

Solid Carbide Drill for Aluminum alloy and Cast iron

MAE/MAS

Helix and burnished quality

Promotes high-speed finish of aluminum and cast iron.

Due to four guide pads,
A highly accurate surface finish.

Because of curved cross section and 10 degree helix,
Good chip disposal and high speed, high feed rate drilling.

With internal oil supply system,
Drilling deep holes.



Solid Carbide Drill for Aluminum alloy and Cast iron

MAE/MAS

Features

1. Guide Pad

- 4 point support gives high hole accuracy.

2. Curved cross-section

- Smooth curled chips are produced.
- Good chip control is due to efficient chip breaking.

3. Oil hole

- Internal oil supply system makes it possible for deep hole drilling.

4. Flutes

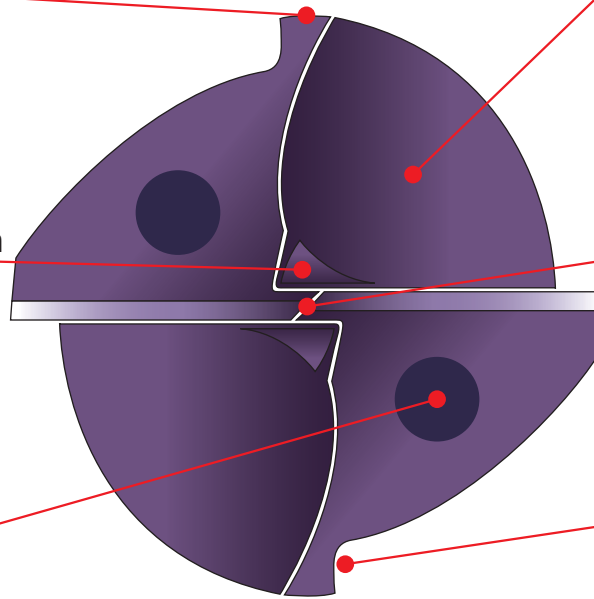
- Employs 10° helix angle. Excellent chip discharge allows for high speed and high feed drilling.

5. Center Point

- Initial drilling noise is minimal and deflection does not occur.

6. Secondary flutes

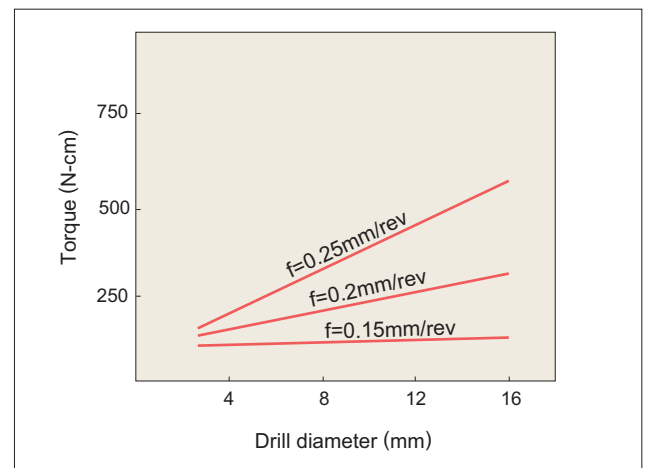
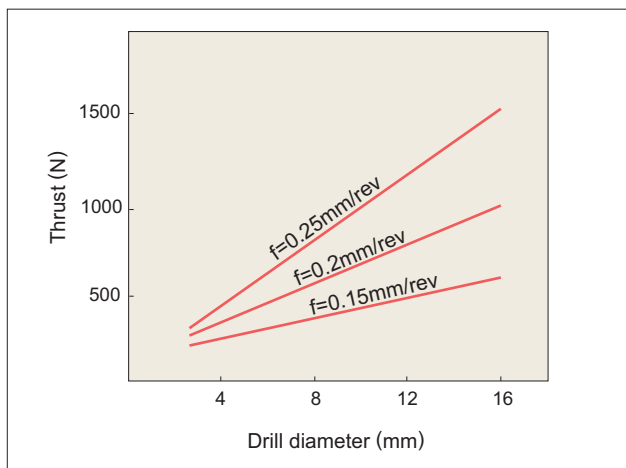
- Cutting oil penetration is effective, so welding is negligible.
- Fine chips are evacuated easily.



Cutting performance

● Cutting resistance

Workpiece : JIS AC4B-T Cutting depth : (L/D=3) through hole Cutting speed : 100m/min Cutting fluid : WSO (10%)

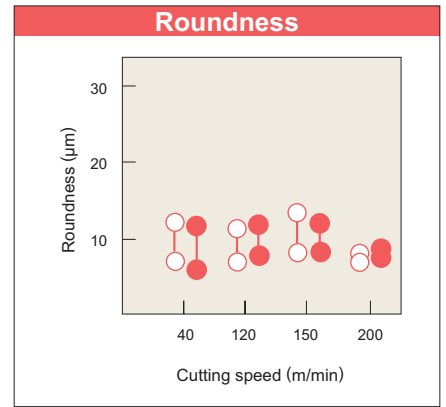
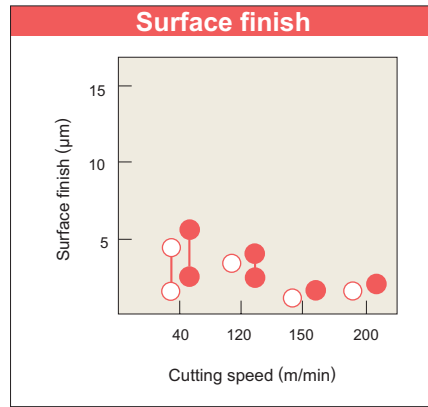
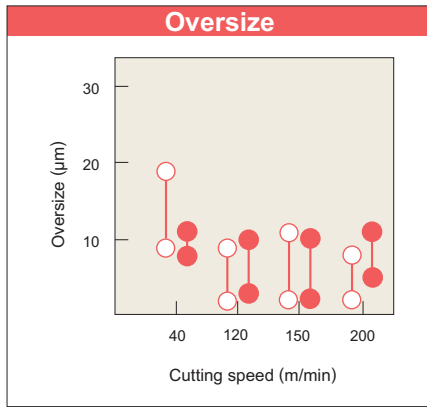


● **Drilling accuracy**

■ **MAE**

Workpiece : JIS AC4B-T6
 Tool : MAE1100MB
 Cutting fluid : WSO (10%) Cutting depth : 33mm (L/D=3) Through hole

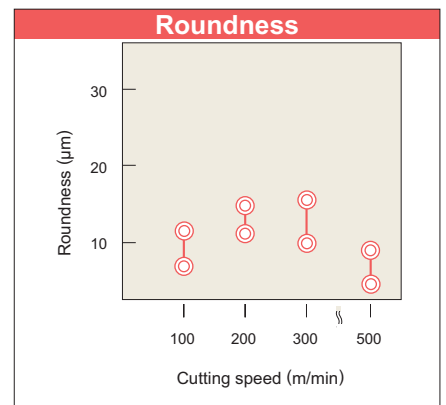
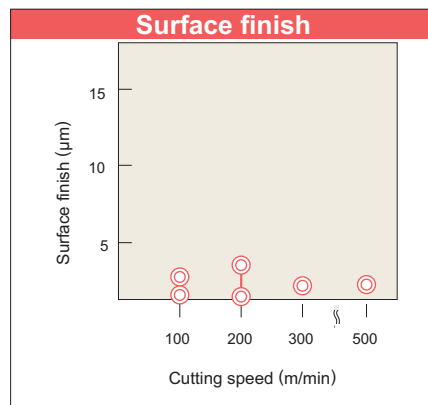
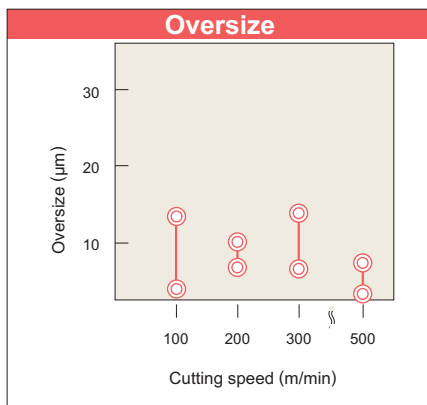
○ — ○ ; Feed=0.15mm/rev
 ● — ● ; Feed=0.35mm/rev



■ **MAS**

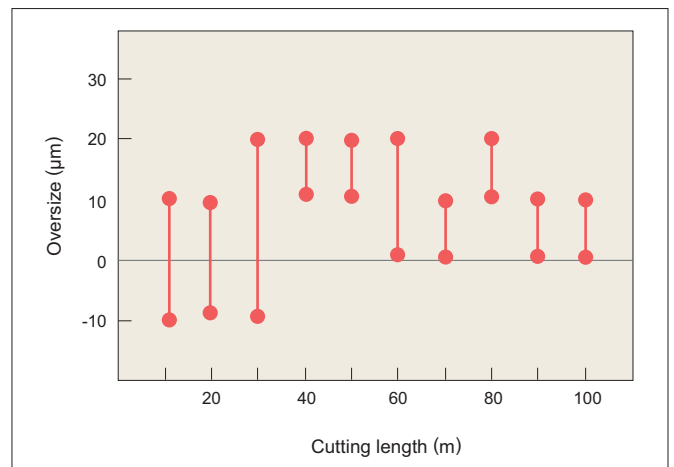
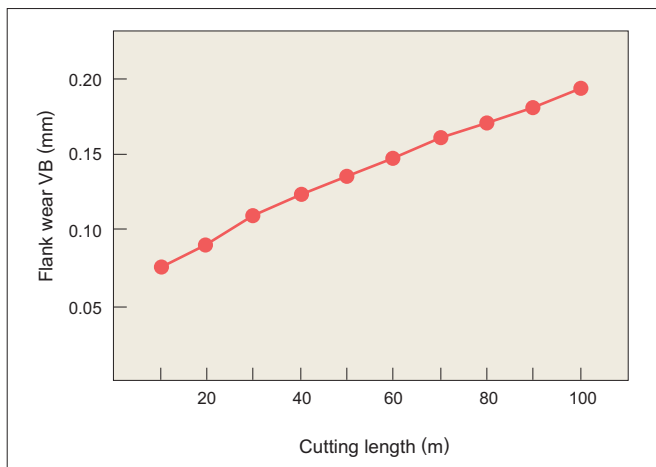
Workpiece : JIS AC4B-T6
 Tool : MAS1000LB
 Cutting fluid : WSO (10%) Cutting depth : 60mm (L/D=6) Through hole

○ — ○ ; Feed=0.2mm/rev



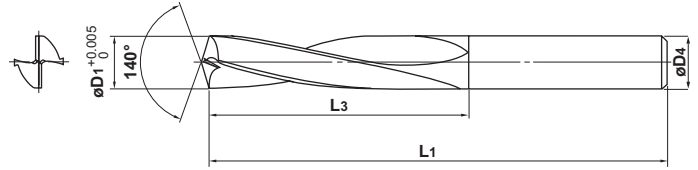
● **Flank wear and oversize range**

Workpiece : JIS AC4B-T6 Feed : 0.25mm/rev
 Tool : MAE1100MB Cutting depth : 33mm (L/D=3) Through hole
 Cutting speed : 80m/min Cutting fluid : WSO (10%)

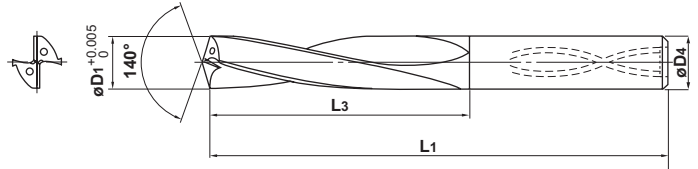


MAE/MAS

MAE (External Coolant)



MAS (Internal Coolant)



(Note) MAS type bigger than $\phi 5$ have a recess in the end face.

Drill Diameter D ₁ (mm)	Hole Depth (l/d)	Coolant	Stock	Order Number	Dimension (mm)		
			HT110		D ₄	L ₁	L ₃
3.0	3	Ext.	●	MAE0300MB	3	61	21
	3	Int.	□	MAS0300MB	3	61	21
	6	Int.	●	MAS0300LB	3	70	30
3.1	3	Ext.	□	MAE0310MB	4	64	24
	3	Int.	□	MAS0310MB	4	64	24
	6	Int.	□	MAS0310LB	4	74	34
3.2	3	Ext.	□	MAE0320MB	4	64	24
	3	Int.	□	MAS0320MB	4	64	24
	6	Int.	□	MAS0320LB	4	74	34
3.3	3	Ext.	●	MAE0330MB	4	64	24
	3	Int.	□	MAS0330MB	4	64	24
	6	Int.	●	MAS0330LB	4	74	34
3.4	3	Ext.	□	MAE0340MB	4	64	24
	3	Int.	□	MAS0340MB	4	64	24
	6	Int.	□	MAS0340LB	4	74	34
3.5	3	Ext.	□	MAE0350MB	4	64	24
	3	Int.	□	MAS0350MB	4	64	24
	6	Int.	□	MAS0350LB	4	74	34
3.6	3	Ext.	□	MAE0360MB	4	68	28
	3	Int.	□	MAS0360MB	4	68	28
	6	Int.	□	MAS0360LB	4	80	40
3.65	3	Ext.	●	★ MAE0365MB	4	68	28
	3	Int.	□	★ MAS0365MB	4	68	28
	6	Int.	●	★ MAS0365LB	4	80	40
3.7	3	Ext.	□	MAE0370MB	4	68	28
	3	Int.	□	MAS0370MB	4	68	28
	6	Int.	□	MAS0370LB	4	80	40

Drill Diameter D ₁ (mm)	Hole Depth (l/d)	Coolant	Stock	Order Number	Dimension (mm)		
			HT110		D ₄	L ₁	L ₃
3.8	3	Ext.	□	MAE0380MB	4	68	28
	3	Int.	□	MAS0380MB	4	68	28
	6	Int.	□	MAS0380LB	4	80	40
3.9	3	Ext.	□	MAE0390MB	4	68	28
	3	Int.	□	MAS0390MB	4	68	28
	6	Int.	□	MAS0390LB	4	80	40
4.0	3	Ext.	●	MAE0400MB	4	68	28
	3	Int.	□	MAS0400MB	4	68	28
	6	Int.	●	MAS0400LB	4	80	40
4.1	3	Ext.	□	MAE0410MB	5	71	31
	3	Int.	□	MAS0410MB	5	71	31
	6	Int.	□	MAS0410LB	5	84	44
4.2	3	Ext.	●	MAE0420MB	5	71	31
	3	Int.	□	MAS0420MB	5	71	31
	6	Int.	●	MAS0420LB	5	84	44
4.3	3	Ext.	□	MAE0430MB	5	71	31
	3	Int.	□	MAS0430MB	5	71	31
	6	Int.	□	MAS0430LB	5	84	44
4.4	3	Ext.	□	MAE0440MB	5	71	31
	3	Int.	□	MAS0440MB	5	71	31
	6	Int.	□	MAS0440LB	5	84	44
4.5	3	Ext.	□	MAE0450MB	5	71	31
	3	Int.	□	MAS0450MB	5	71	31
	6	Int.	□	MAS0450LB	5	84	44
4.6	3	Ext.	●	★ MAE0460MB	5	73	33
	3	Int.	□	★ MAS0460MB	5	73	33
	6	Int.	●	★ MAS0460LB	5	88	48

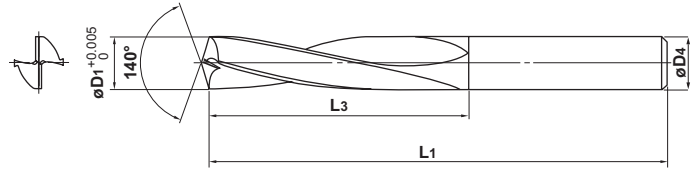
(Note) ★ : Standard hole size for rolled thread tap.

Drill Diameter D ₁ (mm)	Hole Depth (l/d)	Coolant	Stock HTI10	Order Number	Dimension (mm)		
					D ₄	L ₁	L ₃
4.7	3	Ext.	□	MAE0470MB	5	73	33
	3	Int.	□	MAS0470MB	5	73	33
	6	Int.	□	MAS0470LB	5	88	48
4.8	3	Ext.	□	MAE0480MB	5	73	33
	3	Int.	□	MAS0480MB	5	73	33
	6	Int.	□	MAS0480LB	5	88	48
4.9	3	Ext.	□	MAE0490MB	5	73	33
	3	Int.	□	MAS0490MB	5	73	33
	6	Int.	□	MAS0490LB	5	88	48
5.0	3	Ext.	●	MAE0500MB	5	73	33
	3	Int.	●	MAS0500MB	5	73	33
	6	Int.	●	MAS0500LB	5	88	48
5.1	3	Ext.	□	MAE0510MB	6	76	36
	3	Int.	□	MAS0510MB	6	76	36
	6	Int.	□	MAS0510LB	6	92	52
5.2	3	Ext.	□	MAE0520MB	6	76	36
	3	Int.	□	MAS0520MB	6	76	36
	6	Int.	□	MAS0520LB	6	92	52
5.3	3	Ext.	□	MAE0530MB	6	76	36
	3	Int.	□	MAS0530MB	6	76	36
	6	Int.	□	MAS0530LB	6	92	52
5.4	3	Ext.	□	MAE0540MB	6	76	36
	3	Int.	□	MAS0540MB	6	76	36
	6	Int.	□	MAS0540LB	6	92	52
5.5	3	Ext.	●	★ MAE0550MB	6	76	36
	3	Int.	●	★ MAS0550MB	6	76	36
	6	Int.	●	★ MAS0550LB	6	92	52
5.6	3	Ext.	□	MAE0560MB	6	79	39
	3	Int.	□	MAS0560MB	6	79	39
	6	Int.	□	MAS0560LB	6	97	57
5.7	3	Ext.	□	MAE0570MB	6	79	39
	3	Int.	□	MAS0570MB	6	79	39
	6	Int.	□	MAS0570LB	6	97	57

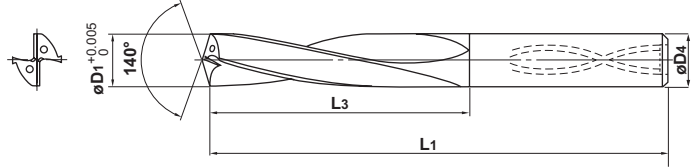
Drill Diameter D ₁ (mm)	Hole Depth (l/d)	Coolant	Stock HTI10	Order Number	Dimension (mm)		
					D ₄	L ₁	L ₃
5.8	3	Ext.	□	MAE0580MB	6	79	39
	3	Int.	□	MAS0580MB	6	79	39
	6	Int.	□	MAS0580LB	6	97	57
5.9	3	Ext.	□	MAE0590MB	6	79	39
	3	Int.	□	MAS0590MB	6	79	39
	6	Int.	□	MAS0590LB	6	97	57
6.0	3	Ext.	●	MAE0600MB	6	79	39
	3	Int.	●	MAS0600MB	6	79	39
	6	Int.	●	MAS0600LB	6	97	57
6.1	3	Ext.	□	MAE0610MB	7	84	42
	3	Int.	□	MAS0610MB	7	84	42
	6	Int.	□	MAS0610LB	7	104	62
6.2	3	Ext.	□	MAE0620MB	7	84	42
	3	Int.	□	MAS0620MB	7	84	42
	6	Int.	□	MAS0620LB	7	104	62
6.3	3	Ext.	□	MAE0630MB	7	84	42
	3	Int.	□	MAS0630MB	7	84	42
	6	Int.	□	MAS0630LB	7	104	62
6.4	3	Ext.	□	MAE0640MB	7	84	42
	3	Int.	□	MAS0640MB	7	84	42
	6	Int.	□	MAS0640LB	7	104	62
6.5	3	Ext.	●	MAE0650MB	7	84	42
	3	Int.	●	MAS0650MB	7	84	42
	6	Int.	●	MAS0650LB	7	104	62
6.6	3	Ext.	□	MAE0660MB	7	84	42
	3	Int.	□	MAS0660MB	7	84	42
	6	Int.	□	MAS0660LB	7	107	65
6.7	3	Ext.	□	MAE0670MB	7	84	42
	3	Int.	□	MAS0670MB	7	84	42
	6	Int.	□	MAS0670LB	7	107	65
6.8	3	Ext.	●	MAE0680MB	7	84	42
	3	Int.	●	MAS0680MB	7	84	42
	6	Int.	●	MAS0680LB	7	107	65

MAE/MAS

MAE (External Coolant)



MAS (Internal Coolant)



(Note) MAS type bigger than $\varnothing 5$ have a recess in the end face.

Drill Diameter D1 (mm)	Hole Depth (l/d)	Coolant	Stock HT10	Order Number	Dimension (mm)		
					D4	L1	L3
6.9	3	Ext.	<input type="checkbox"/>	MAE0690MB	7	84	42
	3	Int.	<input type="checkbox"/>	MAS0690MB	7	84	42
	6	Int.	<input type="checkbox"/>	MAS0690LB	7	107	65
7.0	3	Ext.	<input checked="" type="checkbox"/>	MAE0700MB	7	84	42
	3	Int.	<input checked="" type="checkbox"/>	MAS0700MB	7	84	42
	6	Int.	<input checked="" type="checkbox"/>	MAS0700LB	7	107	65
7.1	3	Ext.	<input type="checkbox"/>	MAE0710MB	8	90	48
	3	Int.	<input type="checkbox"/>	MAS0710MB	8	90	48
	6	Int.	<input type="checkbox"/>	MAS0710LB	8	110	68
7.2	3	Ext.	<input type="checkbox"/>	MAE0720MB	8	90	48
	3	Int.	<input type="checkbox"/>	MAS0720MB	8	90	48
	6	Int.	<input type="checkbox"/>	MAS0720LB	8	110	68
7.3	3	Ext.	<input type="checkbox"/>	MAE0730MB	8	90	48
	3	Int.	<input type="checkbox"/>	MAS0730MB	8	90	48
	6	Int.	<input type="checkbox"/>	MAS0730LB	8	110	68
7.35	3	Ext.	<input checked="" type="checkbox"/>	★ MAE0735MB	8	90	48
	3	Int.	<input checked="" type="checkbox"/>	★ MAS0735MB	8	90	48
	6	Int.	<input checked="" type="checkbox"/>	★ MAS0735LB	8	110	68
7.4	3	Ext.	<input type="checkbox"/>	MAE0740MB	8	90	48
	3	Int.	<input type="checkbox"/>	MAS0740MB	8	90	48
	6	Int.	<input type="checkbox"/>	MAS0740LB	8	110	68
7.5	3	Ext.	<input type="checkbox"/>	MAE0750MB	8	90	48
	3	Int.	<input type="checkbox"/>	MAS0750MB	8	90	48
	6	Int.	<input type="checkbox"/>	MAS0750LB	8	110	68
7.6	3	Ext.	<input type="checkbox"/>	MAE0760MB	8	90	48
	3	Int.	<input type="checkbox"/>	MAS0760MB	8	90	48
	6	Int.	<input type="checkbox"/>	MAS0760LB	8	114	72

Drill Diameter D1 (mm)	Hole Depth (l/d)	Coolant	Stock HT10	Order Number	Dimension (mm)		
					D4	L1	L3
7.7	3	Ext.	<input type="checkbox"/>	MAE0770MB	8	90	48
	3	Int.	<input type="checkbox"/>	MAS0770MB	8	90	48
	6	Int.	<input type="checkbox"/>	MAS0770LB	8	114	72
7.8	3	Ext.	<input type="checkbox"/>	MAE0780MB	8	90	48
	3	Int.	<input type="checkbox"/>	MAS0780MB	8	90	48
	6	Int.	<input type="checkbox"/>	MAS0780LB	8	114	72
7.9	3	Ext.	<input type="checkbox"/>	MAE0790MB	8	90	48
	3	Int.	<input type="checkbox"/>	MAS0790MB	8	90	48
	6	Int.	<input type="checkbox"/>	MAS0790LB	8	114	72
8.0	3	Ext.	<input checked="" type="checkbox"/>	MAE0800MB	8	90	48
	3	Int.	<input checked="" type="checkbox"/>	MAS0800MB	8	90	48
	6	Int.	<input checked="" type="checkbox"/>	MAS0800LB	8	114	72
8.1	3	Ext.	<input type="checkbox"/>	MAE0810MB	9	94	50
	3	Int.	<input type="checkbox"/>	MAS0810MB	9	94	50
	6	Int.	<input type="checkbox"/>	MAS0810LB	9	119	75
8.2	3	Ext.	<input type="checkbox"/>	MAE0820MB	9	94	50
	3	Int.	<input type="checkbox"/>	MAS0820MB	9	94	50
	6	Int.	<input type="checkbox"/>	MAS0820LB	9	119	75
8.3	3	Ext.	<input type="checkbox"/>	MAE0830MB	9	94	50
	3	Int.	<input type="checkbox"/>	MAS0830MB	9	94	50
	6	Int.	<input type="checkbox"/>	MAS0830LB	9	119	75
8.4	3	Ext.	<input type="checkbox"/>	MAE0840MB	9	94	50
	3	Int.	<input type="checkbox"/>	MAS0840MB	9	94	50
	6	Int.	<input type="checkbox"/>	MAS0840LB	9	119	75
8.5	3	Ext.	<input checked="" type="checkbox"/>	MAE0850MB	9	94	50
	3	Int.	<input checked="" type="checkbox"/>	MAS0850MB	9	94	50
	6	Int.	<input checked="" type="checkbox"/>	MAS0850LB	9	119	75

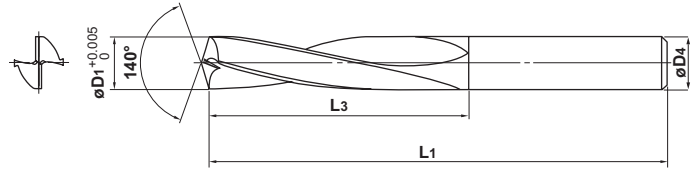
(Note) ★ : Standard hole size for rolled thread tap.

Drill Diameter D1 (mm)	Hole Depth (l/d)	Coolant	Stock	Order Number	Dimension (mm)		
			HT10		D4	L1	L3
8.6	3	Ext.	<input type="checkbox"/>	MAE0860MB	9	94	50
	3	Int.	<input type="checkbox"/>	MAS0860MB	9	94	50
	6	Int.	<input type="checkbox"/>	MAS0860LB	9	121	77
8.7	3	Ext.	<input type="checkbox"/>	MAE0870MB	9	94	50
	3	Int.	<input type="checkbox"/>	MAS0870MB	9	94	50
	6	Int.	<input type="checkbox"/>	MAS0870LB	9	121	77
8.8	3	Ext.	<input type="checkbox"/>	MAE0880MB	9	94	50
	3	Int.	<input type="checkbox"/>	MAS0880MB	9	94	50
	6	Int.	<input type="checkbox"/>	MAS0880LB	9	121	77
8.9	3	Ext.	<input type="checkbox"/>	MAE0890MB	9	94	50
	3	Int.	<input type="checkbox"/>	MAS0890MB	9	94	50
	6	Int.	<input type="checkbox"/>	MAS0890LB	9	121	77
9.0	3	Ext.	<input checked="" type="checkbox"/>	MAE0900MB	9	94	50
	3	Int.	<input checked="" type="checkbox"/>	MAS0900MB	9	94	50
	6	Int.	<input checked="" type="checkbox"/>	MAS0900LB	9	121	77
9.1	3	Ext.	<input type="checkbox"/>	MAE0910MB	10	97	53
	3	Int.	<input type="checkbox"/>	MAS0910MB	10	97	53
	6	Int.	<input type="checkbox"/>	MAS0910LB	10	125	81
9.2	3	Ext.	<input type="checkbox"/>	MAE0920MB	10	97	53
	3	Int.	<input type="checkbox"/>	MAS0920MB	10	97	53
	6	Int.	<input type="checkbox"/>	MAS0920LB	10	125	81
9.21	3	Ext.	<input checked="" type="checkbox"/>	★ MAE0921MB	10	97	53
	3	Int.	<input checked="" type="checkbox"/>	★ MAS0921MB	10	97	53
	6	Int.	<input checked="" type="checkbox"/>	★ MAS0921LB	10	125	81
9.3	3	Ext.	<input type="checkbox"/>	MAE0930MB	10	97	53
	3	Int.	<input type="checkbox"/>	MAS0930MB	10	97	53
	6	Int.	<input type="checkbox"/>	MAS0930LB	10	125	81
9.4	3	Ext.	<input type="checkbox"/>	MAE0940MB	10	97	53
	3	Int.	<input type="checkbox"/>	MAS0940MB	10	97	53
	6	Int.	<input type="checkbox"/>	MAS0940LB	10	125	81
9.5	3	Ext.	<input checked="" type="checkbox"/>	MAE0950MB	10	97	53
	3	Int.	<input checked="" type="checkbox"/>	MAS0950MB	10	97	53
	6	Int.	<input checked="" type="checkbox"/>	MAS0950LB	10	125	81

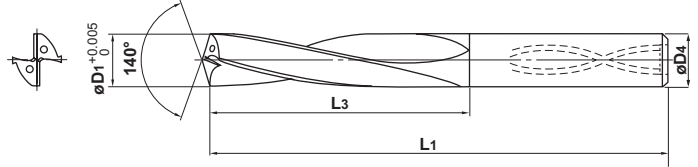
Drill Diameter D1 (mm)	Hole Depth (l/d)	Coolant	Stock	Order Number	Dimension (mm)		
			HT10		D4	L1	L3
9.6	3	Ext.	<input type="checkbox"/>	MAE0960MB	10	97	53
	3	Int.	<input type="checkbox"/>	MAS0960MB	10	97	53
	6	Int.	<input type="checkbox"/>	MAS0960LB	10	125	81
9.7	3	Ext.	<input type="checkbox"/>	MAE0970MB	10	97	53
	3	Int.	<input type="checkbox"/>	MAS0970MB	10	97	53
	6	Int.	<input type="checkbox"/>	MAS0970LB	10	125	81
9.8	3	Ext.	<input type="checkbox"/>	MAE0980MB	10	97	53
	3	Int.	<input type="checkbox"/>	MAS0980MB	10	97	53
	6	Int.	<input type="checkbox"/>	MAS0980LB	10	125	81
9.9	3	Ext.	<input type="checkbox"/>	MAE0990MB	10	97	53
	3	Int.	<input type="checkbox"/>	MAS0990MB	10	97	53
	6	Int.	<input type="checkbox"/>	MAS0990LB	10	125	81
10.0	3	Ext.	<input checked="" type="checkbox"/>	MAE1000MB	10	97	53
	3	Int.	<input checked="" type="checkbox"/>	MAS1000MB	10	97	53
	6	Int.	<input checked="" type="checkbox"/>	MAS1000LB	10	125	81
10.1	3	Ext.	<input type="checkbox"/>	MAE1010MB	11	101	55
	3	Int.	<input type="checkbox"/>	MAS1010MB	11	101	55
	6	Int.	<input type="checkbox"/>	MAS1010LB	11	135	89
10.2	3	Ext.	<input type="checkbox"/>	MAE1020MB	11	101	55
	3	Int.	<input type="checkbox"/>	MAS1020MB	11	101	55
	6	Int.	<input type="checkbox"/>	MAS1020LB	11	135	89
10.3	3	Ext.	<input checked="" type="checkbox"/>	MAE1030MB	11	101	55
	3	Int.	<input checked="" type="checkbox"/>	MAS1030MB	11	101	55
	6	Int.	<input checked="" type="checkbox"/>	MAS1030LB	11	135	89
10.4	3	Ext.	<input type="checkbox"/>	MAE1040MB	11	101	55
	3	Int.	<input type="checkbox"/>	MAS1040MB	11	101	55
	6	Int.	<input type="checkbox"/>	MAS1040LB	11	135	89
10.5	3	Ext.	<input checked="" type="checkbox"/>	MAE1050MB	11	101	55
	3	Int.	<input checked="" type="checkbox"/>	MAS1050MB	11	101	55
	6	Int.	<input checked="" type="checkbox"/>	MAS1050LB	11	135	89
10.6	3	Ext.	<input type="checkbox"/>	MAE1060MB	11	101	55
	3	Int.	<input type="checkbox"/>	MAS1060MB	11	101	55
	6	Int.	<input type="checkbox"/>	MAS1060LB	11	135	89

MAE/MAS

MAE (External Coolant)



MAS (Internal Coolant)



(Note) MAS type bigger than $\varnothing 5$ have a recess in the end face.

Drill Diameter D1 (mm)	Hole Depth (l/d)	Coolant	Stock HT10	Order Number	Dimension (mm)		
					D4	L1	L3
10.7	3	Ext.	<input type="checkbox"/>	MAE1070MB	11	101	55
	3	Int.	<input type="checkbox"/>	MAS1070MB	11	101	55
	6	Int.	<input type="checkbox"/>	MAS1070LB	11	135	89
10.8	3	Ext.	<input type="checkbox"/>	MAE1080MB	11	101	55
	3	Int.	<input type="checkbox"/>	MAS1080MB	11	101	55
	6	Int.	<input type="checkbox"/>	MAS1080LB	11	135	89
10.9	3	Ext.	<input type="checkbox"/>	MAE1090MB	11	101	55
	3	Int.	<input type="checkbox"/>	MAS1090MB	11	101	55
	6	Int.	<input type="checkbox"/>	MAS1090LB	11	135	89
11.0	3	Ext.	<input checked="" type="checkbox"/>	MAE1100MB	11	101	55
	3	Int.	<input checked="" type="checkbox"/>	MAS1100MB	11	101	55
	6	Int.	<input checked="" type="checkbox"/>	MAS1100LB	11	135	89
11.08	3	Ext.	<input checked="" type="checkbox"/>	★ MAE1108MB	12	106	60
	3	Int.	<input checked="" type="checkbox"/>	★ MAS1108MB	12	106	60
	6	Int.	<input checked="" type="checkbox"/>	★ MAS1108LB	12	140	94
11.1	3	Ext.	<input type="checkbox"/>	MAE1110MB	12	106	60
	3	Int.	<input type="checkbox"/>	MAS1110MB	12	106	60
	6	Int.	<input type="checkbox"/>	MAS1110LB	12	140	94
11.2	3	Ext.	<input type="checkbox"/>	MAE1120MB	12	106	60
	3	Int.	<input type="checkbox"/>	MAS1120MB	12	106	60
	6	Int.	<input type="checkbox"/>	MAS1120LB	12	140	94
11.3	3	Ext.	<input type="checkbox"/>	MAE1130MB	12	106	60
	3	Int.	<input type="checkbox"/>	MAS1130MB	12	106	60
	6	Int.	<input type="checkbox"/>	MAS1130LB	12	140	94
11.4	3	Ext.	<input type="checkbox"/>	MAE1140MB	12	106	60
	3	Int.	<input type="checkbox"/>	MAS1140MB	12	106	60
	6	Int.	<input type="checkbox"/>	MAS1140LB	12	140	94

Drill Diameter D1 (mm)	Hole Depth (l/d)	Coolant	Stock HT10	Order Number	Dimension (mm)		
					D4	L1	L3
11.5	3	Ext.	<input type="checkbox"/>	MAE1150MB	12	106	60
	3	Int.	<input type="checkbox"/>	MAS1150MB	12	106	60
	6	Int.	<input type="checkbox"/>	MAS1150LB	12	140	94
11.6	3	Ext.	<input type="checkbox"/>	MAE1160MB	12	106	60
	3	Int.	<input type="checkbox"/>	MAS1160MB	12	106	60
	6	Int.	<input type="checkbox"/>	MAS1160LB	12	140	94
11.7	3	Ext.	<input type="checkbox"/>	MAE1170MB	12	106	60
	3	Int.	<input type="checkbox"/>	MAS1170MB	12	106	60
	6	Int.	<input type="checkbox"/>	MAS1170LB	12	140	94
11.8	3	Ext.	<input type="checkbox"/>	MAE1180MB	12	106	60
	3	Int.	<input type="checkbox"/>	MAS1180MB	12	106	60
	6	Int.	<input type="checkbox"/>	MAS1180LB	12	140	94
11.9	3	Ext.	<input type="checkbox"/>	MAE1190MB	12	106	60
	3	Int.	<input type="checkbox"/>	MAS1190MB	12	106	60
	6	Int.	<input type="checkbox"/>	MAS1190LB	12	140	94
12.0	3	Ext.	<input checked="" type="checkbox"/>	MAE1200MB	12	106	60
	3	Int.	<input checked="" type="checkbox"/>	MAS1200MB	12	106	60
	6	Int.	<input checked="" type="checkbox"/>	MAS1200LB	12	140	94
12.1	3	Ext.	<input type="checkbox"/>	MAE1210MB	13	115	65
	3	Int.	<input type="checkbox"/>	MAS1210MB	13	115	65
	6	Int.	<input type="checkbox"/>	MAS1210LB	13	150	100
12.2	3	Ext.	<input type="checkbox"/>	MAE1220MB	13	115	65
	3	Int.	<input type="checkbox"/>	MAS1220MB	13	115	65
	6	Int.	<input type="checkbox"/>	MAS1220LB	13	150	100
12.3	3	Ext.	<input type="checkbox"/>	MAE1230MB	13	115	65
	3	Int.	<input type="checkbox"/>	MAS1230MB	13	115	65
	6	Int.	<input type="checkbox"/>	MAS1230LB	13	150	100

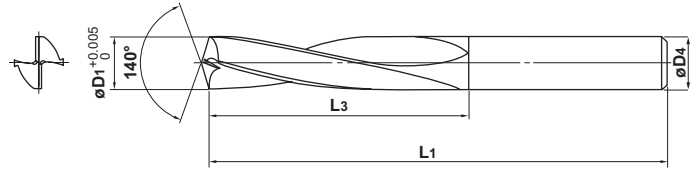
(Note) ★ : Standard hole size for rolled thread tap.

Drill Diameter D ₁ (mm)	Hole Depth (l/d)	Coolant	Stock	Order Number	Dimension (mm)		
			HTI10		D ₄	L ₁	L ₃
12.4	3	Ext.	<input type="checkbox"/>	MAE1240MB	13	115	65
	3	Int.	<input type="checkbox"/>	MAS1240MB	13	115	65
	6	Int.	<input type="checkbox"/>	MAS1240LB	13	150	100
12.5	3	Ext.	<input checked="" type="checkbox"/>	MAE1250MB	13	115	65
	3	Int.	<input checked="" type="checkbox"/>	MAS1250MB	13	115	65
	6	Int.	<input checked="" type="checkbox"/>	MAS1250LB	13	150	100
12.6	3	Ext.	<input type="checkbox"/>	MAE1260MB	13	115	65
	3	Int.	<input type="checkbox"/>	MAS1260MB	13	115	65
	6	Int.	<input type="checkbox"/>	MAS1260LB	13	150	100
12.7	3	Ext.	<input type="checkbox"/>	MAE1270MB	13	115	65
	3	Int.	<input type="checkbox"/>	MAS1270MB	13	115	65
	6	Int.	<input type="checkbox"/>	MAS1270LB	13	150	100
12.8	3	Ext.	<input type="checkbox"/>	MAE1280MB	13	115	65
	3	Int.	<input type="checkbox"/>	MAS1280MB	13	115	65
	6	Int.	<input type="checkbox"/>	MAS1280LB	13	150	100
12.9	3	Ext.	<input type="checkbox"/>	MAE1290MB	13	115	65
	3	Int.	<input type="checkbox"/>	MAS1290MB	13	115	65
	6	Int.	<input type="checkbox"/>	MAS1290LB	13	150	100
12.96	3	Ext.	<input checked="" type="checkbox"/>	★ MAE1296MB	13	115	65
	3	Int.	<input checked="" type="checkbox"/>	★ MAS1296MB	13	115	65
	6	Int.	<input checked="" type="checkbox"/>	★ MAS1296LB	13	150	100
13.0	3	Ext.	<input checked="" type="checkbox"/>	MAE1300MB	13	115	65
	3	Int.	<input checked="" type="checkbox"/>	MAS1300MB	13	115	65
	6	Int.	<input checked="" type="checkbox"/>	MAS1300LB	13	150	100
13.1	3	Ext.	<input type="checkbox"/>	MAE1310MB	14	120	70
	3	Int.	<input type="checkbox"/>	MAS1310MB	14	120	70
	6	Int.	<input type="checkbox"/>	MAS1310LB	14	160	110
13.2	3	Ext.	<input type="checkbox"/>	MAE1320MB	14	120	70
	3	Int.	<input type="checkbox"/>	MAS1320MB	14	120	70
	6	Int.	<input type="checkbox"/>	MAS1320LB	14	160	110
13.3	3	Ext.	<input type="checkbox"/>	MAE1330MB	14	120	70
	3	Int.	<input type="checkbox"/>	MAS1330MB	14	120	70
	6	Int.	<input type="checkbox"/>	MAS1330LB	14	160	110

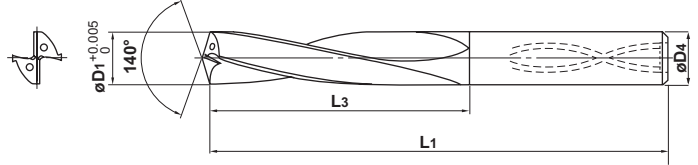
Drill Diameter D ₁ (mm)	Hole Depth (l/d)	Coolant	Stock	Order Number	Dimension (mm)		
			HTI10		D ₄	L ₁	L ₃
13.4	3	Ext.	<input type="checkbox"/>	MAE1340MB	14	120	70
	3	Int.	<input type="checkbox"/>	MAS1340MB	14	120	70
	6	Int.	<input type="checkbox"/>	MAS1340LB	14	160	110
13.5	3	Ext.	<input checked="" type="checkbox"/>	MAE1350MB	14	120	70
	3	Int.	<input checked="" type="checkbox"/>	MAS1350MB	14	120	70
	6	Int.	<input checked="" type="checkbox"/>	MAS1350LB	14	160	110
13.6	3	Ext.	<input type="checkbox"/>	MAE1360MB	14	120	70
	3	Int.	<input type="checkbox"/>	MAS1360MB	14	120	70
	6	Int.	<input type="checkbox"/>	MAS1360LB	14	160	110
13.7	3	Ext.	<input type="checkbox"/>	MAE1370MB	14	120	70
	3	Int.	<input type="checkbox"/>	MAS1370MB	14	120	70
	6	Int.	<input type="checkbox"/>	MAS1370LB	14	160	110
13.8	3	Ext.	<input type="checkbox"/>	MAE1380MB	14	120	70
	3	Int.	<input type="checkbox"/>	MAS1380MB	14	120	70
	6	Int.	<input type="checkbox"/>	MAS1380LB	14	160	110
13.9	3	Ext.	<input type="checkbox"/>	MAE1390MB	14	120	70
	3	Int.	<input type="checkbox"/>	MAS1390MB	14	120	70
	6	Int.	<input type="checkbox"/>	MAS1390LB	14	160	110
14.0	3	Ext.	<input checked="" type="checkbox"/>	MAE1400MB	14	120	70
	3	Int.	<input checked="" type="checkbox"/>	MAS1400MB	14	120	70
	6	Int.	<input checked="" type="checkbox"/>	MAS1400LB	14	160	110
14.1	3	Ext.	<input type="checkbox"/>	MAE1410MB	15	130	72
	3	Int.	<input type="checkbox"/>	MAS1410MB	15	130	72
	6	Int.	<input type="checkbox"/>	MAS1410LB	15	173	115
14.2	3	Ext.	<input type="checkbox"/>	MAE1420MB	15	130	72
	3	Int.	<input type="checkbox"/>	MAS1420MB	15	130	72
	6	Int.	<input type="checkbox"/>	MAS1420LB	15	173	115
14.3	3	Ext.	<input type="checkbox"/>	MAE1430MB	15	130	72
	3	Int.	<input type="checkbox"/>	MAS1430MB	15	130	72
	6	Int.	<input type="checkbox"/>	MAS1430LB	15	173	115
14.4	3	Ext.	<input type="checkbox"/>	MAE1440MB	15	130	72
	3	Int.	<input type="checkbox"/>	MAS1440MB	15	130	72
	6	Int.	<input type="checkbox"/>	MAS1440LB	15	173	115

MAE/MAS

MAE (External Coolant)



MAS (Internal Coolant)



(Note) MAS type bigger than $\phi 5$ have a recess in the end face.

Drill Diameter D1 (mm)	Hole Depth (l/d)	Coolant	Stock HT10	Order Number	Dimension (mm)		
					D4	L1	L3
14.5	3	Ext.	<input type="checkbox"/>	MAE1450MB	15	130	72
	3	Int.	<input type="checkbox"/>	MAS1450MB	15	130	72
	6	Int.	<input type="checkbox"/>	MAS1450LB	15	173	115
14.6	3	Ext.	<input type="checkbox"/>	MAE1460MB	15	130	72
	3	Int.	<input type="checkbox"/>	MAS1460MB	15	130	72
	6	Int.	<input type="checkbox"/>	MAS1460LB	15	173	115
14.7	3	Ext.	<input type="checkbox"/>	MAE1470MB	15	130	72
	3	Int.	<input type="checkbox"/>	MAS1470MB	15	130	72
	6	Int.	<input type="checkbox"/>	MAS1470LB	15	173	115
14.8	3	Ext.	<input type="checkbox"/>	MAE1480MB	15	130	72
	3	Int.	<input type="checkbox"/>	MAS1480MB	15	130	72
	6	Int.	<input type="checkbox"/>	MAS1480LB	15	173	115
14.9	3	Ext.	<input type="checkbox"/>	MAE1490MB	15	130	72
	3	Int.	<input type="checkbox"/>	MAS1490MB	15	130	72
	6	Int.	<input type="checkbox"/>	MAS1490LB	15	173	115
14.96	3	Ext.	●	★ MAE1496MB	15	130	72
	3	Int.	●	★ MAS1496MB	15	130	72
	6	Int.	●	★ MAS1496LB	15	173	115
15.0	3	Ext.	●	MAE1500MB	15	130	72
	3	Int.	●	MAS1500MB	15	130	72
	6	Int.	●	MAS1500LB	15	173	115
15.1	3	Ext.	<input type="checkbox"/>	MAE1510MB	16	134	76
	3	Int.	<input type="checkbox"/>	MAS1510MB	16	134	76
	6	Int.	<input type="checkbox"/>	MAS1510LB	16	178	120
15.2	3	Ext.	<input type="checkbox"/>	MAE1520MB	16	134	76
	3	Int.	<input type="checkbox"/>	MAS1520MB	16	134	76
	6	Int.	<input type="checkbox"/>	MAS1520LB	16	178	120

Drill Diameter D1 (mm)	Hole Depth (l/d)	Coolant	Stock HT10	Order Number	Dimension (mm)		
					D4	L1	L3
15.3	3	Ext.	<input type="checkbox"/>	MAE1530MB	16	134	76
	3	Int.	<input type="checkbox"/>	MAS1530MB	16	134	76
	6	Int.	<input type="checkbox"/>	MAS1530LB	16	178	120
15.4	3	Ext.	<input type="checkbox"/>	MAE1540MB	16	134	76
	3	Int.	<input type="checkbox"/>	MAS1540MB	16	134	76
	6	Int.	<input type="checkbox"/>	MAS1540LB	16	178	120
15.5	3	Ext.	<input type="checkbox"/>	MAE1550MB	16	134	76
	3	Int.	<input type="checkbox"/>	MAS1550MB	16	134	76
	6	Int.	<input type="checkbox"/>	MAS1550LB	16	178	120
15.6	3	Ext.	<input type="checkbox"/>	MAE1560MB	16	134	76
	3	Int.	<input type="checkbox"/>	MAS1560MB	16	134	76
	6	Int.	<input type="checkbox"/>	MAS1560LB	16	178	120
15.7	3	Ext.	<input type="checkbox"/>	MAE1570MB	16	134	76
	3	Int.	<input type="checkbox"/>	MAS1570MB	16	134	76
	6	Int.	<input type="checkbox"/>	MAS1570LB	16	178	120
15.8	3	Ext.	<input type="checkbox"/>	MAE1580MB	16	134	76
	3	Int.	<input type="checkbox"/>	MAS1580MB	16	134	76
	6	Int.	<input type="checkbox"/>	MAS1580LB	16	178	120
15.9	3	Ext.	<input type="checkbox"/>	MAE1590MB	16	134	76
	3	Int.	<input type="checkbox"/>	MAS1590MB	16	134	76
	6	Int.	<input type="checkbox"/>	MAS1590LB	16	178	120
16.0	3	Ext.	●	MAE1600MB	16	134	76
	3	Int.	●	MAS1600MB	16	134	76
	6	Int.	●	MAS1600LB	16	178	120

(Note) ★ : Standard hole size for rolled thread tap.

Recommended cutting conditions

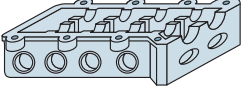
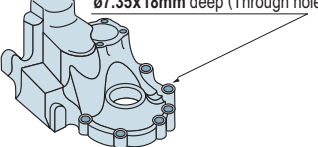
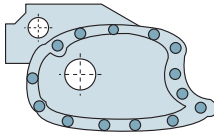
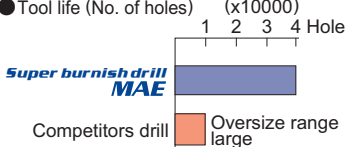
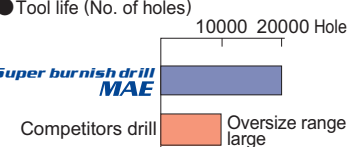
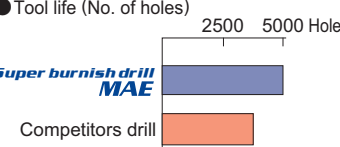
Workpiece	Tool	Drill diameter $\phi 3.0 - \phi 6.0$		Drill diameter $\phi 6.0 - \phi 10.0$		Drill diameter $\phi 10.0 - \phi 16.0$	
		Cutting speed (m/min)	Feed (mm/rev)	Cutting speed (m/min)	Feed (mm/rev)	Cutting speed (m/min)	Feed (mm/rev)
N Cast aluminum alloy	MAE	90(40 - 140)	0.15(0.05 - 0.3)	100(50 - 150)	0.2(0.1 - 0.3)	120(60 - 170)	0.25(0.1 - 0.4)
		100(60 - 150)	0.12(0.05 - 0.25)	110(70 - 160)	0.15(0.05 - 0.25)	130(80 - 180)	0.2(0.1 - 0.3)
K Cast iron	MAE	40(20 - 60)	0.15(0.1 - 0.2)	60(40 - 80)	0.2(0.1 - 0.3)	80(60 - 100)	0.3(0.2 - 0.4)
		30(20 - 40)	0.1(0.05 - 0.15)	40(20 - 60)	0.12(0.05 - 0.2)	60(40 - 80)	0.2(0.1 - 0.3)
N Cast aluminum alloy	MAS	100(60 - 150)	0.15(0.05 - 0.3)	120(80 - 170)	0.2(0.1 - 0.3)	150(100 - 200)	0.25(0.1 - 0.4)
		120(80 - 170)	0.12(0.05 - 0.25)	150(100 - 180)	0.15(0.05 - 0.25)	160(120 - 200)	0.2(0.1 - 0.3)
K Cast iron	MAS	60(40 - 80)	0.15(0.1 - 0.2)	80(60 - 110)	0.2(0.1 - 0.3)	100(70 - 130)	0.3(0.2 - 0.4)
		45(30 - 60)	0.1(0.05 - 0.15)	60(40 - 80)	0.12(0.05 - 0.2)	80(60 - 100)	0.2(0.1 - 0.3)

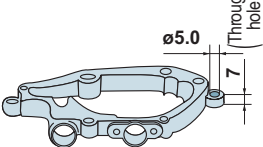
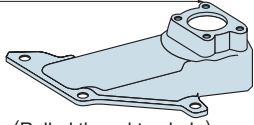
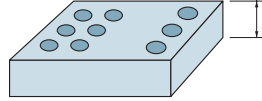
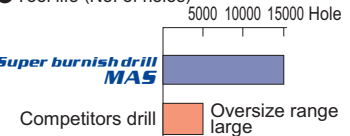
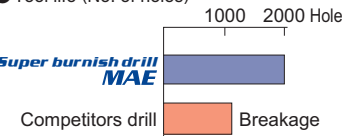
Hole and drill diameters for thread

Thread size	Thread tapping			Roll thread tapping		
	Super burnish drill diameter (ϕD_1)	Hole diameter tolerance (ϕ)		Super burnish drill diameter (ϕD_1)	Hole diameter tolerance (ϕ)	
		max	min		max	min
M4x0.7	3.3	3.242	3.422	3.65	3.65	3.7
M5x0.8	4.2	4.134	4.334	4.6	4.59	4.66
M6x1.0	5.0	4.917	5.153	5.5	5.48	5.57
M8x1.25	6.8	6.647	6.912	7.35	7.34	7.41
M10x1.5	8.5	8.376	8.676	9.21	9.18	9.28
M12x1.75	10.3	10.106	10.441	11.08	11.05	11.15
M14x2	12.0	11.835	12.21	12.96	12.92	13.04
M16x2	14.0	13.835	14.21	14.96	14.92	15.04

MAE/MAS

Application examples

Tool	MAE0550MB	MAE0735MB	MAE0470MB	
Workpiece	ISO Al-Si 6 Cu4 Cast Aluminum Alloy ø5.5x19mm deep (Blind hole) 	JIS ADC12 Die Cast Aluminum Alloy ø7.35x18mm deep (Through hole) 	JIS FC250 Cast Iron 	
Component	Cylinder head	Transmission case	Automotive component	
Cutting conditions	Cutting speed (m/min)	120	100	30
	Feed (mm/rev)	0.1	0.2	0.058
	Revolutions (min ⁻¹)	7000	4300	2031
	Feed (mm/min)	700	860	117
Coolant	Water soluble oil	Water soluble oil	Water soluble oil	
Results	● Tool life (No. of holes) (x10000) 1 2 3 4 Hole  Super burnish drill MAE Competitors drill Oversize range large	● Tool life (No. of holes) 10000 20000 Hole  Super burnish drill MAE Competitors drill Oversize range large	● Tool life (No. of holes) 2500 5000 Hole  Super burnish drill MAE Competitors drill	

Tool	MAS0500MB	MAS0735MB	MAE1100MB						
Workpiece	ISO Al-Si 6 Cu4 Cast Aluminum Alloy ø5.0 (Through hole) 7 	JIS ACD12 Die Cast Aluminum Alloy ø7.35x21mm deep (Blind hole)  (Rolled thread tap hole)	JIS FCD350 Ductile Cast Iron 30 						
Component	Pump case	Housing	Plate						
Cutting conditions	Cutting speed (m/min)	78.5	70	60					
	Feed (mm/rev)	0.05	0.15	0.25					
	Revolutions (min ⁻¹)	5000	3000	1740					
	Feed (mm/min)	250	450	435					
Coolant	Water soluble oil	Water soluble oil	Water soluble oil						
Results	● Hole accuracy <table border="1"> <thead> <tr> <th>Tool</th> <th>Results</th> </tr> </thead> <tbody> <tr> <td>Super burnish drill MAS</td> <td>Oversize (≤20μm) Surface finish (Rmax ≤6.38S)</td> </tr> <tr> <td>Competitors drill</td> <td>Oversize initial hole</td> </tr> </tbody> </table>	Tool	Results	Super burnish drill MAS	Oversize (≤20μm) Surface finish (Rmax ≤6.38S)	Competitors drill	Oversize initial hole	● Tool life (No. of holes) 5000 10000 15000 Hole  Super burnish drill MAS Competitors drill Oversize range large	● Tool life (No. of holes) 1000 2000 Hole  Super burnish drill MAE Competitors drill Breakage
Tool	Results								
Super burnish drill MAS	Oversize (≤20μm) Surface finish (Rmax ≤6.38S)								
Competitors drill	Oversize initial hole								

For Your Safety

● Don't touch breakers and chips without gloves. ● Please machine within recommended application range, and exchange expired tools with new parts in advance. ● Please use safety cover and wear safety glasses. ● When using compounded cutting oils, please take fire prevention. ● When attaching chips or spare parts, please use the attached wrench or spanner. ● 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.

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(Tools specifications subject to change without notice.)