

Solid Carbide Drill

**HTi10  
grade  
addition!**

**MIRACLE® ZET1 Drill**

## Sharp, tough straight cutting edge. Stable drilling performance.

■ Non-coated drills with high wear resistance for cast iron and aluminum alloy.



**NEW**

**HTi10**

**VP15TF**

# Solid Carbide Drill

# MIRACLE<sup>®</sup> ZET1 Drill

## Features

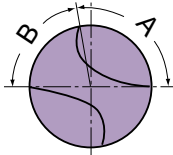
### ● Cutting Edge Geometry

#### 1. X type web thinning

Enables easy initial cutting, which leads to high accuracy cutting.

#### 4. Wider flute geometry

Prevents chip packing and gives excellent chip disposal due to large flute width and depth.



#### 2. Straight cutting edge

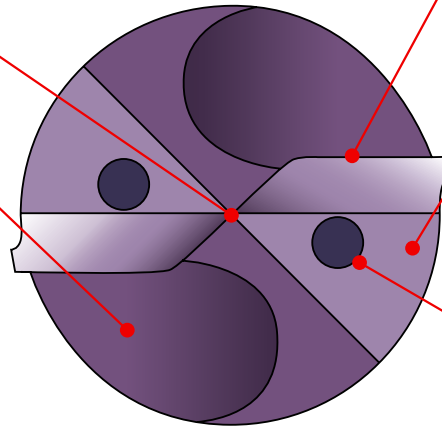
Sharp, tough straight cutting edge.

#### 3. Three rake cutting edge

Enables easy regrinding due to the three rake cutting edge.

#### 5. Oil hole

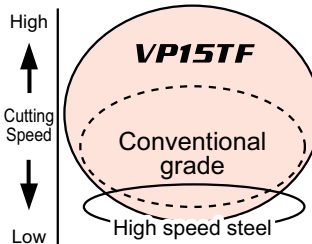
MZS type employs an internal coolant oil hole for optimal high speed machining of difficult-to-cut materials and deep hole drilling.



### ● Grade

#### Cutting speed application range

- Suitable for low to high speed machining, including application range for high speed steel.
- Suitable for use with a wide range of workpiece materials ranging from general steels through to difficult to cut materials.

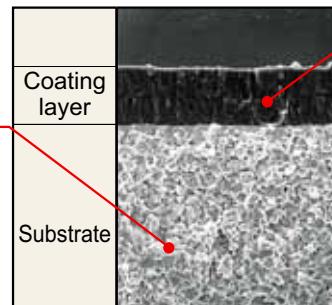


#### About coating ...

- ① Achieves stable tool life due to strengthened adhesion of the coating to the substrate.
- ② Exhibits excellent thermal, wear, and oxidation resistance. Long tool life even under machining of hardened materials.

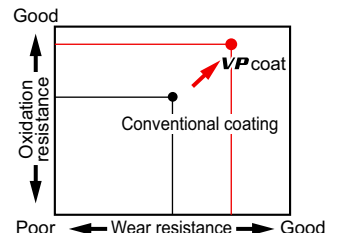
#### Cemented carbide: TF15

Grade	Hardness (HRA)	T.R.S (GPa)
TF15	91.5	2.5



#### VP coating

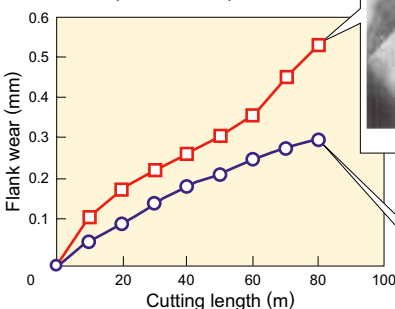
(Al, Ti) N (Aluminium titanium nitride) compound



## Cutting Performance

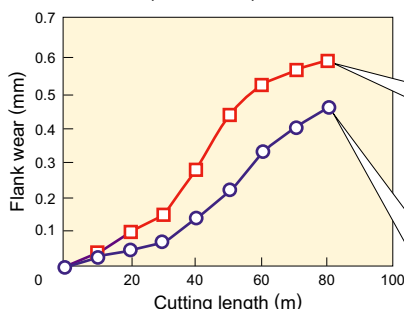
### ● Tool Life

Mild steel (JIS SS400)



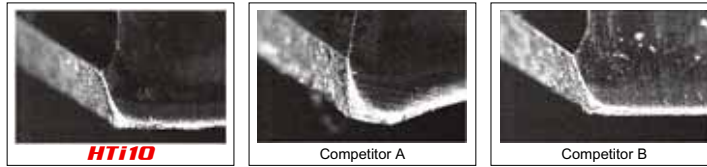
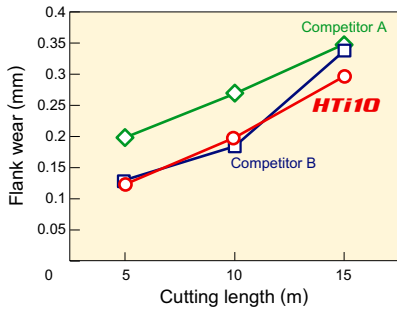
<Cutting conditions>  
 Workpiece : SS400 Feed : 0.25mm/rev  
 Tool : MZE1000MA Coolant : 10% emulsion  
 Grade : VP15TF Pressure : 0.5MPa (External coolant)  
 Cutting speed : 60m/min

Carbon steel (JIS S50C)



<Cutting conditions>  
 Workpiece : S50C Feed : 0.25mm/rev  
 Tool : MZE1000MA Coolant : 10% emulsion  
 Grade : VP15TF Pressure : 0.5MPa (External coolant)  
 Cutting speed : 60m/min

Cast iron (JIS FC250)



<Cutting conditions>

Workpiece : Cast iron (JIS FC250) Feed : 0.2mm/rev  
 Tool : MZE0800MA Coolant : Chronic free emulsion  
 Grade : HTi10 Density : 10%  
 Hole depth : 25mm External coolant  
 Cutting speed : 80m/min

**NEW HTi10**



**Operational Guidance**

<p><b>Drill holding</b></p> <p>Thrust bearing type collet chuck holds the drill securely.</p>	<p><b>Drill length</b></p> <p><math>A : \geq D \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 (MZE)</b></p> <p>Two coolant positions, at the end and at the centre are ideal.</p>	<p><b>Coolant method (MZS)</b></p> <p>Coolant pressure is approx. 0.5-1MPa (<math>\leq \phi 5 : 2-3\text{MPa}</math>).          Coolant volume is 1.5-4.0 l/min.</p>	<p><b>Small diameter drill application</b></p> <p>①When machining a prepared hole with the MZB-SB or other centre drills, set the depth to <math>1D_1</math> (<math>D_1 = \text{drill Diameter}</math>).          ②Use the prepared hole as a guide. Depending on the cutting conditions, peck feed drilling is recommended.</p>	<p><b>Coolant handling</b></p> <p>&lt; MZS 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 <math>\times</math>          Support the workpiece <math>\circ</math></p>	<p><b>Interrupted cutting</b></p> <p>One process <math>\circ</math>          ①Lower the feed when drilling the interrupted part.          Requires prior machining <math>\triangle</math>          ①Spot face with an end mill prior to drilling.</p>	<p><b>Stepped holes</b></p> <p>①Divide the machining into two processes.          ②Drill the larger hole first.          *Tools for chamfering and spot facing can be produced to order.</p>	<p><b>Burring and workpiece chipping</b></p> <p>①Lower the feed rate when breaking through.          ②Add a chamfer.          ③Change the point angle.</p>

**Caution in using the MZS (Drill diameter  $\leq \phi 3$ )**

- Please use a fine mesh filter (mesh  $\leq 3\mu\text{m}$ ) for coolant to prevent jamming in the oil hole.
- For deep drilling ( $l/d > 3$ ), machining guiding hole is recommended. (Use MZE $\circ\circ\circ\circ$ SB type for guiding hole.)
- Peck feed drilling is also effective.

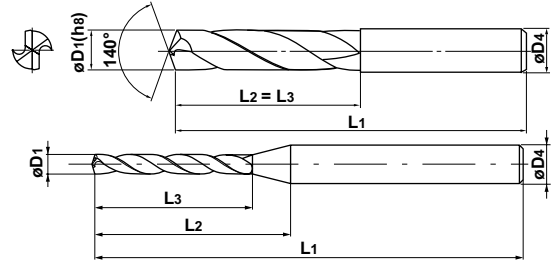
# MIRACLE<sup>®</sup> ZET1 Drill

## MZE (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



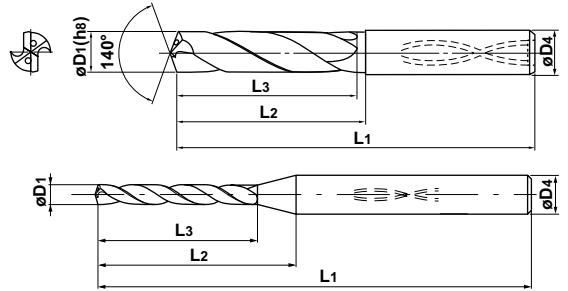
VP15TF (Straight)



## MZS (Internal coolant)



VP15TF (Straight)



Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	NEW		L3	L2	L1	D4
			VP15TF	GP20M						
1.0	2	Ext.	●			MZE0100SB	6	8	55	2.0
	5	Int.	●			MZS0100LB	11	15	55	3.0
	12	Int.	□			MZS0100XB	23	27	55	3.0
1.1	2	Ext.	●			MZE0110SB	7	9	55	2.0
	5	Int.	●			MZS0110LB	17	21	55	3.0
	12	Int.	□			MZS0110XB	23	27	55	3.0
1.2	2	Ext.	●			MZE0120SB	8	9	55	2.0
	5	Int.	●			MZS0120LB	17	20	55	3.0
	12	Int.	□			MZS0120XB	23	26	55	3.0
1.3	2	Ext.	●			MZE0130SB	8	9	55	2.0
	5	Int.	●			MZS0130LB	17	20	55	3.0
	12	Int.	□			MZS0130XB	23	26	55	3.0
1.4	2	Ext.	●			MZE0140SB	9	10	55	2.0
	5	Int.	●			MZS0140LB	17	20	55	3.0
	12	Int.	□			MZS0140XB	23	26	55	3.0
1.5	2	Ext.	●			MZE0150SB	9	10	55	2.0
	5	Int.	●			MZS0150LB	17	20	55	3.0
	12	Int.	□			MZS0150XB	23	26	55	3.0
1.6	2	Ext.	●			MZE0160SB	10	10	55	2.0
	5	Int.	●			MZS0160LB	22	25	68	3.0
	12	Int.	□			MZS0160XB	30	33	68	3.0
1.7	2	Ext.	●			MZE0170SB	10	10	55	2.0
	5	Int.	●			MZS0170LB	22	24	68	3.0
	12	Int.	□			MZS0170XB	30	32	68	3.0
1.8	2	Ext.	●			MZE0180SB	11	11	55	2.0
	5	Int.	●			MZS0180LB	22	24	68	3.0
	12	Int.	□			MZS0180XB	30	32	68	3.0
1.9	2	Ext.	●			MZE0190SB	11	11	55	2.0
	5	Int.	●			MZS0190LB	22	24	68	3.0
	12	Int.	□			MZS0190XB	30	32	68	3.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	NEW		L3	L2	L1	D4
			VP15TF	GP20M						
2.0	2	Ext.	●			MZE0200SA	12	12	55	2.0
	3	Ext.	●			MZE0200MA	16	16	55	2.0
	3	Int.	●			MZS0200MB	16	18	62	3.0
	5	Int.	●			MZS0200LB	22	24	68	3.0
	12	Int.	□			MZS0200XB	30	32	68	3.0
2.1	2	Ext.	●			MZE0210SA	12	12	55	2.1
	3	Ext.	●			MZE0210MA	16	16	55	2.1
	3	Int.	●			MZS0210MB	20	22	66	3.0
	5	Int.	●			MZS0210LB	28	30	74	3.0
	12	Int.	□			MZS0210XB	38	40	74	3.0
2.2	2	Ext.	●			MZE0220SA	13	13	55	2.2
	3	Ext.	●			MZE0220MA	18	18	55	2.2
	3	Int.	●			MZS0220MB	20	21	66	3.0
	5	Int.	●			MZS0220LB	28	29	74	3.0
	12	Int.	□			MZS0220XB	38	39	74	3.0
2.3	2	Ext.	●			MZE0230SA	13	13	55	2.3
	3	Ext.	●			MZE0230MA	18	18	55	2.3
	3	Int.	●			MZS0230MB	20	21	66	3.0
	5	Int.	●			MZS0230LB	28	29	74	3.0
	12	Int.	□			MZS0230XB	38	39	74	3.0
2.4	2	Ext.	●			MZE0240SA	16	16	55	2.4
	3	Ext.	●			MZE0240MA	20	20	55	2.4
	3	Int.	●			MZS0240MB	20	21	66	3.0
	5	Int.	●			MZS0240LB	28	29	74	3.0
	12	Int.	□			MZS0240XB	38	39	74	3.0
2.5	2	Ext.	●			MZE0250SA	16	16	55	2.5
	3	Ext.	●			MZE0250MA	20	20	55	2.5
	3	Int.	●			MZS0250MB	20	21	66	3.0
	5	Int.	●			MZS0250LB	28	29	74	3.0
	12	Int.	□			MZS0250XB	38	39	74	3.0

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

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	NEW		L3	L2	L1	D4
			VP15TF	GP20M						
2.6	2	Ext.	●	□	●	MZE0260SA	16	16	55	2.6
	3	Ext.	●	□	●	MZE0260MA	20	20	55	2.6
	3	Int.	●	□	●	MZS0260MB	24	24	72	3.0
	5	Int.	●	□	●	MZS0260LB	33	33	81	3.0
	12	Int.	□	□	□	MZS0260XB	45	45	81	3.0
2.7	2	Ext.	●	□	●	MZE0270SA	16	16	55	2.7
	3	Ext.	●	□	●	MZE0270MA	20	20	55	2.7
	3	Int.	●	□	●	MZS0270MB	24	24	72	3.0
	5	Int.	●	□	●	MZS0270LB	33	33	81	3.0
	12	Int.	□	□	□	MZS0270XB	45	45	81	3.0
2.8	2	Ext.	●	□	●	MZE0280SA	16	16	55	2.8
	3	Ext.	●	□	●	MZE0280MA	21	21	60	2.8
	3	Int.	●	□	●	MZS0280MB	24	24	72	3.0
	5	Int.	●	□	●	MZS0280LB	33	33	81	3.0
	12	Int.	□	□	□	MZS0280XB	45	45	81	3.0
2.9	2	Ext.	●	□	●	MZE0290SA	16	16	55	2.9
	3	Ext.	●	□	●	MZE0290MA	21	21	60	2.9
	3	Int.	●	□	●	MZS0290MB	24	24	72	3.0
	5	Int.	●	□	●	MZS0290LB	33	33	81	3.0
	12	Int.	□	□	□	MZS0290XB	45	45	81	3.0
3.0	2	Ext.	●	□	●	MZE0300SA	16	16	55	3.0
	3	Ext.	●	□	●	MZE0300MA	21	21	60	3.0
	3	Int.	●	□	●	MZS0300MB	24	24	72	3.0
	5	Int.	●	□	●	MZS0300LB	33	33	81	3.0
	3.1	2	Ext.	●	□	●	MZE0310SA	18	18	55
3		Ext.	●	□	●	MZE0310MA	24	24	60	3.1
3		Int.	●	□	●	MZS0310MB	28	28	76	4.0
5		Int.	●	□	●	MZS0310LB	39	39	87	4.0
3.2		2	Ext.	●	□	●	MZE0320SA	18	18	55
	3	Ext.	●	□	●	MZE0320MA	24	24	60	3.2
	3	Int.	●	□	●	MZS0320MB	28	28	76	4.0
	5	Int.	●	□	●	MZS0320LB	39	39	87	4.0
	3.3	2	Ext.	●	□	●	MZE0330SA	18	18	55
3		Ext.	●	□	●	MZE0330MA	24	24	60	3.3
3		Int.	●	□	●	MZS0330MB	28	28	76	4.0
5		Int.	●	□	●	MZS0330LB	39	39	87	4.0
3.4		2	Ext.	●	□	●	MZE0340SA	20	20	55
	3	Ext.	●	□	●	MZE0340MA	24	24	60	3.4
	3	Int.	●	□	●	MZS0340MB	28	28	76	4.0
	5	Int.	●	□	●	MZS0340LB	39	39	87	4.0
	3.5	2	Ext.	●	□	●	MZE0350SA	20	20	55
3		Ext.	●	□	●	MZE0350MA	24	24	60	3.5
3		Int.	●	□	●	MZS0350MB	28	28	76	4.0
5		Int.	●	□	●	MZS0350LB	39	39	87	4.0
3.6		2	Ext.	●	□	●	MZE0360SA	20	20	55
	3	Ext.	●	□	●	MZE0360MA	27	27	60	3.6
	3	Int.	●	□	●	MZS0360MB	32	32	80	4.0
	5	Int.	●	□	●	MZS0360LB	44	44	92	4.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	NEW		L3	L2	L1	D4
			VP15TF	GP20M						
3.7	2	Ext.	●	□	●	MZE0370SA	20	20	55	3.7
	3	Ext.	●	□	●	MZE0370MA	27	27	60	3.7
	3	Int.	●	□	●	MZS0370MB	32	32	80	4.0
	5	Int.	●	□	●	MZS0370LB	44	44	92	4.0
	3.8	2	Ext.	●	□	●	MZE0380SA	22	22	55
3		Ext.	●	□	●	MZE0380MA	27	27	60	3.8
3		Int.	●	□	●	MZS0380MB	32	32	80	4.0
5		Int.	●	□	●	MZS0380LB	44	44	92	4.0
3.9		2	Ext.	●	□	●	MZE0390SA	22	22	55
	3	Ext.	●	□	●	MZE0390MA	27	27	60	3.9
	3	Int.	●	□	●	MZS0390MB	32	32	80	4.0
	5	Int.	●	□	●	MZS0390LB	44	44	92	4.0
	4.0	2	Ext.	●	□	●	MZE0400SA	22	22	55
3		Ext.	●	□	●	MZE0400MA	27	27	60	4.0
3		Int.	●	□	●	MZS0400MB	32	32	80	4.0
5		Int.	●	□	●	MZS0400LB	44	44	92	4.0
4.1		2	Ext.	●	□	●	MZE0410SA	22	22	55
	3	Ext.	●	□	●	MZE0410MA	29	29	63	4.1
	3	Int.	●	□	●	MZS0410MB	36	36	86	5.0
	5	Int.	●	□	●	MZS0410LB	50	50	100	5.0
	4.2	2	Ext.	●	□	●	MZE0420SA	22	22	55
3		Ext.	●	□	●	MZE0420MA	29	29	63	4.2
3		Int.	●	□	●	MZS0420MB	36	36	86	5.0
5		Int.	●	□	●	MZS0420LB	50	50	100	5.0
4.3		2	Ext.	●	□	●	MZE0430SA	24	24	58
	3	Ext.	●	□	●	MZE0430MA	29	29	63	4.3
	3	Int.	●	□	●	MZS0430MB	36	36	86	5.0
	5	Int.	●	□	●	MZS0430LB	50	50	100	5.0
	4.4	2	Ext.	●	□	●	MZE0440SA	24	24	58
3		Ext.	●	□	●	MZE0440MA	29	29	63	4.4
3		Int.	●	□	●	MZS0440MB	36	36	86	5.0
5		Int.	●	□	●	MZS0440LB	50	50	100	5.0
4.5		2	Ext.	●	□	●	MZE0450SA	24	24	58
	3	Ext.	●	□	●	MZE0450MA	29	29	63	4.5
	3	Int.	●	□	●	MZS0450MB	36	36	86	5.0
	5	Int.	●	□	●	MZS0450LB	50	50	100	5.0
	4.6	2	Ext.	●	□	●	MZE0460SA	24	24	58
3		Ext.	●	□	●	MZE0460MA	32	32	68	4.6
3		Int.	●	□	●	MZS0460MB	40	40	90	5.0
5		Int.	●	□	●	MZS0460LB	55	55	105	5.0
4.7		2	Ext.	●	□	●	MZE0470SA	24	24	58
	3	Ext.	●	□	●	MZE0470MA	32	32	68	4.7
	3	Int.	●	□	●	MZS0470MB	40	40	90	5.0
	5	Int.	●	□	●	MZS0470LB	55	55	105	5.0
	4.8	2	Ext.	●	□	●	MZE0480SA	26	26	62
3		Ext.	●	□	●	MZE0480MA	32	32	68	4.8
3		Int.	●	□	●	MZS0480MB	40	40	90	5.0
5		Int.	●	□	●	MZS0480LB	55	55	105	5.0

# MIRACLE<sup>®</sup> ZET1 Drill

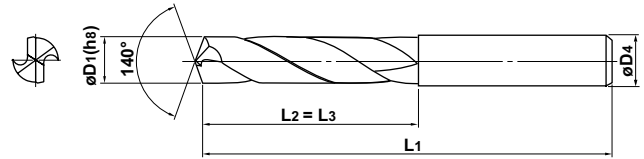
## MZE (External coolant)



VP15TF (Straight)

VP15TF (Straight)

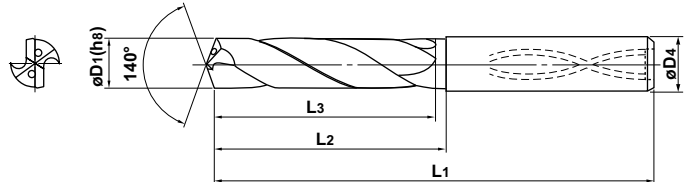
D1(h8)	D1≤3.0	3.0<D1≤6.0	6.0<D1≤10.0	10.0<D1≤18.0	18.0<D1≤30.0
Tolerance	0 -0.014	0 -0.018	0 -0.022	0 -0.027	0 -0.033



## MZS (Internal coolant)



VP15TF (Straight)



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

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	NEW		L3	L2	L1	D4
4.9	2	Ext.	●	□	●	MZE0490SA	26	26	62	4.9
	3	Ext.	●	□	●	MZE0490MA	32	32	68	4.9
	3	Int.	●	□		MZS0490MB	40	40	90	5.0
	5	Int.	●	□		MZS0490LB	55	55	105	5.0
5.0	2	Ext.	●	□	●	MZE0500SA	26	26	62	5.0
	3	Ext.	●	□	●	MZE0500MA	32	32	68	5.0
	3	Int.	●	□		MZS0500MB	27.5	30	82	6.0
	5	Int.	●	□		MZS0500LB	44	48	100	6.0
5.1	2	Ext.	●	□	●	MZE0510SA	26	26	62	5.1
	3	Ext.	●	□	●	MZE0510MA	34	34	72	5.1
	3	Int.	●	□		MZS0510MB	27.5	30	82	6.0
	5	Int.	●	□		MZS0510LB	44	48	100	6.0
5.2	2	Ext.	●	□	●	MZE0520SA	26	26	62	5.2
	3	Ext.	●	□	●	MZE0520MA	34	34	72	5.2
	3	Int.	●	□		MZS0520MB	27.5	30	82	6.0
	5	Int.	●	□		MZS0520LB	44	48	100	6.0
5.3	2	Ext.	●	□	●	MZE0530SA	26	26	62	5.3
	3	Ext.	●	□	●	MZE0530MA	34	34	72	5.3
	3	Int.	●	□		MZS0530MB	27.5	30	82	6.0
	5	Int.	●	□		MZS0530LB	44	48	100	6.0
5.4	2	Ext.	●	□	●	MZE0540SA	28	28	66	5.4
	3	Ext.	●	□	●	MZE0540MA	34	34	72	5.4
	3	Int.	●	□		MZS0540MB	27.5	30	82	6.0
	5	Int.	●	□		MZS0540LB	44	48	100	6.0
5.5	2	Ext.	●	□	●	MZE0550SA	28	28	66	5.5
	3	Ext.	●	□	●	MZE0550MA	34	34	72	5.5
	3	Int.	●	□		MZS0550MB	27.5	30	82	6.0
	5	Int.	●	□		MZS0550LB	44	48	100	6.0
5.6	2	Ext.	●	□	●	MZE0560SA	28	28	66	5.6
	3	Ext.	●	□	●	MZE0560MA	36	36	74	5.6
	3	Int.	●	□		MZS0560MB	30	30	82	6.0
	5	Int.	●	□		MZS0560LB	48	48	100	6.0
5.7	2	Ext.	●	□	●	MZE0570SA	28	28	66	5.7
	3	Ext.	●	□	●	MZE0570MA	36	36	74	5.7
	3	Int.	●	□		MZS0570MB	30	30	82	6.0
	5	Int.	●	□		MZS0570LB	48	48	100	6.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	NEW		L3	L2	L1	D4
5.8	2	Ext.	●	□	●	MZE0580SA	28	28	66	5.8
	3	Ext.	●	□	●	MZE0580MA	36	36	74	5.8
	3	Int.	●	□		MZS0580MB	30	30	82	6.0
	5	Int.	●	□		MZS0580LB	48	48	100	6.0
5.9	2	Ext.	●	□	●	MZE0590SA	28	28	66	5.9
	3	Ext.	●	□	●	MZE0590MA	36	36	74	5.9
	3	Int.	●	□		MZS0590MB	30	30	82	6.0
	5	Int.	●	□		MZS0590LB	48	48	100	6.0
6.0	2	Ext.	●	□	●	MZE0600SA	28	28	66	6.0
	3	Ext.	●	□	●	MZE0600MA	41	41	81	6.0
	3	Int.	●	□		MZS0600MB	30	30	82	6.0
	5	Int.	●	□		MZS0600LB	48	48	100	6.0
6.1	2	Ext.	●	□	●	MZE0610SA	31	31	70	6.1
	3	Ext.	●	□	●	MZE0610MA	41	41	81	6.1
	3	Int.	●	□		MZS0610MB	32.5	35	88	7.0
	5	Int.	●	□		MZS0610LB	52	56	109	7.0
6.2	2	Ext.	●	□	●	MZE0620SA	31	31	70	6.2
	3	Ext.	●	□	●	MZE0620MA	41	41	81	6.2
	3	Int.	●	□		MZS0620MB	32.5	35	88	7.0
	5	Int.	●	□		MZS0620LB	52	56	109	7.0
6.3	2	Ext.	●	□	●	MZE0630SA	31	31	70	6.3
	3	Ext.	●	□	●	MZE0630MA	41	41	81	6.3
	3	Int.	●	□		MZS0630MB	32.5	35	88	7.0
	5	Int.	●	□		MZS0630LB	52	56	109	7.0
6.4	2	Ext.	●	□	●	MZE0640SA	31	31	70	6.4
	3	Ext.	●	□	●	MZE0640MA	41	41	81	6.4
	3	Int.	●	□		MZS0640MB	32.5	35	88	7.0
	5	Int.	●	□		MZS0640LB	52	56	109	7.0
6.5	2	Ext.	●	□	●	MZE0650SA	31	31	70	6.5
	3	Ext.	●	□	●	MZE0650MA	41	41	81	6.5
	3	Int.	●	□		MZS0650MB	32.5	35	88	7.0
	5	Int.	●	□		MZS0650LB	52	56	109	7.0
6.6	2	Ext.	●	□	●	MZE0660SA	31	31	70	6.6
	3	Ext.	●	□	●	MZE0660MA	43	43	83	6.6
	3	Int.	●	□		MZS0660MB	35	35	88	7.0
	5	Int.	●	□		MZS0660LB	56	56	109	7.0

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

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	NEW		L3	L2	L1	D4
6.7	2	Ext.	●	□	●	MZE0670SA	31	31	70	6.7
	3	Ext.	●	□	●	MZE0670MA	43	43	83	6.7
	3	Int.	●	□		MZS0670MB	35	35	88	7.0
	5	Int.	●	□		MZS0670LB	56	56	109	7.0
6.8	2	Ext.	●	□	●	MZE0680SA	34	34	74	6.8
	3	Ext.	●	□	●	MZE0680MA	43	43	83	6.8
	3	Int.	●	□		MZS0680MB	35	35	88	7.0
	5	Int.	●	□		MZS0680LB	56	56	109	7.0
6.9	2	Ext.	●	□	●	MZE0690SA	34	34	74	6.9
	3	Ext.	●	□	●	MZE0690MA	43	43	83	6.9
	3	Int.	●	□		MZS0690MB	35	35	88	7.0
	5	Int.	●	□		MZS0690LB	56	56	109	7.0
7.0	2	Ext.	●	□	●	MZE0700SA	34	34	74	7.0
	3	Ext.	●	□	●	MZE0700MA	43	43	83	7.0
	3	Int.	●	□		MZS0700MB	35	35	88	7.0
	5	Int.	●	□		MZS0700LB	56	56	109	7.0
7.1	2	Ext.	●	□	●	MZE0710SA	34	34	74	7.1
	3	Ext.	●	□	●	MZE0710MA	45	45	87	7.1
	3	Int.	●	□		MZS0710MB	37.5	40	94	8.0
	5	Int.	●	□		MZS0710LB	60	64	118	8.0
7.2	2	Ext.	●	□	●	MZE0720SA	34	34	74	7.2
	3	Ext.	●	□	●	MZE0720MA	45	45	87	7.2
	3	Int.	●	□		MZS0720MB	37.5	40	94	8.0
	5	Int.	●	□		MZS0720LB	60	64	118	8.0
7.3	2	Ext.	●	□	●	MZE0730SA	34	34	74	7.3
	3	Ext.	●	□	●	MZE0730MA	45	45	87	7.3
	3	Int.	●	□		MZS0730MB	37.5	40	94	8.0
	5	Int.	●	□		MZS0730LB	60	64	118	8.0
7.4	2	Ext.	●	□	●	MZE0740SA	34	34	74	7.4
	3	Ext.	●	□	●	MZE0740MA	45	45	87	7.4
	3	Int.	●	□		MZS0740MB	37.5	40	94	8.0
	5	Int.	●	□		MZS0740LB	60	64	118	8.0
7.5	2	Ext.	●	□	●	MZE0750SA	34	34	74	7.5
	3	Ext.	●	□	●	MZE0750MA	45	45	87	7.5
	3	Int.	●	□		MZS0750MB	37.5	40	94	8.0
	5	Int.	●	□		MZS0750LB	60	64	118	8.0
7.6	2	Ext.	●	□	●	MZE0760SA	37	37	79	7.6
	3	Ext.	●	□	●	MZE0760MA	48	48	90	7.6
	3	Int.	●	□		MZS0760MB	40	40	94	8.0
	5	Int.	●	□		MZS0760LB	64	64	118	8.0
7.7	2	Ext.	●	□	●	MZE0770SA	37	37	79	7.7
	3	Ext.	●	□	●	MZE0770MA	48	48	90	7.7
	3	Int.	●	□		MZS0770MB	40	40	94	8.0
	5	Int.	●	□		MZS0770LB	64	64	118	8.0
7.8	2	Ext.	●	□	●	MZE0780SA	37	37	79	7.8
	3	Ext.	●	□	●	MZE0780MA	48	48	90	7.8
	3	Int.	●	□		MZS0780MB	40	40	94	8.0
	5	Int.	●	□		MZS0780LB	64	64	118	8.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	NEW		L3	L2	L1	D4
7.9	2	Ext.	●	□	●	MZE0790SA	37	37	79	7.9
	3	Ext.	●	□	●	MZE0790MA	48	48	90	7.9
	3	Int.	●	□		MZS0790MB	40	40	94	8.0
	5	Int.	●	□		MZS0790LB	64	64	118	8.0
8.0	2	Ext.	●	□	●	MZE0800SA	37	37	79	8.0
	3	Ext.	●	□	●	MZE0800MA	48	48	90	8.0
	3	Int.	●	□		MZS0800MB	40	40	94	8.0
	5	Int.	●	□		MZS0800LB	64	64	118	8.0
8.1	2	Ext.	●	□	●	MZE0810SA	37	37	79	8.1
	3	Ext.	●	□	●	MZE0810MA	53	53	96	8.1
	3	Int.	●	□		MZS0810MB	42.5	45	100	9.0
	5	Int.	●	□		MZS0810LB	68	72	127	9.0
8.2	2	Ext.	●	□	●	MZE0820SA	37	37	79	8.2
	3	Ext.	●	□	●	MZE0820MA	53	53	96	8.2
	3	Int.	●	□		MZS0820MB	42.5	45	100	9.0
	5	Int.	●	□		MZS0820LB	68	72	127	9.0
8.3	2	Ext.	●	□	●	MZE0830SA	37	37	79	8.3
	3	Ext.	●	□	●	MZE0830MA	53	53	96	8.3
	3	Int.	●	□		MZS0830MB	42.5	45	100	9.0
	5	Int.	●	□		MZS0830LB	68	72	127	9.0
8.4	2	Ext.	●	□	●	MZE0840SA	37	37	79	8.4
	3	Ext.	●	□	●	MZE0840MA	53	53	96	8.4
	3	Int.	●	□		MZS0840MB	42.5	45	100	9.0
	5	Int.	●	□		MZS0840LB	68	72	127	9.0
8.5	2	Ext.	●	□	●	MZE0850SA	37	37	79	8.5
	3	Ext.	●	□	●	MZE0850MA	53	53	96	8.5
	3	Int.	●	□		MZS0850MB	42.5	45	100	9.0
	5	Int.	●	□		MZS0850LB	68	72	127	9.0
8.6	2	Ext.	●	□	●	MZE0860SA	40	40	84	8.6
	3	Ext.	●	□	●	MZE0860MA	55	55	98	8.6
	3	Int.	●	□		MZS0860MB	45	45	100	9.0
	5	Int.	●	□		MZS0860LB	72	72	127	9.0
8.7	2	Ext.	●	□	●	MZE0870SA	40	40	84	8.7
	3	Ext.	●	□	●	MZE0870MA	55	55	98	8.7
	3	Int.	●	□		MZS0870MB	45	45	100	9.0
	5	Int.	●	□		MZS0870LB	72	72	127	9.0
8.8	2	Ext.	●	□	●	MZE0880SA	40	40	84	8.8
	3	Ext.	●	□	●	MZE0880MA	55	55	98	8.8
	3	Int.	●	□		MZS0880MB	45	45	100	9.0
	5	Int.	●	□		MZS0880LB	72	72	127	9.0
8.9	2	Ext.	●	□	●	MZE0890SA	40	40	84	8.9
	3	Ext.	●	□	●	MZE0890MA	55	55	98	8.9
	3	Int.	●	□		MZS0890MB	45	45	100	9.0
	5	Int.	●	□		MZS0890LB	72	72	127	9.0
9.0	2	Ext.	●	□	●	MZE0900SA	40	40	84	9.0
	3	Ext.	●	□	●	MZE0900MA	55	55	98	9.0
	3	Int.	●	□		MZS0900MB	45	45	100	9.0
	5	Int.	●	□		MZS0900LB	72	72	127	9.0

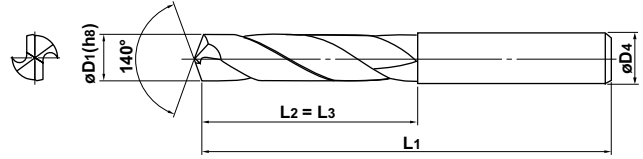
# MIRACLE<sup>®</sup> ZET1 Drill

## MZE (External coolant)



VP15TF (Straight)

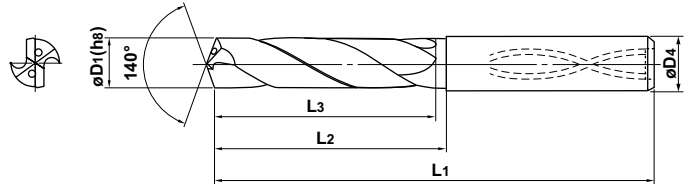
D <sub>1</sub> (h8)	D <sub>1</sub> ≤3.0	3.0<D <sub>1</sub> ≤6.0	6.0<D <sub>1</sub> ≤10.0	10.0<D <sub>1</sub> ≤18.0	18.0<D <sub>1</sub> ≤30.0
Tolerance	0 -0.014	0 -0.018	0 -0.022	0 -0.027	0 -0.033



## MZS (Internal coolant)



VP15TF (Straight)



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

Drill Dia. D <sub>1</sub> (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	NEW		L <sub>3</sub>	L <sub>2</sub>	L <sub>1</sub>	D <sub>4</sub>
9.1	2	Ext.	●	□	●	MZE0910SA	40	40	84	9.1
	3	Ext.	●	□	●	MZE0910MA	58	58	102	9.1
	3	Int.	●	□	□	MZS0910MB	47.5	50	106	10.0
	5	Int.	●	□	□	MZS0910LB	76	80	136	10.0
9.2	2	Ext.	●	□	●	MZE0920SA	40	40	84	9.2
	3	Ext.	●	□	●	MZE0920MA	58	58	102	9.2
	3	Int.	●	□	□	MZS0920MB	47.5	50	106	10.0
	5	Int.	●	□	□	MZS0920LB	76	80	136	10.0
9.3	2	Ext.	●	□	●	MZE0930SA	40	40	84	9.3
	3	Ext.	●	□	●	MZE0930MA	58	58	102	9.3
	3	Int.	●	□	□	MZS0930MB	47.5	50	106	10.0
	5	Int.	●	□	□	MZS0930LB	76	80	136	10.0
9.4	2	Ext.	●	□	●	MZE0940SA	40	40	84	9.4
	3	Ext.	●	□	●	MZE0940MA	58	58	102	9.4
	3	Int.	●	□	□	MZS0940MB	47.5	50	106	10.0
	5	Int.	●	□	□	MZS0940LB	76	80	136	10.0
9.5	2	Ext.	●	□	●	MZE0950SA	40	40	84	9.5
	3	Ext.	●	□	●	MZE0950MA	58	58	102	9.5
	3	Int.	●	□	□	MZS0950MB	47.5	50	106	10.0
	5	Int.	●	□	□	MZS0950LB	76	80	136	10.0
9.6	2	Ext.	●	□	●	MZE0960SA	43	43	89	9.6
	3	Ext.	●	□	●	MZE0960MA	60	60	105	9.6
	3	Int.	●	□	□	MZS0960MB	50	50	106	10.0
	5	Int.	●	□	□	MZS0960LB	80	80	136	10.0
9.7	2	Ext.	●	□	●	MZE0970SA	43	43	89	9.7
	3	Ext.	●	□	●	MZE0970MA	60	60	105	9.7
	3	Int.	●	□	□	MZS0970MB	50	50	106	10.0
	5	Int.	●	□	□	MZS0970LB	80	80	136	10.0
9.8	2	Ext.	●	□	●	MZE0980SA	43	43	89	9.8
	3	Ext.	●	□	●	MZE0980MA	60	60	105	9.8
	3	Int.	●	□	□	MZS0980MB	50	50	106	10.0
	5	Int.	●	□	□	MZS0980LB	80	80	136	10.0
9.9	2	Ext.	●	□	●	MZE0990SA	43	43	89	9.9
	3	Ext.	●	□	●	MZE0990MA	60	60	105	9.9
	3	Int.	●	□	□	MZS0990MB	50	50	106	10.0
	5	Int.	●	□	□	MZS0990LB	80	80	136	10.0

Drill Dia. D <sub>1</sub> (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	NEW		L <sub>3</sub>	L <sub>2</sub>	L <sub>1</sub>	D <sub>4</sub>
10.0	2	Ext.	●	□	●	MZE1000SA	43	43	89	10.0
	3	Ext.	●	□	●	MZE1000MA	60	60	105	10.0
	3	Int.	●	□	□	MZS1000MB	50	50	106	10.0
	5	Int.	●	□	□	MZS1000LB	80	80	136	10.0
10.1	2	Ext.	●	□	●	MZE1010SA	43	43	89	10.1
	3	Ext.	●	□	●	MZE1010MA	66	66	112	10.1
	3	Int.	●	□	□	MZS1010MB	52.5	55	116	11.0
	5	Int.	●	□	□	MZS1010LB	84	88	149	11.0
10.2	2	Ext.	●	□	●	MZE1020SA	43	43	89	10.2
	3	Ext.	●	□	●	MZE1020MA	66	66	112	10.2
	3	Int.	●	□	□	MZS1020MB	52.5	55	116	11.0
	5	Int.	●	□	□	MZS1020LB	84	88	149	11.0
10.3	2	Ext.	●	□	●	MZE1030SA	43	43	89	10.3
	3	Ext.	●	□	●	MZE1030MA	66	66	112	10.3
	3	Int.	●	□	□	MZS1030MB	52.5	55	116	11.0
	5	Int.	●	□	□	MZS1030LB	84	88	149	11.0
10.4	2	Ext.	●	□	●	MZE1040SA	43	43	89	10.4
	3	Ext.	●	□	●	MZE1040MA	66	66	112	10.4
	3	Int.	●	□	□	MZS1040MB	52.5	55	116	11.0
	5	Int.	●	□	□	MZS1040LB	84	88	149	11.0
10.5	2	Ext.	●	□	●	MZE1050SA	43	43	89	10.5
	3	Ext.	●	□	●	MZE1050MA	66	66	112	10.5
	3	Int.	●	□	□	MZS1050MB	52.5	55	116	11.0
	5	Int.	●	□	□	MZS1050LB	84	88	149	11.0
10.6	2	Ext.	●	□	●	MZE1060SA	43	43	89	10.6
	3	Ext.	●	□	●	MZE1060MA	68	68	114	10.6
	3	Int.	●	□	□	MZS1060MB	55	55	116	11.0
	5	Int.	●	□	□	MZS1060LB	88	88	149	11.0
10.7	2	Ext.	●	□	●	MZE1070SA	47	47	95	10.7
	3	Ext.	●	□	●	MZE1070MA	68	68	114	10.7
	3	Int.	●	□	□	MZS1070MB	55	55	116	11.0
	5	Int.	●	□	□	MZS1070LB	88	88	149	11.0
10.8	2	Ext.	●	□	●	MZE1080SA	47	47	95	10.8
	3	Ext.	●	□	●	MZE1080MA	68	68	114	10.8
	3	Int.	●	□	□	MZS1080MB	55	55	116	11.0
	5	Int.	●	□	□	MZS1080LB	88	88	149	11.0

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

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	NEW		L3	L2	L1	D4
10.9	2	Ext.	●	□	●	MZE1090SA	47	47	95	10.9
	3	Ext.	●	□	●	MZE1090MA	68	68	114	10.9
	3	Int.	●	□	●	MZS1090MB	55	55	116	11.0
	5	Int.	●	□	●	MZS1090LB	88	88	149	11.0
11.0	2	Ext.	●	□	●	MZE1100SA	47	47	95	11.0
	3	Ext.	●	□	●	MZE1100MA	68	68	114	11.0
	3	Int.	●	□	●	MZS1100MB	55	55	116	11.0
	5	Int.	●	□	●	MZS1100LB	88	88	149	11.0
11.1	2	Ext.	●	□	●	MZE1110SA	47	47	95	11.1
	3	Ext.	●	□	●	MZE1110MA	71	71	118	11.1
	3	Int.	●	□	●	MZS1110MB	57.5	60	122	12.0
	5	Int.	●	□	●	MZS1110LB	92	96	158	12.0
11.2	2	Ext.	●	□	●	MZE1120SA	47	47	95	11.2
	3	Ext.	●	□	●	MZE1120MA	71	71	118	11.2
	3	Int.	●	□	●	MZS1120MB	57.5	60	122	12.0
	5	Int.	●	□	●	MZS1120LB	92	96	158	12.0
11.3	2	Ext.	●	□	●	MZE1130SA	47	47	95	11.3
	3	Ext.	●	□	●	MZE1130MA	71	71	118	11.3
	3	Int.	●	□	●	MZS1130MB	57.5	60	122	12.0
	5	Int.	●	□	●	MZS1130LB	92	96	158	12.0
11.4	2	Ext.	●	□	●	MZE1140SA	47	47	95	11.4
	3	Ext.	●	□	●	MZE1140MA	71	71	118	11.4
	3	Int.	●	□	●	MZS1140MB	57.5	60	122	12.0
	5	Int.	●	□	●	MZS1140LB	92	96	158	12.0
11.5	2	Ext.	●	□	●	MZE1150SA	47	47	95	11.5
	3	Ext.	●	□	●	MZE1150MA	71	71	118	11.5
	3	Int.	●	□	●	MZS1150MB	57.5	60	122	12.0
	5	Int.	●	□	●	MZS1150LB	92	96	158	12.0
11.6	2	Ext.	●	□	●	MZE1160SA	47	47	95	11.6
	3	Ext.	●	□	●	MZE1160MA	73	73	121	11.6
	3	Int.	●	□	●	MZS1160MB	60	60	122	12.0
	5	Int.	●	□	●	MZS1160LB	96	96	158	12.0
11.7	2	Ext.	●	□	●	MZE1170SA	47	47	95	11.7
	3	Ext.	●	□	●	MZE1170MA	73	73	121	11.7
	3	Int.	●	□	●	MZS1170MB	60	60	122	12.0
	5	Int.	●	□	●	MZS1170LB	96	96	158	12.0
11.8	2	Ext.	●	□	●	MZE1180SA	47	47	95	11.8
	3	Ext.	●	□	●	MZE1180MA	73	73	121	11.8
	3	Int.	●	□	●	MZS1180MB	60	60	122	12.0
	5	Int.	●	□	●	MZS1180LB	96	96	158	12.0
11.9	2	Ext.	●	□	●	MZE1190SA	51	51	102	11.9
	3	Ext.	●	□	●	MZE1190MA	73	73	121	11.9
	3	Int.	●	□	●	MZS1190MB	60	60	122	12.0
	5	Int.	●	□	●	MZS1190LB	96	96	158	12.0
12.0	2	Ext.	●	□	●	MZE1200SA	51	51	102	12.0
	3	Ext.	●	□	●	MZE1200MA	73	73	121	12.0
	3	Int.	●	□	●	MZS1200MB	60	60	122	12.0
	5	Int.	●	□	●	MZS1200LB	96	96	158	12.0

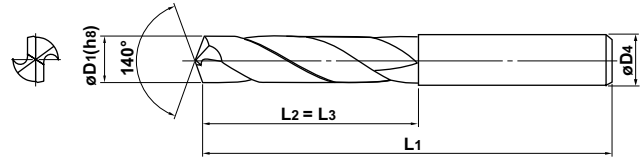
Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	NEW		L3	L2	L1	D4
12.1	2	Ext.	●	□	●	MZE1210SA	51	51	102	12.1
	3	Ext.	●	□	●	MZE1210MA	76	76	135	12.1
	3	Int.	●	□	●	MZS1210MB	62.5	65	128	13.0
	5	Int.	●	□	●	MZS1210LB	100	104	167	13.0
12.2	2	Ext.	●	□	●	MZE1220SA	51	51	102	12.2
	3	Ext.	●	□	●	MZE1220MA	76	76	135	12.2
	3	Int.	●	□	●	MZS1220MB	62.5	65	128	13.0
	5	Int.	●	□	●	MZS1220LB	100	104	167	13.0
12.3	2	Ext.	●	□	●	MZE1230SA	51	51	102	12.3
	3	Ext.	●	□	●	MZE1230MA	76	76	135	12.3
	3	Int.	●	□	●	MZS1230MB	62.5	65	128	13.0
	5	Int.	●	□	●	MZS1230LB	100	104	167	13.0
12.4	2	Ext.	●	□	●	MZE1240SA	51	51	102	12.4
	3	Ext.	●	□	●	MZE1240MA	76	76	135	12.4
	3	Int.	●	□	●	MZS1240MB	62.5	65	128	13.0
	5	Int.	●	□	●	MZS1240LB	100	104	167	13.0
12.5	2	Ext.	●	□	●	MZE1250SA	51	51	102	12.5
	3	Ext.	●	□	●	MZE1250MA	76	76	135	12.5
	3	Int.	●	□	●	MZS1250MB	62.5	65	128	13.0
	5	Int.	●	□	●	MZS1250LB	100	104	167	13.0
12.6	2	Ext.	●	□	●	MZE1260SA	51	51	102	12.6
	3	Ext.	●	□	●	MZE1260MA	78	78	137	12.6
	3	Int.	●	□	●	MZS1260MB	65	65	128	13.0
	5	Int.	●	□	●	MZS1260LB	104	104	167	13.0
12.7	2	Ext.	●	□	●	MZE1270SA	51	51	102	12.7
	3	Ext.	●	□	●	MZE1270MA	78	78	137	12.7
	3	Int.	●	□	●	MZS1270MB	65	65	128	13.0
	5	Int.	●	□	●	MZS1270LB	104	104	167	13.0
12.8	2	Ext.	●	□	●	MZE1280SA	51	51	102	12.8
	3	Ext.	●	□	●	MZE1280MA	78	78	137	12.8
	3	Int.	●	□	●	MZS1280MB	65	65	128	13.0
	5	Int.	●	□	●	MZS1280LB	104	104	167	13.0
12.9	2	Ext.	●	□	●	MZE1290SA	51	51	102	12.9
	3	Ext.	●	□	●	MZE1290MA	78	78	137	12.9
	3	Int.	●	□	●	MZS1290MB	65	65	128	13.0
	5	Int.	●	□	●	MZS1290LB	104	104	167	13.0
13.0	2	Ext.	●	□	●	MZE1300SA	51	51	102	13.0
	3	Ext.	●	□	●	MZE1300MA	78	78	137	13.0
	3	Int.	●	□	●	MZS1300MB	65	65	128	13.0
	5	Int.	●	□	●	MZS1300LB	104	104	167	13.0
13.1	2	Ext.	●	□	●	MZE1310SA	51	51	102	13.1
	3	Ext.	●	□	●	MZE1310MA	84	84	144	13.1
	3	Int.	●	□	●	MZS1310MB	67.5	70	134	14.0
	5	Int.	●	□	●	MZS1310LB	108	112	176	14.0
13.2	2	Ext.	●	□	●	MZE1320SA	51	51	102	13.2
	3	Ext.	●	□	●	MZE1320MA	84	84	144	13.2
	3	Int.	●	□	●	MZS1320MB	67.5	70	134	14.0
	5	Int.	●	□	●	MZS1320LB	108	112	176	14.0

## MZE (External coolant)



VP15TF (Straight)

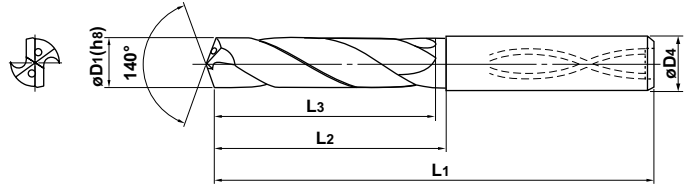
D <sub>1</sub> (h8)	D <sub>1</sub> ≤3.0	3.0<D <sub>1</sub> ≤6.0	6.0<D <sub>1</sub> ≤10.0	10.0<D <sub>1</sub> ≤18.0	18.0<D <sub>1</sub> ≤30.0
Tolerance	0 -0.014	0 -0.018	0 -0.022	0 -0.027	0 -0.033



## MZS (Internal coolant)



VP15TF (Straight)



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

Drill Dia. D <sub>1</sub> (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide			L <sub>3</sub>	L <sub>2</sub>	L <sub>1</sub>	D <sub>4</sub>
				VP15TF	GP20M					
13.3	2	Ext.	●	□	●	MZE1330SA	54	54	107	13.3
	3	Ext.	●	□	●	MZE1330MA	84	84	144	13.3
	3	Int.	●	□	●	MZS1330MB	67.5	70	134	14.0
	5	Int.	●	□	●	MZS1330LB	108	112	176	14.0
13.4	2	Ext.	●	□	●	MZE1340SA	54	54	107	13.4
	3	Ext.	●	□	●	MZE1340MA	84	84	144	13.4
	3	Int.	●	□	●	MZS1340MB	67.5	70	134	14.0
	5	Int.	●	□	●	MZS1340LB	108	112	176	14.0
13.5	2	Ext.	●	□	●	MZE1350SA	54	54	107	13.5
	3	Ext.	●	□	●	MZE1350MA	84	84	144	13.5
	3	Int.	●	□	●	MZS1350MB	67.5	70	134	14.0
	5	Int.	●	□	●	MZS1350LB	108	112	176	14.0
13.6	2	Ext.	●	□	●	MZE1360SA	54	54	107	13.6
	3	Ext.	●	□	●	MZE1360MA	86	86	147	13.6
	3	Int.	●	□	●	MZS1360MB	70	70	134	14.0
	5	Int.	●	□	●	MZS1360LB	112	112	176	14.0
13.7	2	Ext.	●	□	●	MZE1370SA	54	54	107	13.7
	3	Ext.	●	□	●	MZE1370MA	86	86	147	13.7
	3	Int.	●	□	●	MZS1370MB	70	70	134	14.0
	5	Int.	●	□	●	MZS1370LB	112	112	176	14.0
13.8	2	Ext.	●	□	●	MZE1380SA	54	54	107	13.8
	3	Ext.	●	□	●	MZE1380MA	86	86	147	13.8
	3	Int.	●	□	●	MZS1380MB	70	70	134	14.0
	5	Int.	●	□	●	MZS1380LB	112	112	176	14.0
13.9	2	Ext.	●	□	●	MZE1390SA	54	54	107	13.9
	3	Ext.	●	□	●	MZE1390MA	86	86	147	13.9
	3	Int.	●	□	●	MZS1390MB	70	70	134	14.0
	5	Int.	●	□	●	MZS1390LB	112	112	176	14.0
14.0	2	Ext.	●	□	●	MZE1400SA	54	54	107	14.0
	3	Ext.	●	□	●	MZE1400MA	86	86	147	14.0
	3	Int.	●	□	●	MZS1400MB	70	70	134	14.0
	5	Int.	●	□	●	MZS1400LB	112	112	176	14.0
14.1	2	Ext.	●	□	●	MZE1410SA	56	56	111	14.1
	3	Ext.	●	□	●	MZE1410MA	89	89	151	14.1
	3	Int.	●	□	●	MZS1410MB	72.5	75	140	15.0
	5	Int.	●	□	●	MZS1410LB	116	120	185	15.0

Drill Dia. D <sub>1</sub> (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide			L <sub>3</sub>	L <sub>2</sub>	L <sub>1</sub>	D <sub>4</sub>
				VP15TF	GP20M					
14.2	2	Ext.	●	□	●	MZE1420SA	56	56	111	14.2
	3	Ext.	●	□	●	MZE1420MA	89	89	151	14.2
	3	Int.	●	□	●	MZS1420MB	72.5	75	140	15.0
	5	Int.	●	□	●	MZS1420LB	116	120	185	15.0
14.3	2	Ext.	□	□	●	MZE1430SA	56	56	111	14.3
	3	Ext.	●	□	●	MZE1430MA	89	89	151	14.3
	3	Int.	●	□	●	MZS1430MB	72.5	75	140	15.0
	5	Int.	●	□	●	MZS1430LB	116	120	185	15.0
14.4	2	Ext.	□	□	●	MZE1440SA	56	56	111	14.4
	3	Ext.	●	□	●	MZE1440MA	89	89	151	14.4
	3	Int.	●	□	●	MZS1440MB	72.5	75	140	15.0
	5	Int.	●	□	●	MZS1440LB	116	120	185	15.0
14.5	2	Ext.	●	□	●	MZE1450SA	56	56	111	14.5
	3	Ext.	●	□	●	MZE1450MA	89	89	151	14.5
	3	Int.	●	□	●	MZS1450MB	72.5	75	140	15.0
	5	Int.	●	□	●	MZS1450LB	116	120	185	15.0
14.6	2	Ext.	□	□	●	MZE1460SA	56	56	111	14.6
	3	Ext.	●	□	●	MZE1460MA	91	91	153	14.6
	3	Int.	●	□	●	MZS1460MB	75	75	140	15.0
	5	Int.	●	□	●	MZS1460LB	120	120	185	15.0
14.7	2	Ext.	□	□	●	MZE1470SA	56	56	111	14.7
	3	Ext.	●	□	●	MZE1470MA	91	91	153	14.7
	3	Int.	●	□	●	MZS1470MB	75	75	140	15.0
	5	Int.	●	□	●	MZS1470LB	120	120	185	15.0
14.8	2	Ext.	□	□	●	MZE1480SA	56	56	111	14.8
	3	Ext.	●	□	●	MZE1480MA	91	91	153	14.8
	3	Int.	●	□	●	MZS1480MB	75	75	140	15.0
	5	Int.	●	□	●	MZS1480LB	120	120	185	15.0
14.9	2	Ext.	□	□	●	MZE1490SA	56	56	111	14.9
	3	Ext.	●	□	●	MZE1490MA	91	91	153	14.9
	3	Int.	●	□	●	MZS1490MB	75	75	140	15.0
	5	Int.	●	□	●	MZS1490LB	120	120	185	15.0
15.0	2	Ext.	●	□	●	MZE1500SA	56	56	111	15.0
	3	Ext.	●	□	●	MZE1500MA	91	91	153	15.0
	3	Int.	●	□	●	MZS1500MB	75	75	140	15.0
	5	Int.	●	□	●	MZS1500LB	120	120	185	15.0

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

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	Order Number		L3	L2	L1	D4
			VP15TF	GP20M						
15.1	2	Ext.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		MZE1510SA	58	58	115	15.1
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1510MA	94	94	157	15.1
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1510MB	77.5	80	145	16.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1510LB	124	128	193	16.0
15.2	2	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1520SA	58	58	115	15.2
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1520MA	94	94	157	15.2
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1520MB	77.5	80	145	16.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1520LB	124	128	193	16.0
15.3	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1530SA	58	58	115	15.3
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1530MA	94	94	157	15.3
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1530MB	77.5	80	145	16.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1530LB	124	128	193	16.0
15.4	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1540SA	58	58	115	15.4
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1540MA	94	94	157	15.4
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1540MB	77.5	80	145	16.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1540LB	124	128	193	16.0
15.5	2	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1550SA	58	58	115	15.5
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1550MA	94	94	157	15.5
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1550MB	77.5	80	145	16.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1550LB	124	128	193	16.0
15.6	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1560SA	58	58	115	15.6
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1560MA	96	96	160	15.6
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1560MB	80	80	145	16.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1560LB	128	128	193	16.0
15.7	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1570SA	58	58	115	15.7
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1570MA	96	96	160	15.7
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1570MB	80	80	145	16.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1570LB	128	128	193	16.0
15.8	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1580SA	58	58	115	15.8
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1580MA	96	96	160	15.8
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1580MB	80	80	145	16.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1580LB	128	128	193	16.0
15.9	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1590SA	58	58	115	15.9
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1590MA	96	96	160	15.9
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1590MB	80	80	145	16.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1590LB	128	128	193	16.0
16.0	2	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1600SA	58	58	115	16.0
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1600MA	96	96	160	16.0
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1600MB	80	80	145	16.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1600LB	128	128	193	16.0
16.1	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1610SA	60	60	119	16.1
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1610MA	102	102	167	16.1
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1610MB	82.5	85	150	17.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1610LB	132	136	201	17.0
16.2	2	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1620SA	60	60	119	16.2
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1620MA	102	102	167	16.2
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1620MB	82.5	85	150	17.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1620LB	132	136	201	17.0

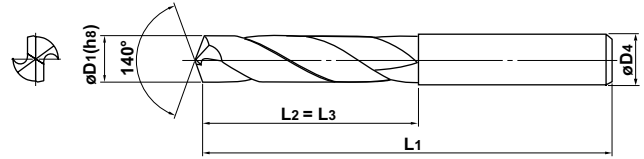
Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide	Order Number		L3	L2	L1	D4
			VP15TF	GP20M						
16.3	2	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1630SA	60	60	119	16.3
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1630MA	102	102	167	16.3
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1630MB	82.5	85	150	17.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1630LB	132	136	201	17.0
16.4	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1640SA	60	60	119	16.4
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1640MA	102	102	167	16.4
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1640MB	82.5	85	150	17.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1640LB	132	136	201	17.0
16.5	2	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1650SA	60	60	119	16.5
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1650MA	102	102	167	16.5
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1650MB	82.5	85	150	17.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1650LB	132	136	201	17.0
16.6	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1660SA	60	60	119	16.6
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1660MA	102	102	167	16.6
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1660MB	85	85	150	17.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1660LB	136	136	201	17.0
16.7	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1670SA	60	60	119	16.7
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1670MA	102	102	167	16.7
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1670MB	85	85	150	17.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1670LB	136	136	201	17.0
16.8	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1680SA	60	60	119	16.8
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1680MA	102	102	167	16.8
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1680MB	85	85	150	17.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1680LB	136	136	201	17.0
16.9	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1690SA	60	60	119	16.9
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1690MA	102	102	167	16.9
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1690MB	85	85	150	17.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1690LB	136	136	201	17.0
17.0	2	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1700SA	60	60	119	17.0
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	MZE1700MA	102	102	167	17.0
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1700MB	85	85	150	17.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		MZS1700LB	136	136	201	17.0
17.1	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1710SA	62	62	123	17.1
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1710MA	102	102	167	17.1
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1710MB	87.5	90	155	18.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1710LB	140	144	209	18.0
17.2	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1720SA	62	62	123	17.2
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1720MA	102	102	167	17.2
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1720MB	87.5	90	155	18.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1720LB	140	144	209	18.0
17.3	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1730SA	62	62	123	17.3
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1730MA	102	102	167	17.3
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1730MB	87.5	90	155	18.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1730LB	140	144	209	18.0
17.4	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1740SA	62	62	123	17.4
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MZE1740MA	102	102	167	17.4
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1740MB	87.5	90	155	18.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>		MZS1740LB	140	144	209	18.0

# MIRACLE<sup>®</sup> ZET1 Drill

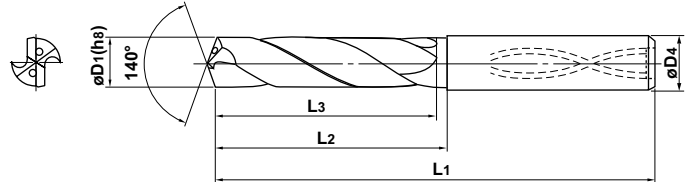
## MZE (External coolant)



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



## MZS (Internal coolant)



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

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide			L3	L2	L1	D4
				VP15TF	GP20M					
17.5	2	Ext.	●	□	●	MZE1750SA	62	62	123	17.5
	3	Ext.	●	●	●	MZE1750MA	102	102	167	17.5
	3	Int.	●	□	□	MZS1750MB	87.5	90	155	18.0
	5	Int.	●	□	□	MZS1750LB	140	144	209	18.0
17.6	2	Ext.	□	□	□	MZE1760SA	62	62	123	17.6
	3	Ext.	□	□	□	MZE1760MA	102	102	167	17.6
	3	Int.	□	□	□	MZS1760MB	90	90	155	18.0
	5	Int.	□	□	□	MZS1760LB	144	144	209	18.0
17.7	2	Ext.	□	□	□	MZE1770SA	62	62	123	17.7
	3	Ext.	□	□	□	MZE1770MA	102	102	167	17.7
	3	Int.	□	□	□	MZS1770MB	90	90	155	18.0
	5	Int.	□	□	□	MZS1770LB	144	144	209	18.0
17.8	2	Ext.	●	□	□	MZE1780SA	62	62	123	17.8
	3	Ext.	□	□	□	MZE1780MA	102	102	167	17.8
	3	Int.	□	□	□	MZS1780MB	90	90	155	18.0
	5	Int.	□	□	□	MZS1780LB	144	144	209	18.0
17.9	2	Ext.	□	□	□	MZE1790SA	62	62	123	17.9
	3	Ext.	□	□	□	MZE1790MA	102	102	167	17.9
	3	Int.	□	□	□	MZS1790MB	90	90	155	18.0
	5	Int.	□	□	□	MZS1790LB	144	144	209	18.0
18.0	2	Ext.	●	□	●	MZE1800SA	62	62	123	18.0
	3	Ext.	●	□	●	MZE1800MA	102	102	167	18.0
	3	Int.	●	□	□	MZS1800MB	90	90	155	18.0
	5	Int.	●	□	□	MZS1800LB	144	144	209	18.0
18.1	2	Ext.	□	□	□	MZE1810SA	64	64	127	18.1
	3	Ext.	□	□	□	MZE1810MA	114	114	179	18.1
	3	Int.	□	□	□	MZS1810MB	92.5	95	160	19.0
	5	Int.	□	□	□	MZS1810LB	148	152	217	19.0
18.2	2	Ext.	□	□	□	MZE1820SA	64	64	127	18.2
	3	Ext.	□	□	□	MZE1820MA	114	114	179	18.2
	3	Int.	□	□	□	MZS1820MB	92.5	95	160	19.0
	5	Int.	□	□	□	MZS1820LB	148	152	217	19.0
18.3	2	Ext.	□	□	□	MZE1830SA	64	64	127	18.3
	3	Ext.	□	□	□	MZE1830MA	114	114	179	18.3
	3	Int.	□	□	□	MZS1830MB	92.5	95	160	19.0
	5	Int.	□	□	□	MZS1830LB	148	152	217	19.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated	Carbide			L3	L2	L1	D4
				VP15TF	GP20M					
18.4	2	Ext.	□	□	□	MZE1840SA	64	64	127	18.4
	3	Ext.	□	□	□	MZE1840MA	114	114	179	18.4
	3	Int.	□	□	□	MZS1840MB	92.5	95	160	19.0
	5	Int.	□	□	□	MZS1840LB	148	152	217	19.0
18.5	2	Ext.	●	□	●	MZE1850SA	64	64	127	18.5
	3	Ext.	●	□	●	MZE1850MA	114	114	179	18.5
	3	Int.	●	□	□	MZS1850MB	92.5	95	160	19.0
	5	Int.	●	□	□	MZS1850LB	148	152	217	19.0
18.6	2	Ext.	□	□	□	MZE1860SA	64	64	127	18.6
	3	Ext.	□	□	□	MZE1860MA	114	114	179	18.6
	3	Int.	□	□	□	MZS1860MB	95	95	160	19.0
	5	Int.	□	□	□	MZS1860LB	152	152	217	19.0
18.7	2	Ext.	□	□	□	MZE1870SA	64	64	127	18.7
	3	Ext.	□	□	□	MZE1870MA	114	114	179	18.7
	3	Int.	□	□	□	MZS1870MB	95	95	160	19.0
	5	Int.	□	□	□	MZS1870LB	152	152	217	19.0
18.8	2	Ext.	□	□	□	MZE1880SA	64	64	127	18.8
	3	Ext.	□	□	□	MZE1880MA	114	114	179	18.8
	3	Int.	□	□	□	MZS1880MB	95	95	160	19.0
	5	Int.	□	□	□	MZS1880LB	152	152	217	19.0
18.9	2	Ext.	□	□	□	MZE1890SA	64	64	127	18.9
	3	Ext.	□	□	□	MZE1890MA	114	114	179	18.9
	3	Int.	□	□	□	MZS1890MB	95	95	160	19.0
	5	Int.	□	□	□	MZS1890LB	152	152	217	19.0
19.0	2	Ext.	●	□	●	MZE1900SA	64	64	127	19.0
	3	Ext.	●	□	●	MZE1900MA	114	114	179	19.0
	3	Int.	●	□	□	MZS1900MB	95	95	160	19.0
	5	Int.	●	□	□	MZS1900LB	152	152	217	19.0
19.1	2	Ext.	□	□	□	MZE1910SA	66	66	131	19.1
	3	Ext.	□	□	□	MZE1910MA	114	114	179	19.1
	3	Int.	□	□	□	MZS1910MB	97.5	100	165	20.0
	5	Int.	□	□	□	MZS1910LB	156	160	225	20.0
19.2	2	Ext.	□	□	□	MZE1920SA	66	66	131	19.2
	3	Ext.	□	□	□	MZE1920MA	114	114	179	19.2
	3	Int.	□	□	□	MZS1920MB	97.5	100	165	20.0
	5	Int.	□	□	□	MZS1920LB	156	160	225	20.0

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

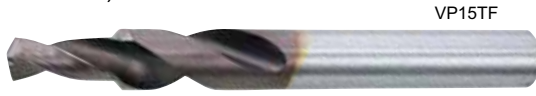
Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated		Carbide		L3	L2	L1	D4
			VP15TF	GP20M	HTT10 <b>NEW</b>					
19.3	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZE1930SA</b>	66	66	131	19.3
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZE1930MA</b>	114	114	179	19.3
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1930MB</b>	97.5	100	165	20.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1930LB</b>	156	160	225	20.0
19.4	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZE1940SA</b>	66	66	131	19.4
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZE1940MA</b>	114	114	179	19.4
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1940MB</b>	97.5	100	165	20.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1940LB</b>	156	160	225	20.0
19.5	2	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>MZE1950SA</b>	66	66	131	19.5
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>MZE1950MA</b>	114	114	179	19.5
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1950MB</b>	97.5	100	165	20.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1950LB</b>	156	160	225	20.0
19.6	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZE1960SA</b>	66	66	131	19.6
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZE1960MA</b>	114	114	179	19.6
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1960MB</b>	100	100	165	20.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1960LB</b>	160	160	225	20.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock			Order Number	Dimensions (mm)			
			Coated		Carbide		L3	L2	L1	D4
			VP15TF	GP20M	HTT10 <b>NEW</b>					
19.7	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZE1970SA</b>	66	66	131	19.7
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZE1970MA</b>	114	114	179	19.7
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1970MB</b>	100	100	165	20.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1970LB</b>	160	160	225	20.0
19.8	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZE1980SA</b>	66	66	131	19.8
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZE1980MA</b>	114	114	179	19.8
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1980MB</b>	100	100	165	20.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1980LB</b>	160	160	225	20.0
19.9	2	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZE1990SA</b>	66	66	131	19.9
	3	Ext.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZE1990MA</b>	114	114	179	19.9
	3	Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1990MB</b>	100	100	165	20.0
	5	Int.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS1990LB</b>	160	160	225	20.0
20.0	2	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>MZE2000SA</b>	66	66	131	20.0
	3	Ext.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>MZE2000MA</b>	114	114	179	20.0
	3	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS2000MB</b>	100	100	165	20.0
	5	Int.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MZS2000LB</b>	160	160	225	20.0

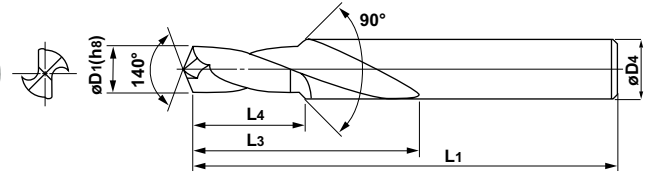
# MIRACLE<sup>®</sup> ZET1 Drill (with chamfer)

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

**MZE** (External coolant)



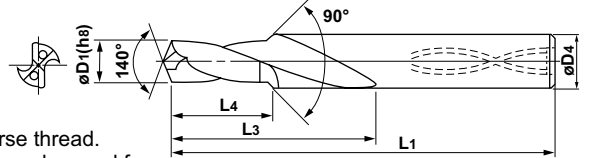
VP15TF



**MZS** (Internal coolant)



VP15TF



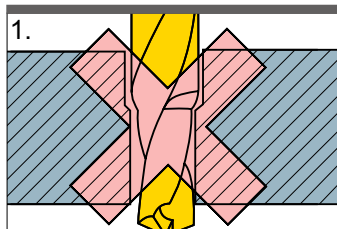
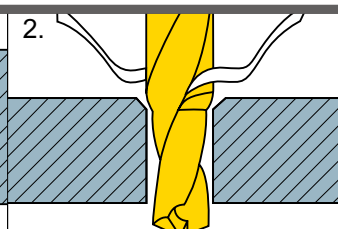
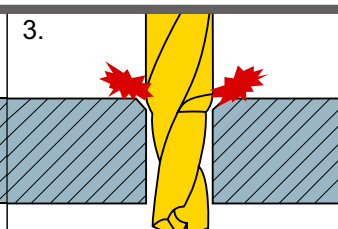
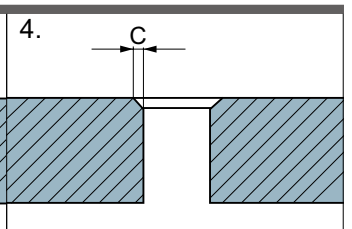
- Notes
1. MZS type with ø6.0 or larger diameter has a recess in the end face.
  2. Spot face drilling is not possible. Chamfering only.
  3. For metric coarse thread.
  4. The MZS type can be used for shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Order Number	Thread Size	Stock		Dimensions (mm)			
					VP15TF	GP20M	L4	L3	L1	D4
3.4	2	Ext.	MZE0340SM04	M4	●		8	21	73	6.0
	2	Int.	MZS0340SM04	M4	●		8	21	73	6.0
	3	Ext.	MZE0340MM04	M4	●		12	25	77	6.0
	3	Int.	MZS0340MM04	M4	●		12	25	77	6.0
4.3	2	Ext.	MZE0430SM05	M5	●		10	26	79	7.0
	2	Int.	MZS0430SM05	M5	●		10	26	79	7.0
	3	Ext.	MZE0430MM05	M5	●		15	31	84	7.0
	3	Int.	MZS0430MM05	M5	●		15	31	84	7.0
5.1	2	Ext.	MZE0510SM06	M6	●		12	30	84	8.0
	2	Int.	MZS0510SM06	M6	●	□	12	30	84	8.0
	3	Ext.	MZE0510MM06	M6	●		18	36	90	8.0
	3	Int.	MZS0510MM06	M6	●	□	18	36	90	8.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Order Number	Thread Size	Stock		Dimensions (mm)			
					VP15TF	GP20M	L4	L3	L1	D4
6.8	2	Ext.	MZE0680SM08	M8	●		16	40	96	10.0
	2	Int.	MZS0680SM08	M8	●	□	16	40	96	10.0
	3	Ext.	MZE0680MM08	M8	●		24	48	104	10.0
	3	Int.	MZS0680MM08	M8	●	□	24	48	104	10.0
8.5	2	Ext.	MZE0850SM10	M10	●		20	50	112	12.0
	2	Int.	MZS0850SM10	M10	●	□	20	50	112	12.0
	3	Ext.	MZE0850MM10	M10	●		30	60	122	12.0
	3	Int.	MZS0850MM10	M10	●	□	30	60	122	12.0
10.3	2	Ext.	MZE1030SM12	M12	●		24	60	124	14.0
	2	Int.	MZS1030SM12	M12	●	□	24	60	124	14.0
	3	Ext.	MZE1030MM12	M12	●		36	72	136	14.0
	3	Int.	MZS1030MM12	M12	●	□	36	72	136	14.0

Note) Please contact Mitsubishi Carbide for any geometry that is not in the brochure (e.g. cutting edge for spot facing).

**Caution for use**

1.	2.	3.	4.
			
Spot facing as shown above is not possible due to the large diameter not having a back taper. Please contact us if spot face drills are required.	Chips from the chamfer machining tend to be elongated and may cause jamming. It is recommended to peck feed to reduce the length of chips.	Cutting resistance increases on initial contact with chamfer. Reduce feed at this point.	The width of the chamfer is C1.0 for M4-M6, and C1.5 for M8-M12. For widths other than those stated above consultation is needed.

**Drill size and hole diameters for tapping**

Thread Size	Metric Coarse Thread		MZE/MZS Drill Application (øD)	Reference HSS drill
	Internal Thread Diameter Tolerance max	Internal Thread Diameter Tolerance min		
M2.5x0.45	2.138	2.013	2.1	2.1
M3x0.5	2.599	2.459	2.5	2.5
M3.5x0.6	3.010	2.850	2.9	2.9
M4x0.7	3.422	3.242	3.4	3.3
M4.5x0.75	3.878	3.688	3.8	3.8
M5x0.8	4.334	4.134	4.3	4.2
M6x1	5.153	4.917	5.1	5.0
M7x1.25	6.153	5.917	6.1	6.0
M8x1.25	6.912	6.647	6.8	6.8

Thread Size	Metric Coarse Thread		MZE/MZS Drill Application (øD)	Reference HSS drill
	Internal Thread Diameter Tolerance max	Internal Thread Diameter Tolerance min		
M9x1.25	7.912	7.647	7.8	7.8
M10x1.5	8.676	8.376	8.5	8.5
M11x1.5	9.676	9.376	9.5	9.5
M12x1.75	10.441	10.106	10.3	10.3
M14x2	12.210	11.835	12.0	12.0
M16x2	14.210	13.835	14.0	14.0
M18x2.5	15.744	15.294	15.5	15.5
M20x2.5	17.744	17.294	17.5	17.5
M22x2.5	19.744	19.294	19.5	19.5

Note) Holes drilled with an MZE type drill should be +0.01 - +0.03mm oversize. For thread tapping and replacement of HSS drills, an approximately 0.1mm bigger drill is recommended.

## Recommended Cutting Conditions for ZET1 drill

### ● MZE (External coolant)

Work Material	Drill diameter Conditions Hardness	φ2.0—φ6.0		φ6.0—φ10.0		φ10.0—φ14.0		φ14.0—φ20.0		
		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)	Feed (mm/rev)	
P Mild Steel	≤180HB	45 (35—55)	0.20 (0.10—0.25)	55 (45—65)	0.25 (0.15—0.30)	65 (55—75)	0.30 (0.20—0.35)	70 (60—80)	0.35 (0.20—0.40)	
	Carbon Steel Alloy Steel	180—280HB	40 (30—50)	0.20 (0.10—0.25)	50 (40—60)	0.25 (0.15—0.25)	60 (50—70)	0.30 (0.20—0.35)	65 (55—75)	0.35 (0.20—0.40)
		280—350HB	35 (25—45)	0.15 (0.10—0.20)	45 (35—55)	0.20 (0.10—0.25)	55 (45—65)	0.25 (0.15—0.30)	60 (50—70)	0.30 (0.20—0.35)
M Stainless Steel	≤200HB	20 (15—30)	0.10 (0.05—0.15)	25 (15—30)	0.12 (0.05—0.15)	25 (15—30)	0.15 (0.10—0.20)	25 (15—30)	0.20 (0.10—0.25)	
K Cast Iron	Tensile Strength ≤350MPa	50 (40—60)	0.25 (0.15—0.30)	60 (50—70)	0.30 (0.20—0.35)	70 (60—80)	0.35 (0.20—0.40)	70 (60—80)	0.40 (0.30—0.45)	
	Ductile Cast Iron Tensile Strength ≤450MPa	45 (35—55)	0.20 (0.10—0.25)	55 (45—65)	0.25 (0.15—0.30)	65 (55—75)	0.30 (0.20—0.35)	70 (60—80)	0.35 (0.20—0.40)	
N Aluminum Alloy	—	80 (70—90)	0.20 (0.10—0.25)	90 (80—100)	0.25 (0.15—0.30)	100 (90—110)	0.30 (0.20—0.35)	110 (100—120)	0.35 (0.20—0.40)	
S Heat Resistant Alloy	—	20 (10—25)	0.10 (0.05—0.15)	25 (15—30)	0.12 (0.05—0.15)	25 (15—30)	0.15 (0.10—0.20)	30 (25—35)	0.20 (0.10—0.25)	
H High Hardened Steel	40—60HRC	20 (10—25)	0.10 (0.05—0.15)	25 (15—30)	0.12 (0.05—0.15)	25 (15—30)	0.15 (0.10—0.20)	30 (25—35)	0.20 (0.10—0.25)	

### ● MZS (Internal coolant)

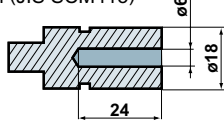
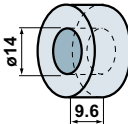
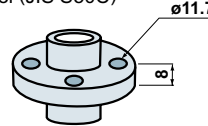
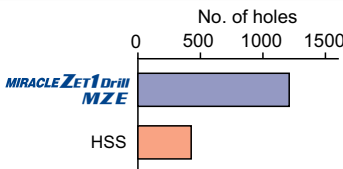
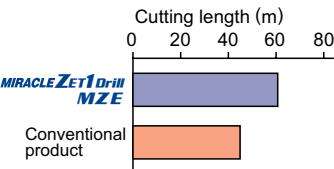
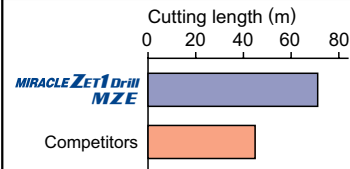
Work Material	Drill diameter Conditions Hardness	φ1.0—φ6.0		φ6.0—φ10.0		φ10.0—φ14.0		φ14.0—φ20.0		
		Cutting speed (m/min)	Feed (mm/rev)	Cutting speed (m/min)	Feed (mm/rev)	Cutting speed (m/min)	Feed (mm/rev)	Cutting speed (m/min)	Feed (mm/rev)	
P Mild Steel	≤180HB	80 (50—120)	0.20 (0.10—0.25)	130 (100—140)	0.25 (0.15—0.30)	150 (110—160)	0.30 (0.20—0.40)	160 (120—170)	0.35 (0.25—0.40)	
	Carbon Steel Alloy Steel	180—280HB	70 (50—100)	0.20 (0.10—0.25)	110 (80—120)	0.20 (0.10—0.25)	130 (90—140)	0.25 (0.15—0.35)	140 (100—150)	0.30 (0.20—0.35)
		280—350HB	60 (30—80)	0.15 (0.10—0.20)	70 (40—90)	0.20 (0.10—0.25)	90 (50—100)	0.25 (0.15—0.35)	100 (60—110)	0.30 (0.20—0.35)
M Stainless Steel	≤200HB	40 (20—60)	0.10 (0.05—0.15)	70 (40—80)	0.20 (0.10—0.25)	90 (50—100)	0.25 (0.15—0.35)	100 (60—110)	0.25 (0.15—0.30)	
K Cast Iron	Tensile Strength ≤350MPa	100 (70—120)	0.25 (0.15—0.30)	130 (100—140)	0.30 (0.20—0.35)	150 (110—160)	0.35 (0.25—0.40)	160 (120—170)	0.35 (0.25—0.40)	
	Ductile Cast Iron Tensile Strength ≤450MPa	60 (30—80)	0.20 (0.10—0.25)	70 (40—90)	0.20 (0.10—0.25)	90 (50—110)	0.25 (0.15—0.35)	100 (60—110)	0.30 (0.20—0.35)	
N Aluminum Alloy	—	120 (80—130)	0.20 (0.10—0.25)	150 (100—160)	0.30 (0.15—0.50)	160 (100—150)	0.40 (0.20—0.35)	170 (100—180)	0.50 (0.20—1.00)	
S Heat Resistant Alloy	—	20 (10—25)	0.10 (0.05—0.15)	25 (15—30)	0.12 (0.05—0.15)	25 (15—30)	0.15 (0.10—0.20)	30 (25—35)	0.20 (0.10—0.25)	

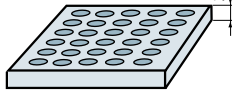
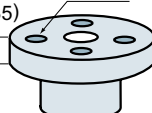
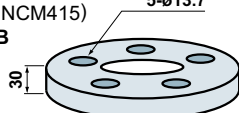
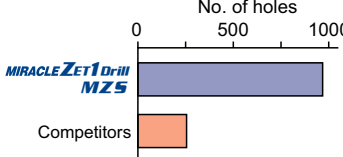
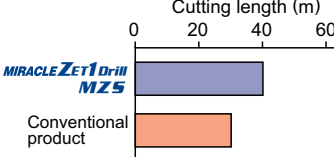
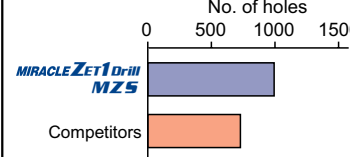
### ● Operational guidance

- Ensure safety guards and goggles are used during operation.
- Ensure tool is clamped securely.
- Re grinding manual (TM-1074) is available. Please contact the sales company.
- Handle with care. Refer to handling pamphlet.
- Use strictly for the prescribed φ application only.

# MIRACLE<sup>®</sup> ZET1 Drill

## Application Examples

Drill	MZE0600MA (VP15TF)	MZE1400MA (VP15TF)	MZE1170MA (VP15TF)	
Workpiece	Alloy steel (JIS SCM415) 200HB 	Stainless steel (JIS SUS630) 35HRC 	Carbon steel (JIS S50C) 200HB 	
Component	Machine parts	Ring	Auto Parts	
Cutting Conditions	Cutting Speed (m/min)	16	24	60
	Feed (mm/rev)	0.15	0.10	0.25
	Revolution (min <sup>-1</sup> )	850	546	1,630
	Table Feed (mm/min)	128	55	408
Coolant	W.S.O.	W.S.O.	W.S.O.	
Machine	Bar feed machine	Bar feed machine	Machining centre	
Results				

Drill	MZS0380LB (VP15TF)	MZS0800MB (VP15TF)	MZS1370MB (VP15TF)	
Workpiece	Stainless steel (JIS SUS304) 150HB 	Alloy steel (JIS SCM435) 240HB 	Alloy steel (JIS SNCM415) 260HB 	
Component	Plate	Flange	Plate	
Cutting Conditions	Cutting Speed (m/min)	40	100	90
	Feed (mm/rev)	0.10	0.25	0.25
	Revolution (min <sup>-1</sup> )	3,350	3,980	2,090
	Table Feed (mm/min)	335	995	523
Coolant	W.S.O.	W.S.O.	W.S.O.	
Machine	Machining centre	Machining centre	Machining centre	
Results				

**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**



The Scope of the Registration:  
Design, Development and  
Production of General  
Carbide Tools and Carbide  
Blanks



The Scope of the Registration:  
Design, Development and  
Production of Cutting Tools,  
Wear-resistant Tools, Rock  
Chilling Tools, Cemented  
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