MITSUBISHI MATERIALS

MNS
WSTAR Drill Series

SOLID CARBIDE DRILL FOR
HIGH EFFICIENCY MACHINING
OF ALUMINUM ALLOYS





TOOL NEWS **B135A**

Solid Carbide Drill for High Efficiency Machining of Aluminum Alloys

WSTAR DRILL SERIES
MNS TYPE

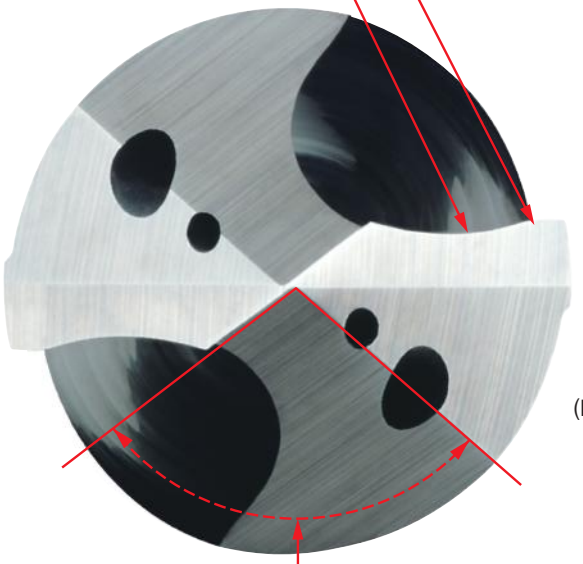
Features

Optimum flute & cutting edge geometry for machining of aluminum alloy

Cutting edge shape

Wavy cutting edge

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



Web thinning pocket

Large thinning pocket for smooth evacuation of the chips prevents welding of the cutting edge.

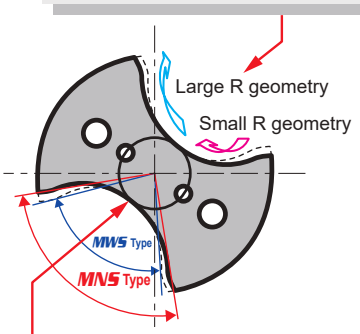
PAT. pending

Cross sectional shape

(Cutting edge shoulder cross section)

Flutes of top edge

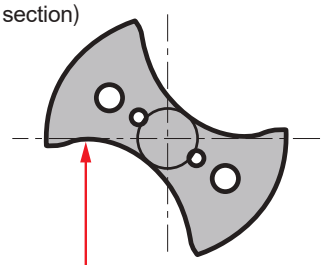
The small R geometry generates initial curling of the chips and combines with the larger geometry to promote smooth chip evacuation.



Special flute geometry

The wide flute is optimally designed for machining of aluminium alloy.

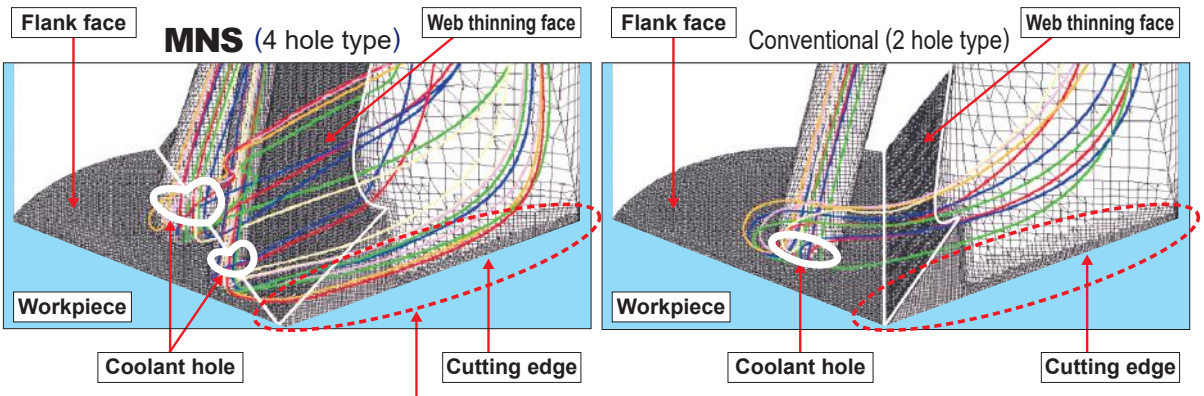
(Mid flute cross section)



Flute geometry

Large flute to prevent chip jamming.

Computerized flow simulation was used to determine the best positioning of the coolant holes

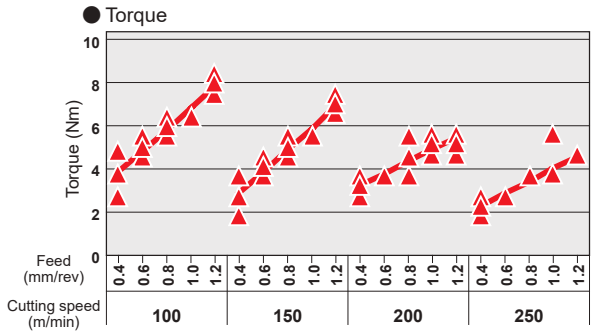


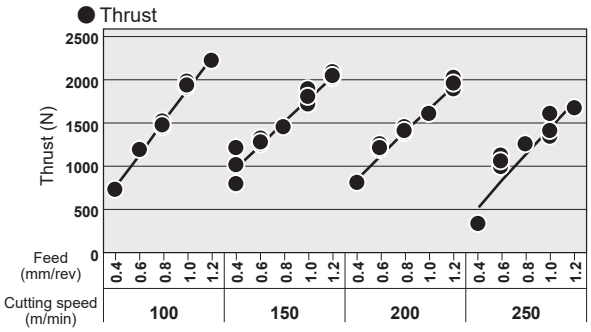
Effective lubrication at the cutting edge point and rake face that can be prone to welding

Cutting Performance

Enables stable, high feed drilling at 1.0mm/rev!

<Cutting conditions>
Workpiece : JIS AC4B-T6
Machine : Machining centre
Tool : MNS0600LB(L/D=5)
Hole depth : 30mm(L/D=5)
Coolant : W.S.O.
Emission pressure : 3MPa (Internal coolant)



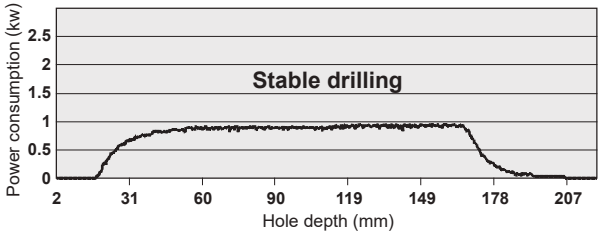


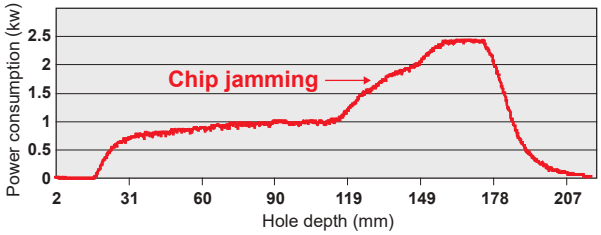
Possible to carry out non-step feed drilling of the holes up to 30xD!

<Cutting conditions>
Workpiece : JIS ADC12
Machine : Machining centre
Tool : ø6.0, L/D 30 drill
Hole depth : 180mm(L/D=29)
Pilot drill : MAS0600MB
Pilot hole depth : 18mm
Cutting speed : 100m/min
Feed per revolution : 0.4mm/rev
Coolant : Semi-dry machining (M.Q.L.)
Emission pressure : 0.5MPa (Internal coolant)



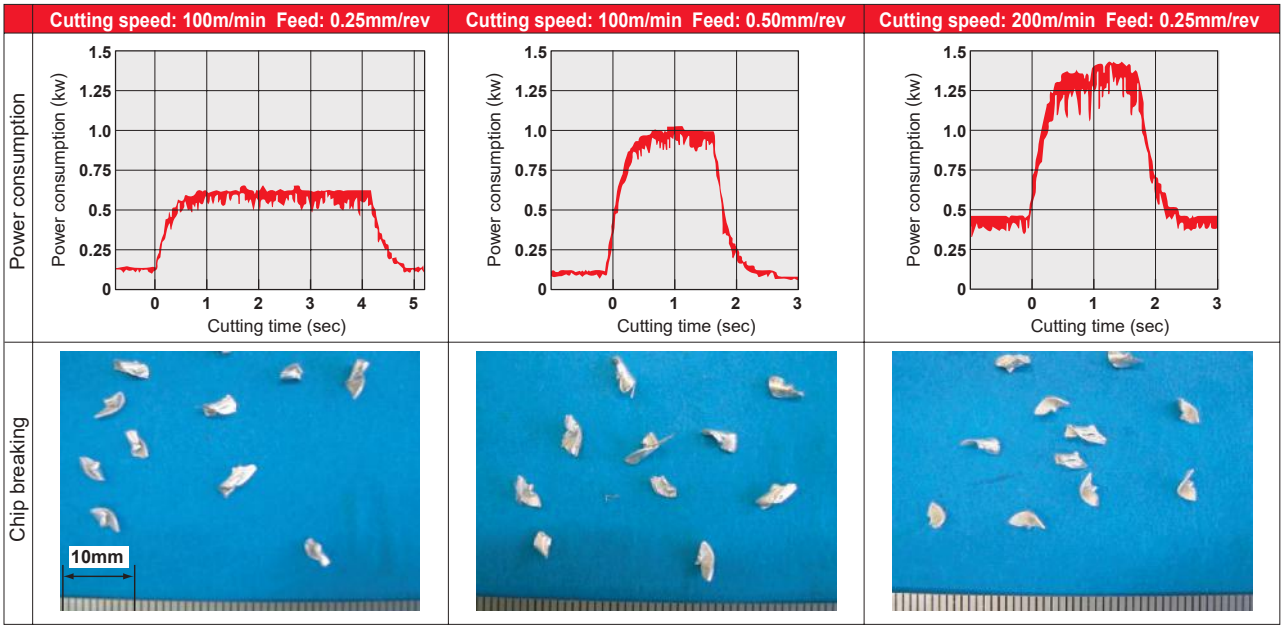






Stable drilling of deep holes in extensive material (A6082) that is difficult to machine

<Cutting conditions>
Workpiece : JIS A6082
Machine : Machining centre
Tool : MNS0550X20DB (L/D=20)
Hole depth : 100mm(L/D=18)
Pilot drill : MAS0550MB
Pilot hole depth : 15mm
Coolant : W.S.O.
Emission pressure : 1MPa (Internal coolant)



Solid Carbide Drill for High Efficiency Machining of Aluminum Alloys

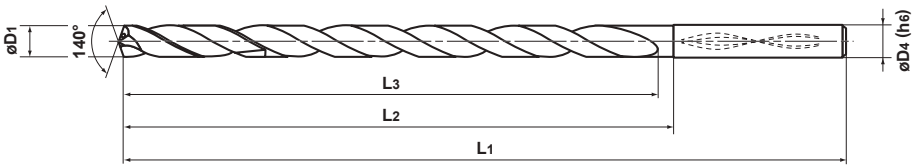
MNS / MNS...DB

WSTAR DRILL WSTAR SUPER LONG DRILL



D1	D1≤3.0	3.0<D1≤6.0	6.0<D1≤10.0	10.0<D1≤14.0
Tolerance	0 -0.014	0 -0.018	0 -0.022	0 -0.027

● 4.5 or smaller diameter drills are designed with 2 coolant holes.



Note) MNS-LB/DB type can be used for shrink fit holders.

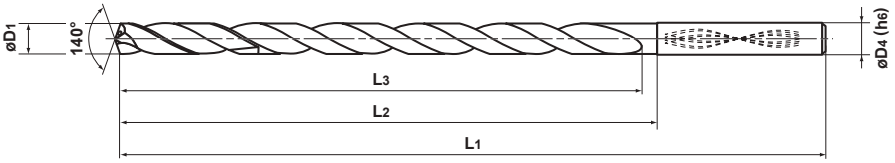
Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock TF15	Order Number	Dimensions (mm) L3	L2	L1	D4
3.0	5	Int.	★	MNS0300LB	33	33	81	3.0
	10	Int.	★	0300X10DB	39	42	90	3.0
	20	Int.	★	0300X20DB	69	72	120	3.0
	30	Int.	★	0300X30DB	99	102	150	3.0
3.1	5	Int.	★	0310LB	39	39	87	4.0
	10	Int.	□	0310X10DB	46	49	97	4.0
	20	Int.	□	0310X20DB	81	84	132	4.0
	30	Int.	□	0310X30DB	116	119	167	4.0
3.2	5	Int.	★	0320LB	39	39	87	4.0
	10	Int.	★	0320X10DB	46	49	97	4.0
	20	Int.	★	0320X20DB	81	84	132	4.0
	30	Int.	★	0320X30DB	116	119	167	4.0
3.3	5	Int.	★	0330LB	39	39	87	4.0
	10	Int.	□	0330X10DB	46	49	97	4.0
	20	Int.	□	0330X20DB	81	84	132	4.0
	30	Int.	□	0330X30DB	116	119	167	4.0
3.4	5	Int.	★	0340LB	39	39	87	4.0
	10	Int.	★	0340X10DB	46	49	97	4.0
	20	Int.	★	0340X20DB	81	84	132	4.0
	30	Int.	★	0340X30DB	116	119	167	4.0
3.5	5	Int.	★	0350LB	39	39	87	4.0
	10	Int.	□	0350X10DB	46	49	97	4.0
	20	Int.	□	0350X20DB	81	84	132	4.0
	30	Int.	□	0350X30DB	116	119	167	4.0
3.6	5	Int.	★	0360LB	44	44	92	4.0
	10	Int.	★	0360X10DB	52	55	103	4.0
	20	Int.	★	0360X20DB	92	95	143	4.0
	30	Int.	★	0360X30DB	132	135	183	4.0
3.7	5	Int.	★	0370LB	44	44	92	4.0
	10	Int.	□	0370X10DB	52	55	103	4.0
	20	Int.	□	0370X20DB	92	95	143	4.0
	30	Int.	□	0370X30DB	132	135	183	4.0
3.8	5	Int.	★	MNS0380LB	44	44	92	4.0
	10	Int.	□	0380X10DB	52	55	103	4.0
	20	Int.	□	0380X20DB	92	95	143	4.0
	30	Int.	□	0380X30DB	132	135	183	4.0
3.9	5	Int.	★	0390LB	44	44	92	4.0
	10	Int.	★	0390X10DB	52	55	103	4.0
	20	Int.	★	0390X20DB	92	95	143	4.0
	30	Int.	★	0390X30DB	132	135	183	4.0
4.0	5	Int.	★	0400LB	44	44	92	4.0
	10	Int.	★	0400X10DB	52	55	103	4.0
	20	Int.	★	0400X20DB	92	95	143	4.0
	30	Int.	★	0400X30DB	132	135	183	4.0
4.1	5	Int.	★	0410LB	50	50	100	5.0
	10	Int.	□	0410X10DB	59	62	112	5.0
	20	Int.	□	0410X20DB	104	107	157	5.0
	30	Int.	□	0410X30DB	149	152	202	5.0
4.2	5	Int.	★	0420LB	50	50	100	5.0
	10	Int.	□	0420X10DB	59	62	112	5.0
	20	Int.	□	0420X20DB	104	107	157	5.0
	30	Int.	□	0420X30DB	149	152	202	5.0
4.3	5	Int.	★	0430LB	50	50	100	5.0
	10	Int.	□	0430X10DB	59	62	112	5.0
	20	Int.	□	0430X20DB	104	107	157	5.0
	30	Int.	□	0430X30DB	149	152	202	5.0
4.4	5	Int.	★	0440LB	50	50	100	5.0
	10	Int.	□	0440X10DB	59	62	112	5.0
	20	Int.	□	0440X20DB	104	107	157	5.0
	30	Int.	□	0440X30DB	149	152	202	5.0
4.5	5	Int.	★	0450LB	50	50	100	5.0
	10	Int.	□	0450X10DB	59	62	112	5.0
	20	Int.	□	0450X20DB	104	107	157	5.0
	30	Int.	□	0450X30DB	149	152	202	5.0

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

★ : Japan inventory maintained. □ : Non stock, produced to order only.



D1	D1≤3.0	3.0<D1≤6.0	6.0<D1≤10.0	10.0<D1≤14.0
Tolerance	0 -0.014	0 -0.018	0 -0.022	0 -0.027



Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock TF15	Order Number	Dimensions (mm) L3	L2	L1	D4
4.6	5	Int.	★	MNS0460LB	55	55	105	5.0
	10	Int.	□	0460X10DB	65	68	118	5.0
	20	Int.	□	0460X20DB	115	118	168	5.0
	30	Int.	□	0460X30DB	165	168	218	5.0
4.7	5	Int.	★	0470LB	55	55	105	5.0
	10	Int.	□	0470X10DB	65	68	118	5.0
	20	Int.	□	0470X20DB	115	118	168	5.0
	30	Int.	□	0470X30DB	165	168	218	5.0
4.8	5	Int.	★	0480LB	55	55	105	5.0
	10	Int.	□	0480X10DB	65	68	118	5.0
	20	Int.	□	0480X20DB	115	118	168	5.0
	30	Int.	□	0480X30DB	165	168	218	5.0
4.9	5	Int.	★	0490LB	55	55	105	5.0
	10	Int.	★	0490X10DB	65	68	118	5.0
	20	Int.	★	0490X20DB	115	118	168	5.0
	30	Int.	★	0490X30DB	165	168	218	5.0
5.0	5	Int.	★	0500LB	44	44	100	6.0
	10	Int.	★	0500X10DB	65	68	118	5.0
	20	Int.	★	0500X20DB	115	118	168	5.0
	30	Int.	★	0500X30DB	165	168	218	5.0
5.1	5	Int.	★	0510LB	44	44	100	6.0
	10	Int.	★	0510X10DB	72	75	127	6.0
	20	Int.	★	0510X20DB	127	130	182	6.0
	30	Int.	★	0510X30DB	182	185	237	6.0
5.2	5	Int.	★	0520LB	44	44	100	6.0
	10	Int.	□	0520X10DB	72	75	127	6.0
	20	Int.	□	0520X20DB	127	130	182	6.0
	30	Int.	□	0520X30DB	182	185	237	6.0
5.3	5	Int.	★	0530LB	44	44	100	6.0
	10	Int.	□	0530X10DB	72	75	127	6.0
	20	Int.	□	0530X20DB	127	130	182	6.0
	30	Int.	□	0530X30DB	182	185	237	6.0
5.4	5	Int.	★	0540LB	44	44	100	6.0
	10	Int.	□	0540X10DB	72	75	127	6.0
	20	Int.	□	0540X20DB	127	130	182	6.0
	30	Int.	□	0540X30DB	182	185	237	6.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock TF15	Order Number	Dimensions (mm) L3	L2	L1	D4
5.5	5	Int.	★	MNS0550LB	44	44	100	6.0
	10	Int.	★	0550X10DB	72	75	127	6.0
	20	Int.	★	0550X20DB	127	130	182	6.0
	30	Int.	★	0550X30DB	182	185	237	6.0
5.6	5	Int.	★	0560LB	48	48	100	6.0
	10	Int.	□	0560X10DB	78	81	133	6.0
	20	Int.	□	0560X20DB	138	141	193	6.0
	30	Int.	□	0560X30DB	198	201	253	6.0
5.7	5	Int.	★	0570LB	48	48	100	6.0
	10	Int.	□	0570X10DB	78	81	133	6.0
	20	Int.	□	0570X20DB	138	141	193	6.0
	30	Int.	□	0570X30DB	198	201	253	6.0
5.8	5	Int.	★	0580LB	48	48	100	6.0
	10	Int.	□	0580X10DB	78	81	133	6.0
	20	Int.	□	0580X20DB	138	141	193	6.0
	30	Int.	□	0580X30DB	198	201	253	6.0
5.9	5	Int.	★	0590LB	48	48	100	6.0
	10	Int.	□	0590X10DB	78	81	133	6.0
	20	Int.	□	0590X20DB	138	141	193	6.0
	30	Int.	□	0590X30DB	198	201	253	6.0
6.0	5	Int.	★	0600LB	48	48	100	6.0
	10	Int.	★	0600X10DB	78	81	133	6.0
	20	Int.	★	0600X20DB	138	141	193	6.0
	30	Int.	★	0600X30DB	198	201	253	6.0
6.1	5	Int.	★	0610LB	52	52	109	7.0
	10	Int.	★	0610X10DB	85	88	141	7.0
	20	Int.	★	0610X20DB	150	153	206	7.0
	30	Int.	★	0610X30DB	215	218	271	7.0
6.2	5	Int.	★	0620LB	52	52	109	7.0
	10	Int.	□	0620X10DB	85	88	141	7.0
	20	Int.	□	0620X20DB	150	153	206	7.0
	30	Int.	□	0620X30DB	215	218	271	7.0
6.3	5	Int.	★	0630LB	52	52	109	7.0
	10	Int.	□	0630X10DB	85	88	141	7.0
	20	Int.	□	0630X20DB	150	153	206	7.0
	30	Int.	□	0630X30DB	215	218	271	7.0

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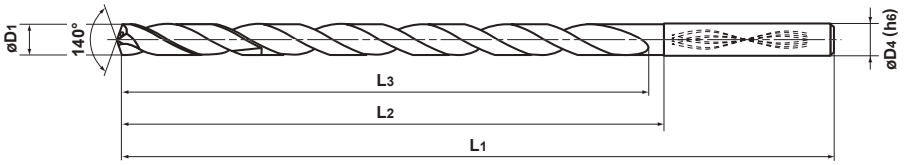
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MNS / MNS...DB

WSTAR DRILL WSTAR SUPER LONG DRILL



D1	D1≤3.0	3.0<D1≤6.0	6.0<D1≤10.0	10.0<D1≤14.0
Tolerance	0 -0.014	0 -0.018	0 -0.022	0 -0.027



Note) MNS-LB/DB type can be used for shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock TF15	Order Number	Dimensions (mm) L3	L2	L1	D4
6.4	5	Int.	★	MNS0640LB	52	52	109	7.0
	10	Int.	□	0640X10DB	85	88	141	7.0
	20	Int.	□	0640X20DB	150	153	206	7.0
	30	Int.	□	0640X30DB	215	218	271	7.0
6.5	5	Int.	★	0650LB	52	52	109	7.0
	10	Int.	★	0650X10DB	85	88	141	7.0
	20	Int.	★	0650X20DB	150	153	206	7.0
	30	Int.	★	0650X30DB	215	218	271	7.0
6.6	5	Int.	★	0660LB	56	56	109	7.0
	10	Int.	□	0660X10DB	91	94	147	7.0
	20	Int.	□	0660X20DB	161	164	217	7.0
	30	Int.	□	0660X30DB	231	234	287	7.0
6.7	5	Int.	★	0670LB	56	56	109	7.0
	10	Int.	★	0670X10DB	91	94	147	7.0
	20	Int.	★	0670X20DB	161	164	217	7.0
	30	Int.	★	0670X30DB	231	234	287	7.0
6.8	5	Int.	★	0680LB	56	56	109	7.0
	10	Int.	□	0680X10DB	91	94	147	7.0
	20	Int.	□	0680X20DB	161	164	217	7.0
	30	Int.	□	0680X30DB	231	234	287	7.0
6.9	5	Int.	★	0690LB	56	56	109	7.0
	10	Int.	□	0690X10DB	91	94	147	7.0
	20	Int.	□	0690X20DB	161	164	217	7.0
	30	Int.	□	0690X30DB	231	234	287	7.0
7.0	5	Int.	★	0700LB	56	56	109	7.0
	10	Int.	★	0700X10DB	91	94	147	7.0
	20	Int.	★	0700X20DB	161	164	217	7.0
	30	Int.	★	0700X30DB	231	234	287	7.0
7.1	5	Int.	★	0710LB	60	64	118	8.0
	10	Int.	□	0710X10DB	98	101	155	8.0
	20	Int.	□	0710X20DB	173	176	230	8.0
	30	Int.	□	0710X30DB	248	251	305	8.0
7.2	5	Int.	★	0720LB	60	64	118	8.0
	10	Int.	★	0720X10DB	98	101	155	8.0
	20	Int.	★	0720X20DB	173	176	230	8.0
	30	Int.	★	0720X30DB	248	251	305	8.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock TF15	Order Number	Dimensions (mm) L3	L2	L1	D4
7.3	5	Int.	★	MNS0730LB	60	64	118	8.0
	10	Int.	□	0730X10DB	98	101	155	8.0
	20	Int.	□	0730X20DB	173	176	230	8.0
	30	Int.	□	0730X30DB	248	251	305	8.0
7.4	5	Int.	★	0740LB	60	64	118	8.0
	10	Int.	□	0740X10DB	98	101	155	8.0
	20	Int.	□	0740X20DB	173	176	230	8.0
	30	Int.	□	0740X30DB	248	251	305	8.0
7.5	5	Int.	★	0750LB	60	64	118	8.0
	10	Int.	□	0750X10DB	98	101	155	8.0
	20	Int.	□	0750X20DB	173	176	230	8.0
	30	Int.	□	0750X30DB	248	251	305	8.0
7.6	5	Int.	★	0760LB	64	64	118	8.0
	10	Int.	□	0760X10DB	104	107	161	8.0
	20	Int.	□	0760X20DB	184	187	241	8.0
	30	Int.	□	0760X30DB	264	267	321	8.0
7.7	5	Int.	★	0770LB	64	64	118	8.0
	10	Int.	□	0770X10DB	104	107	161	8.0
	20	Int.	□	0770X20DB	184	187	241	8.0
	30	Int.	□	0770X30DB	264	267	321	8.0
7.8	5	Int.	★	0780LB	64	64	118	8.0
	10	Int.	★	0780X10DB	104	107	161	8.0
	20	Int.	★	0780X20DB	184	187	241	8.0
	30	Int.	★	0780X30DB	264	267	321	8.0
7.9	5	Int.	★	0790LB	64	64	118	8.0
	10	Int.	□	0790X10DB	104	107	161	8.0
	20	Int.	□	0790X20DB	184	187	241	8.0
	30	Int.	□	0790X30DB	264	267	321	8.0
8.0	5	Int.	★	0800LB	64	64	118	8.0
	10	Int.	★	0800X10DB	104	107	161	8.0
	20	Int.	★	0800X20DB	184	187	241	8.0
	30	Int.	★	0800X30DB	264	267	321	8.0
8.1	5	Int.	★	0810LB	68	72	127	9.0
	10	Int.	□	0810X10DB	111	114	169	9.0
	20	Int.	□	0810X20DB	196	199	254	9.0
	30	Int.	□	0810X30DB	281	284	339	9.0

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

★ : Japan inventory maintained. □ : Non stock, produced to order only.

Drill Dia. D_1 (mm)	Hole Depth (l/d)	Coolant	Stock TF15	Order Number	Dimensions (mm) L_3	L_2	L_1	D_4
8.2	5	Int.	★	**MNS0820LB**	68	72	127	9.0
	10	Int.	□	**0820X10DB**	111	114	169	9.0
	20	Int.	□	**0820X20DB**	196	199	254	9.0
	30	Int.	□	**0820X30DB**	281	284	339	9.0
8.3	5	Int.	★	**0830LB**	68	72	127	9.0
	10	Int.	□	**0830X10DB**	111	114	169	9.0
	20	Int.	□	**0830X20DB**	196	199	254	9.0
	30	Int.	□	**0830X30DB**	281	284	339	9.0
8.4	5	Int.	★	**0840LB**	68	72	127	9.0
	10	Int.	□	**0840X10DB**	111	114	169	9.0
	20	Int.	□	**0840X20DB**	196	199	254	9.0
	30	Int.	□	**0840X30DB**	281	284	339	9.0
8.5	5	Int.	★	**0850LB**	68	72	127	9.0
	10	Int.	□	**0850X10DB**	111	114	169	9.0
	20	Int.	□	**0850X20DB**	196	199	254	9.0
	30	Int.	□	**0850X30DB**	281	284	339	9.0
8.6	5	Int.	★	**0860LB**	72	72	127	9.0
	10	Int.	□	**0860X10DB**	117	120	175	9.0
	20	Int.	□	**0860X20DB**	207	210	265	9.0
	30	Int.	□	**0860X30DB**	297	300	355	9.0
8.7	5	Int.	★	**0870LB**	72	72	127	9.0
	10	Int.	□	**0870X10DB**	117	120	175	9.0
	20	Int.	□	**0870X20DB**	207	210	265	9.0
	30	Int.	□	**0870X30DB**	297	300	355	9.0
8.8	5	Int.	★	**0880LB**	72	72	127	9.0
	10	Int.	□	**0880X10DB**	117	120	175	9.0
	20	Int.	□	**0880X20DB**	207	210	265	9.0
	30	Int.	□	**0880X30DB**	297	300	355	9.0
8.9	5	Int.	★	**0890LB**	72	72	127	9.0
	10	Int.	□	**0890X10DB**	117	120	175	9.0
	20	Int.	□	**0890X20DB**	207	210	265	9.0
	30	Int.	□	**0890X30DB**	297	300	355	9.0
9.0	5	Int.	★	**0900LB**	72	72	127	9.0
	10	Int.	★	**0900X10DB**	117	120	175	9.0
	20	Int.	★	**0900X20DB**	207	210	265	9.0
	30	Int.	★	**0900X30DB**	297	300	355	9.0
9.1	5	Int.	★	**0910LB**	76	80	136	10.0
	10	Int.	□	**0910X10DB**	124	127	182	10.0
	20	Int.	□	**0910X20DB**	219	222	277	10.0
	30	Int.	□	**0910X30DB**	314	317	372	10.0
9.2	5	Int.	★	**0920LB**	76	80	136	10.0
	10	Int.	□	**0920X10DB**	124	127	182	10.0
	20	Int.	□	**0920X20DB**	219	222	277	10.0
	30	Int.	□	**0920X30DB**	314	317	372	10.0
9.3	5	Int.	★	**0930LB**	76	80	136	10.0
	10	Int.	□	**0930X10DB**	124	127	182	10.0
	20	Int.	□	**0930X20DB**	219	222	277	10.0
	30	Int.	□	**0930X30DB**	314	317	372	10.0
9.4	5	Int.	★	**MNS0940LB**	76	80	136	10.0
	10	Int.	□	**0940X10DB**	124	127	182	10.0
	20	Int.	□	**0940X20DB**	219	222	277	10.0
	30	Int.	□	**0940X30DB**	314	317	372	10.0
9.5	5	Int.	★	**0950LB**	76	80	136	10.0
	10	Int.	□	**0950X10DB**	124	127	182	10.0
	20	Int.	□	**0950X20DB**	219	222	277	10.0
	30	Int.	□	**0950X30DB**	314	317	372	10.0
9.6	5	Int.	★	**0960LB**	80	80	136	10.0
	10	Int.	□	**0960X10DB**	130	133	188	10.0
	20	Int.	□	**0960X20DB**	230	233	288	10.0
	30	Int.	□	**0960X30DB**	330	333	388	10.0
9.7	5	Int.	★	**0970LB**	80	80	136	10.0
	10	Int.	□	**0970X10DB**	130	133	188	10.0
	20	Int.	□	**0970X20DB**	230	233	288	10.0
	30	Int.	□	**0970X30DB**	330	333	388	10.0
9.8	5	Int.	★	**0980LB**	80	80	136	10.0
	10	Int.	★	**0980X10DB**	130	133	188	10.0
	20	Int.	★	**0980X20DB**	230	233	288	10.0
	30	Int.	★	**0980X30DB**	330	333	388	10.0
9.9	5	Int.	★	**0990LB**	80	80	136	10.0
	10	Int.	□	**0990X10DB**	130	133	188	10.0
	20	Int.	□	**0990X20DB**	230	233	288	10.0
	30	Int.	□	**0990X30DB**	330	333	388	10.0
10.0	5	Int.	★	**1000LB**	80	80	136	10.0
	10	Int.	★	**1000X10DB**	130	133	188	10.0
	20	Int.	★	**1000X20DB**	230	233	288	10.0
	30	Int.	★	**1000X30DB**	330	333	388	10.0
10.1	5	Int.	★	**1010LB**	84	88	149	11.0
	10	Int.	□	**1010X10DB**	137	140	201	11.0
	20	Int.	□	**1010X20DB**	242	245	306	11.0
10.2	5	Int.	★	**1020LB**	84	88	149	11.0
	10	Int.	□	**1020X10DB**	137	140	201	11.0
	20	Int.	□	**1020X20DB**	242	245	306	11.0
10.3	5	Int.	★	**1030LB**	84	88	149	11.0
	10	Int.	□	**1030X10DB**	137	140	201	11.0
	20	Int.	□	**1030X20DB**	242	245	306	11.0
10.4	5	Int.	★	**1040LB**	84	88	149	11.0
	10	Int.	□	**1040X10DB**	137	140	201	11.0
	20	Int.	□	**1040X20DB**	242	245	306	11.0
10.5	5	Int.	★	**1050LB**	84	88	149	11.0
	10	Int.	★	**1050X10DB**	137	140	201	11.0
	20	Int.	★	**1050X20DB**	242	245	306	11.0
10.6	5	Int.	★	**1060LB**	88	88	149	11.0
	10	Int.	□	**1060X10DB**	143	146	207	11.0
	20	Int.	□	**1060X20DB**	253	256	317	11.0

★ : Japan inventory maintained. □ : Non stock, produced to order only.

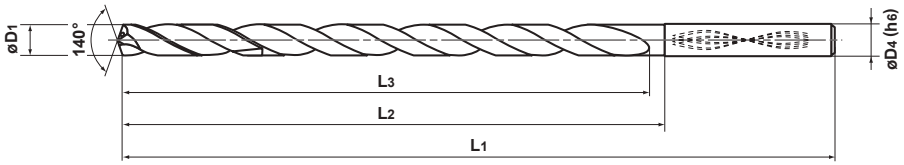
Solid Carbide Drill for High Efficiency Machining of Aluminum Alloys

MNS / MNS...DB

WSTAR DRILL WSTAR SUPER LONG DRILL



D_1	$D_1 \leq 3.0$	$3.0 < D_1 \leq 6.0$	$6.0 < D_1 \leq 10.0$	$10.0 < D_1 \leq 14.0$
Tolerance	0 -0.014	0 -0.018	0 -0.022	0 -0.027



Note) MNS-LB/DB type can be used for shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock TF15	Order Number	Dimensions (mm) L3	L2	L1	D4
	5	Int.	★	**MNS1070LB**	88	88	149	11.0
10.7	10	Int.	□	**1070X10DB**	143	146	207	11.0
	20	Int.	□	**1070X20DB**	253	256	317	11.0
	5	Int.	★	**1080LB**	88	88	149	11.0
10.8	10	Int.	□	**1080X10DB**	143	146	207	11.0
	20	Int.	□	**1080X20DB**	253	256	317	11.0
	5	Int.	★	**1090LB**	88	88	149	11.0
10.9	10	Int.	□	**1090X10DB**	143	146	207	11.0
	20	Int.	□	**1090X20DB**	253	256	317	11.0
	5	Int.	★	**1100LB**	88	88	149	11.0
11.0	10	Int.	★	**1100X10DB**	143	146	207	11.0
	20	Int.	★	**1100X20DB**	253	256	317	11.0
	5	Int.	★	**1110LB**	92	96	158	12.0
11.1	10	Int.	□	**1110X10DB**	150	153	215	12.0
	20	Int.	□	**1110X20DB**	265	268	330	12.0
	5	Int.	★	**1120LB**	92	96	158	12.0
11.2	10	Int.	□	**1120X10DB**	150	153	215	12.0
	20	Int.	□	**1120X20DB**	265	268	330	12.0
	5	Int.	★	**1130LB**	92	96	158	12.0
11.3	10	Int.	□	**1130X10DB**	150	153	215	12.0
	20	Int.	□	**1130X20DB**	265	268	330	12.0
	5	Int.	★	**1140LB**	92	96	158	12.0
11.4	10	Int.	□	**1140X10DB**	150	153	215	12.0
	20	Int.	□	**1140X20DB**	265	268	330	12.0
	5	Int.	★	**1150LB**	92	96	158	12.0
11.5	10	Int.	□	**1150X10DB**	150	153	215	12.0
	20	Int.	□	**1150X20DB**	265	268	330	12.0
	5	Int.	★	**1160LB**	96	96	158	12.0
11.6	10	Int.	□	**1160X10DB**	156	159	221	12.0
	20	Int.	□	**1160X20DB**	276	279	341	12.0
	5	Int.	★	**1170LB**	96	96	158	12.0
11.7	10	Int.	□	**1170X10DB**	156	159	221	12.0
	20	Int.	□	**1170X20DB**	276	279	341	12.0
	5	Int.	★	**1180LB**	96	96	158	12.0
11.8	10	Int.	□	**1180X10DB**	156	159	221	12.0
	20	Int.	□	**1180X20DB**	276	279	341	12.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant	Stock TF15	Order Number	Dimensions (mm) L3	L2	L1	D4
	5	Int.	★	**MNS1190LB**	96	96	158	12.0
11.9	10	Int.	□	**1190X10DB**	156	159	221	12.0
	20	Int.	□	**1190X20DB**	276	279	341	12.0
	5	Int.	★	**1200LB**	96	96	158	12.0
12.0	10	Int.	★	**1200X10DB**	156	159	221	12.0
	20	Int.	★	**1200X20DB**	276	279	341	12.0
	5	Int.	★	**1210LB**	100	104	167	13.0
12.1	10	Int.	□	**1210X10DB**	163	166	229	13.0
	20	Int.	□	**1210X20DB**	288	291	354	13.0
	5	Int.	★	**1220LB**	100	104	167	13.0
12.2	10	Int.	□	**1220X10DB**	163	166	229	13.0
	20	Int.	□	**1220X20DB**	288	291	354	13.0
	5	Int.	★	**1230LB**	100	104	167	13.0
12.3	10	Int.	□	**1230X10DB**	163	166	229	13.0
	20	Int.	□	**1230X20DB**	288	291	354	13.0
	5	Int.	★	**1240LB**	100	104	167	13.0
12.4	10	Int.	□	**1240X10DB**	163	166	229	13.0
	20	Int.	□	**1240X20DB**	288	291	354	13.0
	5	Int.	★	**1250LB**	100	104	167	13.0
12.5	10	Int.	□	**1250X10DB**	163	166	229	13.0
	20	Int.	□	**1250X20DB**	288	291	354	13.0
	5	Int.	★	**1260LB**	104	104	167	13.0
12.6	10	Int.	□	**1260X10DB**	169	172	235	13.0
	20	Int.	□	**1260X20DB**	299	302	365	13.0
	5	Int.	★	**1270LB**	104	104	167	13.0
12.7	10	Int.	□	**1270X10DB**	169	172	235	13.0
	20	Int.	□	**1270X20DB**	299	302	365	13.0
	5	Int.	★	**1280LB**	104	104	167	13.0
12.8	10	Int.	□	**1280X10DB**	169	172	235	13.0
	20	Int.	□	**1280X20DB**	299	302	365	13.0
	5	Int.	★	**1290LB**	104	104	167	13.0
12.9	10	Int.	□	**1290X10DB**	169	172	235	13.0
	20	Int.	□	**1290X20DB**	299	302	365	13.0
	5	Int.	★	**1300LB**	104	104	167	13.0
13.0	10	Int.	★	**1300X10DB**	169	172	235	13.0
	20	Int.	★	**1300X20DB**	299	302	365	13.0

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

★ : Japan inventory maintained. □ : Non stock, produced to order only.

Drill Dia. D_1 (mm)	Hole Depth (l/d)	Coolant	Stock TF15	Order Number	Dimensions (mm) L_3	L_2	L_1	D_4
	5	Int.	★	**MNS1310LB**	108	112	176	14.0
13.1	10	Int.	□	**1310X10DB**	176	179	243	14.0
	20	Int.	□	**1310X20DB**	311	314	378	14.0
	5	Int.	★	**1320LB**	108	112	176	14.0
13.2	10	Int.	□	**1320X10DB**	176	179	243	14.0
	20	Int.	□	**1320X20DB**	311	314	378	14.0
	5	Int.	★	**1330LB**	108	112	176	14.0
13.3	10	Int.	□	**1330X10DB**	176	179	243	14.0
	20	Int.	□	**1330X20DB**	311	314	378	14.0
	5	Int.	★	**1340LB**	108	112	176	14.0
13.4	10	Int.	□	**1340X10DB**	176	179	243	14.0
	20	Int.	□	**1340X20DB**	311	314	378	14.0
	5	Int.	★	**1350LB**	108	112	176	14.0
13.5	10	Int.	□	**1350X10DB**	176	179	243	14.0
	20	Int.	□	**1350X20DB**	311	314	378	14.0

Drill Dia. D_1 (mm)	Hole Depth (l/d)	Coolant	Stock TF15	Order Number	Dimensions (mm) L_3	L_2	L_1	D_4
	5	Int.	★	**MNS1360LB**	112	112	176	14.0
13.6	10	Int.	□	**1360X10DB**	182	185	249	14.0
	20	Int.	□	**1360X20DB**	322	325	389	14.0
	5	Int.	★	**1370LB**	112	112	176	14.0
13.7	10	Int.	□	**1370X10DB**	182	185	249	14.0
	20	Int.	□	**1370X20DB**	322	325	389	14.0
	5	Int.	★	**1380LB**	112	112	176	14.0
13.8	10	Int.	□	**1380X10DB**	182	185	249	14.0
	20	Int.	□	**1380X20DB**	322	325	389	14.0
	5	Int.	★	**1390LB**	112	112	176	14.0
13.9	10	Int.	□	**1390X10DB**	182	185	249	14.0
	20	Int.	□	**1390X20DB**	322	325	389	14.0
	5	Int.	★	**1400LB**	112	112	176	14.0
14.0	10	Int.	★	**1400X10DB**	182	185	249	14.0
	20	Int.	★	**1400X20DB**	322	325	389	14.0

Recommended Cutting Conditions

Work Material		Order Number	Drill Diameter					
			ϕ3.0—ϕ6.0		**ϕ6.0—ϕ10.0**		**ϕ10.0—ϕ14.0**	
			Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
N	Aluminum Alloy Casting Aluminum Die Casting	MNS...LB	80—150	0.20—0.50	100—200	0.30—1.00	150—250	0.30—1.00
		MNS...DB	60—120	0.20—0.50	80—150	0.30—1.00	120—200	0.30—1.00
	Wrought Aluminum Alloy	MNS...LB	80—150	0.15—0.30	100—200	0.20—0.40	150—250	0.20—0.40
		MNS...DB	60—120	0.15—0.30	80—150	0.20—0.40	120—200	0.20—0.40

Note 1) When using the drill with a length over l/d 10, it is necessary to use a prep holes as a guide. (If no prep-hole is used then drill breakage can occur)

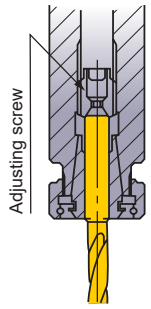
Note 2) For pilot hole drilling, Mitsubishi Materials MNS-LB, MAE-MB or MAS-MB drill is recommended.

★ : Japan inventory maintained. □ : Non stock, produced to order only.

MNS
WSTAR DRILL

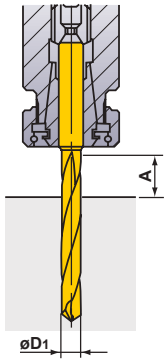
Operational Guidance for the MNS-LB Drill

Drill holding



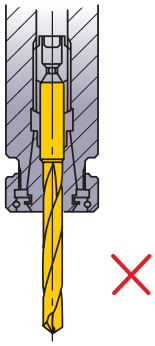
Thrust bearing type collet chuck holds the drill securely.

Drill length



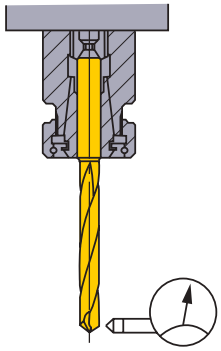
A : ≥ D_1 x 1.5

Drill installation



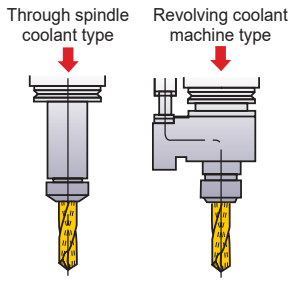
Do not clamp on the flutes.

Installation tolerance



Runout ≤ 0.03mm

Coolant method (MNS)



Coolant pressure is approx. 0.5 - 7MPa.

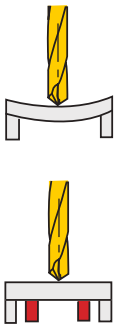
Coolant handling

< **MNS** type >

1) Dirt and dust particles in old coolant can clog the oil hole and prevent effective flow. Regular coolant exchange is recommended.

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.

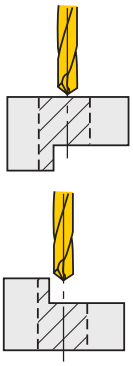
Thin workpieces



If bending occurs ×

Support the workpiece ○

Interrupted cutting



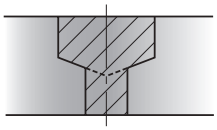
One process ○

①Lower the feed when drilling the interrupted part.

Requires prior machining △

①Spot face with an end mill prior to drilling.

Stepped holes

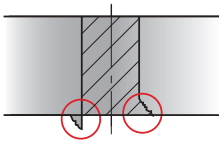


①Divide the machining into two processes.

②Drill the larger hole first.

*Tools for chamfering and spot facing can be produced to order.

Burring and workpiece chipping



①Lower the feed rate when breaking through.

②Add a chamfer.

③Change the point angle.

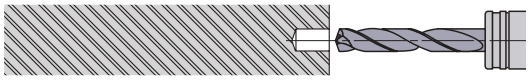
MNS...DB
WSTAR SUPER LONG DRILL

Operational Guidance for the MNS-DB Drill

Flat Face Drilling

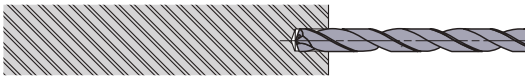
●Drilling a blind hole

1. Drilling a pilot hole



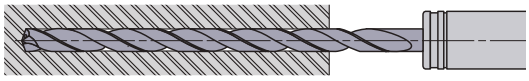
①Use a drill with a larger (flatter) point angle than the super long type. Mitsubishi type MNS-LB, MAE-MB or MAS-MB drill is recommended.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1D or deeper.
(Adjust the pilot hole depth according to the length of the super long type.)

2. Initial cutting with the long type drill



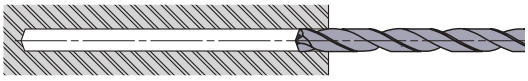
①Penetrate the pilot hole at low revolution. (Cutting speed 20m-30m/min, feed rate 0.2mm-0.3mm/rev)
②Stop the long type drill 1mm-3mm short of the pilot hole bottom.

3. Drill the deep hole



①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

4. Drill retraction

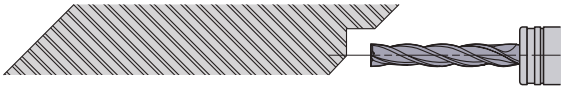


①After drilling, lower the cutting revolution about 1mm-2mm short of the hole end. (Cutting speed of around 20m-30m/min)
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.
③Finally, clear the hole at a cutting speed of 20m-30m/min and feed rate of 0.2mm-0.3mm/rev.

Interrupted Drilling

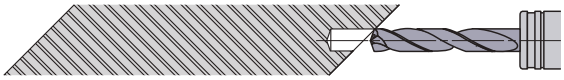
●Drilling and breaking through on irregular faces or angles

1. Spot facing



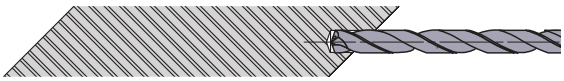
①Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

2. Drilling a pilot hole



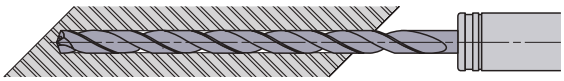
①Use a drill with a larger (flatter) point angle than the super long type. Mitsubishi type MNS-LB, MAE-MB or MAS-MB drill is recommended.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1D or deeper.
(Adjust the pilot hole depth according to the length of the super long type.)

3. Initial cutting with the long type drill



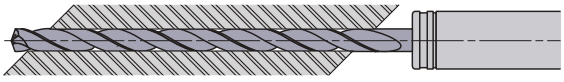
①Penetrate the pilot hole at a low revolution. (Cutting speed 20m-30m/min, feed rate 0.2mm-0.3mm/rev)
②Stop the long type drill 1mm-3mm short of the pilot hole bottom.

4. Drill the deep hole



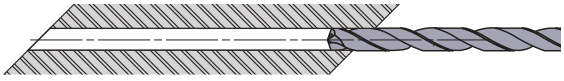
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

5. Breaking through



①When breaking through, the cutting edge can be damaged.
②A feed rate of 0.05mm-0.1mm/rev is recommended.

6. Drill retraction



①Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.
②Finally clear the hole at a cutting speed of 20m-30m/min and feed rate of 0.2mm-0.3mm/rev.

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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 attaching inserts or spare parts, please use only the correct wrench or driver.
- When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

www.mmc-carbide.com/us

Tools specifications subject to change without notice.

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