

Achieving Stable And Long Tool Life With Excellent Chip Evacuation

Super MultiDrill GS_{type}/HGS_{type}/WGS_{type}

Super Multi Drills

GS Series


Jflute
Wide & Smooth

New "J flute" Design Achieves Excellent Chip Control And Stable Drilling

Utilizing "DEX Coat" ensures stable and long tool life

Applicable to a wide variety of work materials

HGS type, with its double-margin design, improves stability and hole accuracy in deep hole drilling applications

WGS type, with its special cutting edge design, achieves stable hole accuracy and minimizes work hardening from drilling


 Super MultiDrill
GS series

 Size : ϕ 1.0mm - ϕ 20.0mm

2D 4D
P M K N S H

 Super MultiDrill
HGS series

 Size : ϕ 1.5mm - ϕ 20.0mm

3D 5D 8D
P M K N S H

 Super MultiDrill
WGS series

 Size : ϕ 6.8mm - ϕ 16.0mm

2D Thin Plate Drilling


P M K N S H


Super MultiDrill GS type / HGS type

Excellent Versatility
Applicable to Soft Steel, General Steel, Stainless Steel, Grey Cast Iron and Ductile Cast Iron

Solid Carbide Super MultiDrill GS type and HGS type utilize a new "J flute" design that has a wide chip pocket to achieve excellent chip control and evacuation. In addition, "DEX Coat" is also utilized to achieve stable and longer tool life for a variety of work materials, covering a wide application range.

Series Range

Appearance (Coolant Supply)	Catalogue No.	Drill Diameter (mm)	Hole Depth (L/D)
 GS type (External)	MDW□□□□GS2	φ1.0 ~ φ20.0	~ 2
	MDW□□□□GS4	φ1.0 ~ φ20.0	~ 4

Appearance (Coolant Supply)	Catalogue No.	Drill Diameter (mm)	Hole Depth (L/D)
 HGS type (Internal)	MDW□□□□HGS3	φ1.5 ~ φ20.0	~ 3
	MDW□□□□HGS5	φ1.5 ~ φ20.0	~ 5
	MDW□□□□HGS8	φ1.5 ~ φ16.0	~ 8

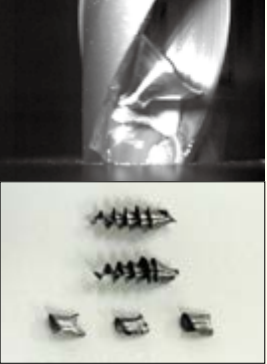
1 New J flute Design

Unique wide and smooth flute design significantly improves chip control and evacuation

- Stable drilling with minimal runout even on small machine applications


Chip Control

GS type



Compact Chips


Conventional Drill



Work material : S50C (200HB)
Drill used : MDW0800GS4
Cutting Conditions : $V_c=80\text{m/min}$, $f=0.25\text{mm/rev}$, $H=24\text{mm}$
External Coolant Supply (Water Soluble)


J flute


※ "J flute" is a registered trademark.



HGS

1 Wide chip pocket smoothly evacuate chips generated at the center portion of the drill



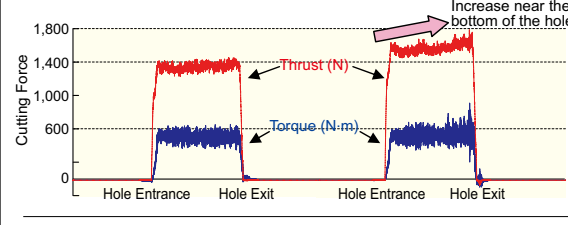


GS

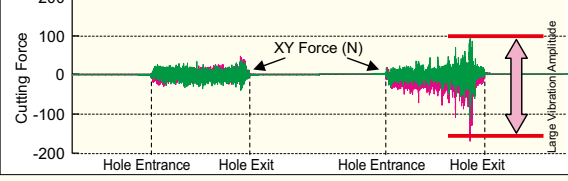
Cutting Resistance Comparison

The GS type exhibits stable drilling behaviour throughout

GS type



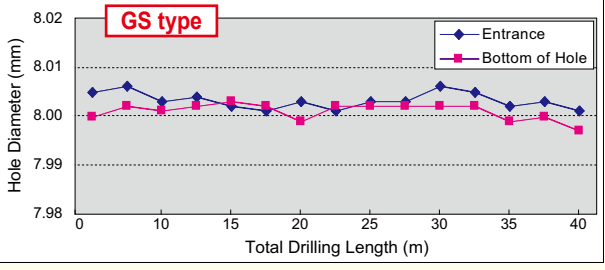
Conventional Drill



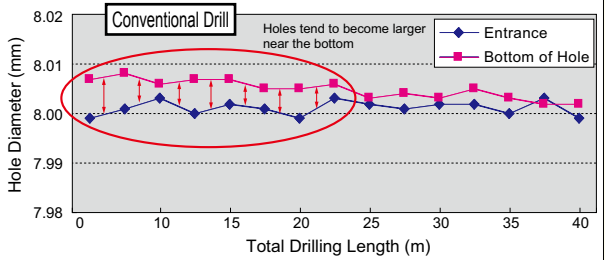
Work Material : S50C (200HB)
Drill Used : MDW0800GS4
Cutting Conditions : $V_c=80\text{m/min}$, $f=0.25\text{mm/rev}$, $H=24\text{mm}$
External Coolant Supply (Water Soluble)

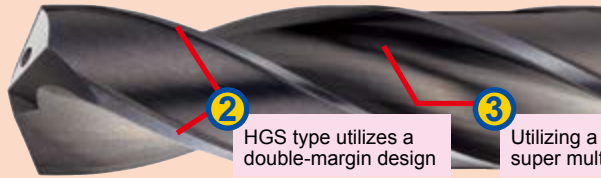
Minimize enlargement at the bottom of the hole to improve accuracy

GS type



Conventional Drill





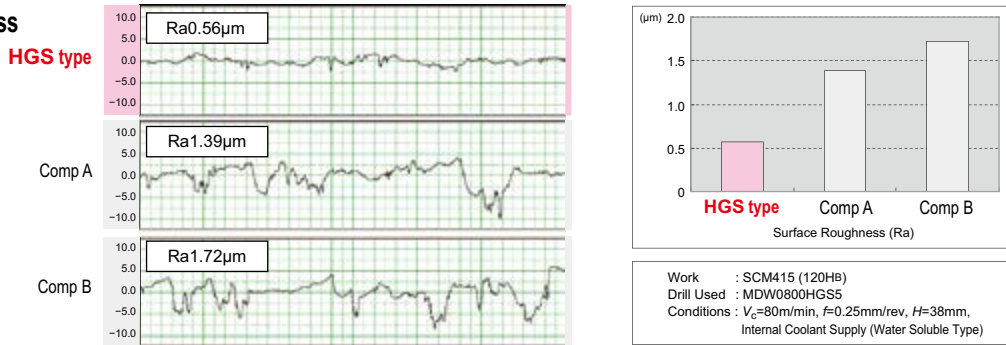
HGS type utilizes a double-margin design

Utilizing a world's first compound super multi-layered "DEX Coat"

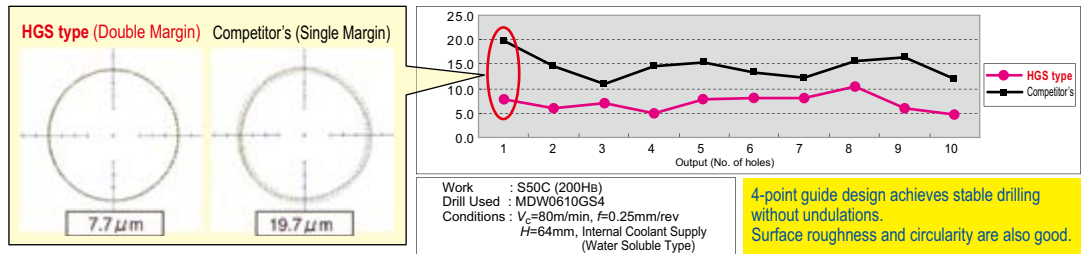
2 Double-Margin Design (HGS type) ※ Exclude drill sizes $\phi 1.5 \sim \phi 2.4\text{mm}$

HGS type, with its double-margin design, improves stability and hole accuracy in deep hole drilling applications

Surface Roughness Comparison



Circularity Comparison



3 Special Coating for Drills **DEX Coat**

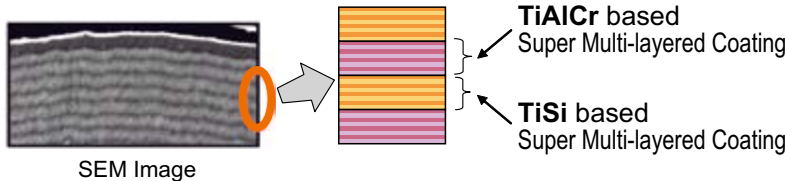
Next generation coating that utilizes an unique nano-coating technology to provide more than double the tool life of conventional coatings

World's First!
Compound super multi-layered coating

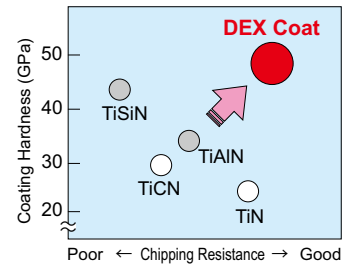
- Significant improvements in wear, thermal and adhesion resistance by adding Silicon and Chrome
- New super multi-layered structure offers significant improvements in chipping resistance (coating strength)

Coating Layer

World's first compound super multi-layered coating that is made from alternate layers of super multi-layered coatings



Coating Properties



Application Examples of "DEX Coat"

Wear Resistance Comparison	Adhesion Resistance Comparison
<p>Improved wear resistance at the shoulder and rake face results in longer tool life</p> <p>Cutting Edge Damage Comparison After Drilling 70m</p> <p>GS type</p> <p>Competitor's</p> <p>GS type: Wear</p> <p>Competitor's: Wear</p> <p>Drilling Length (m)</p> <p>Drill Used : MDW0800GS4 Work : S50C (200Hs) Cutting Conditions : $V_c=70\text{m/min}$, $f=0.25\text{mm/rev}$, $H=32\text{mm}$ External Coolant Supply (Water Soluble)</p>	<p>Significant improvements in preventing fractures caused by work adhesion to the shoulder and flute portions when drilling Soft Steel.</p> <p>Cutting Edge Damage Comparison After Drilling 70m</p> <p>HGS type</p> <p>Competitor's</p> <p>HGS type: Able to Continue</p> <p>Competitor's: Breakage</p> <p>Drilling Length (m)</p> <p>Drill Used : MDW0800HGS5 Work : SCM415 (120Hs) Cutting Conditions : $V_c=80\text{m/min}$, $f=0.25\text{mm/rev}$, $H=38\text{mm}$ Internal Coolant Supply (Water Soluble)</p>

Super MultiDrill GS type

External Coolant Supply

Recommended Cutting Conditions

P12

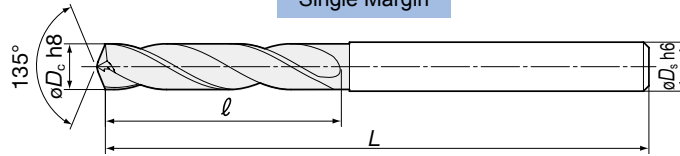
Carbon Steel Alloy Steel -0.28% 0.29%~	Heat-treated Steel	Hardened Steel ~45HRC 48HRC~	Stainless Steel	Ti-Alloy	Heat-Resistant Steel	Cast Iron	Ductile Cast Iron	Aluminum Alloy	Copper Alloy	Composite Material CFRP
○	○	○	○	○	○	○	○	○	○	○

DEX
Coat

2D

4D

Single Margin



● Drill Diameter $\phi 1.0 \sim \phi 6.5\text{mm}$

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

● Drill Diameter $\phi 6.6 \sim \phi 12.0\text{mm}$

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

Grade: ACX70

When placing an order, please indicate 2 or 4 in the as your required drill length. (Example: MDW0200GS2)

● mark : Standard stocked item

External Coolant Supply

Recommended Cutting Conditions

ISO P12

Carbon Steel Alloy Steel ~0.28% 0.29%	Heat-treated Steel	Hardened Steel ~45HrC 46HrC-	Stainless Steel	Ti-Alloy	Heat-Resistant Steel	Cast Iron	Ductile Cast Iron	Aluminum Alloy	Copper Alloy	Composite Material CFRP
○	◎	◎	○	○	○	○	○	○	○	○



Single Margin



● Drill Diameter $\phi 12.1 \sim \phi 16.0\text{mm}$

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

● Drill Diameter $\phi 16.1 \sim \phi 20.0\text{mm}$

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

Grade: ACX70

When placing an order, please indicate 2 or 4 in the as your required drill length. (Example: MDW1210GS4)

● mark : Standard stocked item Blank : Made to order

Super MultiDrill HGS type

Internal Coolant Supply

Recommended Cutting Conditions

P12

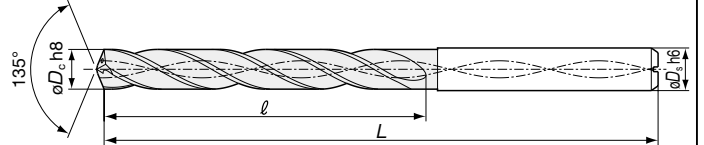
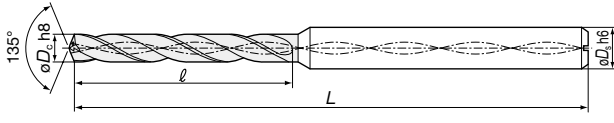
Carbon Steel Alloy Steel -0.28% 0.29%	Heat-treated Steel	Hardened Steel ~45HRC 46HRC-	Stainless Steel	Ti-Alloy	Heat-Resistant Steel	Cast Iron	Ductile Cast Iron	Aluminum Alloy	Copper Alloy	Composite Material CFRP
○	○	○	○	○	○	○	○	○	○	○

3D 5D 8D



● HGS Drill Diameter $\phi 1.5 \sim \phi 2.4\text{mm}$ Single Margin

● HGS Drill Diameter $\phi 2.5 \sim \phi 20.0\text{mm}$ Double Margin



● Drill Diameter $\phi 1.5 \sim \phi 7.0\text{mm}$

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

● Drill Diameter $\phi 7.1 \sim \phi 12.0\text{mm}$

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

Grade: ACX70

When placing an order, please indicate 3, 5 or 8 in the as your required drill length. (Example: MDW0150HGS3)

● mark : Standard stocked item

Note : Small size drills ($\phi 1.5 \sim 2.4\text{mm}$) are only available in single margin specification.

Internal Coolant Supply

Recommended Cutting Conditions

P12

Carbon Steel Alloy Steel ~0.28% 0.29%~	Heat-treated Steel	Hardened Steel ~45HRC 46HRC~	Stainless Steel	Ti-Alloy	Heat-Resistant Steel	Cast Iron	Ductile Cast Iron	Aluminum Alloy	Copper Alloy	Composite Material CFRP
○	○	○	○	○	○	○	○	○	○	○

3D 5D 8D



● HGS Drill Diameter $\phi 1.5 \sim \phi 2.4\text{mm}$ Single Margin

● HGS Drill Diameter $\phi 2.5 \sim \phi 20.0\text{mm}$ Double Margin



● Drill Diameter $\phi 12.1 \sim \phi 16.0\text{mm}$

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

● Drill Diameter $\phi 16.1 \sim \phi 20.0\text{mm}$

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

Grade: ACX70


When placing an order, please indicate 3, 5 or 8 in the as your required drill length. (Example: MDW1210HGS5)

● mark : Standard stocked item Blank : Made to order

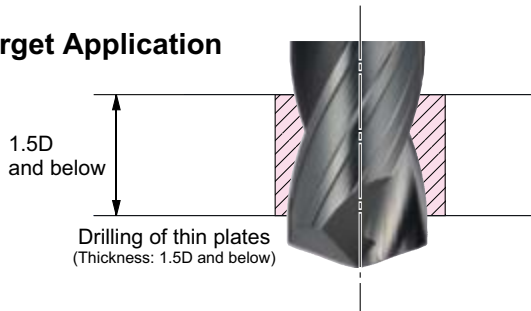
Super MultiDrill WGS type

Super MultiDrill WGS type with an optimized "J flute" design, improves chip breaking capabilities when drilling thin plates and with excellent sharpness, this drill can minimize work hardening during drilling. In addition, it utilizes a **special double-margin design** to achieve stable hole diameter accuracy.

Series Range

Appearance (Coolant Supply)	Catalogue No.	Drill Diameter (mm)	Hole Depth (L/D)
 WGS type (External)	NEW MDW□□□□WGS2	ø6.8 ~ ø16.0	~ 2

Target Application



< Typical Automotive Components >

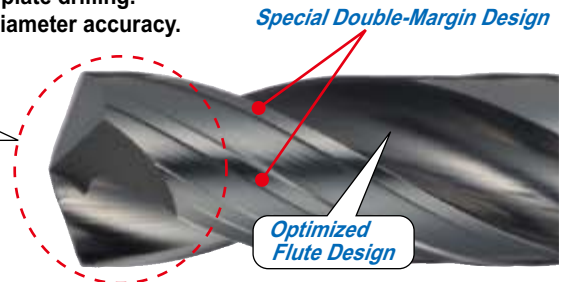
- Bolt holes for automotive components such as:
- Bearing Hub (Inner ring, Outer ring)
 - Knuckle
 - Differential Ring
 - Flange

Characteristics

Super MultiDrill WGS type utilizes a special "J flute" design for thin plate drilling. It also uses a special double-margin design to achieve stable hole diameter accuracy.

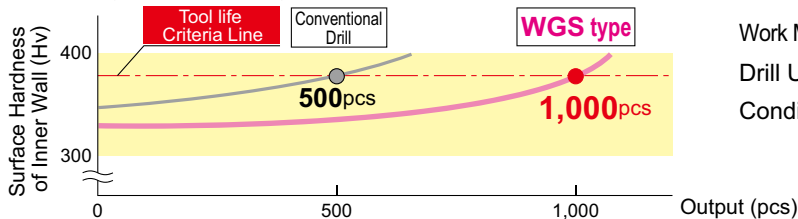


Special Cutting Edge Design



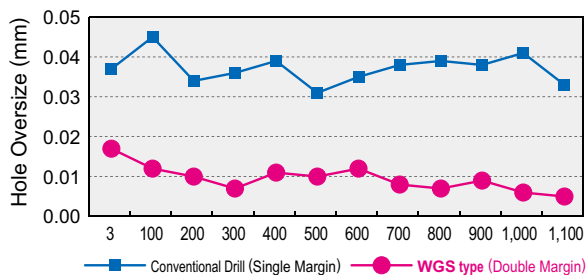
Performance

● Minimizing work hardening of drilled hole wall



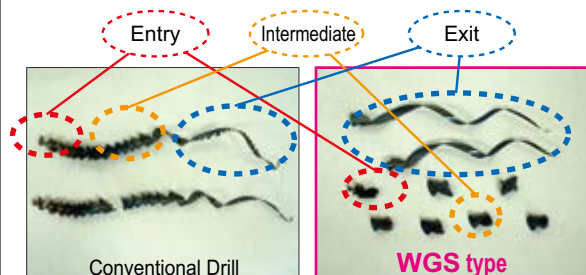
Work Material : S53C
 Drill Used : MDW1390WGS2
 Conditions : $V_c=70\text{m/min}$, $f=0.2\text{mm/rev}$, $H=13\text{mm}$

● Stability of drilled hole size



Work Material : S50C
 Drill Used : MDW1080WGS2
 Conditions : $V_c=80\text{m/min}$, $f=0.25\text{mm/rev}$, $H=16\text{mm}$

● Shortening of chips



Work Material : SUJ2
 Drill Used : MDW1150WGS2
 Conditions : $V_c=80\text{m/min}$, $f=0.25\text{mm/rev}$, $H=13\text{mm}$

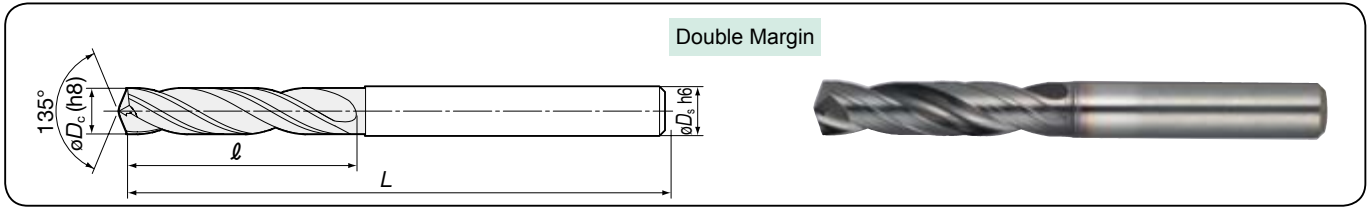
Super MultiDrill WGS type

External Coolant Supply

Recommended Cutting Conditions

P12

Carbon Steel Alloy Steel ~0.28%	Heat-treated Steel 0.29%~	Hardened Steel ~45HRC 46HRC~	Stainless Steel	Ti-Alloy	Heat- Resistant Steel	Cast Iron	Ductile Cast Iron	Aluminum Alloy	Copper Alloy	Composite Material CFRP
○	◎	◎	○	○	○	○	○	○	○	○



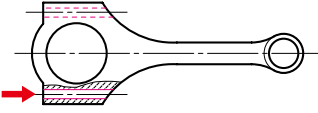
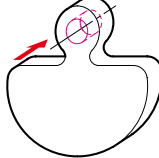
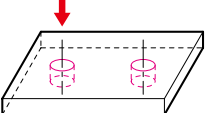
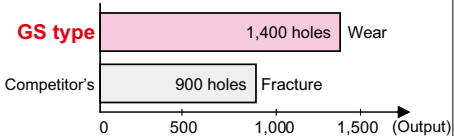
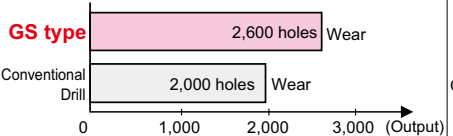
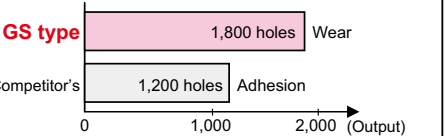
● Drill Diameter $\phi 6.8 \sim \phi 16.0$ mm

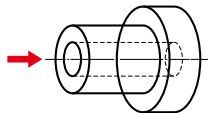
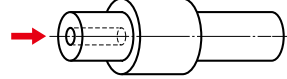
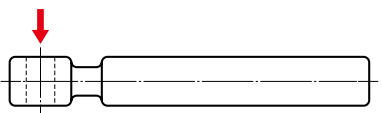
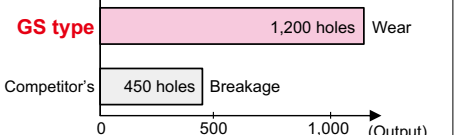

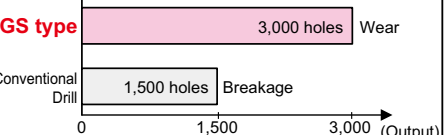
Drill Diameter ϕD_c (mm)	Shank Diameter ϕD_s (mm)	Catalogue No.	2D type	
			Dimensions (mm)	
			L	ℓ
6.8~ 7.0	7.0	MDW 0680~0700WGS2	73	33
7.1~ 7.5	8.0	MDW 0710~0750WGS2	78	
7.6~ 8.0		0760~0800WGS2		36
8.1~ 8.5	9.0	MDW 0810~0850WGS2	82	
8.6~ 9.0		0860~0900WGS2		38
9.1~ 9.5	10.0	MDW 0910~0950WGS2	87	
9.6~10.0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

Grade: ACX70

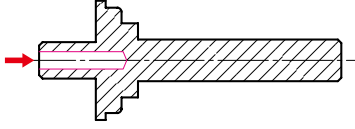
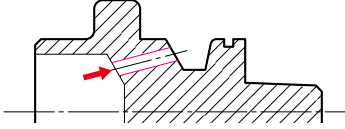
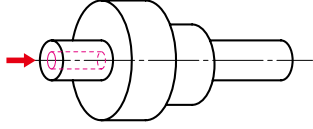
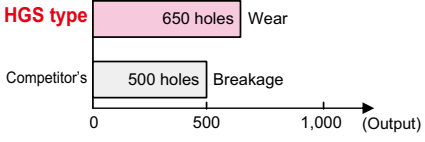

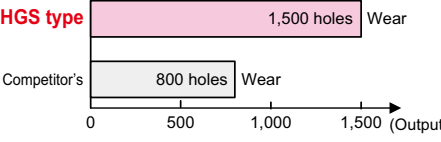
* The drills in this series are made to order.
Please specify the hole diameter (including tolerances)
when placing an order.

Application Examples (Super MultiDrill GS type)

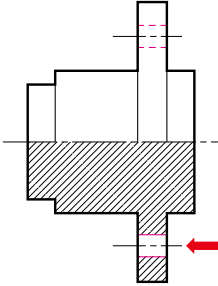
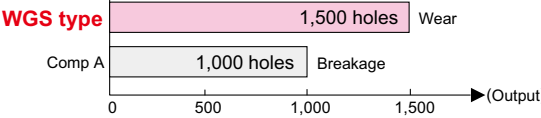
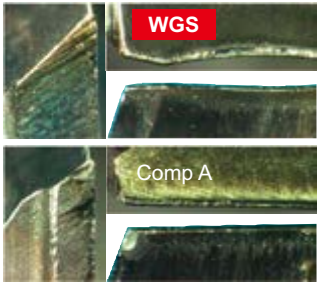
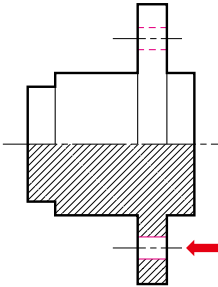
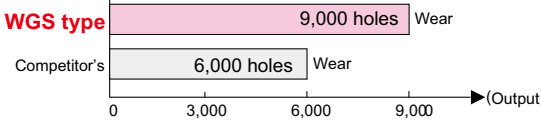

● S43C (250HB) Automotive Component	● Boron Steel (250HRC) Machine Component	● SS400 Machine Component																											
																													
Drill Used : MDW0970GS4 Conditions : $V_c=80\text{m/min}$, $f=0.25\text{mm/rev}$ $H=25\text{mm}$, External Coolant Supply (Water Soluble Type)	Drill Used : MDW0980GS2 Conditions : $V_c=70\text{m/min}$, $f=0.15\text{mm/rev}$ $H=7\text{mm}$, External Coolant Supply (Water Soluble Type)	Drill Used : MDW1050GS4 Conditions : $V_c=150\text{m/min}$, $f=0.3\text{mm/rev}$ $H=12\text{mm}$, External Coolant Supply (Water Soluble Type)																											
Achieving 1.5 times longer tool life! Reduced wear at peripheral cutting edges!	1.3x tool life of conventional tools! Good circularity and cylindricity!	Achieving 1.5 times longer tool life! Good chip control!																											
 <table border="1"> <tr><th>Type</th><th>Output (holes)</th><th>Failure Mode</th></tr> <tr><td>GS type</td><td>1,400</td><td>Wear</td></tr> <tr><td>Competitor's</td><td>900</td><td>Fracture</td></tr> </table>	Type	Output (holes)	Failure Mode	GS type	1,400	Wear	Competitor's	900	Fracture	 <table border="1"> <tr><th>Type</th><th>Output (holes)</th><th>Failure Mode</th></tr> <tr><td>GS type</td><td>2,600</td><td>Wear</td></tr> <tr><td>Conventional Drill</td><td>2,000</td><td>Wear</td></tr> </table>	Type	Output (holes)	Failure Mode	GS type	2,600	Wear	Conventional Drill	2,000	Wear	 <table border="1"> <tr><th>Type</th><th>Output (holes)</th><th>Failure Mode</th></tr> <tr><td>GS type</td><td>1,800</td><td>Wear</td></tr> <tr><td>Competitor's</td><td>1,200</td><td>Adhesion</td></tr> </table>	Type	Output (holes)	Failure Mode	GS type	1,800	Wear	Competitor's	1,200	Adhesion
Type	Output (holes)	Failure Mode																											
GS type	1,400	Wear																											
Competitor's	900	Fracture																											
Type	Output (holes)	Failure Mode																											
GS type	2,600	Wear																											
Conventional Drill	2,000	Wear																											
Type	Output (holes)	Failure Mode																											
GS type	1,800	Wear																											
Competitor's	1,200	Adhesion																											

● SUS310S Machine Component	● SCM435 Machine Component	● S45C Machine Component																											
																													
Drill Used : MDW0330GS4 Conditions : $V_c=25\text{m/min}$, $f=0.06\text{mm/rev}$ $H=10\text{mm}$, External Coolant Supply (Oil Based Type)	Drill Used : MDW0610GS4 Conditions : $V_c=61\text{m/min}$, $f=0.15\text{mm/rev}$ $H=25\text{mm}$, External Coolant Supply (Water Soluble Type)	Drill Used : MDW1040GS4 Conditions : $V_c=80\text{m/min}$, $f=0.2\text{mm/rev}$ (GS type) $V_c=40\text{m/min}$, $f=0.25\text{mm/rev}$ (Conv. drill) $H=31\text{mm}$, External Coolant Supply (Water Soluble Type)																											
Achieving 2.6 times longer tool life!	Achieving 2.3 times longer tool life!	Achieving 1.6 times higher efficiency and 1.8 times longer tool life!																											
 <table border="1"> <tr><th>Type</th><th>Output (holes)</th><th>Failure Mode</th></tr> <tr><td>GS type</td><td>1,200</td><td>Wear</td></tr> <tr><td>Competitor's</td><td>450</td><td>Breakage</td></tr> </table>	Type	Output (holes)	Failure Mode	GS type	1,200	Wear	Competitor's	450	Breakage	 <table border="1"> <tr><th>Type</th><th>Output (holes)</th><th>Failure Mode</th></tr> <tr><td>GS type</td><td>7,100</td><td>Wear</td></tr> <tr><td>Competitor's</td><td>3,000</td><td>Breakage</td></tr> </table>	Type	Output (holes)	Failure Mode	GS type	7,100	Wear	Competitor's	3,000	Breakage	 <table border="1"> <tr><th>Type</th><th>Output (holes)</th><th>Failure Mode</th></tr> <tr><td>GS type</td><td>3,000</td><td>Wear</td></tr> <tr><td>Conventional Drill</td><td>1,500</td><td>Breakage</td></tr> </table>	Type	Output (holes)	Failure Mode	GS type	3,000	Wear	Conventional Drill	1,500	Breakage
Type	Output (holes)	Failure Mode																											
GS type	1,200	Wear																											
Competitor's	450	Breakage																											
Type	Output (holes)	Failure Mode																											
GS type	7,100	Wear																											
Competitor's	3,000	Breakage																											
Type	Output (holes)	Failure Mode																											
GS type	3,000	Wear																											
Conventional Drill	1,500	Breakage																											

Application Examples (Super MultiDrill HGS type)

● SCR440H Automotive Component	● SUJ2 Automotive Component	● SCM415 Machine Component
		
Drill Used : MDW0600HGS8 Conditions : $V_c=80\text{m/min}$, $f=0.25\text{mm/rev}$ $H=28\text{mm}$, Internal Coolant Supply (Oil Based Type)	Drill Used : MDW0570HGS5 Conditions : $V_c=80\text{m/min}$, $f=0.1\text{mm/rev}$ $H=35\text{mm}$, Internal Coolant Supply (Water Soluble Type)	Drill Used : MDW0860HGS3 Conditions : $V_c=52\text{m/min}$, $f=0.2\text{mm/rev}$ $H=25\text{mm}$, Internal Coolant Supply (Water Soluble Type)
Achieving 1.3 times longer tool life!	Achieving 2.5 times longer tool life!	Achieving 1.8 times longer tool life!
		

Application Examples (Super MultiDrill WGS type)

	<ul style="list-style-type: none"> Drill Used : MDW1110WGS2 Conditions : $V_c=70\text{m/min}$, $f=0.3\text{mm/rev}$, $H=6\text{mm}$ External Coolant Supply (Water Soluble) Work Material : SUJ2 <div style="background-color: yellow; text-align: center;">Achieving 1.5 times longer tool life !</div> 	
	<ul style="list-style-type: none"> Drill Used : MDW1370WGS2 Conditions : $V_c=90\text{m/min}$, $f=0.3\text{mm/rev}$, $H=10\text{mm}$ External Coolant Supply (Water Soluble) Work Material : S53C <div style="background-color: yellow; text-align: center;">Achieving 1.5 times longer tool life with reduced wear at center of drill</div> 	

Recommended Cutting Conditions (Super MultiDrill GS type)

[Vc : Cutting Speed (m/min), f : Feedrate (mm/rev)]

Drill Diameter øD _C (mm)	Cutting Condition	Soft Steel / General Steel (~300HB)	Hardened Steel		Stainless Steel (~200HB)	Grey Cast Iron FC250	Ductile Cast Iron FCD450
			(~45HRC)	(~60HRC)			
~ø3.0	V _c	30 - 60 - 70	20 - 30 - 40	10 - 15 - 20	10 - 25 - 40	40 - 50 - 70	35 - 45 - 60
	f	0.10 - 0.15 - 0.20	0.06 - 0.07 - 0.08	0.05 - 0.07 - 0.08	0.06 - 0.08 - 0.12	0.15 - 0.20 - 0.25	0.12 - 0.15 - 0.20
~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 - 0.20 - 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 - 0.20 - 0.25	0.08 - 0.09 - 0.10	0.05 - 0.07 - 0.08	0.08 - 0.10 - 0.15	0.15 - 0.20 - 0.30	0.15 - 0.20 - 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 - 0.30	0.09 - 0.10 - 0.13	0.06 - 0.08 - 0.10	0.09 - 0.12 - 0.17	0.18 - 0.23 - 0.33	0.18 - 0.23 - 0.30
~ø10.0	V _c	50 - 80 - 130	20 - 40 - 40	10 - 15 - 20	15 - 40 - 60	50 - 60 - 80	50 - 60 - 70
	f	0.20 - 0.25 - 0.35	0.10 - 0.12 - 0.15	0.06 - 0.08 - 0.10	0.10 - 0.15 - 0.20	0.20 - 0.30 - 0.35	0.20 - 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	0.20 - 0.25 - 0.35	0.10 - 0.12 - 0.15	0.06 - 0.08 - 0.10	0.10 - 0.15 - 0.20	0.20 - 0.30 - 0.35	0.20 - 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	0.10 - 0.12 - 0.15	0.07 - 0.09 - 0.11	0.10 - 0.15 - 0.20	0.22 - 0.30 - 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 - 0.30 - 0.35	0.10 - 0.12 - 0.15	0.08 - 0.10 - 0.12	0.10 - 0.15 - 0.20	0.25 - 0.30 - 0.35	0.25 - 0.30 - 0.35

Min. - Optimum - Max.

Recommended Cutting Conditions (Super MultiDrill HGS type)

[Vc : Cutting Speed (m/min), f : Feedrate (mm/rev)]

Drill Diameter øD _C (mm)	Cutting Condition	Soft Steel / General Steel (~300HB)	Hardened Steel		Stainless Steel (~200HB)	Grey Cast Iron FC250	Ductile Cast Iron FCD450	Ti Alloy 6Al-4V-Ti	Inconel 718
			(~45HRC)	(~60HRC)					
~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	0.10 - 0.15 - 0.20	0.06 - 0.07 - 0.08	0.05 - 0.07 - 0.08	0.06 - 0.08 - 0.12	0.15 - 0.20 - 0.25	0.12 - 0.15 - 0.20	0.08 - 0.09 - 0.10	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 - 0.20 - 0.25	0.07 - 0.08 - 0.09	0.05 - 0.07 - 0.08	0.07 - 0.10 - 0.13	0.15 - 0.20 - 0.25	0.13 - 0.18 - 0.23	0.08 - 0.09 - 0.10	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 - 0.20 - 0.25	0.08 - 0.09 - 0.10	0.05 - 0.07 - 0.08	0.08 - 0.12 - 0.15	0.15 - 0.20 - 0.30	0.15 - 0.20 - 0.25	0.08 - 0.09 - 0.10	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 - 0.10 - 0.13	0.06 - 0.08 - 0.10	0.09 - 0.14 - 0.18	0.18 - 0.23 - 0.33	0.18 - 0.23 - 0.30	0.08 - 0.09 - 0.10	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	0.20 - 0.25 - 0.35	0.10 - 0.12 - 0.15	0.06 - 0.08 - 0.10	0.10 - 0.15 - 0.20	0.20 - 0.30 - 0.35	0.20 - 0.25 - 0.35	0.08 - 0.10 - 0.12	0.08 - 0.09 - 0.10
~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	0.20 - 0.25 - 0.35	0.10 - 0.12 - 0.15	0.06 - 0.08 - 0.10	0.10 - 0.15 - 0.20	0.20 - 0.30 - 0.35	0.20 - 0.25 - 0.35	0.08 - 0.10 - 0.12	0.08 - 0.09 - 0.10
~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 - 0.26 - 0.35	0.10 - 0.12 - 0.15	0.07 - 0.09 - 0.11	0.10 - 0.15 - 0.20	0.25 - 0.30 - 0.35	0.22 - 0.27 - 0.37	0.09 - 0.11 - 0.13	0.08 - 0.09 - 0.10
~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 - 0.30 - 0.35	0.10 - 0.12 - 0.15	0.08 - 0.10 - 0.12	0.10 - 0.15 - 0.20	0.25 - 0.30 - 0.35	0.25 - 0.30 - 0.35	0.10 - 0.12 - 0.15	0.08 - 0.09 - 0.10

Min. - Optimum - Max.

Recommended Cutting Conditions (Super MultiDrill WGS type)

[Vc : Cutting Speed (m/min), f : Feedrate (mm/rev)]

Drill Diameter øD _C (mm)	Cutting Condition	Soft Steel / General Steel (~200HB)	Stainless Steel (~200HB)	Grey Cast Iron FC250	Ductile Cast Iron FCD450
~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
~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

Min. - Optimum - Max.

- * The recommended cutting conditions depend on actual machine rigidity, work clamping and other factors. Please adjust the conditions accordingly.
 * If work hardening occurs during drilling, please operate using the lower ranges of the recommended cutting conditions.

SAFETY NOTES

- Very hot or lengthy chips may be discharged while the machine is in operation. Therefore, machine guards, safety goggles or other protective covers must be used. Fire safety precautions must also be considered.
- Please handle with care as this product has sharp edges.
- Improper cutting conditions or mis-handling of the tool may result in breakages or projectiles. Therefore, please use the tool within its recommended conditions.
- When using non-water soluble cutting oil, precautions against fire must be taken and please ensure that a fire extinguisher is placed near the machine.

 **SUMITOMO ELECTRIC INDUSTRIES, LTD.**

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