardened Steel

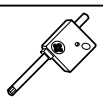
– C (General Purpose) – CS (General Purpose – Strong Edge)

Grade		Coated Carbide		Carbide
Application	High Speed/Light			
	General Purpose			
	Roughing			

Cat. No.	AC225	AC2000	G10E	Dimensions (mm) Inscribed Circle	Thickness	Nose Radius
JPW 840804C	▲	▲	▲	8.0	3.8	
841004C	▲	▲	▲	10.0	3.8	0.4
841204C	▲	▲	▲	12.0	4.8	
841508C		▲		15.0	5.3	0.8
JPW 840804CS	▲			8.0	3.8	
841004CS	▲			10.0	3.8	0.4
841204CS	▲			12.0	4.8	
841508CS	▲			15.0	5.3	0.8

■ Spare Parts (Standard)



Insert Seat (External)	Insert Seat (Internal)	Pin	Clamp Screw	Spanner	Recommended Tightening Torque (N·m)	Applicable Holder 2D	Applicable Holder 3D
—	—	—	BFT2045T06	TRX06	0.5	ST20-BKS140-28L to 195-39L	ST20-BKS140-42L to 195-59L
—	—	—	BFT2506T08	TRX08	1.1	ST25-BKS200-40L to 245-49L	ST25-BKS200-60L to 245-74L
—	—	—	BFF2506T08	TRX08	1.1	ST32-BKS250-50L to 290-58L	ST32-BKS250-75L to 290-87L
—	—	—	BFF3505T10	TRX10	2.0	ST40-BKS300-60L to 360-72L	ST40-BKS300-90L to 360-108L
TS3744A	TS3744B	TSP3744	BFF3505T10	TRX10	2.0	ST40-BKS370-74L to 440-88L	ST40-BKS370-111L to 440-132L
TS4554A	TS4554B	TSP4568	BFF4510T15	TRX15	3.4	ST40-BKS450-90L to 540-108L	ST40-BKS450-135L to 540-162L
TS5568A	TS5568B	TSP4568	BFF4510T15	TRX15	3.4	ST40-BKS550-110L to 680-136L	ST40-BKS550-165L to 680-204L

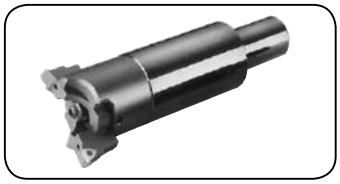
(Note) Pin sold with insert seat as a set.

■ Spare Parts (Slim)


Clamp Screw	Spanner	Recommended Tightening Torque (N · m)	Applicable Holder 2D	Applicable Holder 3D
BFT2045T06	TRX06	0.5	ST20-BKS140-28L to 195-39L	ST20-BKS140-42L to 195-59L
BFT2506T08	TRX08	1.1	ST25-BKS200-40L to 245-74L	ST25-BKS200-60L to 245-74L

Counter Drill
VPS Type

*Production of this cutter body is on a made-to-order basis only.



■ Inserts

Inserts are same as those for the Full Cut Drill.

■ Spare Parts (Counter-weight)






Applicable Toolholder Cat. No.	Differential Screw	Radial Adjustment Screw	L Key (DS)	L Key (Radial)	Clamp Screw	Spanner	Recommended Tightening Torque (N·m)
ST32-VPS051-135	DS41	M4X10L	LH040	LH020	BFT2506T08	TRX08	1.1
ST40-VPS061-165	DS53	M5X16L	LH050	LH025	BFF2506T08	TRX08	1.1
ST40-VPS075-180	DS68	M5X16L	LH060	LH025	BFF3505T10	TRX10	2.0
ST40-VPS092-180	DS68	M5X16L	LH060	LH025	BFF3505T10	TRX10	2.0
ST50-VPS109-225	DS68	M5X20L	LH060	LH025	BFF3505T10	TRX10	2.0
ST50-VPS129-225	DS68	M5X20L	LH060	LH025	BFF3505T10	TRX10	2.0

▲mark : To be replaced by new item (Please confirm stock availability)