

Series
Expansion

Solid carbide drill **MIRACLE** coated

WSTAR Drill

Innovative "Wave type cutting edge & flute geometry"

**Multi-purpose drill
for cutting carbon and alloy steels,
stainless steels, cast iron
and difficult-to-cut
materials.**

- Drill sizes available in 0.1mm steps from $\varnothing 3$ to $\varnothing 20$.
- Sharp cutting edge performance and smooth chip discharge
- **New 8 x D type available**



Sharp cutting edge performance and smooth chip discharge.

MIRACLE[®] Coated VP15TF

Miracle coating has high welding resistance, making it suitable for machining a wide range of workpiece materials from mild steels and carbon steels, through to stainless steels and cast iron.



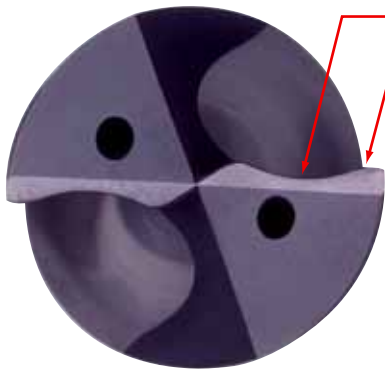
Solid carbide
MIRACLE[®] coated

WSTAR Drill

■ Features

- Wavy cutting edge & special flute geometry to promote smooth chip evacuation

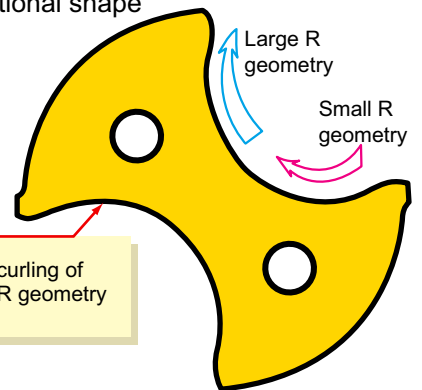
Cutting edge shape



Wavy cutting edge

The wave edge design achieves a sharp peripheral edge cutting performance with a strong initial cutting point near the centre.

Cross sectional shape

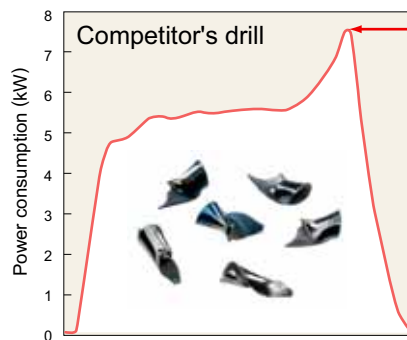
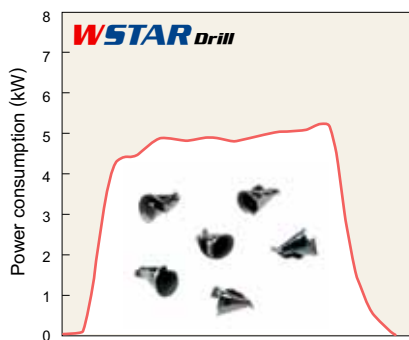


Flute geometry

The small R geometry generates initial curling of the chips and combines with the larger R geometry to promote smooth chip evacuation.

- Cutting resistance & chip geometry

WSTAR Drill lowers the cutting resistance and power consumption. Chips are broken into a compact shape for excellent chip disposability to prevent jamming..

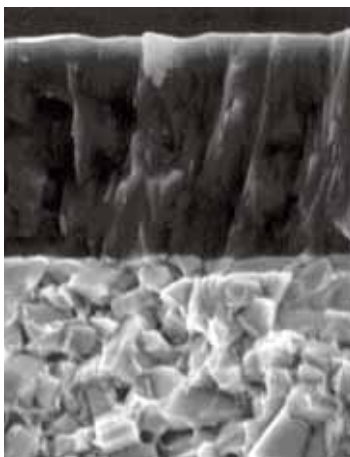


Chip packing occurred just before breaking through.

<Cutting conditions>

Workpiece : JIS S50C (150-180HB)
Drill diameter : ϕ 12 (Internal coolant)
Hole depth : 60mm
Cutting speed : 120m/min
Feed : 0.25mm/rev
Coolant : WSO
Oil pressure : 0.5MPa

- Long tool life **MIRACLE[®]** coated **VP15TF**



MIRACLE[®] coating
(Al,Ti)N

Cemented carbide
substrate **TF15**



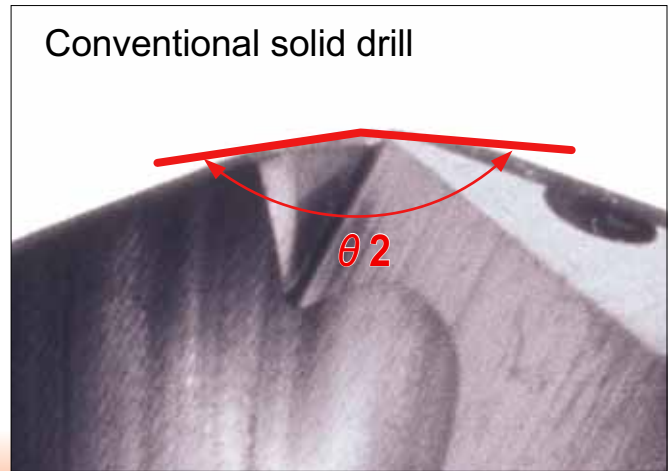
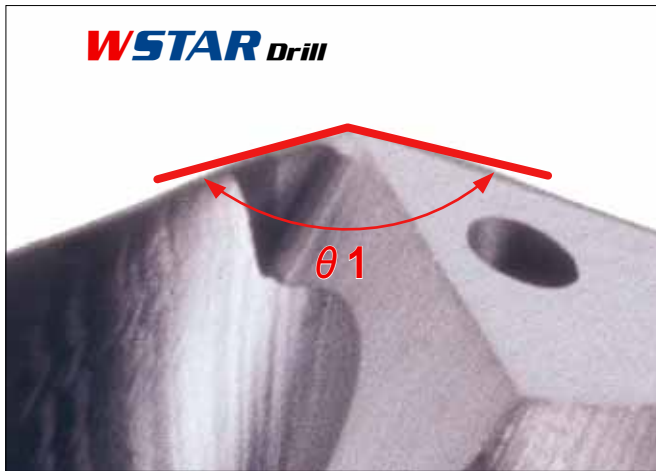
Features of **VP15TF**

Miracle coated VP15TF has a high welding resistance, making it suitable for machining a wide range of workpiece materials from mild steels and carbon steels, through to stainless steels and cast iron.

● Centripetal top edge geometry

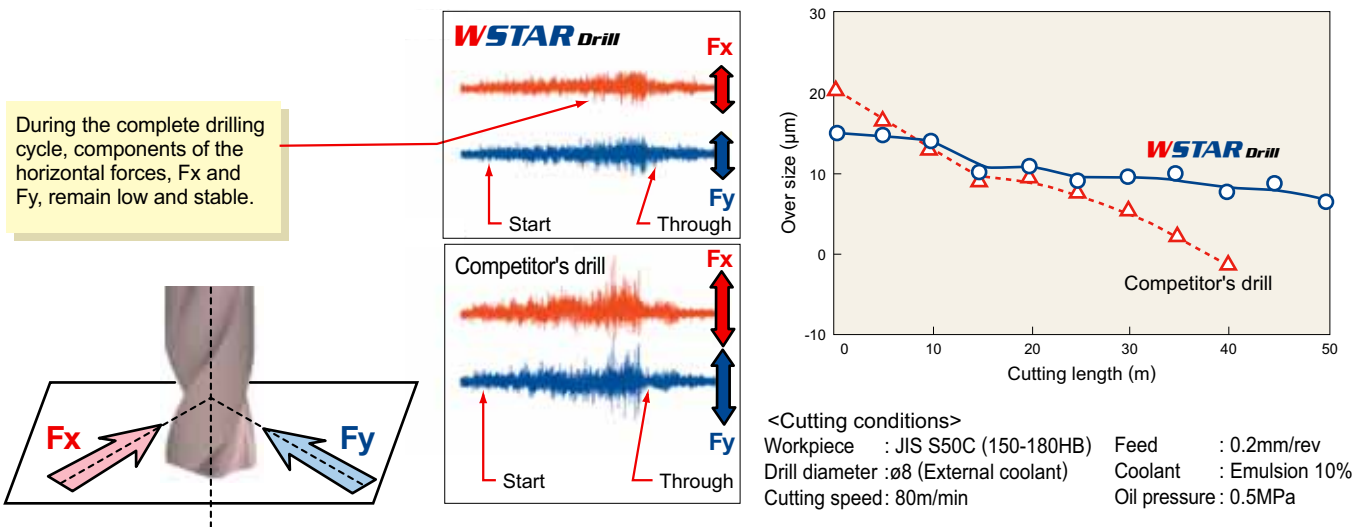
Top edge geometry

The centripetal top edge geometry with a small point angle and X-thinning promotes a self centering action for accurate hole positions! ($\theta 1 < \theta 2$)



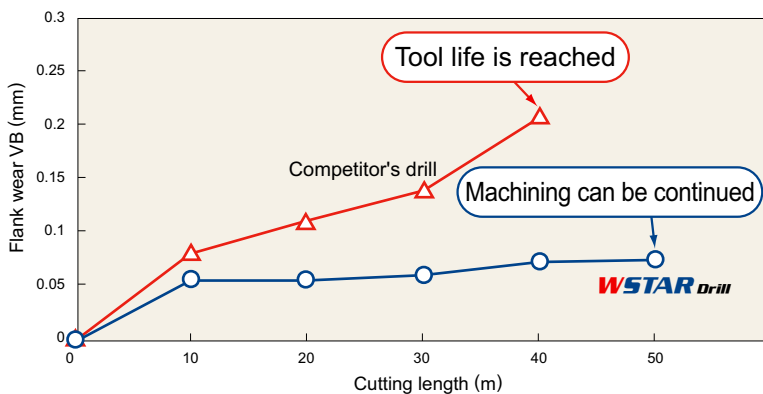
● Machining accuracy (over size)

WSTAR Drill stays on centre and is highly wear resistant, helping to maintain hole size accuracy!



● Tool life

WSTAR Drill has high flank and margin wear resistance!

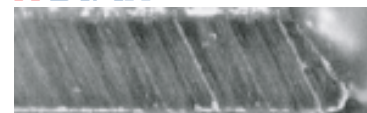


Enlarged picture of the margin after 40m drilling length.

Competitor's drill



WSTAR Drill



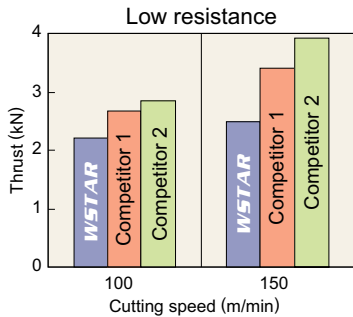
<Cutting conditions>

Workpiece : JIS S50C (150-180HB) Cutting speed : 80m/min
 Drill diameter : $\phi 8$ (External coolant) Feed : 0.2mm/rev
 Coolant : Emulsion 10% Hole depth : 25mm (Through hole)
 Oil pressure : 0.5MPa

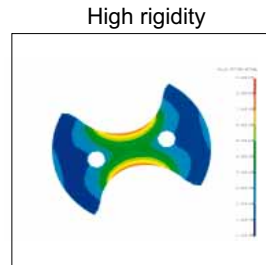
Cutting Performance

High Efficiency Drilling

Excellent chip control, low cutting resistance and high rigidity characterise the Miracle Coated **WSTAR** Drill

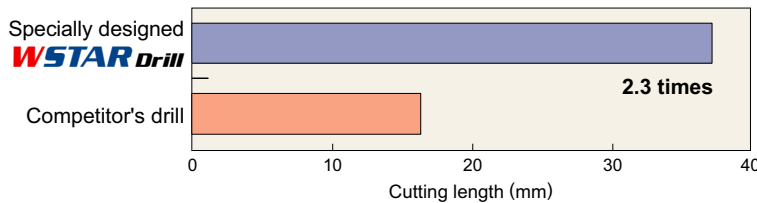


<Cutting conditions>
Workpiece : JIS S45C (180-220HB)
Drill diameter : ϕ 9.5mm
(Internal coolant)
Hole depth : 47mm (Through hole)
W.S.O (Internal coolant)



CAE analytical result
Deflection Resistance : 20% improvement
Run Out : 10% improvement

The **WSTAR** Drill more than doubled tool life compared to a competitor's drill at a feed rate of 0.4mm/rev.

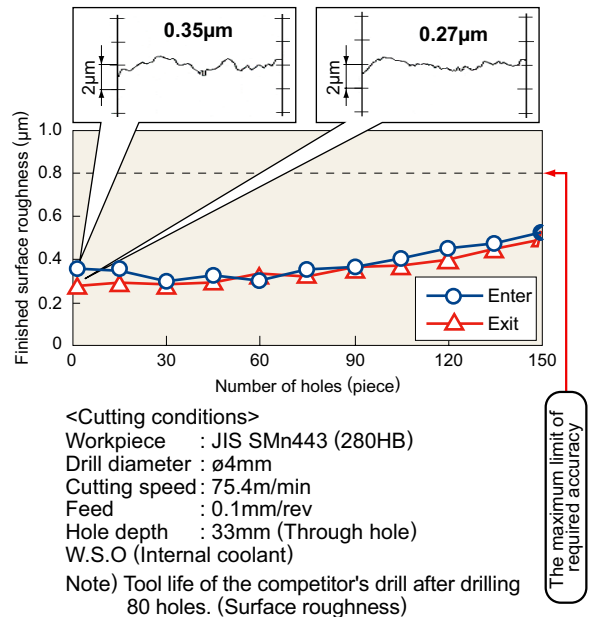
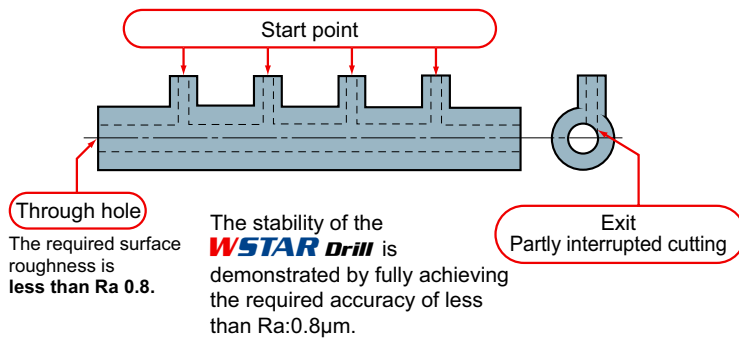


<Cutting conditions>
Workpiece : JIS SCM440 (280HB)
Drill diameter : ϕ 12mm
Cutting speed : 120m/min
Feed : 0.4mm/rev
Hole depth : 54mm (Through hole)
W.S.O (Internal coolant)

Maintaining drilling accuracy (Surface roughness)

Cutting performance of the specially designed **WSTAR** Drill.

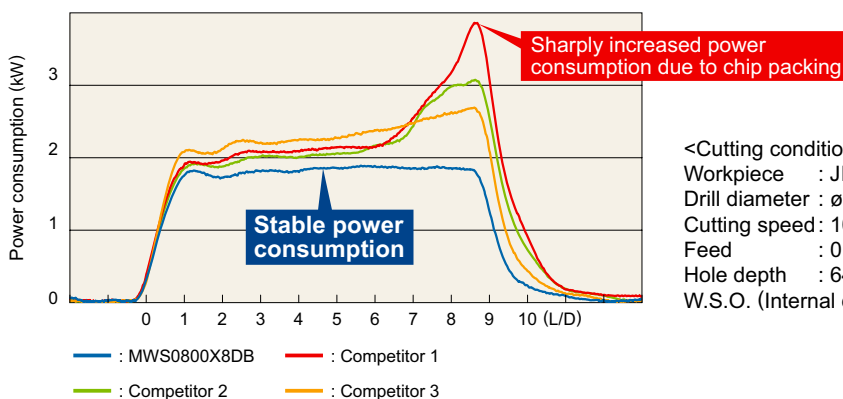
Due largely to the centripetal force exerted by the cutting edge configuration, the **WSTAR** Drill shows its ability to generate an accurate and quality machined finish.



<Cutting conditions>
Workpiece : JIS SMn443 (280HB)
Drill diameter : ϕ 4mm
Cutting speed : 75.4m/min
Feed : 0.1mm/rev
Hole depth : 33mm (Through hole)
W.S.O (Internal coolant)
Note) Tool life of the competitor's drill after drilling 80 holes. (Surface roughness)

Stable power consumption (for 8 x D)

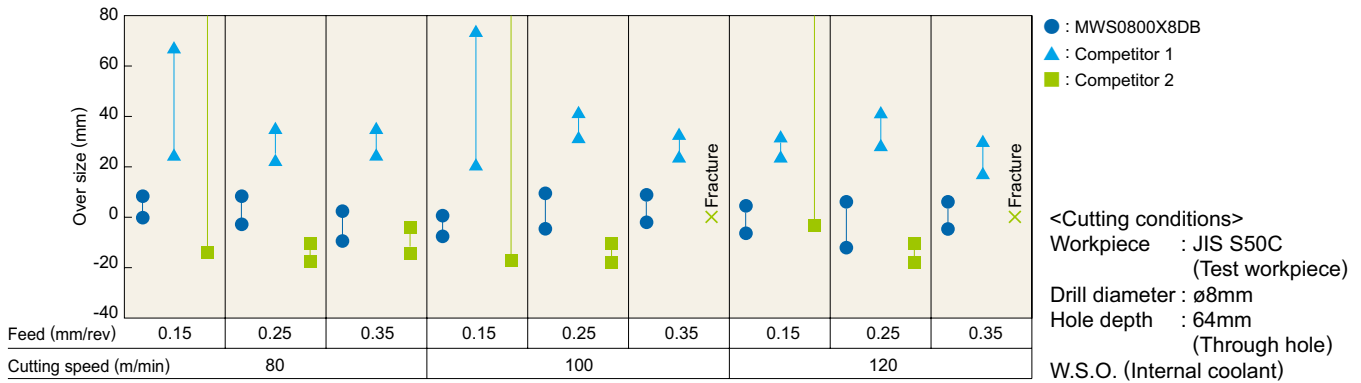
The **WSTAR** Drill enables continuous feed drilling of the 8xD deep hole.



<Cutting conditions>
Workpiece : JIS S50C (Test workpiece)
Drill diameter : ϕ 8mm
Cutting speed : 100m/min
Feed : 0.2mm/rev
Hole depth : 64mm (Through hole)
W.S.O (Internal coolant)

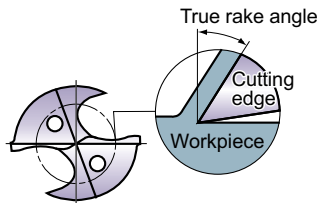
● Stable over size (for 8 x D)

The **WSTAR** drill delivers stable machining accuracy over a wide range of cutting conditions due to the low resistance cutting edge, high tool rigidity and good chip control.

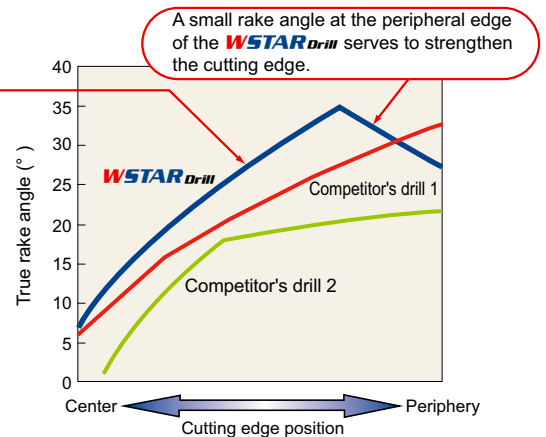


● Reliable drilling performance when machining difficult-to-cut materials

With a unique flute geometry and cutting edge rake angle, the **WSTAR** drill improves drilling performance of difficult-to-cut materials.



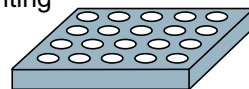
A large concave angle engineered into the cutting edge improves the **WSTAR** drill drilling performance.



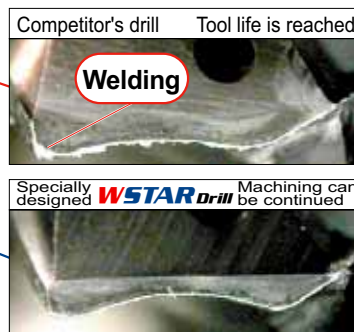
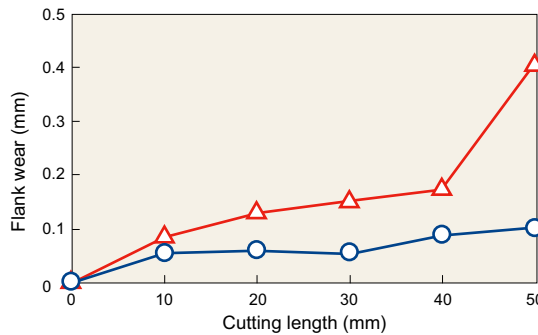
● Drilling performance in Austenitic stainless steel (JIS SUS304)

The **WSTAR** drill resists built-up edges, a common failure mechanism when machining austenitic stainless steels, thus preventing edge chipping and drill fracture.

The **WSTAR** drill prevents welding on the cutting edge. Further use of the drill is possible.



Application example
 workpiece : Plate (304 stainless steel)
 Tool : MWS0800MB

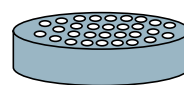


<Cutting conditions>
 Workpiece : JIS SUS304 (190-210HB)
 Drill diameter : ø8mm
 Cutting speed : 120m/min
 Feed : 0.2mm/rev
 Hole depth : 25mm (Through hole)
 W.S.O (Internal coolant)

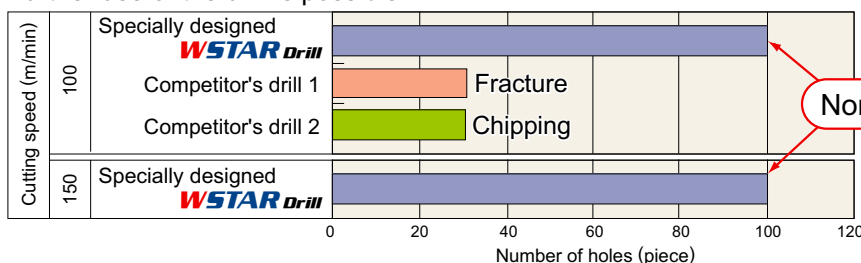
● Drilling performance in Titanium alloy (JIS Ti-6Al-4V)

The **WSTAR** drill resists deformation of the cutting edge when high cutting temperatures are generated due to the low thermal conductivity of the workpiece.

The **WSTAR** drill prevents fracturing and chipping. Further use of the drill is possible.



Application example
 workpiece : Plate (JIS Ti-6Al-4V)
 Tool : Specially designed **WSTAR** drill



<Cutting conditions>
 Workpiece : JIS Ti-6Al-4V (42-45HRC)
 Drill diameter : ø8mm
 Cutting speed : 100m/min : 150m/min
 Feed : 0.05mm/rev
 Hole depth : 24mm (Blind hole)

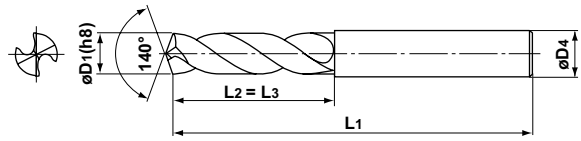
Solid carbide drill

WSTAR Drill

MIRACLE[®] coated

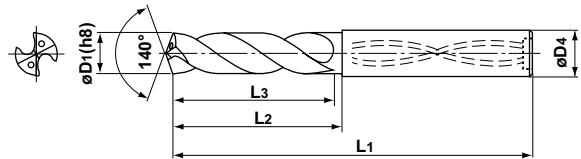
MWE (External coolant)

D1(h8)	D1 ≤ 3.0	3.0 < D1 ≤ 6.0	6.0 < D1 ≤ 10.0	10.0 < D1 ≤ 18.0	18.0 < D1 ≤ 30.0
Tolerance	0 -0.014	0 -0.018	0 -0.022	0 -0.027	0 -0.033



MWS (Internal coolant)

● MWS-MB/LB/X8DB type can be used for shrink fit holders.



*MWS type with ø5.0 or larger diameter has a recess in the end face.

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
3.0	2	Ext.	●	MWE0300SA	16	16	55	3.0
	3	Ext.	●	MWE0300MA	21	21	60	3.0
	3	Int.	●	MWS0300MB	24	24	72	3.0
	5	Int.	●	MWS0300LB	33	33	81	3.0
	NEW 8	Int.	●	MWS0300X8DB	35	35	81	3.0
3.1	2	Ext.	●	MWE0310SA	18	18	55	3.1
	3	Ext.	●	MWE0310MA	24	24	60	3.1
	3	Int.	●	MWS0310MB	28	28	76	4.0
	5	Int.	●	MWS0310LB	39	39	87	4.0
	NEW 8	Int.	●	MWS0310X8DB	41	41	87	4.0
3.2	2	Ext.	●	MWE0320SA	18	18	55	3.2
	3	Ext.	●	MWE0320MA	24	24	60	3.2
	3	Int.	●	MWS0320MB	28	28	76	4.0
	5	Int.	●	MWS0320LB	39	39	87	4.0
	NEW 8	Int.	●	MWS0320X8DB	41	41	87	4.0
3.3	2	Ext.	●	MWE0330SA	18	18	55	3.3
	3	Ext.	●	MWE0330MA	24	24	60	3.3
	3	Int.	●	MWS0330MB	28	28	76	4.0
	5	Int.	●	MWS0330LB	39	39	87	4.0
	NEW 8	Int.	●	MWS0330X8DB	41	41	87	4.0
3.4	2	Ext.	●	MWE0340SA	20	20	55	3.4
	3	Ext.	●	MWE0340MA	24	24	60	3.4
	3	Int.	●	MWS0340MB	28	28	76	4.0
	5	Int.	●	MWS0340LB	39	39	87	4.0
	NEW 8	Int.	●	MWS0340X8DB	41	41	87	4.0
3.5	2	Ext.	●	MWE0350SA	20	20	55	3.5
	3	Ext.	●	MWE0350MA	24	24	60	3.5
	3	Int.	●	MWS0350MB	28	28	76	4.0
	5	Int.	●	MWS0350LB	39	39	87	4.0
	NEW 8	Int.	●	MWS0350X8DB	41	41	87	4.0

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
3.6	2	Ext.	●	MWE0360SA	20	20	55	3.6
	3	Ext.	●	MWE0360MA	27	27	60	3.6
	3	Int.	●	MWS0360MB	32	32	80	4.0
	5	Int.	●	MWS0360LB	44	44	92	4.0
	NEW 8	Int.	●	MWS0360X8DB	46	46	92	4.0
3.7	2	Ext.	●	MWE0370SA	20	20	55	3.7
	3	Ext.	●	MWE0370MA	27	27	60	3.7
	3	Int.	●	MWS0370MB	32	32	80	4.0
	5	Int.	●	MWS0370LB	44	44	92	4.0
	NEW 8	Int.	●	MWS0370X8DB	46	46	92	4.0
3.8	2	Ext.	●	MWE0380SA	22	22	55	3.8
	3	Ext.	●	MWE0380MA	27	27	60	3.8
	3	Int.	●	MWS0380MB	32	32	80	4.0
	5	Int.	●	MWS0380LB	44	44	92	4.0
	NEW 8	Int.	●	MWS0380X8DB	46	46	92	4.0
3.9	2	Ext.	●	MWE0390SA	22	22	55	3.9
	3	Ext.	●	MWE0390MA	27	27	60	3.9
	3	Int.	●	MWS0390MB	32	32	80	4.0
	5	Int.	●	MWS0390LB	44	44	92	4.0
	NEW 8	Int.	●	MWS0390X8DB	46	46	92	4.0
4.0	2	Ext.	●	MWE0400SA	22	22	55	4.0
	3	Ext.	●	MWE0400MA	27	27	60	4.0
	3	Int.	●	MWS0400MB	32	32	80	4.0
	5	Int.	●	MWS0400LB	44	44	92	4.0
	NEW 8	Int.	●	MWS0400X8DB	46	46	92	4.0
4.1	2	Ext.	●	MWE0410SA	22	22	55	4.1
	3	Ext.	●	MWE0410MA	29	29	63	4.1
	3	Int.	●	MWS0410MB	36	36	86	5.0
	5	Int.	●	MWS0410LB	50	50	100	5.0
	NEW 8	Int.	●	MWS0410X8DB	52	52	100	5.0

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

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
4.2	2	Ext.	●	MWE0420SA	22	22	55	4.2
	3	Ext.	●	MWE0420MA	29	29	63	4.2
	3	Int.	●	MWS0420MB	36	36	86	5.0
	5	Int.	●	MWS0420LB	50	50	100	5.0
	NEW 8	Int.	●	MWS0420X8DB	52	52	100	5.0
4.3	2	Ext.	●	MWE0430SA	24	24	58	4.3
	3	Ext.	●	MWE0430MA	29	29	63	4.3
	3	Int.	●	MWS0430MB	36	36	86	5.0
	5	Int.	●	MWS0430LB	50	50	100	5.0
	NEW 8	Int.	●	MWS0430X8DB	52	52	100	5.0
4.4	2	Ext.	●	MWE0440SA	24	24	58	4.4
	3	Ext.	●	MWE0440MA	29	29	63	4.4
	3	Int.	●	MWS0440MB	36	36	86	5.0
	5	Int.	●	MWS0440LB	50	50	100	5.0
	NEW 8	Int.	●	MWS0440X8DB	52	52	100	5.0
4.5	2	Ext.	●	MWE0450SA	24	24	58	4.5
	3	Ext.	●	MWE0450MA	29	29	63	4.5
	3	Int.	●	MWS0450MB	36	36	86	5.0
	5	Int.	●	MWS0450LB	50	50	100	5.0
	NEW 8	Int.	●	MWS0450X8DB	52	52	100	5.0
4.6	2	Ext.	●	MWE0460SA	24	24	58	4.6
	3	Ext.	●	MWE0460MA	32	32	68	4.6
	3	Int.	●	MWS0460MB	40	40	90	5.0
	5	Int.	●	MWS0460LB	55	55	105	5.0
	NEW 8	Int.	●	MWS0460X8DB	57	57	105	5.0
4.7	2	Ext.	●	MWE0470SA	24	24	58	4.7
	3	Ext.	●	MWE0470MA	32	32	68	4.7
	3	Int.	●	MWS0470MB	40	40	90	5.0
	5	Int.	●	MWS0470LB	55	55	105	5.0
	NEW 8	Int.	●	MWS0470X8DB	57	57	105	5.0
4.8	2	Ext.	●	MWE0480SA	26	26	62	4.8
	3	Ext.	●	MWE0480MA	32	32	68	4.8
	3	Int.	●	MWS0480MB	40	40	90	5.0
	5	Int.	●	MWS0480LB	55	55	105	5.0
	NEW 8	Int.	●	MWS0480X8DB	57	57	105	5.0
4.9	2	Ext.	●	MWE0490SA	26	26	62	4.9
	3	Ext.	●	MWE0490MA	32	32	68	4.9
	3	Int.	●	MWS0490MB	40	40	90	5.0
	5	Int.	●	MWS0490LB	55	55	105	5.0
	NEW 8	Int.	●	MWS0490X8DB	57	57	105	5.0
5.0	2	Ext.	●	MWE0500SA	26	26	62	5.0
	3	Ext.	●	MWE0500MA	32	32	68	5.0
	3	Int.	●	MWS0500MB	27.5	30	82	5.0
	5	Int.	●	MWS0500LB	44	48	100	5.0
	NEW 8	Int.	●	MWS0500X8DB	57	57	105	5.0
5.1	2	Ext.	●	MWE0510SA	26	26	62	5.1
	3	Ext.	●	MWE0510MA	34	34	72	5.1
	3	Int.	●	MWS0510MB	27.5	30	82	6.0
	5	Int.	●	MWS0510LB	44	48	100	6.0
	NEW 8	Int.	●	MWS0510X8DB	61	66	118	6.0

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
5.2	2	Ext.	●	MWE0520SA	26	26	62	5.2
	3	Ext.	●	MWE0520MA	34	34	72	5.2
	3	Int.	●	MWS0520MB	27.5	30	82	6.0
	5	Int.	●	MWS0520LB	44	48	100	6.0
	NEW 8	Int.	●	MWS0520X8DB	61	66	118	6.0
5.3	2	Ext.	●	MWE0530SA	26	26	62	5.3
	3	Ext.	●	MWE0530MA	34	34	72	5.3
	3	Int.	●	MWS0530MB	27.5	30	82	6.0
	5	Int.	●	MWS0530LB	44	48	100	6.0
	NEW 8	Int.	●	MWS0530X8DB	61	66	118	6.0
5.4	2	Ext.	●	MWE0540SA	28	28	66	5.4
	3	Ext.	●	MWE0540MA	34	34	72	5.4
	3	Int.	●	MWS0540MB	27.5	30	82	6.0
	5	Int.	●	MWS0540LB	44	48	100	6.0
	NEW 8	Int.	●	MWS0540X8DB	61	66	118	6.0
5.5	2	Ext.	●	MWE0550SA	28	28	66	5.5
	3	Ext.	●	MWE0550MA	34	34	72	5.5
	3	Int.	●	MWS0550MB	27.5	30	82	6.0
	5	Int.	●	MWS0550LB	44	48	100	6.0
	NEW 8	Int.	●	MWS0550X8DB	61	66	118	6.0
5.6	2	Ext.	●	MWE0560SA	28	28	66	5.6
	3	Ext.	●	MWE0560MA	36	36	74	5.6
	3	Int.	●	MWS0560MB	30	30	82	6.0
	5	Int.	●	MWS0560LB	48	48	100	6.0
	NEW 8	Int.	●	MWS0560X8DB	66	66	118	6.0
5.7	2	Ext.	●	MWE0570SA	28	28	66	5.7
	3	Ext.	●	MWE0570MA	36	36	74	5.7
	3	Int.	●	MWS0570MB	30	30	82	6.0
	5	Int.	●	MWS0570LB	48	48	100	6.0
	NEW 8	Int.	●	MWS0570X8DB	66	66	118	6.0
5.8	2	Ext.	●	MWE0580SA	28	28	66	5.8
	3	Ext.	●	MWE0580MA	36	36	74	5.8
	3	Int.	●	MWS0580MB	30	30	82	6.0
	5	Int.	●	MWS0580LB	48	48	100	6.0
	NEW 8	Int.	●	MWS0580X8DB	66	66	118	6.0
5.9	2	Ext.	●	MWE0590SA	28	28	66	5.9
	3	Ext.	●	MWE0590MA	36	36	74	5.9
	3	Int.	●	MWS0590MB	30	30	82	6.0
	5	Int.	●	MWS0590LB	48	48	100	6.0
	NEW 8	Int.	●	MWS0590X8DB	66	66	118	6.0
6.0	2	Ext.	●	MWE0600SA	28	28	66	6.0
	3	Ext.	●	MWE0600MA	41	41	81	6.0
	3	Int.	●	MWS0600MB	30	30	82	6.0
	5	Int.	●	MWS0600LB	48	48	100	6.0
	NEW 8	Int.	●	MWS0600X8DB	66	66	118	6.0
6.1	2	Ext.	●	MWE0610SA	31	31	70	6.1
	3	Ext.	●	MWE0610MA	41	41	81	6.1
	3	Int.	●	MWS0610MB	32.5	35	88	7.0
	5	Int.	●	MWS0610LB	52	56	109	7.0
	NEW 8	Int.	●	MWS0610X8DB	72	77	130	7.0

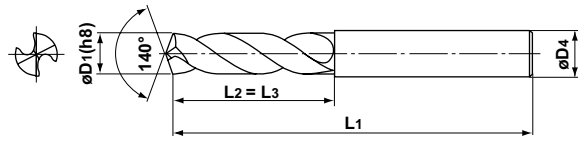
Solid carbide drill

WSTAR Drill

MIRACLE[®] coated

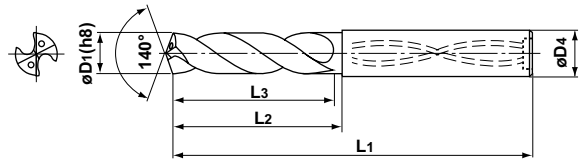
MWE (External coolant)

D1(h8)	D1 ≤ 3.0	3.0 < D1 ≤ 6.0	6.0 < D1 ≤ 10.0	10.0 < D1 ≤ 18.0	18.0 < D1 ≤ 30.0
Tolerance	0 -0.014	0 -0.018	0 -0.022	0 -0.027	0 -0.033



MWS (Internal coolant)

● MWS-MB/LB/X8DB type can be used for shrink fit holders.



*MWS type with ø5.0 or larger diameter has a recess in the end face.

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
6.2	2	Ext.	●	MWE0620SA	31	31	70	6.2
	3	Ext.	●	MWE0620MA	41	41	81	6.2
	3	Int.	●	MWS0620MB	32.5	35	88	7.0
	5	Int.	●	MWS0620LB	52	56	109	7.0
	NEW	8	Int.	●	MWS0620X8DB	72	77	130
6.3	2	Ext.	●	MWE0630SA	31	31	70	6.3
	3	Ext.	●	MWE0630MA	41	41	81	6.3
	3	Int.	●	MWS0630MB	32.5	35	88	7.0
	5	Int.	●	MWS0630LB	52	56	109	7.0
	NEW	8	Int.	●	MWS0630X8DB	72	77	130
6.4	2	Ext.	●	MWE0640SA	31	31	70	6.4
	3	Ext.	●	MWE0640MA	41	41	81	6.4
	3	Int.	●	MWS0640MB	32.5	35	88	7.0
	5	Int.	●	MWS0640LB	52	56	109	7.0
	NEW	8	Int.	●	MWS0640X8DB	72	77	130
6.5	2	Ext.	●	MWE0650SA	31	31	70	6.5
	3	Ext.	●	MWE0650MA	41	41	81	6.5
	3	Int.	●	MWS0650MB	32.5	35	88	7.0
	5	Int.	●	MWS0650LB	52	56	109	7.0
	NEW	8	Int.	●	MWS0650X8DB	72	77	130
6.6	2	Ext.	●	MWE0660SA	31	31	70	6.6
	3	Ext.	●	MWE0660MA	43	43	83	6.6
	3	Int.	●	MWS0660MB	35	35	88	7.0
	5	Int.	●	MWS0660LB	56	56	109	7.0
	NEW	8	Int.	●	MWS0660X8DB	77	77	130
6.7	2	Ext.	●	MWE0670SA	31	31	70	6.7
	3	Ext.	●	MWE0670MA	43	43	83	6.7
	3	Int.	●	MWS0670MB	35	35	88	7.0
	5	Int.	●	MWS0670LB	56	56	109	7.0
	NEW	8	Int.	●	MWS0670X8DB	77	77	130

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
6.8	2	Ext.	●	MWE0680SA	34	34	74	6.8
	3	Ext.	●	MWE0680MA	43	43	83	6.8
	3	Int.	●	MWS0680MB	35	35	88	7.0
	5	Int.	●	MWS0680LB	56	56	109	7.0
	NEW	8	Int.	●	MWS0680X8DB	77	77	130
6.9	2	Ext.	●	MWE0690SA	34	34	74	6.9
	3	Ext.	●	MWE0690MA	43	43	83	6.9
	3	Int.	●	MWS0690MB	35	35	88	7.0
	5	Int.	●	MWS0690LB	56	56	109	7.0
	NEW	8	Int.	●	MWS0690X8DB	77	77	130
7.0	2	Ext.	●	MWE0700SA	34	34	74	7.0
	3	Ext.	●	MWE0700MA	43	43	83	7.0
	3	Int.	●	MWS0700MB	35	35	88	7.0
	5	Int.	●	MWS0700LB	56	56	109	7.0
	NEW	8	Int.	●	MWS0700X8DB	77	77	130
7.1	2	Ext.	●	MWE0710SA	34	34	74	7.1
	3	Ext.	●	MWE0710MA	45	45	87	7.1
	3	Int.	●	MWS0710MB	37.5	40	94	8.0
	5	Int.	●	MWS0710LB	60	64	118	8.0
	NEW	8	Int.	●	MWS0710X8DB	83	88	142
7.2	2	Ext.	●	MWE0720SA	34	34	74	7.2
	3	Ext.	●	MWE0720MA	45	45	87	7.2
	3	Int.	●	MWS0720MB	37.5	40	94	8.0
	5	Int.	●	MWS0720LB	60	64	118	8.0
	NEW	8	Int.	●	MWS0720X8DB	83	88	142
7.3	2	Ext.	●	MWE0730SA	34	34	74	7.3
	3	Ext.	●	MWE0730MA	45	45	87	7.3
	3	Int.	●	MWS0730MB	37.5	40	94	8.0
	5	Int.	●	MWS0730LB	60	64	118	8.0
	NEW	8	Int.	●	MWS0730X8DB	83	88	142

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

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
7.4	2	Ext.	●	MWE0740SA	34	34	74	7.4
	3	Ext.	●	MWE0740MA	45	45	87	7.4
	3	Int.	●	MWS0740MB	37.5	40	94	8.0
	5	Int.	●	MWS0740LB	60	64	118	8.0
	NEW 8	Int.	●	MWS0740X8DB	83	88	142	8.0
7.5	2	Ext.	●	MWE0750SA	34	34	74	7.5
	3	Ext.	●	MWE0750MA	45	45	87	7.5
	3	Int.	●	MWS0750MB	37.5	40	94	8.0
	5	Int.	●	MWS0750LB	60	64	118	8.0
	NEW 8	Int.	●	MWS0750X8DB	83	88	142	8.0
7.6	2	Ext.	●	MWE0760SA	37	37	79	7.6
	3	Ext.	●	MWE0760MA	48	48	90	7.6
	3	Int.	●	MWS0760MB	40	40	94	8.0
	5	Int.	●	MWS0760LB	64	64	118	8.0
	NEW 8	Int.	●	MWS0760X8DB	88	88	142	8.0
7.7	2	Ext.	●	MWE0770SA	37	37	79	7.7
	3	Ext.	●	MWE0770MA	48	48	90	7.7
	3	Int.	●	MWS0770MB	40	40	94	8.0
	5	Int.	●	MWS0770LB	64	64	118	8.0
	NEW 8	Int.	●	MWS0770X8DB	88	88	142	8.0
7.8	2	Ext.	●	MWE0780SA	37	37	79	7.8
	3	Ext.	●	MWE0780MA	48	48	90	7.8
	3	Int.	●	MWS0780MB	40	40	94	8.0
	5	Int.	●	MWS0780LB	64	64	118	8.0
	NEW 8	Int.	●	MWS0780X8DB	88	88	142	8.0
7.9	2	Ext.	●	MWE0790SA	37	37	79	7.9
	3	Ext.	●	MWE0790MA	48	48	90	7.9
	3	Int.	●	MWS0790MB	40	40	94	8.0
	5	Int.	●	MWS0790LB	64	64	118	8.0
	NEW 8	Int.	●	MWS0790X8DB	88	88	142	8.0
8.0	2	Ext.	●	MWE0800SA	37	37	79	8.0
	3	Ext.	●	MWE0800MA	48	48	90	8.0
	3	Int.	●	MWS0800MB	40	40	94	8.0
	5	Int.	●	MWS0800LB	64	64	118	8.0
	NEW 8	Int.	●	MWS0800X8DB	88	88	142	8.0
8.1	2	Ext.	●	MWE0810SA	37	37	79	8.1
	3	Ext.	●	MWE0810MA	53	53	96	8.1
	3	Int.	●	MWS0810MB	42.5	45	100	9.0
	5	Int.	●	MWS0810LB	68	72	127	9.0
	NEW 8	Int.	●	MWS0810X8DB	94	99	154	9.0
8.2	2	Ext.	●	MWE0820SA	37	37	79	8.2
	3	Ext.	●	MWE0820MA	53	53	96	8.2
	3	Int.	●	MWS0820MB	42.5	45	100	9.0
	5	Int.	●	MWS0820LB	68	72	127	9.0
	NEW 8	Int.	●	MWS0820X8DB	94	99	154	9.0
8.3	2	Ext.	●	MWE0830SA	37	37	79	8.3
	3	Ext.	●	MWE0830MA	53	53	96	8.3
	3	Int.	●	MWS0830MB	42.5	45	100	9.0
	5	Int.	●	MWS0830LB	68	72	127	9.0
	NEW 8	Int.	●	MWS0830X8DB	94	99	154	9.0

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
8.4	2	Ext.	●	MWE0840SA	37	37	79	8.4
	3	Ext.	●	MWE0840MA	53	53	96	8.4
	3	Int.	●	MWS0840MB	42.5	45	100	9.0
	5	Int.	●	MWS0840LB	68	72	127	9.0
	NEW 8	Int.	●	MWS0840X8DB	94	99	154	9.0
8.5	2	Ext.	●	MWE0850SA	37	37	79	8.5
	3	Ext.	●	MWE0850MA	53	53	96	8.5
	3	Int.	●	MWS0850MB	42.5	45	100	9.0
	5	Int.	●	MWS0850LB	68	72	127	9.0
	NEW 8	Int.	●	MWS0850X8DB	94	99	154	9.0
8.6	2	Ext.	●	MWE0860SA	40	40	84	8.6
	3	Ext.	●	MWE0860MA	55	55	98	8.6
	3	Int.	●	MWS0860MB	45	45	100	9.0
	5	Int.	●	MWS0860LB	72	72	127	9.0
	NEW 8	Int.	●	MWS0860X8DB	99	99	154	9.0
8.7	2	Ext.	●	MWE0870SA	40	40	84	8.7
	3	Ext.	●	MWE0870MA	55	55	98	8.7
	3	Int.	●	MWS0870MB	45	45	100	9.0
	5	Int.	●	MWS0870LB	72	72	127	9.0
	NEW 8	Int.	●	MWS0870X8DB	99	99	154	9.0
8.8	2	Ext.	●	MWE0880SA	40	40	84	8.8
	3	Ext.	●	MWE0880MA	55	55	98	8.8
	3	Int.	●	MWS0880MB	45	45	100	9.0
	5	Int.	●	MWS0880LB	72	72	127	9.0
	NEW 8	Int.	●	MWS0880X8DB	99	99	154	9.0
8.9	2	Ext.	●	MWE0890SA	40	40	84	8.9
	3	Ext.	●	MWE0890MA	55	55	98	8.9
	3	Int.	●	MWS0890MB	45	45	100	9.0
	5	Int.	●	MWS0890LB	72	72	127	9.0
	NEW 8	Int.	●	MWS0890X8DB	99	99	154	9.0
9.0	2	Ext.	●	MWE0900SA	40	40	84	9.0
	3	Ext.	●	MWE0900MA	55	55	98	9.0
	3	Int.	●	MWS0900MB	45	45	100	9.0
	5	Int.	●	MWS0900LB	72	72	127	9.0
	NEW 8	Int.	●	MWS0900X8DB	99	99	154	9.0
9.1	2	Ext.	●	MWE0910SA	40	40	84	9.1
	3	Ext.	●	MWE0910MA	58	58	102	9.1
	3	Int.	●	MWS0910MB	47.5	50	106	10.0
	5	Int.	●	MWS0910LB	76	80	136	10.0
	NEW 8	Int.	●	MWS0910X8DB	105	110	166	10.0
9.2	2	Ext.	●	MWE0920SA	40	40	84	9.2
	3	Ext.	●	MWE0920MA	58	58	102	9.2
	3	Int.	●	MWS0920MB	47.5	50	106	10.0
	5	Int.	●	MWS0920LB	76	80	136	10.0
	NEW 8	Int.	●	MWS0920X8DB	105	110	166	10.0
9.3	2	Ext.	●	MWE0930SA	40	40	84	9.3
	3	Ext.	●	MWE0930MA	58	58	102	9.3
	3	Int.	●	MWS0930MB	47.5	50	106	10.0
	5	Int.	●	MWS0930LB	76	80	136	10.0
	NEW 8	Int.	●	MWS0930X8DB	105	110	166	10.0

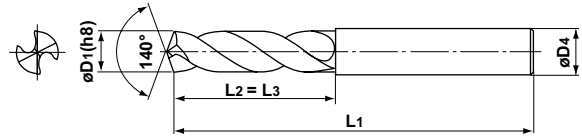
Solid carbide drill

WSTAR Drill

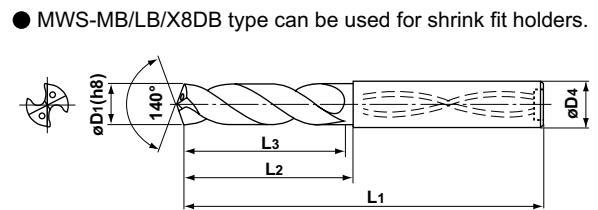
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MWE (External coolant)

D1(h8)	D1 ≤ 3.0	3.0 < D1 ≤ 6.0	6.0 < D1 ≤ 10.0	10.0 < D1 ≤ 18.0	18.0 < D1 ≤ 30.0
Tolerance	0 -0.014	0 -0.018	0 -0.022	0 -0.027	0 -0.033



MWS (Internal coolant)



*MWS type with ø5.0 or larger diameter has a recess in the end face.

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
9.4	2	Ext.	●	MWE0940SA	40	40	84	9.4
	3	Ext.	●	MWE0940MA	58	58	102	9.4
	3	Int.	●	MWS0940MB	47.5	50	106	10.0
	5	Int.	●	MWS0940LB	76	80	136	10.0
	NEW	8	Int.	●	MWS0940X8DB	105	110	166
9.5	2	Ext.	●	MWE0950SA	40	40	84	9.5
	3	Ext.	●	MWE0950MA	58	58	102	9.5
	3	Int.	●	MWS0950MB	47.5	50	106	10.0
	5	Int.	●	MWS0950LB	76	80	136	10.0
	NEW	8	Int.	●	MWS0950X8DB	105	110	166
9.6	2	Ext.	●	MWE0960SA	43	43	89	9.6
	3	Ext.	●	MWE0960MA	60	60	105	9.6
	3	Int.	●	MWS0960MB	50	50	106	10.0
	5	Int.	●	MWS0960LB	80	80	136	10.0
	NEW	8	Int.	●	MWS0960X8DB	110	110	166
9.7	2	Ext.	●	MWE0970SA	43	43	89	9.7
	3	Ext.	●	MWE0970MA	60	60	105	9.7
	3	Int.	●	MWS0970MB	50	50	106	10.0
	5	Int.	●	MWS0970LB	80	80	136	10.0
	NEW	8	Int.	●	MWS0970X8DB	110	110	166
9.8	2	Ext.	●	MWE0980SA	43	43	89	9.8
	3	Ext.	●	MWE0980MA	60	60	105	9.8
	3	Int.	●	MWS0980MB	50	50	106	10.0
	5	Int.	●	MWS0980LB	80	80	136	10.0
	NEW	8	Int.	●	MWS0980X8DB	110	110	166
9.9	2	Ext.	●	MWE0990SA	43	43	89	9.9
	3	Ext.	●	MWE0990MA	60	60	105	9.9
	3	Int.	●	MWS0990MB	50	50	106	10.0
	5	Int.	●	MWS0990LB	80	80	136	10.0
	NEW	8	Int.	●	MWS0990X8DB	110	110	166

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
10.0	2	Ext.	●	MWE1000SA	43	43	89	10.0
	3	Ext.	●	MWE1000MA	60	60	105	10.0
	3	Int.	●	MWS1000MB	50	50	106	10.0
	5	Int.	●	MWS1000LB	80	80	136	10.0
	NEW	8	Int.	●	MWS1000X8DB	110	110	166
10.1	2	Ext.	●	MWE1010SA	43	43	89	10.1
	3	Ext.	●	MWE1010MA	66	66	112	10.1
	3	Int.	●	MWS1010MB	52.5	55	116	11.0
	5	Int.	●	MWS1010LB	84	88	149	11.0
	NEW	8	Int.	●	MWS1010X8DB	116	121	182
10.2	2	Ext.	●	MWE1020SA	43	43	89	10.2
	3	Ext.	●	MWE1020MA	66	66	112	10.2
	3	Int.	●	MWS1020MB	52.5	55	116	11.0
	5	Int.	●	MWS1020LB	84	88	149	11.0
	NEW	8	Int.	●	MWS1020X8DB	116	121	182
10.3	2	Ext.	●	MWE1030SA	43	43	89	10.3
	3	Ext.	●	MWE1030MA	66	66	112	10.3
	3	Int.	●	MWS1030MB	52.5	55	116	11.0
	5	Int.	●	MWS1030LB	84	88	149	11.0
	NEW	8	Int.	●	MWS1030X8DB	116	121	182
10.4	2	Ext.	●	MWE1040SA	43	43	89	10.4
	3	Ext.	●	MWE1040MA	66	66	112	10.4
	3	Int.	●	MWS1040MB	52.5	55	116	11.0
	5	Int.	●	MWS1040LB	84	88	149	11.0
	NEW	8	Int.	●	MWS1040X8DB	116	121	182
10.5	2	Ext.	●	MWE1050SA	43	43	89	10.5
	3	Ext.	●	MWE1050MA	66	66	112	10.5
	3	Int.	●	MWS1050MB	52.5	55	116	11.0
	5	Int.	●	MWS1050LB	84	88	149	11.0
	NEW	8	Int.	●	MWS1050X8DB	116	121	182

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

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
10.6	2	Ext.	●	MWE1060SA	43	43	89	10.6
	3	Ext.	●	MWE1060MA	68	68	114	10.6
	3	Int.	●	MWS1060MB	55	55	116	11.0
	5	Int.	●	MWS1060LB	88	88	149	11.0
	NEW 8	Int.	●	MWS1060X8DB	121	121	182	11.0
10.7	2	Ext.	●	MWE1070SA	47	47	95	10.7
	3	Ext.	●	MWE1070MA	68	68	114	10.7
	3	Int.	●	MWS1070MB	55	55	116	11.0
	5	Int.	●	MWS1070LB	88	88	149	11.0
	NEW 8	Int.	●	MWS1070X8DB	121	121	182	11.0
10.8	2	Ext.	●	MWE1080SA	47	47	95	10.8
	3	Ext.	●	MWE1080MA	68	68	114	10.8
	3	Int.	●	MWS1080MB	55	55	116	11.0
	5	Int.	●	MWS1080LB	88	88	149	11.0
	NEW 8	Int.	●	MWS1080X8DB	121	121	182	11.0
10.9	2	Ext.	●	MWE1090SA	47	47	95	10.9
	3	Ext.	●	MWE1090MA	68	68	114	10.9
	3	Int.	●	MWS1090MB	55	55	116	11.0
	5	Int.	●	MWS1090LB	88	88	149	11.0
	NEW 8	Int.	●	MWS1090X8DB	121	121	182	11.0
11.0	2	Ext.	●	MWE1100SA	47	47	95	11.0
	3	Ext.	●	MWE1100MA	68	68	114	11.0
	3	Int.	●	MWS1100MB	55	55	116	11.0
	5	Int.	●	MWS1100LB	88	88	149	11.0
	NEW 8	Int.	●	MWS1100X8DB	121	121	182	11.0
11.1	2	Ext.	●	MWE1110SA	47	47	95	11.1
	3	Ext.	●	MWE1110MA	71	71	118	11.1
	3	Int.	●	MWS1110MB	57.5	60	122	12.0
	5	Int.	●	MWS1110LB	92	96	158	12.0
	NEW 8	Int.	●	MWS1110X8DB	127	132	194	12.0
11.2	2	Ext.	●	MWE1120SA	47	47	95	11.2
	3	Ext.	●	MWE1120MA	71	71	118	11.2
	3	Int.	●	MWS1120MB	57.5	60	122	12.0
	5	Int.	●	MWS1120LB	92	96	158	12.0
	NEW 8	Int.	●	MWS1120X8DB	127	132	194	12.0
11.3	2	Ext.	●	MWE1130SA	47	47	95	11.3
	3	Ext.	●	MWE1130MA	71	71	118	11.3
	3	Int.	●	MWS1130MB	57.5	60	122	12.0
	5	Int.	●	MWS1130LB	92	96	158	12.0
	NEW 8	Int.	●	MWS1130X8DB	127	132	194	12.0
11.4	2	Ext.	●	MWE1140SA	47	47	95	11.4
	3	Ext.	●	MWE1140MA	71	71	118	11.4
	3	Int.	●	MWS1140MB	57.5	60	122	12.0
	5	Int.	●	MWS1140LB	92	96	158	12.0
	NEW 8	Int.	●	MWS1140X8DB	127	132	194	12.0
11.5	2	Ext.	●	MWE1150SA	47	47	95	11.5
	3	Ext.	●	MWE1150MA	71	71	118	11.5
	3	Int.	●	MWS1150MB	57.5	60	122	12.0
	5	Int.	●	MWS1150LB	92	96	158	12.0
	NEW 8	Int.	●	MWS1150X8DB	127	132	194	12.0

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
11.6	2	Ext.	●	MWE1160SA	47	47	95	11.6
	3	Ext.	●	MWE1160MA	73	73	121	11.6
	3	Int.	●	MWS1160MB	60	60	122	12.0
	5	Int.	●	MWS1160LB	96	96	158	12.0
	NEW 8	Int.	●	MWS1160X8DB	132	132	194	12.0
11.7	2	Ext.	●	MWE1170SA	47	47	95	11.7
	3	Ext.	●	MWE1170MA	73	73	121	11.7
	3	Int.	●	MWS1170MB	60	60	122	12.0
	5	Int.	●	MWS1170LB	96	96	158	12.0
	NEW 8	Int.	●	MWS1170X8DB	132	132	194	12.0
11.8	2	Ext.	●	MWE1180SA	47	47	95	11.8
	3	Ext.	●	MWE1180MA	73	73	121	11.8
	3	Int.	●	MWS1180MB	60	60	122	12.0
	5	Int.	●	MWS1180LB	96	96	158	12.0
	NEW 8	Int.	●	MWS1180X8DB	132	132	194	12.0
11.9	2	Ext.	●	MWE1190SA	51	51	102	11.9
	3	Ext.	●	MWE1190MA	73	73	121	11.9
	3	Int.	●	MWS1190MB	60	60	122	12.0
	5	Int.	●	MWS1190LB	96	96	158	12.0
	NEW 8	Int.	●	MWS1190X8DB	132	132	194	12.0
12.0	2	Ext.	●	MWE1200SA	51	51	102	12.0
	3	Ext.	●	MWE1200MA	73	73	121	12.0
	3	Int.	●	MWS1200MB	60	60	122	12.0
	5	Int.	●	MWS1200LB	96	96	158	12.0
	NEW 8	Int.	●	MWS1200X8DB	132	132	194	12.0
12.1	2	Ext.	●	MWE1210SA	51	51	102	12.1
	3	Ext.	●	MWE1210MA	76	76	135	12.1
	3	Int.	●	MWS1210MB	62.5	65	128	13.0
	5	Int.	●	MWS1210LB	100	104	167	13.0
	NEW 8	Int.	□	MWS1210X8DB	138	143	206	13.0
12.2	2	Ext.	●	MWE1220SA	51	51	102	12.2
	3	Ext.	●	MWE1220MA	76	76	135	12.2
	3	Int.	●	MWS1220MB	62.5	65	128	13.0
	5	Int.	●	MWS1220LB	100	104	167	13.0
	NEW 8	Int.	□	MWS1220X8DB	138	143	206	13.0
12.3	2	Ext.	●	MWE1230SA	51	51	102	12.3
	3	Ext.	●	MWE1230MA	76	76	135	12.3
	3	Int.	●	MWS1230MB	62.5	65	128	13.0
	5	Int.	●	MWS1230LB	100	104	167	13.0
	NEW 8	Int.	□	MWS1230X8DB	138	143	206	13.0
12.4	2	Ext.	●	MWE1240SA	51	51	102	12.4
	3	Ext.	●	MWE1240MA	76	76	135	12.4
	3	Int.	●	MWS1240MB	62.5	65	128	13.0
	5	Int.	●	MWS1240LB	100	104	167	13.0
	NEW 8	Int.	□	MWS1240X8DB	138	143	206	13.0
12.5	2	Ext.	●	MWE1250SA	51	51	102	12.5
	3	Ext.	●	MWE1250MA	76	76	135	12.5
	3	Int.	●	MWS1250MB	62.5	65	128	13.0
	5	Int.	●	MWS1250LB	100	104	167	13.0
	NEW 8	Int.	●	MWS1250X8DB	138	143	206	13.0

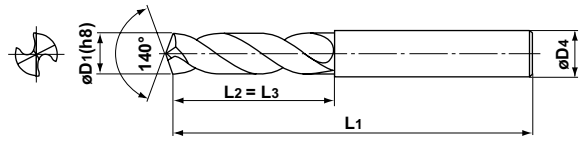
Solid carbide drill

WSTAR Drill

MIRACLE® coated

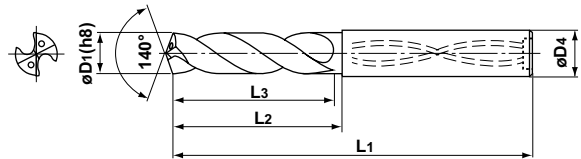
MWE (External coolant)

D1(h8)	D1 ≤ 3.0	3.0 < D1 ≤ 6.0	6.0 < D1 ≤ 10.0	10.0 < D1 ≤ 18.0	18.0 < D1 ≤ 30.0
Tolerance	0 -0.014	0 -0.018	0 -0.022	0 -0.027	0 -0.033



MWS (Internal coolant)

● MWS-MB/LB/X8DB type can be used for shrink fit holders.



*MWS type with ø5.0 or larger diameter has a recess in the end face.

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
12.6	2	Ext.	●	MWE1260SA	51	51	102	12.6
	3	Ext.	●	MWE1260MA	78	78	137	12.6
	3	Int.	●	MWS1260MB	65	65	128	13.0
	5	Int.	●	MWS1260LB	104	104	167	13.0
	NEW	8	Int.	□	MWS1260X8DB	143	143	206
12.7	2	Ext.	●	MWE1270SA	51	51	102	12.7
	3	Ext.	●	MWE1270MA	78	78	137	12.7
	3	Int.	●	MWS1270MB	65	65	128	13.0
	5	Int.	●	MWS1270LB	104	104	167	13.0
	NEW	8	Int.	□	MWS1270X8DB	143	143	206
12.8	2	Ext.	●	MWE1280SA	51	51	102	12.8
	3	Ext.	●	MWE1280MA	78	78	137	12.8
	3	Int.	●	MWS1280MB	65	65	128	13.0
	5	Int.	●	MWS1280LB	104	104	167	13.0
	NEW	8	Int.	□	MWS1280X8DB	143	143	206
12.9	2	Ext.	●	MWE1290SA	51	51	102	12.9
	3	Ext.	●	MWE1290MA	78	78	137	12.9
	3	Int.	●	MWS1290MB	65	65	128	13.0
	5	Int.	●	MWS1290LB	104	104	167	13.0
	NEW	8	Int.	□	MWS1290X8DB	143	143	206
13.0	2	Ext.	●	MWE1300SA	51	51	102	13.0
	3	Ext.	●	MWE1300MA	78	78	137	13.0
	3	Int.	●	MWS1300MB	65	65	128	13.0
	5	Int.	●	MWS1300LB	104	104	167	13.0
	NEW	8	Int.	●	MWS1300X8DB	143	143	206
13.1	2	Ext.	●	MWE1310SA	51	51	102	13.1
	3	Ext.	●	MWE1310MA	84	84	144	13.1
	3	Int.	●	MWS1310MB	67.5	70	134	14.0
	5	Int.	●	MWS1310LB	108	112	176	14.0
	NEW	8	Int.	□	MWS1310X8DB	149	154	218

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
13.2	2	Ext.	●	MWE1320SA	51	51	102	13.2
	3	Ext.	●	MWE1320MA	84	84	144	13.2
	3	Int.	●	MWS1320MB	67.5	70	134	14.0
	5	Int.	●	MWS1320LB	108	112	176	14.0
	NEW	8	Int.	□	MWS1320X8DB	149	154	218
13.3	2	Ext.	●	MWE1330SA	54	54	107	13.3
	3	Ext.	●	MWE1330MA	84	84	144	13.3
	3	Int.	●	MWS1330MB	67.5	70	134	14.0
	5	Int.	●	MWS1330LB	108	112	176	14.0
	NEW	8	Int.	□	MWS1330X8DB	149	154	218
13.4	2	Ext.	●	MWE1340SA	54	54	107	13.4
	3	Ext.	●	MWE1340MA	84	84	144	13.4
	3	Int.	●	MWS1340MB	67.5	70	134	14.0
	5	Int.	●	MWS1340LB	108	112	176	14.0
	NEW	8	Int.	□	MWS1340X8DB	149	154	218
13.5	2	Ext.	●	MWE1350SA	54	54	107	13.5
	3	Ext.	●	MWE1350MA	84	84	144	13.5
	3	Int.	●	MWS1350MB	67.5	70	134	14.0
	5	Int.	●	MWS1350LB	108	112	176	14.0
	NEW	8	Int.	●	MWS1350X8DB	149	154	218
13.6	2	Ext.	●	MWE1360SA	54	54	107	13.6
	3	Ext.	●	MWE1360MA	86	86	147	13.6
	3	Int.	●	MWS1360MB	70	70	134	14.0
	5	Int.	●	MWS1360LB	112	112	176	14.0
	NEW	8	Int.	□	MWS1360X8DB	154	154	218
13.7	2	Ext.	●	MWE1370SA	54	54	107	13.7
	3	Ext.	●	MWE1370MA	86	86	147	13.7
	3	Int.	●	MWS1370MB	70	70	134	14.0
	5	Int.	●	MWS1370LB	112	112	176	14.0
	NEW	8	Int.	□	MWS1370X8DB	154	154	218

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

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
13.8	2	Ext.	●	MWE1380SA	54	54	107	13.8
	3	Ext.	●	MWE1380MA	86	86	147	13.8
	3	Int.	●	MWS1380MB	70	70	134	14.0
	5	Int.	●	MWS1380LB	112	112	176	14.0
	NEW 8	Int.	□	MWS1380X8DB	154	154	218	14.0
13.9	2	Ext.	●	MWE1390SA	54	54	107	13.9
	3	Ext.	●	MWE1390MA	86	86	147	13.9
	3	Int.	●	MWS1390MB	70	70	134	14.0
	5	Int.	●	MWS1390LB	112	112	176	14.0
	NEW 8	Int.	□	MWS1390X8DB	154	154	218	14.0
14.0	2	Ext.	●	MWE1400SA	54	54	107	14.0
	3	Ext.	●	MWE1400MA	86	86	147	14.0
	3	Int.	●	MWS1400MB	70	70	134	14.0
	5	Int.	●	MWS1400LB	112	112	176	14.0
	NEW 8	Int.	●	MWS1400X8DB	154	154	218	14.0
14.1	2	Ext.	●	MWE1410SA	56	56	111	14.1
	3	Ext.	●	MWE1410MA	89	89	151	14.1
	3	Int.	●	MWS1410MB	72.5	75	140	15.0
	5	Int.	●	MWS1410LB	116	120	185	15.0
	NEW 8	Int.	□	MWS1410X8DB	160	165	225	15.0
14.2	2	Ext.	●	MWE1420SA	56	56	111	14.2
	3	Ext.	●	MWE1420MA	89	89	151	14.2
	3	Int.	●	MWS1420MB	72.5	75	140	15.0
	5	Int.	●	MWS1420LB	116	120	185	15.0
	NEW 8	Int.	●	MWS1420X8DB	160	165	225	15.0
14.3	2	Ext.	□	MWE1430SA	56	56	111	14.3
	3	Ext.	●	MWE1430MA	89	89	151	14.3
	3	Int.	●	MWS1430MB	72.5	75	140	15.0
	5	Int.	●	MWS1430LB	116	120	185	15.0
	NEW 8	Int.	□	MWS1430X8DB	160	165	225	15.0
14.4	2	Ext.	□	MWE1440SA	56	56	111	14.4
	3	Ext.	●	MWE1440MA	89	89	151	14.4
	3	Int.	●	MWS1440MB	72.5	75	140	15.0
	5	Int.	●	MWS1440LB	116	120	185	15.0
	NEW 8	Int.	□	MWS1440X8DB	160	165	225	15.0
14.5	2	Ext.	●	MWE1450SA	56	56	111	14.5
	3	Ext.	●	MWE1450MA	89	89	151	14.5
	3	Int.	●	MWS1450MB	72.5	75	140	15.0
	5	Int.	●	MWS1450LB	116	120	185	15.0
	NEW 8	Int.	●	MWS1450X8DB	160	165	225	15.0
14.6	2	Ext.	□	MWE1460SA	56	56	111	14.6
	3	Ext.	●	MWE1460MA	91	91	153	14.6
	3	Int.	●	MWS1460MB	75	75	140	15.0
	5	Int.	●	MWS1460LB	120	120	185	15.0
	NEW 8	Int.	□	MWS1460X8DB	165	165	225	15.0
14.7	2	Ext.	□	MWE1470SA	56	56	111	14.7
	3	Ext.	●	MWE1470MA	91	91	153	14.7
	3	Int.	●	MWS1470MB	75	75	140	15.0
	5	Int.	●	MWS1470LB	120	120	185	15.0
	NEW 8	Int.	□	MWS1470X8DB	165	165	225	15.0

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
14.8	2	Ext.	□	MWE1480SA	56	56	111	14.8
	3	Ext.	●	MWE1480MA	91	91	153	14.8
	3	Int.	●	MWS1480MB	75	75	140	15.0
	5	Int.	●	MWS1480LB	120	120	185	15.0
	NEW 8	Int.	□	MWS1480X8DB	165	165	225	15.0
14.9	2	Ext.	□	MWE1490SA	56	56	111	14.9
	3	Ext.	●	MWE1490MA	91	91	153	14.9
	3	Int.	●	MWS1490MB	75	75	140	15.0
	5	Int.	●	MWS1490LB	120	120	185	15.0
	NEW 8	Int.	□	MWS1490X8DB	165	165	225	15.0
15.0	2	Ext.	●	MWE1500SA	56	56	111	15.0
	3	Ext.	●	MWE1500MA	91	91	153	15.0
	3	Int.	●	MWS1500MB	75	75	140	15.0
	5	Int.	●	MWS1500LB	120	120	185	15.0
	NEW 8	Int.	●	MWS1500X8DB	165	165	225	15.0
15.1	2	Ext.	□	MWE1510SA	58	58	115	15.1
	3	Ext.	●	MWE1510MA	94	94	157	15.1
	3	Int.	●	MWS1510MB	77.5	80	145	16.0
	5	Int.	●	MWS1510LB	124	128	193	16.0
	NEW 8	Int.	□	MWS1510X8DB	171	176	241	16.0
15.2	2	Ext.	●	MWE1520SA	58	58	115	15.2
	3	Ext.	●	MWE1520MA	94	94	157	15.2
	3	Int.	●	MWS1520MB	77.5	80	145	16.0
	5	Int.	●	MWS1520LB	124	128	193	16.0
	NEW 8	Int.	□	MWS1520X8DB	171	176	241	16.0
15.3	2	Ext.	□	MWE1530SA	58	58	115	15.3
	3	Ext.	●	MWE1530MA	94	94	157	15.3
	3	Int.	●	MWS1530MB	77.5	80	145	16.0
	5	Int.	●	MWS1530LB	124	128	193	16.0
	NEW 8	Int.	□	MWS1530X8DB	171	176	241	16.0
15.4	2	Ext.	□	MWE1540SA	58	58	115	15.4
	3	Ext.	●	MWE1540MA	94	94	157	15.4
	3	Int.	●	MWS1540MB	77.5	80	145	16.0
	5	Int.	●	MWS1540LB	124	128	193	16.0
	NEW 8	Int.	□	MWS1540X8DB	171	176	241	16.0
15.5	2	Ext.	●	MWE1550SA	58	58	115	15.5
	3	Ext.	●	MWE1550MA	94	94	157	15.5
	3	Int.	●	MWS1550MB	77.5	80	145	16.0
	5	Int.	●	MWS1550LB	124	128	193	16.0
	NEW 8	Int.	●	MWS1550X8DB	171	176	241	16.0
15.6	2	Ext.	□	MWE1560SA	58	58	115	15.6
	3	Ext.	●	MWE1560MA	96	96	160	15.6
	3	Int.	●	MWS1560MB	80	80	145	16.0
	5	Int.	●	MWS1560LB	128	128	193	16.0
	NEW 8	Int.	□	MWS1560X8DB	176	176	241	16.0
15.7	2	Ext.	□	MWE1570SA	58	58	115	15.7
	3	Ext.	●	MWE1570MA	96	96	160	15.7
	3	Int.	●	MWS1570MB	80	80	145	16.0
	5	Int.	●	MWS1570LB	128	128	193	16.0
	NEW 8	Int.	□	MWS1570X8DB	176	176	241	16.0

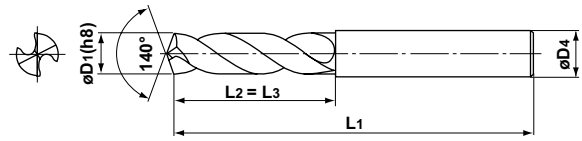
Solid carbide drill

WSTAR Drill

MIRACLE[®] coated

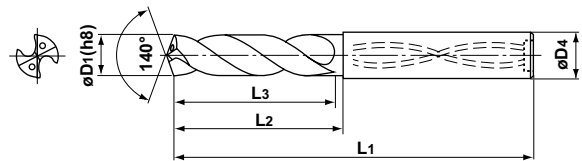
MWE (External coolant)

D ₁ (h8)	D ₁ ≤ 3.0	3.0 < D ₁ ≤ 6.0	6.0 < D ₁ ≤ 10.0	10.0 < D ₁ ≤ 18.0	18.0 < D ₁ ≤ 30.0
Tolerance	0 -0.014	0 -0.018	0 -0.022	0 -0.027	0 -0.033



MWS (Internal coolant)

● MWS-MB/LB/X8DB type can be used for shrink fit holders.



*MWS type with ø5.0 or larger diameter has a recess in the end face.

Drill dia. D ₁ (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L ₃	L ₂	L ₁	D ₄
15.8	2	Ext.	□	MWE1580SA	58	58	115	15.8
	3	Ext.	●	MWE1580MA	96	96	160	15.8
	3	Int.	●	MWS1580MB	80	80	145	16.0
	5	Int.	●	MWS1580LB	128	128	193	16.0
15.9	2	Ext.	□	MWE1590SA	58	58	115	15.9
	3	Ext.	●	MWE1590MA	96	96	160	15.9
	3	Int.	●	MWS1590MB	80	80	145	16.0
	5	Int.	●	MWS1590LB	128	128	193	16.0
16.0	2	Ext.	●	MWE1600SA	58	58	115	16.0
	3	Ext.	●	MWE1600MA	96	96	160	16.0
	3	Int.	●	MWS1600MB	80	80	145	16.0
	5	Int.	●	MWS1600LB	128	128	193	16.0
16.1	2	Ext.	□	MWE1610SA	60	60	119	16.1
	3	Ext.	□	MWE1610MA	102	102	167	16.1
	3	Int.	□	MWS1610MB	82.5	85	150	17.0
	5	Int.	□	MWS1610LB	132	136	201	17.0
16.2	2	Ext.	●	MWE1620SA	60	60	119	16.2
	3	Ext.	□	MWE1620MA	102	102	167	16.2
	3	Int.	□	MWS1620MB	82.5	85	150	17.0
	5	Int.	□	MWS1620LB	132	136	201	17.0
16.3	2	Ext.	●	MWE1630SA	60	60	119	16.3
	3	Ext.	□	MWE1630MA	102	102	167	16.3
	3	Int.	□	MWS1630MB	82.5	85	150	17.0
	5	Int.	□	MWS1630LB	132	136	201	17.0
16.4	2	Ext.	□	MWE1640SA	60	60	119	16.4
	3	Ext.	□	MWE1640MA	102	102	167	16.4
	3	Int.	□	MWS1640MB	82.5	85	150	17.0
	5	Int.	□	MWS1640LB	132	136	201	17.0

Drill dia. D ₁ (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L ₃	L ₂	L ₁	D ₄
16.5	2	Ext.	●	MWE1650SA	60	60	119	16.5
	3	Ext.	●	MWE1650MA	102	102	167	16.5
	3	Int.	●	MWS1650MB	82.5	85	150	17.0
	5	Int.	●	MWS1650LB	132	136	201	17.0
16.6	2	Ext.	□	MWE1660SA	60	60	119	16.6
	3	Ext.	□	MWE1660MA	102	102	167	16.6
	3	Int.	□	MWS1660MB	85	85	150	17.0
	5	Int.	□	MWS1660LB	136	136	201	17.0
16.7	2	Ext.	□	MWE1670SA	60	60	119	16.7
	3	Ext.	□	MWE1670MA	102	102	167	16.7
	3	Int.	□	MWS1670MB	85	85	150	17.0
	5	Int.	□	MWS1670LB	136	136	201	17.0
16.8	2	Ext.	□	MWE1680SA	60	60	119	16.8
	3	Ext.	□	MWE1680MA	102	102	167	16.8
	3	Int.	□	MWS1680MB	85	85	150	17.0
	5	Int.	□	MWS1680LB	136	136	201	17.0
16.9	2	Ext.	□	MWE1690SA	60	60	119	16.9
	3	Ext.	□	MWE1690MA	102	102	167	16.9
	3	Int.	□	MWS1690MB	85	85	150	17.0
	5	Int.	□	MWS1690LB	136	136	201	17.0
17.0	2	Ext.	●	MWE1700SA	60	60	119	17.0
	3	Ext.	●	MWE1700MA	102	102	167	17.0
	3	Int.	●	MWS1700MB	85	85	150	17.0
	5	Int.	●	MWS1700LB	136	136	201	17.0
17.1	2	Ext.	□	MWE1710SA	62	62	123	17.1
	3	Ext.	□	MWE1710MA	102	102	167	17.1
	3	Int.	□	MWS1710MB	87.5	90	155	18.0
	5	Int.	□	MWS1710LB	140	144	209	18.0
17.2	2	Ext.	□	MWE1720SA	62	62	123	17.2
	3	Ext.	□	MWE1720MA	102	102	167	17.2
	3	Int.	□	MWS1720MB	87.5	90	155	18.0
	5	Int.	□	MWS1720LB	140	144	209	18.0

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

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
17.3	2	Ext.	□	MWE1730SA	62	62	123	17.3
	3	Ext.	□	MWE1730MA	102	102	167	17.3
	3	Int.	□	MWS1730MB	87.5	90	155	18.0
	5	Int.	□	MWS1730LB	140	144	209	18.0
17.4	2	Ext.	□	MWE1740SA	62	62	123	17.4
	3	Ext.	□	MWE1740MA	102	102	167	17.4
	3	Int.	□	MWS1740MB	87.5	90	155	18.0
	5	Int.	□	MWS1740LB	140	144	209	18.0
17.5	2	Ext.	●	MWE1750SA	62	62	123	17.5
	3	Ext.	●	MWE1750MA	102	102	167	17.5
	3	Int.	●	MWS1750MB	87.5	90	155	18.0
	5	Int.	●	MWS1750LB	140	144	209	18.0
17.6	2	Ext.	□	MWE1760SA	62	62	123	17.6
	3	Ext.	□	MWE1760MA	102	102	167	17.6
	3	Int.	□	MWS1760MB	90	90	155	18.0
	5	Int.	□	MWS1760LB	144	144	209	18.0
17.7	2	Ext.	□	MWE1770SA	62	62	123	17.7
	3	Ext.	□	MWE1770MA	102	102	167	17.7
	3	Int.	□	MWS1770MB	90	90	155	18.0
	5	Int.	□	MWS1770LB	144	144	209	18.0
17.8	2	Ext.	●	MWE1780SA	62	62	123	17.8
	3	Ext.	□	MWE1780MA	102	102	167	17.8
	3	Int.	□	MWS1780MB	90	90	155	18.0
	5	Int.	□	MWS1780LB	144	144	209	18.0
17.9	2	Ext.	□	MWE1790SA	62	62	123	17.9
	3	Ext.	□	MWE1790MA	102	102	167	17.9
	3	Int.	□	MWS1790MB	90	90	155	18.0
	5	Int.	□	MWS1790LB	144	144	209	18.0
18.0	2	Ext.	●	MWE1800SA	62	62	123	18.0
	3	Ext.	●	MWE1800MA	102	102	167	18.0
	3	Int.	●	MWS1800MB	90	90	155	18.0
	5	Int.	●	MWS1800LB	144	144	209	18.0
18.1	2	Ext.	□	MWE1810SA	64	64	127	18.1
	3	Ext.	□	MWE1810MA	114	114	179	18.1
	3	Int.	□	MWS1810MB	92.5	95	160	19.0
	5	Int.	□	MWS1810LB	148	152	217	19.0
18.2	2	Ext.	□	MWE1820SA	64	64	127	18.2
	3	Ext.	□	MWE1820MA	114	114	179	18.2
	3	Int.	□	MWS1820MB	92.5	95	160	19.0
	5	Int.	□	MWS1820LB	148	152	217	19.0
18.3	2	Ext.	□	MWE1830SA	64	64	127	18.3
	3	Ext.	□	MWE1830MA	114	114	179	18.3
	3	Int.	□	MWS1830MB	92.5	95	160	19.0
	5	Int.	□	MWS1830LB	148	152	217	19.0
18.4	2	Ext.	□	MWE1840SA	64	64	127	18.4
	3	Ext.	□	MWE1840MA	114	114	179	18.4
	3	Int.	□	MWS1840MB	92.5	95	160	19.0
	5	Int.	□	MWS1840LB	148	152	217	19.0

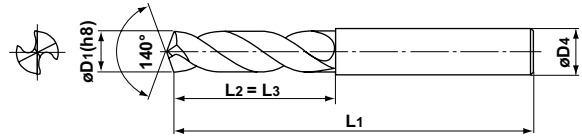
Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
18.5	2	Ext.	●	MWE1850SA	64	64	127	18.5
	3	Ext.	●	MWE1850MA	114	114	179	18.5
	3	Int.	●	MWS1850MB	92.5	95	160	19.0
	5	Int.	●	MWS1850LB	148	152	217	19.0
18.6	2	Ext.	□	MWE1860SA	64	64	127	18.6
	3	Ext.	□	MWE1860MA	114	114	179	18.6
	3	Int.	□	MWS1860MB	95	95	160	19.0
	5	Int.	□	MWS1860LB	152	152	217	19.0
18.7	2	Ext.	□	MWE1870SA	64	64	127	18.7
	3	Ext.	□	MWE1870MA	114	114	179	18.7
	3	Int.	□	MWS1870MB	95	95	160	19.0
	5	Int.	□	MWS1870LB	152	152	217	19.0
18.8	2	Ext.	□	MWE1880SA	64	64	127	18.8
	3	Ext.	□	MWE1880MA	114	114	179	18.8
	3	Int.	□	MWS1880MB	95	95	160	19.0
	5	Int.	□	MWS1880LB	152	152	217	19.0
18.9	2	Ext.	□	MWE1890SA	64	64	127	18.9
	3	Ext.	□	MWE1890MA	114	114	179	18.9
	3	Int.	□	MWS1890MB	95	95	160	19.0
	5	Int.	□	MWS1890LB	152	152	217	19.0
19.0	2	Ext.	●	MWE1900SA	64	64	127	19.0
	3	Ext.	●	MWE1900MA	114	114	179	19.0
	3	Int.	●	MWS1900MB	95	95	160	19.0
	5	Int.	●	MWS1900LB	152	152	217	19.0
19.1	2	Ext.	□	MWE1910SA	66	66	131	19.1
	3	Ext.	□	MWE1910MA	114	114	179	19.1
	3	Int.	□	MWS1910MB	97.5	100	165	20.0
	5	Int.	□	MWS1910LB	156	160	225	20.0
19.2	2	Ext.	□	MWE1920SA	66	66	131	19.2
	3	Ext.	□	MWE1920MA	114	114	179	19.2
	3	Int.	□	MWS1920MB	97.5	100	165	20.0
	5	Int.	□	MWS1920LB	156	160	225	20.0
19.3	2	Ext.	□	MWE1930SA	66	66	131	19.3
	3	Ext.	□	MWE1930MA	114	114	179	19.3
	3	Int.	□	MWS1930MB	97.5	100	165	20.0
	5	Int.	□	MWS1930LB	156	160	225	20.0
19.4	2	Ext.	□	MWE1940SA	66	66	131	19.4
	3	Ext.	□	MWE1940MA	114	114	179	19.4
	3	Int.	□	MWS1940MB	97.5	100	165	20.0
	5	Int.	□	MWS1940LB	156	160	225	20.0
19.5	2	Ext.	●	MWE1950SA	66	66	131	19.5
	3	Ext.	●	MWE1950MA	114	114	179	19.5
	3	Int.	●	MWS1950MB	97.5	100	165	20.0
	5	Int.	●	MWS1950LB	156	160	225	20.0
19.6	2	Ext.	□	MWE1960SA	66	66	131	19.6
	3	Ext.	□	MWE1960MA	114	114	179	19.6
	3	Int.	□	MWS1960MB	100	100	165	20.0
	5	Int.	□	MWS1960LB	160	160	225	20.0

Solid carbide drill

WSTAR Drill
MIRACLE[®] coated

MWE (External coolant)

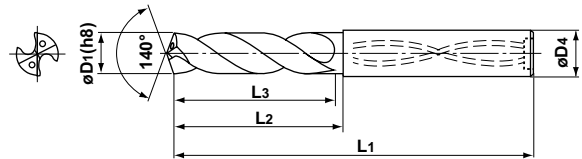
D1(h8)	D1 ≤ 3.0	3.0 < D1 ≤ 6.0	6.0 < D1 ≤ 10.0	10.0 < D1 ≤ 18.0	18.0 < D1 ≤ 30.0
Tolerance	0 -0.014	0 -0.018	0 -0.022	0 -0.027	0 -0.033



MWS (Internal coolant)



● MWS-MB/LB/X8DB type can be used for shrink fit holders.



*MWS type with ø5.0 or larger diameter has a recess in the end face.

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
19.7	2	Ext.	□	MWE1970SA	66	66	131	19.7
	3	Ext.	□	MWE1970MA	114	114	179	19.7
	3	Int.	□	MWS1970MB	100	100	165	20.0
	5	Int.	□	MWS1970LB	160	160	225	20.0
19.8	2	Ext.	□	MWE1980SA	66	66	131	19.8
	3	Ext.	□	MWE1980MA	114	114	179	19.8
	3	Int.	□	MWS1980MB	100	100	165	20.0
	5	Int.	□	MWS1980LB	160	160	225	20.0

Drill dia. D1 (mm)	Depth (l/d)	Coolant	Stock VP15TF	Order number	Dimensions (mm)			
					L3	L2	L1	D4
19.9	2	Ext.	□	MWE1990SA	66	66	131	19.9
	3	Ext.	□	MWE1990MA	114	114	179	19.9
	3	Int.	□	MWS1990MB	100	100	165	20.0
	5	Int.	□	MWS1990LB	160	160	225	20.0
20.0	2	Ext.	●	MWE2000SA	66	66	131	20.0
	3	Ext.	●	MWE2000MA	114	114	179	20.0
	3	Int.	●	MWS2000MB	100	100	165	20.0
	5	Int.	●	MWS2000LB	160	160	225	20.0

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

Recommended Cutting Conditions

MWE (External coolant)

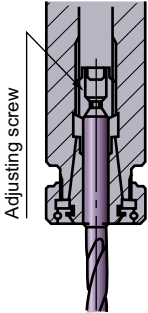
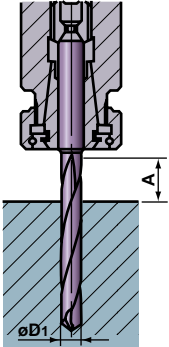
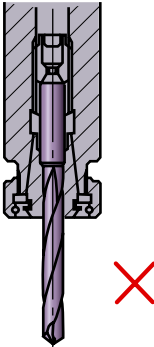
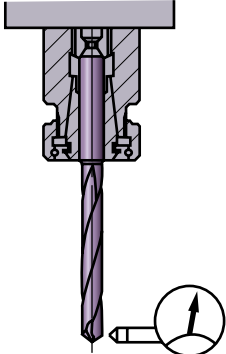
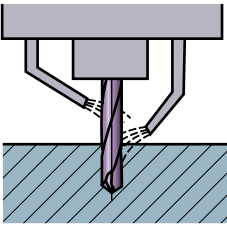
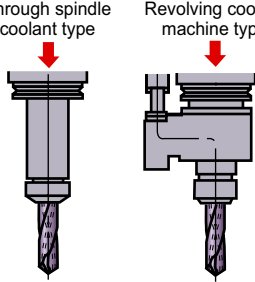
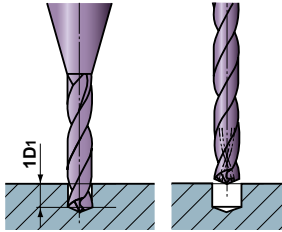
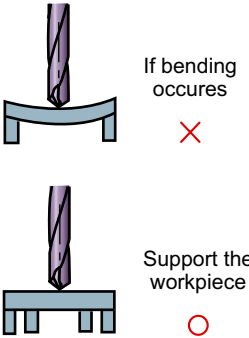
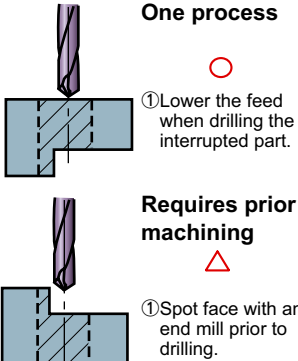
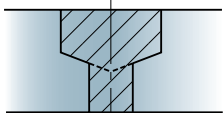
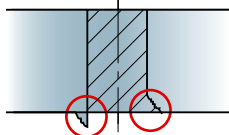
Workpiece	Drill diameter	φ3.0-6.0		φ6.0-10.0		φ10.0-14.0		φ14.0-20.0	
		Conditions Hardness	Cutting speed (m/min)	Feed (mm/rev)	Cutting speed (m/min)	Feed (mm/rev)	Cutting speed (m/min)	Feed (mm/rev)	Cutting speed (m/min)
P Mild steel	≤ 180HB	85	0.20	85	0.25	90	0.30	100	0.35
		(35-100)	(0.15-0.30)	(45-120)	(0.15-0.35)	(55-120)	(0.20-0.35)	(60-130)	(0.20-0.40)
		Carbon steel	180-280HB	80	0.20	90	0.25	90	0.30
Alloy steel	280-350HB	75	0.15	80	0.20	85	0.25	85	0.30
		(35-80)	(0.15-0.20)	(45-115)	(0.15-0.25)	(55-115)	(0.15-0.30)	(55-115)	(0.20-0.35)
M Stainless steel	≤ 200HB	20	0.10	25	0.12	25	0.15	25	0.20
K Cast iron	Tensile strength ≤ 350MPa	70	0.25	75	0.30	80	0.35	85	0.40
		(40-85)	(0.15-0.30)	(50-90)	(0.20-0.35)	(50-95)	(0.20-0.40)	(55-95)	(0.30-0.45)
Ductile cast iron	Tensile strength ≤ 450MPa	65	0.20	70	0.25	75	0.30	80	0.35
N Aluminum alloy	-	80	0.20	90	0.25	100	0.30	110	0.35
		(70-90)	(0.10-0.25)	(80-100)	(0.15-0.30)	(90-110)	(0.20-0.35)	(100-120)	(0.20-0.40)
S Heat resistant alloy	-	20	0.10	25	0.12	25	0.15	30	0.20
H Hardened material	40-60HRC	20	0.10	25	0.12	25	0.15	30	0.20
		(15-25)	(0.05-0.15)	(15-30)	(0.05-0.15)	(15-30)	(0.10-0.20)	(15-35)	(0.10-0.25)

MWS (Internal coolant)

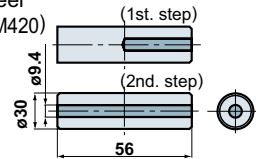
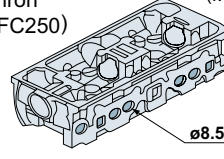
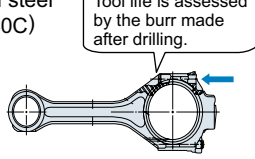
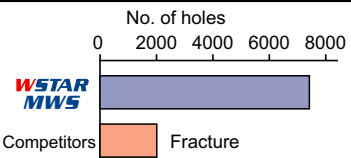
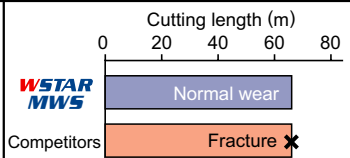
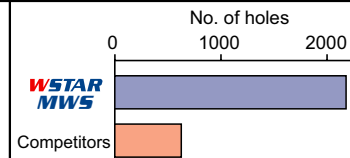
Workpiece	Drill diameter	φ3.0-6.0		φ6.0-10.0		φ10.0-14.0		φ14.0-20.0	
		Conditions Hardness	Cutting speed (m/min)	Feed (mm/rev)	Cutting speed (m/min)	Feed (mm/rev)	Cutting speed (m/min)	Feed (mm/rev)	Cutting speed (m/min)
P Mild steel	≤ 180HB	110	0.20	130	0.25	150	0.30	160	0.35
		(50-120)	(0.15-0.25)	(80-140)	(0.20-0.35)	(90-170)	(0.20-0.40)	(100-180)	(0.20-0.40)
		Carbon steel	180-280HB	90	0.20	110	0.25	130	0.25
Alloy steel	280-350HB	80	0.20	90	0.25	110	0.25	120	0.30
		(40-90)	(0.15-0.30)	(60-110)	(0.15-0.30)	(70-130)	(0.15-0.40)	(90-140)	(0.20-0.40)
M Stainless steel	≤ 200HB	60	0.10	80	0.20	90	0.25	100	0.25
K Cast iron	Tensile strength ≤ 350MPa	100	0.25	130	0.30	150	0.35	160	0.35
		(70-120)	(0.15-0.30)	(100-140)	(0.20-0.35)	(110-160)	(0.25-0.40)	(120-170)	(0.25-0.40)
Ductile cast iron	Tensile strength ≤ 450MPa	60	0.20	70	0.20	90	0.25	100	0.30
N Aluminum alloy	-	120	0.25	150	0.30	160	0.40	170	0.50
		(80-150)	(0.20-0.35)	(100-170)	(0.20-0.50)	(100-170)	(0.20-0.80)	(100-180)	(0.20-1.00)
S Heat resistant alloy	-	20	0.10	25	0.12	25	0.15	30	0.20
		(10-25)	(0.05-0.15)	(15-30)	(0.05-0.15)	(15-30)	(0.10-0.20)	(25-35)	(0.10-0.25)

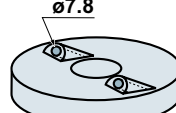
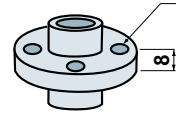
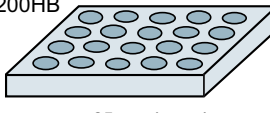
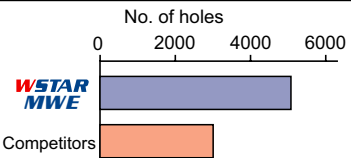
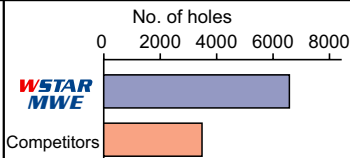
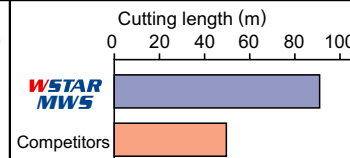
* Please refer to the next page for further information about the effective use of WSTAR drills.

Operational Guidance

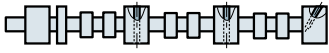
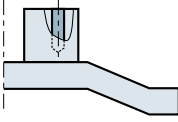
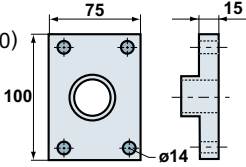
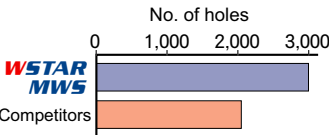
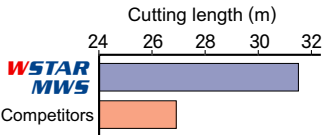
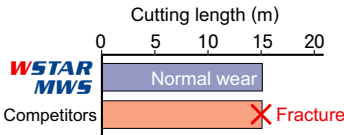
<p>Drill holding</p>  <p>Adjusting screw</p> <p>Thrust bearing type collet chuck holds the drill securely.</p>	<p>Drill length</p>  <p>$A : \geq D \times 1.5$</p>	<p>Drill installation</p>  <p>Do not clamp on the flutes.</p>	<p>Installation tolerance</p>  <p>Runout $\leq 0.03\text{mm}$</p>
<p>Coolant method (MWE)</p>  <p>Two coolant positions, at the end and at the center are ideal.</p>	<p>Coolant method (MWS)</p>  <p>Through spindle coolant type Revolving coolant machine type</p> <p>Coolant pressure is approx. 0.5-1MPa ($\leq \phi 5 : 2-3\text{MPa}$). Coolant volume is 1.5-4.0 l/min.</p>	<p>Small diameter drill application</p>  <p>$1D_1$</p> <ol style="list-style-type: none"> When machining a prepared hole with the MZB-SB or other center drills, set the depth to $1D_1$ ($D_1 = \text{drill Diameter}$). Use the prepared hole as a guide. Depending on the cutting conditions, peck feed drilling is recommended. 	<p>Coolant handling</p> <p>< MWS type ></p> <ol style="list-style-type: none"> Dirt and dust particles in old coolant can clog the oil hole and prevent effective flow. Regular coolant exchange is recommended. 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.
<p>Thin workpieces</p>  <p>If bending occurs ✗</p> <p>Support the workpiece ○</p>	<p>Interrupted cutting</p>  <p>One process ○</p> <ol style="list-style-type: none"> Lower the feed when drilling the interrupted part. <p>Requires prior machining △</p> <ol style="list-style-type: none"> Spot face with an end mill prior to drilling. 	<p>Stepped holes</p>  <ol style="list-style-type: none"> Divide the machining into two processes. Drill the larger hole first. <p>*Tools for chamfering and spot facing can be produced to order.</p>	<p>Burring and workpiece chipping</p>  <ol style="list-style-type: none"> Lower the feed rate when breaking through. Add a chamfer. Change the point angle.

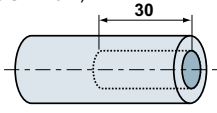
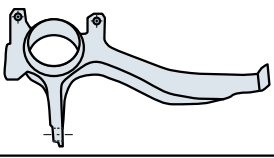
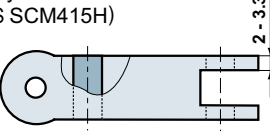
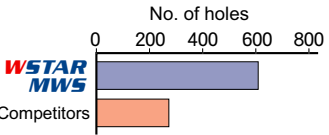
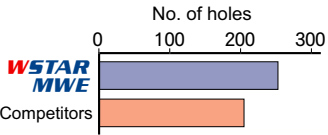
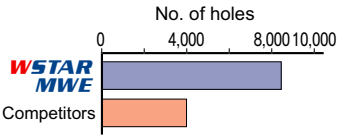
Application examples

Drill	MWS0940MB	MWS0850MB	MWS1590LB
Workpiece	Alloy steel (JIS SCM420) 180HB 	Cast iron (JIS FC250) (M10 bolt) 	Carbon steel (JIS S40C) 280HB 
Component	Crank pin	Auto parts	Con rod
Cutting conditions	Cutting speed (m/min)	54	115
	Feed (mm/rev)	0.2	0.25
	Revolution (min ⁻¹)	1,829	2,302
	Table feed (mm/min)	366	576
Coolant	WSO	WSO	Mist
Machine	NC lathe	Machining centre	Machining centre
Result			

Drill	MWE0780MA	MWE1200SA	MWS0800MB
Workpiece	Ductile cast iron (JIS FCD700) 200HB 	Carbon steel (JIS S55C) 255HB 	Stainless steel (JIS SUS304) 200HB 
Component	Compressor parts	Auto parts	Machine parts
Cutting conditions	Cutting speed (m/min)	48	60
	Feed (mm/rev)	0.15	0.2
	Revolution (min ⁻¹)	1,958	1,602
	Table feed (mm/min)	294	320
Coolant	WSO	WSO	WSO
Machine	Machining centre	Machining centre	Machining centre
Result			

Application examples

Drill	MWS0400LB	MWS1040LB	MWS1400MB
Workpiece	Carbon steel (JIS S48C) 	Mild steel (JIS SS400) 	Mild steel (JIS SS400) 
Component	Cam shaft	Machine parts	Flange
Cutting conditions	Cutting speed (m/min)	80	125
	Feed (mm/rev)	0.18	0.3
	Revolution (min ⁻¹)	6,366	1,898
	Table feed (mm/min)	1,145	569.4
Coolant	WSO	Mist	WSO
Machine	Machining centre	Machining centre	Turn / mill centreCCC
Result			

Drill	MWS1200MB	MWE1510SA	MWE1120SA
Workpiece	Alloy steel (JIS SCr420H) 	Carbon steel (JIS S43C) 	Alloy steel (JIS SCM415H) 
Component	Transmission parts	Automobile parts	Automobile parts
Cutting conditions	Cutting speed (m/min)	60	88
	Feed (mm/rev)	0.2	0.16
	Revolution (min ⁻¹)	1,200	1,265
	Table feed (mm/min)	240	202
Coolant	WSO	WSO	WSO
Machine	CNC lathe	Machining centre	Machining centre
Result			

For Your Safety

● Do not touch cutting edges and chips without gloves. ● Machine within the recommended conditions, and replace worn tools with new ones before breakage. ● Use protectors such as safety covers and protective glasses. High-temperature chips can scatter and long chips can be discharged. ● Always take precautions against fire when using water-insoluble coolant. ● When using tools in revolution machining, please make a trial run to check run-out, vibration, 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.