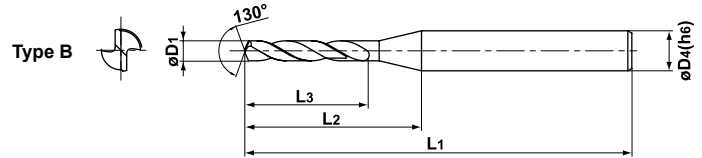
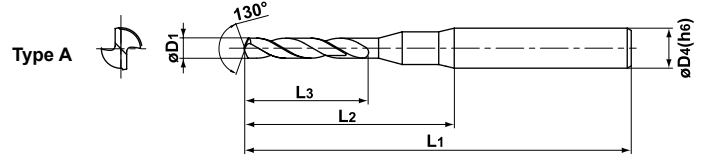


Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○	○	◎	○	○

Tolerance	0.1 ≤ D ≤ 3
D1 (mm)	$\begin{matrix} 0 \\ -0.009 \end{matrix}$
D4 (mm)	$\begin{matrix} 0 \\ -0.006 \end{matrix}$

## METRIC STANDARD



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

Drill Dia. D1 (mm)	Coolant (Int./Ext.)	Stock		Order Number	Dimensions (mm)				Type
		VP20MF	VP15TF		L3	L2	L1	D4	
0.10	Ext.	★		MSE0010SB	1.2	9.7	38	3	A
0.11	Ext.	★		0011SB	1.2	9.7	38	3	A
0.12	Ext.	★		0012SB	1.4	9.7	38	3	A
0.13	Ext.	★		0013SB	1.4	9.7	38	3	A
0.14	Ext.	★		0014SB	2	9.7	38	3	A
0.15	Ext.	★		0015SB	2	9.7	38	3	A
0.16	Ext.	★		0016SB	2	9.7	38	3	A
0.17	Ext.	★		0017SB	2	9.7	38	3	A
0.18	Ext.	★		0018SB	2	9.7	38	3	A
0.19	Ext.	★		0019SB	2	9.7	38	3	A
0.20	Ext.	★		0020SB	2.5	9.7	38	3	A
0.21	Ext.	★		0021SB	2.5	9.7	38	3	A
0.22	Ext.	★		0022SB	2.5	9.7	38	3	A
0.23	Ext.	★		0023SB	2.5	9.7	38	3	A
0.24	Ext.	★		0024SB	3	9.7	38	3	A
0.25	Ext.	★		0025SB	3	9.7	38	3	A
0.26	Ext.	★		0026SB	3	9.7	38	3	A
0.27	Ext.	★		0027SB	3	9.7	38	3	A
0.28	Ext.	★		0028SB	3	9.7	38	3	A
0.29	Ext.	★		0029SB	3	9.7	38	3	A
0.30	Ext.		★	0030SB	5	10.2	38	3	B
0.31	Ext.		★	0031SB	5	10.2	38	3	B
0.32	Ext.		★	0032SB	5	10.2	38	3	B
0.33	Ext.		★	0033SB	5	10.2	38	3	B
0.34	Ext.		★	0034SB	6	11.2	38	3	B
0.35	Ext.		★	0035SB	6	11.1	38	3	B
0.36	Ext.		★	0036SB	6	11.1	38	3	B
0.37	Ext.		★	0037SB	6	11.1	38	3	B
0.38	Ext.		★	0038SB	6	11.1	38	3	B
0.39	Ext.		★	0039SB	6	11.1	38	3	B
0.40	Ext.		★	0040SB	7	12.1	38	3	B
0.41	Ext.		★	0041SB	7	12.0	38	3	B

Drill Dia. D1 (mm)	Coolant (Int./Ext.)	Stock		Order Number	Dimensions (mm)				Type
		VP20MF	VP15TF		L3	L2	L1	D4	
0.42	Ext.		★	MSE0042SB	7	12.0	38	3	B
0.43	Ext.		★	0043SB	7	12.0	38	3	B
0.44	Ext.		★	0044SB	7	12.0	38	3	B
0.45	Ext.		★	0045SB	7	12.0	38	3	B
0.46	Ext.		★	0046SB	7	11.9	38	3	B
0.47	Ext.		★	0047SB	7	11.9	38	3	B
0.48	Ext.		★	0048SB	7	11.9	38	3	B
0.49	Ext.		★	0049SB	7	11.9	38	3	B
0.50	Ext.		★	0050SB	7	11.9	38	3	B
0.51	Ext.		★	0051SB	7	11.8	38	3	B
0.52	Ext.		★	0052SB	7	11.8	38	3	B
0.53	Ext.		★	0053SB	7	11.8	38	3	B
0.54	Ext.		★	0054SB	7	11.8	38	3	B
0.55	Ext.		★	0055SB	7	11.8	38	3	B
0.56	Ext.		★	0056SB	7	11.8	38	3	B
0.57	Ext.		★	0057SB	7	11.7	38	3	B
0.58	Ext.		★	0058SB	7	11.7	38	3	B
0.59	Ext.		★	0059SB	7	11.7	38	3	B
0.60	Ext.		★	0060SB	7	11.7	38	3	B
0.61	Ext.		★	0061SB	7	11.7	38	3	B
0.62	Ext.		★	0062SB	7	11.6	38	3	B
0.63	Ext.		★	0063SB	7	11.6	38	3	B
0.64	Ext.		★	0064SB	7	11.6	38	3	B
0.65	Ext.		★	0065SB	7	11.6	38	3	B
0.66	Ext.		★	0066SB	7	11.6	38	3	B
0.67	Ext.		★	0067SB	7	11.5	38	3	B
0.68	Ext.		★	0068SB	7	11.5	38	3	B
0.69	Ext.		★	0069SB	7	11.5	38	3	B
0.70	Ext.		★	0070SB	8	12.5	38	3	B
0.71	Ext.		★	0071SB	8	12.5	38	3	B
0.72	Ext.		★	0072SB	8	12.5	38	3	B
0.73	Ext.		★	0073SB	8	12.4	38	3	B

(Note) Please contact Mitsubishi Materials for any geometry that is not in the catalog (e.g. different dia. and length).

Drill Dia. D <sub>1</sub> (mm)	Coolant (Int./Ext.)	Stock		Order Number	Dimensions (mm)				Type
		VP20MF	VP15TF		L <sub>3</sub>	L <sub>2</sub>	L <sub>1</sub>	D <sub>4</sub>	
0.74	Ext.	★		MSE0074SB	8	12.4	38	3	B
0.75	Ext.	★		0075SB	8	12.4	38	3	B
0.76	Ext.	★		0076SB	8	12.4	38	3	B
0.77	Ext.	★		0077SB	8	12.4	38	3	B
0.78	Ext.	★		0078SB	8	12.3	38	3	B
0.79	Ext.	★		0079SB	8	12.3	38	3	B
0.80	Ext.	★		0080SB	10	14.3	38	3	B
0.81	Ext.	★		0081SB	10	14.3	38	3	B
0.82	Ext.	★		0082SB	10	14.3	38	3	B
0.83	Ext.	★		0083SB	10	14.3	38	3	B
0.84	Ext.	★		0084SB	10	14.2	38	3	B
0.85	Ext.	★		0085SB	10	14.2	38	3	B
0.86	Ext.	★		0086SB	10	14.2	38	3	B

Drill Dia. D <sub>1</sub> (mm)	Coolant (Int./Ext.)	Stock		Order Number	Dimensions (mm)				Type
		VP20MF	VP15TF		L <sub>3</sub>	L <sub>2</sub>	L <sub>1</sub>	D <sub>4</sub>	
0.87	Ext.	★		MSE0087SB	10	14.2	38	3	B
0.88	Ext.	★		0088SB	10	14.2	38	3	B
0.89	Ext.	★		0089SB	10	14.1	38	3	B
0.90	Ext.	★		0090SB	10	14.1	38	3	B
0.91	Ext.	★		0091SB	10	14.1	38	3	B
0.92	Ext.	★		0092SB	10	14.1	38	3	B
0.93	Ext.	★		0093SB	10	14.1	38	3	B
0.94	Ext.	★		0094SB	10	14.0	38	3	B
0.95	Ext.	★		0095SB	10	14.0	38	3	B
0.96	Ext.	★		0096SB	10	14.0	38	3	B
0.97	Ext.	★		0097SB	10	14.0	38	3	B
0.98	Ext.	★		0098SB	10	14.0	38	3	B
0.99	Ext.	★		0099SB	10	14.0	38	3	B

## RECOMMENDED CUTTING CONDITIONS

Drill Dia.	Mild Steel (≤180HB)					Carbon Steel, Alloy Steel (180–280HB)				
	AISI 1010 etc.					AISI 1045, 4140 etc.				
	inch	mm	Cutting Speed (SFM)	Revolution (min <sup>-1</sup> )	Feed (Min.—Max.) (IPR)	Peck (inch)	Cutting Speed (SFM)	Revolution (min <sup>-1</sup> )	Feed (Min.—Max.) (IPR)	Peck (inch)
.0394	0.10	20	20000	.0001 (.00004—.0001)	.0008	20	20000	.0001 (.00004—.0001)	.0008	
.0472	0.12	25	20000	.0001 (.00004—.0001)	.0008	25	20000	.0001 (.00004—.0001)	.0008	
.0630	0.16	30	20000	.0001 (.00004—.0001)	.0008	30	20000	.0001 (.00004—.0001)	.0008	
.0787	0.20	40	20000	.0001 (.0001—.0002)	.0016	40	20000	.0001 (.0001—.0002)	.0016	
.0984	0.25	50	20000	.0001 (.0001—.0002)	.0016	50	20000	.0001 (.0001—.0002)	.0016	
.1260	0.32	65	20000	.0002 (.0001—.0002)	.0020	65	20000	.0002 (.0001—.0002)	.0020	
.1575	0.40	80	20000	.0002 (.0001—.0002)	.0020	80	20000	.0002 (.0001—.0002)	.0020	
.1969	0.50	100	20000	.0002 (.0002—.0003)	.0039	100	20000	.0002 (.0002—.0003)	.0039	
.2480	0.63	130	20000	.0003 (.0002—.0004)	.0039	130	20000	.0003 (.0002—.0004)	.0039	
.3150	0.80	165	20000	.0008 (.0006—.0010)	.0118	165	20000	.0006 (.0005—.0007)	.0118	
.3937	0.99	205	20000	.0016 (.0012—.0020)	.0118	205	20000	.0008 (.0006—.0010)	.0118	

(Note 1) When drilling holes up to  $\phi$ 0.3mm, the use of a spot drill is recommended. (Order number : MSP0300SB, Cutting conditions :

See below.)

(Note 2) Change cutting conditions depending on your machine and workpiece rigidity.

(Note 3) When machining holes over 5D, reduce the step stated above.

(Note 4) The use of water-soluble fluid (diluted by 20 times) is recommended for drilling under the cutting conditions above. Lower the revolutions if you use oil fluid or mist.

(Note 5) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

Drill Dia.		Cutting Speed (SFM)	Revolution (min <sup>-1</sup> )	Feed (Min.—Max.) (IPR)	Peck (inch)	Work Material			
						Carbon Steel, Alloy Steel (280—350HB)		Pre-hardened Steel	
inch	mm					Cutting Speed (SFM)	Revolution (min <sup>-1</sup> )	Feed (Min.—Max.) (IPR)	Peck (inch)
		AISI 4340 etc.				AISI P21, P20 etc.			
<b>.0394</b>	<b>0.10</b>	20	20000	.0001 (.00004—.0001)	.0008	20	20000	.0001 (.00004—.0001)	.0008
<b>.0472</b>	<b>0.12</b>	25	20000	.0001 (.00004—.0001)	.0008	25	20000	.0001 (.00004—.0001)	.0008
<b>.0630</b>	<b>0.16</b>	30	20000	.0001 (.00004—.0001)	.0008	30	20000	.0001 (.00004—.0001)	.0008
<b>.0787</b>	<b>0.20</b>	40	20000	.0001 (.00008—.0002)	.0016	40	20000	.0001 (.00008—.0002)	.0016
<b>.0984</b>	<b>0.25</b>	50	20000	.0001 (.00008—.0002)	.0016	50	20000	.0001 (.00008—.0002)	.0016
<b>.1260</b>	<b>0.32</b>	65	20000	.0002 (.00012—.0002)	.0020	65	20000	.0002 (.00012—.0002)	.0020
<b>.1575</b>	<b>0.40</b>	80	20000	.0002 (.00012—.0002)	.0020	80	20000	.0002 (.00012—.0002)	.0020
<b>.1969</b>	<b>0.50</b>	100	20000	.0002 (.00020—.0003)	.0039	100	20000	.0002 (.00020—.0003)	.0039
<b>.2480</b>	<b>0.63</b>	130	20000	.0003 (.00024—.0004)	.0039	130	20000	.0003 (.00024—.0004)	.0039
<b>.3150</b>	<b>0.80</b>	165	20000	.0006 (.00047—.0007)	.0118	165	20000	.0006 (.00047—.0007)	.0118
<b>.3937</b>	<b>0.99</b>	205	20000	.0008 (.00059—.0010)	.0118	205	20000	.0008 (.00059—.0010)	.0118
		Austenitic Stainless Steel (≤200HB) <td colspan="4">Gray Cast Iron (≤350MPa) </td>				Gray Cast Iron (≤350MPa)			
		AISI 304, 316 etc. <td colspan="4">No45B etc. </td>				No45B etc.			
inch	mm					Cutting Speed (SFM)	Revolution (min <sup>-1</sup> )	Feed (Min.—Max.) (IPR)	Peck (inch)
<b>.0394</b>	<b>0.10</b>	20	20000	.0001 (.00004—.0001)	.0008	20	20000	.0001 (.00004—.0001)	.0008
<b>.0472</b>	<b>0.12</b>	25	20000	.0001 (.00004—.0001)	.0008	25	20000	.0001 (.00004—.0001)	.0008
<b>.0630</b>	<b>0.16</b>	30	20000	.0001 (.00004—.0001)	.0008	30	20000	.0001 (.00004—.0001)	.0008
<b>.0787</b>	<b>0.20</b>	35	18000	.0001 (.00008—.0002)	.0016	40	20000	.0001 (.00008—.0002)	.0016
<b>.0984</b>	<b>0.25</b>	45	18000	.0001 (.00008—.0002)	.0016	50	20000	.0001 (.00008—.0002)	.0016
<b>.1260</b>	<b>0.32</b>	50	15000	.0002 (.00012—.0002)	.0020	65	20000	.0002 (.00012—.0002)	.0020
<b>.1575</b>	<b>0.40</b>	60	15000	.0002 (.00012—.0002)	.0020	80	20000	.0002 (.00012—.0002)	.0020
<b>.1969</b>	<b>0.50</b>	50	10000	.0002 (.00020—.0003)	.0039	100	20000	.0002 (.00020—.0003)	.0039
<b>.2480</b>	<b>0.63</b>	65	10000	.0003 (.00024—.0004)	.0039	130	20000	.0003 (.00024—.0004)	.0039
<b>.3150</b>	<b>0.80</b>	50	6000	.0006 (.00047—.0007)	.0079	165	20000	.0008 (.00059—.0010)	.0118
<b>.3937</b>	<b>0.99</b>	60	6000	.0008 (.00059—.0010)	.0079	205	20000	.0016 (.00118—.0020)	.0118
		Aluminium Alloy (Si<5%) <td colspan="4">Heat Resistant Alloy </td>				Heat Resistant Alloy			
		ASTM A6061, A7075 etc. <td colspan="4">Inconel718 etc. </td>				Inconel718 etc.			
inch	mm					Cutting Speed (SFM)	Revolution (min <sup>-1</sup> )	Feed (Min.—Max.) (IPR)	Peck (inch)
<b>.0394</b>	<b>0.10</b>	20	20000	.0001 (.00004—.0001)	.0020	5	7000	.00004 (.00002—.00004)	.0008
<b>.0472</b>	<b>0.12</b>	25	20000	.0001 (.00008—.0002)	.0020	10	7000	.00004 (.00002—.00004)	.0008
<b>.0630</b>	<b>0.16</b>	30	20000	.0002 (.00012—.0002)	.0020	10	7000	.00004 (.00002—.00004)	.0008
<b>.0787</b>	<b>0.20</b>	40	20000	.0002 (.00020—.0003)	.0039	10	5000	.00008 (.00004—.00008)	.0016
<b>.0984</b>	<b>0.25</b>	50	20000	.0003 (.00024—.0004)	.0039	10	5000	.00008 (.00004—.00008)	.0016
<b>.1260</b>	<b>0.32</b>	65	20000	.0004 (.00031—.0005)	.0118	10	4000	.00008 (.00004—.00008)	.0020
<b>.1575</b>	<b>0.40</b>	80	20000	.0008 (.00059—.0010)	.0118	15	4000	.00008 (.00004—.00008)	.0020
<b>.1969</b>	<b>0.50</b>	100	20000	.0012 (.00098—.0014)	.0197	15	3000	.00012 (.00004—.00012)	.0039
<b>.2480</b>	<b>0.63</b>	130	20000	.0016 (.00138—.0018)	.0197	20	3000	.00016 (.00008—.00016)	.0039
<b>.3150</b>	<b>0.80</b>	165	20000	.0020 (.00177—.0022)	.0315	15	1800	.00024 (.00016—.00024)	.0079
<b>.3937</b>	<b>0.99</b>	205	20000	.0024 (.00217—.0026)	.0315	20	1800	.00039 (.00031—.00039)	.0079

(Note 1) When drilling holes up to  $\phi 0.3$ mm, the use of a spot drill is recommended. (Order number : MSP0300SB, Cutting conditions : See below.)

(Note 2) Change cutting conditions depending on your machine and workpiece rigidity.

(Note 3) When machining holes over 5D, reduce the step stated above.

(Note 4) The use of water-soluble fluid (diluted by 20 times) is recommended for drilling under the cutting conditions above. Lower the revolutions if you use oil fluid or mist.

(Note 5) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.