

# CARBIDE & HSS



High Performance Cutting Tools













## DRILLS

# SELECTION GUIDE



## DRILL

SERIES		MATERIAL	LENGTH	COOLANT	COATING	PAGES
2TDSS		Solid Carbide	3x	Solid	TiAlN	265
2TDSR		Solid Carbide	5x	Solid	TiAlN	268
2TDCR		Solid Carbide	5x	Coolant	TiAlN	271
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Solid Carbide Drills

2TDSS Series

HSS TAPS

DIES

END MILLS

DRILLS

CARBIDE BURRS

CS TAPS

3X

## Solid carbide 3x high performance drill

Carbide

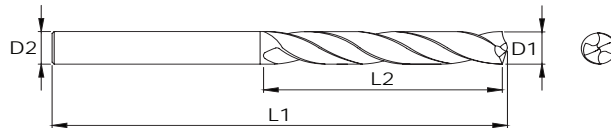


P0-P6

K1-K3

S1-S4

M1-M3



Unit : mm

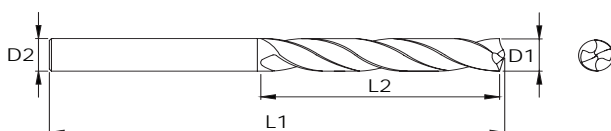
Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
3	FBJ0501006	16	57	3
3.1	FBJ0501007	22	63	4
3.2	FBJ0501008	22	63	4
3.3	FBJ0501009	22	63	4
3.4	FBJ0501010	22	63	4
3.5	FBJ0501011	22	63	4
3.6	FBJ0501012	22	63	4
3.7	FBJ0501013	22	63	4
3.8	FBJ0501014	22	63	4
3.9	FBJ0501015	22	63	4
4	FBJ0501016	22	63	4
4.1	FBJ0501017	26	63	5
4.2	FBJ0501018	26	63	5
4.3	FBJ0501019	26	63	5
4.4	FBJ0501020	26	63	5
4.5	FBJ0501021	26	63	5
4.6	FBJ0501022	26	63	5
4.7	FBJ0501023	26	63	5
4.8	FBJ0501024	26	63	5
4.9	FBJ0501025	26	63	5

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
5	FBJ0501026	26	63	5
5.1	FBJ0501027	30	76	6
5.2	FBJ0501028	30	76	6
5.3	FBJ0501029	30	76	6
5.4	FBJ0501030	30	76	6
5.5	FBJ0501031	30	76	6
5.7	FBJ0501032	30	76	6
5.8	FBJ0501033	30	76	6
5.9	FBJ0501034	30	76	6
6	FBJ0501035	30	76	6
6.1	FBJ0501037	35	82	8
6.2	FBJ0501038	35	82	8
6.3	FBJ0501039	35	82	8
6.4	FBJ0501040	35	82	8
6.5	FBJ0501041	35	82	8
6.6	FBJ0501042	35	82	8
6.7	FBJ0501043	35	82	8
6.8	FBJ0501044	35	82	8
6.9	FBJ0501045	35	82	8
7	FBJ0501046	35	82	8



3X

## Solid carbide 3x high performance drill



P0-P6

K1-K3

S1-S4

M1-M3

Unit : mm

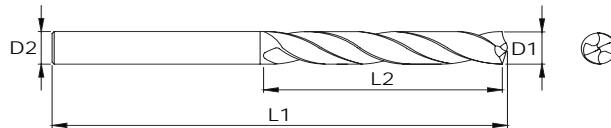
Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
7.1	FBJ0501047	38	82	8
7.2	FBJ0501048	38	82	8
7.3	FBJ0501049	38	82	8
7.4	FBJ0501050	38	82	8
7.5	FBJ0501051	38	82	8
7.6	FBJ0501052	38	82	8
7.8	FBJ0501053	38	82	8
7.9	FBJ0501054	38	82	8
8	FBJ0501055	38	82	8
8.1	FBJ0501056	43	89	10
8.2	FBJ0501057	43	89	10
8.3	FBJ0501058	43	89	10
8.4	FBJ0501059	43	89	10
8.5	FBJ0501060	43	89	10
8.6	FBJ0501061	43	89	10
8.7	FBJ0501062	43	89	10
8.8	FBJ0501063	43	89	10
8.9	FBJ0501064	43	89	10
9	FBJ0501065	43	89	10
9.1	FBJ0501066	43	89	10

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
9.2	FBJ0501067	43	89	10
9.25	FBJ0501068	43	89	10
9.3	FBJ0501069	43	89	10
9.5	FBJ0501070	43	89	10
9.6	FBJ0501071	43	89	10
9.4	FBJ0501072	43	89	10
9.7	FBJ0501073	43	89	10
9.8	FBJ0501074	43	89	10
9.9	FBJ0501075	43	89	10
10	FBJ0501076	43	89	10
10.1	FBJ0501077	51	101	12
10.2	FBJ0501078	51	101	12
10.3	FBJ0501079	51	101	12
10.4	FBJ0501080	51	101	12
10.5	FBJ0501081	51	101	12
10.6	FBJ0501082	51	101	12
10.7	FBJ0501083	51	101	12
10.8	FBJ0501084	51	101	12
10.9	FBJ0501085	51	101	12
11	FBJ0501086	51	101	12

3X

## Solid carbide 3x high performance drill

Carbide



P0-P6

K1-K3

S1-S4

M1-M3

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
11.1	FBJ0501087	51	101	12
11.2	FBJ0501088	51	101	12
11.3	FBJ0501089	51	101	12
11.4	FBJ0501090	51	101	12
11.5	FBJ0501091	51	101	12
11.6	FBJ0501092	51	101	12
11.7	FBJ0501093	51	101	12
11.8	FBJ0501094	51	101	12
11.9	FBJ0501095	51	101	12
12	FBJ0501096	51	101	12
12.1	FBJ0501097	54	107	14
12.5	FBJ0501098	54	107	14
12.8	FBJ0501099	54	107	14
12.83	FBJ0501100	54	107	14
12.9	FBJ0501101	54	107	14
13	FBJ0501102	54	107	14
13.5	FBJ0501103	54	107	14
13.7	FBJ0501104	54	107	14
14	FBJ0501105	54	107	14
14.5	FBJ0501106	60	117	16

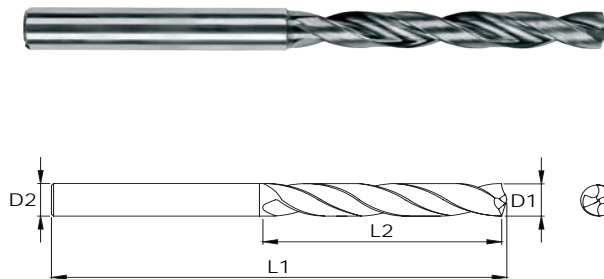
Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
14.7	FBJ0501107	60	117	16
15	FBJ0501108	60	117	16
15.3	FBJ0501109	60	117	16
15.5	FBJ0501110	60	117	16
15.7	FBJ0501111	60	117	16
16	FBJ0501112	60	117	16
16.08	FBJ0501113	63	122	18
16.3	FBJ0501114	63	122	18
16.5	FBJ0501115	63	122	18
17	FBJ0501116	63	122	18
17.5	FBJ0501117	63	122	18
18	FBJ0501118	63	122	18
18.5	FBJ0501119	70	133	20
19.16	FBJ0501120	70	133	20
19.25	FBJ0501121	70	133	20
19.3	FBJ0501122	70	133	20
19.5	FBJ0501123	70	133	20
20	FBJ0501124	70	133	20



5X

## Solid carbide 5x high performance drill

Carbide



P0-P6

K1-K3

S1-S4

M1-M3

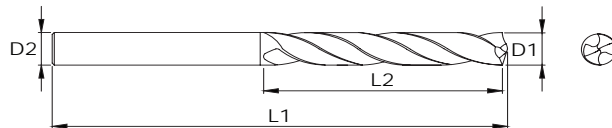
Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
3	FBJ0501125	24	63	3
3.1	FBJ0501126	32	69	4
3.2	FBJ0501127	32	69	4
3.3	FBJ0501128	32	69	4
3.4	FBJ0501129	32	69	4
3.5	FBJ0501130	32	69	4
3.6	FBJ0501131	32	69	4
3.7	FBJ0501132	32	69	4
3.8	FBJ0501133	32	69	4
3.9	FBJ0501134	32	69	4
4	FBJ0501135	32	69	4
4.1	FBJ0501136	38	80	5
4.2	FBJ0501137	38	80	5
4.3	FBJ0501138	38	80	5
4.4	FBJ0501139	38	80	5
4.5	FBJ0501140	38	80	5
4.6	FBJ0501141	38	80	5
4.7	FBJ0501142	38	80	5

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
4.8	FBJ0501143	38	80	5
4.9	FBJ0501144	38	80	5
5	FBJ0501145	38	80	5
5.1	FBJ0501146	40	82	6
5.2	FBJ0501147	40	82	6
5.3	FBJ0501148	40	82	6
5.4	FBJ0501149	40	82	6
5.5	FBJ0501150	40	82	6
5.7	FBJ0501151	40	82	6
5.8	FBJ0501152	40	82	6
5.9	FBJ0501153	40	82	6
6	FBJ0501154	40	82	6
6.1	FBJ0501155	48	91	8
6.2	FBJ0501156	48	91	8
6.3	FBJ0501157	48	91	8
6.4	FBJ0501158	48	91	8
6.5	FBJ0501159	48	91	8
6.6	FBJ0501160	48	91	8

**5X****Solid carbide 5x high performance drill**

Carbide

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

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
6.7	FBJ0501161	48	91	8
6.8	FBJ0501162	48	91	8
6.9	FBJ0501163	48	91	8
7	FBJ0501164	48	91	8
7.1	FBJ0501165	48	91	8
7.2	FBJ0501166	48	91	8
7.3	FBJ0501167	48	91	8
7.4	FBJ0501168	48	91	8
7.5	FBJ0501169	48	91	8
7.6	FBJ0501170	48	91	8
7.7	FBJ0501171	48	91	8
7.8	FBJ0501172	48	91	8
7.9	FBJ0501173	48	91	8
8	FBJ0501174	48	91	8
8.1	FBJ0501175	55	103	10
8.2	FBJ0501176	55	103	10
8.3	FBJ0501177	55	103	10
8.4	FBJ0501178	55	103	10

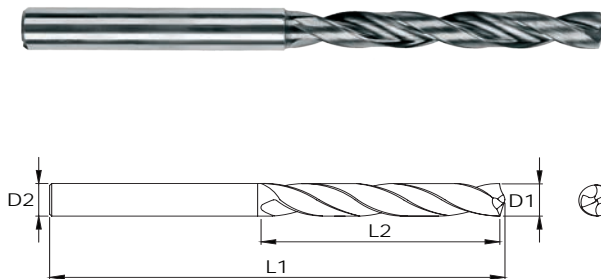
Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
8.5	FBJ0501179	55	103	10
8.6	FBJ0501180	55	103	10
8.7	FBJ0501181	55	103	10
8.8	FBJ0501182	55	103	10
8.9	FBJ0501183	55	103	10
9	FBJ0501184	55	103	10
9.1	FBJ0501185	55	103	10
9.2	FBJ0501186	55	103	10
9.25	FBJ0501187	55	103	10
9.3	FBJ0501188	55	103	10
9.4	FBJ0501189	55	103	10
9.5	FBJ0501190	55	103	10
9.6	FBJ0501191	55	103	10
9.7	FBJ0501192	55	103	10
9.8	FBJ0501193	55	103	10
9.9	FBJ0501194	55	103	10
10	FBJ0501195	55	103	10
10.1	FBJ0501196	60	120	12



5X

## Solid carbide 5x high performance drill

Carbide



P0-P6

K1-K3

S1-S4

M1-M3

Unit : mm

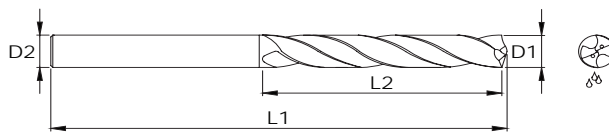
Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
10.2	FBJ0501197	60	120	12
10.3	FBJ0501198	60	120	12
10.4	FBJ0501199	60	120	12
10.5	FBJ0501200	60	120	12
10.6	FBJ0501201	60	120	12
10.7	FBJ0501202	60	120	12
10.8	FBJ0501203	60	120	12
10.9	FBJ0501204	60	120	12
11	FBJ0501205	60	120	12
11.1	FBJ0501206	66	120	12
11.2	FBJ0501207	66	120	12
11.3	FBJ0501208	66	120	12
11.4	FBJ0501209	66	120	12
11.5	FBJ0501210	66	120	12
11.6	FBJ0501211	66	120	12
11.7	FBJ0501212	66	120	12
11.8	FBJ0501213	66	120	12
11.9	FBJ0501214	66	120	12

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
12	FBJ0501215	66	120	12
12.1	FBJ0501216	72	126	14
12.5	FBJ0501217	72	126	14
12.8	FBJ0501218	72	126	14
12.83	FBJ0501219	72	126	14
12.9	FBJ0501220	72	126	14
13	FBJ0501221	72	126	14
13.5	FBJ0501222	77	134	14
13.7	FBJ0501223	77	134	14
14	FBJ0501224	77	134	14
14.5	FBJ0501225	80	140	16
14.7	FBJ0501226	80	140	16
15	FBJ0501227	80	140	16
15.3	FBJ0501228	82	146	16
15.5	FBJ0501229	82	146	16
15.7	FBJ0501230	82	146	16
16	FBJ0501231	82	146	16



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

Carbide

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

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
3	FBJ0501232	24	75	3
3.1	FBJ0501233	32	80	4
3.2	FBJ0501234	32	80	4
3.3	FBJ0501235	32	80	4
3.4	FBJ0501236	32	80	4
3.5	FBJ0501237	32	80	4
3.6	FBJ0501238	32	80	4
3.7	FBJ0501239	32	80	4
3.8	FBJ0501240	32	80	4
3.9	FBJ0501241	32	80	4
4	FBJ0501242	32	80	4
4.1	FBJ0501243	38	82	5
4.2	FBJ0501244	38	82	5
4.3	FBJ0501245	38	82	5
4.4	FBJ0501246	38	82	5
4.5	FBJ0501247	38	82	5
4.6	FBJ0501248	38	82	5
4.7	FBJ0501249	38	82	5
4.8	FBJ0501250	38	82	5
4.9	FBJ0501251	38	82	5

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
5	FBJ0501252	38	82	5
5.1	FBJ0501253	40	82	6
5.2	FBJ0501254	40	82	6
5.3	FBJ0501255	40	82	6
5.4	FBJ0501256	40	82	6
5.5	FBJ0501257	40	82	6
5.7	FBJ0501258	40	82	6
5.8	FBJ0501259	40	82	6
5.9	FBJ0501260	40	82	6
6	FBJ0501261	40	82	6
6.1	FBJ0501262	48	91	8
6.2	FBJ0501263	48	91	8
6.3	FBJ0501264	48	91	8
6.4	FBJ0501265	48	91	8
6.5	FBJ0501266	48	91	8
6.6	FBJ0501267	48	91	8
6.7	FBJ0501268	48	91	8
6.8	FBJ0501269	48	91	8
6.9	FBJ0501270	48	91	8
7	FBJ0501271	48	91	8



5X

## Solid carbide 5x high performance drill with coolant feed

Carbide

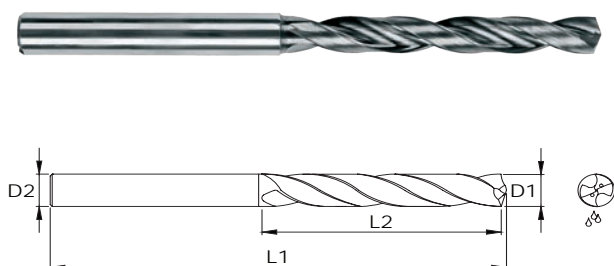


5X

142°

30°

TiAlN



P0-P6

K1-K3

S1-S4

M1-M3

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
7.1	FBJ0501272	48	91	8
7.2	FBJ0501274	48	91	8
7.3	FBJ0501275	48	91	8
7.4	FBJ0501276	48	91	8
7.5	FBJ0501277	48	91	8
7.6	FBJ0501278	48	91	8
7.7	FBJ0501279	48	91	8
7.8	FBJ0501280	48	91	8
7.9	FBJ0501281	48	91	8
8	FBJ0501282	48	91	8
8.1	FBJ0501283	55	103	10
8.2	FBJ0501284	55	103	10
8.3	FBJ0501285	55	103	10
8.4	FBJ0501286	55	103	10
8.5	FBJ0501287	55	103	10
8.6	FBJ0501288	55	103	10
8.7	FBJ0501289	55	103	10
8.8	FBJ0501290	55	103	10
8.9	FBJ0501291	55	103	10
9	FBJ0501292	55	103	10
9.1	FBJ0501293	55	103	10
9.2	FBJ0501294	55	103	10

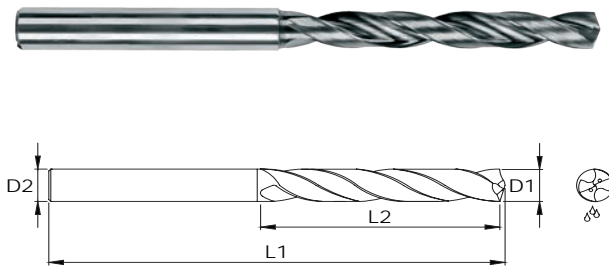
Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
9.25	FBJ0501295	55	103	10
9.3	FBJ0501296	55	103	10
9.4	FBJ0501297	55	103	10
9.5	FBJ0501298	55	103	10
9.6	FBJ0501299	55	103	10
9.7	FBJ0501300	55	103	10
9.8	FBJ0501301	55	103	10
9.9	FBJ0501302	55	103	10
10	FBJ0501303	55	103	10
10.1	FBJ0501304	60	120	12
10.2	FBJ0501305	60	120	12
10.3	FBJ0501306	60	120	12
10.4	FBJ0501307	60	120	12
10.5	FBJ0501308	60	120	12
10.6	FBJ0501309	60	120	12
10.7	FBJ0501310	60	120	12
10.8	FBJ0501311	60	120	12
10.9	FBJ0501312	60	120	12
11	FBJ0501313	60	120	12
11.1	FBJ0501314	66	120	12
11.2	FBJ0501315	66	120	12
11.3	FBJ0501316	66	120	12



5X

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

Carbide



P0-P6

K1-K3

S1-S4

M1-M3

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
11.4	FBJ0501317	66	120	12
11.5	FBJ0501318	66	120	12
11.6	FBJ0501319	66	120	12
11.7	FBJ0501320	66	120	12
11.8	FBJ0501321	66	120	12
11.9	FBJ0501322	66	120	12
12	FBJ0501323	66	120	12
12.1	FBJ0501324	72	126	14
12.5	FBJ0501325	72	126	14
12.8	FBJ0501326	72	126	14
12.83	FBJ0501327	72	126	14
12.9	FBJ0501328	72	126	14
13	FBJ0501329	72	126	14
13.5	FBJ0501330	77	134	14
13.7	FBJ0501331	77	134	14
14	FBJ0501332	77	134	14
14.5	FBJ0501333	80	146	16
14.7	FBJ0501334	80	146	16
15	FBJ0501335	80	146	16
15.3	FBJ0501336	82	146	16
15.5	FBJ0501337	82	146	16
15.7	FBJ0501338	82	146	16

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
16	FBJ0501339	82	146	16
16.08	FBJ0501340	90	158	18
16.3	FBJ0501341	90	158	18
16.5	FBJ0501342	90	158	18
17	FBJ0501343	90	158	18
17.5	FBJ0501344	95	158	18
18	FBJ0501345	95	158	18
18.5	FBJ0501346	100	160	20
19.16	FBJ0501347	100	160	20
19.25	FBJ0501348	100	160	20
19.3	FBJ0501349	100	160	20
19.5	FBJ0501350	100	160	20
20	FBJ0501351	100	160	20



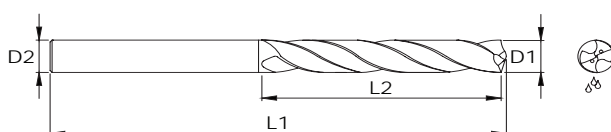
Solid Carbide Drills

2TDCL Series

7X

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

Carbide



P0-P6

K1-K3

S1-S4

M1-M3

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
3	FBJ0501352	33	81	3
3.1	FBJ0501353	40	92	4
3.2	FBJ0501354	40	92	4
3.3	FBJ0501355	40	92	4
3.4	FBJ0501356	40	92	4
3.5	FBJ0501357	40	92	4
3.6	FBJ0501358	40	92	4
3.7	FBJ0501359	40	92	4
3.8	FBJ0501360	40	92	4
3.9	FBJ0501361	40	92	4
4	FBJ0501362	40	92	4
4.1	FBJ0501363	45	100	5
4.2	FBJ0501364	45	100	5
4.3	FBJ0501365	45	100	5
4.4	FBJ0501366	45	100	5
4.5	FBJ0501367	45	100	5
4.6	FBJ0501368	45	100	5
4.7	FBJ0501369	45	100	5
4.8	FBJ0501370	45	100	5
4.9	FBJ0501371	45	100	5
5	FBJ0501372	45	100	5
5.1	FBJ0501373	51	100	6
5.2	FBJ0501374	51	100	6

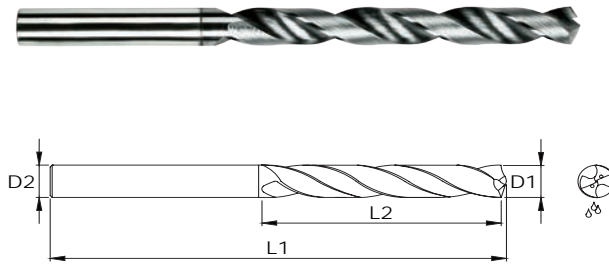
Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
5.3	FBJ0501375	51	100	6
5.4	FBJ0501376	51	100	6
5.5	FBJ0501377	51	100	6
5.7	FBJ0501378	51	100	6
5.8	FBJ0501379	51	100	6
5.9	FBJ0501380	51	100	6
6	FBJ0501381	51	100	6
6.1	FBJ0501382	60	109	8
6.2	FBJ0501383	60	109	8
6.3	FBJ0501384	60	109	8
6.4	FBJ0501385	60	109	8
6.5	FBJ0501386	60	109	8
6.6	FBJ0501387	60	109	8
6.7	FBJ0501388	60	109	8
6.8	FBJ0501389	60	109	8
6.9	FBJ0501390	60	109	8
7	FBJ0501391	60	109	8
7.1	FBJ0501392	70	118	8
7.2	FBJ0501393	70	118	8
7.3	FBJ0501394	70	118	8
7.4	FBJ0501395	70	118	8
7.5	FBJ0501396	70	118	8
7.6	FBJ0501397	70	118	8



7X

## Solid carbide 7x high performance drill with coolant feed

Carbide



P0-P6

K1-K3

S1-S4

M1-M3

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
7.7	FBJ0501398	70	118	8
7.8	FBJ0501399	70	118	8
7.9	FBJ0501400	70	118	8
8	FBJ0501401	70	118	8
8.1	FBJ0501402	80	127	10
8.2	FBJ0501403	80	127	10
8.3	FBJ0501404	80	127	10
8.4	FBJ0501405	80	127	10
8.5	FBJ0501406	80	127	10
8.6	FBJ0501407	80	127	10
8.7	FBJ0501408	80	127	10
8.8	FBJ0501409	80	127	10
8.9	FBJ0501410	80	127	10
9	FBJ0501411	80	127	10
9.1	FBJ0501412	85	136	10
9.2	FBJ0501413	85	136	10
9.25	FBJ0501414	85	136	10
9.3	FBJ0501415	85	136	10
9.4	FBJ0501416	85	136	10
9.5	FBJ0501417	85	136	10
9.6	FBJ0501418	85	136	10
9.7	FBJ0501419	85	136	10
9.8	FBJ0501420	85	136	10

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
9.9	FBJ0501421	85	136	10
10	FBJ0501422	85	136	10
10.1	FBJ0501423	93	149	12
10.2	FBJ0501424	93	149	12
10.3	FBJ0501425	93	149	12
10.4	FBJ0501426	93	149	12
10.5	FBJ0501427	93	149	12
10.6	FBJ0501428	93	149	12
10.7	FBJ0501429	93	149	12
10.8	FBJ0501430	93	149	12
10.9	FBJ0501431	93	149	12
11	FBJ0501432	93	149	12
11.1	FBJ0501433	102	155	12
11.2	FBJ0501434	102	155	12
11.3	FBJ0501435	102	155	12
11.4	FBJ0501436	102	155	12
11.5	FBJ0501437	102	155	12
11.6	FBJ0501438	102	155	12
11.7	FBJ0501439	102	155	12
11.8	FBJ0501440	102	155	12
11.9	FBJ0501441	102	155	12
12	FBJ0501442	102	155	12



5X

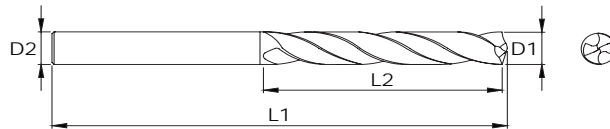
## Solid carbide jobber drill

Carbide

REG



BF



P0-P6

K1-K3

M1-M3

H1-H4

S1-S4

N1-N7

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
3	FBJ0500001	33	61	3
3.1	FBJ0500003	36	65	4
3.2	FBJ0500005	36	65	4
3.3	FBJ0500007	36	65	4
3.4	FBJ0500009	39	70	4
3.5	FBJ0500011	39	70	4
3.6	FBJ0500013	39	70	4
3.7	FBJ0500015	39	70	4
3.8	FBJ0500017	43	75	4
3.9	FBJ0500019	43	75	4
4	FBJ0500021	43	75	4
4.1	FBJ0500023	43	75	5
4.2	FBJ0500025	43	75	5
4.3	FBJ0500027	47	80	5
4.4	FBJ0500029	47	80	5
4.5	FBJ0500031	47	80	5
4.6	FBJ0500033	47	80	5
4.7	FBJ0500035	47	80	5

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
4.8	FBJ0500037	52	86	5
4.9	FBJ0500039	52	86	5
5	FBJ0500041	52	86	5
5.1	FBJ0500043	52	86	6
5.2	FBJ0500045	52	86	6
5.3	FBJ0500047	52	86	6
5.4	FBJ0500049	57	93	6
5.5	FBJ0500051	57	93	6
5.6	FBJ0500053	57	93	6
5.7	FBJ0500055	57	93	6
5.8	FBJ0500057	57	93	6
5.9	FBJ0500059	57	93	6
6	FBJ0500061	57	93	6
6.1	FBJ0500063	63	101	8
6.2	FBJ0500065	63	101	8
6.3	FBJ0500067	63	101	8
6.4	FBJ0500069	63	101	8



5X

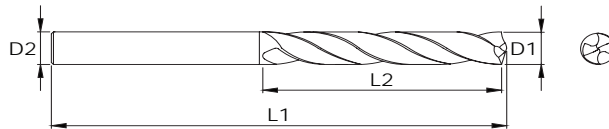
## Solid carbide jobber drill

Carbide

REG



BF



P0-P6

K1-K3

M1-M3

H1-H4

S1-S4

N1-N7

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
6.5	FBJ0500071	63	101	8
6.6	FBJ0500073	63	101	8
6.7	FBJ0500075	63	101	8
6.8	FBJ0500077	69	109	8
6.9	FBJ0500079	69	109	8
7	FBJ0500081	69	109	8
7.1	FBJ0500083	69	109	8
7.2	FBJ0500085	69	109	8
7.3	FBJ0500087	69	109	8
7.4	FBJ0500089	69	109	8
7.5	FBJ0500091	69	109	8
7.6	FBJ0500093	75	117	8
7.7	FBJ0500095	75	117	8
7.8	FBJ0500097	75	117	8
7.9	FBJ0500099	75	117	8
8	FBJ0500101	75	117	8
8.1	FBJ0500103	75	117	10

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
8.2	FBJ0500105	75	117	10
8.3	FBJ0500107	75	117	10
8.4	FBJ0500109	75	117	10
8.5	FBJ0500111	75	117	10
8.6	FBJ0500113	81	125	10
8.7	FBJ0500115	81	125	10
8.8	FBJ0500117	81	125	10
8.9	FBJ0500119	81	125	10
9	FBJ0500121	81	125	10
9.1	FBJ0500123	81	125	10
9.2	FBJ0500125	81	125	10
9.3	FBJ0500127	81	125	10
9.4	FBJ0500129	81	125	10
9.5	FBJ0500131	81	125	10
9.6	FBJ0500133	87	133	10
9.7	FBJ0500135	87	133	10
9.8	FBJ0500137	87	133	10
9.9	FBJ0500139	87	133	10



5X

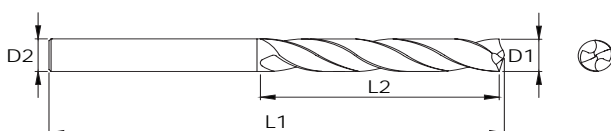
## Solid carbide jobber drill

Carbide

REG



BF



P0-P6

K1-K3

M1-M3

H1-H4

S1-S4

N1-N7

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
10	FBJ0500141	87	133	10
10.1	FBJ0500143	87	133	12
10.2	FBJ0500145	87	133	12
10.3	FBJ0500147	87	133	12
10.4	FBJ0500149	87	133	12
10.5	FBJ0500151	87	133	12
10.6	FBJ0500153	87	133	12
10.7	FBJ0500155	94	142	12
10.8	FBJ0500157	94	142	12
10.9	FBJ0500159	94	142	12
11	FBJ0500161	94	142	12
11.1	FBJ0500163	94	142	12
11.2	FBJ0500165	94	142	12
11.3	FBJ0500167	94	142	12
11.4	FBJ0500169	94	142	12
11.5	FBJ0500171	94	142	12
11.6	FBJ0500173	94	142	12
11.7	FBJ0500175	94	142	12
11.8	FBJ0500177	94	142	12

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
11.9	FBJ0500179	101	151	12
12	FBJ0500181	101	151	12
12.5	FBJ0500183	101	151	14
13	FBJ0500185	101	151	14
13.5	FBJ0500187	108	160	14
14	FBJ0500189	108	160	14
14.5	FBJ0500191	114	169	16
15	FBJ0500193	114	169	16
15.5	FBJ0500195	120	178	16
16	FBJ0500197	120	178	16
16.5	FBJ0500199	125	184	18
17	FBJ0500201	125	184	18
17.5	FBJ0500203	130	191	18
18	FBJ0500205	130	191	18
18.5	FBJ0500207	135	198	20
19	FBJ0500209	135	198	20
20	FBJ0500211	140	205	20

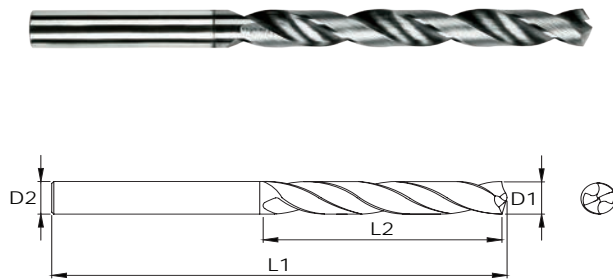


5X

## Solid carbide jobber drill

Carbide

REG



P0-P6

K1-K3

M1-M3

H1-H4

S1-S4

N1-N7

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
3	FBJ0500002	33	61	3
3.1	FBJ0500004	36	65	4
3.2	FBJ0500006	36	65	4
3.3	FBJ0500008	36	65	4
3.4	FBJ0500010	39	70	4
3.5	FBJ0500012	39	70	4
3.6	FBJ0500014	39	70	4
3.7	FBJ0500016	39	70	4
3.8	FBJ0500018	43	75	4
3.9	FBJ0500020	43	75	4
4	FBJ0500022	43	75	4
4.1	FBJ0500024	43	75	5
4.2	FBJ0500026	43	75	5
4.3	FBJ0500028	47	80	5
4.4	FBJ0500030	47	80	5
4.5	FBJ0500032	47	80	5
4.6	FBJ0500034	47	80	5

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
4.7	FBJ0500036	47	80	5
4.8	FBJ0500038	52	86	5
4.9	FBJ0500040	52	86	5
5	FBJ0500042	52	86	5
5.1	FBJ0500044	52	86	6
5.2	FBJ0500046	52	86	6
5.3	FBJ0500048	52	86	6
5.4	FBJ0500050	57	93	6
5.5	FBJ0500052	57	93	6
5.6	FBJ0500054	57	93	6
5.7	FBJ0500056	57	93	6
5.8	FBJ0500058	57	93	6
5.9	FBJ0500060	57	93	6
6	FBJ0500062	57	93	6
6.1	FBJ0500064	63	101	8
6.2	FBJ0500066	63	101	8
6.3	FBJ0500068	63	101	8



Solid Carbide Drills

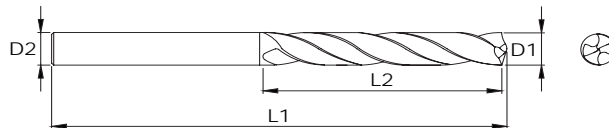
F224A Series

5X

## Solid carbide jobber drill

Carbide

REG



P0-P6

K1-K3

M1-M3

H1-H4

S1-S4

N1-N7

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
6.4	FBJ0500070	63	101	8
6.5	FBJ0500072	63	101	8
6.6	FBJ0500074	63	101	8
6.7	FBJ0500076	63	101	8
6.8	FBJ0500078	69	109	8
6.9	FBJ0500080	69	109	8
7	FBJ0500082	69	109	8
7.1	FBJ0500084	69	109	8
7.2	FBJ0500086	69	109	8
7.3	FBJ0500088	69	109	8
7.4	FBJ0500090	69	109	8
7.5	FBJ0500092	69	109	8
7.6	FBJ0500094	75	117	8
7.7	FBJ0500096	75	117	8
7.8	FBJ0500098	75	117	8
7.9	FBJ0500100	75	117	8
8	FBJ0500102	75	117	8
8.1	FBJ0500104	75	117	10
8.2	FBJ0500106	75	117	10
8.3	FBJ0500108	75	117	10
8.4	FBJ0500110	75	117	10

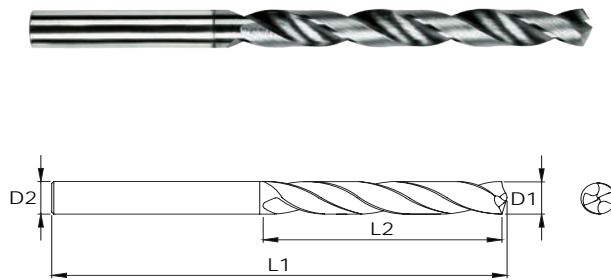
Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
8.5	FBJ0500112	75	117	10
8.6	FBJ0500114	81	125	10
8.7	FBJ0500116	81	125	10
8.8	FBJ0500118	81	125	10
8.9	FBJ0500120	81	125	10
9	FBJ0500122	81	125	10
9.1	FBJ0500124	81	125	10
9.2	FBJ0500126	81	125	10
9.3	FBJ0500128	81	125	10
9.4	FBJ0500130	81	125	10
9.5	FBJ0500132	81	125	10
9.6	FBJ0500134	87	133	10
9.7	FBJ0500136	87	133	10
9.8	FBJ0500138	87	133	10
9.9	FBJ0500140	87	133	10
10	FBJ0500142	87	133	10
10.1	FBJ0500144	87	133	12
10.2	FBJ0500146	87	133	12
10.3	FBJ0500148	87	133	12
10.4	FBJ0500150	87	133	12
10.5	FBJ0500152	87	133	12

5X

## Solid carbide jobber drill

Carbide

REG



P0-P6

K1-K3

M1-M3

H1-H4

S1-S4

N1-N7

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
10.6	FBJ0500154	87	142	12
10.7	FBJ0500156	94	142	12
10.8	FBJ0500158	94	142	12
10.9	FBJ0500160	94	142	12
11	FBJ0500162	94	142	12
11.1	FBJ0500164	94	142	12
11.2	FBJ0500166	94	142	12
11.3	FBJ0500168	94	142	12
11.4	FBJ0500170	94	142	12
11.5	FBJ0500172	94	142	12
11.6	FBJ0500174	94	142	12
11.7	FBJ0500176	94	142	12
11.8	FBJ0500178	94	142	12
11.9	FBJ0500180	101	151	12
12	FBJ0500182	101	151	12
12.5	FBJ0500184	101	151	14
13	FBJ0500186	101	151	14
13.5	FBJ0500188	108	160	14

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
14	FBJ0500190	108	160	14
14.5	FBJ0500192	114	169	16
15	FBJ0500194	114	169	16
15.5	FBJ0500196	120	178	16
16	FBJ0500198	120	178	16
16.5	FBJ0500200	125	184	18
17	FBJ0500202	125	184	18
17.5	FBJ0500204	130	191	18
18	FBJ0500206	130	191	18
18.5	FBJ0500208	135	198	20
19	FBJ0500210	135	198	20
20	FBJ0500212	140	205	20

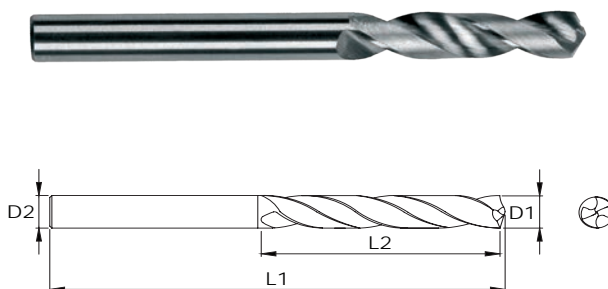


3X

## Solid carbide jobber drill

Carbide

STUB



P0-P6

K1-K3

M1-M3

H1-H4

S1-S4

N1-N7

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
3	FBJ0500213	16	46	3
3.1	FBJ0500215	18	49	4
3.2	FBJ0500217	18	49	4
3.3	FBJ0500219	18	49	4
3.4	FBJ0500221	20	52	4
3.5	FBJ0500223	20	52	4
3.6	FBJ0500225	20	52	4
3.7	FBJ0500227	20	52	4
3.8	FBJ0500229	22	55	4
3.9	FBJ0500231	22	55	4
4	FBJ0500233	22	55	4
4.1	FBJ0500235	22	55	5
4.2	FBJ0500237	22	55	5
4.3	FBJ0500239	24	58	5
4.4	FBJ0500241	24	58	5
4.5	FBJ0500243	24	58	5
4.7	FBJ0500247	24	58	5
4.8	FBJ0500249	26	62	5

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
4.9	FBJ0500251	26	62	5
5	FBJ0500253	26	62	5
5.1	FBJ0500255	26	62	6
5.2	FBJ0500257	26	62	6
5.3	FBJ0500259	26	62	6
5.4	FBJ0500261	28	66	6
5.5	FBJ0500263	28	66	6
5.6	FBJ0500265	28	66	6
5.7	FBJ0500267	28	66	6
5.8	FBJ0500269	28	66	6
5.9	FBJ0500271	28	66	6
6	FBJ0500273	28	66	6
6.1	FBJ0500275	31	70	8
6.2	FBJ0500277	31	70	8
6.3	FBJ0500279	31	70	8
6.4	FBJ0500281	31	70	8
6.5	FBJ0500283	31	70	8
6.6	FBJ0500285	31	70	8



3X

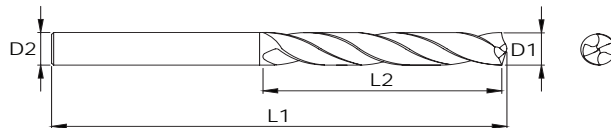
## Solid carbide jobber drill

Carbide

STUB



BF



P0-P6

K1-K3

M1-M3

H1-H4

S1-S4

N1-N7

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
6.7	FBJ0500287	31	70	8
6.8	FBJ0500289	34	74	8
6.9	FBJ0500291	34	74	8
7	FBJ0500293	34	74	8
7.1	FBJ0500295	34	74	8
7.2	FBJ0500297	34	74	8
7.3	FBJ0500299	34	74	8
7.4	FBJ0500301	34	74	8
7.5	FBJ0500303	34	74	8
7.6	FBJ0500305	37	79	8
7.7	FBJ0500307	37	79	8
7.8	FBJ0500309	37	79	8
7.9	FBJ0500311	37	79	8
8	FBJ0500313	37	79	8
8.1	FBJ0500315	37	79	10
8.2	FBJ0500317	37	79	10
8.3	FBJ0500319	37	79	10
8.4	FBJ0500321	37	79	10

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
8.5	FBJ0500323	37	79	10
8.6	FBJ0500325	40	84	10
8.7	FBJ0500327	40	84	10
8.8	FBJ0500329	40	84	10
8.9	FBJ0500331	40	84	10
9	FBJ0500333	40	84	10
9.1	FBJ0500335	40	84	10
9.2	FBJ0500337	40	84	10
9.3	FBJ0500339	40	84	10
9.4	FBJ0500341	40	84	10
9.5	FBJ0500343	40	84	10
9.6	FBJ0500345	43	89	10
9.7	FBJ0500347	43	89	10
9.8	FBJ0500349	43	89	10
9.9	FBJ0500351	43	89	10
10	FBJ0500353	43	89	10
10.1	FBJ0500355	43	89	12



3X

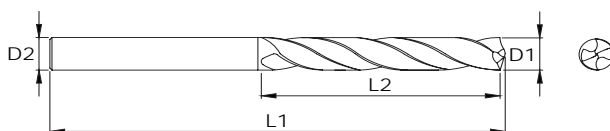
## Solid carbide jobber drill

Carbide

STUB



BF



P0-P6

K1-K3

M1-M3

H1-H4

S1-S4

N1-N7

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
10.2	FBJ0500357	43	89	12
10.3	FBJ0500359	43	89	12
10.4	FBJ0500361	43	89	12
10.5	FBJ0500363	43	89	12
10.6	FBJ0500365	43	89	12
10.7	FBJ0500367	47	95	12
10.8	FBJ0500369	47	95	12
10.9	FBJ0500371	47	95	12
11	FBJ0500373	47	95	12
11.1	FBJ0500375	47	95	12
11.2	FBJ0500377	47	95	12
11.3	FBJ0500379	47	95	12
11.4	FBJ0500381	47	95	12
11.5	FBJ0500383	47	95	12
11.6	FBJ0500385	47	95	12
11.7	FBJ0500387	47	95	12
11.8	FBJ0500389	47	95	12

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
11.9	FBJ0500391	51	102	12
12	FBJ0500393	51	102	12
12.5	FBJ0500395	51	102	14
13	FBJ0500397	51	102	14
13.5	FBJ0500399	54	107	14
14	FBJ0500401	54	107	14
14.5	FBJ0500403	56	111	16
15	FBJ0500405	56	111	16
15.5	FBJ0500407	58	115	16
16	FBJ0500409	58	115	16
16.5	FBJ0500411	60	119	18
17	FBJ0500413	60	119	18
17.5	FBJ0500415	62	123	18
18	FBJ0500417	62	123	18
18.5	FBJ0500419	64	127	20
19	FBJ0500421	64	127	20
20	FBJ0500423	66	131	20



Solid Carbide Drills

F226A Series

HSS TAPS

DIES

END MILLS

DRILLS

CARBIDE BURRS

CS TAPS

3X

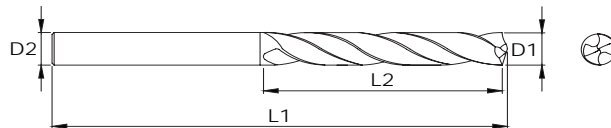
## Solid carbide jobber drill

Carbide

STUB



TiAlN



P0-P6

K1-K3

M1-M3

H1-H4

S1-S4

N1-N7

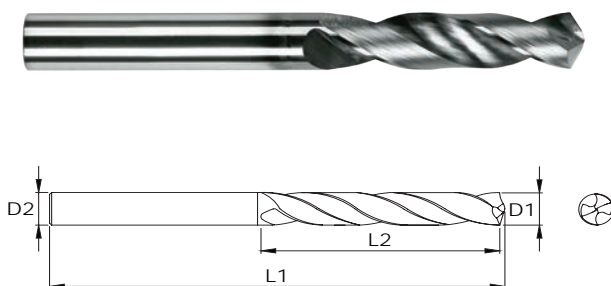
Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
3	FBJ0500214	16	46	3
3.1	FBJ0500216	18	49	4
3.2	FBJ0500218	18	49	4
3.3	FBJ0500220	18	49	4
3.4	FBJ0500222	20	52	4
3.5	FBJ0500224	20	52	4
3.6	FBJ0500226	20	52	4
3.7	FBJ0500228	20	52	4
3.8	FBJ0500230	22	55	4
3.9	FBJ0500232	22	55	4
4	FBJ0500234	22	55	4
4.1	FBJ0500236	22	55	5
4.2	FBJ0500238	22	55	5
4.3	FBJ0500240	24	58	5
4.4	FBJ0500242	24	58	5
4.5	FBJ0500244	24	58	5
4.7	FBJ0500248	24	58	5
4.8	FBJ0500250	26	62	5

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	Ø D2
4.9	FBJ0500252	26	62	5
5	FBJ0500254	26	62	5
5.1	FBJ0500256	26	62	6
5.2	FBJ0500258	26	62	6
5.3	FBJ0500260	26	62	6
5.4	FBJ0500262	28	66	6
5.5	FBJ0500264	28	66	6
5.6	FBJ0500266	28	66	6
5.7	FBJ0500268	28	66	6
5.8	FBJ0500270	28	66	6
5.9	FBJ0500272	28	66	6
6	FBJ0500274	28	66	6
6.1	FBJ0500276	31	70	8
6.2	FBJ0500278	31	70	8
6.3	FBJ0500280	31	70	8
6.4	FBJ0500282	31	70	8
6.5	FBJ0500284	31	70	8
6.6	FBJ0500286	31	70	8



# 3X Solid carbide jobber drill



P0-P6

K1-K3

M1-M3

H1-H4

S1-S4

N1-N7

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	D2
6.7	FBJ0500288	31	70	8
6.8	FBJ0500290	34	74	8
6.9	FBJ0500292	34	74	8
7	FBJ0500294	34	74	8
7.1	FBJ0500296	34	74	8
7.2	FBJ0500298	34	74	8
7.3	FBJ0500300	34	74	8
7.4	FBJ0500302	34	74	8
7.5	FBJ0500304	34	74	8
7.6	FBJ0500306	37	79	8
7.7	FBJ0500308	37	79	8
7.8	FBJ0500310	37	79	8
7.9	FBJ0500312	37	79	8
8	FBJ0500314	37	79	8
8.1	FBJ0500316	37	79	10
8.2	FBJ0500318	37	79	10
8.3	FBJ0500320	37	79	10
8.4	FBJ0500322	37	79	10

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
Ø D1		L2	L1	D2
8.5	FBJ0500324	37	79	10
8.6	FBJ0500326	40	84	10
8.7	FBJ0500328	40	84	10
8.8	FBJ0500330	40	84	10
8.9	FBJ0500332	40	84	10
9	FBJ0500334	40	84	10
9.1	FBJ0500336	40	84	10
9.2	FBJ0500338	40	84	10
9.3	FBJ0500340	40	84	10
9.4	FBJ0500342	40	84	10
9.5	FBJ0500344	43	89	10
9.6	FBJ0500346	43	89	10
9.7	FBJ0500348	43	89	10
9.8	FBJ0500350	43	89	10
9.9	FBJ0500352	43	89	10
10	FBJ0500354	43	89	10
10.1	FBJ0500356	43	89	12
10.2	FBJ0500358	43	89	12





Solid Carbide Drills

F226A Series

HSS TAPS

DIES

END MILLS

DRILLS

CARBIDE BURRS

CS TAPS

3X

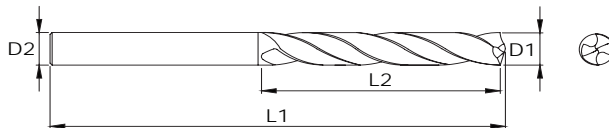
## Solid carbide jobber drill

Carbide

STUB



TiAlN



P0-P6

K1-K3

M1-M3

H1-H4

S1-S4

N1-N7

Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
ØD1		L2	L1	D2
10.3	FBJ0500360	43	89	12
10.4	FBJ0500362	43	89	12
10.5	FBJ0500364	43	89	12
10.6	FBJ0500366	43	89	12
10.7	FBJ0500368	47	95	12
10.8	FBJ0500370	47	95	12
10.9	FBJ0500372	47	95	12
11	FBJ0500374	47	95	12
11.1	FBJ0500376	47	95	12
11.2	FBJ0500378	47	95	12
11.3	FBJ0500380	47	95	12
11.4	FBJ0500382	47	95	12
11.5	FBJ0500384	47	95	12
11.6	FBJ0500386	47	95	12
11.7	FBJ0500388	47	95	12
11.8	FBJ0500390	47	95	12
11.9	FBJ0500392	51	102	12
12	FBJ0500394	51	102	12

Diameter	EDP No	Flute Length	Overall Length	Shank Diameter
ØD1		L2	L1	D2
12.5	FBJ0500396	51	102	14
13	FBJ0500398	51	102	14
13.5	FBJ0500400	54	107	14
14	FBJ0500402	54	107	14
14.5	FBJ0500404	56	111	16
15	FBJ0500406	56	111	16
15.5	FBJ0500408	58	115	16
16	FBJ0500410	58	115	16
16.5	FBJ0500412	60	119	18
17	FBJ0500414	60	119	18
17.5	FBJ0500416	62	123	18
18	FBJ0500418	62	123	18
18.5	FBJ0500420	64	127	20
19	FBJ0500422	64	127	20
20	FBJ0500424	66	131	20



High Speed Steel Drills

5X

## High speed steel straight shank jobber drill

HSS

DIN  
338

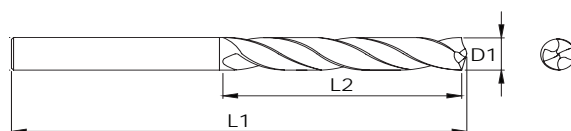


5X



30°

BF



Unit : mm

Diameter	EDP No	Flute Length	Overall Length
Ø D1		L2	L1
1.0	FBR0200001	12	34
1.1	FBR0200002	14	36
1.2	FBR0200003	16	38
1.3	FBR0200004	16	38
1.4	FBR0200005	18	40
1.5	FBR0200006	18	40
1.6	FBR0200007	20	43
1.7	FBR0200008	20	43
1.8	FBR0200009	22	46
1.9	FBR0200010	22	46
2	FBR0200011	24	49
2.1	FBR0200012	24	49
2.2	FBR0200013	27	53
2.3	FBR0200014	27	53
2.4	FBR0200015	30	57
2.5	FBR0200016	30	57
2.6	FBR0200017	30	57
2.7	FBR0200018	33	61
2.8	FBR0200019	33	61
2.9	FBR0200020	33	61
3	FBR0200021	33	61

Diameter	EDP No	Flute Length	Overall Length
Ø D1		L2	L1
3.1	FBR0200022	36	65
3.2	FBR0200023	36	65
3.3	FBR0200024	36	65
3.4	FBR0200025	39	70
3.5	FBR0200026	39	70
3.6	FBR0200027	39	70
3.7	FBR0200028	39	70
3.8	FBR0200029	43	75
3.9	FBR0200030	43	75
4.0	FBR0200031	43	75
4.1	FBR0200032	43	75
4.2	FBR0200033	43	75
4.3	FBR0200034	47	80
4.4	FBR0200035	47	80
4.5	FBR0200036	47	80
4.6	FBR0200037	47	80
4.7	FBR0200038	47	80
4.8	FBR0200039	52	86
4.9	FBR0200040	52	86
5	FBR0200041	52	86
5.1	FBR0200042	52	86



High Speed Steel Drills

HSS TAPS

DIES

END MILLS

DRILLS

CARBIDE BURRS

CS TAPS

5X

## High speed steel straight shank jobber drill

HSS

DIN  
338

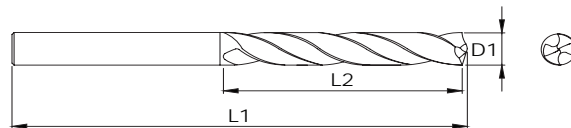


5X



30°

BF



Unit : mm

Diameter	EDP No	Flute Length	Overall Length
ØD1		L2	L1
5.2	FBR0200043	52	86
5.3	FBR0200044	52	86
5.4	FBR0200045	57	93
5.5	FBR0200046	57	93
5.6	FBR0200047	57	93
5.7	FBR0200048	57	93
5.8	FBR0200049	57	93
5.9	FBR0200050	57	93
6	FBR0200051	57	93
6.1	FBR0200052	63	101
6.2	FBR0200053	63	101
6.3	FBR0200054	63	101
6.4	FBR0200055	63	101
6.5	FBR0200056	63	101
6.6	FBR0200057	63	101
6.7	FBR0200058	63	101
6.8	FBR0200059	69	109
6.9	FBR0200060	69	109
7.0	FBR0200061	69	109
7.1	FBR0200062	69	109
7.2	FBR0200063	69	109

Diameter	EDP No	Flute Length	Overall Length
ØD1		L2	L1
7.3	FBR0200064	69	109
7.4	FBR0200065	69	109
7.5	FBR0200066	69	109
7.6	FBR0200067	75	117
7.7	FBR0200068	75	117
7.8	FBR0200069	75	117
7.9	FBR0200070	75	117
8	FBR0200071	75	117
8.1	FBR0200072	75	117
8.2	FBR0200073	75	117
8.3	FBR0200074	75	117
8.4	FBR0200075	75	117
8.5	FBR0200076	75	117
8.6	FBR0200077	81	125
8.7	FBR0200078	81	125
8.8	FBR0200079	81	125
8.9	FBR0200080	81	125
9	FBR0200081	81	125
9.1	FBR0200082	81	125
9.2	FBR0200083	81	125
9.3	FBR0200084	81	125



High Speed Steel Drills

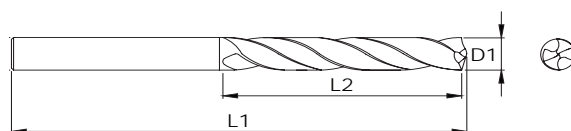
5X

## High speed steel straight shank jobber drill

HSS

DIN  
338

BF



Unit : mm

Diameter	EDP No	Flute Length	Overall Length
Ø D1		L2	L1
9.4	FBR0200085	81	125
9.5	FBR0200086	81	125
9.6	FBR0200087	87	133
9.7	FBR0200088	87	133
9.8	FBR0200089	87	133
9.9	FBR0200090	87	133
10.0	FBR0200091	87	133
10.1	FBR0200264	87	133
10.2	FBR0200092	87	133
10.3	FBR0200265	87	133
10.4	FBR0200266	87	133
10.5	FBR0200093	87	133
10.6	FBR0200141	87	133
10.7	FBR0200094	94	142
10.8	FBR0200095	94	142
10.9	FBR0200267	94	142
11	FBR0200096	94	142
11.1	FBR0200268	94	142
11.2	FBR0200269	94	142

Diameter	EDP No	Flute Length	Overall Length
Ø D1		L2	L1
11.3	FBR0200270	94	142
11.4	FBR0200271	94	142
11.5	FBR0200097	94	142
11.6	FBR0200272	94	142
11.7	FBR0200273	94	142
11.8	FBR0200098	94	142
11.9	FBR0200274	101	151
12	FBR0200099	101	151
12.1	FBR0200275	101	151
12.2	FBR0200276	101	151
12.3	FBR0200277	101	151
12.4	FBR0200278	101	151
12.5	FBR0200100	101	151
12.6	FBR0200142	101	151
12.7	FBR0200279	101	151
12.8	FBR0200280	101	151
12.9	FBR0200281	101	151
13.0	FBR0200101	101	151



High Speed Steel Drills

HSS TAPS

DIES

END MILLS

DRILLS

CARBIDE BURRS

CS TAPS

5X

## High speed steel straight shank jobber drill

HSS

DIN  
338

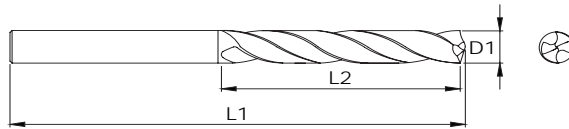


5X



30°

BF



Unit : mm

Diameter	EDP No	Flute Length	Overall Length
Ø D1		L2	L1
1/16"	FBR0200158	20	43
5/64"	FBR0200159	24	49
3/32"	FBR0200160	30	57
7/64"	FBR0200103	33	61
1/8"	FBR0200102	36	65
9/64"	FBR0200104	39	70
5/32"	FBR0200105	43	75
11/64"	FBR0200106	47	80
3/16"	FBR0200107	52	86
13/64"	FBR0200109	52	86
7/32"	FBR0200161	57	93
15/64"	FBR0200282	57	93
1/4"	FBR0200108	63	101
17/64"	FBR0200110	69	109
9/32"	FBR0200162	69	109
19/64"	FBR0200163	75	117
5/16"	FBR0200111	75	117

Diameter	EDP No	Flute Length	Overall Length
Ø D1		L2	L1
21/64"	FBR0200112	75	117
11/32"	FBR0200164	81	125
23/64"	FBR0200165	81	125
3/8"	FBR0200113	87	133
25/64"	FBR0200283	87	133
13/32"	FBR0200284	87	133
27/64"	FBR0200285	94	142
7/16"	FBR0200114	94	142
29/64"	FBR0200286	94	142
15/32"	FBR0200287	101	151
31/64"	FBR0200288	101	151
1/2"	FBR0200115	101	151



High Speed Steel Drills

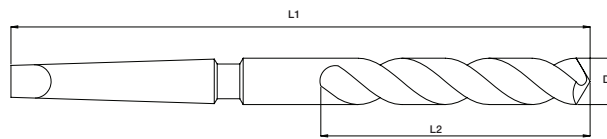
## High speed steel morse taper shank drill

HSS

DIN  
345



BF



Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Morse Taper Shank Number
ØD1		L2	L1	
8	FBR0200198	75	156	MT-1
8.5	FBR0200199	75	156	MT-1
9	FBR0200200	81	162	MT-1
9.5	FBR0200201	81	162	MT-1
10	FBR0200204	87	168	MT-1
10.5	FBR0200206	87	168	MT-1
11	FBR0200208	94	175	MT-2
11.5	FBR0200210	94	175	MT-2
12	FBR0200116	101	182	MT-2
12.5	FBR0200212	101	182	MT-2
13	FBR0200117	101	182	MT-2
13.5	FBR0200214	108	189	MT-2
14	FBR0200119	108	189	MT-2
14.5	FBR0200216	114	212	MT-2
15	FBR0200121	114	212	MT-2
15.5	FBR0200217	120	218	MT-2
16	FBR0200123	120	218	MT-2
16.5	FBR0200218	125	223	MT-2
17	FBR0200219	125	223	MT-2
17.5	FBR0200220	130	228	MT-2

Diameter	EDP No	Flute Length	Overall Length	Morse Taper Shank Number
ØD1		L2	L1	
18	FBR0200125	130	228	MT-2
18.5	FBR0200221	135	233	MT-2
19	FBR0200126	135	233	MT-2
19.50	FBR0200222	140	238	MT-2
20	FBR0200128	140	238	MT-2
20.5	FBR0200223	145	243	MT-2
21	FBR0200130	145	243	MT-2
21.5	FBR0200224	150	248	MT-2
22	FBR0200308	150	248	MT-2
22.5	FBR0200309	155	253	MT-2
23	FBR0200225	155	253	MT-2
23.5	FBR0200226	155	276	MT-2
24	FBR0200132	160	281	MT-2
24.5	FBR0200227	160	281	MT-2
25	FBR0200133	160	281	MT-2
25.5	FBR0200228	165	286	MT-2
26	FBR0200135	165	286	MT-2
26.5	FBR0200229	165	286	MT-3
27	FBR0200230	170	291	MT-3
27.5	FBR0200231	170	291	MT-3



High Speed Steel Drills

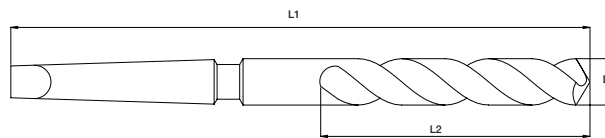
## High speed steel morse taper shank drill

HSS

DIN  
345



BF



Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Morse Taper Shank Number
ØD1		L2	L1	
28	FBR0200136	170	291	MT-3
28.5	FBR0200232	175	296	MT-3
29	FBR0200137	175	296	MT-3
29.5	FBR0200310	175	296	MT-3
30	FBR0200139	175	296	MT-3
30.5	FBR0200233	180	301	MT-3
31	FBR0200234	180	301	MT-3
31.5	FBR0200235	180	301	MT-3
32	FBR0200140	185	334	MT-3
32.5	FBR0200236	185	334	MT-3
33	FBR0200237	185	334	MT-3
33.5	FBR0200238	185	334	MT-3
34	FBR0200239	190	339	MT-3
34.5	FBR0200240	190	339	MT-3
35	FBR0200241	190	339	MT-3
35.5	FBR0200242	190	339	MT-3
36	FBR0200243	195	344	MT-3
36.5	FBR0200244	195	344	MT-3
37	FBR0200245	195	344	MT-3
37.5	FBR0200246	195	344	MT-3

Diameter	EDP No	Flute Length	Overall Length	Morse Taper Shank Number
ØD1		L2	L1	
38	FBR0200247	200	349	MT-3
38.5	FBR0200248	200	349	MT-3
39	FBR0200249	200	349	MT-3
39.5	FBR0200250	200	349	MT-3
40	FBR0200251	200	349	MT-3
40.5	FBR0200252	205	354	MT-3
41	FBR0200253	205	354	MT-3
41.5	FBR0200254	205	354	MT-3
42	FBR0200255	205	354	MT-3
43	FBR0200256	210	359	MT-3
44	FBR0200257	210	359	MT-3
45	FBR0200258	210	359	MT-3
46	FBR0200259	215	364	MT-3
47	FBR0200260	215	364	MT-3
48	FBR0200261	220	369	MT-3
49	FBR0200262	220	369	MT-3
50	FBR0200263	220	369	MT-4

HSS TAPS

DIES

END MILLS

DRILLS

CARBIDE BURRS

CS TAPS



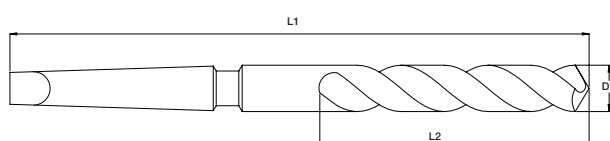
High Speed Steel Drills

## High speed steel morse taper shank drill

HSS

DIN  
345

BF



Unit : mm

Diameter	EDP No	Flute Length	Overall Length	Morse Taper Shank Number
ØD1		L2	L1	
3/8"	FBR0200202	87	168	MT-1
25/64"	FBR0200203	87	168	MT-1
13/32"	FBR0200205	87	168	MT-1
27/64"	FBR0200207	94	175	MT-2
7/16"	FBR0200209	94	175	MT-2
15/32"	FBR0200211	101	182	MT-2
1/2"	FBR0200118	101	182	MT-2
17/32"	FBR0200213	108	189	MT-2
35/64"	FBR0200215	108	189	MT-2
9/16"	FBR0200120	114	212	MT-2
5/8"	FBR0200122	120	218	MT-2
11/16"	FBR0200124	130	228	MT-2
3/4"	FBR0200127	140	238	MT-2
13/16"	FBR0200129	145	243	MT-2
7/8"	FBR0200131	150	248	MT-2
1"	FBR0200134	165	286	MT-2
1.1/8"	FBR0200138	175	296	MT-3



# DRILLS



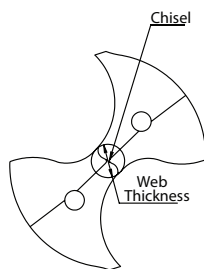
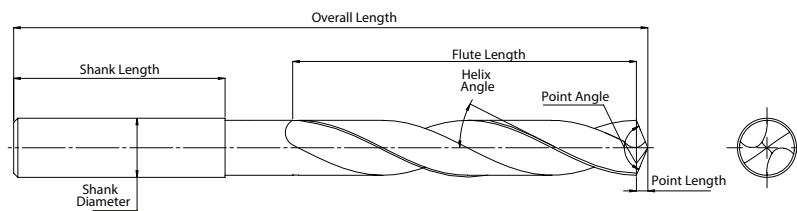
High Performance Cutting Tools



## TECHINICAL DETAILS



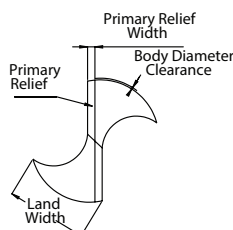
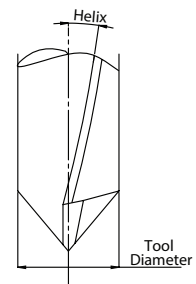
## SOLID CARBIDE DRILL NOMENCLATURE



**Chisel Edge** – The non-cutting tip of the drill. Pushes, rather than cuts material. Having a smaller chisel means that a tool will cut more aggressively. A larger chisel means that a tool will be stronger.

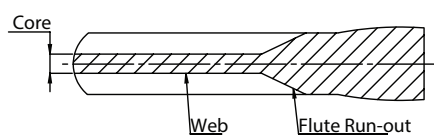
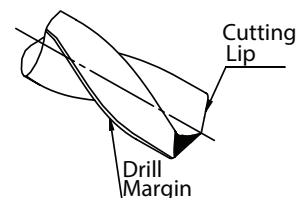
**Web** – The core of the drill that is left from the fluting operation. A thicker web means added rigidity, while a smaller web means more chip evacuation. On two flute drills, typically varies from 16% - 30% of the tool diameter.

**Helix Angle** - Varies from 0° to 35° helix on standard tools. Lower helix angle means more rigidity and strength and a higher helix angle means more aggressive drilling and better chip evacuation.



**Margin Width** – Provides a surface to support the drill inside the hole during the drilling operation. Totem® offers both single margin and double margin geometries. Margin widths are a balancing act between friction build-up vs. tool support in the drilling operation.

**Cutting Lip** - The cutting edges of a two flute drill extending from the chisel edge to the periphery.



**Land Width** – The amount of material left on the drill per side, from the fluting operation. Larger land widths mean more rigidity, while smaller land widths allow for better chip evacuation.

Having a problem with drill geometries? Circle the area where the problem exists.  
Include a detailed explanation of the issue and mail to [sales@forbes.co.in](mailto:sales@forbes.co.in)



## FEED RATE CHART

### Series 2TDSS/2TDSR METRIC

Workpiece Material Group		Material	SMM	Tool Diameter					
				3	6	10	12	16	20
				mm/rev					
Steels	P	Low Carbon Steels 1018/12L14	105-125	.102-.152	.152-.229	.229-.279	.254-.330	.279-.381	.305-.432
		Alloy Steels (up to 35 Rc) 4140/A2/D2/400	85-105						
		Alloy Steels (36-45 Rc) 4140/A2/D2	50-65						
Cast Irons	K	Gray Cast Iron A48, Class 20/G4000 405-500	125-150	.102-.152	.152-.229	.229-.279	.254-.330	.279-.381	.305-.432
		Ductile Cast Iron 60-40-18	95-115						
Austenitic	M	304/316	40-60	.102-.152	.152-.229	.229-.279	.254-.330	.279-.381	.305-.432
Precipitation Hardened Stainless Steels	M	17-4 PH	30-50	.051-.076	.102-.152	.127-.229	.152-.254	.229-.305	.254-.356
		13-8 PH							
Special Alloys	S	Titanium	45	0.025	0.064	0.102	0.127	0.152	0.191
		6AL-4V							
		Cobalt-Based Alloys	15						
		Stellite, Haynes 25/188							
		Nickel-Based Alloys	25						
		Inconel 625/718							
		Iron-Based Alloys							
		Incoloy 800-802/Multimet	30						
		High Nickel Alloys							
Monel									

#RPM = SMM x 318.057/Tool Dia.

#mm/min = RPM x mm/rev

### Series 2TDSS/2TDSR INCH

Workpiece Material Group		Material	SFM	Tool Diameter					
				1/8	1/4	3/8	1/2	5/8	3/4
				IPR					
Steels	P	Low Carbon Steels 1018/12L14	345-405	.0038- .0063	.0063- .0088	.0088- .0110	.0100- .0125	.0110- .0150	.0120- .0170
		Alloy Steels (up to 35 Rc) 4140/A2/D2/400	280-350						
		Alloy Steels (36-45 Rc) 4140/A2/D2	170-210						
Cast Irons	K	Gray Cast Iron A48, Class 20/G4000 405-500	315-375	.0038- .0063	.0063- .0088	.0088- .0110	.0100- .0125	.0110- .0150	.0120- .0170
		Ductile Cast Iron 60-40-18							
Austenitic	M	304/316	125-190	.0038- .0063	.0063- .0088	.0088- .0110	.0100- .0125	.0110- .0150	.0120- .0170
Precipitation Hardened Stainless Steels	M	17-4 PH	95-155	.0019- .0031	.0038- .0063	.0050- .0088	.0063- .0100	.0088- .0120	.0100- .0140
		13-8 PH							
Special Alloys	S	Titanium	150	0.001	0.0025	0.004	0.005	0.006	0.0075
		6AL-4V							
		Cobalt-Based Alloys	40						
		Stellite, Haynes 25/188							
		Nickel-Based Alloys	80						
		Inconel 625/718							
		Iron-Based Alloys							
		Incoloy 800-802/Multimet	100						
		High Nickel Alloys							
Monel									

#RPM = SFM x 3.82/Tool Dia.

#IPM = RPM x IPR

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.



## TECHNICAL DETAILS

### FEED RATE CHART

#### Series 2TDCR METRIC

Workpiece Material Group		Material	SMM	Tool Diameter					
				3	6	10	12	16	20
				mm/rev					
Steels	P	Low Carbon Steels 1018/12L14	150-190	.102-.152	.152-.229	.229-.279	.254-.330	.279-.381	.305-.432
		Alloy Steels (up to 35 Rc) 4140/A2/D2/400	95-130						
		Alloy Steels (36-45 Rc) 4140/A2/D2	60-75	.051-.076	.102-.152	.127-.229	.152-.254	.229-.305	.254-.356
Cast Irons	K	Gray Cast Iron A48, Class 20/G4000 405-500	150-190	.102-.152	.152-.229	.229-.279	.254-.330	.279-.381	.305-.432
		Ductile Cast Iron 60-40-18	106-129						
Austenitic	M	304/316	65-95	.102-.152	.152-.229	.229-.279	.254-.330	.279-.381	.305-.432
Precipitation Hardened Stainless Steels	M	17-4 PH	45-65	.051-.076	.102-.152	.127-.229	.152-.254	.229-.305	.254-.356
		13-8 PH							
Special Alloys	S	Titanium	55	0.025	0.064	0.102	0.127	0.152	0.191
		6AL-4V							
		Cobalt-Based Alloys	15						
		Stellite, Haynes 25/188							
		Nickel-Based Alloys	30						
		Inconel 625/718							
		Iron-Based Alloys							
		Incoloy 800-802/Multimet	35						
		High Nickel Alloys							
Monel									

$$\#RPM = SMM \times 318.057 / \text{Tool Dia.}$$

$$\#mm/min = RPM \times mm/rev$$

#### Series 2TDCR INCH

Workpiece Material Group		Material	SFM	Tool Diameter					
				1/8	1/4	3/8	1/2	5/8	3/4
				IPR					
Steels	P	Low Carbon Steels 1018/12L14	500-625	.0038- .0063	.0063- .0088	.0088- .0110	.0100- .0125	.0110- .0150	.0120- .0170
		Alloy Steels (up to 35 Rc) 4140/A2/D2/400	315-435						
			Alloy Steels (36-45 Rc) 4140/A2/D2	190-250	.0019- .0031	.0038- .0063	.0050- .0088	.0063- .0100	.0088- .0120
Cast Irons	K	Gray Cast Iron A48, Class 20/G4000 405-500	500-625	.0038- .0063	.0063- .0088	.0088- .0110	.0100- .0125	.0110- .0150	.0120- .0170
		Ductile Cast Iron 60-40-18	350-425						
Austenitic	M	304/316	220-315	.0038- .0063	.0063- .0088	.0088- .0110	.0100- .0125	.0110- .0150	.0120- .0170
Precipitation Hardened Stainless Steels	M	17-4 PH	155-220	.0019- .0031	.0038- .0063	.0050- .0088	.0063- .0100	.0088- .0120	.0100- .0140
		13-8 PH							
Special Alloys	S	Titanium	180	0.001	0.0025	0.004	0.005	0.006	0.0075
		6AL-4V							
		Cobalt-Based Alloys	50						
		Stellite, Haynes 25/188							
		Nickel-Based Alloys	95						
		Inconel 625/718							
		Iron-Based Alloys							
		Incoloy 800-802/Multimet	120						
		High Nickel Alloys							
Monel									

$$\#RPM = SFM \times 3.82 / \text{Tool Dia.}$$

$$\#IPM = RPM \times IPR$$

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.



## FEED RATE CHART

### Series 2TDCL METRIC

Workpiece Material Group		Material	SMM	Tool Diameter (mm)					
				3	6	10	12	16	19
				mm/rev					
Steels	P	Low Carbon Steels 1018/12L14	160-180	.102-.152	.152-.229	.229-.279	.254-.330	.279-.381	.305-.432
		Alloy Steels (up to 35 Rc) 4140/A2/D2/400	85-115						
		Alloy Steels (36-45 Rc) 4140/A2/D2	50-70						
Cast Irons	K	Gray Cast Iron A48, Class 20/G4000 405-500	160-180	.102-.152	.152-.229	.229-.279	.254-.330	.279-.381	.305-.432
		Ductile Cast Iron 60-40-18	106-129						
Austenitic	M	304/316	55-85	.102-.152	.152-.229	.229-.279	.254-.330	.279-.381	.305-.432
Precipitation Hardened Stainless Steels	M	17-4 PH	40-60	.051-.076	.102-.152	.127-.229	.152-.254	.229-.305	.254-.356
		13-8 PH							
Special Alloys	S	Titanium	55	0.025	0.064	0.102	0.127	0.152	0.191
		6AL-4V							
		Cobalt-Based Alloys	15						
		Stellite, Haynes 25/188							
		Nickel-Based Alloys	30						
		Inconel 625/718							
		Iron-Based Alloys							
		Incoloy 800-802/Multimet	35						
		High Nickel Alloys							
Monel									

$$\#RPM = SMM \times 318.057 / \text{Tool Dia.}$$

$$\#mm/min = RPM \times mm/rev$$

### Series 2TDCL INCH

Workpiece Material Group		Material	SFM	Tool Diameter (inch)					
				1/8	1/4	3/8	1/2	5/8	3/4
				IPR					
Steels	P	Low Carbon Steels 1018/12L14	530-595	.0038- .0063	.0063- .0088	.0088- .0110	.0100- .0125	.0110- .0150	.0120- .0170
		Alloy Steels (up to 35 Rc) 4140/A2/D2/400	280-375						
		Alloy Steels (36-45 Rc) 4140/A2/D2	170-225						
Cast Irons	K	Gray Cast Iron A48, Class 20/G4000 405-500	530-590	.0038- .0063	.0063- .0088	.0088- .0110	.0100- .0125	.0110- .0150	.0120- .0170
		Ductile Cast Iron 60-40-18	350-425						
Austenitic	M	304/316	185-280	.0038- .0063	.0063- .0088	.0088- .0110	.0100- .0125	.0110- .0150	.0120- .0170
Precipitation Hardened Stainless Steels	M	17-4 PH	125-190	.0019- .0031	.0038- .0063	.0050- .0088	.0063- .0100	.0088- .0120	.0100- .0140
		13-8 PH							
Special Alloys	S	Titanium	180	0.001	0.0025	0.004	0.005	0.006	0.0075
		6AL-4V							
		Cobalt-Based Alloys	50						
		Stellite, Haynes 25/188							
		Nickel-Based Alloys	95						
		Inconel 625/718							
		Iron-Based Alloys							
		Incoloy 800-802/Multimet	120						
		High Nickel Alloys							
Monel									

$$\#RPM = SFM \times 3.82 / \text{Tool Dia.}$$

$$\#IPM = RPM \times IPR$$

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.



## FEED RATE CHART

### Series F224/F226 METRIC

Workpiece Material Group		Material	SMM		Tool Diameter (mm)					
			F224	F226	3	6	10	12	20	25
			IPR							
Steels	P	Low Carbon Steels 1018/12L14	55	55	0.127	0.152	0.2	0.254	0.305	0.356
		Alloy Steels (up to 35 Rc) 4140/A2/D2/400	50	50						
		Alloy Steels (36-45 Rc) 4140/A2/D2	45	45	0.127	0.152	0.2	0.254	0.305	0.356
Cast Irons	K	Gray Cast Iron A48, Class 20/G4000 405-500	40	40	0.127	0.152	0.2	0.254	0.305	0.356
		Ductile Cast Iron 60-40-18	55	55						
Austenitic	M	304/316	85	85	0.127	0.152	0.2	0.254	0.305	0.356
Precipitation Hardened Stainless Steels	M	17-4 PH	30	30	0.127	0.152	0.2	0.254	0.305	0.356
		13-8 PH								
Non Ferrous	N	Plastic	120	120	0.05	0.076	0.1	0.152	0.225	0.25
		Kevlar/Graphite	120	120	0.05	0.076	0.1	0.152	0.225	0.25

$$\#RPM = SMM \times 318.057 / \text{Tool Dia.}$$

$$\#mm/min = RPM \times mm/rev$$

### Series F224/F226 INCH

Workpiece Material Group		Material	SFM		Tool Diameter (inch)					
			F224	F226	1/8	1/4	3/8	1/2	3/4	1
			IPR							
Steels	P	Low Carbon Steels 1018/12L14	175	175	0.004	0.006	0.008	0.01	0.012	0.014
		Alloy Steels (up to 35 Rc) 4140/A2/D2/400	165	165						
		Alloy Steels (36-45 Rc) 4140/A2/D2	150	150	0.004	0.006	0.008	0.01	0.012	0.014
Cast Irons	K	Gray Cast Iron A48, Class 20/G4000 405-500	275	275	0.004	0.006	0.008	0.01	0.012	0.014
		Ductile Cast Iron 60-40-18	175	175						
Austenitic	M	304/316	135	135	0.004	0.006	0.008	0.01	0.012	0.014
Precipitation Hardened Stainless Steels	M	17-4 PH	100	100	0.004	0.006	0.008	0.01	0.012	0.014
		13-8 PH								
Non Ferrous	N	Plastic	400	400	0.002	0.004	0.006	0.008	0.01	0.012
		Kevlar/Graphite	400	400	0.002	0.004	0.006	0.008	0.01	0.012

$$\#RPM = SFM \times 3.82 / \text{Tool Dia.}$$

$$\#IPM = RPM \times IPR$$



## DRILL TROUBLESHOOTING

		Tool Deterioration													Chip Formation		
	Problem	Flank wear	Margin wear	Breakage	Flaking	Creater wear	Chisel edge wear	Corner chipping	Flute chipping	Cutting edge chipping	Cutting edge wear	Point center chipping	Rake face	Scoring on tool body	Long stringy	Varied chip form	Blue/brown chips
Speed & Feed	Reduce feed or reduce at exit	X		X			X	X	X	X		X	X	X			
	Reduce feed at entrance			X													
	Consistent feed rate			X											X	X	
	Increase feed	X					X								X		
	Reduce speed	X	X			X		X			X						
	Increase speed										X						
Coolant	Coolant mix		X	X	X					X				X			
	Coolant increase flow	X		X			X	X		X							X
	Coolant filter	X		X	X					X							
Setup	Workpiece clamp rigid		X	X			X	X		X				X			
	Collet accuracy			X						X							
	Tool holder fit .0008			X						X							
	Alignment			X						X							
	Peck drill			X													
	Concentricity		X	X	X			X	X					X			
	Do not extract tool during peck							X									

		Tool Life	Workpiece								Process						
	Problem	Tool Life	Undersized hole	Oversized hole	Poor alignment	Poor surface finish	Heavy burr breakout	Retract marks	Hole location	Hole straightness	Deflection	Point Deflection	Galling	Vibration	Abnormal noise	Chip packing	No drill penetration
Speed & Feed	Reduce feed or reduce at exit	X	X	X		X	X			X						X	
	Reduce feed at entrance		X			X			X		X			X		X	
	Consistent feed rate															X	
	Increase feed		X	X									X		X		
	Reduce speed	X	X													X	
	Increase speed					X											
Coolant	Coolant mix	X	X			X	X									X	
	Coolant increase flow	X	X			X	X									X	
	Coolant filter	X	X			X	X									X	
Setup	Workpiece clamp rigid	X		X	X	X	X	X	X	X							X
	Collet accuracy			X					X	X				X			
	Tool holder fit .0008			X					X	X				X			
	Alignment			X													X
	Peck drill																
	Concentricity				X	X		X	X	X		X		X			
	Do not extract tool during peck																

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.



## DRILL TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
Hole expansion	Run out of drill when attached to the machine	Check holder and/or select another one
	Loose hold	Check run out after fixing to the chuck
	Non-symmetric point angle	Regrind correctly
	Different lip height	Check preciseness after reground
	Run out of chisel edge	
Irregular hole size	Non-symmetric point angle	Regrind correctly
	Large lip height	Check precision after regrind
	Run out of chisel edge	
	Margin wear is large	
	Large run out after attached to the machine	Check holder and select another one
	Loose hold	Check run out after fixing to the chuck
	Low work holding rigidity	
	Feed rate to high	Decrease feed rate
	Not enough lubrication	Use drill with an oil hole
Low position accuracy	Large run out when attached to the machine	Check holder and/or select another one
		Check run out after fixing to the collet
	Large spindle run out	Select more rigid tool and machine
	Run out when cutting material	Select more rigid tool and machine
		Increase work clamping rigidity
		Select a low cutting resistance thinning
		Use centering
		Work piece should be horizontal
Hole perpendicularity		Use a drill bush
	Excessive tool wear	Regrind
	Low position accuracy	Increase position accuracy
	Non-symmetric point angle	Regrind correctly
	Large lip height	Check precision after regrinding
	Run out of chisel edge	
	Not enough drill rigidity	Increase drill rigidity
	Drilling surface is not horizontal	Work piece must be horizontal
Bad cylindrical accuracy	Poor alignment	Make a center hole. Check alignment
	Non-symmetric point angle	Regrind correctly
		Check precision after regrinding
	Large lip height	
	Run out of chisel edge	
	Large run out after attached to machine	Check holder and/or select another one
	Loose hold	Check run out after fixing to the chuck
	Low work holding rigidity	
	Relief angle is too large	Regrind correctly
	Low drill rigidity	Use larger web drills



## DRILL TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
Poor surface finish	Poor regrinding	Take off all the wear
	Not suitable coolant for the material	Change supply method; increase volume
	Not enough coolant	Select higher coolant quality
	Large run out after attached to machine	Check holder and/or select another one
	Loose hold	Check run out after fixing to the chuck
	Feed rate is too high	Reduce feed rate
	Excessive tool wear	Regrind correctly
	Build up on margin is too large	Select a coated tool
	Chip packing	Select suitable drill (wide flute, high helix oil hole drill). Change cutting conditions (feed rate or adopt step drilling)
Bad cylindrical shape	Non-symmetric point angle	Regrind correctly
	Large lip height	Check precision after regrinding
	Run out of chisel edge	
	Large margin wear	
	Feed rate is too low	Increase the feed rate
Chipping of corner edge	In appropriate tool material	Choose suitable tool material
	Uneven hardness distribution on the work material	Iso static treatment
		Change tool, material & cutting conditions, machining method
	Cutting or feed speed is too high	Reduce cutting speed or feed
	Not enough coolant	Change lubrication method
Chipping of cutting edge	Large run out after attached to machine	Check holder and/or select another one
		Check run out after fixing to the collet
	Relief angle is too small	Regrind correctly
	Tool material is not suitable	Choose suitable tool material
	Cutting speed or feed is too high	Reduce cutting speed or feed
Abnormal wear on corner part	Too late regrinding	Regrind after a shorter time of use
	Bad alignment	Check/adjust the alignment
	Cutting speed too high	Decrease the cutting speed
	Point dimensions are not suitable	Select correct point dimensions
	Tool materials not suitable	Choose suitable tool material
	Coolant is not suitable	Change coolant
Large wear and chipping, crushing of the chisel edge	Feed rate is too large	Decrease feed rate
	Point dimensions are not suitable	Select correct point dimensions
	Tool materials is not suitable	Choose suitable tool material
	Relief angle is too small	Increase relief angle
Chipping of margin	Bush diameter is too small	Select correct bush diameter or select drill with chip breakers
	Chip packing between drill & bush	
Margin built-up	High heat generation due to large wear on the cutting edge	Regrind
	Lubrication is insufficient	Change lubrication method
	Coolant is not suitable	Change coolant
	Bad chip ejection	Change drill or the cutting conditions
	Ductile material	



## TABLE OF CUTTING SPEEDS - FRACTIONAL SIZE DRILLS - HSS DRILL

Ft/.min	50	60	70	80	100
M/.min	15	18	21	24	30
Drill dia "'inch'	Revolutions Per Minute				
1/64"	12224	14656	17088	19520	24448
1/32"	6112	7328	8544	9760	12224
3/64"	4064	4896	5696	6528	8160
1/16"	3056	3664	4272	4880	6112
5/64"	2448	2928	3424	3904	4896
3/32"	2032	2448	2848	3264	4080
1/8"	1528	1832	2136	2440	3056
5/32"	1224	1464	1712	1952	2448
3/16"	1016	1224	1424	1632	2040
7/32"	872	1048	1224	1400	1744
1/4"	764	916	1068	1220	1528
5/16"	612	732	856	976	1224
3/8"	508	612	712	816	1020
7/16"	436	524	612	700	872
1/2"	382	458	534	670	764
9/16"	340	408	476	544	680
5/8"	306	366	428	488	612
11/16"	278	334	388	444	556
3/4"	254	306	356	408	510
13/16"	234	282	330	376	470
7/8"	218	262	306	350	436
15/16"	204	244	286	326	408
1"	191	229	267	305	382
1-2/8"	170	204	238	272	340
1-1/4"	153	183	214	244	306
1-1/2"	127	153	178	204	255
1-3/4"	109	131	153	175	218
2"	95	114	133	152	191
2-1/4"	85	102	119	136	170
2-1/2"	76	92	107	122	153
2-3/4"	69	83	97	111	139
3"	64	76	89	102	127
4"	48	57	67	76	95

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.



## TABLE OF CUTTING SPEEDS - METRIC SIZE DRILLS - HSS DRILL

Ft./min	50	60	70	80	100
M/.min	15	18	21	24	30
Drill dia "mm'	Revolutions Per Minute				
0.5	9695	11634	13573	15512	19390
1	4847	5817	6786	7756	9695
1.5	3237	3884	4532	5179	6474
2	2427	2912	3397	3883	4854
2.5	1941	2329	2717	3105	3882
3	1617	1940	2264	2587	3234
4	1213	1455	1698	1940	2425
5	970	1164	1359	1553	1941
6	808	970	1132	1294	1617
7	693	832	970	1109	1386
8	606	728	849	970	1213
9	539	647	755	862	1078
10	485	582	679	776	970
11	441	529	617	706	882
12	404	485	566	647	808
13	373	448	522	597	746
14	346	416	485	554	693
15	323	388	453	554	693
16	303	364	424	485	606
17	285	342	399	456	571
18	269	323	377	431	539
19	255	306	357	408	511
20	242	291	340	388	485
21	231	277	323	370	462
22	220	265	309	353	441
23	211	253	295	337	422
24	202	242	283	323	404
25	194	233	272	310	388
26	186	224	261	298	373
27	180	216	252	287	359
30	162	194	226	259	323
33	147	176	206	235	294
36	135	162	189	216	270
39	124	149	174	199	249
42	116	139	162	185	231
45	108	129	151	172	216
48	101	121	141	162	202
51	95	114	133	152	190
56	87	104	121	139	173
61	80	95	111	127	159
65	75	90	104	119	149

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.



## FEEDS FOR HSS TWIST DRILLS

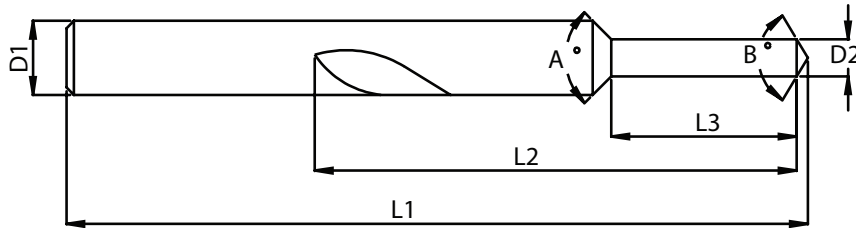
Drills dia inch	Feed / rev inch	Drill dia inch	Feed mm / Rev
1/16 - 3/32	.0015 - .0025	1.6 - 3.0	0.04 - 0.06
1/8 - 5/32	.002 - .004	3.0 - 4.0	0.05 - 0.10
3/16 - 7/32	.003 - .006	4.0 - 5.5	0.075 - 0.15
1/4 - 5/16	.004 - .008	5.5 - 8.0	0.10 - 0.20
3/8 - 7/16	.006 - 0.10	8.0 - 11.0	0.15 - 0.25
1/2 - 9/16	.008 - .012	11.0 - 14.5	0.20 - 0.30
5/8 - 11/16	.009 - .013	14.5 - 17.5	0.23 - 0.33
3/4 - 13/16	.010 - .014	17.5 - 20.5	0.25 - 0.36
7/8 - 15/16	.011 - .015	20.5 - 24.0	0.28 - 0.38
1 - 1.1/8	.012 - .016	24.0 - 28.5	0.30 - 0.40
1.1/4 - 1.1/2	.014 - .018	28.5 - 38.0	0.35 - 0.45
over 1.1/2	.016 - .020	over 38.0	0.40 - 0.50*
1/16 - 3/32	.002 - .0035	1.6 - 3.0	0.05 - 0.09
1/8 - 5/32	.0025 - .006	3.0 - 4.0	0.06 - 0.015
3/16 - 7/32	.004 - .009	4.0 - 5.5	0.10 - 0.23
1/4 - 5/16	.005 - .012	5.5 - 8.0	0.125 - 0.30
3/8 - 7/16	.0075 - .015	8.0 - 11.0	0.19 - 0.38
1/2 - 9/16	.010 - .018	11.0 - 14.5	0.25 - 0.45
5/8 - 11/16	.011 - .020	14.5 - 17.5	0.28 - 0.50
3/4 - 13/16	.0125 - .021	17.5 - 20.5	0.31 - 0.53
7/8 - 15/16	.0135 - .022	20.5 - 24.0	0.34 - 0.56
1 - 1.1/8	.015 - .024	24.0 - 28.5	0.38 - 0.60
1.1/4 - 1.1/2	.0175 - .027	28.5 - 38.0	0.44 - 0.68
over 1.1/2	.020 - .030	over 38.0	0.50 - 0.75



## CUSTOM TOOL REQUEST FORM

Fill in information requested on drawing.  
(\*Required Fields)

☐ Request Approval Drawing



A = \_\_\_\_\_  
B = \_\_\_\_\_  
D1 = \_\_\_\_\_  
D2 = \_\_\_\_\_  
L1 = \_\_\_\_\_  
L2 = \_\_\_\_\_  
L3 = \_\_\_\_\_

**\*Material**

- ☐ Solid Carbide  
☐ Carbide Coolant Thru

**\*Number of Flutes**

- ☐ Solid Carbide  
☐ Carbide Coolant Thru

**\*Margin Style**

- ☐ Single  
☐ Double

**\*Margin Style**

- ☐ Cutting  
☐ Non-Cutting

**\*Flute Form**

- ☐ Straight  
☐ Helical \_\_\_\_\_ °Helix on Major Dia.

**\*Coating**

- ☐ TiN  
☐ TiCN  
☐ TiAlN  
☐ None  
Other \_\_\_\_\_

**Note:**

This information enables us to engineer and manufacture a tool for your specific requirements.

Customer Name: \_\_\_\_\_

Phone: \_\_\_\_\_

\* Work Material Machined: \_\_\_\_\_

Hardness: \_\_\_\_\_

Distributor: \_\_\_\_\_

Quantities: \_\_\_\_\_



## TRIAL TOOL RESULTS FORM

Customer Name		Ref No.	
Address		Date	
		Sales Engineer Name:	
		Contact No.:	
Contact Person :		Trial PO OA No:	
<b>Tool Diameter :</b>			
<b>Component Details:</b>		<b>Operation Details:</b>	
Name		Drilling Depth	
Material		No. of Holes/ Component	
Material Hardness		Drill Dia	
Machine Make /Model/No.		No. of Pecking	
Tool No.		Tol/Finish required :	
<b>Machining Details :</b>			
<b>Parameters</b>	<b>Existing</b>	<b>Trial 1</b>	
Holding			
M/c. Type			
Cycle Time			
Coolant			
Coolant Press.			
<b>Tool Data:</b>			
<b>Parameters</b>	<b>Existing</b>	<b>Trial 1</b>	<b>Regrinding Trial</b>
Make			
Ext/Thru cool			
Cutting Speed (Vc) m/min			
RPM			
Feed			
Depth of cut			
Life Obtained (TIME)			
Kind of Failure			
<b>Cost Data:</b>			
Tool Cost (Rs.)			
Cost/Component (Rs.)			
Remarks:-			
Customer Benefit:-1.			
Customer Benefit:-2.			

Sales Engineer  
FORBES & COMPANY LIMITED

Authorised Signatory  
CUSTOMER

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

## Deep Hole High Performance Drills

Introducing the latest Range of High Performance Solid Carbide Drills for Deep Hole Drilling.

Deep Hole through coolant Drills Tailor made to your specification with an industry proven High Performance Geometry with the latest coating technology and superior substrate with a high toughness and micrograin structure to ensure superior tool life and lesser breakage.

Application:- Oil Hole Drilling in Crankshaft

Material:- Forged Steel

Dia = 3.0-10,0mm

Length = 15D, 20D

Cutting conditions within a range of  $vc = 60-100$  m/min,  $fz = 0,10-0,25$  mm/rev



## Connecting Rod Bolt Hole High Performance Drills

Introducing the latest Range of High Performance Solid Carbide Drills for Con Rod Drilling

Through Coolant Step Drills as per Con Rod specification available with the latest coating combined with the latest High Performance Geometry, sub micron substrate and superior coating to give you the lowest cost per part

Application :- Connecting Rod Bolt Hole Drilling

Material:- Drop Forged Steel ( Heat Treated)

Dia - 3-32mm

Length- 5D, 8D, 10D

Cutting conditions within a range of  $vc = 60-100$  m/min,  $fz = 0,15-0,35$  mm/rev





## High Performance Custom Solution Drills

We have what you need....

Solid Carbide High Performance round tools tailor made to your specification based on your

application needs. Please contact our trained sales and application experts to come and study your application. We commit to deliver superior solutions with the lowest cost per part.



Industry

Aerospace, Automotive, Defense, Railways, General Engineering, Energy Equipments  
Dia 1.00- 32.00mm

Options :- Solid, Thorough Coolant 30 degree Helix, 40 Degree Helix, Axial Coolant Duct, Parallel Coolant Ducts

## High Performance Micro Drills



Automotive Fuel Injection  
Parts Common Rail Parts  
Turbo Charger Parts  
Steering Components  
Automatic Transmission  
Power Train Components

Precision Machining  
Jewellery Industry Spinnerets  
& Spin Plates Electronic  
Connector Parts Screw  
Machine components

AeroSpace Valve Bodies  
Thermocouples Integrated  
Sensors Interior Cabin  
Fixtures Fuel System  
Components Hydraulic &  
Pneumatic Parts Writing  
Instruments Ball Pen Tips

Medical  
Traumatology  
Medical Devices  
Bone Screws & Plate  
Surgical Suture Needles  
Orthopedics Components  
Dental, Implants & Bridges  
Watch Industry Watch  
Case Watch Plates Small  
Precision Parts Watch Link  
Components