

Solid Carbide Drill with Through Coolant Holes

WSTAR DRILL SERIES

MINI-MWS

For high efficiency micro deep hole drilling!

- Increased stability deep hole drilling is realised after using MWS-SB drills for pilot holes.
- Drill sizes available from $\varnothing 0.5$ to $\varnothing 2.95$ in lengths L/D1,5,12,20,25 and 30.



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MINI-MWS

■ Features of MWS-LB/XB/DB Type

- Through coolant holes, flute geometry and cutting edge geometry are optimised for deep micro hole drilling.



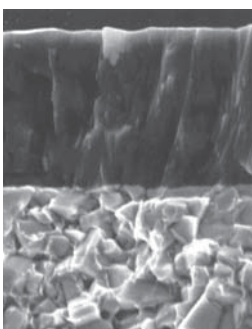
Smoother flute surface for improved chip disposal.

Through coolant forces efficient discharge of chips.

Special flute geometry for superior chip flow.

Optimum cutting edge geometry for breaking chips into small pieces.

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



MIRACLE®
coating
(Al,Ti)N

TF15
micrograin
cemented
carbide

VP15TF



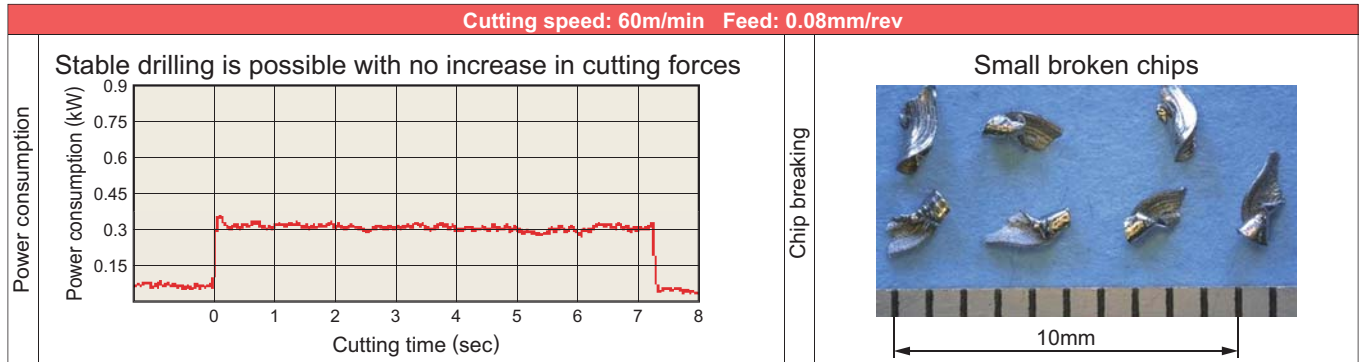
Features of **VP15TF**

MIRACLE® coated **VP15TF** is ideal for drilling due to its high resistance to chip welding. Suitable for machining a wide range of workpiece materials from mild and alloy steels through to stainless steel and cast iron.

Cutting Performance

● Excellent chip disposal

Non-peck drilling is possible when drilling 75mm depth small holes!



<Cutting conditions>

Workpiece : JIS SCM440
 Drill : MWS0255X30DB (φ2.55mm)
 Hole depth : 75mm
 Cutting speed: 60m/min

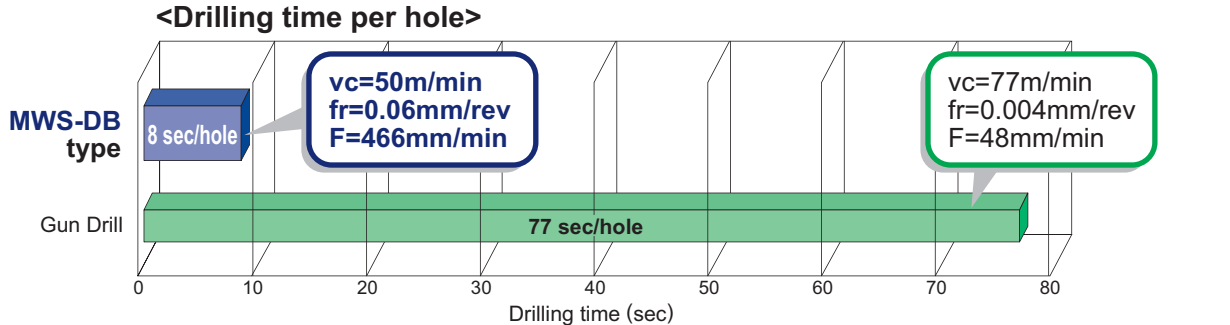
Feed : 0.08mm/rev
 Coolant : W.S.O.
 Emission pressure: 5MPa (Internal coolant)
 Machine : Machining centre

<Cutting conditions for pilot drilling>

Drill : MWS0255SB (φ2.55mm)
 Hole depth : 3mm
 Cutting speed: 60m/min
 Feed : 0.08mm/rev

● Ultra productivity machining

90% cycle time reduction when drilling 62mm depth small holes!



<Cutting conditions for MWS-DB>

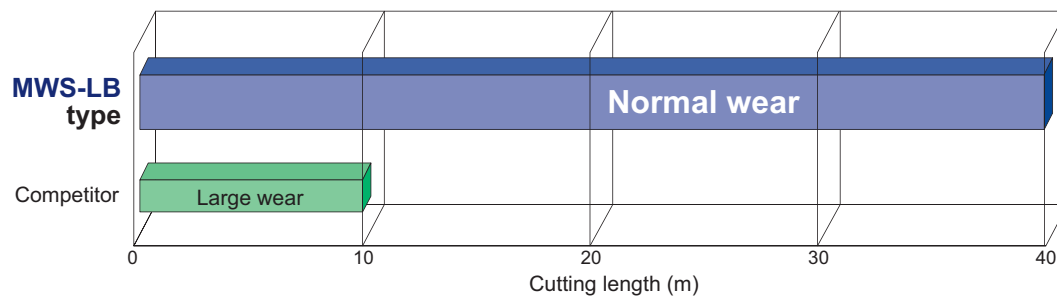
Workpiece : JIS SCM440
 Drill : MWS0205X30DB (φ2.05mm)
 Hole depth : 62mm
 Cutting speed: 50m/min

Feed : 0.06mm/rev
 Coolant : W.S.O.
 Emission pressure: 1.5MPa (Internal coolant)
 Machine : Machining centre

<Cutting conditions for pilot drilling>

Drill : MWS0205SB (φ2.05mm)
 Hole depth : 3mm
 Cutting speed: 60m/min
 Feed : 0.08mm/rev

● Longer tool life when drilling stainless steel



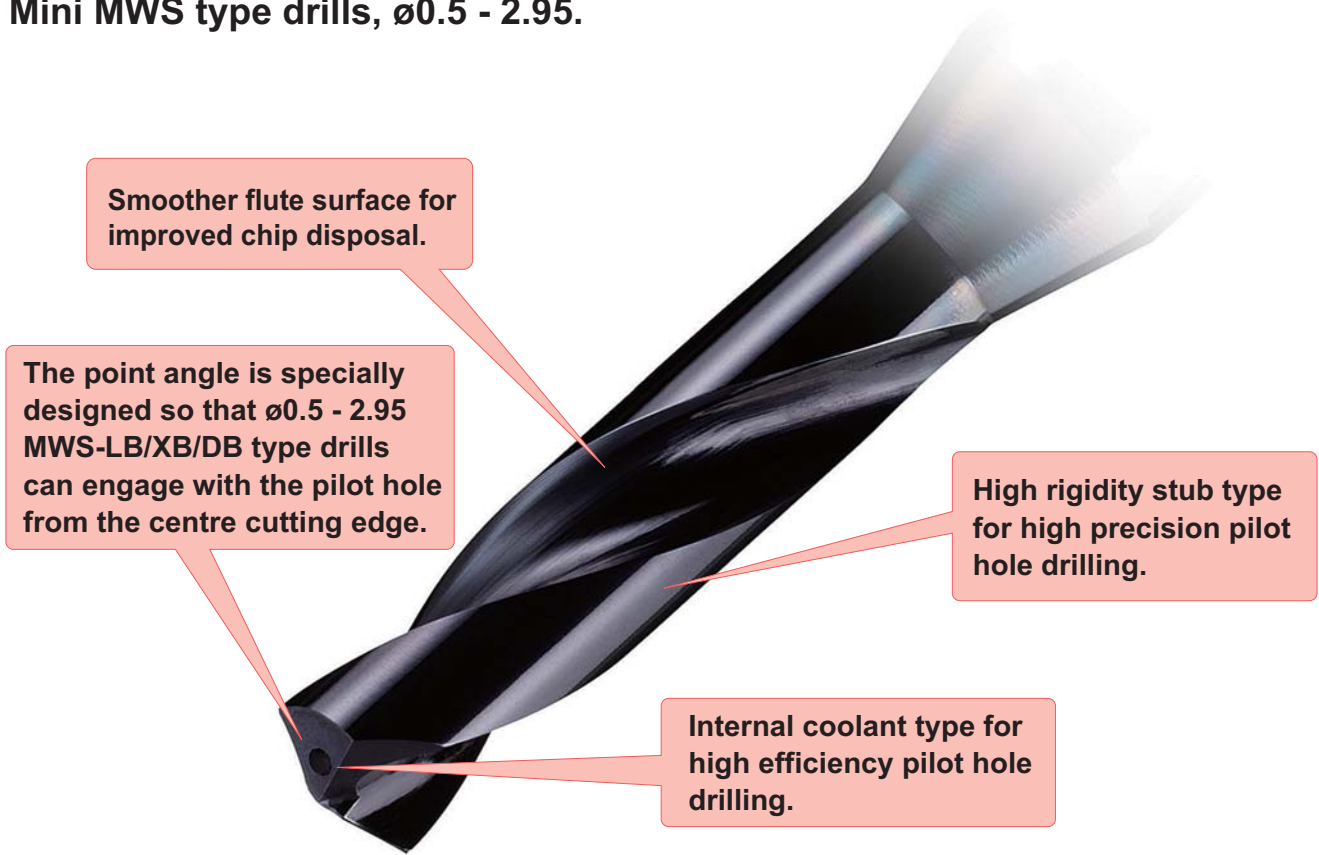
<Cutting conditions>

Workpiece : JIS SUS304
 Drill : φ2.5mm
 Hole depth : 13mm
 Cutting speed: 40m/min

Feed : 0.06mm/rev
 Coolant : W.S.O.
 Emission pressure: 3MPa (Internal coolant)
 Machine : Machining centre

Features of MWS-SB Type

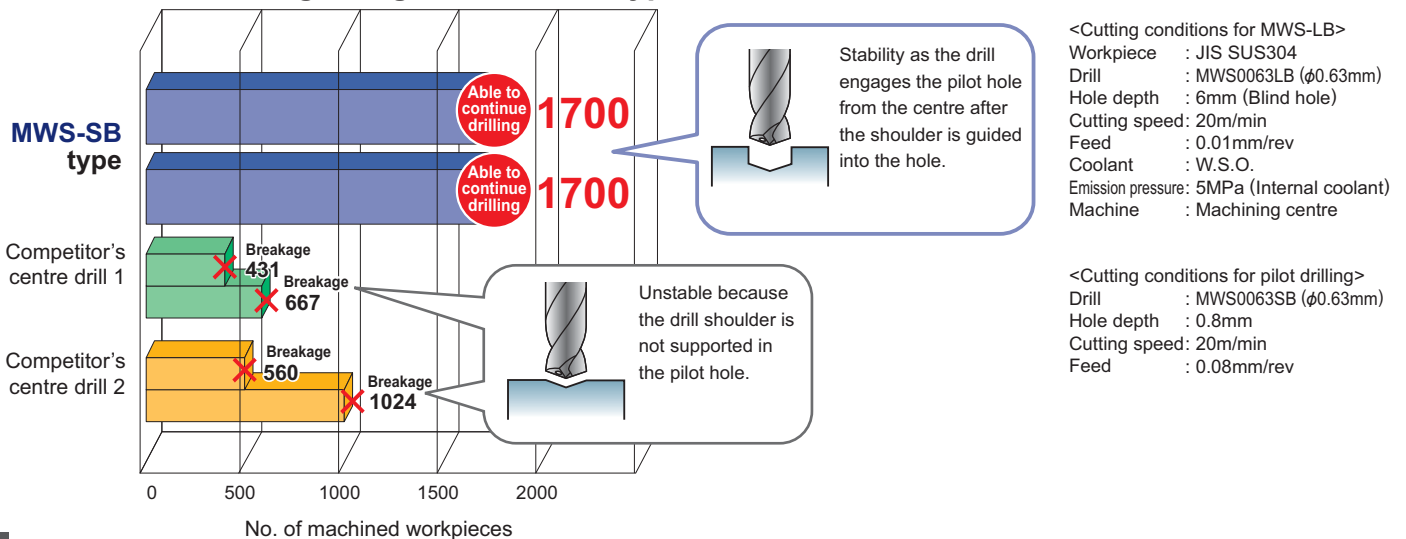
- The MWS-SB type is a pilot drill specially designed for use with Mini MWS type drills, $\phi 0.5 - 2.95$.



Cutting Performance

- Drilling pilot holes with the MWS-SB type allows the long Mini-MWS type drills to deliver increased tool life.

Micro hole drilling using the MWS-SB type drill



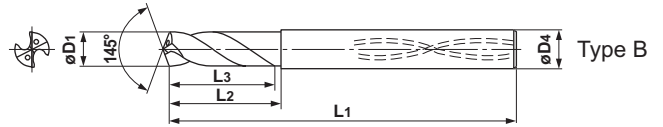
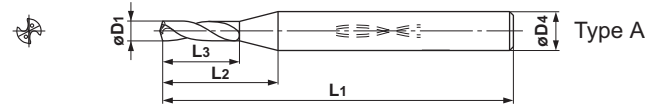
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MINI-MWS WSTAR DRILL SERIES

MWS (Internal coolant)

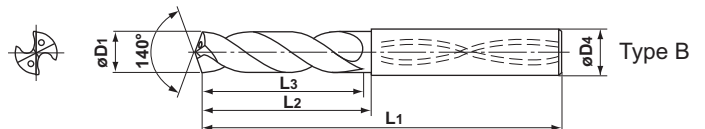
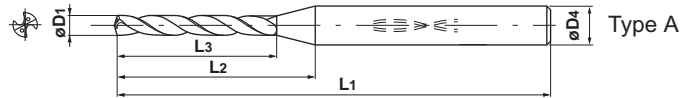
SB Type NEW
(For pilot holes)

D1	0.5 ≤ D1 < 1.0	1.0 ≤ D1 < 2.95
Tolerance (mm)	+0.009 0	+0.014 0



LB/XB Type

D1	0.5 ≤ D1 < 1.0	1.0 ≤ D1 < 2.95
Tolerance (mm)	0 -0.009	0 -0.014



(Note) MWS type can be used for shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm)				Type
					L3	L2	L1	D4	
NEW 0.50	1	Int.	●	MWS0050SB	2.5	7.2	47	3	A
	5	Int.	●	MWS0050LB	8	13	47	3	A
	12	Int.	●	MWS0050XB	16	21	47	3	A
NEW 0.51	1	Int.	●	MWS0051SB	2.6	7.2	47	3	A
	5	Int.	●	MWS0051LB	8	13	47	3	A
	12	Int.	●	MWS0051XB	16	21	47	3	A
NEW 0.52	1	Int.	●	MWS0052SB	2.6	7.2	47	3	A
	5	Int.	●	MWS0052LB	8	13	47	3	A
	12	Int.	●	MWS0052XB	16	21	47	3	A
NEW 0.53	1	Int.	●	MWS0053SB	2.6	7.2	47	3	A
	5	Int.	●	MWS0053LB	8	13	47	3	A
	12	Int.	●	MWS0053XB	16	21	47	3	A
NEW 0.54	1	Int.	●	MWS0054SB	2.6	7.2	47	3	A
	5	Int.	●	MWS0054LB	8	13	47	3	A
	12	Int.	●	MWS0054XB	16	21	47	3	A
NEW 0.55	1	Int.	●	MWS0055SB	2.6	7.2	47	3	A
	5	Int.	●	MWS0055LB	8	13	47	3	A
	12	Int.	●	MWS0055XB	16	21	47	3	A
NEW 0.56	1	Int.	●	MWS0056SB	2.9	7.5	47	3	A
	5	Int.	●	MWS0056LB	8	13	47	3	A
	12	Int.	●	MWS0056XB	16	21	47	3	A
NEW 0.57	1	Int.	●	MWS0057SB	2.9	7.4	47	3	A
	5	Int.	●	MWS0057LB	8	13	47	3	A
	12	Int.	●	MWS0057XB	16	21	47	3	A
NEW 0.58	1	Int.	●	MWS0058SB	2.9	7.4	47	3	A
	5	Int.	●	MWS0058LB	8	13	47	3	A
	12	Int.	●	MWS0058XB	16	21	47	3	A
NEW 0.59	1	Int.	●	MWS0059SB	2.9	7.4	47	3	A
	5	Int.	●	MWS0059LB	8	12	47	3	A
	12	Int.	●	MWS0059XB	16	20	47	3	A

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm)				Type
					L3	L2	L1	D4	
NEW 0.60	1	Int.	●	MWS0060SB	2.9	7.4	47	3	A
	5	Int.	●	MWS0060LB	8	12	47	3	A
	12	Int.	●	MWS0060XB	16	20	47	3	A
NEW 0.61	1	Int.	●	MWS0061SB	3.1	7.6	47	3	A
	5	Int.	●	MWS0061LB	8	12	47	3	A
	12	Int.	●	MWS0061XB	16	20	47	3	A
NEW 0.62	1	Int.	●	MWS0062SB	3.1	7.5	47	3	A
	5	Int.	●	MWS0062LB	8	12	47	3	A
	12	Int.	●	MWS0062XB	16	20	47	3	A
NEW 0.63	1	Int.	●	MWS0063SB	3.1	7.5	47	3	A
	5	Int.	●	MWS0063LB	8	12	47	3	A
	12	Int.	●	MWS0063XB	16	20	47	3	A
NEW 0.64	1	Int.	●	MWS0064SB	3.1	7.5	47	3	A
	5	Int.	●	MWS0064LB	8	12	47	3	A
	12	Int.	●	MWS0064XB	16	20	47	3	A
NEW 0.65	1	Int.	●	MWS0065SB	3.1	7.5	47	3	A
	5	Int.	●	MWS0065LB	8	12	47	3	A
	12	Int.	●	MWS0065XB	16	20	47	3	A
NEW 0.66	1	Int.	●	MWS0066SB	3.4	7.8	47	3	A
	5	Int.	●	MWS0066LB	8	12	47	3	A
	12	Int.	●	MWS0066XB	16	20	47	3	A
NEW 0.67	1	Int.	●	MWS0067SB	3.4	7.7	47	3	A
	5	Int.	●	MWS0067LB	8	12	47	3	A
	12	Int.	●	MWS0067XB	16	20	47	3	A
NEW 0.68	1	Int.	●	MWS0068SB	3.4	7.7	47	3	A
	5	Int.	●	MWS0068LB	8	12	47	3	A
	12	Int.	●	MWS0068XB	16	20	47	3	A
NEW 0.69	1	Int.	●	MWS0069SB	3.4	7.7	47	3	A
	5	Int.	●	MWS0069LB	8	12	47	3	A
	12	Int.	●	MWS0069XB	16	20	47	3	A

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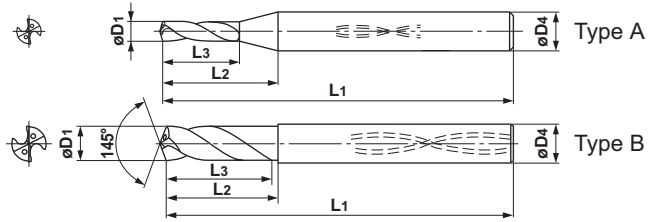
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MINI-MWS WSTAR DRILL SERIES

MWS (Internal coolant)

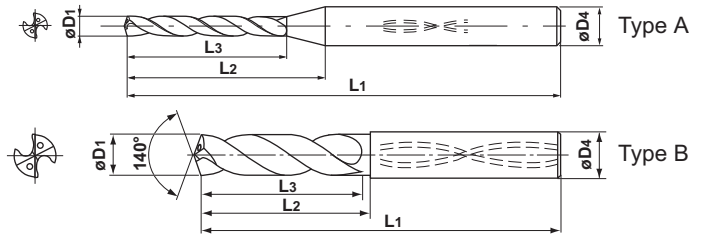
SB Type NEW
(For pilot holes)

D1	0.5≤D1<1.0	1.0≤D1<2.95
Tolerance (mm)	+0.009 0	+0.014 0



LB/XB Type

D1	0.5≤D1<1.0	1.0≤D1<2.95
Tolerance (mm)	0 -0.009	0 -0.014



DB Type NEW



(Note) MWS type can be used for shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm)				Type
					L3	L2	L1	D4	
0.70	1	Int.	●	MWS0070SB	3.4	7.7	47	3	A
	5	Int.	●	MWS0070LB	8	12	47	3	A
	12	Int.	●	MWS0070XB	16	20	47	3	A
0.71	1	Int.	●	MWS0071SB	3.6	7.9	50	3	A
	5	Int.	●	MWS0071LB	10	14	50	3	A
	12	Int.	●	MWS0071XB	20	24	50	3	A
0.72	1	Int.	●	MWS0072SB	3.6	7.9	50	3	A
	5	Int.	●	MWS0072LB	10	14	50	3	A
	12	Int.	●	MWS0072XB	20	24	50	3	A
0.73	1	Int.	●	MWS0073SB	3.6	7.8	50	3	A
	5	Int.	●	MWS0073LB	10	14	50	3	A
	12	Int.	●	MWS0073XB	20	24	50	3	A
0.74	1	Int.	●	MWS0074SB	3.6	7.8	50	3	A
	5	Int.	●	MWS0074LB	10	14	50	3	A
	12	Int.	●	MWS0074XB	20	24	50	3	A
0.75	1	Int.	●	MWS0075SB	3.6	7.8	50	3	A
	5	Int.	●	MWS0075LB	10	14	50	3	A
	12	Int.	●	MWS0075XB	20	24	50	3	A
0.76	1	Int.	●	MWS0076SB	3.9	8.1	50	3	A
	5	Int.	●	MWS0076LB	10	14	50	3	A
	12	Int.	●	MWS0076XB	20	24	50	3	A
0.77	1	Int.	●	MWS0077SB	3.9	8.1	50	3	A
	5	Int.	●	MWS0077LB	10	14	50	3	A
	12	Int.	●	MWS0077XB	20	24	50	3	A
0.78	1	Int.	●	MWS0078SB	3.9	8.0	50	3	A
	5	Int.	●	MWS0078LB	10	14	50	3	A
	12	Int.	●	MWS0078XB	20	24	50	3	A
0.79	1	Int.	●	MWS0079SB	3.9	8.0	50	3	A
	5	Int.	●	MWS0079LB	10	14	50	3	A
	12	Int.	●	MWS0079XB	20	24	50	3	A

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm)				Type
					L3	L2	L1	D4	
0.80	1	Int.	●	MWS0080SB	3.9	8.0	50	3	A
	5	Int.	●	MWS0080LB	10	14	50	3	A
	12	Int.	●	MWS0080XB	20	24	50	3	A
0.81	1	Int.	●	MWS0081SB	4.1	8.2	50	3	A
	5	Int.	●	MWS0081LB	10	14	50	3	A
	12	Int.	●	MWS0081XB	20	24	50	3	A
0.82	1	Int.	●	MWS0082SB	4.1	8.2	50	3	A
	5	Int.	●	MWS0082LB	10	14	50	3	A
	12	Int.	●	MWS0082XB	20	24	50	3	A
0.83	1	Int.	●	MWS0083SB	4.1	8.1	50	3	A
	5	Int.	●	MWS0083LB	10	14	50	3	A
	12	Int.	●	MWS0083XB	20	24	50	3	A
0.84	1	Int.	●	MWS0084SB	4.1	8.1	50	3	A
	5	Int.	●	MWS0084LB	10	14	50	3	A
	12	Int.	●	MWS0084XB	20	24	50	3	A
0.85	1	Int.	●	MWS0085SB	4.1	8.1	50	3	A
	5	Int.	●	MWS0085LB	10	14	50	3	A
	12	Int.	●	MWS0085XB	20	24	50	3	A
0.86	1	Int.	●	MWS0086SB	4.4	8.4	50	3	A
	5	Int.	●	MWS0086LB	10	14	50	3	A
	12	Int.	●	MWS0086XB	20	24	50	3	A
0.87	1	Int.	●	MWS0087SB	4.4	8.4	50	3	A
	5	Int.	●	MWS0087LB	10	14	50	3	A
	12	Int.	●	MWS0087XB	20	24	50	3	A
0.88	1	Int.	●	MWS0088SB	4.4	8.4	50	3	A
	5	Int.	●	MWS0088LB	10	14	50	3	A
	12	Int.	●	MWS0088XB	20	24	50	3	A
0.89	1	Int.	●	MWS0089SB	4.4	8.3	50	3	A
	5	Int.	●	MWS0089LB	10	14	50	3	A
	12	Int.	●	MWS0089XB	20	24	50	3	A

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

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm)				Type
					L3	L2	L1	D4	
NEW 0.90	1	Int.	●	MWS0090SB	4.4	8.3	50	3	A
	5	Int.	●	MWS0090LB	10	14	50	3	A
	12	Int.	●	MWS0090XB	20	24	50	3	A
NEW 0.91	1	Int.	●	MWS0091SB	4.6	8.5	50	3	A
	5	Int.	●	MWS0091LB	10	14	50	3	A
	12	Int.	●	MWS0091XB	20	24	50	3	A
NEW 0.92	1	Int.	●	MWS0092SB	4.6	8.5	50	3	A
	5	Int.	●	MWS0092LB	10	14	50	3	A
	12	Int.	●	MWS0092XB	20	24	50	3	A
NEW 0.93	1	Int.	●	MWS0093SB	4.6	8.5	50	3	A
	5	Int.	●	MWS0093LB	10	14	50	3	A
	12	Int.	●	MWS0093XB	20	24	50	3	A
NEW 0.94	1	Int.	●	MWS0094SB	4.6	8.4	50	3	A
	5	Int.	●	MWS0094LB	10	14	50	3	A
	12	Int.	●	MWS0094XB	20	24	50	3	A
NEW 0.95	1	Int.	●	MWS0095SB	4.6	8.4	50	3	A
	5	Int.	●	MWS0095LB	10	14	50	3	A
	12	Int.	●	MWS0095XB	20	24	50	3	A
NEW 0.96	1	Int.	●	MWS0096SB	4.9	8.7	50	3	A
	5	Int.	●	MWS0096LB	10	14	50	3	A
	12	Int.	●	MWS0096XB	20	24	50	3	A
NEW 0.97	1	Int.	●	MWS0097SB	4.9	8.7	50	3	A
	5	Int.	●	MWS0097LB	10	14	50	3	A
	12	Int.	●	MWS0097XB	20	24	50	3	A
NEW 0.98	1	Int.	●	MWS0098SB	4.9	8.7	50	3	A
	5	Int.	●	MWS0098LB	10	14	50	3	A
	12	Int.	●	MWS0098XB	20	24	50	3	A
NEW 0.99	1	Int.	●	MWS0099SB	4.9	8.7	50	3	A
	5	Int.	●	MWS0099LB	10	14	50	3	A
	12	Int.	●	MWS0099XB	20	24	50	3	A
NEW 1.00	1	Int.	●	MWS0100SB	5.0	8.7	55	3	A
	5	Int.	●	MWS0100LB	11	15	55	3	A
	12	Int.	●	MWS0100XB	23	27	55	3	A
	20	Int.	●	MWS0100X20DB	24	28	60	3	A
	25	Int.	●	MWS0100X25DB	28	32	66	3	A
NEW 1.05	1	Int.	□	MWS0105SB	5.2	8.8	55	3	A
	20	Int.	□	MWS0105X20DB	24	28	60	3	A
	25	Int.	□	MWS0105X25DB	29	33	66	3	A
NEW 1.10	1	Int.	●	MWS0110SB	5.4	8.9	55	3	A
	5	Int.	●	MWS0110LB	17	21	55	3	A
	12	Int.	●	MWS0110XB	23	27	55	3	A
	20	Int.	●	MWS0110X20DB	25	29	60	3	A
	25	Int.	●	MWS0110X25DB	31	34	66	3	A
NEW 1.15	1	Int.	□	MWS0115SB	5.6	9.1	55	3	A
	20	Int.	□	MWS0115X20DB	26	30	60	3	A
	25	Int.	□	MWS0115X25DB	32	36	66	3	A
	30	Int.	□	MWS0115X30DB	38	41	72	3	A
	NEW 1.20	1	Int.	●	MWS0120SB	6.0	9.4	55	3
5		Int.	●	MWS0120LB	17	20	55	3	A
12		Int.	●	MWS0120XB	23	26	55	3	A
20		Int.	●	MWS0120X20DB	28	31	60	3	A
25		Int.	●	MWS0120X25DB	34	37	66	3	A
30		Int.	●	MWS0120X30DB	40	43	72	3	A
NEW 1.25	1	Int.	□	MWS0125SB	6.2	9.5	55	3	A
	20	Int.	□	MWS0125X20DB	29	32	68	3	A
	25	Int.	□	MWS0125X25DB	35	38	74	3	A
	30	Int.	□	MWS0125X30DB	41	45	82	3	A
NEW 1.30	1	Int.	●	MWS0130SB	6.4	9.6	55	3	A
	5	Int.	●	MWS0130LB	17	20	55	3	A
	12	Int.	●	MWS0130XB	23	26	55	3	A
	20	Int.	●	MWS0130X20DB	30	33	68	3	A
	25	Int.	●	MWS0130X25DB	36	40	74	3	A
	30	Int.	●	MWS0130X30DB	43	46	82	3	A

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm)				Type
					L3	L2	L1	D4	
NEW 1.35	1	Int.	□	MWS0135SB	6.6	9.7	55	3	A
	20	Int.	□	MWS0135X20DB	31	34	68	3	A
	25	Int.	□	MWS0135X25DB	38	41	74	3	A
NEW 1.40	1	Int.	●	MWS0140SB	7.0	10.0	55	3	A
	5	Int.	●	MWS0140LB	17	20	55	3	A
	12	Int.	●	MWS0140XB	23	26	55	3	A
NEW 1.45	1	Int.	□	MWS0145SB	7.2	10.1	55	3	A
	20	Int.	□	MWS0145X20DB	33	36	68	3	A
	25	Int.	□	MWS0145X25DB	41	43	74	3	A
NEW 1.50	1	Int.	●	MWS0150SB	7.4	10.2	55	3	A
	5	Int.	●	MWS0150LB	17	20	55	3	A
	12	Int.	●	MWS0150XB	23	26	55	3	A
NEW 1.55	1	Int.	□	MWS0155SB	7.6	10.3	68	3	A
	20	Int.	□	MWS0155X20DB	36	38	78	3	A
	25	Int.	□	MWS0155X25DB	43	46	86	3	A
NEW 1.60	1	Int.	●	MWS0160SB	8.0	10.6	68	3	A
	5	Int.	●	MWS0160LB	22	25	68	3	A
	12	Int.	●	MWS0160XB	30	33	68	3	A
NEW 1.65	1	Int.	□	MWS0165SB	8.2	10.7	68	3	A
	20	Int.	□	MWS0165X20DB	38	40	78	3	A
	25	Int.	□	MWS0165X25DB	46	49	86	3	A
NEW 1.70	1	Int.	●	MWS0170SB	8.4	10.8	68	3	A
	5	Int.	●	MWS0170LB	22	24	68	3	A
	12	Int.	●	MWS0170XB	30	32	68	3	A
NEW 1.75	1	Int.	□	MWS0175SB	8.6	10.9	68	3	A
	20	Int.	□	MWS0175X20DB	40	43	84	3	A
	25	Int.	□	MWS0175X25DB	49	51	94	3	A
NEW 1.80	1	Int.	●	MWS0180SB	9.0	11.2	68	3	A
	5	Int.	●	MWS0180LB	22	24	68	3	A
	12	Int.	●	MWS0180XB	30	32	68	3	A
NEW 1.85	1	Int.	□	MWS0185SB	9.2	11.3	68	3	A
	20	Int.	□	MWS0185X20DB	43	45	84	3	A
	25	Int.	□	MWS0185X25DB	52	54	94	3	A
NEW 1.90	1	Int.	●	MWS0190SB	9.4	11.5	68	3	A
	5	Int.	●	MWS0190LB	22	24	68	3	A
	12	Int.	●	MWS0190XB	30	32	68	3	A
NEW 1.95	1	Int.	□	MWS0195SB	9.6	11.6	68	3	A
	20	Int.	□	MWS0195X20DB	45	47	84	3	A
	25	Int.	□	MWS0195X25DB	55	57	94	3	A
NEW 2.00	1	Int.	□	MWS0200SB	10.0	12.0	68	3	A
	20	Int.	□	MWS0200X20DB	48	50	90	3	A
	25	Int.	□	MWS0200X25DB	58	60	102	3	A

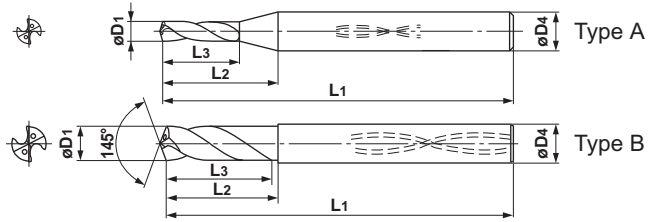
Solid Carbide Drill with Through Coolant Holes

MINI-MWS WSTAR DRILL SERIES

MWS (Internal coolant)

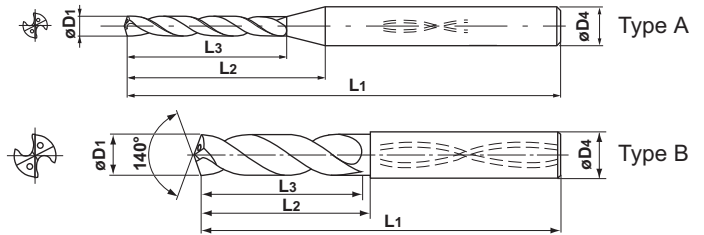
SB Type NEW
(For pilot holes)

D1	0.5≤D1<1.0	1.0≤D1<2.95
Tolerance (mm)	+0.009 0	+0.014 0



LB/XB Type

D1	0.5≤D1<1.0	1.0≤D1<2.95
Tolerance (mm)	0 -0.009	0 -0.014



DB Type NEW



(Note) MWS type can be used for shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm)				Type
					L3	L2	L1	D4	
NEW 2.00	1	Int.	●	MWS0200SB	10.0	11.9	68	3	A
	5	Int.	●	MWS0200LB	22	24	68	3	A
	12	Int.	●	MWS0200XB	30	32	68	3	A
	20	Int.	●	MWS0200X20DB	46	48	84	3	A
	25	Int.	●	MWS0200X25DB	56	58	94	3	A
NEW 30	Int.	●	MWS0200X30DB	66	68	102	3	A	
	NEW 2.05	1	Int.	□	MWS0205SB	10.2	12.0	74	3
20		Int.	□	MWS0205X20DB	47	49	94	3	A
25		Int.	□	MWS0205X25DB	57	59	107	3	A
30		Int.	□	MWS0205X30DB	68	69	118	3	A
NEW 2.10	1	Int.	●	MWS0210SB	10.4	12.1	74	3	A
	5	Int.	●	MWS0210LB	28	30	74	3	A
	12	Int.	●	MWS0210XB	38	40	74	3	A
	20	Int.	●	MWS0210X20DB	48	50	94	3	A
	25	Int.	●	MWS0210X25DB	59	60	107	3	A
NEW 30	Int.	●	MWS0210X30DB	69	71	118	3	A	
	NEW 2.15	1	Int.	□	MWS0215SB	10.6	12.2	74	3
20		Int.	□	MWS0215X20DB	49	51	94	3	A
25		Int.	□	MWS0215X25DB	60	62	107	3	A
30		Int.	□	MWS0215X30DB	71	73	118	3	A
NEW 2.20	1	Int.	●	MWS0220SB	11.0	12.5	74	3	A
	5	Int.	●	MWS0220LB	28	29	74	3	A
	12	Int.	●	MWS0220XB	38	39	74	3	A
	20	Int.	●	MWS0220X20DB	51	52	94	3	A
	25	Int.	●	MWS0220X25DB	62	63	107	3	A
NEW 30	Int.	●	MWS0220X30DB	73	74	118	3	A	
	NEW 2.25	1	Int.	□	MWS0225SB	11.2	12.6	74	3
20		Int.	□	MWS0225X20DB	52	53	94	3	A
25		Int.	□	MWS0225X25DB	63	64	107	3	A
30		Int.	□	MWS0225X30DB	74	76	118	3	A

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm)				Type
					L3	L2	L1	D4	
NEW 2.30	1	Int.	●	MWS0230SB	11.4	12.7	74	3	A
	5	Int.	●	MWS0230LB	28	29	74	3	A
	12	Int.	●	MWS0230XB	38	39	74	3	A
	20	Int.	●	MWS0230X20DB	53	54	94	3	A
	25	Int.	●	MWS0230X25DB	64	66	107	3	A
NEW 30	Int.	●	MWS0230X30DB	76	77	118	3	A	
	NEW 2.35	1	Int.	□	MWS0235SB	11.6	12.8	74	3
20		Int.	□	MWS0235X20DB	54	55	94	3	A
25		Int.	□	MWS0235X25DB	66	67	107	3	A
30		Int.	□	MWS0235X30DB	78	79	118	3	A
NEW 2.40	1	Int.	●	MWS0240SB	12.0	13.1	74	3	A
	5	Int.	●	MWS0240LB	28	29	74	3	A
	12	Int.	●	MWS0240XB	38	39	74	3	A
	20	Int.	●	MWS0240X20DB	55	56	94	3	A
	25	Int.	●	MWS0240X25DB	67	68	107	3	A
NEW 30	Int.	●	MWS0240X30DB	79	80	118	3	A	
	NEW 2.45	1	Int.	□	MWS0245SB	12.2	13.2	74	3
20		Int.	□	MWS0245X20DB	56	57	94	3	A
25		Int.	□	MWS0245X25DB	69	70	107	3	A
30		Int.	□	MWS0245X30DB	81	82	118	3	A
NEW 2.50	1	Int.	●	MWS0250SB	12.4	13.3	74	3	A
	5	Int.	●	MWS0250LB	28	29	74	3	A
	12	Int.	●	MWS0250XB	38	39	74	3	A
	20	Int.	●	MWS0250X20DB	58	59	94	3	A
	25	Int.	●	MWS0250X25DB	70	71	107	3	A
NEW 30	Int.	●	MWS0250X30DB	83	84	118	3	A	
	NEW 2.55	1	Int.	□	MWS0255SB	12.6	12.6	81	3
20		Int.	□	MWS0255X20DB	59	59	103	3	B
25		Int.	□	MWS0255X25DB	71	71	117	3	B
30		Int.	□	MWS0255X30DB	84	84	132	3	B

* Please contact us for any geometry that is not in this catalogue (e.g. different diameters and lengths can be made to order).

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

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm)				Type
					L3	L2	L1	D4	
2.60	1	Int.	●	MWS0260SB	13.0	13.0	81	3	B
	5	Int.	●	MWS0260LB	33	33	81	3	B
	12	Int.	●	MWS0260XB	45	45	81	3	B
	20	Int.	●	MWS0260X20DB	60	60	103	3	B
	25	Int.	●	MWS0260X25DB	73	73	117	3	B
30	Int.	●	MWS0260X30DB	86	86	132	3	B	
2.65	1	Int.	□	MWS0265SB	13.2	13.2	81	3	B
	20	Int.	□	MWS0265X20DB	61	61	103	3	B
	25	Int.	□	MWS0265X25DB	74	74	117	3	B
	30	Int.	□	MWS0265X30DB	87	87	132	3	B
2.70	1	Int.	●	MWS0270SB	13.4	13.4	81	3	B
	5	Int.	●	MWS0270LB	33	33	81	3	B
	12	Int.	●	MWS0270XB	45	45	81	3	B
	20	Int.	●	MWS0270X20DB	62	62	103	3	B
	25	Int.	●	MWS0270X25DB	76	76	117	3	B
30	Int.	●	MWS0270X30DB	89	89	132	3	B	
2.75	1	Int.	□	MWS0275SB	13.6	13.6	81	3	B
	20	Int.	□	MWS0275X20DB	63	63	103	3	B
	25	Int.	□	MWS0275X25DB	77	77	117	3	B
	30	Int.	□	MWS0275X30DB	91	91	132	3	B

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm)				Type
					L3	L2	L1	D4	
2.80	1	Int.	●	MWS0280SB	14.0	14.0	81	3	B
	5	Int.	●	MWS0280LB	33	33	81	3	B
	12	Int.	●	MWS0280XB	45	45	81	3	B
	20	Int.	●	MWS0280X20DB	64	64	103	3	B
	25	Int.	●	MWS0280X25DB	78	78	117	3	B
30	Int.	●	MWS0280X30DB	92	92	132	3	B	
2.85	1	Int.	□	MWS0285SB	14.2	14.2	81	3	B
	20	Int.	□	MWS0285X20DB	66	66	103	3	B
	25	Int.	□	MWS0285X25DB	80	80	117	3	B
	30	Int.	□	MWS0285X30DB	94	94	132	3	B
2.90	1	Int.	●	MWS0290SB	14.4	14.4	81	3	B
	5	Int.	●	MWS0290LB	33	33	81	3	B
	12	Int.	●	MWS0290XB	45	45	81	3	B
	20	Int.	●	MWS0290X20DB	67	67	103	3	B
	25	Int.	●	MWS0290X25DB	81	81	117	3	B
30	Int.	●	MWS0290X30DB	96	96	132	3	B	
2.95	1	Int.	□	MWS0295SB	14.6	14.6	81	3	B
	20	Int.	□	MWS0295X20DB	68	68	103	3	B
	25	Int.	□	MWS0295X25DB	83	83	117	3	B
	30	Int.	□	MWS0295X30DB	97	97	132	3	B

Recommended Cutting Conditions

SB/LB/XB Type Drill

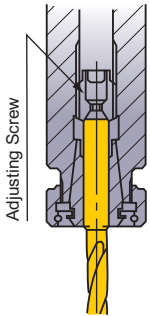
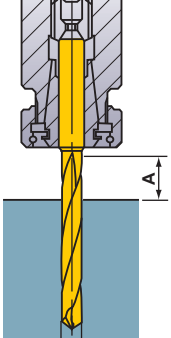
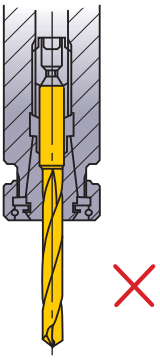
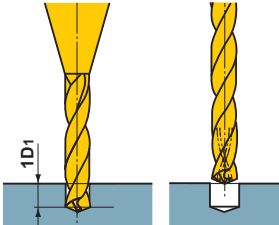
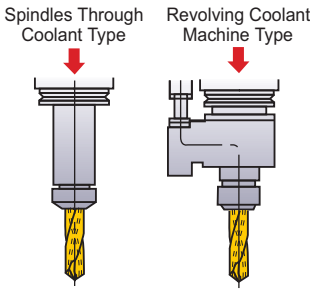
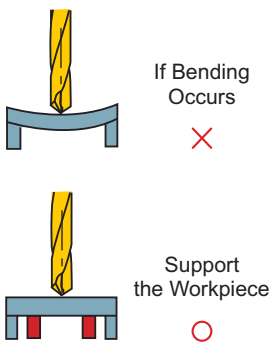
Work Material	Drill Diameter	Conditions Hardness	φ0.50-φ0.70		φ0.71-φ0.85		φ0.86-φ0.99		φ1.0-φ2.95	
			Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
P Mild Steel	≤180HB	≤180HB	50	0.010	50	0.02	50	0.03	50	0.08
			(40-60)	(0.005-0.015)	(40-60)	(0.01-0.03)	(40-60)	(0.02-0.05)	(40-60)	(0.04-0.12)
			Carbon Steel Alloy Steel	180-280HB	50	0.010	50	0.02	50	0.03
		280-350HB	(40-60)	(0.005-0.015)	(40-60)	(0.01-0.03)	(40-60)	(0.02-0.05)	(40-60)	(0.04-0.12)
M Stainless Steel	≤200HB	≤200HB	30	0.008	30	0.015	30	0.02	30	0.05
			(20-40)	(0.005-0.01)	(20-40)	(0.008-0.02)	(20-40)	(0.01-0.03)	(20-40)	(0.02-0.10)
K Cast Iron	Tensile Strength ≤350MPa	Tensile Strength ≤350MPa	50	0.015	50	0.02	50	0.04	50	0.08
			(40-60)	(0.008-0.02)	(40-60)	(0.01-0.03)	(40-60)	(0.02-0.06)	(40-60)	(0.04-0.12)
Ductile Cast Iron	Tensile Strength ≤450MPa	Tensile Strength ≤450MPa	30	0.010	30	0.02	30	0.03	30	0.06
			(20-40)	(0.005-0.015)	(20-40)	(0.01-0.03)	(20-40)	(0.02-0.05)	(20-40)	(0.02-0.10)
N Aluminium Alloy	-	-	60	0.03	60	0.04	60	0.06	60	0.10
			(50-80)	(0.02-0.05)	(50-80)	(0.03-0.06)	(50-80)	(0.04-0.08)	(50-80)	(0.05-0.15)
S Heat Resistant Alloy	-	-	10	0.006	10	0.01	10	0.01	10	0.03
			(5-15)	(0.004-0.008)	(5-15)	(0.005-0.02)	(5-15)	(0.005-0.02)	(5-15)	(0.01-0.05)

DB Type Long Drill

Work Material	Drill Diameter	Conditions Hardness	φ1.0-φ2.0		φ2.05-φ2.95	
			Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
P Mild Steel	≤180HB	≤180HB	50	0.08	60	0.10
			(40-60)	(0.04-0.10)	(50-70)	(0.08-0.12)
			Carbon Steel Alloy Steel	180-280HB	40	0.07
		280-350HB	(30-50)	(0.04-0.08)	(40-60)	(0.06-0.12)
			30	0.04	50	0.07
			(20-40)	(0.03-0.06)	(40-60)	(0.05-0.10)
M Stainless Steel	≤200HB	≤200HB	30	0.03	30	0.06
			(20-40)	(0.01-0.05)	(20-40)	(0.04-0.08)
K Cast Iron	Tensile Strength ≤350MPa	Tensile Strength ≤350MPa	40	0.07	50	0.09
			(30-50)	(0.04-0.08)	(40-60)	(0.06-0.12)
Ductile Cast Iron	Tensile Strength ≤450MPa	Tensile Strength ≤450MPa	30	0.04	50	0.07
			(20-40)	(0.03-0.06)	(40-60)	(0.05-0.10)
S Heat Resistant Alloy	-	-	10	0.02	15	0.03
			(5-15)	(0.01-0.03)	(10-20)	(0.01-0.05)

MINI-MWS WSTAR DRILL SERIES

Operational Guidance for Mini MWS drills

Drill Holding	Drill Length	Drill Installation	Drill Installation
 <p>Adjusting Screw</p> <p>Thrust bearing type collet chuck holds the drill securely.</p>	 <p>$A \geq D_1 \times 2$</p>	 <p>Do not clamp on the flutes.</p>	 <p>① For pilot hole drilling, use the SB type drill. ② Use the prepared hole as a guide when using a drill with an oil hole. Depending on the cutting conditions, peck feed is recommended.</p>
Through Coolant Type	Thin Workpiece	Coolant Handling	
 <p>Spindles Through Coolant Type Revolving Coolant Machine Type</p> <p>Recommended coolant pressure: $\geq 3\text{Mpa}$ At least 1.5Mpa is required.</p>	 <p>If Bending Occurs</p> <p>Support the Workpiece</p>	<ol style="list-style-type: none"> 1) Small particles of swarf will jam in the oil hole of small diameter drills. Always use a fine mesh filter as a preventative measure. 2) Dirt and dust particles adhere to the oil in old coolant and prevent an efficient flow. Regular coolant exchange is recommended. 	

Cautions for use

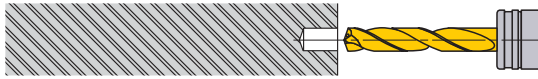
- Please use a fine mesh filter (mesh $\leq 3\mu\text{m}$) for coolant to prevent jamming in the oil hole.
- For deep drilling with the long type drill, machining a pilot hole is recommended. (Otherwise, centrifugal forces may cause drill breakage.)

Operational Guidance for MWS Long Type Drills (L/D ≥ 10)

Flat Face Drilling

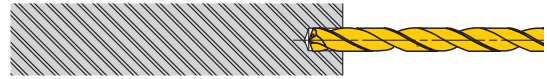
● Drilling a blind hole

1. Drilling a pilot hole



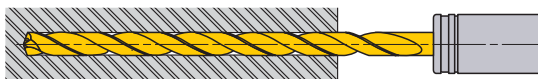
- ① Use the SB type drill.
- ② Ensure a high precision hole is drilled for the guide.
- ③ Drill depth : Approx 1D.

2. Initial cutting with the long type drill



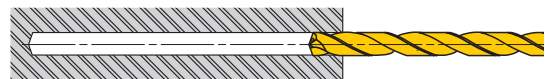
- ① Penetrate the pilot hole at a low revolution. (Revolution speed 1000min^{-1} , feed rate $0.2\text{--}0.3\text{mm/rev}$)
- ② Stop the long type drill $0.5\text{--}1.0\text{mm}$ short of the pilot hole bottom.

3. Drill the deep hole



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

4. Drill retraction

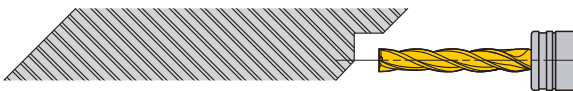


- ① After drilling, lower the cutting revolution about $0.5\text{--}1.0\text{mm}$ short of the hole end. (Revolution speed of around 1000min^{-1})
- ② Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min .
- ③ Finally clear the hole at a cutting speed of $20\text{--}30\text{m/min}$ and feed rate of $0.2\text{--}0.3\text{mm/rev}$.

Interrupted Drilling

● Drilling and breaking through on irregular faces or angles

1. Spot facing



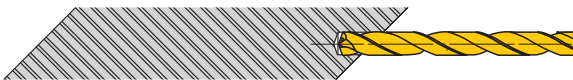
- ① Machine a flat on the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

2. Drilling a pilot hole



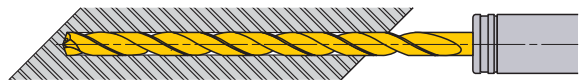
- ① Use a drill with a larger (flatter) point angle than the long type. The MWS-SB type is recommended.
- ② Ensure a high precision hole is drilled for the guide.
- ③ Drill depth : Approx 1D.

3. Initial cutting with the long type drill



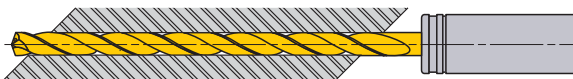
- ① Penetrate the pilot hole at a low revolution. (Revolution speed 1000min^{-1} , feed rate $0.2\text{--}0.3\text{mm/rev}$)
- ② Stop the long type drill $0.5\text{--}1.0\text{mm}$ short of the pilot hole bottom.

4. Drill the deep hole



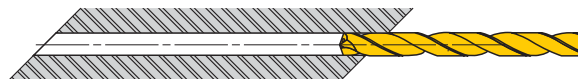
- ① Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

5. Breaking through



- ① When breaking through, the cutting edge can be damaged.
- ② Feed rate should be half the normal feed.

6. Drill retraction



- ① Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min .
- ② Finally clear the hole at a revolution speed of 1000min^{-1} and feed rate of $0.2\text{--}0.3\text{mm/rev}$.

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 Cemented
Carbide Tools and Carbide
Blanks



The Scope of the Registration:
Design, Development and
Production of Cutting Tools,
Wear-resistant Tools, Rock
Drilling Tools, Cemented
Carbide Blanks and Coated
Products



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(Tools specifications subject to change without notice.)