

Solid Carbide Drill for Stainless Steel  
**WSTAR** Drill Series

## **MIMS**

Special drill for stainless steels added to the WSTAR series.

## **Beyond the bounds of common sense for Stainless steel drilling**

Use of a unique coolant hole geometry improves the cooling effect. **“TRI-Cooling Technology”**  
Longer tool life and efficiency of stainless steels.



- Drill sizes available in 0.1mm increments from  $\phi 3.0$  to  $\phi 20.0$ .
- L/D 3, 5 types are available as standard.
- Shank diameters are even, possible to use in combination with milling holders.  
(Possible for use with shrink-fit holders and drill collets.)

# Solid Carbide Drill for Stainless Steel

## **WSTAR** drill series

# **MMS**

## Feature

Unique coolant hole geometry for high productivity & long tool life!

### 1 Unique coolant hole geometry

Employs new TRI-cooling technology. Discharged coolant volume increase by unique hole shape. (Coolant holes on drills larger than  $\varnothing 6$  mm)

PAT.P.

### 3 Special margin to reduce cutting resistance

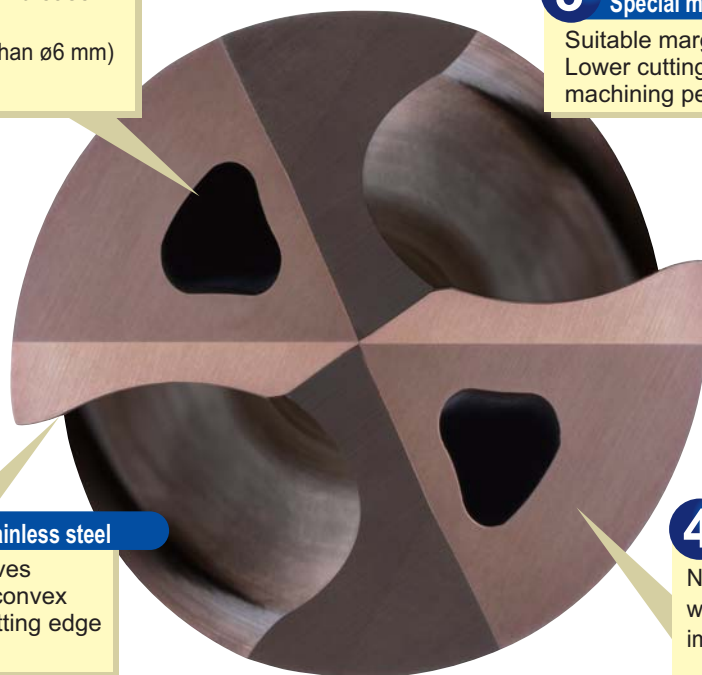
Suitable margin width for stainless steels. Lower cutting resistance offering higher machining performance.

### 2 Wavy cutting edge for stainless steel

The concave edge improves sharpness, whereas the convex edge improves overall cutting edge strength.

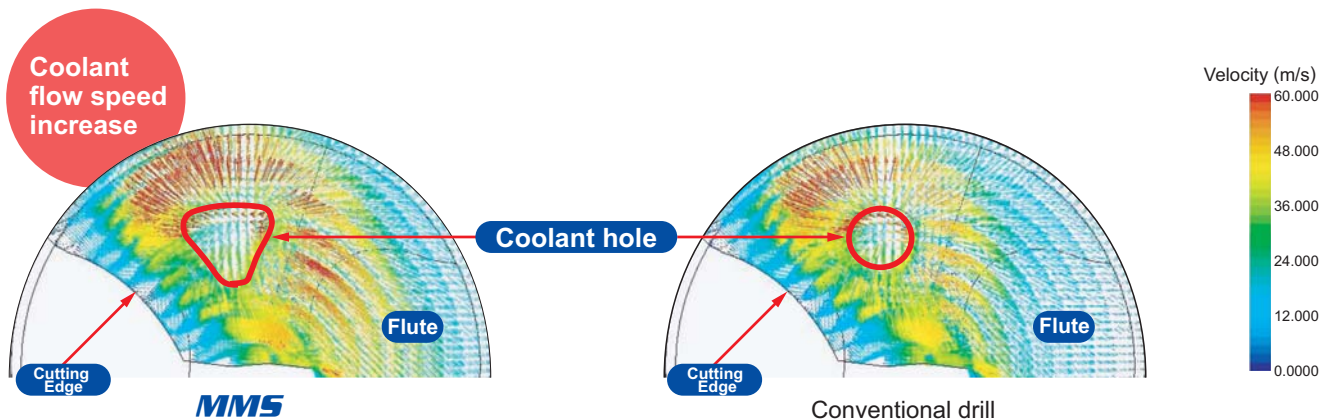
### 4 New tool grade DP7020

New substrate for stainless steels, with a PVD coating offering improved lubricity.



Compared to conventional drills, coolant volume is doubled. Improved cooling and longer tool life.

Coolant flow speed simulation (Rotation 4700rpm)



# Cutting Performance

The MMS drill generates chips that are easily evacuated leading to higher performance.

## MMS

Feed (mm/rev)	Cutting speed (m/min)		
	60	80	100
0.2	○ Workable	○ Workable	○ Workable
0.3	○ Workable	○ Workable	○ Workable
0.35	○ Workable	● Breakage	—



Easy to evacuate chip geometry

<Cutting conditions>  
 Drill :  $\phi$ 6.1mm  
 Workpiece : SUS304  
 Hole depth : 30mm (L/D=5)  
 Coolant : W.S.O  
 Emission pressure : 3MPa  
 Machine : Machining centre

## Conventional drill

Feed (mm/rev)	Cutting speed (m/min)		
	60	80	100
0.2	○ Workable	○ Workable	○ Workable
0.3	○ Workable	● Breakage	—
0.35	● Breakage	—	—

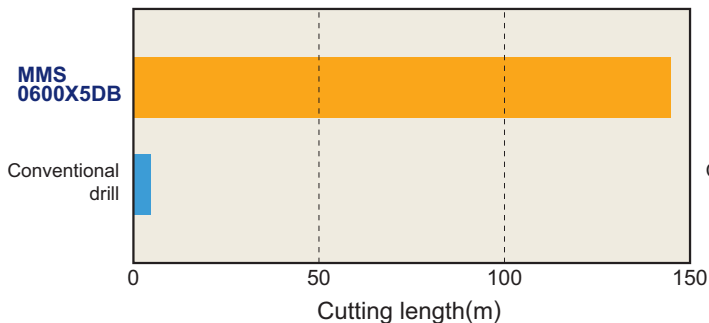


\*Above is an example, for recommended cutting conditions please refer to page 7.

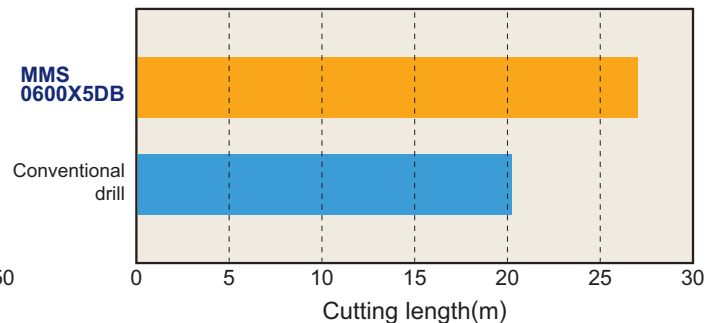
The MMS drill offer longer tool life, and can be used for various stainless steels.

### ● Austenitic stainless steel

### ● Martensitic stainless steel



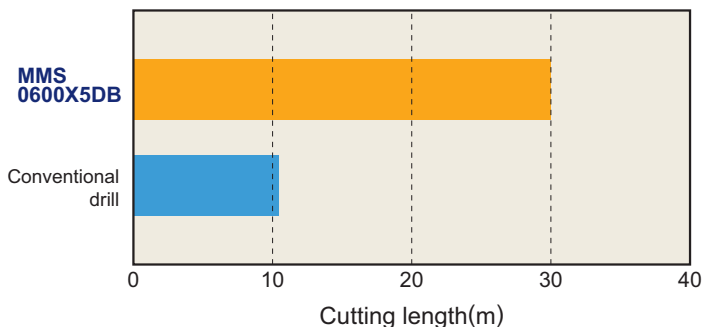
<Cutting conditions>  
 Drill :  $\phi$ 6.0mm      Feed Rate : 955mm/min (Non-step)  
 Workpiece : JIS SUS316L      Coolant : W.S.O  
 Hole depth : 30mm (L/D=5)      Emission pressure : 3MPa  
 Cutting speed : 90m/min      Machine : Machining centre  
 Feed : 0.2mm/rev



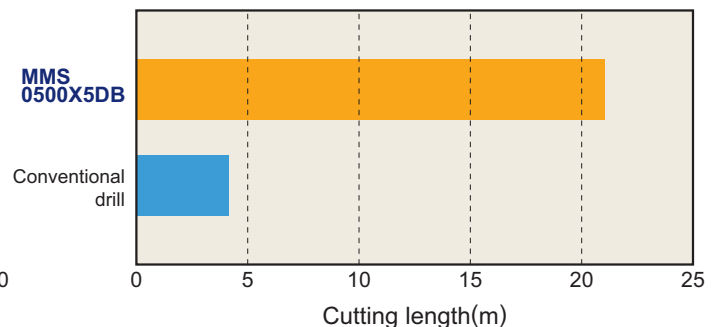
<Cutting conditions>  
 Drill :  $\phi$ 6.0mm      Feed Rate : 345mm/min (Non-step)  
 Workpiece : JIS SUS420J2      Coolant : W.S.O  
 Hole depth : 30mm (L/D=5)      Emission pressure : 3MPa  
 Cutting speed : 50m/min      Machine : Machining centre  
 Feed : 0.13mm/rev

### ● Duplex steel

### ● PH stainless steel



<Cutting conditions>  
 Drill :  $\phi$ 6.0mm      Feed Rate : 345mm/min (Non-step)  
 Workpiece : JIS SUS329J1      Coolant : W.S.O  
 Hole depth : 30mm (L/D=5)      Emission pressure : 3MPa  
 Cutting speed : 50m/min      Machine : Machining centre  
 Feed : 0.13mm/rev



<Cutting conditions>  
 Drill :  $\phi$ 5.0mm      Feed Rate : 255mm/min (Non-step)  
 Workpiece : JIS SUS630      Coolant : W.S.O  
 Hole depth : 25mm (L/D=5)      Emission pressure : 3MPa  
 Cutting speed : 50m/min      Machine : Machining centre  
 Feed : 0.08mm/rev

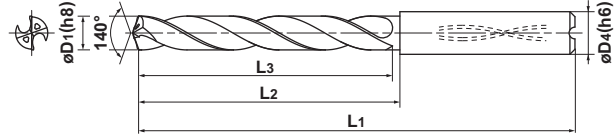
# Solid Carbide Drill for Stainless Steel

## MMS

### WSTAR Drill Series

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
		◎			

	D1=3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤20
D1 Tolerance (mm)	0 -0.014	0 -0.018	0 -0.022	0 -0.027	0 -0.033
D4 Tolerance (mm)	0 -0.008	0 -0.008	0 -0.009	0 -0.011	0 -0.013



★When looking at the coating the colour can vary depending on the direction of viewing. This does not have any effect on the performance of the drill.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock DP7020	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
3.0	3	Int.	●	MMS0300X3DB	21	23	70	6
	5	Int.	●	0300X5DB	28	31	78	6
3.1	3	Int.	●	0310X3DB	21	23	70	6
	5	Int.	●	0310X5DB	28	31	78	6
3.2	3	Int.	●	0320X3DB	21	23	70	6
	5	Int.	●	0320X5DB	28	31	78	6
3.3	3	Int.	●	0330X3DB	21	23	70	6
	5	Int.	●	0330X5DB	28	31	78	6
3.4	3	Int.	●	0340X3DB	21	23	70	6
	5	Int.	●	0340X5DB	28	31	78	6
3.5	3	Int.	●	0350X3DB	21	23	70	6
	5	Int.	●	0350X5DB	28	31	78	6
3.6	3	Int.	●	0360X3DB	22	23	70	6
	5	Int.	●	0360X5DB	30	31	78	6
3.7	3	Int.	●	0370X3DB	22	23	70	6
	5	Int.	●	0370X5DB	30	31	78	6
3.8	3	Int.	●	0380X3DB	22	23	70	6
	5	Int.	●	0380X5DB	30	31	78	6
3.9	3	Int.	●	0390X3DB	22	23	70	6
	5	Int.	●	0390X5DB	30	31	78	6
4.0	3	Int.	●	0400X3DB	22	23	70	6
	5	Int.	●	0400X5DB	30	31	78	6
4.1	3	Int.	●	0410X3DB	24	26	73	6
	5	Int.	●	0410X5DB	33	35	82	6
4.2	3	Int.	●	0420X3DB	24	26	73	6
	5	Int.	●	0420X5DB	33	35	82	6
4.3	3	Int.	●	0430X3DB	24	26	73	6
	5	Int.	●	0430X5DB	33	35	82	6
4.4	3	Int.	●	0440X3DB	24	26	73	6
	5	Int.	●	0440X5DB	33	35	82	6
4.5	3	Int.	●	0450X3DB	24	26	73	6
	5	Int.	●	0450X5DB	33	35	82	6
4.6	3	Int.	●	0460X3DB	25	28	75	6
	5	Int.	●	0460X5DB	35	38	85	6
4.7	3	Int.	●	0470X3DB	25	28	75	6
	5	Int.	●	0470X5DB	35	38	85	6
4.8	3	Int.	●	0480X3DB	25	28	75	6
	5	Int.	●	0480X5DB	35	38	85	6

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock DP7020	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
4.9	3	Int.	●	MMS0490X3DB	25	28	75	6
	5	Int.	●	0490X5DB	35	38	85	6
5.0	3	Int.	●	0500X3DB	25	28	75	6
	5	Int.	●	0500X5DB	35	38	85	6
5.1	3	Int.	●	0510X3DB	28	30	81	6
	5	Int.	●	0510X5DB	39	42	89	6
5.2	3	Int.	●	0520X3DB	28	30	81	6
	5	Int.	●	0520X5DB	39	42	89	6
5.3	3	Int.	●	0530X3DB	28	30	81	6
	5	Int.	●	0530X5DB	39	42	89	6
5.4	3	Int.	●	0540X3DB	28	30	81	6
	5	Int.	●	0540X5DB	39	42	89	6
5.5	3	Int.	●	0550X3DB	28	30	81	6
	5	Int.	●	0550X5DB	39	42	89	6
5.6	3	Int.	●	0560X3DB	30	30	81	6
	5	Int.	●	0560X5DB	42	42	89	6
5.7	3	Int.	●	0570X3DB	30	30	81	6
	5	Int.	●	0570X5DB	42	42	89	6
5.8	3	Int.	●	0580X3DB	30	30	81	6
	5	Int.	●	0580X5DB	42	42	89	6
5.9	3	Int.	●	0590X3DB	30	30	81	6
	5	Int.	●	0590X5DB	42	42	89	6
6.0	3	Int.	●	0600X3DB	30	30	81	6
	5	Int.	●	0600X5DB	42	42	89	6
6.1	3	Int.	●	0610X3DB	33	35	86	8
	5	Int.	●	0610X5DB	46	48	95	8
6.2	3	Int.	●	0620X3DB	33	35	86	8
	5	Int.	●	0620X5DB	46	48	95	8
6.3	3	Int.	●	0630X3DB	33	35	86	8
	5	Int.	●	0630X5DB	46	48	95	8
6.4	3	Int.	●	0640X3DB	33	35	86	8
	5	Int.	●	0640X5DB	46	48	95	8
6.5	3	Int.	●	0650X3DB	33	35	86	8
	5	Int.	●	0650X5DB	46	48	95	8
6.6	3	Int.	●	0660X3DB	35	37	90	8
	5	Int.	●	0660X5DB	49	51	98	8
6.7	3	Int.	●	0670X3DB	35	37	90	8
	5	Int.	●	0670X5DB	49	51	98	8

Note) Please contact Mitsubishi Carbide for any geometry that is not in the brochure (e.g. different diameter and length).

● : Inventory maintained.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock DP7020	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
6.8	3	Int.	●	MMS0680X3DB	35	37	90	8
	5	Int.	●	0680X5DB	49	51	98	8
6.9	3	Int.	●	0690X3DB	35	37	90	8
	5	Int.	●	0690X5DB	49	51	98	8
7.0	3	Int.	●	0700X3DB	35	37	90	8
	5	Int.	●	0700X5DB	49	51	98	8
7.1	3	Int.	●	0710X3DB	38	39	90	8
	5	Int.	●	0710X5DB	53	56	103	8
7.2	3	Int.	●	0720X3DB	38	39	90	8
	5	Int.	●	0720X5DB	53	56	103	8
7.3	3	Int.	●	0730X3DB	38	39	90	8
	5	Int.	●	0730X5DB	53	56	103	8
7.4	3	Int.	●	0740X3DB	38	39	90	8
	5	Int.	●	0740X5DB	53	56	103	8
7.5	3	Int.	●	0750X3DB	38	39	90	8
	5	Int.	●	0750X5DB	53	56	103	8
7.6	3	Int.	●	0760X3DB	40	40	90	8
	5	Int.	●	0760X5DB	56	56	103	8
7.7	3	Int.	●	0770X3DB	40	40	90	8
	5	Int.	●	0770X5DB	56	56	103	8
7.8	3	Int.	●	0780X3DB	40	40	90	8
	5	Int.	●	0780X5DB	56	56	103	8
7.9	3	Int.	●	0790X3DB	40	40	90	8
	5	Int.	●	0790X5DB	56	56	103	8
8.0	3	Int.	●	0800X3DB	40	40	90	8
	5	Int.	●	0800X5DB	56	56	103	8
8.1	3	Int.	●	0810X3DB	43	45	96	10
	5	Int.	●	0810X5DB	60	62	113	10
8.2	3	Int.	●	0820X3DB	43	45	96	10
	5	Int.	●	0820X5DB	60	62	113	10
8.3	3	Int.	●	0830X3DB	43	45	96	10
	5	Int.	●	0830X5DB	60	62	113	10
8.4	3	Int.	●	0840X3DB	43	45	96	10
	5	Int.	●	0840X5DB	60	62	113	10
8.5	3	Int.	●	0850X3DB	43	45	96	10
	5	Int.	●	0850X5DB	60	62	113	10
8.6	3	Int.	●	0860X3DB	45	47	101	10
	5	Int.	●	0860X5DB	63	65	116	10
8.7	3	Int.	●	0870X3DB	45	47	101	10
	5	Int.	●	0870X5DB	63	65	116	10
8.8	3	Int.	●	0880X3DB	45	47	101	10
	5	Int.	●	0880X5DB	63	65	116	10
8.9	3	Int.	●	0890X3DB	45	47	101	10
	5	Int.	●	0890X5DB	63	65	116	10
9.0	3	Int.	●	0900X3DB	45	47	101	10
	5	Int.	●	0900X5DB	63	65	116	10
9.1	3	Int.	●	0910X3DB	48	50	101	10
	5	Int.	●	0910X5DB	67	70	121	10
9.2	3	Int.	●	0920X3DB	48	50	101	10
	5	Int.	●	0920X5DB	67	70	121	10

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock DP7020	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
9.3	3	Int.	●	MMS0930X3DB	48	50	101	10
	5	Int.	●	0930X5DB	67	70	121	10
9.4	3	Int.	●	0940X3DB	48	50	101	10
	5	Int.	●	0940X5DB	67	70	121	10
9.5	3	Int.	●	0950X3DB	48	50	101	10
	5	Int.	●	0950X5DB	67	70	121	10
9.6	3	Int.	●	0960X3DB	50	50	101	10
	5	Int.	●	0960X5DB	70	70	121	10
9.7	3	Int.	●	0970X3DB	50	50	101	10
	5	Int.	●	0970X5DB	70	70	121	10
9.8	3	Int.	●	0980X3DB	50	50	101	10
	5	Int.	●	0980X5DB	70	70	121	10
9.9	3	Int.	●	0990X3DB	50	50	101	10
	5	Int.	●	0990X5DB	70	70	121	10
10.0	3	Int.	●	1000X3DB	50	50	101	10
	5	Int.	●	1000X5DB	70	70	121	10
10.1	3	Int.	●	1010X3DB	53	55	111	12
	5	Int.	●	1010X5DB	74	78	134	12
10.2	3	Int.	●	1020X3DB	53	55	111	12
	5	Int.	●	1020X5DB	74	78	134	12
10.3	3	Int.	●	1030X3DB	53	55	111	12
	5	Int.	●	1030X5DB	74	78	134	12
10.4	3	Int.	●	1040X3DB	53	55	111	12
	5	Int.	●	1040X5DB	74	78	134	12
10.5	3	Int.	●	1050X3DB	53	55	111	12
	5	Int.	●	1050X5DB	74	78	134	12
10.6	3	Int.	●	1060X3DB	55	56	116	12
	5	Int.	●	1060X5DB	77	78	134	12
10.7	3	Int.	●	1070X3DB	55	56	116	12
	5	Int.	●	1070X5DB	77	78	134	12
10.8	3	Int.	●	1080X3DB	55	56	116	12
	5	Int.	●	1080X5DB	77	78	134	12
10.9	3	Int.	●	1090X3DB	55	56	116	12
	5	Int.	●	1090X5DB	77	78	134	12
11.0	3	Int.	●	1100X3DB	55	56	116	12
	5	Int.	●	1100X5DB	77	78	134	12
11.1	3	Int.	●	1110X3DB	58	60	116	12
	5	Int.	●	1110X5DB	81	84	140	12
11.2	3	Int.	●	1120X3DB	58	60	116	12
	5	Int.	●	1120X5DB	81	84	140	12
11.3	3	Int.	●	1130X3DB	58	60	116	12
	5	Int.	●	1130X5DB	81	84	140	12
11.4	3	Int.	●	1140X3DB	58	60	116	12
	5	Int.	●	1140X5DB	81	84	140	12
11.5	3	Int.	●	1150X3DB	58	60	116	12
	5	Int.	●	1150X5DB	81	84	140	12
11.6	3	Int.	●	1160X3DB	60	60	116	12
	5	Int.	●	1160X5DB	84	84	140	12
11.7	3	Int.	●	1170X3DB	60	60	116	12
	5	Int.	●	1170X5DB	84	84	140	12

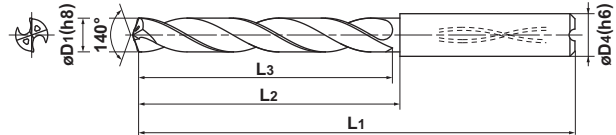
# Solid Carbide Drill for Stainless Steel

## MMS

### WSTAR Drill Series

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
		◎			

	D1=3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤20
D4 Tolerance (mm)	0 -0.014	0 -0.018	0 -0.022	0 -0.027	0 -0.033
D1 Tolerance (mm)	0 -0.008	0 -0.008	0 -0.009	0 -0.011	0 -0.013



\*When looking at the coating the colour can vary depending on the direction of viewing. This does not have any effect on the performance of the drill.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock DP7020	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
11.8	3	Int.	●	MMS1180X3DB	60	60	116	12
	5	Int.	●	1180X5DB	84	84	140	12
11.9	3	Int.	●	1190X3DB	60	60	116	12
	5	Int.	●	1190X5DB	84	84	140	12
12.0	3	Int.	●	1200X3DB	60	60	116	12
	5	Int.	●	1200X5DB	84	84	140	12
12.1	3	Int.	●	1210X3DB	63	66	122	14
	5	Int.	●	1210X5DB	88	92	148	14
12.2	3	Int.	●	1220X3DB	63	66	122	14
	5	Int.	●	1220X5DB	88	92	148	14
12.3	3	Int.	●	1230X3DB	63	66	122	14
	5	Int.	●	1230X5DB	88	92	148	14
12.4	3	Int.	●	1240X3DB	63	66	122	14
	5	Int.	●	1240X5DB	88	92	148	14
12.5	3	Int.	●	1250X3DB	63	66	122	14
	5	Int.	●	1250X5DB	88	92	148	14
12.6	3	Int.	●	1260X3DB	65	66	122	14
	5	Int.	●	1260X5DB	91	92	148	14
12.7	3	Int.	●	1270X3DB	65	66	122	14
	5	Int.	●	1270X5DB	91	92	148	14
12.8	3	Int.	●	1280X3DB	65	66	122	14
	5	Int.	●	1280X5DB	91	92	148	14
12.9	3	Int.	●	1290X3DB	65	66	122	14
	5	Int.	●	1290X5DB	91	92	148	14
13.0	3	Int.	●	1300X3DB	65	66	122	14
	5	Int.	●	1300X5DB	91	92	148	14
13.1	3	Int.	●	1310X3DB	68	70	126	14
	5	Int.	●	1310X5DB	95	98	154	14
13.2	3	Int.	●	1320X3DB	68	70	126	14
	5	Int.	●	1320X5DB	95	98	154	14
13.3	3	Int.	●	1330X3DB	68	70	126	14
	5	Int.	●	1330X5DB	95	98	154	14
13.4	3	Int.	●	1340X3DB	68	70	126	14
	5	Int.	●	1340X5DB	95	98	154	14
13.5	3	Int.	●	1350X3DB	68	70	126	14
	5	Int.	●	1350X5DB	95	98	154	14
13.6	3	Int.	●	1360X3DB	70	70	126	14
	5	Int.	●	1360X5DB	98	98	154	14

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock DP7020	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
13.7	3	Int.	●	MMS1370X3DB	70	70	126	14
	5	Int.	●	1370X5DB	98	98	154	14
13.8	3	Int.	●	1380X3DB	70	70	126	14
	5	Int.	●	1380X5DB	98	98	154	14
13.9	3	Int.	●	1390X3DB	70	70	126	14
	5	Int.	●	1390X5DB	98	98	154	14
14.0	3	Int.	●	1400X3DB	70	70	126	14
	5	Int.	●	1400X5DB	98	98	154	14
14.1	3	Int.	●	1410X3DB	73	76	135	16
	5	Int.	●	1410X5DB	102	106	165	16
14.2	3	Int.	●	1420X3DB	73	76	135	16
	5	Int.	●	1420X5DB	102	106	165	16
14.3	3	Int.	●	1430X3DB	73	76	135	16
	5	Int.	●	1430X5DB	102	106	165	16
14.4	3	Int.	●	1440X3DB	73	76	135	16
	5	Int.	●	1440X5DB	102	106	165	16
14.5	3	Int.	●	1450X3DB	73	76	135	16
	5	Int.	●	1450X5DB	102	106	165	16
14.6	3	Int.	●	1460X3DB	75	76	135	16
	5	Int.	●	1460X5DB	105	106	165	16
14.7	3	Int.	●	1470X3DB	75	76	135	16
	5	Int.	●	1470X5DB	105	106	165	16
14.8	3	Int.	●	1480X3DB	75	76	135	16
	5	Int.	●	1480X5DB	105	106	165	16
14.9	3	Int.	●	1490X3DB	75	76	135	16
	5	Int.	●	1490X5DB	105	106	165	16
15.0	3	Int.	●	1500X3DB	75	76	135	16
	5	Int.	●	1500X5DB	105	106	165	16
15.1	3	Int.	●	1510X3DB	78	80	139	16
	5	Int.	●	1510X5DB	109	112	171	16
15.2	3	Int.	●	1520X3DB	78	80	139	16
	5	Int.	●	1520X5DB	109	112	171	16
15.3	3	Int.	●	1530X3DB	78	80	139	16
	5	Int.	●	1530X5DB	109	112	171	16
15.4	3	Int.	●	1540X3DB	78	80	139	16
	5	Int.	●	1540X5DB	109	112	171	16
15.5	3	Int.	●	1550X3DB	78	80	139	16
	5	Int.	●	1550X5DB	109	112	171	16

Note) Please contact Mitsubishi Carbide for any geometry that is not in the brochure (e.g. different diameter and length).

● : Inventory maintained. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock DP7020	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
15.6	3	Int.	●	MMS1560X3DB	80	80	139	16
	5	Int.	●	1560X5DB	112	112	171	16
15.7	3	Int.	●	1570X3DB	80	80	139	16
	5	Int.	●	1570X5DB	112	112	171	16
15.8	3	Int.	●	1580X3DB	80	80	139	16
	5	Int.	●	1580X5DB	112	112	171	16
15.9	3	Int.	●	1590X3DB	80	80	139	16
	5	Int.	●	1590X5DB	112	112	171	16
16.0	3	Int.	●	1600X3DB	80	80	139	16
	5	Int.	●	1600X5DB	112	112	171	16
16.1	3	Int.	□	1610X3DB	83	86	145	18
	5	Int.	□	1610X5DB	116	120	179	18
16.2	3	Int.	□	1620X3DB	83	86	145	18
	5	Int.	□	1620X5DB	116	120	179	18
16.3	3	Int.	□	1630X3DB	83	86	145	18
	5	Int.	□	1630X5DB	116	120	179	18
16.4	3	Int.	□	1640X3DB	83	86	145	18
	5	Int.	□	1640X5DB	116	120	179	18
16.5	3	Int.	●	1650X3DB	83	86	145	18
	5	Int.	●	1650X5DB	116	120	179	18
16.6	3	Int.	□	1660X3DB	85	86	145	18
	5	Int.	□	1660X5DB	119	120	179	18
16.7	3	Int.	□	1670X3DB	85	86	145	18
	5	Int.	□	1670X5DB	119	120	179	18
16.8	3	Int.	□	1680X3DB	85	86	145	18
	5	Int.	□	1680X5DB	119	120	179	18
16.9	3	Int.	□	1690X3DB	85	86	145	18
	5	Int.	□	1690X5DB	119	120	179	18
17.0	3	Int.	●	1700X3DB	85	86	145	18
	5	Int.	●	1700X5DB	119	120	179	18
17.1	3	Int.	□	1710X3DB	88	90	149	18
	5	Int.	□	1710X5DB	123	126	185	18
17.2	3	Int.	□	1720X3DB	88	90	149	18
	5	Int.	□	1720X5DB	123	126	185	18
17.3	3	Int.	□	1730X3DB	88	90	149	18
	5	Int.	□	1730X5DB	123	126	185	18
17.4	3	Int.	□	1740X3DB	88	90	149	18
	5	Int.	□	1740X5DB	123	126	185	18
17.5	3	Int.	●	1750X3DB	88	90	149	18
	5	Int.	●	1750X5DB	123	126	185	18
17.6	3	Int.	□	1760X3DB	90	90	149	18
	5	Int.	□	1760X5DB	126	126	185	18
17.7	3	Int.	□	1770X3DB	90	90	149	18
	5	Int.	□	1770X5DB	126	126	185	18
17.8	3	Int.	□	1780X3DB	90	90	149	18
	5	Int.	□	1780X5DB	126	126	185	18

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock DP7020	Order Number	Dimensions (mm)			
					L3	L2	L1	D4
17.9	3	Int.	□	MMS1790X3DB	90	90	149	18
	5	Int.	□	1790X5DB	126	126	185	18
18.0	3	Int.	●	1800X3DB	90	90	149	18
	5	Int.	●	1800X5DB	126	126	185	18
18.1	3	Int.	□	1810X3DB	93	96	157	20
	5	Int.	□	1810X5DB	130	134	191	20
18.2	3	Int.	□	1820X3DB	93	96	157	20
	5	Int.	□	1820X5DB	130	134	191	20
18.3	3	Int.	□	1830X3DB	93	96	157	20
	5	Int.	□	1830X5DB	130	134	191	20
18.4	3	Int.	□	1840X3DB	93	96	157	20
	5	Int.	□	1840X5DB	130	134	191	20
18.5	3	Int.	●	1850X3DB	93	96	157	20
	5	Int.	●	1850X5DB	130	134	191	20
18.6	3	Int.	□	1860X3DB	95	96	157	20
	5	Int.	□	1860X5DB	133	134	195	20
18.7	3	Int.	□	1870X3DB	95	96	157	20
	5	Int.	□	1870X5DB	133	134	195	20
18.8	3	Int.	□	1880X3DB	95	96	157	20
	5	Int.	□	1880X5DB	133	134	195	20
18.9	3	Int.	□	1890X3DB	95	96	157	20
	5	Int.	□	1890X5DB	133	134	195	20
19.0	3	Int.	●	1900X3DB	95	96	157	20
	5	Int.	●	1900X5DB	133	134	195	20
19.1	3	Int.	□	1910X3DB	98	100	161	20
	5	Int.	□	1910X5DB	137	140	201	20
19.2	3	Int.	□	1920X3DB	98	100	161	20
	5	Int.	□	1920X5DB	137	140	201	20
19.3	3	Int.	□	1930X3DB	98	100	161	20
	5	Int.	□	1930X5DB	137	140	201	20
19.4	3	Int.	□	1940X3DB	98	100	161	20
	5	Int.	□	1940X5DB	137	140	201	20
19.5	3	Int.	●	1950X3DB	98	100	161	20
	5	Int.	●	1950X5DB	137	140	201	20
19.6	3	Int.	□	1960X3DB	100	100	161	20
	5	Int.	□	1960X5DB	140	140	201	20
19.7	3	Int.	□	1970X3DB	100	100	161	20
	5	Int.	□	1970X5DB	140	140	201	20
19.8	3	Int.	□	1980X3DB	100	100	161	20
	5	Int.	□	1980X5DB	140	140	201	20
19.9	3	Int.	□	1990X3DB	100	100	161	20
	5	Int.	□	1990X5DB	140	140	201	20
20.0	3	Int.	●	2000X3DB	100	100	161	20
	5	Int.	●	2000X5DB	140	140	201	20

### Recommended Cutting Conditions

Work Material	No	Hardness	Cutting Speed (m/min)	Feed (mm/rev)			
				Drill Diameter			
				φ3.0-φ3.9	φ4.0-φ5.9	φ6.0-φ7.9	φ8.0-φ9.9
Ferritic, Martensitic Stainless Steel	1	≤200HB	60-80-100	0.08-0.13-0.18	0.10-0.15-0.20	0.12-0.17-0.22	0.14-0.19-0.23
	2	>200HB	40-60-80	0.08-0.10-0.18	0.10-0.12-0.20	0.12-0.15-0.22	0.14-0.17-0.23
PH Stainless Steel	3	<450HB	40-50-80	0.08-0.10-0.18	0.10-0.12-0.20	0.12-0.15-0.22	0.14-0.17-0.23
Austenitic Stainless Steel	4	≤200HB	60-80-100	0.08-0.13-0.18	0.10-0.15-0.20	0.12-0.17-0.22	0.14-0.19-0.23
	5	>200HB	40-60-80	0.08-0.10-0.18	0.10-0.12-0.20	0.12-0.15-0.22	0.14-0.17-0.23
Duplex Steel	6	135HB-275HB	40-50-80	0.08-0.10-0.18	0.10-0.12-0.20	0.12-0.15-0.22	0.14-0.17-0.23

Work Material	No	Hardness	Cutting Speed (m/min)	Feed (mm/rev)			
				Drill Diameter			
				φ10.0-φ11.9	φ12.0-φ15.9	φ16.0-φ19.9	φ20.0
Ferritic, Martensitic Stainless Steel	1	≤200HB	50-60-70	0.15-0.20-0.24	0.16-0.21-0.25	0.17-0.22-0.26	0.18-0.23-0.28
	2	>200HB	40-50-60	0.15-0.18-0.24	0.16-0.19-0.25	0.17-0.20-0.26	0.18-0.21-0.26
PH Stainless Steel	3	<450HB	30-40-50	0.15-0.18-0.24	0.16-0.19-0.25	0.17-0.20-0.26	0.18-0.21-0.28
Austenitic Stainless Steel	4	≤200HB	50-60-70	0.15-0.20-0.24	0.16-0.21-0.25	0.17-0.22-0.26	0.18-0.23-0.28
	5	>200HB	40-50-60	0.15-0.18-0.24	0.16-0.19-0.25	0.17-0.20-0.26	0.18-0.21-0.28
Duplex Steel	6	135HB-275HB	30-40-50	0.15-0.18-0.24	0.16-0.19-0.25	0.17-0.20-0.26	0.18-0.21-0.28

(Note 1) Spindle through & high pressure coolant system is recommended to make stable holes.

(Note 3) Emulsion type of water coolant is recommended.

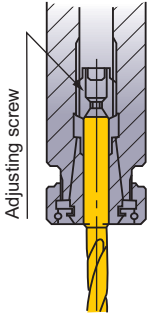
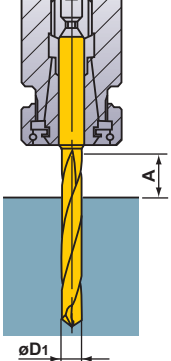
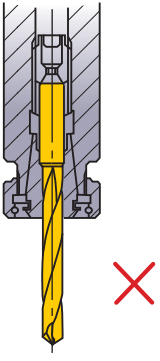
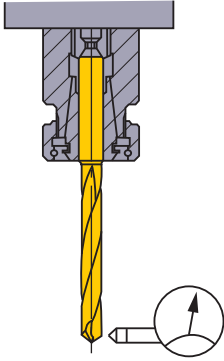
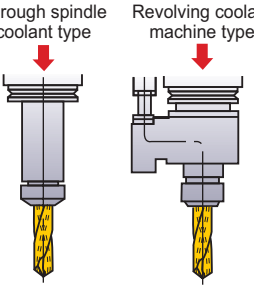
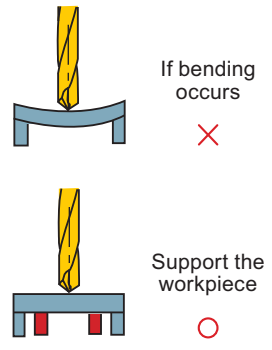
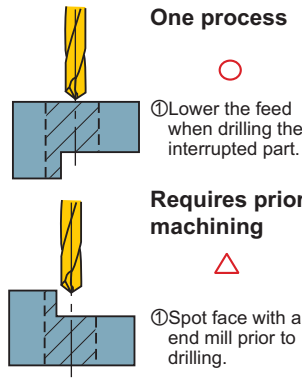
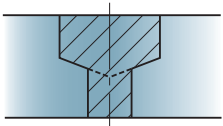
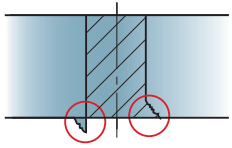
(Note 3) In non water cutting fluid, reduce the rotation by 10%-20%.

### Stainless Steel Cross Reference List

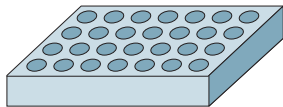
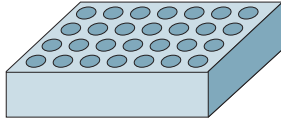
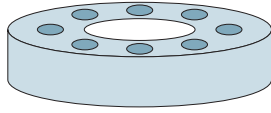
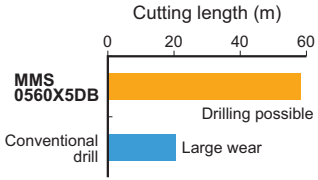
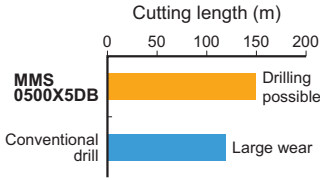
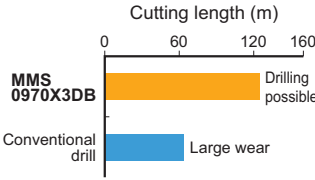
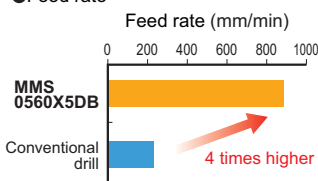
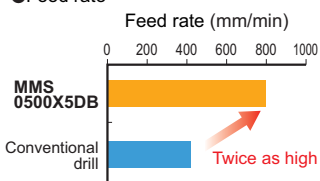
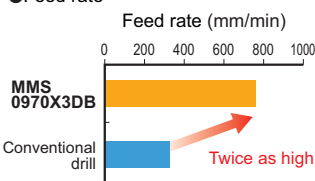
Work Material	No	Japan	Germany		USA
		JIS	W-no.	DIN	AIS/SAE
Ferritic, Martensitic Stainless Steel	1	SUS416	1.4005	X12CrS3	416
		SUS410	1.4006	X10Cr13	410
		SUS430	1.4016	X6Cr17	430
		SUS434	1.4113	X6CrMo17	434
		SUS430LX	1.4510	X6CrTi17	430Ti
	2	—	1.4512	X6CrTi12	409
		SUS420J1	1.4021	X20Cr13	420
		SUS431	1.4057	X20CrNi17-2	431
PH Stainless Steel	3	SUS420J2	1.4028	X30Cr13	420
		SUS440C	1.4125	X10CrMo17	440C
		SUS630	1.4542	X5CrNiCuNb16 4	630 (17-4PH)
Austenitic Stainless Steel	4	—	1.4545	—	S15500 (15-5PH)
		SUS631	1.4568	X7CrNiAl17 7	631 (17-7PH)
		SUS304	1.4301	X5CrNi18 10	304
		SUS305	1.4303	X5CrNi8-12	305
		SUS303	1.4305	X12CrNiS18-9	303
	5	SUS304L	1.4307	X2CrNi19-11	304L
		SUS316	1.4401	X5CrNiMo17 12 2	316
		SUS304LN	1.4311	X2CrNi18 10	304LN
		SUS316L	1.4404	X2CrNiMo17 12 2	316L
		SUS316LN	1.4406	X2CrNiMoN17 12 2	316LN
		SUS316L	1.4435	X2CrNiMo18 14 3	—
		SUS317L	1.4438	X2CrNiMo18 15 4	317L
		—	1.4529	X1NiCrMoCuN25 20 7	N08926
		SUS321	1.4541	X6CrNiTi18-10	321
		SUS347	1.4550	X6CrNiNb18-10	347
Duplex Steel	6	SUS316Ti	1.4571	X6CrNiMoTi17 12 2	316Ti
		—	1.4362	X2CrNiN23 4	—
		SCS14A	1.4410	X2CrNiMoN25 7 4	S32750
		SUS329J1	1.4460	X3CrNiMoN27 5 2	329
		SUS329J3L	1.4462	X2CrNiMoN22 5 3	S31803



## Operational Guidance for the MMS Drill

<p><b>Drill holding</b></p>  <p>Adjusting screw</p> <p>Thrust bearing type collet chuck holds the drill securely.</p>	<p><b>Drill holding</b></p>  <p><math>A : \geq D1 \times 1.5</math></p>	<p><b>Drill installation</b></p>  <p>Do not clamp on the flutes.</p>	<p><b>Installation tolerance</b></p>  <p>Runout <math>\leq 0.03\text{mm}</math></p>
<p><b>Coolant method</b></p>  <p>Through spindle coolant type    Revolving coolant machine type</p> <p>Coolant pressure is approx. 0.5 - 7MPa.</p>	<p><b>Coolant handling</b></p> <p>&lt; MMS type &gt;</p> <ol style="list-style-type: none"> <li>1) Dirt and dust particles in old coolant can clog the oil hole and prevent effective flow. Regular coolant exchange is recommended.</li> <li>2) Small particles of swarf will jam in the oil hole. Use a filter as a preventative measure. When using small diameter drills, use a fine mesh filter.</li> </ol>	<p><b>Thin workpieces</b></p>  <p>If bending occurs</p> <p>Support the workpiece</p>	<p><b>Interrupted cutting</b></p>  <p>One process</p> <p>① Lower the feed when drilling the interrupted part.</p> <p>Requires prior machining</p> <p>① Spot face with an end mill prior to drilling.</p>
<p><b>Stepped holes</b></p>  <ol style="list-style-type: none"> <li>① Divide the machining into two processes.</li> <li>② Drill the larger hole first.</li> </ol> <p>*Tools for chamfering and spot facing can be produced to order.</p>	<p><b>Burring and workpiece chipping</b></p>  <ol style="list-style-type: none"> <li>① Lower the feed rate when breaking through.</li> <li>② Change the point angle.</li> <li>③ Change the point angle.</li> </ol>		

### Application Examples

Drill		MMS0560X5DB		MMS0500X5DB		MMS0970X3DB	
Workpiece		Austenitic stainless steel JIS SUS304(200HB) Hole depth : 20mm 		PH stainless steel JIS SUS630 Hole depth : 30mm 		Austenitic stainless steel JIS SUS304L(200HB) Hole depth : 25.4mm 	
Component		Medical parts		Spinneret		Heat exchanger parts	
Cutting Conditions	Drill	MMS0560X5DB	Conventional drill	MMS0500X5DB	Conventional drill	MMS0970X3DB	Conventional drill
	Cutting Speed (m/min)	70	39	64	66	99	70
	Feed (mm/rev)	0.22	0.1	0.2	0.1	0.23	0.14
	Revolution (min <sup>-1</sup> )	3979	2217	4074	4210	3249	2297
	Feed Rate (mm/min)	875	222	815	421	747	322
Coolant		Emulsion		Emulsion		Emulsion	
Machine		Machining centre		Machining centre		Machining centre	
Result		<p>● Tool life</p> <p>Cutting length (m)</p> 		<p>● Tool life</p> <p>Cutting length (m)</p> 		<p>● Tool life</p> <p>Cutting length (m)</p> 	
		<p>● Feed rate</p> <p>Feed rate (mm/min)</p> 		<p>● Feed rate</p> <p>Feed rate (mm/min)</p> 		<p>● Feed rate</p> <p>Feed rate (mm/min)</p> 	





Solid Carbide Drill for Stainless steel  
**WSTAR** Drill Series  
**MIMS**

For Your Safety

●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc. ●Grinding or heating of cutting tools produces dust and mist. Inhaling large amount of dust or contacting with eyes and skins may harm your body.

**MITSUBISHI MATERIALS CORPORATION**

**MITSUBISHI MATERIALS CORPORATION**

**Area Marketing & Operations Dept.**

KFC bldg., 8F, 1-6-1, Yokoami, Sumida-ku, Tokyo 130-0015, Japan

TEL +81-3-5819-8772 FAX +81-3-5819-8774

**Mitsubishi Carbide Home page : <http://www.mitsubishicarbide.com>**  
(Tools specifications subject to change without notice.)

EXP-09-N219  
2010.4.(-)