



**High Performance Cutting Tools**



**SOLID CARBIDE DRILLS**

## TD DRILLS SOLID AND THROUGH COOLANT - 3X, 5X, 7X

4.004

### WORK PIECE MATERIALS

#### PRIMARY

Steel, Stainless Steel, Cast Iron, Super Alloys

#### FEATURES

- Reinforced core geometry for higher feed rates
- Special flute form for effective chip evacuation
- Special nano grain carbide raw material with an optimum balance of hardness and toughness
- High performance coating for superior wear resistance at higher cutting speeds

#### FUNCTION

- High performance coating for superior wear resistance at higher cutting speeds
- Universal geometry

#### BENEFITS

- Higher productivity
- High feed rate geometry
- Lower breakages and rejection rates due to stable core



## DHD SERIES - DEEP HOLE DRILLING - 12X, 15X, 20X

4.022

### WORK PIECE MATERIALS

#### PRIMARY

Forged Steel, Stainless Steel, Cast Iron, Aluminium

#### FEATURES

- Reinforced core design
- Superior surface treatment
- 4 Margins to guide
- High performance coating
- Optimized flute design

#### FUNCTION

- High performance coating for superior wear resistance at higher cutting speeds
- Stable cutting edge

#### BENEFITS

- Better hole straightness
- High feed rate geometry
- Lower breakages and rejection rates due to stable core



## SOLID CARBIDE JOBBER DRILL - F224/F224A AND F226/F226A

4.036

### WORK PIECE MATERIALS

#### PRIMARY

Steel, Stainless Steel, Cast Iron, Aluminium

#### FEATURES

- Reinforced core design
- Superior surface treatment
- Available in regular and stub
- 30 Degree helix & 118 degree point angle
- Optimized flute design

#### FUNCTION

- High performance coating for superior wear resistance at higher cutting speeds
- Stable cutting edge

#### BENEFITS

- Better hole straightness
- High feed rate geometry
- Lower breakages and rejection rates due to stable core



## CARBIDE SPOTTING DRILL (60°/90°/120°)

4.043

### WORK PIECE MATERIALS

#### PRIMARY

Steel, Cast Iron, Stainless Steel, Super Alloys, Hard Steel, Aluminium

#### FEATURES

- Right-hand helix
- h6 tolerance range
- Point angle tolerance +0°/-1°
- Standard length

#### FUNCTION

- 60°/90°/120° point angle
- Can be used as a chamfering tool if the spot drill diameter is larger than the final hole size.
- Tight tolerance with a very short flute length
- Highly recommend in deep-hole drilling

#### BENEFITS

- Ensure accurate hole location by avoiding drill deflection of materials.
- Useful in abrasive workpiece materials where the machining conditions are rigid.
- Designed to be extremely rigid to precisely spot a hole for a twist drill



## CARBIDE CENTRE DRILLS

4.044

### WORK PIECE MATERIALS

#### PRIMARY

Steel, Stainless Steel, Cast Iron, Super Alloys

#### PRIMARY

Cast Irons & Non Ferrous

#### FEATURES

- DIN333 standard
- Available in both LH and RH cut
- Available in form A and form B

#### FUNCTION

- 118° point angle
- General centering process for wide range of materials
- Coating available on request
- Can operate on higher cutting speeds

#### BENEFITS

- Double ended drills produce smoother finishes and many more holes than HSS centre drills
- Works equally well on soft and heat treated materials
- Carbide reduces possibility of breakage
- Increase tool life dramatically



## CARBIDE CHAMFER TOOLS (60°/90°)

4.047

### WORK PIECE MATERIALS

#### PRIMARY

Steel, Cast Iron, Stainless Steel, Super Alloys, Hard Steel, Aluminium

#### FEATURES

- 4 flutes
- Available in TiN coating
- Available in 60° and 90° point angle

#### FUNCTION

- Versatile chamfering tool

#### BENEFITS

- Superior surface quality



## MULTI FLUTE CARBIDE REAMING TOOLS

4.050

### WORK PIECE MATERIALS

#### PRIMARY

Steel, Stainless Steel, Cast Iron and Non ferrous

#### FEATURES

- ISO H7 tolerance class hole
- Internal coolant supply
- Available in right hand cut
- Intermediate diameters from 1.5mm - 20mm

#### FUNCTION

- Special coatings and lead chamfer configurations enable high-speed machining
- Highest metal removal rate at higher speeds and feeds

#### BENEFITS

- Longer tool life with increased hole and surface quality
- Address most common reaming applications.





**High Performance Cutting Tools**

DRILLS



## TD DRILLS

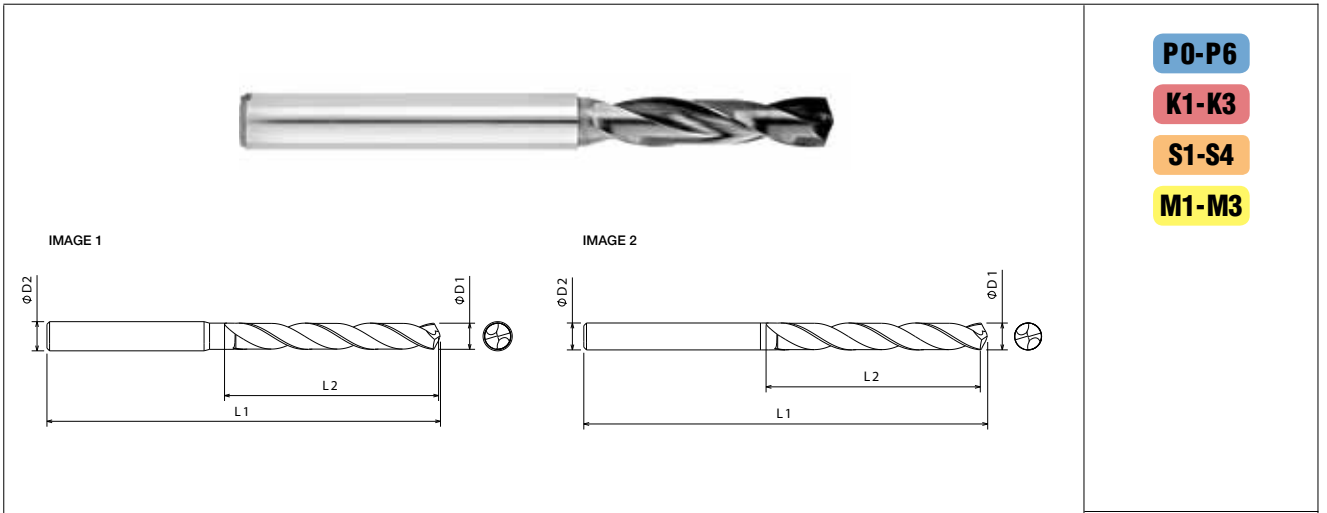
### Features Benefits

- Reinforced core geometry for higher feed rates
- Special flute form for effective chip evacuation
- Special nano grain carbide raw material with an optimum balance of hardness and toughness
- High performance coating for superior wear resistance at higher cutting speeds

### Functions & Benefits

- Universal geometry which can be used for Cast Iron and Steel
- Higher Productivity
- High Feed Rate Geometry
- Lower breakages and rejection rates due to stable core

**3X** Solid carbide 3X high performance drill



- P0-P6**
- K1-K3**
- S1-S4**
- M1-M3**

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
1.0	7	58	4	1	FBJ0503714
1.2	7	58	4	1	FBJ0503715
1.3	7	58	4	1	FBJ0503716
1.4	7	58	4	1	FBJ0503717
1.5	9	58	4	1	FBJ0503718
1.6	9	58	4	1	FBJ0503719
1.7	9	58	4	1	FBJ0503720
1.8	9	58	4	1	FBJ0503721
1.9	13	58	4	1	FBJ0503722
2.0	13	58	4	1	FBJ0503723
2.1	13	58	4	1	FBJ0503724
2.2	13	58	4	1	FBJ0503725
2.3	13	58	4	1	FBJ0503726
2.4	13	58	4	1	FBJ0503727
2.5	13	58	4	1	FBJ0503728
2.6	13	58	4	1	FBJ0503729
2.7	13	58	4	1	FBJ0503730
2.8	13	58	4	1	FBJ0503731
2.9	13	58	4	1	FBJ0503732
3.0	16	57	3	1	FBJ0501006
3.0	16	57	6	1	FBJ0503835
3.1	22	63	4	1	FBJ0501007
3.1	22	63	6	1	FBJ0503836
3.2	22	63	4	1	FBJ0501008
3.2	22	63	6	1	FBJ0503837
3.3	22	63	4	1	FBJ0501009
3.3	22	63	6	1	FBJ0503838

ØD1	L2	L1	ØD2	Image	EDP No
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3.5	22	63	4	1	FBJ0501011
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3.6	22	63	4	1	FBJ0501012
3.6	22	63	6	1	FBJ0503841
3.7	22	63	4	1	FBJ0501013
3.7	22	63	6	1	FBJ0503842
3.8	22	63	4	1	FBJ0501014
3.8	22	63	6	1	FBJ0503843
3.9	22	63	4	1	FBJ0501015
3.9	22	63	6	1	FBJ0503844
4.0	22	63	4	2	FBJ0501016
4.0	22	63	6	1	FBJ0503845
4.1	26	63	5	1	FBJ0501017
4.1	26	63	6	1	FBJ0503846
4.2	26	63	5	1	FBJ0501018
4.2	26	63	6	1	FBJ0503847
4.3	26	63	5	1	FBJ0501019
4.3	26	63	6	1	FBJ0503848
4.4	26	63	5	1	FBJ0501020
4.4	26	63	6	1	FBJ0503849
4.5	26	63	5	1	FBJ0501021
4.5	26	63	6	1	FBJ0503850
4.6	26	63	5	1	FBJ0501022
4.6	26	63	6	1	FBJ0503851
4.65	26	63	6	1	FBJ0505029

DRILLS

**3X**

**Solid carbide 3X high performance drill**



P0-P6

K1-K3

S1-S4

M1-M3

IMAGE 1

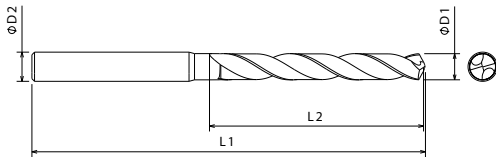
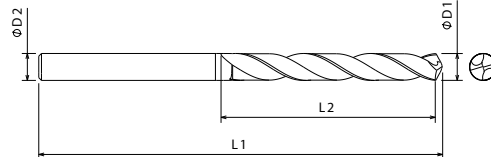


IMAGE 2

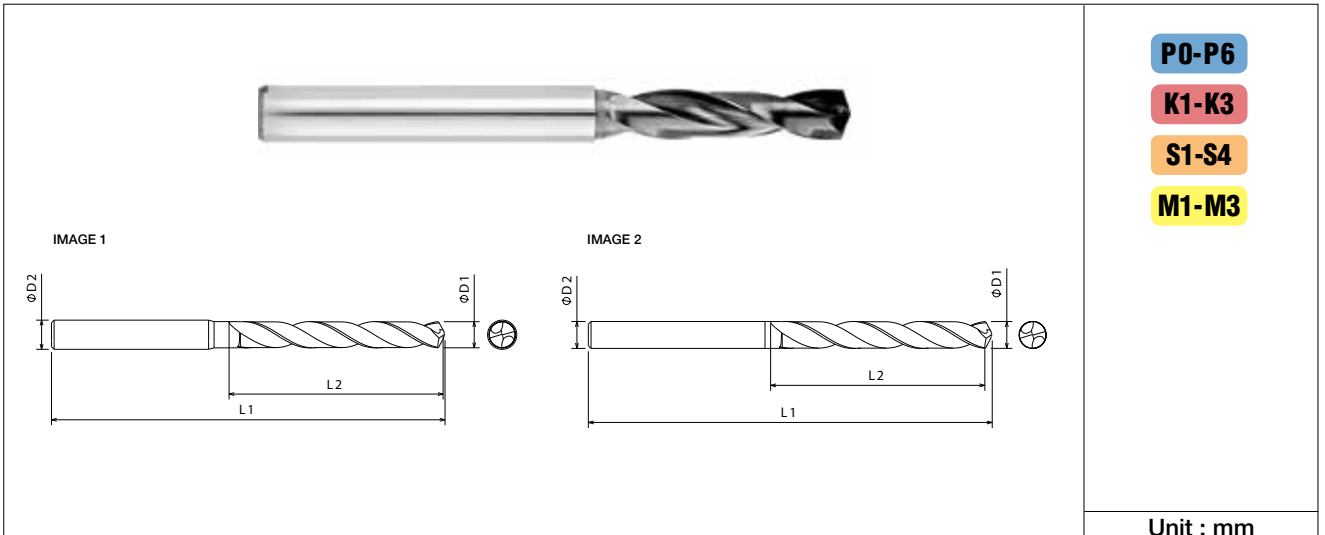


Unit : mm

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4.7	26	63	6	1	FBJ0503852
4.8	26	63	5	1	FBJ0501024
4.8	26	63	6	1	FBJ0503853
4.9	26	63	5	1	FBJ0501025
4.9	26	63	6	1	FBJ0503854
5.0	26	63	5	2	FBJ0501026
5.0	26	63	6	1	FBJ0503855
5.1	30	76	6	1	FBJ0501027
5.2	30	76	6	1	FBJ0501028
5.3	30	76	6	1	FBJ0501029
5.4	30	76	6	1	FBJ0501030
5.5	30	76	6	1	FBJ0501031
5.7	30	76	6	1	FBJ0501032
5.8	30	76	6	1	FBJ0501033
5.9	30	76	6	1	FBJ0501034
6.0	30	76	6	2	FBJ0501035
6.1	35	82	8	1	FBJ0501037
6.2	35	82	8	1	FBJ0501038
6.3	35	82	8	1	FBJ0501039
6.4	35	82	8	1	FBJ0501040
6.5	35	82	8	1	FBJ0501041
6.6	35	82	8	1	FBJ0501042
6.7	35	82	8	1	FBJ0501043
6.8	35	82	8	1	FBJ0501044
6.9	35	82	8	1	FBJ0501045

ØD1	L2	L1	ØD2	Image	EDP No
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7.3	38	82	8	1	FBJ0501049
7.4	38	82	8	1	FBJ0501050
7.5	38	82	8	1	FBJ0501051
7.6	38	82	8	1	FBJ0501052
7.8	38	82	8	1	FBJ0501053
7.9	38	82	8	1	FBJ0501054
8.0	38	82	8	2	FBJ0501055
8.1	43	89	10	1	FBJ0501056
8.2	43	89	10	1	FBJ0501057
8.3	43	89	10	1	FBJ0501058
8.4	43	89	10	1	FBJ0501059
8.5	43	89	10	1	FBJ0501060
8.6	43	89	10	1	FBJ0501061
8.7	43	89	10	1	FBJ0501062
8.8	43	89	10	1	FBJ0501063
8.9	43	89	10	1	FBJ0501064
9.0	43	89	10	1	FBJ0501065
9.1	43	89	10	1	FBJ0501066
9.2	43	89	10	1	FBJ0501067
9.25	43	89	10	1	FBJ0501068
9.3	43	89	10	1	FBJ0501069
9.4	43	89	10	1	FBJ0501072
9.5	43	89	10	1	FBJ0501070
9.6	43	89	10	1	FBJ0501071

Application data on page no 4.011

**3X**
**Solid carbide 3X high performance drill**


ØD1	L2	L1	ØD2	Image	EDP No
9.7	43	89	10	1	FBJ0501073
9.8	43	89	10	1	FBJ0501074
9.9	43	89	10	1	FBJ0501075
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10.2	51	101	12	1	FBJ0501078
10.3	51	101	12	1	FBJ0501079
10.4	51	101	12	1	FBJ0501080
10.5	51	101	12	1	FBJ0501081
10.6	51	101	12	1	FBJ0501082
10.7	51	101	12	1	FBJ0501083
10.8	51	101	12	1	FBJ0501084
10.9	51	101	12	1	FBJ0501085
11.0	51	101	12	1	FBJ0501086
11.1	51	101	12	1	FBJ0501087
11.2	51	101	12	1	FBJ0501088
11.3	51	101	12	1	FBJ0501089
11.4	51	101	12	1	FBJ0501090
11.5	51	101	12	1	FBJ0501091
11.6	51	101	12	1	FBJ0501092
11.7	51	101	12	1	FBJ0501093
11.8	51	101	12	1	FBJ0501094
11.9	51	101	12	1	FBJ0501095
12.0	51	101	12	2	FBJ0501096
12.1	54	107	14	1	FBJ0501097
12.5	54	107	14	1	FBJ0501098

ØD1	L2	L1	ØD2	Image	EDP No
12.8	54	107	14	1	FBJ0501099
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12.9	54	107	14	1	FBJ0501101
13.0	54	107	14	1	FBJ0501102
13.5	54	107	14	1	FBJ0501103
13.7	54	107	14	1	FBJ0501104
14.0	54	107	14	2	FBJ0501105
14.5	60	117	16	1	FBJ0501106
14.7	60	117	16	1	FBJ0501107
15.0	60	117	16	1	FBJ0501108
15.3	60	117	16	1	FBJ0501109
15.5	60	117	16	1	FBJ0501110
15.7	60	117	16	1	FBJ0501111
16.0	60	117	16	2	FBJ0501112
16.08	63	122	18	1	FBJ0501113
16.3	63	122	18	1	FBJ0501114
16.5	63	122	18	1	FBJ0501115
17.0	63	122	18	1	FBJ0501116
17.5	63	122	18	1	FBJ0501117
18.0	63	122	18	2	FBJ0501118
18.5	70	133	20	1	FBJ0501119
19.16	70	133	20	1	FBJ0501120
19.25	70	133	20	1	FBJ0501121
19.3	70	133	20	1	FBJ0501122
19.5	70	133	20	1	FBJ0501123
20.0	70	133	20	2	FBJ0501124

**DRILLS**

**5X**

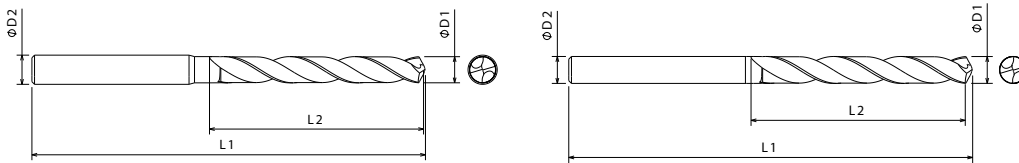
**Solid carbide 5X high performance drill**



- P0-P6**
- K1-K3**
- S1-S4**
- M1-M3**

IMAGE 1

IMAGE 2



Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
1.0	9	58	4	1	FBJ0504389
1.2	9	58	4	1	FBJ0504390
1.3	9	58	4	1	FBJ0504391
1.4	9	58	4	1	FBJ0504392
1.5	12	58	4	1	FBJ0504393
1.6	12	58	4	1	FBJ0504394
1.7	12	58	4	1	FBJ0504395
1.8	12	58	4	1	FBJ0504396
1.9	15	58	4	1	FBJ0504397
2.0	18	58	4	1	FBJ0504398
2.1	18	58	4	1	FBJ0504399
2.2	18	58	4	1	FBJ0504400
2.3	18	58	4	1	FBJ0504401
2.4	22	58	4	1	FBJ0504402
2.5	22	58	4	1	FBJ0504403
2.6	22	58	4	1	FBJ0504404
2.7	22	58	4	1	FBJ0504405
2.8	22	58	4	1	FBJ0504406
2.9	22	58	4	1	FBJ0504407
3.0	28	66	6	1	FBJ0504408
3.0	24	63	3	1	FBJ0501125
3.0	24	63	6	1	FBJ0503886
3.1	32	69	4	1	FBJ0501126
3.1	32	69	6	1	FBJ0503887
3.2	32	69	4	1	FBJ0501127

ØD1	L2	L1	ØD2	Image	EDP No
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3.3	32	69	4	1	FBJ0501128
3.3	32	69	6	1	FBJ0503889
3.4	32	69	4	1	FBJ0501129
3.4	32	69	6	1	FBJ0503890
3.5	32	69	4	1	FBJ0501130
3.5	32	69	6	1	FBJ0503891
3.6	32	69	4	1	FBJ0501131
3.6	32	69	6	1	FBJ0503892
3.7	32	69	4	1	FBJ0501132
3.7	32	69	6	1	FBJ0503893
3.8	32	69	4	1	FBJ0501133
3.8	32	69	6	1	FBJ0503894
3.9	32	69	4	1	FBJ0501134
3.9	32	69	6	1	FBJ0503895
4.0	32	69	4	2	FBJ0501135
4.0	32	69	6	1	FBJ0503896
4.1	38	80	5	1	FBJ0501136
4.1	38	80	6	1	FBJ0503897
4.2	38	80	5	1	FBJ0501137
4.2	38	80	6	1	FBJ0503898
4.3	38	80	5	1	FBJ0501138
4.3	38	80	6	1	FBJ0503899
4.4	38	80	5	1	FBJ0501139
4.4	38	80	6	1	FBJ0503900

DRILLS



**5X**

**Solid carbide 5X high performance drill**



IMAGE 1

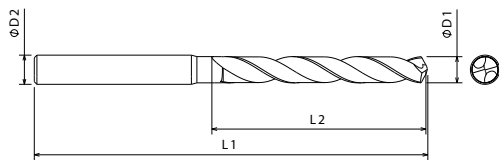
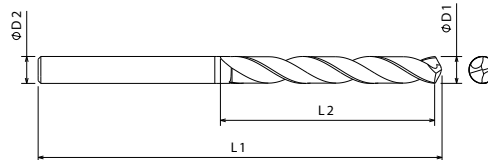


IMAGE 2



P0-P6

K1-K3

S1-S4

M1-M3

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
4.5	38	80	5	1	FBJ0501140
4.5	38	80	6	1	FBJ0503901
4.6	38	80	5	1	FBJ0501141
4.6	38	80	6	1	FBJ0503902
4.65	38	80	6	1	FBJ0505031
4.65	38	80	5	1	FBJ0505032
4.7	38	80	5	1	FBJ0501142
4.7	38	80	6	1	FBJ0503903
4.8	38	80	5	1	FBJ0501143
4.8	38	80	6	1	FBJ0503904
4.9	38	80	5	1	FBJ0501144
4.9	38	80	6	1	FBJ0503905
5.0	38	80	5	2	FBJ0501145
5.0	38	80	6	1	FBJ0503906
5.1	40	82	6	1	FBJ0501146
5.2	40	82	6	1	FBJ0501147
5.3	40	82	6	1	FBJ0501148
5.4	40	82	6	1	FBJ0501149
5.5	40	82	6	1	FBJ0501150
5.7	40	82	6	1	FBJ0501151
5.8	40	82	6	1	FBJ0501152
5.9	40	82	6	1	FBJ0501153
6.0	40	82	6	2	FBJ0501154
6.1	48	91	8	1	FBJ0501155
6.2	48	91	8	1	FBJ0501156

ØD1	L2	L1	ØD2	Image	EDP No
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6.4	48	91	8	1	FBJ0501158
6.5	48	91	8	1	FBJ0501159
6.6	48	91	8	1	FBJ0501160
6.7	48	91	8	1	FBJ0501161
6.8	48	91	8	1	FBJ0501162
6.9	48	91	8	1	FBJ0501163
7.0	48	91	8	1	FBJ0501164
7.1	48	91	8	1	FBJ0501165
7.2	48	91	8	1	FBJ0501166
7.3	48	91	8	1	FBJ0501167
7.4	48	91	8	1	FBJ0501168
7.5	48	91	8	1	FBJ0501169
7.6	48	91	8	1	FBJ0501170
7.7	48	91	8	1	FBJ0501171
7.8	48	91	8	1	FBJ0501172
7.9	48	91	8	1	FBJ0501173
8.0	48	91	8	2	FBJ0501174
8.1	55	103	10	1	FBJ0501175
8.2	55	103	10	1	FBJ0501176
8.3	55	103	10	1	FBJ0501177
8.4	55	103	10	1	FBJ0501178
8.5	55	103	10	1	FBJ0501179
8.6	55	103	10	1	FBJ0501180
8.7	55	103	10	1	FBJ0501181

**5X**

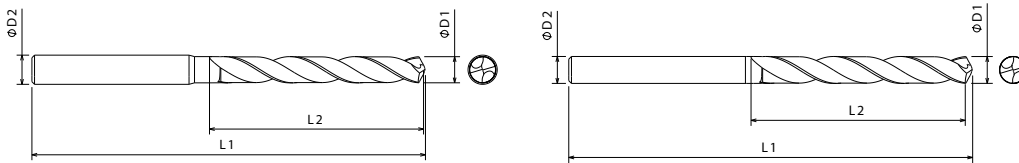
**Solid carbide 5X high performance drill**



- P0-P6**
- K1-K3**
- S1-S4**
- M1-M3**

IMAGE 1

IMAGE 2



Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
8.8	55	103	10	1	FBJ0501182
8.9	55	103	10	1	FBJ0501183
9.0	55	103	10	1	FBJ0501184
9.1	55	103	10	1	FBJ0501185
9.2	55	103	10	1	FBJ0501186
9.25	55	103	10	1	FBJ0501187
9.3	55	103	10	1	FBJ0501188
9.4	55	103	10	1	FBJ0501189
9.5	55	103	10	1	FBJ0501190
9.6	55	103	10	1	FBJ0501191
9.7	55	103	10	1	FBJ0501192
9.8	55	103	10	1	FBJ0501193
9.9	55	103	10	1	FBJ0501194
10.0	55	103	10	2	FBJ0501195
10.1	60	120	12	1	FBJ0501196
10.2	60	120	12	1	FBJ0501197
10.3	60	120	12	1	FBJ0501198
10.4	60	120	12	1	FBJ0501199
10.5	60	120	12	1	FBJ0501200
10.6	60	120	12	1	FBJ0501201
10.7	60	120	12	1	FBJ0501202
10.8	60	120	12	1	FBJ0501203
10.9	60	120	12	1	FBJ0501204
11.0	60	120	12	1	FBJ0501205
11.1	66	120	12	1	FBJ0501206

ØD1	L2	L1	ØD2	Image	EDP No
11.2	66	120	12	1	FBJ0501207
11.3	66	120	12	1	FBJ0501208
11.4	66	120	12	1	FBJ0501209
11.5	66	120	12	1	FBJ0501210
11.6	66	120	12	1	FBJ0501211
11.7	66	120	12	1	FBJ0501212
11.8	66	120	12	1	FBJ0501213
11.9	66	120	12	1	FBJ0501214
12.0	66	120	12	2	FBJ0501215
12.1	72	126	14	1	FBJ0501216
12.5	72	126	14	1	FBJ0501217
12.8	72	126	14	1	FBJ0501218
12.83	72	126	14	1	FBJ0501219
12.9	72	126	14	1	FBJ0501220
13.0	72	126	14	1	FBJ0501221
13.5	77	134	14	1	FBJ0501222
13.7	77	134	14	1	FBJ0501223
14.0	77	134	14	2	FBJ0501224
14.5	80	140	16	1	FBJ0501225
14.7	80	140	16	1	FBJ0501226
15.0	80	140	16	1	FBJ0501227
15.3	82	146	16	1	FBJ0501228
15.5	82	146	16	1	FBJ0501229
15.7	82	146	16	1	FBJ0501230
16.0	82	146	16	2	FBJ0501231



## Cutting parameters

### Series 2TDSS/2TDSR METRIC

Workpiece Material Group			Cutting Speed Vc (m/min)		Recommended Feed in mm/rev												
					Tool Diameter (mm)												
			min	max	Range	3.00		6.00		10.00		12.00		16.0		20.0	
Steel	P	0	105	125	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		1	105	125	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	105	125	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		3	85	105	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		4	50	65	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
		5	85	105	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
Stainless Steels	M	1	40	60	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	30	50	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
		3	30	50	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
Cast Iron	K	1	125	150	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	95	115	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		3	95	115	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
Special Alloys	S	1	15	25	f rev	0.015	0.026	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		2	10	15	f rev	0.015	0.026	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		3	15	25	f rev	0.015	0.026	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		4	25	45	f rev	0.015	0.026	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191

#RPM(N) = Vc(m/min) X 318.18/Tool Dia.      #Vf(mm/min) = RPM(N) X frev (mm/rev)

### Series 2TDSS/2TDSR INCH

Workpiece Material Group			Cutting Speed Vc ft/min		Recommended Feed in inch/rev												
					Tool Diameter (Inch)												
			min	max	Range	1/8		1/4		3/8		1/2		5/8		3/4	
Steel	P	0	344	410	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		1	344	410	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	344	410	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		3	279	344.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		4	164	213.2	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
		5	279	344.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
Stainless Steels	M	1	131	196.8	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	98	164	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
		3	98	164	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
Cast Iron	K	1	410	492	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	312	377.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		3	312	377.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
Special Alloys	S	1	49	82	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		2	33	49.2	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		3	49	82	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		4	82	147.6	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075

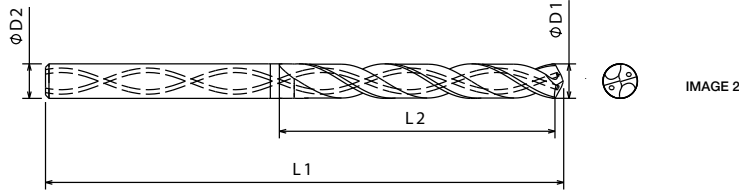
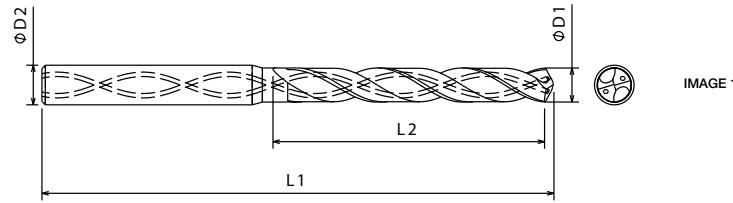
#RPM (N) = Vc (SFM) X 3.82/Tool Dia.      #Vf (Inch/min) = RPM (N) x frev (inch/rev)

The technical data are based upon theoretical values and are only intended for planning purposes and may vary based on the application. Actual results will vary. No responsibility from Forbes and Company Limited or their distributors is assumed.

### Drill tolerance

Details	Cutting Dia. "D1" Range	Cutting Dia. "D1" Tolerance h7 ANSI B4.2	Shank Dia. "D2"	Shank Tolerance h6 ANSI B4.2
2TDSS	1.00-3.00	0.00/-0.010	3.00-6.00	-0.008
	3.00-6.00	0.00/-0.012	3.00-6.00	-0.008
	6.00-10.00	0.00/-0.015	6.00-10.00	-0.009
	10.00-18.00	0.00/-0.018	10.00-18.00	-0.011
	20.00	0.00/-0.021	20.00	-0.013
2TDSR	1.00-3.00	0.00/-0.010	3.00-6.00	-0.008
	3.00-6.00	0.00/-0.012	3.00-6.00	-0.008
	6.00-10.00	0.00/-0.015	6.00-10.00	-0.009
	10.00-16.00	0.00/-0.018	10.00-16.00	-0.011

**3X** Solid carbide 3X high performance drill with coolant feed



P0-P6

K1-K3

M1-M3

S1-S4

Unit : mm

DRILLS

ØD1	L2	L1	ØD2	Image	EDP No
3.0	16	57	3	2	FBJ0502493
3.1	22	63	4	1	FBJ0502494
3.2	22	63	4	1	FBJ0502495
3.3	22	63	4	1	FBJ0502496
3.4	22	63	4	1	FBJ0502497
3.5	22	63	4	1	FBJ0502498
3.6	22	63	4	1	FBJ0502499
3.7	22	63	4	1	FBJ0502500
3.8	22	63	4	1	FBJ0502501
3.9	22	63	4	1	FBJ0502502
4.0	22	63	4	2	FBJ0502503
4.1	26	65	5	1	FBJ0502504
4.2	26	65	5	1	FBJ0502505
4.3	26	65	5	1	FBJ0502506
4.4	26	65	5	1	FBJ0502507
4.5	26	65	5	1	FBJ0502508
4.6	26	65	5	1	FBJ0502509
4.65	26	65	5	1	FBJ0505033
4.7	26	65	5	1	FBJ0502510
4.8	26	65	5	1	FBJ0502511

ØD1	L2	L1	ØD2	Image	EDP No
4.9	26	65	5	1	FBJ0502512
5.0	26	65	5	2	FBJ0502513
5.1	26	65	6	1	FBJ0502514
5.2	26	65	6	1	FBJ0502515
5.3	26	65	6	1	FBJ0502516
5.4	26	65	6	1	FBJ0502517
5.5	26	65	6	1	FBJ0502518
5.6	26	65	6	1	FBJ0502519
5.7	26	65	6	1	FBJ0502520
5.8	26	65	6	1	FBJ0502521
5.9	26	65	6	1	FBJ0502522
6.0	26	65	6	2	FBJ0502523
6.1	35	80	8	1	FBJ0502524
6.2	35	80	8	1	FBJ0502525
6.3	35	80	8	1	FBJ0502526
6.4	35	80	8	1	FBJ0502527
6.5	35	80	8	1	FBJ0502528
6.6	35	80	8	1	FBJ0502529
6.7	35	80	8	1	FBJ0502530
6.8	35	80	8	1	FBJ0502531

**3X**

**Solid carbide 3X high performance drill with coolant feed**

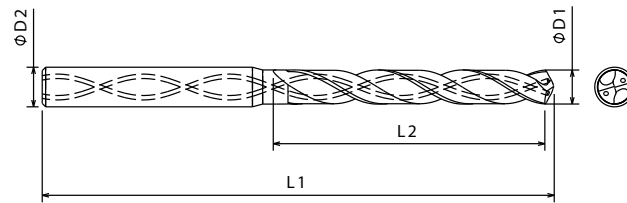


IMAGE 1

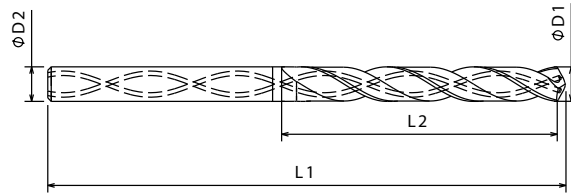


IMAGE 2

P0-P6

K1-K3

M1-M3

S1-S4

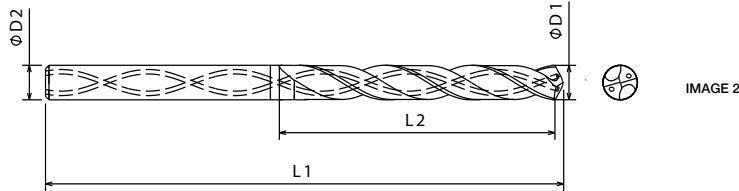
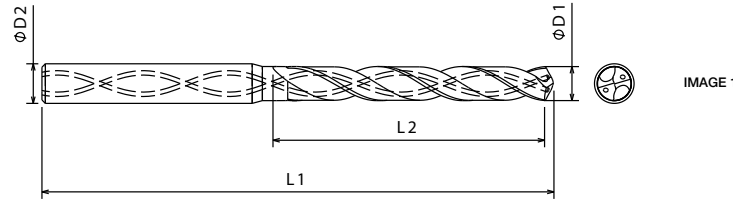
Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
6.9	35	80	8	1	FBJ0502532
7.0	35	80	8	1	FBJ0502533
7.1	38	80	8	1	FBJ0502534
7.2	38	80	8	1	FBJ0502535
7.3	38	80	8	1	FBJ0502536
7.4	38	80	8	1	FBJ0502537
7.5	38	80	8	1	FBJ0502538
7.6	38	80	8	1	FBJ0502539
7.8	38	80	8	1	FBJ0502540
7.9	38	80	8	1	FBJ0502541
8.0	38	80	8	2	FBJ0502542
8.1	41	82	10	1	FBJ0502543
8.2	41	82	10	1	FBJ0502544
8.3	41	82	10	1	FBJ0502545
8.4	41	82	10	1	FBJ0502546
8.5	41	82	10	1	FBJ0502547
8.6	41	82	10	1	FBJ0502548
8.7	41	82	10	1	FBJ0502549
8.8	41	82	10	1	FBJ0502550
8.9	41	82	10	1	FBJ0502551

ØD1	L2	L1	ØD2	Image	EDP No
9.0	41	82	10	1	FBJ0502552
9.1	41	82	10	1	FBJ0502553
9.2	41	82	10	1	FBJ0502554
9.3	41	82	10	1	FBJ0502555
9.4	41	82	10	1	FBJ0502556
9.5	41	82	10	1	FBJ0502557
9.6	41	82	10	1	FBJ0502558
9.7	41	82	10	1	FBJ0502559
9.8	41	82	10	1	FBJ0502560
9.9	41	82	10	1	FBJ0502561
10.0	41	82	10	2	FBJ0502562
10.1	55	102	12	1	FBJ0502563
10.2	55	102	12	1	FBJ0502564
10.3	55	102	12	1	FBJ0502565
10.4	55	102	12	1	FBJ0502566
10.5	55	102	12	1	FBJ0502567
10.6	55	102	12	1	FBJ0502568
10.7	55	102	12	1	FBJ0502569
10.8	55	102	12	1	FBJ0502570
10.9	55	102	12	1	FBJ0502571

**3X**

**Solid carbide 3X high performance drill with coolant feed**



P0-P6

K1-K3

M1-M3

S1-S4

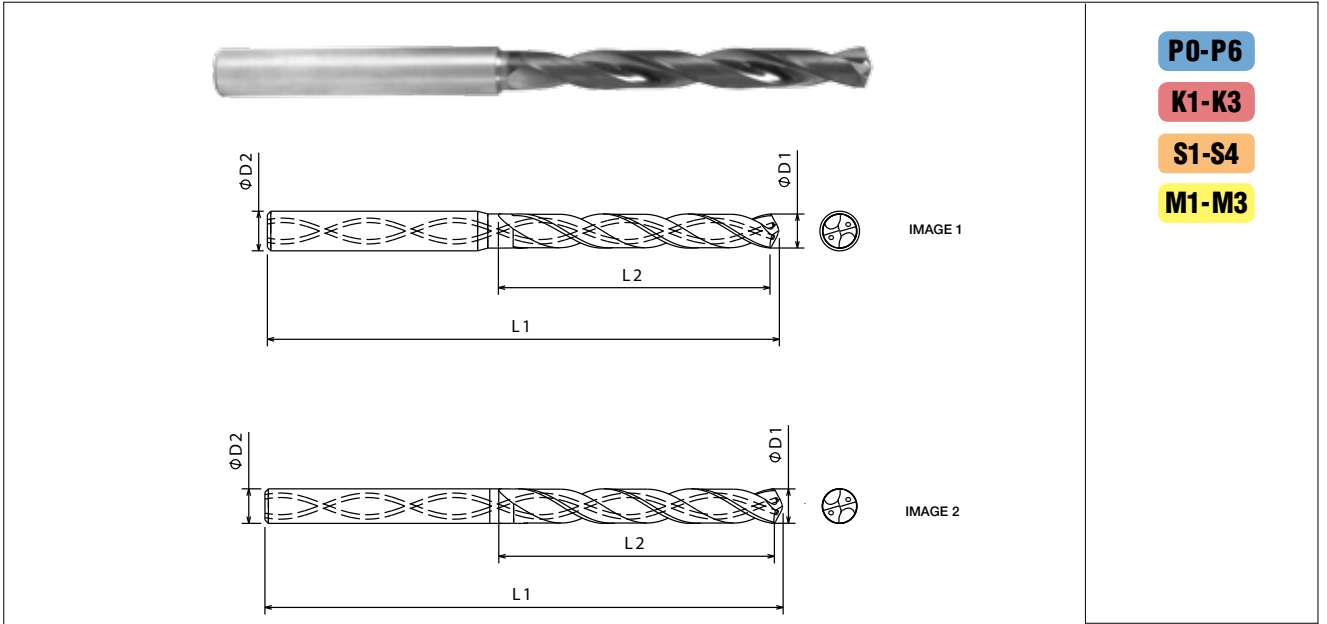
Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
11.0	55	102	12	1	FBJ0502572
11.1	55	102	12	1	FBJ0502573
11.2	55	102	12	1	FBJ0502574
11.3	55	102	12	1	FBJ0502575
11.4	55	102	12	1	FBJ0502576
11.5	55	102	12	1	FBJ0502577
11.6	55	102	12	1	FBJ0502578
11.7	55	102	12	1	FBJ0502579
11.8	55	102	12	1	FBJ0502580
11.9	55	102	12	1	FBJ0502581
12.0	55	102	12	2	FBJ0502582
12.1	60	107	14	1	FBJ0502583
12.5	60	107	14	1	FBJ0502584
12.8	60	107	14	1	FBJ0502585
12.9	60	107	14	1	FBJ0502587
13.0	60	107	14	1	FBJ0502588
13.5	60	107	14	1	FBJ0502589
13.7	60	107	14	1	FBJ0502590

ØD1	L2	L1	ØD2	Image	EDP No
14.0	60	107	14	2	FBJ0502591
14.5	60	110	16	1	FBJ0502592
14.7	60	110	16	1	FBJ0502593
15.0	60	110	16	1	FBJ0502594
15.3	60	110	16	1	FBJ0502595
15.5	60	110	16	1	FBJ0502596
15.7	60	110	16	1	FBJ0502597
16.0	60	110	16	2	FBJ0502598
16.3	73	122	18	1	FBJ0502599
16.5	73	122	18	1	FBJ0502600
17.0	73	122	18	1	FBJ0502601
17.5	73	122	18	1	FBJ0502602
18.0	73	122	18	2	FBJ0502603
18.5	80	133	20	1	FBJ0502604
19.1	80	133	20	1	FBJ0502605
19.3	80	133	20	1	FBJ0502607
19.5	80	133	20	1	FBJ0502608
20.0	80	133	20	2	FBJ0502609

**5X** Solid carbide 5X high performance drill with coolant feed

Carbide REG 5X 30° TiAlN



- P0-P6**
- K1-K3**
- S1-S4**
- M1-M3**

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
3.0	24	75	3	2	FBJ0501232
3.1	32	80	4	1	FBJ0501233
3.2	32	80	4	1	FBJ0501234
3.3	32	80	4	1	FBJ0501235
3.4	32	80	4	1	FBJ0501236
3.5	32	80	4	1	FBJ0501237
3.6	32	80	4	1	FBJ0501238
3.7	32	80	4	1	FBJ0501239
3.8	32	80	4	1	FBJ0501240
3.9	32	80	4	1	FBJ0501241
4.0	32	80	4	2	FBJ0501242
4.1	38	82	5	1	FBJ0501243
4.2	38	82	5	1	FBJ0501244
4.3	38	82	5	1	FBJ0501245
4.4	38	82	5	1	FBJ0501246
4.5	38	82	5	1	FBJ0501247
4.6	38	82	5	1	FBJ0501248
4.65	38	82	5	1	FBJ0505034
4.7	38	82	5	1	FBJ0501249
4.8	38	82	5	1	FBJ0501250

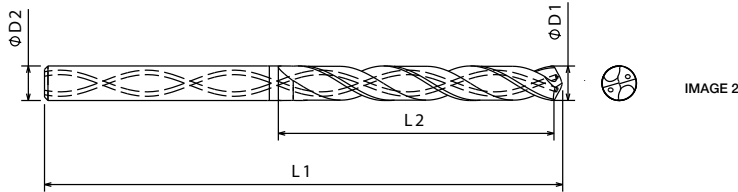
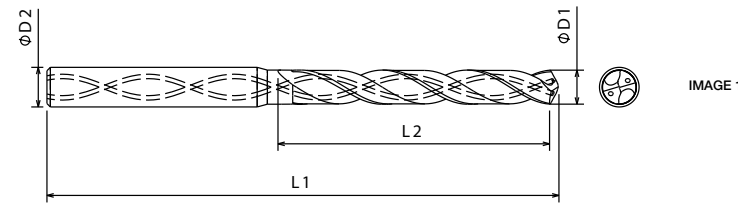
ØD1	L2	L1	ØD2	Image	EDP No
4.9	38	82	5	1	FBJ0501251
5.0	38	82	5	2	FBJ0501252
5.1	40	82	6	1	FBJ0501253
5.2	40	82	6	1	FBJ0501254
5.3	40	82	6	1	FBJ0501255
5.4	40	82	6	1	FBJ0501256
5.5	40	82	6	1	FBJ0501257
5.7	40	82	6	1	FBJ0501258
5.8	40	82	6	1	FBJ0501259
5.9	40	82	6	1	FBJ0501260
6.0	40	82	6	2	FBJ0501261
6.1	48	91	8	1	FBJ0501262
6.2	48	91	8	1	FBJ0501263
6.3	48	91	8	1	FBJ0501264
6.4	48	91	8	1	FBJ0501265
6.5	48	91	8	1	FBJ0501266
6.6	48	91	8	1	FBJ0501267
6.7	48	91	8	1	FBJ0501268
6.8	48	91	8	1	FBJ0501269
6.9	48	91	8	1	FBJ0501270

DRILLS

**5X** Solid carbide 5X high performance drill with coolant feed



DRILLS



- P0-P6
- K1-K3
- S1-S4
- M1-M3

Unit : mm

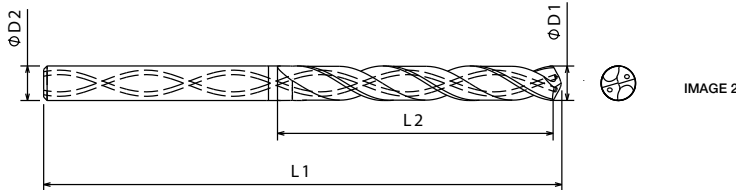
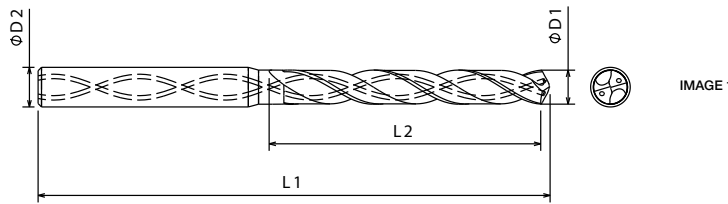
ØD1	L2	L1	ØD2	Image	EDP No
7.0	48	91	8	1	FBJ0501271
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7.14	48	91	8	1	FBJ0501273
7.2	48	91	8	1	FBJ0501274
7.3	48	91	8	1	FBJ0501275
7.4	48	91	8	1	FBJ0501276
7.5	48	91	8	1	FBJ0501277
7.6	48	91	8	1	FBJ0501278
7.7	48	91	8	1	FBJ0501279
7.8	48	91	8	1	FBJ0501280
7.9	48	91	8	1	FBJ0501281
8.0	48	91	8	2	FBJ0501282
8.1	55	103	10	1	FBJ0501283
8.2	55	103	10	1	FBJ0501284
8.3	55	103	10	1	FBJ0501285
8.4	55	103	10	1	FBJ0501286
8.5	55	103	10	1	FBJ0501287
8.6	55	103	10	1	FBJ0501288
8.7	55	103	10	1	FBJ0501289
8.8	55	103	10	1	FBJ0501290

ØD1	L2	L1	ØD2	Image	EDP No
8.9	55	103	10	1	FBJ0501291
9.0	55	103	10	1	FBJ0501292
9.1	55	103	10	1	FBJ0501293
9.2	55	103	10	1	FBJ0501294
9.25	55	103	10	1	FBJ0501295
9.3	55	103	10	1	FBJ0501296
9.4	55	103	10	1	FBJ0501297
9.5	55	103	10	1	FBJ0501298
9.6	55	103	10	1	FBJ0501299
9.7	55	103	10	1	FBJ0501300
9.8	55	103	10	1	FBJ0501301
9.9	55	103	10	1	FBJ0501302
10.0	55	103	10	2	FBJ0501303
10.1	60	120	12	1	FBJ0501304
10.2	60	120	12	1	FBJ0501305
10.3	60	120	12	1	FBJ0501306
10.4	60	120	12	1	FBJ0501307
10.5	60	120	12	1	FBJ0501308
10.6	60	120	12	1	FBJ0501309
10.7	60	120	12	1	FBJ0501310



**5X**

**Solid carbide 5X high performance drill with coolant feed**



P0-P6

K1-K3

S1-S4

M1-M3

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
10.8	60	120	12	1	FBJ0501311
10.9	60	120	12	1	FBJ0501312
11.0	60	120	12	1	FBJ0501313
11.1	66	120	12	1	FBJ0501314
11.2	66	120	12	1	FBJ0501315
11.3	66	120	12	1	FBJ0501316
11.4	66	120	12	1	FBJ0501317
11.5	66	120	12	1	FBJ0501318
11.6	66	120	12	1	FBJ0501319
11.7	66	120	12	1	FBJ0501320
11.8	66	120	12	1	FBJ0501321
11.9	66	120	12	1	FBJ0501322
12.0	66	120	12	2	FBJ0501323
12.1	72	126	14	1	FBJ0501324
12.5	72	126	14	1	FBJ0501325
12.8	72	126	14	1	FBJ0501326
12.83	72	126	14	1	FBJ0501327
12.9	72	126	14	1	FBJ0501328
13.0	72	126	14	1	FBJ0501329
13.5	77	134	14	1	FBJ0501330
13.7	77	134	14	1	FBJ0501331

ØD1	L2	L1	ØD2	Image	EDP No
14.0	77	134	14	2	FBJ0501332
14.5	80	146	16	1	FBJ0501333
14.7	80	146	16	1	FBJ0501334
15.0	80	146	16	1	FBJ0501335
15.3	82	146	16	1	FBJ0501336
15.5	82	146	16	1	FBJ0501337
15.7	82	146	16	1	FBJ0501338
16.0	82	146	16	2	FBJ0501339
16.08	90	158	18	1	FBJ0501340
16.3	90	158	18	1	FBJ0501341
16.5	90	158	18	1	FBJ0501342
17.0	90	158	18	1	FBJ0501343
17.5	95	158	18	1	FBJ0501344
18.0	95	158	18	2	FBJ0501345
18.5	100	160	20	1	FBJ0501346
19.16	100	160	20	1	FBJ0501347
19.25	100	160	20	1	FBJ0501348
19.3	100	160	20	1	FBJ0501349
19.5	100	160	20	1	FBJ0501350
20.0	100	160	20	2	FBJ0501351



## Cutting parameters

### Series 2TDCS/2TDCR METRIC

Workpiece Material Group		Cutting Speed Vc (m/min)		Recommended Feed in mm/rev													
				Tool Diameter (mm)													
		min	max	Range	3.00		6.00		10.00		12.00		16.0		20.0		
Steel	P	0	150	190	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		1	150	190	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	150	190	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		3	95	130	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		4	60	75	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
		5	95	130	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
Stainless Steels	M	1	65	95	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
		2	45	65	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
		3	45	65	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
Cast Iron	K	1	150	190	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	106	129	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		3	106	129	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
Special Alloys	S	1	20	30	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		2	10	15	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		3	20	30	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		4	35	55	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191

#RPM = Vc x 318.18/Tool Dia.

#mm/min = RPM x mm/rev

### Series 2TDCS/2TDCR INCH

Workpiece Material Group		Cutting Speed Vc ft/min		Recommended Feed in inch/rev													
				Tool Diameter (Inch)													
		min	max	Range	1/8		1/4		3/8		1/2		5/8		3/4		
Steel	P	0	492	623.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		1	492	623.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	492	623.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		3	312	426.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		4	197	246	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
		5	312	426.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
Stainless Steels	M	1	213	311.6	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	148	213.2	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
		3	148	213.2	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
Cast Iron	K	1	492	623.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	348	423.12	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		3	348	423.12	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
Special Alloys	S	1	66	98.4	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		2	33	49.2	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		3	66	98.4	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		4	115	180.4	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075

#RPM (N) = Vc (SFM) X 3.82/Tool Dia.

#Vf (Inch/min) = RPM (N) x frev (inch/rev)

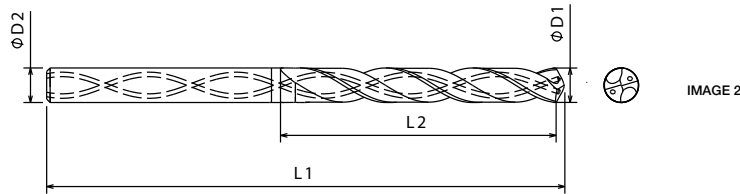
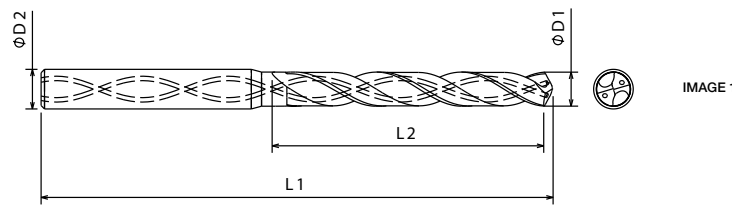
The technical data are based upon theoretical values and are only intended for planning purposes and may vary based on the application. Actual results will vary. No responsibility from Forbes and Company Limited or their distributors is assumed.

### Drill tolerance

Details	Cutting Dia. "D1" Range	Cutting Dia. "D1" Tolerance h7 ANSI B4.2	Shank Dia. "D2"	Shank Tolerance h6 ANSI B4.2
2TDCS	3.00-6.00	0.00/-0.012	3.00-6.00	-0.008
	6.00-10.00	0.00/-0.015	6.00-10.00	-0.009
	10.00-18.00	0.00/-0.018	10.00-18.00	-0.011
	20.00	0.00/-0.021	20.00	-0.013
	3.00-6.00	0.00/-0.012	3.00-6.00	-0.008
2TDCR	6.00-10.00	0.00/-0.015	6.00-10.00	-0.009
	10.00-18.00	0.00/-0.018	10.00-18.00	-0.011
	20.00	0.00/-0.021	20.00	-0.013

**7X**

**Solid carbide 7X high performance drill with coolant feed**



P0-P6

K1-K3

S1-S4

M1-M3

Unit : mm

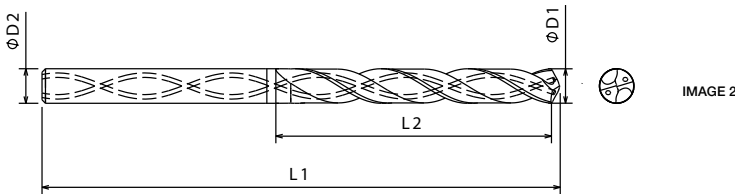
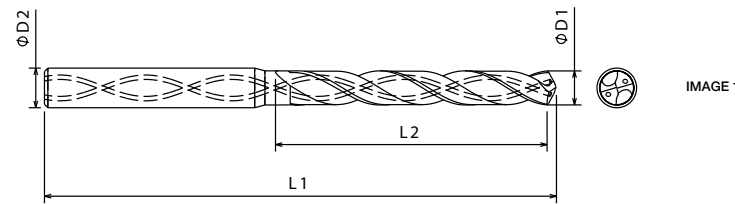
ØD1	L2	L1	ØD2	Image	EDP No
3.0	33	81	3	2	FBJ0501352
3.1	40	92	4	1	FBJ0501353
3.2	40	92	4	1	FBJ0501354
3.3	40	92	4	1	FBJ0501355
3.4	40	92	4	1	FBJ0501356
3.5	40	92	4	1	FBJ0501357
3.6	40	92	4	1	FBJ0501358
3.7	40	92	4	1	FBJ0501359
3.8	40	92	4	1	FBJ0501360
3.9	40	92	4	1	FBJ0501361
4.0	40	92	4	2	FBJ0501362
4.1	45	100	5	1	FBJ0501363
4.2	45	100	5	1	FBJ0501364
4.3	45	100	5	1	FBJ0501365
4.4	45	100	5	1	FBJ0501366
4.5	45	100	5	1	FBJ0501367
4.6	45	100	5	1	FBJ0501368
4.65	45	100	5	1	FBJ0505035
4.7	45	100	5	1	FBJ0501369
4.8	45	100	5	1	FBJ0501370
4.9	45	100	5	1	FBJ0501371
5.0	45	100	5	2	FBJ0501372
5.1	51	100	6	1	FBJ0501373
5.2	51	100	6	1	FBJ0501374

ØD1	L2	L1	ØD2	Image	EDP No
5.3	51	100	6	1	FBJ0501375
5.4	51	100	6	1	FBJ0501376
5.5	51	100	6	1	FBJ0501377
5.6	51	100	6	1	FBJ0505036
5.7	51	100	6	1	FBJ0501378
5.8	51	100	6	1	FBJ0501379
5.9	51	100	6	1	FBJ0501380
6.0	51	100	6	2	FBJ0501381
6.1	60	109	8	1	FBJ0501382
6.2	60	109	8	1	FBJ0501383
6.3	60	109	8	1	FBJ0501384
6.4	60	109	8	1	FBJ0501385
6.5	60	109	8	1	FBJ0501386
6.6	60	109	8	1	FBJ0501387
6.7	60	109	8	1	FBJ0501388
6.8	60	109	8	1	FBJ0501389
6.9	60	109	8	1	FBJ0501390
7.0	60	109	8	1	FBJ0501391
7.1	70	118	8	1	FBJ0501392
7.2	70	118	8	1	FBJ0501393
7.3	70	118	8	1	FBJ0501394
7.4	70	118	8	1	FBJ0501395
7.5	70	118	8	1	FBJ0501396
7.6	70	118	8	1	FBJ0501397

Application data on page no 4.021

**7X** Solid carbide 7X high performance drill with coolant feed

Carbide LONG 7X 30° TiAlN



P0-P6

K1-K3

S1-S4

M1-M3

Unit : mm

DRILLS

ØD1	L2	L1	ØD2	Image	EDP No
7.7	70	118	8	1	FBJ0501398
7.8	70	118	8	1	FBJ0501399
7.9	70	118	8	1	FBJ0501400
8.0	70	118	8	2	FBJ0501401
8.1	80	127	10	1	FBJ0501402
8.2	80	127	10	1	FBJ0501403
8.3	80	127	10	1	FBJ0501404
8.4	80	127	10	1	FBJ0501405
8.5	80	127	10	1	FBJ0501406
8.6	80	127	10	1	FBJ0501407
8.7	80	127	10	1	FBJ0501408
8.8	80	127	10	1	FBJ0501409
8.9	80	127	10	1	FBJ0501410
9.0	80	127	10	1	FBJ0501411
9.1	85	136	10	1	FBJ0501412
9.2	85	136	10	1	FBJ0501413
9.25	85	136	10	1	FBJ0501414
9.3	85	136	10	1	FBJ0501415
9.4	85	136	10	1	FBJ0501416
9.5	85	136	10	1	FBJ0501417
9.6	85	136	10	1	FBJ0501418
9.7	85	136	10	1	FBJ0501419
9.8	85	136	10	1	FBJ0501420

ØD1	L2	L1	ØD2	Image	EDP No
9.9	85	136	10	1	FBJ0501421
10.0	85	136	10	2	FBJ0501422
10.1	93	149	12	1	FBJ0501423
10.2	93	149	12	1	FBJ0501424
10.3	93	149	12	1	FBJ0501425
10.4	93	149	12	1	FBJ0501426
10.5	93	149	12	1	FBJ0501427
10.6	93	149	12	1	FBJ0501428
10.7	93	149	12	1	FBJ0501429
10.8	93	149	12	1	FBJ0501430
10.9	93	149	12	1	FBJ0501431
11.0	93	149	12	1	FBJ0501432
11.1	102	155	12	1	FBJ0501433
11.2	102	155	12	1	FBJ0501434
11.3	102	155	12	1	FBJ0501435
11.4	102	155	12	1	FBJ0501436
11.5	102	155	12	1	FBJ0501437
11.6	102	155	12	1	FBJ0501438
11.7	102	155	12	1	FBJ0501439
11.8	102	155	12	1	FBJ0501440
11.9	102	155	12	1	FBJ0501441
12.0	102	155	12	2	FBJ0501442



## Cutting parameters

### Series 2TDCL METRIC

Workpiece Material Group		Cutting Speed Vc ( m/min)		Recommended Feed in mm/rev													
				Tool Diameter (mm)													
		min	max	mm Range	3.00		6.00		10.00		12.00		16.0		20.0		
Steel	P	0	160	180	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		1	160	180	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	160	180	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		3	85	115	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		4	50	70	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
		5	85	115	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
Stainless Steels	M	1	55	85	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	40	60	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
		3	40	60	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
Cast Iron	K	1	160	180	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	106	129	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		3	106	129	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
Special Alloys	S	1	20	30	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		2	10	15	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		3	20	30	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		4	35	55	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191

#RPM(N) = Vc(m/min) X 318.18/Tool Dia.

#Vf(mm/min) = RPM(N) X frev (mm/rev)

### Series 2TDCL INCH

Workpiece Material Group		Cutting Speed Vc ft/min		Recommended Feed in inch/rev													
				Tool Diameter (Inch)													
		min	max	Inch Range	1/8		1/4		3/8		1/2		5/8		3/4		
Steel	P	0	525	590.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		1	525	590.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	525	590.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		3	279	377.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		4	164	229.6	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
		5	279	377.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
Stainless Steels	M	1	180	278.8	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	131	196.8	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
		3	131	196.8	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
Cast Iron	K	1	525	590.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	348	423.12	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		3	348	423.12	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
Special Alloys	S	1	66	98.4	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		2	33	49.2	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		3	66	98.4	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		4	115	180.4	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075

#RPM (N) = Vc (SFM ) X 3.82/Tool Dia.

#Vf (Inch/min) = RPM (N) x frev ( inch/rev)

### Drill tolerance

Details	Cutting Dia. "D1" Range	Cutting Dia. "D1" Tolerance h7 ANSI B4.2	Shank Dia. "D2"	Shank Tolerance h6 ANSI B4.2
2TDCL	3.00-6.00	0.00/-0.012	3.00-6.00	-0.008
	6.00-10.00	0.00/-0.015	6.00-10.00	-0.009
	10.00-12.00	0.00/-0.018	10.00-12.00	-0.011

## Deep hole drilling

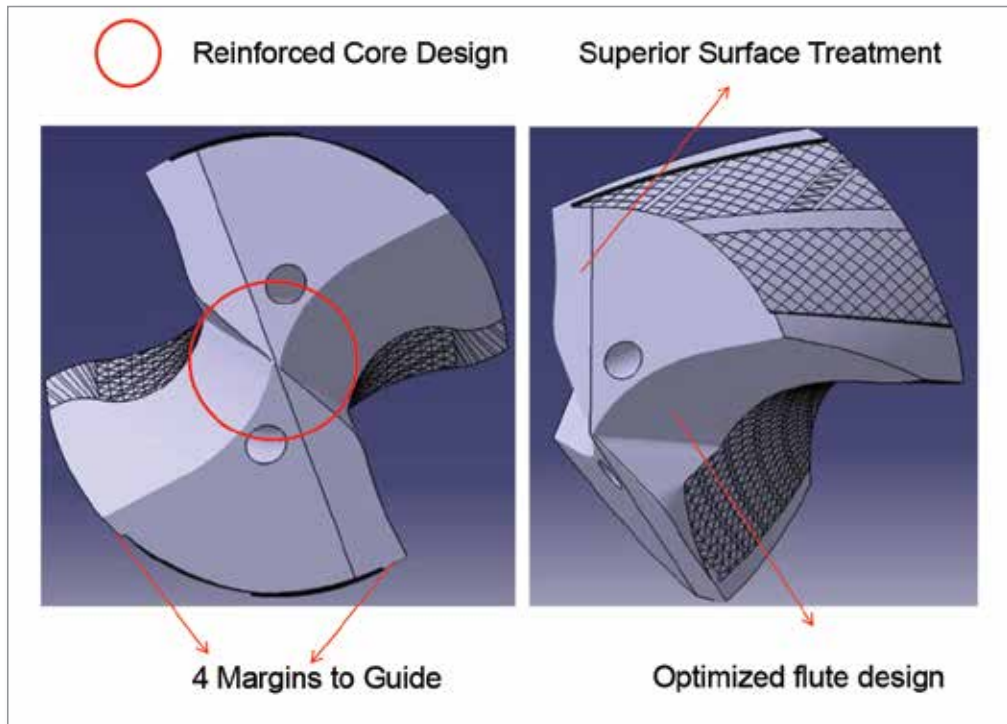


### Features

- Reinforced Core Design
- Superior Surface Treatment
- 4 Margins to Guide
- High Performance Coating
- Optimized Flute Design

### Benefits

- Stable cutting edge
- Better Chip Evacuation
- Better Hole Straightness
- Superior Tool Life
- Eliminated Breakages



## Case studies

<b>Challenge</b>	Reduction in CPC
<b>Component</b>	Crank Shaft
<b>Material</b>	Forged Steel- 30 HRc
<b>Competition</b>	Mitsubishi
<b>Solution</b>	DRILL 8.00MMX240X290 SH8 T/C DHD PT
<b>Machine</b>	HMC
<b>Vc</b>	80m/min
<b>RPM</b>	3200
<b>Feed in mm/min</b>	230 @ entry/ 350 /220 @ exit
<b>Depth</b>	160 X 1 Hole
<b>Existing Tool Life</b>	64 meters
<b>Tool Life Achieved</b>	66 meters
<b>Result</b>	Better tool Life
<b>Benefit</b>	15% reduction in CPC

<b>Challenge</b>	Reduction in breakage of oil hole drill
<b>Component</b>	Crankshaft 4 Cyliner
<b>Material</b>	Forged Steel
<b>Competition</b>	Guhring
<b>Solution</b>	DRILL 5.50MMX84X125 SH6 T/C DHD PT
<b>Machine</b>	SPM
<b>Vc</b>	65m/min
<b>RPM</b>	3760
<b>Feed in mm/min</b>	200 @ entry/ 500 /1000 @ exit
<b>Depth</b>	78 X 4 Holes
<b>Existing Tool Life</b>	187 meters
<b>Tool Life Achieved</b>	190 meters
<b>Result</b>	No Breakage
<b>Benefit</b>	10% reduction in CPC

<b>Challenge</b>	Reduce burr folding at exit
<b>Component</b>	Cylinder Head
<b>Material</b>	Aluminium ADC-7% Si
<b>Competition</b>	OSG Korea
<b>Solution</b>	DRILL 6.00MMX118X175 SH6 T/C DHD
<b>Machine</b>	HMC HSK63A
<b>Vc</b>	188m/min
<b>RPM</b>	10000
<b>Feed in mm/min</b>	500 @ entry/ 1200 /500 @ exit
<b>Depth</b>	80 X 4 Holes
<b>Existing Tool Life</b>	800 meters
<b>Tool Life Achieved</b>	800 meters
<b>Result</b>	Negligible wear and burr folding
<b>Benefit</b>	10% reduction in CPC

<b>Challenge</b>	Reduction in breakage of oil hole drill
<b>Component</b>	Crankshaft 2 Cyliner
<b>Material</b>	Forged Steel SAE 1541B
<b>Competition</b>	Sumitomo
<b>Solution</b>	DRILL 4.97X115X165MM SH5 T/C DHD PT
<b>Machine</b>	HMC
<b>Vc</b>	73m/min
<b>RPM</b>	4700
<b>Feed in mm/min</b>	200 @ entry/ 700 /500 @ exit
<b>Depth</b>	95 X 2 Holes
<b>Existing Tool Life</b>	34.2 meters
<b>Tool Life Achieved</b>	38 meters
<b>Result</b>	No Breakage
<b>Benefit</b>	10% reduction in CPC

<b>Challenge</b>	Reduction in CPC
<b>Component</b>	Crankshaft 4 Cyliner
<b>Material</b>	Forged Steel 38 MnSiV6 30-32 HRc
<b>Competition</b>	OSG
<b>Solution</b>	DRILL 6.00MMX115X 165 SH6 T/C DHD PT
<b>Machine</b>	Angular SPM
<b>Vc</b>	55m/min
<b>RPM</b>	2400
<b>Feed in mm/min</b>	150 @ entry/ 450 /150 @ exit
<b>Depth</b>	85 X 4 Holes
<b>Existing Tool Life</b>	150 meters
<b>Tool Life Achieved</b>	162 meters
<b>Result</b>	No Breakage
<b>Benefit</b>	10% reduction in CPC

<b>Challenge</b>	Reduction in CPC
<b>Component</b>	Crankshaft 6 Cyliner
<b>Material</b>	Forged Steel 38 MnSiV6 30-32 HRc
<b>Competition</b>	OSG
<b>Solution</b>	DRILL 7.00MMX110X160 SH8 T/C DHD PT
<b>Machine</b>	Angular SPM
<b>Vc</b>	55m/min
<b>RPM</b>	2800
<b>Feed in mm/min</b>	150 @ entry/ 500 /150 @ exit
<b>Depth</b>	80 X 4 Holes
<b>Existing Tool Life</b>	150 meters
<b>Tool Life Achieved</b>	172 meters
<b>Result</b>	No Breakage
<b>Benefit</b>	15% reduction in CPC

<b>Challenge</b>	Reduction in CPC
<b>Component</b>	Crankshaft 4 Cyliner
<b>Material</b>	Forged Steel EN19B 280-320 BHN
<b>Competition</b>	OSG
<b>Solution</b>	DRILL 5.95MMX120X 192 SH6 T/C DHD PT
<b>Machine</b>	HMC
<b>Vc</b>	55m/min
<b>RPM</b>	2934
<b>Feed in mm/min</b>	150 @ entry/ 480 /150 @ exit
<b>Depth</b>	105 X 4 Holes
<b>Existing Tool Life</b>	110 meters
<b>Tool Life Achieved</b>	124 meters
<b>Result</b>	No Breakage
<b>Benefit</b>	10% reduction in CPC

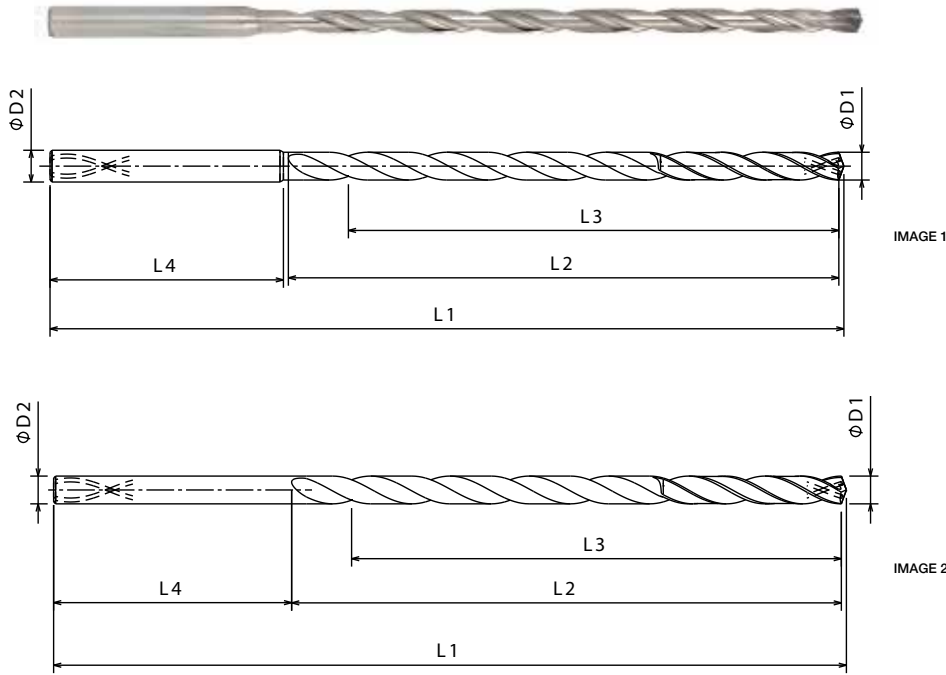
<b>Challenge</b>	Reduction in CPC
<b>Component</b>	Cam Shaft
<b>Material</b>	Forged Steel 16MnCr5 20-25 HRc
<b>Competition</b>	Walter
<b>Solution</b>	DRILL 7.00MMX110X 160 SH8 T/C DHD PT
<b>Machine</b>	SPM
<b>Vc</b>	55m/min
<b>RPM</b>	2500
<b>Feed in mm/min</b>	400 @ entry/ 550 /400 @ exit
<b>Depth</b>	68 X 1 Holes
<b>Existing Tool Life</b>	68 meters
<b>Tool Life Achieved</b>	123 meters
<b>Result</b>	No Breakage
<b>Benefit</b>	50% reduction in CPC

**12X**

**Solid carbide 12X high performance deep hole drill with coolant feed**



DRILLS



- P0-P4
- M1-M3
- K1-K3
- N1-N2

Unit : mm

Diameter	Flute Length	Cutting Length	Overall Length	Shank Length	Shank Diameter	Image	Bright - Polished	TiAIN
							EDP No	EDP No
ØD1	L2	L3	L1	L4	D2			
3.00	52	44	93	36	4	1	FBJ0504114	FBJ0504035
3.175	52	44	93	36	4	1	FBJ0504115	FBJ0504036
3.264	53	44	93	36	4	1	FBJ0504116	FBJ0504037
3.50	53	44	93	36	4	1	FBJ0504117	FBJ0504038
3.970	66	56	107	36	4	1	FBJ0504118	FBJ0504039
4.00	66	56	107	36	6	1	FBJ0504119	FBJ0504040
4.50	67	56	107	36	6	1	FBJ0504120	FBJ0504041
4.60	68	57	107	36	6	1	FBJ0504121	FBJ0504042
4.763	82	69	125	36	6	1	FBJ0504122	FBJ0504043
4.80	82	69	125	36	6	1	FBJ0504123	FBJ0504044
4.90	83	70	125	36	6	1	FBJ0504124	FBJ0504045
5.00	83	70	125	36	6	1	FBJ0504125	FBJ0504046
5.10	83	70	125	36	6	1	FBJ0504126	FBJ0504047
5.20	83	70	125	36	6	1	FBJ0504127	FBJ0504048
5.30	84	71	125	36	6	1	FBJ0504128	FBJ0504049
5.41	84	71	125	36	6	1	FBJ0504129	FBJ0504050
5.50	84	71	125	36	6	1	FBJ0504130	FBJ0504051
5.558	84	71	125	36	6	1	FBJ0504131	FBJ0504052
5.60	85	72	125	36	6	1	FBJ0504132	FBJ0504053
5.70	85	72	125	36	6	1	FBJ0504133	FBJ0504054

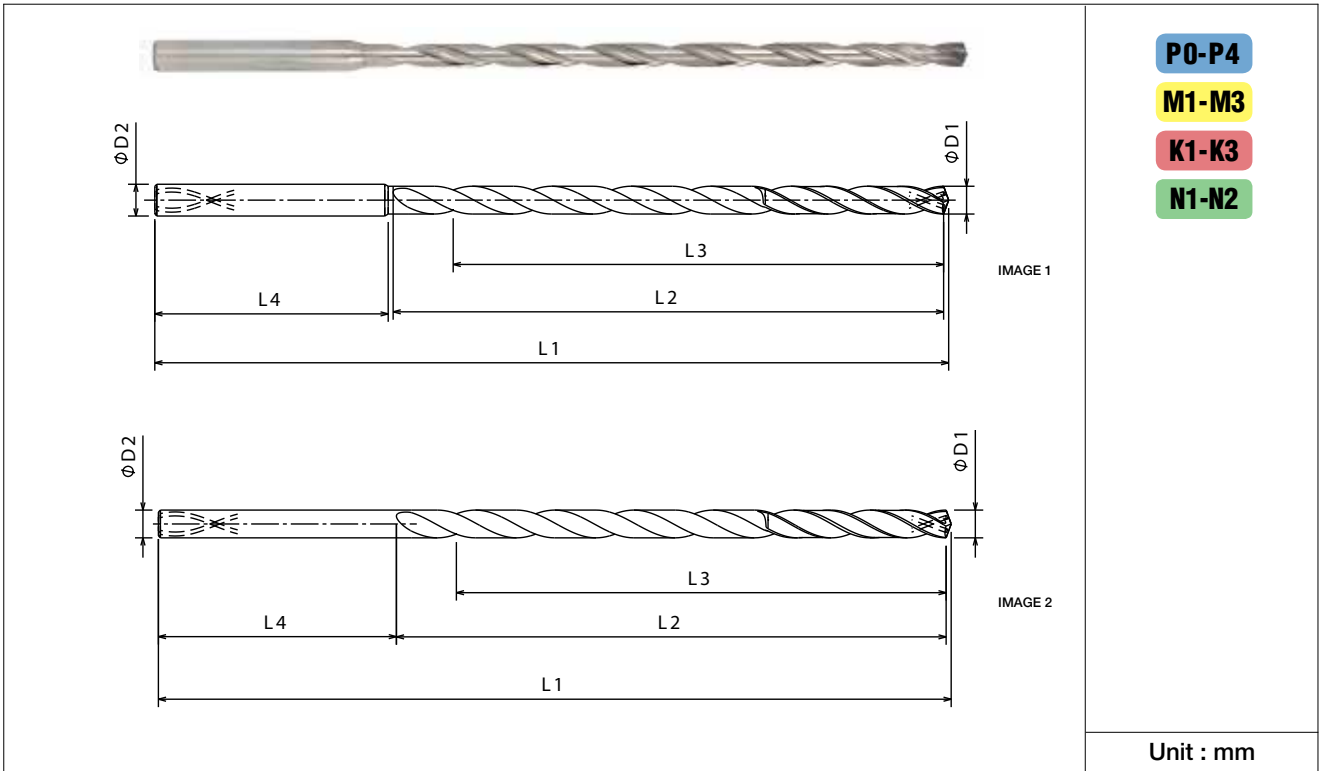
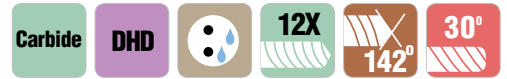
Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills



**12X**

**Solid carbide 12X high performance deep hole drill with coolant feed**



Diameter	Flute Length	Cutting Length	Overall Length	Shank Length	Shank Diameter	Image	Bright - Polished	TiAIN
							EDP No	EDP No
ØD1	L2	L3	L1	L4	D2			
5.80	85	71	125	36	6	1	FBJ0504134	FBJ0504055
5.90	85	71	125	36	6	1	FBJ0504135	FBJ0504056
6.00	86	72	125	36	6	2	FBJ0504136	FBJ0504057
6.20	97	82	139	36	8	1	FBJ0504137	FBJ0504058
6.35	98	83	139	36	8	1	FBJ0504138	FBJ0504059
6.50	98	83	139	36	8	1	FBJ0504139	FBJ0504060
6.528	98	83	139	36	8	1	FBJ0504140	FBJ0504061
6.60	99	84	139	36	8	1	FBJ0504141	FBJ0504062
6.746	99	83	139	36	8	1	FBJ0504142	FBJ0504063
6.80	99	83	139	36	8	1	FBJ0504143	FBJ0504064
6.909	100	84	139	36	8	1	FBJ0504144	FBJ0504065
7.00	100	84	139	36	8	1	FBJ0504145	FBJ0504066
7.145	111	94	153	36	8	1	FBJ0504146	FBJ0504067
7.50	112	95	153	36	8	1	FBJ0504147	FBJ0504068
7.541	112	95	153	36	8	1	FBJ0504148	FBJ0504069
7.70	113	96	153	36	8	1	FBJ0504149	FBJ0504070
7.80	113	95	153	36	8	1	FBJ0504150	FBJ0504071
7.938	114	96	153	36	8	1	FBJ0504151	FBJ0504072
8.00	114	96	153	36	8	2	FBJ0504152	FBJ0504073
8.10	136	116	185	40	10	1	FBJ0504153	FBJ0504074

Application data on page no 4.034

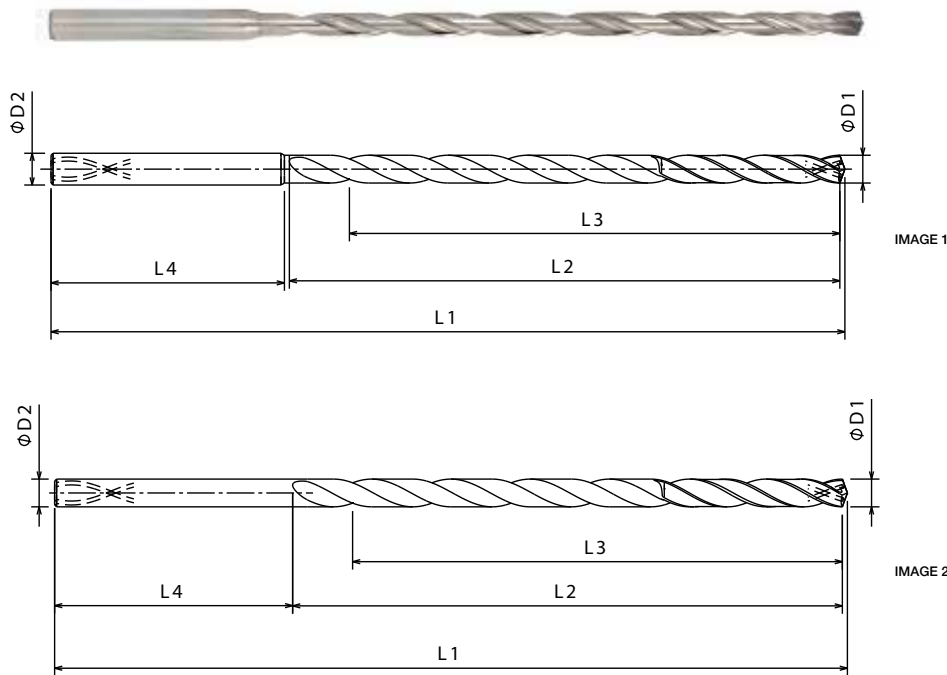
Note: Use DHD drills with Forbes PA150 pilot drills

**12X**

**Solid carbide 12X high performance deep hole drill with coolant feed**



DRILLS



- P0-P4
- M1-M3
- K1-K3
- N1-N2

Unit : mm

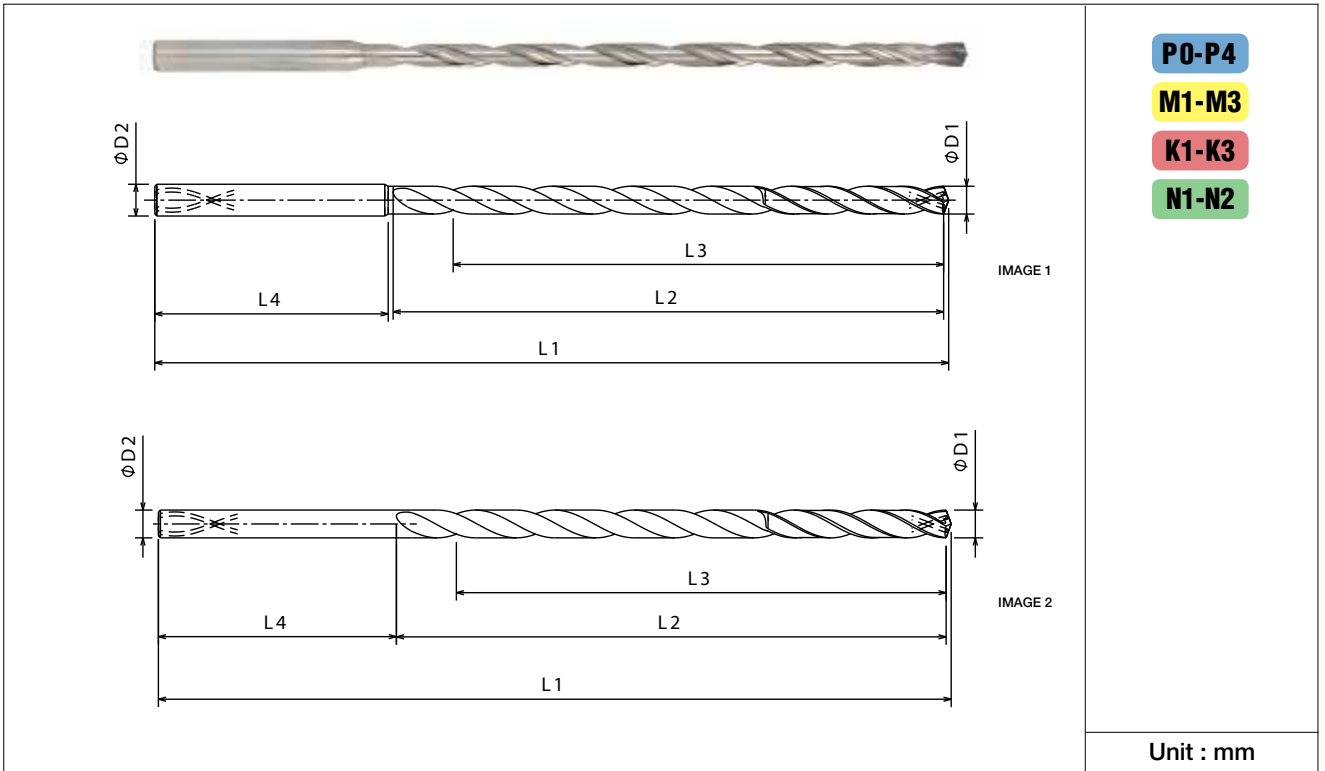
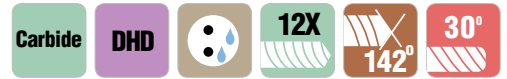
Diameter	Flute Length	Cutting Length	Overall Length	Shank Length	Shank Diameter	Image	Bright - Polished	TiAIN
							EDP No	EDP No
ØD1	L2	L3	L1	L4	D2			
8.334	137	117	185	40	10	1	FBJ0504154	FBJ0504075
8.433	137	117	185	40	10	1	FBJ0504155	FBJ0504076
8.50	137	117	185	40	10	1	FBJ0504156	FBJ0504077
8.70	138	118	185	40	10	1	FBJ0504157	FBJ0504078
8.733	138	117	185	40	10	1	FBJ0504158	FBJ0504079
9.00	139	118	185	40	10	1	FBJ0504159	FBJ0504080
9.10	139	118	185	40	10	1	FBJ0504160	FBJ0504081
9.129	139	118	185	40	10	1	FBJ0504161	FBJ0504082
9.50	140	119	185	40	10	1	FBJ0504162	FBJ0504083
9.525	140	119	185	40	10	1	FBJ0504163	FBJ0504084
9.921	142	120	185	40	10	1	FBJ0504164	FBJ0504085
10.00	142	120	185	40	10	2	FBJ0504165	FBJ0504086
10.20	164	140	218	45	12	1	FBJ0504166	FBJ0504087
10.30	165	141	218	45	12	1	FBJ0504167	FBJ0504088
10.32	165	141	218	45	12	1	FBJ0504168	FBJ0504089
10.50	165	141	218	45	12	1	FBJ0504169	FBJ0504090
10.716	166	142	218	45	12	1	FBJ0504170	FBJ0504091
10.80	166	141	218	45	12	1	FBJ0504171	FBJ0504092
11.00	167	142	218	45	12	1	FBJ0504172	FBJ0504093

Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills

**12X**

**Solid carbide 12X high performance deep hole drill with coolant feed**



Diameter	Flute Length	Cutting Length	Overall Length	Shank Length	Shank Diameter	Image	Bright - Polished	TiAIN
							EDP No	EDP No
ØD1	L2	L3	L1	L4	D2			
11.113	167	142	218	45	12	1	FBJ0504173	FBJ0504094
11.50	168	143	218	45	12	1	FBJ0504174	FBJ0504095
11.80	169	143	218	45	12	1	FBJ0504175	FBJ0504096
12.00	170	144	218	45	12	2	FBJ0504176	FBJ0504097
12.10	192	164	246	45	14	1	FBJ0504177	FBJ0504098
12.304	193	165	246	45	14	1	FBJ0504178	FBJ0504099
12.50	193	165	246	45	14	1	FBJ0504179	FBJ0504100
12.70	194	166	246	45	14	1	FBJ0504180	FBJ0504101
13.00	195	166	246	45	14	1	FBJ0504181	FBJ0504102
13.10	195	166	246	45	14	1	FBJ0504182	FBJ0504103
13.50	196	167	246	45	14	1	FBJ0504183	FBJ0504104
14.00	198	168	246	45	14	2	FBJ0504184	FBJ0504105
14.10	220	188	277	48	16	1	FBJ0504185	FBJ0504106
14.288	220	188	277	48	16	1	FBJ0504186	FBJ0504107
14.50	221	189	277	48	16	1	FBJ0504187	FBJ0504108
14.684	222	190	277	48	16	1	FBJ0504188	FBJ0504109
15.00	223	190	277	48	16	1	FBJ0504189	FBJ0504110
15.50	224	191	277	48	16	1	FBJ0504190	FBJ0504111
15.875	225	192	277	48	16	1	FBJ0504191	FBJ0504112
16.00	226	192	277	48	16	2	FBJ0504192	FBJ0504113

Application data on page no 4.034

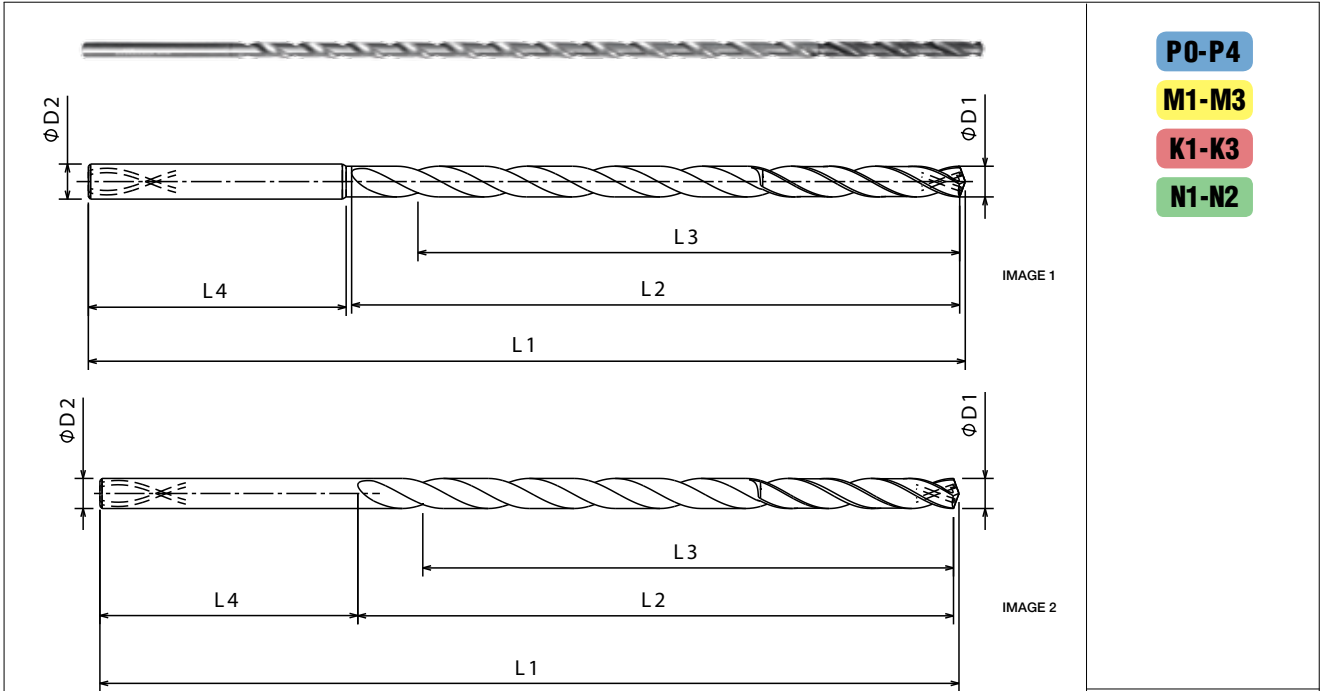
Note: Use DHD drills with Forbes PA150 pilot drills

**15X**

**Solid carbide 15X high performance deep hole drill with coolant feed**



DRILLS



- P0-P4
- M1-M3
- K1-K3
- N1-N2

Unit : mm

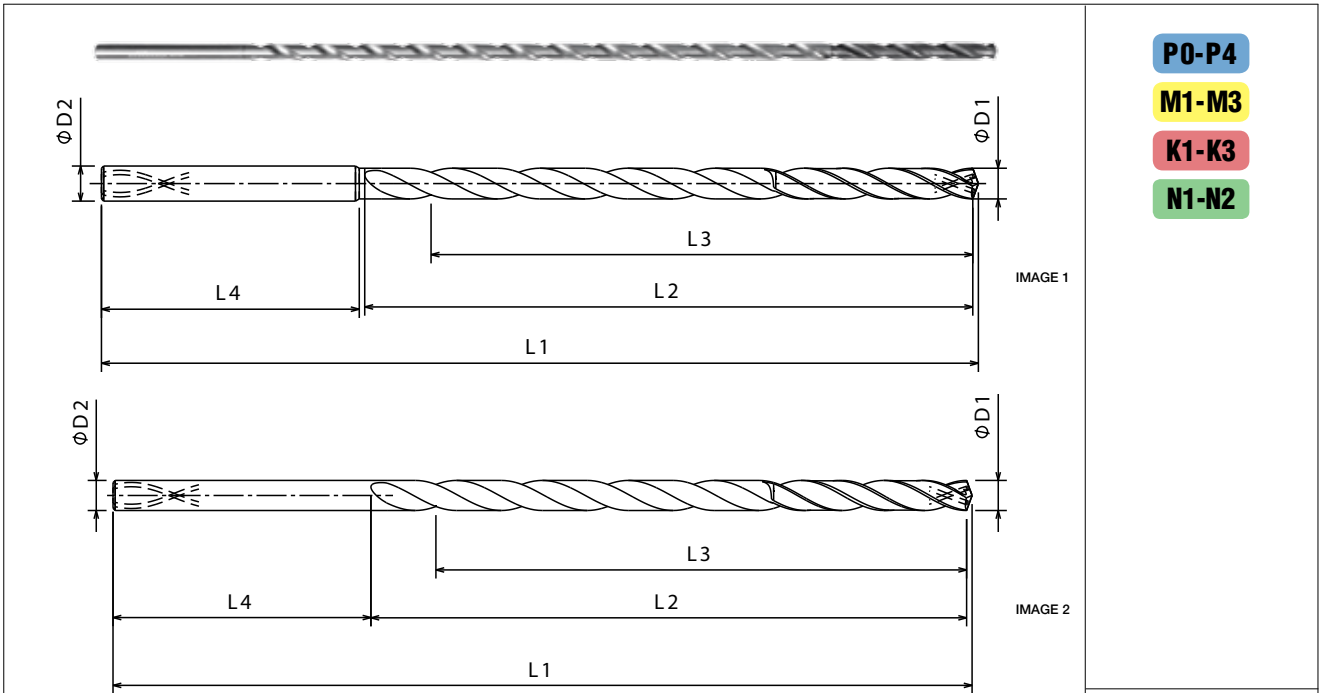
Diameter	Flute Length	Cutting Length	Overall Length	Shank Length	Shank Diameter	Image	Bright - Polished	TiAIN
							EDP No	EDP No
ØD1	L2	L3	L1	L4	D2			
3.00	67	58	105	32	4	1	FBJ0504245	FBJ0504193
3.175	67	58	105	32	4	1	FBJ0504246	FBJ0504194
3.20	67	58	105	32	4	1	FBJ0504247	FBJ0504195
3.50	68	59	105	32	4	1	FBJ0504248	FBJ0504196
3.970	70	60	105	32	4	1	FBJ0504249	FBJ0504197
4.00	70	60	105	32	6	1	FBJ0504250	FBJ0504198
4.50	85	74	124	34	6	1	FBJ0504251	FBJ0504199
4.623	86	75	124	34	6	1	FBJ0504252	FBJ0504200
4.763	86	75	124	34	6	1	FBJ0504253	FBJ0504201
4.90	87	75	124	34	6	1	FBJ0504254	FBJ0504202
5.00	87	75	124	34	6	1	FBJ0504255	FBJ0504203
5.260	102	89	143	36	6	1	FBJ0504256	FBJ0504204
5.41	102	89	143	36	6	1	FBJ0504257	FBJ0504205
5.50	102	89	143	36	6	1	FBJ0504258	FBJ0504206
5.558	102	89	143	36	6	1	FBJ0504259	FBJ0504207
5.80	103	89	143	36	6	1	FBJ0504260	FBJ0504208
5.90	104	90	143	36	6	1	FBJ0504261	FBJ0504209
6.00	104	90	143	36	6	2	FBJ0504262	FBJ0504210

Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills

**15X**

**Solid carbide 15X high performance deep hole drill with coolant feed**



- P0-P4**
- M1-M3**
- K1-K3**
- N1-N2**

Unit : mm

Diameter	Flute Length	Cutting Length	Overall Length	Shank Length	Shank Diameter	Image	Bright - Polished	TiAIN
							EDP No	EDP No
ØD1	L2	L3	L1	L4	D2			
6.20	118	103	162	38	8	1	FBJ0504263	FBJ0504211
6.35	119	104	162	38	8	1	FBJ0504264	FBJ0504212
6.50	119	104	162	38	8	1	FBJ0504265	FBJ0504213
6.528	119	104	162	38	8	1	FBJ0504266	FBJ0504214
6.746	120	104	162	38	8	1	FBJ0504267	FBJ0504215
6.909	121	105	162	38	8	1	FBJ0504268	FBJ0504216
7.00	121	105	162	38	8	1	FBJ0504269	FBJ0504217
7.145	135	118	181	40	8	1	FBJ0504270	FBJ0504218
7.50	136	119	181	40	8	1	FBJ0504271	FBJ0504219
7.541	136	119	181	40	8	1	FBJ0504272	FBJ0504220
7.938	138	120	181	40	8	1	FBJ0504273	FBJ0504221
8.00	138	120	181	40	8	2	FBJ0504274	FBJ0504222
8.334	153	134	200	42	10	1	FBJ0504275	FBJ0504223
8.433	153	134	200	42	10	1	FBJ0504276	FBJ0504224
8.50	153	134	200	42	10	1	FBJ0504277	FBJ0504225
8.733	154	134	200	42	10	1	FBJ0504278	FBJ0504226
9.00	155	135	200	42	10	1	FBJ0504279	FBJ0504227

Application data on page no 4.034

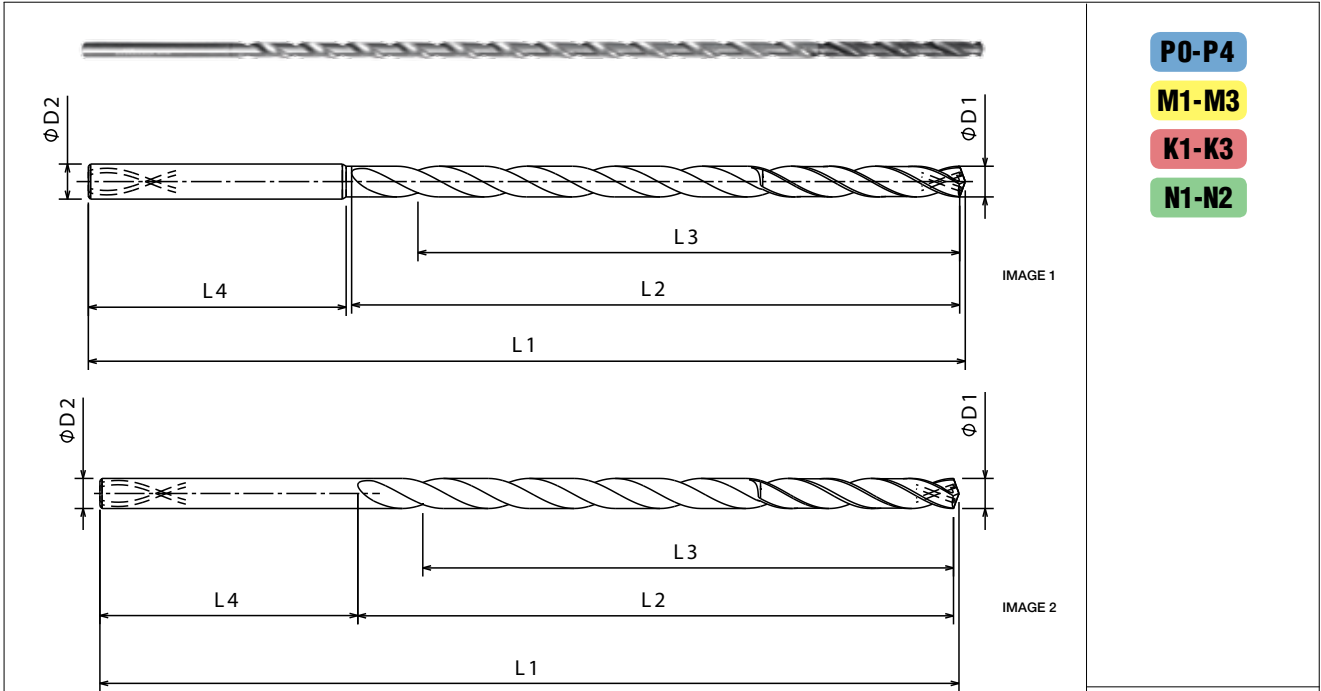
Note: Use DHD drills with Forbes PA150 pilot drills

**15X**

**Solid carbide 15X high performance deep hole drill with coolant feed**



DRILLS



- P0-P4
- M1-M3
- K1-K3
- N1-N2

Unit : mm

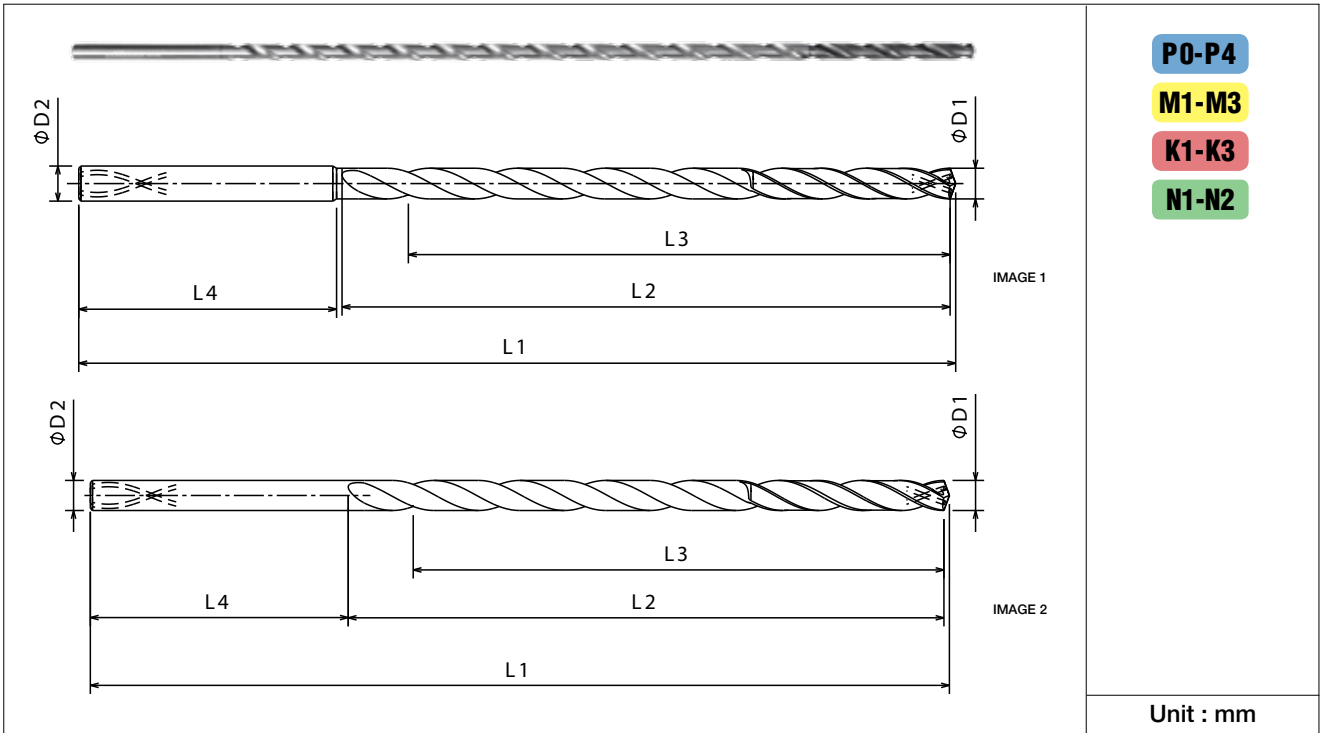
Diameter	Flute Length	Cutting Length	Overall Length	Shank Length	Shank Diameter	Image	Bright - Polished	TiAIN
							EDP No	EDP No
ØD1	L2	L3	L1	L4	D2			
9.10	169	148	219	44	10	1	FBJ0504280	FBJ0504228
9.50	170	149	219	44	10	1	FBJ0504281	FBJ0504229
9.525	170	149	219	44	10	1	FBJ0504282	FBJ0504230
9.75	171	149	219	44	10	1	FBJ0504283	FBJ0504231
10.00	172	150	219	44	10	2	FBJ0504284	FBJ0504232
10.20	186	163	238	46	12	1	FBJ0504285	FBJ0504233
10.50	187	164	238	46	12	1	FBJ0504286	FBJ0504234
10.72	188	165	238	46	12	1	FBJ0504287	FBJ0504235
11.00	189	165	238	46	12	1	FBJ0504288	FBJ0504236
11.50	204	179	257	48	12	1	FBJ0504289	FBJ0504237
12.00	206	180	257	48	12	2	FBJ0504290	FBJ0504238
12.50	221	194	276	50	14	1	FBJ0504291	FBJ0504239
12.70	222	195	276	50	14	1	FBJ0504292	FBJ0504240
13.00	223	195	276	50	14	1	FBJ0504293	FBJ0504241
13.10	237	208	295	52	14	1	FBJ0504294	FBJ0504242
13.50	238	209	295	52	14	1	FBJ0504295	FBJ0504243
14.00	240	210	295	52	14	2	FBJ0504296	FBJ0504244

Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills

**20X**

**Solid carbide 20X high performance deep hole drill with coolant feed**



Unit : mm

Diameter	Flute Length	Cutting Length	Overall Length	Shank Length	Shank Diameter	Image	Bright - Polished	TiAIN
							EDP No	EDP No
ØD1	L2	L3	L1	L4	D2			
3.00	83	74	125	32	4	1	FBJ0504341	FBJ0504297
3.175	83	74	125	32	4	1	FBJ0504342	FBJ0504298
3.30	84	75	125	32	4	1	FBJ0504343	FBJ0504299
3.50	86	77	125	32	4	1	FBJ0504344	FBJ0504300
3.97	89	79	125	32	4	1	FBJ0504345	FBJ0504301
4.00	90	80	125	32	6	1	FBJ0504346	FBJ0504302
4.50	108	97	149	34	6	1	FBJ0504347	FBJ0504303
4.623	109	98	149	34	6	1	FBJ0504348	FBJ0504304
4.763	110	99	149	34	6	1	FBJ0504349	FBJ0504305
4.90	112	100	149	34	6	1	FBJ0504350	FBJ0504306
5.00	112	100	149	34	6	1	FBJ0504351	FBJ0504307
5.26	128	115	173	36	6	1	FBJ0504352	FBJ0504308
5.41	129	116	173	36	6	1	FBJ0504353	FBJ0504309
5.50	130	117	173	36	6	1	FBJ0504354	FBJ0504310
5.558	130	117	173	36	6	1	FBJ0504355	FBJ0504311

Application data on page no 4.034

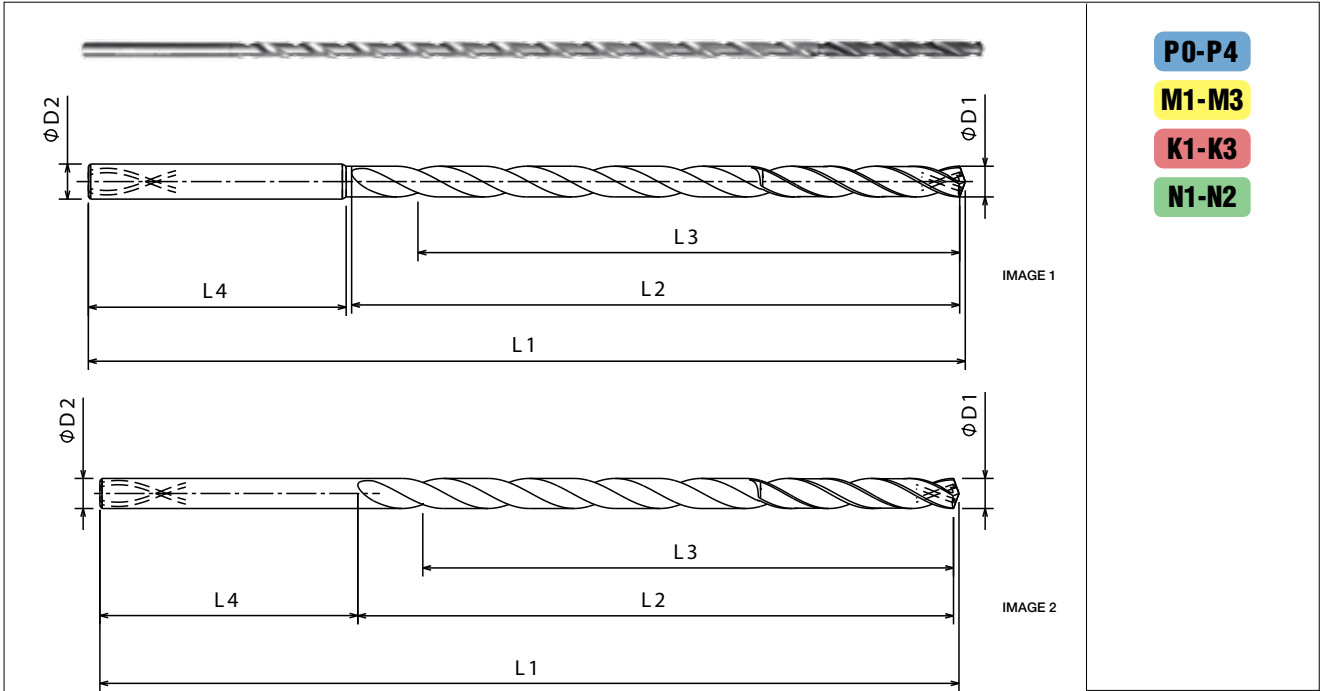
Note: Use DHD drills with Forbes PA150 pilot drills

**20X**

**Solid carbide 20X high performance deep hole drill with coolant feed**



DRILLS



- P0-P4
- M1-M3
- K1-K3
- N1-N2

Unit : mm

Diameter	Flute Length	Cutting Length	Overall Length	Shank Length	Shank Diameter	Image	Bright - Polished	TiAIN
							EDP No	EDP No
ØD1	L2	L3	L1	L4	D2			
5.80	132	118	173	36	6	1	FBJ0504356	FBJ0504312
5.90	134	120	173	36	6	1	FBJ0504357	FBJ0504313
6.00	134	120	173	36	6	2	FBJ0504358	FBJ0504314
6.20	149	134	197	38	8	1	FBJ0504359	FBJ0504315
6.35	151	136	197	38	8	1	FBJ0504360	FBJ0504316
6.50	152	137	197	38	8	1	FBJ0504361	FBJ0504317
6.528	152	137	197	38	8	1	FBJ0504362	FBJ0504318
6.746	154	138	197	38	8	1	FBJ0504363	FBJ0504319
6.909	155	139	197	38	8	1	FBJ0504364	FBJ0504320
7.00	156	140	197	38	8	1	FBJ0504365	FBJ0504321
7.145	171	154	221	40	8	1	FBJ0504366	FBJ0504322
7.50	174	157	221	40	8	1	FBJ0504367	FBJ0504323
7.541	174	157	221	40	8	1	FBJ0504368	FBJ0504324
7.938	177	159	221	40	8	1	FBJ0504369	FBJ0504325
8.00	178	160	221	40	8	2	FBJ0504370	FBJ0504326

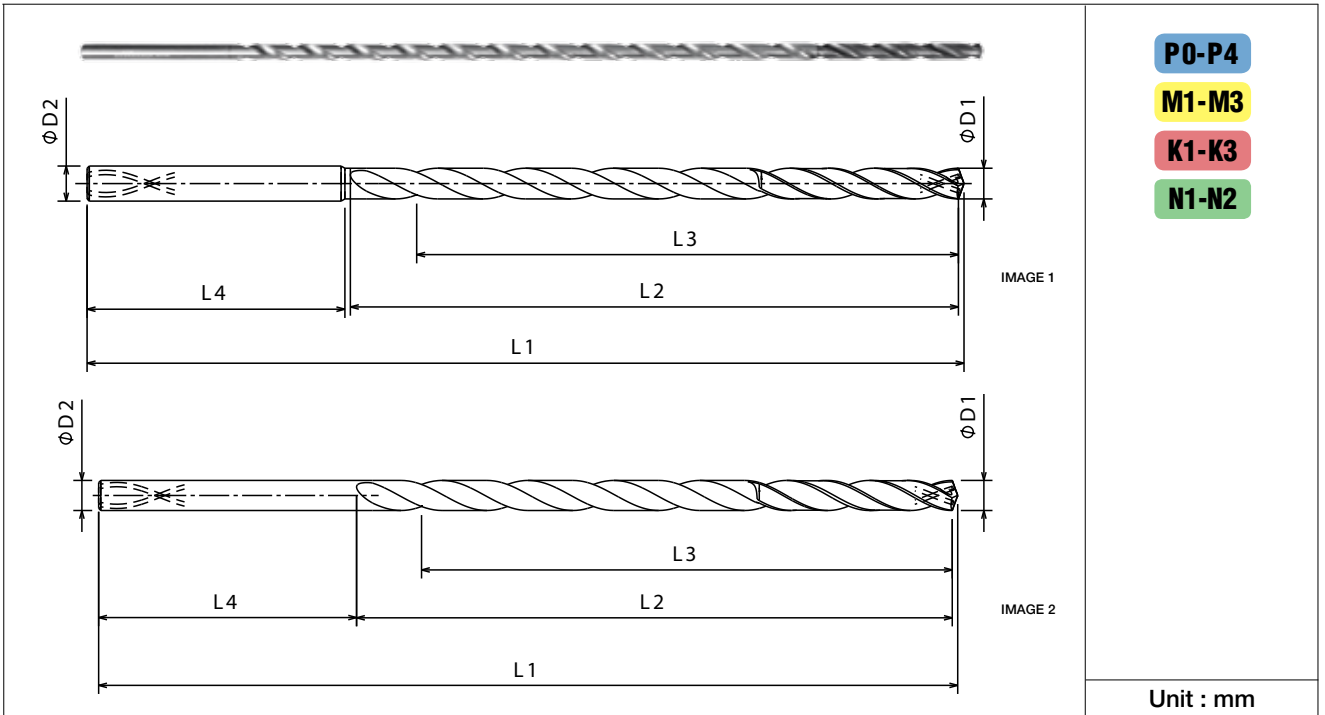
Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills



**20X**

**Solid carbide 20X high performance deep hole drill with coolant feed**



- P0-P4
- M1-M3
- K1-K3
- N1-N2

Unit : mm

Diameter	Flute Length	Cutting Length	Overall Length	Shank Length	Shank Diameter	Image	Bright - Polished	TiAIN
							EDP No	EDP No
ØD1	L2	L3	L1	L4	D2			
8.334	194	175	245	42	10	1	FBJ0504371	FBJ0504327
8.433	195	176	245	42	10	1	FBJ0504372	FBJ0504328
8.50	196	177	245	42	10	1	FBJ0504373	FBJ0504329
8.733	198	178	245	42	10	1	FBJ0504374	FBJ0504330
9.00	200	180	245	42	10	1	FBJ0504375	FBJ0504331
9.10	215	194	269	44	10	1	FBJ0504376	FBJ0504332
9.50	218	197	269	44	10	1	FBJ0504377	FBJ0504333
9.525	218	197	269	44	10	1	FBJ0504378	FBJ0504334
9.75	220	198	269	44	10	1	FBJ0504379	FBJ0504335
10.00	222	200	269	44	10	2	FBJ0504380	FBJ0504336
10.20	237	214	293	46	12	1	FBJ0504381	FBJ0504337
10.50	240	217	293	46	12	1	FBJ0504382	FBJ0504338
10.72	242	219	293	46	12	1	FBJ0504383	FBJ0504339
11.00	244	220	293	46	12	1	FBJ0504384	FBJ0504340

Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills



## Cutting parameters

### Series DHD-12X/DHD-15X/DHD-20X METRIC TiAlN

Workpiece Material Group		Cutting Speed Vc (m/min)		Recommended feed in mm/rev															
				Diameter in mm															
				mm	3.00		4.00		6.00		8.00		10.0		12.0		16.0		
	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max		
Steel	P	0	50	80	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24
		1	50	80	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24
		2	50	80	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24
		3	40	60	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24
Stainless Steels	M	1	40	60	f rev	0.05	0.09	0.07	0.12	0.09	0.14	0.10	0.15	0.11	0.16	0.12	0.17	0.14	0.19
		2	30	50	f rev	0.04	0.08	0.06	0.11	0.08	0.13	0.09	0.14	0.10	0.15	0.11	0.16	0.13	0.18
		3	30	50	f rev	0.04	0.08	0.06	0.11	0.08	0.13	0.09	0.14	0.10	0.15	0.11	0.16	0.13	0.18
Cast Iron	K	1	60	100	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24
		2	60	80	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24
		3	60	80	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24

### Series DHD-12X/DHD-15X/DHD-20X Bright METRIC

Workpiece Material Group		Cutting Speed Vc (m/min)		Recommended feed in mm/rev															
				Diameter in mm															
				mm	3.00		4.00		6.00		8.00		10.0		12.0		16.0		
	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max		
Non Ferrous	N	1	120	300	f rev	0.12	0.17	0.13	0.18	0.15	0.24	0.19	0.29	0.26	0.35	0.31	0.4	0.41	0.51
		2	120	300	f rev	0.12	0.17	0.13	0.18	0.15	0.24	0.19	0.29	0.26	0.35	0.31	0.4	0.41	0.51

#RPM(N) = Vc(m/min) X 318.18/Tool Dia.      #Vf(mm/min) = RPM(N) X frev (mm/rev)

The technical data are based upon theoretical values and are only intended for planning purposes and may vary based on the application. Actual results will vary. No responsibility from Forbes and Company Limited or their distributors is assumed.

## Case studies

Challenge	Reduction in CPC	Challenge	Reduction in CPC
<b>Component</b>	Crank Shaft	<b>Component</b>	Crank Shaft
<b>Material</b>	Forged Steel SAE1541	<b>Material</b>	Forged Steel 35 HRC
<b>Competition</b>	OSG	<b>Competition</b>	Mitsubishi/Sumitomo/Walter
<b>Solution</b>	DRILL 5.00MMX135X185 SH6 T/C DHD PT	<b>Solution</b>	DRILL 5.97MMX160X210 SH6 T/C DHD PT
<b>Machine</b>	SPM	<b>Machine</b>	HMC
<b>Vc</b>	59m/min	<b>Vc</b>	66m/min
<b>RPM</b>	3800	<b>RPM</b>	3500
<b>Feed in mm/min</b>	150 @ entry/ 480/150 @ exit	<b>Feed in mm/min</b>	420mm/min
<b>Depth</b>	105 X 2 Holes	<b>Depth</b>	138 X 6 Holes
<b>Existing Tool Life</b>	26 meters	<b>Existing Tool Life</b>	33 meters
<b>Tool Life Achieved</b>	32 meters	<b>Tool Life Achieved</b>	33 meters
<b>Result</b>	No Breakage	<b>Result</b>	No Breakage
<b>Benefit</b>	10% reduction in CPC	<b>Benefit</b>	10% reduction in CPC

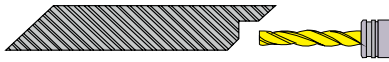
### Drill tolerance

Details	Cutting Dia. "D1" Range	Cutting Dia. "D1" Tolerance h7 ANSI B4.2	Shank Dia. "D2"	Shank Tolerance h6 ANSI B4.2
DHD 12X	3.00-6.00	-0.020/-0.030	4.00-6.00	-0.008
	6.00-10.00	-0.020/-0.030	6.00-10.00	-0.009
	10.00-16.00	-0.020/-0.030	10.00-16.00	-0.011
DHD 15X	3.00-6.00	-0.020/-0.030	4.00-6.00	-0.008
	6.00-10.00	-0.020/-0.030	6.00-10.00	-0.009
	10.00-14.00	-0.020/-0.030	10.00-14.00	-0.011
DHD 20X	3.00-6.00	-0.020/-0.030	4.00-6.00	-0.008
	6.00-10.00	-0.020/-0.030	6.00-10.00	-0.009
	10.00-12.00	-0.020/-0.030	10.00-12.00	-0.011

### Technical details

Clamping-Always use a Hydraulic chuck and ensure that the tool is set and the max run out is within 2-3 microns

#### SPOT FACING/ SURFACE PREPARATION



- Create a small flat which will ensure that the next tool has a flat surface to drill- Machine a flat surface on the surface using a flat end mill or a slot drill capable of Spot facing,
- Ensure the spot face is atleast equal to the diameter of the tool

#### DRILLING A PILOT HOLE – USE A DRILL WITH A WIDER POINT ANGLE THAN THE DEEP HOLE DRILL



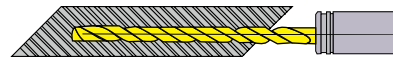
- We always recommend you to ask your supplier to supply the long drill along with the pilot, This would ensure better understanding of the process as a whole by the supplier, For example we recommend that the Pilot should have an angle of 150-155 degrees and the long drill 135-142, this is recommended to ensure no rubbing during entry and the best centring for the long drill
- We always ensure that the pilots we make are of a positive tolerance when compared to the oil hole drill. For Example the pilot we prepare is generally of m7 tolerance and the DHD is of h7 tolerance. This will ensure no interference during machining
- We recommend that you drill a minimum of 1XD for the pilot or can go as high as per the application of the long drill, Note that the higher the pilot drills, the long drill has a lesser contact time which will help improve output on the long run
- We also recommend that you can combine the Spot Face and the Pilot into a single tool and try the Forbes designed flat bottom pilot tool to reduce your cycle time

#### DRILLING WITH THE LONG DRILL – ENTRY AND INITIAL CUTTING



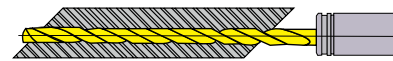
- Enter the drilled pilot hole at a lower cutting speed (lower than 30m/min) and a moderate feed and stop about 1-3mm before the bottom face of the pilot drill

#### DRILLING WITH THE LONG DRILL – DRILLING THE DEEP HOLE



- Start cutting at the recommended parameters of the supplier without any pecking cycle. Note here first achieve the desired RPM and then start the feed, generally we notice a lot of breakage at this area as the Drill would not have reached its suggested RPM and contact the surface creating high load condition and break.

#### DRILLING WITH THE LONG DRILL – BREAKING THROUGH



- At the exit we typically will face a challenge where the drill will need to break out into a cross hole or a curved exit. We recommend you drop you feed at the exit to 15%-20% of the recommended cutting parameters. This will ensure lowest probability of an edge breakage due to uneven cutting.

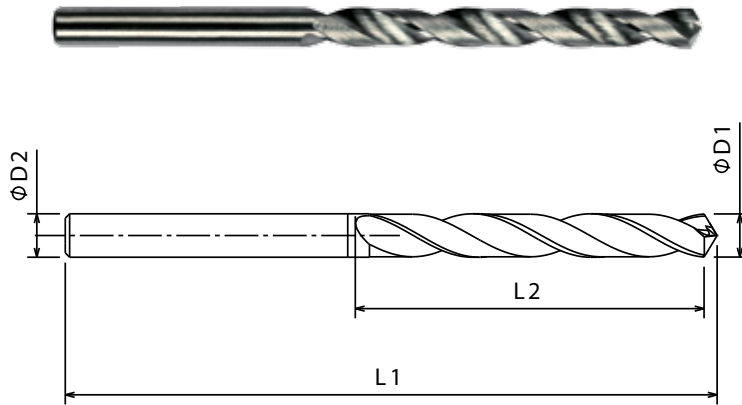
#### RETRACTION OF THE LONG DRILL



- Retract the drill with anything between 1m to 3mm feed rate upto the last 5mm of the pilot hole and then clear the hole at the same parameters used during entry.

**5X**

**Solid carbide jobber drill**



- P1-P6
- M1-M2
- K1-K2
- N5-N6

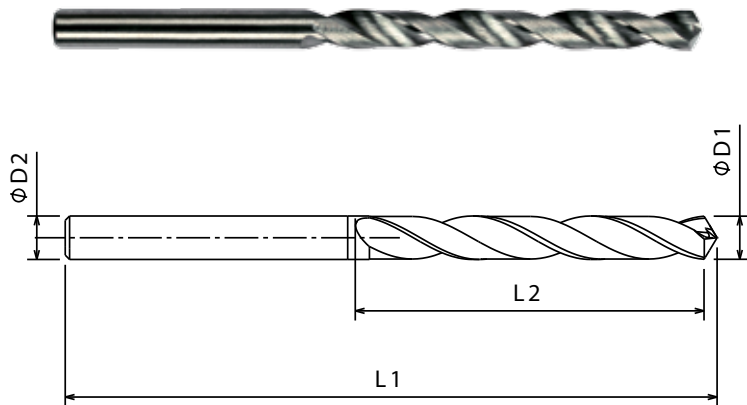
Unit : mm

Ø D1	L2	L1	Ø D2	F224 (BRIGHT)	F224A (TiAlN)
				EDP No	EDP No
1.00	12.00	34	1.00	FBJ0501506	FBJ0501507
1.05	12.00	34	1.05	FBJ0501516	FBJ0501517
1.10	14.00	36	1.10	FBJ0501520	FBJ0501521
1.15	14.00	36	1.15	FBJ0501528	FBJ0501529
1.20	16.00	38	1.20	FBJ0501532	FBJ0501533
1.25	16.00	38	1.25	FBJ0501542	FBJ0501543
1.30	16.00	38	1.30	FBJ0501546	FBJ0501547
1.35	18.00	40	1.35	FBJ0501550	FBJ0501551
1.40	18.00	40	1.40	FBJ0501554	FBJ0501555
1.45	18.00	40	1.45	FBJ0501560	FBJ0501561
1.50	18.00	40	1.50	FBJ0501570	FBJ0501571
1.60	20.00	43	1.60	FBJ0501584	FBJ0501585
1.70	20.00	43	1.70	FBJ0501592	FBJ0501593
1.80	22.00	46	1.80	FBJ0501598	FBJ0501599
1.90	22.00	46	1.90	FBJ0501604	FBJ0501605
2.00	24.00	49	2.00	FBJ0501612	FBJ0501613
2.10	24.00	49	2.10	FBJ0501618	FBJ0501619
2.20	27.00	53	2.20	FBJ0501622	FBJ0501623
2.30	27.00	53	2.30	FBJ0501628	FBJ0501629
2.40	30.00	57	2.40	FBJ0501638	FBJ0501639
2.50	30.00	57	2.50	FBJ0501646	FBJ0501647
2.60	30.00	57	2.60	FBJ0501654	FBJ0501655

Ø D1	L2	L1	Ø D2	F224 (BRIGHT)	F224A (TiAlN)
				EDP No	EDP No
2.70	33.00	61	2.70	FBJ0501660	FBJ0501661
2.80	33.00	61	2.80	FBJ0501664	FBJ0501665
3.00	33.00	61	3.00	FBJ0500001	FBJ0500002
3.10	36.00	65	3.10	FBJ0500003	FBJ0500004
3.20	36.00	65	3.20	FBJ0500005	FBJ0500006
3.30	36.00	65	3.30	FBJ0500007	FBJ0500008
3.40	39.00	70	3.40	FBJ0500009	FBJ0500010
3.50	39.00	70	3.50	FBJ0500011	FBJ0500012
3.60	39.00	70	3.60	FBJ0500013	FBJ0500014
3.70	39.00	70	3.70	FBJ0500015	FBJ0500016
3.80	43.00	75	3.80	FBJ0500017	FBJ0500018
3.90	43.00	75	3.90	FBJ0500019	FBJ0500020
4.00	43.00	75	4.00	FBJ0500021	FBJ0500022
4.10	43.00	75	4.10	FBJ0500023	FBJ0500024
4.20	43.00	75	4.20	FBJ0500025	FBJ0500026
4.30	47.00	80	4.30	FBJ0500027	FBJ0500028
4.40	47.00	80	4.40	FBJ0500029	FBJ0500030
4.50	47.00	80	4.50	FBJ0500031	FBJ0500032
4.60	47.00	80	4.60	FBJ0500033	FBJ0500034
4.70	47.00	80	4.70	FBJ0500035	FBJ0500036
4.80	52.00	86	4.80	FBJ0500037	FBJ0500038
4.90	52.00	86	4.90	FBJ0500039	FBJ0500040

Application data on page no 4.042

# 5X Solid carbide jobber drill



- P1-P6
- M1-M2
- K1-K2
- N5-N6

Unit : mm

Ø D1	L2	L1	Ø D2	F224 (BRIGHT)	F224A (TiAlN)
				EDP No	EDP No
5.00	52.00	86	5.00	FBJ0500041	FBJ0500042
5.10	52.00	86	5.10	FBJ0500043	FBJ0500044
5.20	52.00	86	5.20	FBJ0500045	FBJ0500046
5.30	52.00	86	5.30	FBJ0500047	FBJ0500048
5.40	57.00	93	5.40	FBJ0500049	FBJ0500050
5.50	57.00	93	5.50	FBJ0500051	FBJ0500052
5.60	57.00	93	5.60	FBJ0500053	FBJ0500054
5.70	57.00	93	5.70	FBJ0500055	FBJ0500056
5.80	57.00	93	5.80	FBJ0500057	FBJ0500058
5.90	57.00	93	5.90	FBJ0500059	FBJ0500060
6.00	57.00	93	6.00	FBJ0500061	FBJ0500062
6.10	63.00	101	6.10	FBJ0500063	FBJ0500064
6.20	63.00	101	6.20	FBJ0500065	FBJ0500066
6.30	63.00	101	6.30	FBJ0500067	FBJ0500068
6.40	63.00	101	6.40	FBJ0500069	FBJ0500070
6.50	63.00	101	6.50	FBJ0500071	FBJ0500072
6.60	63.00	101	6.60	FBJ0500073	FBJ0500074
6.70	63.00	101	6.70	FBJ0500075	FBJ0500076
6.80	69.00	109	6.80	FBJ0500077	FBJ0500078
6.90	69.00	109	6.90	FBJ0500079	FBJ0500080
7.00	69.00	109	7.00	FBJ0500081	FBJ0500082
7.10	69.00	109	7.10	FBJ0500083	FBJ0500084

Ø D1	L2	L1	Ø D2	F224 (BRIGHT)	F224A (TiAlN)
				EDP No	EDP No
7.20	69.00	109	7.20	FBJ0500085	FBJ0500086
7.30	69.00	109	7.30	FBJ0500087	FBJ0500088
7.40	69.00	109	7.40	FBJ0500089	FBJ0500090
7.50	69.00	109	7.50	FBJ0500091	FBJ0500092
7.60	75.00	117	7.60	FBJ0500093	FBJ0500094
7.70	75.00	117	7.70	FBJ0500095	FBJ0500096
7.80	75.00	117	7.80	FBJ0500097	FBJ0500098
7.90	75.00	117	7.90	FBJ0500099	FBJ0500100
8.00	75.00	117	8.00	FBJ0500101	FBJ0500102
8.10	75.00	117	8.10	FBJ0500103	FBJ0500104
8.20	75.00	117	8.20	FBJ0500105	FBJ0500106
8.30	75.00	117	8.30	FBJ0500107	FBJ0500108
8.40	75.00	117	8.40	FBJ0500109	FBJ0500110
8.50	75.00	117	8.50	FBJ0500111	FBJ0500112
8.60	81.00	125	8.60	FBJ0500113	FBJ0500114
8.70	81.00	125	8.70	FBJ0500115	FBJ0500116
8.80	81.00	125	8.80	FBJ0500117	FBJ0500118
8.90	81.00	125	8.90	FBJ0500119	FBJ0500120
9.00	81.00	125	9.00	FBJ0500121	FBJ0500122
9.10	81.00	125	9.10	FBJ0500123	FBJ0500124
9.20	81.00	125	9.20	FBJ0500125	FBJ0500126
9.30	81.00	125	9.30	FBJ0500127	FBJ0500128

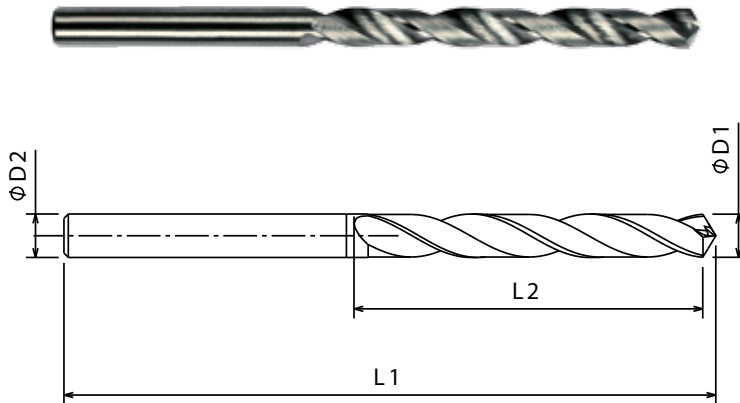
Application data on page no 4.042

**5X**

**Solid carbide jobber drill**



DRILLS



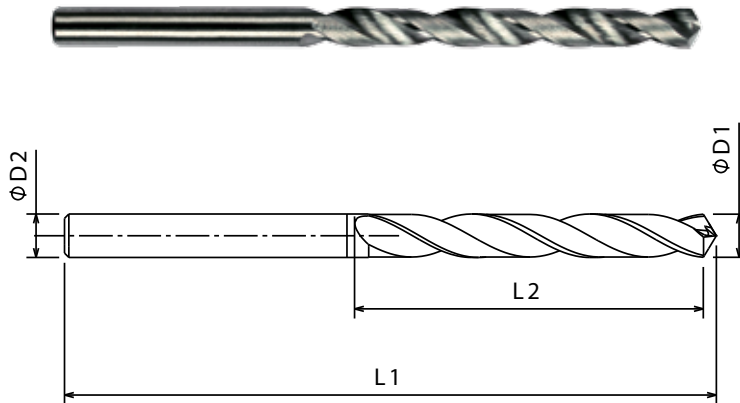
- P1-P6**
- M1-M2**
- K1-K2**
- N5-N6**

Unit : mm

Ø D1	L2	L1	Ø D2	F224 (BRIGHT)	F224A (TiAlN)
				EDP No	EDP No
9.40	81.00	125	9.40	FBJ0500129	FBJ0500130
9.50	81.00	125	9.50	FBJ0500131	FBJ0500132
9.60	87.00	133	9.60	FBJ0500133	FBJ0500134
9.70	87.00	133	9.70	FBJ0500135	FBJ0500136
9.80	87.00	133	9.80	FBJ0500137	FBJ0500138
9.90	87.00	133	9.90	FBJ0500139	FBJ0500140
10.00	87.00	133	10.00	FBJ0500141	FBJ0500142
10.10	87.00	133	10.10	FBJ0500143	FBJ0500144
10.20	87.00	133	10.20	FBJ0500145	FBJ0500146
10.30	87.00	133	10.30	FBJ0500147	FBJ0500148
10.40	87.00	133	10.40	FBJ0500149	FBJ0500150
10.50	87.00	133	10.50	FBJ0500151	FBJ0500152
10.60	87.00	133	10.60	FBJ0500153	FBJ0500154
10.70	94.00	142	10.70	FBJ0500155	FBJ0500156
10.80	94.00	142	10.80	FBJ0500157	FBJ0500158
10.90	94.00	142	10.90	FBJ0500159	FBJ0500160
11.00	94.00	142	11.00	FBJ0500161	FBJ0500162
11.10	94.00	142	11.10	FBJ0500163	FBJ0500164
11.20	94.00	142	11.20	FBJ0500165	FBJ0500166
11.30	94.00	142	11.30	FBJ0500167	FBJ0500168
11.40	94.00	142	11.40	FBJ0500169	FBJ0500170

Ø D1	L2	L1	Ø D2	F224 (BRIGHT)	F224A (TiAlN)
				EDP No	EDP No
11.50	94.00	142	11.50	FBJ0500171	FBJ0500172
11.60	94.00	142	11.60	FBJ0500173	FBJ0500174
11.70	94.00	142	11.70	FBJ0500175	FBJ0500176
11.80	94.00	142	11.80	FBJ0500177	FBJ0500178
11.90	101.00	151	11.90	FBJ0500179	FBJ0500180
12.00	101.00	151	12.00	FBJ0500181	FBJ0500182
12.50	101.00	151	12.50	FBJ0500183	FBJ0500184
13.00	101.00	151	13.00	FBJ0500185	FBJ0500186
13.50	108.00	160	13.50	FBJ0500187	FBJ0500188
14.00	108.00	160	14.00	FBJ0500189	FBJ0500190
14.50	114.00	169	14.50	FBJ0500191	FBJ0500192
15.00	114.00	169	15.00	FBJ0500193	FBJ0500194
15.50	120.00	178	15.50	FBJ0500195	FBJ0500196
16.00	120.00	178	16.00	FBJ0500197	FBJ0500198
16.50	125.00	184	16.50	FBJ0500199	FBJ0500200
17.00	125.00	184	17.00	FBJ0500201	FBJ0500202
17.50	130.00	191	17.50	FBJ0500203	FBJ0500204
18.00	130.00	191	18.00	FBJ0500205	FBJ0500206
18.50	135.00	198	18.50	FBJ0500207	FBJ0500208
19.00	135.00	198	19.00	FBJ0500209	FBJ0500210
20.00	140.00	205	20.00	FBJ0500211	FBJ0500212

**3X** Solid carbide jobber drill



P1-P6

M1-M2

K1-K2

N5-N6

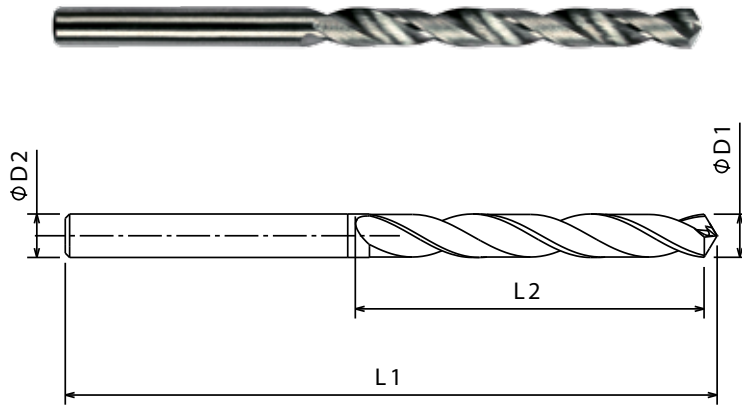
Unit : mm

ØD1	L2	L1	ØD2	F226 (BRIGHT)	F226A (TiAlN)
				EDP No	EDP No
1.00	6	26	1.00	FBJ0501504	FBJ0501505
1.05	7	28	1.05	FBJ0501518	FBJ0501519
1.10	7	28	1.10	FBJ0501522	FBJ0501523
1.15	8	30	1.15	FBJ0501530	FBJ0501531
1.20	8	30	1.20	FBJ0501534	FBJ0501535
1.25	8	30	1.25	FBJ0501544	FBJ0501545
1.30	8	30	1.30	FBJ0501548	FBJ0501549
1.35	9	32	1.35	FBJ0501552	FBJ0501553
1.40	9	32	1.40	FBJ0501556	FBJ0501557
1.45	9	32	1.45	FBJ0501562	FBJ0501563
1.50	9	32	1.50	FBJ0501572	FBJ0501573
1.60	10	34	1.60	FBJ0501580	FBJ0501581
1.70	10	34	1.70	FBJ0501590	FBJ0501591
1.80	11	36	1.80	FBJ0501594	FBJ0501595
1.90	11	36	1.90	FBJ0501600	FBJ0501601
2.00	12	38	2.00	FBJ0501608	FBJ0501609
2.10	12	38	2.10	FBJ0501616	FBJ0501617
2.20	13	40	2.20	FBJ0501620	FBJ0501621
2.30	13	40	2.30	FBJ0501624	FBJ0501625
2.40	14	43	2.40	FBJ0501634	FBJ0501635
2.50	14	43	2.50	FBJ0501642	FBJ0501643
2.60	14	43	2.60	FBJ0501652	FBJ0501653

ØD1	L2	L1	ØD2	F226 (BRIGHT)	F226A (TiAlN)
				EDP No	EDP No
2.70	16	46	2.70	FBJ0501658	FBJ0501659
2.80	16	46	2.80	FBJ0501662	FBJ0501663
3.00	16	46	3.00	FBJ0500213	FBJ0500214
3.10	18	49	3.10	FBJ0500215	FBJ0500216
3.20	18	49	3.20	FBJ0500217	FBJ0500218
3.30	18	49	3.30	FBJ0500219	FBJ0500220
3.40	20	52	3.40	FBJ0500221	FBJ0500222
3.50	20	52	3.50	FBJ0500223	FBJ0500224
3.60	20	52	3.60	FBJ0500225	FBJ0500226
3.70	20	52	3.70	FBJ0500227	FBJ0500228
3.80	22	55	3.80	FBJ0500229	FBJ0500230
3.90	22	55	3.90	FBJ0500231	FBJ0500232
4.00	22	55	4.00	FBJ0500233	FBJ0500234
4.10	22	55	4.10	FBJ0500235	FBJ0500236
4.20	22	55	4.20	FBJ0500237	FBJ0500238
4.30	24	58	4.30	FBJ0500239	FBJ0500240
4.40	24	58	4.40	FBJ0500241	FBJ0500242
4.50	24	58	4.50	FBJ0500243	FBJ0500244
4.60	24	58	4.60	FBJ0500245	FBJ0500246
4.70	24	58	4.70	FBJ0500247	FBJ0500248
4.80	26	62	4.80	FBJ0500249	FBJ0500250
4.90	26	62	4.90	FBJ0500251	FBJ0500252

**3X**

**Solid carbide jobber drill**



P1-P6

M1-M2

K1-K2

N5-N6

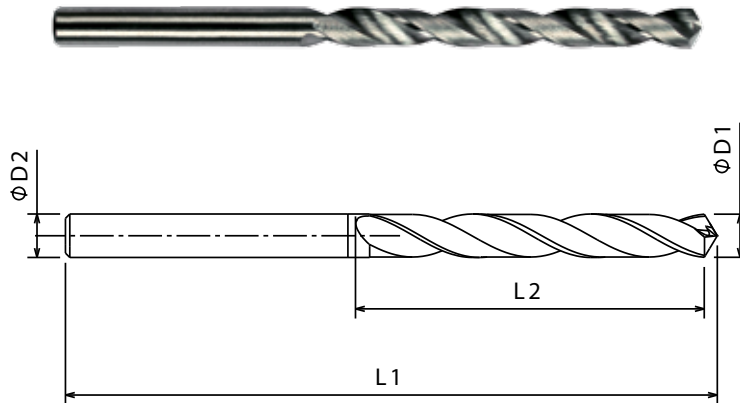
Unit : mm

ØD1	L2	L1	ØD2	F226 (BRIGHT)	F226A (TiAlN)
				EDP No	EDP No
5.00	26	62	5.00	FBJ0500253	FBJ0500254
5.10	26	62	5.10	FBJ0500255	FBJ0500256
5.20	26	62	5.20	FBJ0500257	FBJ0500258
5.30	26	62	5.30	FBJ0500259	FBJ0500260
5.40	28	66	5.40	FBJ0500261	FBJ0500262
5.50	28	66	5.50	FBJ0500263	FBJ0500264
5.60	28	66	5.60	FBJ0500265	FBJ0500266
5.70	28	66	5.70	FBJ0500267	FBJ0500268
5.80	28	66	5.80	FBJ0500269	FBJ0500270
5.90	28	66	5.90	FBJ0500271	FBJ0500272
6.00	28	66	6.00	FBJ0500273	FBJ0500274
6.10	31	70	6.10	FBJ0500275	FBJ0500276
6.20	31	70	6.20	FBJ0500277	FBJ0500278
6.30	31	70	6.30	FBJ0500279	FBJ0500280
6.40	31	70	6.40	FBJ0500281	FBJ0500282
6.50	31	70	6.50	FBJ0500283	FBJ0500284
6.60	31	70	6.60	FBJ0500285	FBJ0500286
6.70	31	70	6.70	FBJ0500287	FBJ0500288
6.80	34	74	6.80	FBJ0500289	FBJ0500290
6.90	34	74	6.90	FBJ0500291	FBJ0500292
7.00	34	74	7.00	FBJ0500293	FBJ0500294
7.10	34	74	7.10	FBJ0500295	FBJ0500296

ØD1	L2	L1	ØD2	F226 (BRIGHT)	F226A (TiAlN)
				EDP No	EDP No
7.20	34	74	7.20	FBJ0500297	FBJ0500298
7.30	34	74	7.30	FBJ0500299	FBJ0500300
7.40	34	74	7.40	FBJ0500301	FBJ0500302
7.50	34	74	7.50	FBJ0500303	FBJ0500304
7.60	37	79	7.60	FBJ0500305	FBJ0500306
7.70	37	79	7.70	FBJ0500307	FBJ0500308
7.80	37	79	7.80	FBJ0500309	FBJ0500310
7.90	37	79	7.90	FBJ0500311	FBJ0500312
8.00	37	79	8.00	FBJ0500313	FBJ0500314
8.10	37	79	8.10	FBJ0500315	FBJ0500316
8.20	37	79	8.20	FBJ0500317	FBJ0500318
8.30	37	79	8.30	FBJ0500319	FBJ0500320
8.40	37	79	8.40	FBJ0500321	FBJ0500322
8.50	37	79	8.50	FBJ0500323	FBJ0500324
8.60	40	84	8.60	FBJ0500325	FBJ0500326
8.70	40	84	8.70	FBJ0500327	FBJ0500328
8.80	40	84	8.80	FBJ0500329	FBJ0500330
8.90	40	84	8.90	FBJ0500331	FBJ0500332
9.00	40	84	9.00	FBJ0500333	FBJ0500334
9.10	40	84	9.10	FBJ0500335	FBJ0500336
9.20	40	84	9.20	FBJ0500337	FBJ0500338
9.30	40	84	9.30	FBJ0500339	FBJ0500340



**3X** Solid carbide jobber drill



- P1-P6
- M1-M2
- K1-K2
- N5-N6

Unit : mm

ØD1	L2	L1	ØD2	F226 (BRIGHT)	F226A (TiAlN)
				EDP No	EDP No
9.40	40	84	9.40	FBJ0500341	FBJ0500342
9.50	40	84	9.50	FBJ0500343	FBJ0500344
9.60	43	89	9.60	FBJ0500345	FBJ0500346
9.70	43	89	9.70	FBJ0500347	FBJ0500348
9.80	43	89	9.80	FBJ0500349	FBJ0500350
9.90	43	89	9.90	FBJ0500351	FBJ0500352
10.00	43	89	10.00	FBJ0500353	FBJ0500354
10.10	43	89	10.10	FBJ0500355	FBJ0500356
10.20	43	89	10.20	FBJ0500357	FBJ0500358
10.30	43	89	10.30	FBJ0500359	FBJ0500360
10.40	43	89	10.40	FBJ0500361	FBJ0500362
10.50	43	89	10.50	FBJ0500363	FBJ0500364
10.60	43	89	10.60	FBJ0500365	FBJ0500366
10.70	47	95	10.70	FBJ0500367	FBJ0500368
10.80	47	95	10.80	FBJ0500369	FBJ0500370
10.90	47	95	10.90	FBJ0500371	FBJ0500372
11.00	47	95	11.00	FBJ0500373	FBJ0500374
11.10	47	95	11.10	FBJ0500375	FBJ0500376
11.20	47	95	11.20	FBJ0500377	FBJ0500378
11.30	47	95	11.30	FBJ0500379	FBJ0500380
11.40	47	95	11.40	FBJ0500381	FBJ0500382

ØD1	L2	L1	ØD2	F226 (BRIGHT)	F226A (TiAlN)
				EDP No	EDP No
11.50	47	95	11.50	FBJ0500383	FBJ0500384
11.60	47	95	11.60	FBJ0500385	FBJ0500386
11.70	47	95	11.70	FBJ0500387	FBJ0500388
11.80	47	95	11.80	FBJ0500389	FBJ0500390
11.90	51	102	11.90	FBJ0500391	FBJ0500392
12.00	51	102	12.00	FBJ0500393	FBJ0500394
12.50	51	102	12.50	FBJ0500395	FBJ0500396
13.00	51	102	13.00	FBJ0500397	FBJ0500398
13.50	54	107	13.50	FBJ0500399	FBJ0500400
14.00	54	107	14.00	FBJ0500401	FBJ0500402
14.50	56	111	14.50	FBJ0500403	FBJ0500404
15.00	56	111	15.00	FBJ0500405	FBJ0500406
15.50	58	115	15.50	FBJ0500407	FBJ0500408
16.00	58	115	16.00	FBJ0500409	FBJ0500410
16.50	60	119	16.50	FBJ0500411	FBJ0500412
17.00	60	119	17.00	FBJ0500413	FBJ0500414
17.50	62	123	17.50	FBJ0500415	FBJ0500416
18.00	62	123	18.00	FBJ0500417	FBJ0500418
18.50	64	127	18.50	FBJ0500419	FBJ0500420
19.00	64	127	19.00	FBJ0500421	FBJ0500422
20.00	66	131	20.00	FBJ0500423	FBJ0500424

DRILLS



## Cutting parameters

### Series F224/F226 METRIC

Workpiece Material Group		Cutting Speed Vc (m/min)		Recommended feed in mm/rev																					
				Diameter in mm																					
				mm		1.0		1.5		3.0		4.0		6.0		8.0		10.0		12.0		16.0		20.0	
min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max			
Steel	P	1	50	55	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		2	50	55	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		3	45	50	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		4	45	50	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		5	40	45	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		6	40	45	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
Stainless Steels	M	1	50	55	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		2	40	45	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
Cast Iron	K	1	75	85	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		2	50	55	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
Non Ferrous	N	5	105	120	f rev	0.005	0.006	0.010	0.013	0.040	0.050	0.048	0.060	0.061	0.076	0.073	0.091	0.081	0.101	0.122	0.152	0.162	0.203	0.180	0.225
		6	105	120	f rev	0.005	0.006	0.010	0.013	0.040	0.050	0.048	0.060	0.061	0.076	0.073	0.091	0.081	0.101	0.122	0.152	0.162	0.203	0.180	0.225

#RPM(N) = Vc(m/min) X 318.18/Tool Dia.      #Vf(mm/min) = RPM(N) X frev (mm/rev)

For coated F224/F226 increase cutting speed by 20%

### Series F224/F226 Inch

Workpiece Material Group		Cutting Speed Vc ft/min		Recommended feed in mm/rev																					
				Diameter in mm																					
				Inch		1/32		1/16		1/8		1/6		1/4		1/3		3/8		1/2		5/8		3/4	
min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max			
Steel	P	1	164	180	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		2	164	180	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		3	148	164	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		4	148	164	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		5	131	148	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		6	131	148	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
Stainless Steels	M	1	164	180	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		2	131	148	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
Cast Iron	K	1	246	279	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		2	164	180	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
Non Ferrous	N	5	344	394	f rev	0.0002	0.0002	0.0004	0.0005	0.0016	0.0020	0.0019	0.0024	0.0024	0.0030	0.0029	0.0036	0.0032	0.0040	0.0048	0.0060	0.0064	0.0080	0.0071	0.0089
		6	344	394	f rev	0.0002	0.0002	0.0004	0.0005	0.0016	0.0020	0.0019	0.0024	0.0024	0.0030	0.0029	0.0036	0.0032	0.0040	0.0048	0.0060	0.0064	0.0080	0.0071	0.0089

#RPM (N) = Vc (SFM) X 3.82/Tool Dia.      #Vf (Inch/min) = RPM (N) x frev (inch/rev)

The technical data are based upon theoretical values and are only intended for planning purposes and may vary based on the application. Actual results will vary. No responsibility from Forbes and Company Limited or their distributors is assumed.

### Drill tolerance

Details	Cutting Dia. "D1" Range	Cutting Dia. "D1" Tolerance h7 ANSI B4.2	Shank Dia. "D2"	Shank Tolerance h6 ANSI B4.2
F224/224A	1.00-3.00	0.00/-0.013	1.00-3.00	-0.006
	3.00-6.00	0.00/-0.013	3.00-6.00	-0.008
	6.00-10.00	0.00/-0.013	6.00-10.00	-0.009
	10.00-18.00	0.00/-0.013	10.00-12.00	-0.011
	20.00	0.00/-0.013	20.00	-0.013
F226/226A	1.00-3.00	0.00/-0.013	1.00-3.00	-0.006
	3.00-6.00	0.00/-0.013	3.00-6.00	-0.008
	6.00-10.00	0.00/-0.013	6.00-10.00	-0.009
	10.00-18.00	0.00/-0.013	10.00-12.00	-0.011
	20.00	0.00/-0.013	20.00	-0.013