

**New**

# Micro Long Drills 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  $v_f=500\text{mm/min}$  (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 $\phi D_c$ (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 - <b>50</b> - 60	40 - <b>50</b> - 60	40 - <b>50</b> - 60	20 - <b>30</b> - 40	40 - <b>50</b> - 60	50 - <b>60</b> - 70	5 - <b>10</b> - 15
	$f$	0.01 - <b>0.02</b> - 0.03	0.01 - <b>0.02</b> - 0.03	0.01 - <b>0.02</b> - 0.03	0.01 - <b>0.02</b> - 0.03	0.02 - <b>0.03</b> - 0.04	0.03 - <b>0.04</b> - 0.06	0.005 - <b>0.01</b> - 0.02
Up to 1.5	$v_c$	40 - <b>50</b> - 60	40 - <b>50</b> - 60	40 - <b>50</b> - 60	20 - <b>30</b> - 40	40 - <b>50</b> - 60	50 - <b>60</b> - 70	5 - <b>10</b> - 15
	$f$	0.04 - <b>0.08</b> - 0.12	0.04 - <b>0.08</b> - 0.12	0.04 - <b>0.08</b> - 0.12	0.02 - <b>0.05</b> - 0.10	0.04 - <b>0.08</b> - 0.12	0.05 - <b>0.10</b> - 0.15	0.01 - <b>0.03</b> - 0.05
Up to 2.0	$v_c$	40 - <b>50</b> - 60	40 - <b>50</b> - 60	40 - <b>50</b> - 60	20 - <b>30</b> - 40	40 - <b>50</b> - 60	50 - <b>60</b> - 70	5 - <b>10</b> - 15
	$f$	0.06 - <b>0.08</b> - 0.12	0.06 - <b>0.08</b> - 0.12	0.06 - <b>0.08</b> - 0.12	0.04 - <b>0.06</b> - 0.10	0.06 - <b>0.08</b> - 0.12	0.08 - <b>0.12</b> - 0.15	0.01 - <b>0.03</b> - 0.05

Min. - **Optimum** - Max.

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

Drill Diameter $\phi D_c$ (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 - <b>50</b> - 60	40 - <b>50</b> - 60	40 - <b>50</b> - 60	20 - <b>30</b> - 40	40 - <b>50</b> - 60	50 - <b>60</b> - 70	5 - <b>10</b> - 15
	$f$	0.01 - <b>0.02</b> - 0.03	0.01 - <b>0.02</b> - 0.03	0.01 - <b>0.02</b> - 0.03	0.01 - <b>0.02</b> - 0.03	0.02 - <b>0.03</b> - 0.04	0.03 - <b>0.04</b> - 0.06	0.005 - <b>0.01</b> - 0.02
Up to 1.5	$v_c$	40 - <b>50</b> - 60	40 - <b>50</b> - 60	40 - <b>50</b> - 60	20 - <b>30</b> - 40	40 - <b>50</b> - 60	50 - <b>60</b> - 70	5 - <b>10</b> - 15
	$f$	0.03 - <b>0.05</b> - 0.07	0.03 - <b>0.05</b> - 0.07	0.03 - <b>0.05</b> - 0.07	0.02 - <b>0.04</b> - 0.07	0.04 - <b>0.07</b> - 0.10	0.05 - <b>0.08</b> - 0.12	0.01 - <b>0.02</b> - 0.03
Up to 2.0	$v_c$	40 - <b>50</b> - 60	40 - <b>50</b> - 60	40 - <b>50</b> - 60	20 - <b>30</b> - 40	40 - <b>50</b> - 60	50 - <b>60</b> - 70	5 - <b>10</b> - 15
	$f$	0.04 - <b>0.06</b> - 0.08	0.04 - <b>0.06</b> - 0.08	0.04 - <b>0.06</b> - 0.08	0.04 - <b>0.06</b> - 0.08	0.04 - <b>0.07</b> - 0.10	0.05 - <b>0.08</b> - 0.12	0.01 - <b>0.02</b> - 0.03

Min. - **Optimum** - Max.

## ■ Application Examples

### ● Automotive Component Mould (Equivalent to SUS416)

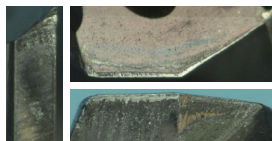
Tool : MLDH1400L20 (Guide : MLDH1400P)

Equipment : Vertical Machining Centre (HSKA63)

Coolant Supply : Internal Coolant (Emulsion Type, Pump Pressure : 4MPa)

Cutting Conditions :  $v_c=60\text{m/min}$   $f=0.03\text{mm/rev}$   $H=21\text{mm}$

Tool Life : **600 Units (11.4m/reg)**



### ● Tooling Component (Equivalent to SKD11)

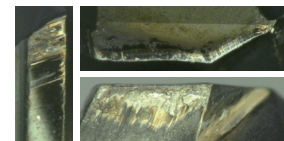
Tool : MLDH1900L20 (Guide : MLDH1900P)

Equipment : Vertical Machining Centre (HSKA63)

Coolant Supply : Internal Coolant (Emulsion Type, Pump Pressure : 4MPa)

Cutting Conditions :  $v_c=60\text{m/min}$   $f=0.10\text{mm/rev}$   $H=27\text{mm}$

Tool Life : **600 Units (18m/reg)**



# Micro Long Drills MLDH-L / MLDH-P Type

New

MLDH-P Type



MLDH-L Type



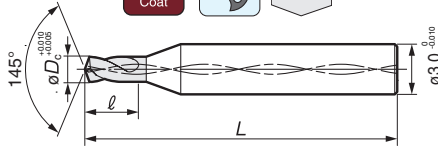
## Internal Coolant Supply (MLDH-P Type / MLDH-L Type)

Carbon Steel	Alloy Steel	Tempered Steel	Hardened Steel	Stainless steel	Ti Alloy	Heat-resistant steel	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.2%	Steel	Up to 49HRC	From 49HRC	◎	◎	◎	◎	○	○	○

● MLDH-P Type



2D



● MLDH-L Type

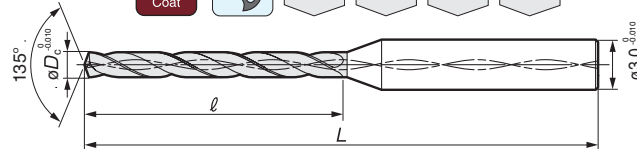


5D

12D

20D

30D



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

Diameter $\phi D_c$ (mm)	Dedicated Guide Hole MLDH-P Type			Micro Long Drill MLDH-L Type												
	Cat. No.	Stock	Dimensions (mm)	Cat. No. 5, 12, 20, 30	Hole Depth: 5D		Hole Depth: 12D		Hole Depth: 20D		Hole Depth: 30D					
					Stock	Dimensions (mm)	Stock	Dimensions (mm)	Stock	Dimensions (mm)	Stock	Dimensions (mm)				
			L	ℓ	5	L	ℓ	12	L	ℓ	20	L	ℓ	30	L	ℓ
0.80	MLDH 0800P	★		3.2	MLDH 0800L	★	8	★		★		19	★			
0.81	0810P	★			0810L	★										28
0.82	MLDH 0820P	★		3.3	MLDH 0820L	★										
0.83	0830P	★			0830L	★			14		60					
0.84	MLDH 0840P	★			MLDH 0840L	★						20				
0.85	0850P	★		3.4	0850L	★										
0.86	0860P	★			0860L	★										
0.87	MLDH 0870P	★			MLDH 0870L	★										
0.88	0880P	★		3.5	0880L	★						21				
0.89	MLDH 0890P	★			MLDH 0890L	★										
0.90	0900P	★		3.6	0900L	★	50									
0.91	0910P	★			0910L	★										
0.92	MLDH 0920P	★			MLDH 0920L	★										
0.93	0930P	★		3.7	0930L	★										
0.94	MLDH 0940P	★			MLDH 0940L	★										
0.95	0950P	★		3.8	0950L	★										
0.96	0960P	★	45		0960L	★						23				
0.97	MLDH 0970P	★			MLDH 0970L	★										
0.98	0980P	★		3.9	0980L	★										
0.99	MLDH 0990P	★			MLDH 0990L	★										
1.00	1000P	★		4.0	1000L	★										
1.05	MLDH 1050P	★		4.2	MLDH 1050L	★										
1.10	MLDH 1100P	★		4.4	MLDH 1100L	★										
1.15	MLDH 1150P	★		4.6	MLDH 1150L	★										
1.20	MLDH 1200P	★		4.8	MLDH 1200L	★										
1.25	MLDH 1250P	★		5.0	MLDH 1250L	★										
1.30	MLDH 1300P	★		5.2	MLDH 1300L	★										
1.35	MLDH 1350P	★		5.4	MLDH 1350L	★										
1.40	MLDH 1400P	★		5.6	MLDH 1400L	★										
1.45	MLDH 1450P	★		5.8	MLDH 1450L	★										
1.50	MLDH 1500P	★		6.0	MLDH 1500L	★										
1.55	MLDH 1550P	★		6.2	MLDH 1550L	★										
1.60	MLDH 1600P	★		6.4	MLDH 1600L	★										
1.65	MLDH 1650P	★		6.6	MLDH 1650L	★										
1.70	MLDH 1700P	★		6.8	MLDH 1700L	★										
1.75	MLDH 1750P	★		7.0	MLDH 1750L	★										
1.80	MLDH 1800P	★		7.2	MLDH 1800L	★										
1.85	MLDH 1850P	★		7.4	MLDH 1850L	★										
1.90	MLDH 1900P	★		7.6	MLDH 1900L	★										
1.95	MLDH 1950P	★		7.8	MLDH 1950L	★										
2.00	MLDH 2000P	★		8.0	MLDH 2000L	★										

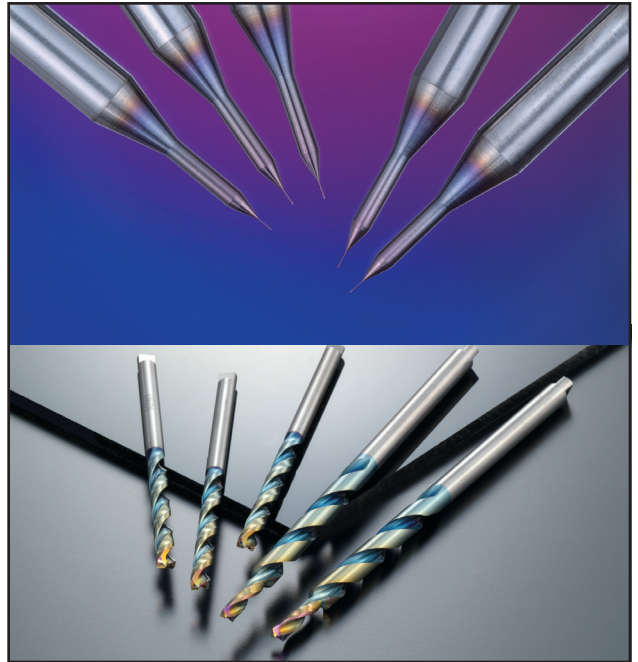
Grade: ACV70

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.

# SMALL DIAMETER & DLC COATED DRILLS

Pages 464-468



MicroDrills/DLC Coated Drills

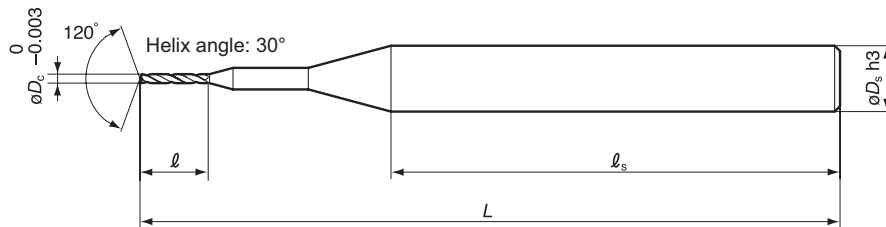
## Table of Contents

Small Dia. & DLC coated Drills:	Pages
<b>Small Diameter Drills</b>	
MDUS Type .....	465
MDSS Type .....	466-467
<b>DLC Coated Drills</b>	
NHGS Type .....	468



### ■ MDUS-Features & Benefits

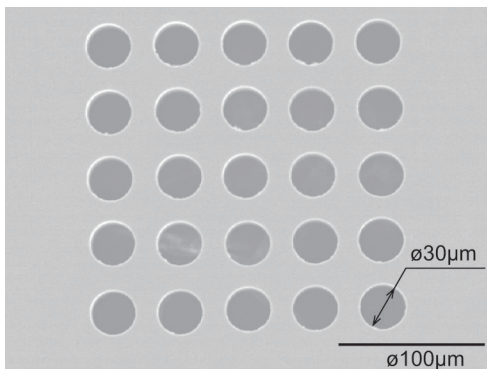
- **High precision shank**  
Shank tolerance: h3  
Concentricity: 0.3µm or less  
Roundness: 0.5µm or less
- **New ultra-thin TiAlN coating**  
Provides improved wear resistance
- **Wide material range**  
Ideal for machining steel, stainless steel, and copper



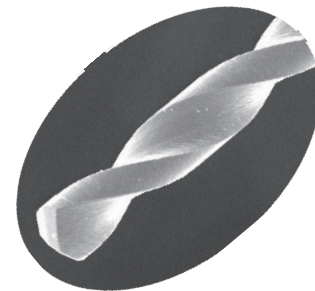
### ø0.030 to ø0.180mm

Catalog Number	øDc (mm)	øDs (mm)	Stock	Dimensions (mm)		
				ℓ	ℓs	L
MDUS0030-30C	0.030	3.0	★	0.3	28	38
MDUS0040-30C	0.040		★	0.4		
MDUS0050-30C	0.050		★	0.5		
MDUS0080-30C	0.080		★	0.8		
MDUS0100-30C	0.100		★	1.0		
MDUS0120-30C	0.120		★	1.2		
MDUS0150-30C	0.150		★	1.5		
MDUS0180-30C	0.180		★	1.8		

★ = Worldwide Warehouse item available in 10 business days



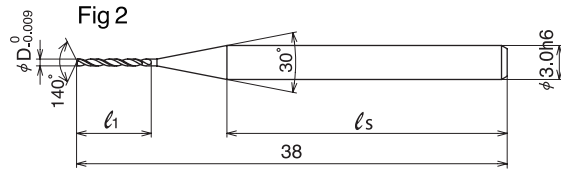
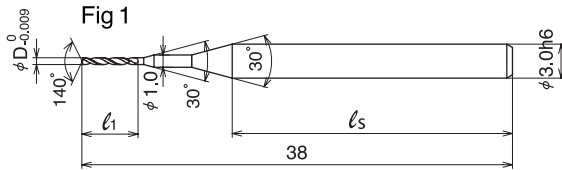
Material: 304 Stainless Steel  
Drill: MDUS0030-30C (ø0.03mm)





### ■ Features & Benefits

- High breakage resistance due to a combination of tough, stable carbide substrate and a highly rigid design
- Long tool life is achieved as a result of the PVD coating created especially for small diameter drills
- Wide variety of applications including carbon steel, alloy steel, die steel, and stainless steel



### ø0.20 to ø0.49mm

Catalog Number	Stock	øDc (mm)	Dimensions (mm)		Style
			ℓ	ℓ <sub>s</sub>	
MDSS0020	★	0.20	2.5	28	Fig1
MDSS0021	★	0.21			
MDSS0022	★	0.22			
MDSS0023	★	0.23			
MDSS0024	★	0.24			
MDSS0025	★	0.25			
MDSS0026	★	0.26			
MDSS0027	★	0.27			
MDSS0028	★	0.28			
MDSS0029	★	0.29	3	28	Fig1
MDSS0030	★	0.30			
MDSS0031	★	0.31			
MDSS0032	★	0.32			
MDSS0033	★	0.33			
MDSS0034	★	0.34			
MDSS0035	★	0.35			
MDSS0036	★	0.36			
MDSS0037	★	0.37			
MDSS0038	★	0.38	4	28	Fig1
MDSS0039	★	0.39			
MDSS0040	★	0.40			
MDSS0041	★	0.41			
MDSS0042	★	0.42			
MDSS0043	★	0.43			
MDSS0044	★	0.44			
MDSS0045	★	0.45			
MDSS0046	★	0.46			
MDSS0047	★	0.47	5	28	Fig2
MDSS0048	★	0.48			
MDSS0049	★	0.49			

### ø0.50 to ø0.79mm

Catalog Number	Stock	øDc (mm)	Dimensions (mm)		Style
			ℓ	ℓ <sub>s</sub>	
MDSS0050	★	0.50	6	27	Fig1
MDSS0051	★	0.51			
MDSS0052	★	0.52			
MDSS0053	★	0.53			
MDSS0054	★	0.54			
MDSS0055	★	0.55			
MDSS0056	★	0.56			
MDSS0057	★	0.57			
MDSS0058	★	0.58			
MDSS0059	★	0.59	7	26	Fig2
MDSS0060	★	0.60			
MDSS0061	★	0.61			
MDSS0062	★	0.62			
MDSS0063	★	0.63			
MDSS0064	★	0.64			
MDSS0065	★	0.65			
MDSS0066	★	0.66			
MDSS0067	★	0.67			
MDSS0068	★	0.68	9	24	Fig2
MDSS0069	★	0.69			
MDSS0070	★	0.70			
MDSS0071	★	0.71			
MDSS0072	★	0.72			
MDSS0073	★	0.73			
MDSS0074	★	0.74			
MDSS0075	★	0.75			
MDSS0076	★	0.76			
MDSS0077	★	0.77			
MDSS0078	★	0.78			
MDSS0079	★	0.79			

★ = Worldwide Warehouse item available in 10 business days

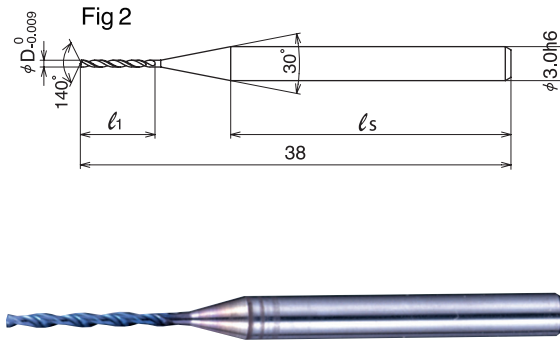
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### ø0.80 to ø1.00mm

Catalog Number	Stock	øDc (mm)	Dimensions (mm)		Style
			ℓ	ℓs	
MDSS0080	★	0.80	10	23	Fig2
MDSS0081	★	0.81			
MDSS0082	★	0.82			
MDSS0083	★	0.83			
MDSS0084	★	0.84			
MDSS0085	★	0.85			
MDSS0086	★	0.86			
MDSS0087	★	0.87			
MDSS0088	★	0.88			
MDSS0089	★	0.89			
MDSS0090	★	0.90	11	22	Fig2
MDSS0091	★	0.91			
MDSS0092	★	0.92			
MDSS0093	★	0.93			
MDSS0094	★	0.94			
MDSS0095	★	0.95			
MDSS0096	★	0.96			
MDSS0097	★	0.97			
MDSS0098	★	0.98			
MDSS0099	★	0.99			
MDSS0100	★	1.00	12	21	



★ = Worldwide Warehouse item available in 10 business days

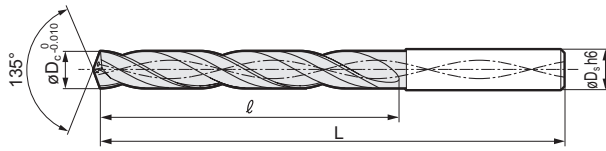
## Recommended Cutting Conditions (Wet)

Feed Rate=ipm / mm/min		Structural Steel	Alloy Steel	Die Steel	Hardened Steel	Hardened Steel	Ductile Cast Iron	Stainless Steel
		Carbon Steel Gray Cast Iron	Pre-hardened Steel	Tempered Steel	40-50 HRC	50-55 HRC		
~ø.20 - ø.29 mm	RPM	31,800	26,500	21,200	12,700	10,600	31,800	10,600
	Feed Rate	2.362 / 60	1.969 / 50	1.575 / 40	1.181 / 30	0.787 / 20	2.362 / 60	0.787 / 20
	Step Feed	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD
~ø.30 - .39 mm	RPM	31,800	26,500	21,200	12,700	10,600	31,800	10,600
	Feed Rate	3.937 / 100	3.150 / 80	2.362 / 60	1.575 / 40	1.181 / 30	3.937 / 100	1.181 / 30
	Step Feed	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD
~ø.40 - .49 mm	RPM	31,800	25,900	19,900	12,700	9,900	31,800	9,500
	Feed Rate	5.118 / 130	3.937 / 100	3.150 / 80	1.969 / 50	1.575 / 40	5.118 / 130	1.575 / 40
	Step Feed	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD
~ø.50 - .59 mm	RPM	31,800	25,500	19,100	12,700	9,500	31,800	9,500
	Feed Rate	7.480 / 190	5.906 / 150	4.330 / 110	2.362 / 60	1.969 / 50	7.480 / 190	1.969 / 50
	Step Feed	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD	0.1XD
~ø.60 - 1.00 mm	RPM	23,900	15,900	12,700	8,000	5,600	19,100	5,600
	Feed Rate	14.173 / 360	9.449 / 240	3.543 / 90	3.937 / 100	2.362 / 60	11.417 / 290	3.150 / 80
	Step Feed	0.2XD	.5XD*	0.2XD - .5XD*	0.1XD	0.1XD	0.2XD - .5XD*	0.1XD

\* Step feed is recommended for drilling of holes deeper than 3XD

- 1) The conditions above are recommended under wet conditions, using water-soluble coolant.
- 2) If machine noises and vibrations are present, adjust the cutting conditions accordingly.
- 3) If the machine cannot achieve the recommended spindle speed, use the maximum spindle speed available.





### Diameter $\phi 3.00$ to $8.00$ mm (5XD)

Catalog Number	$\phi D_c$ (mm)	$\phi D_s$ (mm)	Stock	Dimensions (mm)	
				$\ell$	L
MDW0300NHGS5	3.00	3.0	★	28	78
MDW0340NHGS5	3.40	4.0	★	32	86
MDW0350NHGS5	3.50		★		
MDW0365NHGS5	3.65		★		
MDW0380NHGS5	3.80		★		
MDW0400NHGS5	4.00	★	36		
MDW0430NHGS5	4.30	5.0	★	40	98
MDW0450NHGS5	4.50		★		
MDW0460NHGS5	4.60		★		
MDW0500NHGS5	5.00		★		
MDW0510NHGS5	5.10	6.0	★	44	100
MDW0550NHGS5	5.50		★		
MDW0600NHGS5	6.00		★		
MDW0610NHGS5	6.10	7.0	★	52	109
MDW0650NHGS5	6.50		★		
MDW0680NHGS5	6.80		★		
MDW0700NHGS5	7.00		★		
MDW0735NHGS5	7.35	8.0	★	60	118
MDW0750NHGS5	7.50		★		
MDW0780NHGS5	7.80		★		
MDW0800NHGS5	8.00		★		

### Diameter $\phi 8.50$ to $16.00$ mm (5XD)

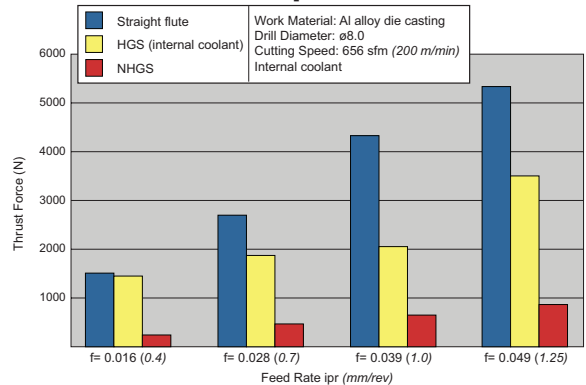
Catalog Number	$\phi D_c$ (mm)	$\phi D_s$ (mm)	Stock	Dimensions (mm)	
				$\ell$	L
MDW0850NHGS5	8.50	9.0	★	68	127
MDW0860NHGS5	8.60		★		
MDW0900NHGS5	9.00		★		
MDW0921NHGS5	9.21	10.0	★	76	136
MDW0950NHGS5	9.50		★		
MDW0960NHGS5	9.60		★		
MDW1000NHGS5	10.00		★		
MDW1040NHGS5	10.40	11.0	★	84	149
MDW1050NHGS5	10.50		★		
MDW1100NHGS5	11.00		★		
MDW1110NHGS5	11.10	12.0	★	92	158
MDW1150NHGS5	11.50		★		
MDW1200NHGS5	12.00		★		
MDW1210NHGS5	12.10	13.0	★	100	167
MDW1250NHGS5	12.50		★		
MDW1300NHGS5	13.00		★		
MDW1350NHGS5	13.50	14.0	★	108	176
MDW1400NHGS5	14.00		★		
MDW1410NHGS5	14.10	15.0	★	116	185
MDW1450NHGS5	14.50		★		
MDW1490NHGS5	14.90		★		
MDW1500NHGS5	15.00		★		
MDW1550NHGS5	15.50	16.0	★	124	194
MDW1600NHGS5	16.00		★		

★ = Worldwide Warehouse item available in 10 business days

### ■ Features & Benefits

- **High efficiency drilling**  
DLC or "diamond like carbon" coating along with special web thinning drastically reduce cutting resistance
- **Precision drilling**  
Special cutting edge design improves hole quality
- **Longer tool life**  
DLC coating and cutting edge design provide long and stable tool life
- **For a wide variety of work material**  
Die cast aluminum, aluminum casting, wrought aluminum alloy, brass casting, and bronze casting

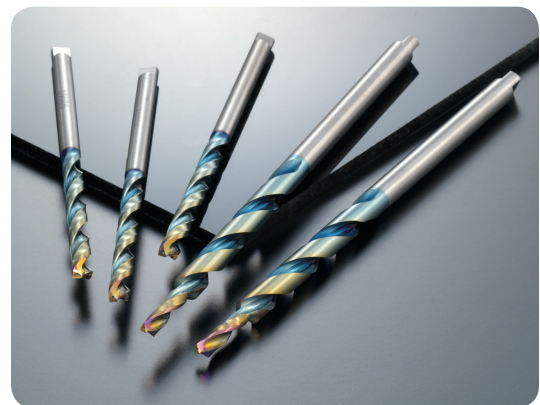
### ■ Thrust Force Comparison



### ■ Recommended Running Conditions

Speed: v (m/min)  
Feed: f (mm/rev)

Drill Diameter	Aluminum Casting/ Die Cast Aluminum		Wrought Aluminum Alloy
	Up to $\phi 6.00$	v	80 - 200
	f	0.2 - 0.5	0.2 - 0.3
Up to $\phi 10.00$	v	100 - 250	100 - 250
	f	0.4 - 0.8	0.2 - 0.4
Up to $\phi 16.00$	v	120 - 250	120 - 250
	f	0.4 - 1.0	0.3 - 0.5





**SUMITOMO**

**CARBIDE - CBN - DIAMOND**

**1-800-950-5202**

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