



High Performance Cutting Tools



HIGH SPEED STEEL DRILLS

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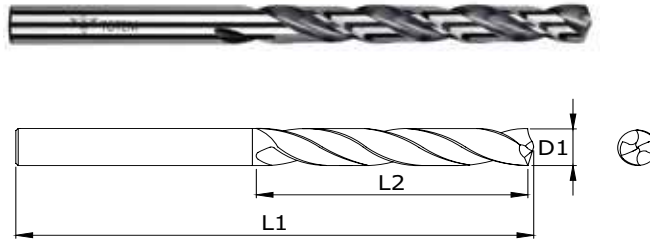


SERIES	MATERIAL	SURFACE FINISH	PAGES
Jobber	HSS	Bright	5.003
Stub	HSS	Bright	5.006
Long	HSS	Bright	5.009
Case Set	HSS	Bright	5.012
Jobber M35	HSS-E	Black & Gold	5.013
Reduced Shank	HSS	Blackened	5.016
Taper Shank	HSS	Bright	5.017
Taper Shank - Forged Flute	HSS	Bright	5.019
HSS Centre Drill	HSS	Bright	5.020
HSS Annular Cutter	HSS	Bright	5.022
TCT Annular Cutter	TCT	Bright	5.026



High Speed Steel Drills

HSS parallel shank twist drill - jobber series



Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
1.00		12	34	FBR0200001
1.10		14	36	FBR0200002
1.19	3/64"	16	38	FBR0200157
1.20		16	38	FBR0200003
1.30		16	38	FBR0200004
1.40		18	40	FBR0200005
1.50		18	40	FBR0200006
1.59	1/16"	20	43	FBR0200158
1.60		20	43	FBR0200007
1.70		20	43	FBR0200008
1.80		22	46	FBR0200009
1.90		22	46	FBR0200010
1.98	5/64"	24	49	FBR0200159
2.00		24	49	FBR0200011
2.10		24	49	FBR0200012
2.20		27	53	FBR0200013
2.30		27	53	FBR0200014
2.38	3/32"	30	57	FBR0200160
2.40		30	57	FBR0200015
2.50		30	57	FBR0200016
2.60		30	57	FBR0200017
2.70		33	61	FBR0200018
2.78	7/64"	33	61	FBR0200103
2.80		33	61	FBR0200019
2.90		33	61	FBR0200020
3.00		33	61	FBR0200021
3.10		36	65	FBR0200022
3.17	1/8"	36	65	FBR0200102
3.20		36	65	FBR0200023

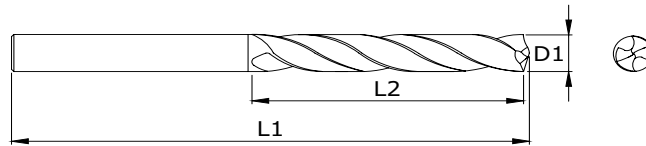
Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
3.30		36	65	FBR0200024
3.40		39	70	FBR0200025
3.50		39	70	FBR0200026
3.57	9/64"	39	70	FBR0200104
3.60		39	70	FBR0200027
3.70		39	70	FBR0200028
3.80		43	75	FBR0200029
3.90		43	75	FBR0200030
3.97	5/32"	43	75	FBR0200105
4.00		43	75	FBR0200031
4.10		43	75	FBR0200032
4.20		43	75	FBR0200033
4.30		47	80	FBR0200034
4.37	11/64"	47	80	FBR0200106
4.40		47	80	FBR0200035
4.50		47	80	FBR0200036
4.60		47	80	FBR0200037
4.70		47	80	FBR0200038
4.76	3/16"	52	86	FBR0200107
4.80		52	86	FBR0200039
4.90		52	86	FBR0200040
5.00		52	86	FBR0200041
5.10		52	86	FBR0200042
5.16	13/64"	52	86	FBR0200109
5.20		52	86	FBR0200043
5.30		52	86	FBR0200044
5.40		57	93	FBR0200045
5.50		57	93	FBR0200046
5.56	7/32"	57	93	FBR0200161

HSS DRILLS



High Speed Steel Drills

HSS parallel shank twist drill - jobber series



HSS DRILLS

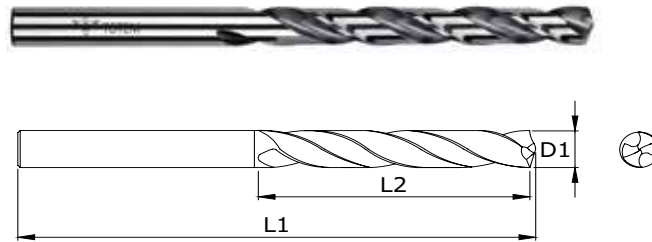
Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
5.60		57	93	FBR0200047
5.70		57	93	FBR0200048
5.80		57	93	FBR0200049
5.90		57	93	FBR0200050
5.95	15/64"	57	93	FBR0200282
6.00		57	93	FBR0200051
6.10		63	101	FBR0200052
6.20		63	101	FBR0200053
6.30		63	101	FBR0200054
6.35	1/4"	63	101	FBR0200108
6.40		63	101	FBR0200055
6.50		63	101	FBR0200056
6.60		63	101	FBR0200057
6.70		63	101	FBR0200058
6.75	17/64"	69	109	FBR0200110
6.80		69	109	FBR0200059
6.90		69	109	FBR0200060
7.00		69	109	FBR0200061
7.10		69	109	FBR0200062
7.14	9/32"	69	109	FBR0200162
7.20		69	109	FBR0200063
7.30		69	109	FBR0200064
7.40		69	109	FBR0200065
7.50		69	109	FBR0200066
7.54	19/64"	75	117	FBR0200163
7.60		75	117	FBR0200067
7.70		75	117	FBR0200068
7.80		75	117	FBR0200069
7.90		75	117	FBR0200070
7.94	5/16"	75	117	FBR0200111
8.00		75	117	FBR0200071

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
8.10		75	117	FBR0200072
8.20		75	117	FBR0200073
8.30		75	117	FBR0200074
8.33	21/64"	75	117	FBR0200112
8.40		75	117	FBR0200075
8.50		75	117	FBR0200076
8.60		81	125	FBR0200077
8.70		81	125	FBR0200078
8.73	11/32"	81	125	FBR0200164
8.80		81	125	FBR0200079
8.90		81	125	FBR0200080
9.00		81	125	FBR0200081
9.10		81	125	FBR0200082
9.13	23/64"	81	125	FBR0200165
9.20		81	125	FBR0200083
9.30		81	125	FBR0200084
9.40		81	125	FBR0200085
9.50		81	125	FBR0200086
9.52	3/8"	87	133	FBR0200113
9.60		87	133	FBR0200087
9.70		87	133	FBR0200088
9.80		87	133	FBR0200089
9.90		87	133	FBR0200090
9.92	25/64"	87	133	FBR0200283
10.00		87	133	FBR0200091
10.10		87	133	FBR0200264
10.20		87	133	FBR0200092
10.30		87	133	FBR0200265
10.32	13/32"	87	133	FBR0200284
10.40		87	133	FBR0200266
10.50		87	133	FBR0200093



High Speed Steel Drills

HSS parallel shank twist drill - jobber series



Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
10.60		87	133	FBR0200141
10.70		94	142	FBR0200094
10.72	27/64"	94	142	FBR0200285
10.80		94	142	FBR0200095
10.90		94	142	FBR0200267
11.00		94	142	FBR0200096
11.10		94	142	FBR0200268
11.11	7/16"	94	142	FBR0200114
11.20		94	142	FBR0200269
11.30		94	142	FBR0200270
11.40		94	142	FBR0200271
11.50		94	142	FBR0200097
11.51	29/64"	94	142	FBR0200286
11.60		94	142	FBR0200272
11.70		94	142	FBR0200273
11.80		94	142	FBR0200098
11.90		101	151	FBR0200274
11.91	15/32"	101	151	FBR0200287
12.00		101	151	FBR0200099
12.10		101	151	FBR0200275
12.20		101	151	FBR0200276
12.30		101	151	FBR0200277
12.30	31/64"	101	151	FBR0200288
12.40		101	151	FBR0200278
12.50		101	151	FBR0200100
12.60		101	151	FBR0200142
12.70	1/2"	101	151	FBR0200115
12.70		101	151	FBR0200279
12.80		101	151	FBR0200280
12.90		101	151	FBR0200281

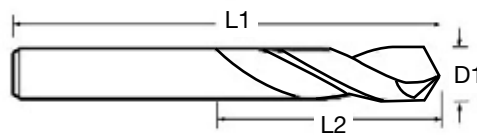
Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
13.00		101	151	FBR0200101
13.10	33/64"	101	151	FBR0200289
13.49	17/32"	108	160	FBR0200290
13.50		108	160	FBR0200143
13.89	35/64"	108	160	FBR0200291
14.00		108	160	FBR0200144
14.29	9/16"	114	169	FBR0200292
14.50		114	169	FBR0200145
14.68	37/64"	114	169	FBR0200293
15.00		114	169	FBR0200146
15.08	19/32"	120	178	FBR0200294
15.48	39/64"	120	178	FBR0200295
15.50		120	178	FBR0200147
15.87	5/8"	120	178	FBR0200296
16.00		120	178	FBR0200148
16.50		125	184	FBR0200149
16.67	21/32"	125	184	FBR0200297
17.00		125	184	FBR0200150
17.46	11/16"	125	184	FBR0200298
17.50		130	191	FBR0200151
18.00		130	191	FBR0200152
18.26	23/32"	135	198	FBR0200299
18.50		135	198	FBR0200153
19.00		135	198	FBR0200154
19.05	3/4"	140	205	FBR0200300
19.50		140	205	FBR0200155
18.84	25/32"	140	205	FBR0200301
20.00		140	205	FBR0200156
20.64	13/16"	140	205	FBR0200302

HSS DRILLS



High Speed Steel Drills

HSS parallel shank twist drill - stub series



HSS DRILLS

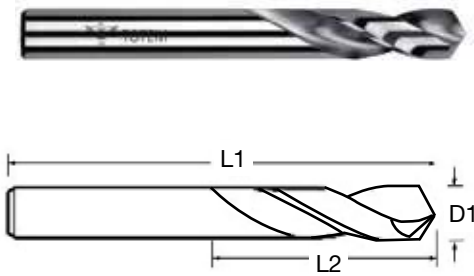
Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
1.00		6	26	FBR0200313
1.10		7	28	FBR0200314
1.19	3/64"	8	30	FBR0200940
1.20		8	30	FBR0200315
1.30		8	30	FBR0200316
1.40		9	32	FBR0200317
1.50		9	32	FBR0200318
1.59	1/16"	10	34	FBR0200941
1.60		10	34	FBR0200319
1.70		10	34	FBR0200320
1.80		11	36	FBR0200321
1.90		11	36	FBR0200322
1.98	5/64"	12	38	FBR0200942
2.00		12	38	FBR0200323
2.10		12	38	FBR0200324
2.20		13	40	FBR0200325
2.30		13	40	FBR0200326
2.38	3/32"	14	43	FBR0200943
2.40		14	43	FBR0200327
2.50		14	43	FBR0200328
2.60		14	43	FBR0200329
2.70		16	46	FBR0200330
2.78	7/64"	16	46	FBR0200944
2.80		16	46	FBR0200331
2.90		16	46	FBR0200332
3.00		16	46	FBR0200333
3.10		18	49	FBR0200334
3.18	1/8"	18	49	FBR0200450
3.20		18	49	FBR0200335
3.30		18	49	FBR0200336

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
3.40		20	52	FBR0200337
3.50		20	52	FBR0200338
3.57	9/64"	20	52	FBR0200451
3.60		20	52	FBR0200339
3.70		20	52	FBR0200340
3.80		22	55	FBR0200341
3.90		22	55	FBR0200342
3.97	5/32"	22	55	FBR0200452
4.00		22	55	FBR0200343
4.10		22	55	FBR0200344
4.20		22	55	FBR0200345
4.30		24	58	FBR0200346
4.37	11/64"	24	58	FBR0200453
4.40		24	58	FBR0200347
4.50		24	58	FBR0200348
4.60		24	58	FBR0200349
4.70		24	58	FBR0200350
4.76	3/16	26	62	FBR0200454
4.80		26	62	FBR0200351
4.90		26	62	FBR0200352
5.00		26	62	FBR0200353
5.10		26	62	FBR0200354
5.16	13/64	26	62	FBR0200456
5.20		26	62	FBR0200355
5.30		26	62	FBR0200356
5.40		28	66	FBR0200357
5.50		28	66	FBR0200358
5.56	7/32"	28	66	FBR0200945
5.60		28	66	FBR0200359
5.70		28	66	FBR0200360



High Speed Steel Drills

HSS parallel shank twist drill - stub series



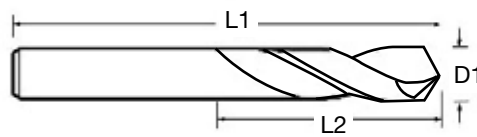
Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
5.80		28	66	FBR0200361
5.90		28	66	FBR0200362
5.95	15/64	28	66	FBR0200946
6.00		28	66	FBR0200363
6.10		31	70	FBR0200364
6.20		31	70	FBR0200365
6.30		31	70	FBR0200366
6.40		31	70	FBR0200367
6.35	1/4"	31	70	FBR0200455
6.50		31	70	FBR0200368
6.60		31	70	FBR0200369
6.70		31	70	FBR0200370
6.75	17/64	34	74	FBR0200947
6.80		34	74	FBR0200371
6.90		34	74	FBR0200372
7.00		34	74	FBR0200373
7.10		34	74	FBR0200374
7.14	9/32"	34	74	FBR0200948
7.20		34	74	FBR0200375
7.30		34	74	FBR0200376
7.40		34	74	FBR0200377
7.50		34	74	FBR0200378
7.54	19/64	37	79	FBR0200949
7.60		37	79	FBR0200379
7.70		37	79	FBR0200380
7.80		37	79	FBR0200381
7.90		37	79	FBR0200382
7.94	5/16"	37	79	FBR0200457
8.00		37	79	FBR0200383
8.10		37	79	FBR0200384

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
8.20		37	79	FBR0200385
8.30		37	79	FBR0200386
8.33	21/64	37	79	FBR0200950
8.40		37	79	FBR0200387
8.50		37	79	FBR0200388
8.60		40	84	FBR0200389
8.70		40	84	FBR0200390
8.73	11/32"	40	84	FBR0200951
8.80		40	84	FBR0200391
8.90		40	84	FBR0200392
9.00		40	84	FBR0200393
9.10		40	84	FBR0200394
9.13	23/64	40	84	FBR0200952
9.20		40	84	FBR0200395
9.30		40	84	FBR0200396
9.40		40	84	FBR0200397
9.50		40	84	FBR0200398
9.60		43	89	FBR0200399
9.70		43	89	FBR0200400
9.52	3/8"	43	89	FBR0200458
9.80		43	89	FBR0200401
9.90		43	89	FBR0200402
9.92	25/64	43	89	FBR0200953
10.00		43	89	FBR0200403
10.10		43	89	FBR0200404
10.20		43	89	FBR0200405
10.30		43	89	FBR0200406
10.32	13/32	43	89	FBR0200954
10.40		43	89	FBR0200407
10.50		43	89	FBR0200408

HSS DRILLS



HSS parallel shank twist drill - stub series



HSS DRILLS

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
10.60		43	89	FBR0200409
10.70		47	95	FBR0200410
10.72	27/64	47	95	FBR0200955
10.80		47	95	FBR0200411
10.90		47	95	FBR0200412
11.00		47	95	FBR0200413
11.10		47	95	FBR0200414
11.11	7/16"	47	95	FBR0200459
11.20		47	95	FBR0200415
11.30		47	95	FBR0200416
11.40		47	95	FBR0200417
11.50		47	95	FBR0200418
11.51	29/64	47	95	FBR0200956
11.60		47	95	FBR0200419
11.70		47	95	FBR0200420
11.80		47	95	FBR0200421
11.90		51	102	FBR0200422
11.91	15/32	51	102	FBR0200957
12.00		51	102	FBR0200423
12.10		51	102	FBR0200424
12.20		51	102	FBR0200425
12.30		51	102	FBR0200426
12.40		51	102	FBR0200427
12.50		51	102	FBR0200428
12.60		51	102	FBR0200429
12.70	1/2"	51	102	FBR0200460
12.80		51	102	FBR0200431
12.90		51	102	FBR0200432

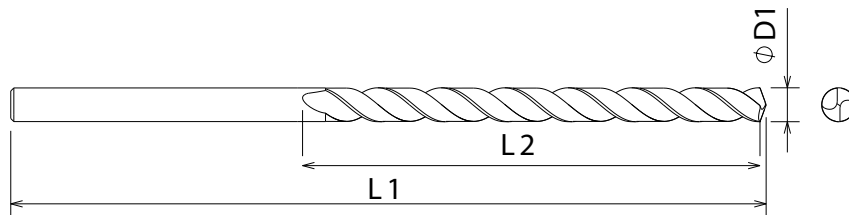
Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
13.00		51	102	FBR0200433
13.50		54	107	FBR0200435
14.00		54	107	FBR0200437
14.28	9/16"	56	111	FBR0201799
14.50		56	111	FBR0200438
15.00		56	111	FBR0200439
15.50		58	115	FBR0200440
16.00		58	115	FBR0200441
16.50		60	119	FBR0200442
17.00		60	119	FBR0200443
17.50		62	123	FBR0200444
18.00		62	123	FBR0200445
18.50		64	127	FBR0200446
19.00		64	127	FBR0200447
19.50		66	131	FBR0200448
20.00		66	131	FBR0200449

1. An excellent general purpose drill with conventional 118° point angle
2. Shorter flute & overall length increases the rigidity, resulting in less deflection, better hole accuracy & longer tool life
3. Stable cutting edge
4. Better chip evacuation
5. Better hole straightness
6. Eliminated breakages
7. Operating at higher feeds
8. Ideal to use in manual hand held drilling application
9. Superior tool life



High Speed Steel Drills

HSS parallel shank twist drill - long series



Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
1.00		33	56	FBR0200958
1.10		37	60	FBR0200959
1.19	3/64"	41	65	FBR0200960
1.20		41	65	FBR0200961
1.30		41	65	FBR0200962
1.40		45	70	FBR0200963
1.50		45	70	FBR0200964
1.59	1/16"	50	76	FBR0200965
1.60		50	76	FBR0200966
1.80		53	80	FBR0200967
1.90		53	80	FBR0200968
1.98	5/64"	56	85	FBR0200969
2.00		56	85	FBR0200561
2.10		56	85	FBR0200970
2.20		59	90	FBR0200971
2.30		59	90	FBR0200972
2.38	3/32"	62	95	FBR0200973
2.40		62	95	FBR0200974
2.50		62	95	FBR0200562
2.60		62	95	FBR0200975
2.70		66	100	FBR0200976
2.78	7/64"	66	100	FBR0200977
2.80		66	100	FBR0200978
2.90		66	100	FBR0200979
3.00		66	100	FBR0200563
3.10		69	106	FBR0200980
3.17	1/8"	69	106	FBR0200981

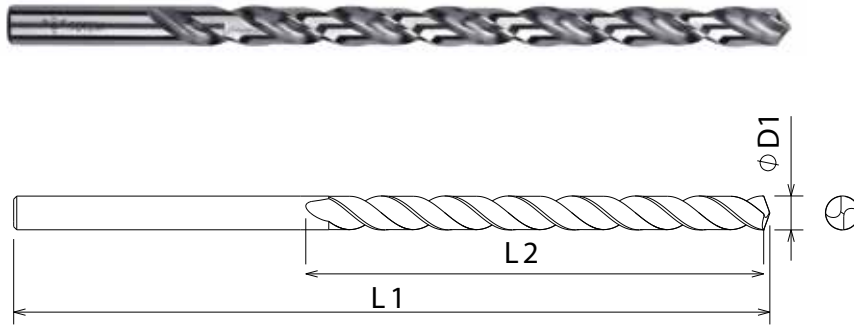
Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
3.20		69	106	FBR0200982
3.30		69	106	FBR0200983
3.40		73	112	FBR0200984
3.50		73	112	FBR0200564
3.60		73	112	FBR0200985
3.70		73	112	FBR0200986
3.80		78	119	FBR0200987
3.90		78	119	FBR0200988
3.97	5/32"	78	119	FBR0200989
4.00		78	119	FBR0200565
4.10		78	119	FBR0200990
4.20		78	119	FBR0200991
4.30		82	126	FBR0200992
4.37	11/64"	82	126	FBR0200993
4.40		82	126	FBR0200994
4.50		82	126	FBR0200566
4.60		82	126	FBR0200995
4.70		82	126	FBR0200996
4.76	3/16"	87	132	FBR0200997
4.80		87	132	FBR0200998
4.90		87	132	FBR0200999
5.00		87	132	FBR0200567
5.10		87	132	FBR0201000
5.16	13/64"	87	132	FBR0201001
5.20		87	132	FBR0201002
5.30		87	132	FBR0201003
5.40		91	139	FBR0201004

HSS DRILLS



High Speed Steel Drills

HSS parallel shank twist drill - long series



HSS DRILLS

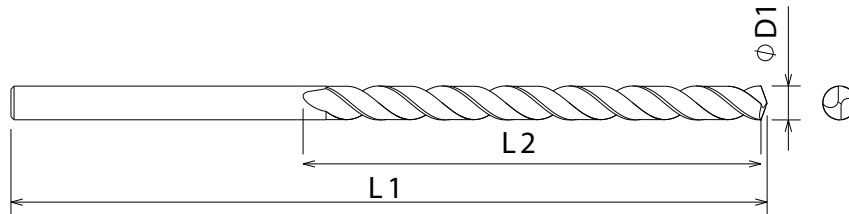
Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
5.50		91	139	FBR0201005
5.56	7/32"	91	139	FBR0201006
5.60		91	139	FBR0201007
5.70		91	139	FBR0201008
5.80		91	139	FBR0201009
5.90		91	139	FBR0201010
5.95	15/64"	91	139	FBR0201011
6.00		91	139	FBR0200568
6.10		97	148	FBR0201012
6.20		97	148	FBR0201013
6.30		97	148	FBR0201014
6.35	1/4"	97	148	FBR0201015
6.40		97	148	FBR0201016
6.50		97	148	FBR0201017
6.60		97	148	FBR0201018
6.70		97	148	FBR0201019
6.75	17/64"	102	156	FBR0201020
6.80		102	156	FBR0201021
6.90		102	156	FBR0201022
7.00		102	156	FBR0201023
7.10		102	156	FBR0201024
7.14	9/32"	102	156	FBR0201025
7.20		102	156	FBR0201026
7.30		102	156	FBR0201027
7.40		102	156	FBR0201028
7.50		102	156	FBR0201029

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
7.54	19/64"	109	165	FBR0201030
7.60		109	165	FBR0201031
7.70		109	165	FBR0201032
7.80		109	165	FBR0201033
7.90		109	165	FBR0201034
7.94	5/16"	109	165	FBR0201035
8.00		109	165	FBR0201036
8.10		109	165	FBR0201037
8.20		109	165	FBR0201038
8.30		109	165	FBR0201039
8.33	21/64"	109	165	FBR0201040
8.40		109	165	FBR0201041
8.50		109	165	FBR0201042
8.60		115	175	FBR0201043
8.70		115	175	FBR0201044
8.73	11/32"	115	175	FBR0201045
8.80		115	175	FBR0201046
8.90		115	175	FBR0201047
9.00		115	175	FBR0201048
9.10		115	175	FBR0201049
9.13	23/64"	115	175	FBR0201050
9.20		115	175	FBR0201051
9.30		115	175	FBR0201052
9.40		115	175	FBR0201053
9.50		115	175	FBR0201054
9.52	3/8"	121	184	FBR0201055



High Speed Steel Drills

HSS parallel shank twist drill - long series



Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
9.60		121	184	FBR0201056
9.70		121	184	FBR0201057
9.80		121	184	FBR0201058
9.90		121	184	FBR0201059
9.92	25/64"	121	184	FBR0201060
10.00		121	184	FBR0201061
10.10		121	184	FBR0201062
10.20		121	184	FBR0201063
10.30		121	184	FBR0201064
10.32	13/32"	121	184	FBR0201065
10.40		121	184	FBR0201066
10.50		121	184	FBR0201067
10.60		121	184	FBR0201068
10.70		128	195	FBR0201069
10.72	27/64	128	195	FBR0201070
10.80		128	195	FBR0201071
10.90		128	195	FBR0201072
11.00		128	195	FBR0201073
11.11	7/16"	128	195	FBR0201074
11.20		128	195	FBR0201075
11.30		128	195	FBR0201076
11.40		128	195	FBR0201077
11.50		128	195	FBR0201078
11.51	29/64"	128	195	FBR0201079
11.60		128	195	FBR0201080
11.70		128	195	FBR0201081

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
11.80		128	195	FBR0201082
11.90		134	205	FBR0201083
11.91	15/32"	134	205	FBR0201084
12.00		134	205	FBR0201085
12.10		134	205	FBR0201086
12.20		134	205	FBR0201087
12.3	31/64"	134	205	FBR0201088
12.40		134	205	FBR0201089
12.50		134	205	FBR0201090
12.60		134	205	FBR0201091
12.7	1/2"	134	205	FBR0201092
12.80		134	205	FBR0201093
12.90		134	205	FBR0201094
13.00		134	205	FBR0201095

1. For general purpose drilling in deep hole applications
2. Stable cutting edge
3. Better chip evacuation
4. Better hole straightness
5. Eliminated breakages
6. Well suited for deep holes
7. Superior tool life

HSS DRILLS



Drill case sets



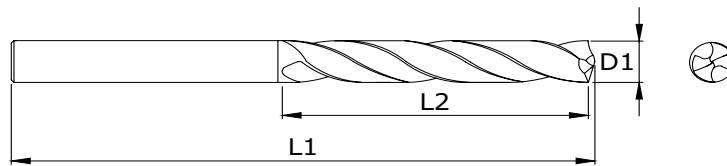
HSS DRILLS

EDP No	Size
FBR0200531	HSS Drills Case Set 1.0 mm to 13.0 mm (25 pcs)
FBR0200532	HSS Drills Case Set 2.0 mm to 8.0 mm (13 pcs)
FBR0200543	HSS Drills Case Set 1/16" to 1/4" (13 pcs)
FBR0200545	HSS Drills Case Set 1/16" to 1/2" (29 pcs)
FBR0202169	HSS Drills Case Set M2 1.0 TO 10.0 mm (19 pcs)
FBR0202170	HSS Drills Case Set M2 1.0 TO 5.9 mm (50 pcs)
FBR0202171	HSS Drills Case Set M2 6.0 TO 10.0 mm (41 pcs)
FBR0202172	HSS Drills Case Set M35 B&G 1.0 TO 10.0 mm (19 pcs)
FBR0202173	HSS Drills Case Set M35 B&G 1.0 TO 13.0 mm (25 pcs)
FBR0202174	HSS Drills Case Set M35 B&G 1.0 TO 5.9 mm (50 pcs)
FBR0202175	HSS Drills Case Set M35 B&G 6.0 TO 10.0 mm (41 pcs)
FBR0202258	HSS Drills Case Set M35 B&G 1/16"TO 1/2"(29 pcs)
FBR0202259	HSS Drills Case Set M2 1/16" TO 3/8" (21 pcs)
FBR0202266	HSS Drills Case Set M2 1.50 TO 6.50 mm (13 pcs)
FBR0202267	HSS Drills Case Set M2 TiN 1.50 TO 6.50 mm (13 pcs)
FBR0202268	HSS Drills Case Set M2 TiN 1.0 TO 10.0 mm (19 pcs)



High Speed Steel Drills

HSS-E parallel shank twist drill - M35 series black & gold



Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
1.00		12	34	FBR0201801
1.10		14	36	FBR0201802
1.19	3/64	16	38	FBR0201923
1.20		16	38	FBR0201803
1.30		16	38	FBR0201804
1.40		18	40	FBR0201805
1.50		18	40	FBR0201806
1.59	1/16	20	43	FBR0201924
1.60		20	43	FBR0201807
1.70		20	43	FBR0201808
1.80		22	46	FBR0201809
1.90		22	46	FBR0201810
1.98	5/64	24	49	FBR0201925
2.00		24	49	FBR0201811
2.10		24	49	FBR0201812
2.20		27	53	FBR0201813
2.30		27	53	FBR0201814
2.38	3/32	30	57	FBR0201926
2.40		30	57	FBR0201815
2.50		30	57	FBR0201816
2.60		30	57	FBR0201817
2.70		33	61	FBR0201818
2.78	7/64	33	61	FBR0201927
2.80		33	61	FBR0201819
2.90		33	61	FBR0201820
3.00		33	61	FBR0201821
3.10		36	65	FBR0201822
3.17	1/8	36	65	FBR0201928

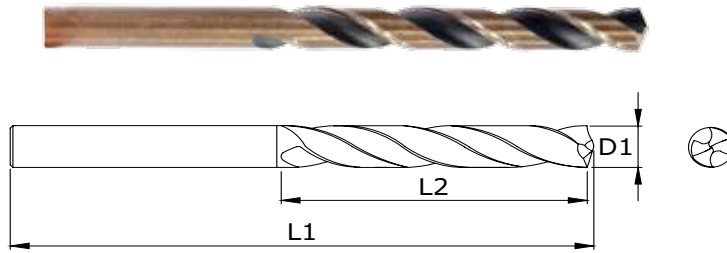
Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
3.20		36	65	FBR0201823
3.30		36	65	FBR0201824
3.40		39	70	FBR0201825
3.50		39	70	FBR0201826
3.57	9/64	39	70	FBR0201929
3.60		39	70	FBR0201827
3.70		39	70	FBR0201828
3.80		43	75	FBR0201829
3.90		43	75	FBR0201830
3.97	5/32	43	75	FBR0201930
4.00		43	75	FBR0201831
4.10		43	75	FBR0201832
4.20		43	75	FBR0201833
4.30		47	80	FBR0201834
4.37	11/64	47	80	FBR0201931
4.40		47	80	FBR0201835
4.50		47	80	FBR0201836
4.60		47	80	FBR0201837
4.70		47	80	FBR0201838
4.76	3/16	52	86	FBR0201932
4.80		52	86	FBR0201839
4.90		52	86	FBR0201840
5.00		52	86	FBR0201841
5.10		52	86	FBR0201842
5.16	13/64	52	86	FBR0201933
5.20		52	86	FBR0201843
5.30		52	86	FBR0201844
5.40		57	93	FBR0201845

HSS DRILLS



High Speed Steel Drills

HSS-E parallel shank twist drill - M35 series black & gold



HSS DRILLS

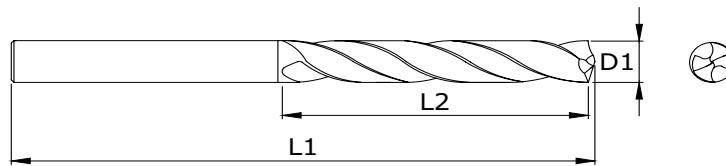
Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
5.50		57	93	FBR0201846
5.56	7/32	57	93	FBR0201934
5.60		57	93	FBR0201847
5.70		57	93	FBR0201848
5.80		57	93	FBR0201849
5.90		57	93	FBR0201850
5.95	15/64	57	93	FBR0201935
6.00		57	93	FBR0201851
6.10		63	101	FBR0201852
6.20		63	101	FBR0201853
6.30		63	101	FBR0201854
6.35	1/4	63	101	FBR0201936
6.40		63	101	FBR0201855
6.50		63	101	FBR0201856
6.60		63	101	FBR0201857
6.70		63	101	FBR0201858
6.75	17/64	69	109	FBR0201937
6.80		69	109	FBR0201859
6.90		69	109	FBR0201860
7.00		69	109	FBR0201861
7.10		69	109	FBR0201862
7.14	9/32	69	109	FBR0201938
7.20		69	109	FBR0201863
7.30		69	109	FBR0201864
7.40		69	109	FBR0201865
7.50		69	109	FBR0201866
7.54	19/64	75	117	FBR0201939
7.60		75	117	FBR0201867

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
7.70		75	117	FBR0201868
7.80		75	117	FBR0201869
7.90		75	117	FBR0201870
7.94	5/16	75	117	FBR0201940
8.00		75	117	FBR0201871
8.10		75	117	FBR0201872
8.20		75	117	FBR0201873
8.30		75	117	FBR0201874
8.33	21/64	75	117	FBR0201941
8.40		75	117	FBR0201875
8.50		75	117	FBR0201876
8.60		81	125	FBR0201877
8.70		81	125	FBR0201878
8.73	11/32	81	125	FBR0201942
8.80		81	125	FBR0201879
8.90		81	125	FBR0201880
9.00		81	125	FBR0201881
9.10		81	125	FBR0201882
9.13	23/64	81	125	FBR0201943
9.20		81	125	FBR0201883
9.30		81	125	FBR0201884
9.40		81	125	FBR0201885
9.50		81	125	FBR0201886
9.52	3/8	87	133	FBR0201944
9.60		87	133	FBR0201887
9.70		87	133	FBR0201888
9.80		87	133	FBR0201889
9.90		87	133	FBR0201890



High Speed Steel Drills

HSS-E parallel shank twist drill - M35 series black & gold



Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
9.92	25/64	87	133	FBR0201945
10.00		87	133	FBR0201891
10.10		87	133	FBR0201892
10.20		87	133	FBR0201893
10.30		87	133	FBR0201894
10.32	13/32	87	133	FBR0201946
10.40		87	133	FBR0201895
10.50		87	133	FBR0201896
10.60		87	133	FBR0201897
10.70		94	142	FBR0201898
10.72	27/64	94	142	FBR0201947
10.80		94	142	FBR0201899
10.90		94	142	FBR0201900
11.00		94	142	FBR0201901
11.10		94	142	FBR0201902
11.11	7/16	94	142	FBR0201948
11.20		94	142	FBR0201903
11.30		94	142	FBR0201904
11.40		94	142	FBR0201905
11.50		94	142	FBR0201906
11.51	29/64	94	142	FBR0201949
11.60		94	142	FBR0201907
11.70		94	142	FBR0201908
11.80		94	142	FBR0201909
11.90		101	151	FBR0201910
11.91	15/32	101	151	FBR0201950
12.00		101	151	FBR0201911
12.10		101	151	FBR0201912

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch			
12.20		101	151	FBR0201913
12.30		101	151	FBR0201914
12.30	31/64	101	151	FBR0201951
12.40		101	151	FBR0201915
12.50		101	151	FBR0201916
12.60		101	151	FBR0201917
12.70		101	151	FBR0201918
12.70	1/2	101	151	FBR0201952
12.80		101	151	FBR0201919
12.90		101	151	FBR0201920
13.00		101	151	FBR0201921

1. Made from premium grade High Speed Steel
2. High performance drills suitable for Production applications & also for tough Maintenance applications
3. Well suited for drilling on Stainless Steel & challenging Alloy Steel materials
4. Precision ground 135 Degree Split Point angle is Self Centring & reduces Thrust during application
5. Special Black & Gold surface treatment to increase lubricity & reduce friction
6. Stable cutting edge
7. The strong web construction provides greater strength & rigidity to the drill
8. Better chip evacuation
9. Better hole straightness
10. Eliminated breakages
11. Operating at higher feeds
12. Superior tool life



Reduced shank drill series

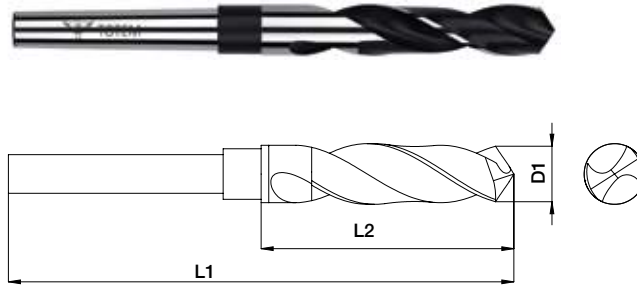
HSS

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HSS DRILLS

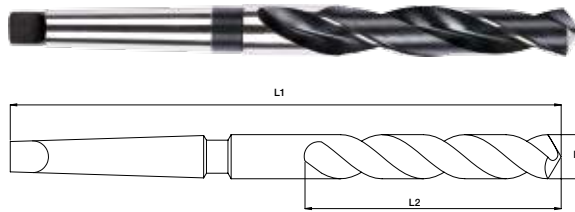
Size (D1)	Shank Dia (L2)	EDP No
mm	inch	
13.5	1/2"	FBR0200479
14.0	1/2"	FBR0200461
14.50	1/2"	FBR0200480
15.0	1/2"	FBR0200462
15.50	1/2"	FBR0200481
16.0	1/2"	FBR0200463
16.50	1/2"	FBR0200482
17.0	1/2"	FBR0200464
17.50	1/2"	FBR0200483
18.0	1/2"	FBR0200465
18.50	1/2"	FBR0200484
19.0	1/2"	FBR0200466
19.50	1/2"	FBR0200485
20.0	1/2"	FBR0200467
20.50	1/2"	FBR0200486
21.0	1/2"	FBR0200469
21.50	1/2"	FBR0200487

Size (D1)	Shank Dia (L2)	EDP No
mm	inch	
22.0	1/2"	FBR0200470
22.50	1/2"	FBR0200488
23.0	1/2"	FBR0200471
23.50	1/2"	FBR0200489
24.0	1/2"	FBR0200490
24.5	1/2"	FBR0200491
25.0	1/2"	FBR0200492
25.5	1/2"	FBR0200493
26.0	1/2"	FBR0200472
26.50	1/2"	FBR0200494
27.0	1/2"	FBR0200495
27.50	1/2"	FBR0200496
28.0	1/2"	FBR0200473
28.50	1/2"	FBR0200497
29.0	1/2"	FBR0200498
29.50	1/2"	FBR0200499
30.0	1/2"	FBR0200500



High Speed Steel Drills

HSS taper shank twist drill series



Size (D1)		Flute Length (L2)	Overall Length (L1)	MT Shank No	EDP No
mm	inch				
8.00		75	156	1	FBR0200198
8.50		75	156	1	FBR0200199
9.00		81	162	1	FBR0200200
9.50		81	162	1	FBR0200201
9.52	3/8"	87	168	1	FBR0200202
9.92	25/64"	87	168	1	FBR0200203
10.00		87	168	1	FBR0200204
10.32	13/32"	87	168	1	FBR0200205
10.50		87	168	1	FBR0200206
10.72	27/64"	94	175	1	FBR0200207
11.00		94	175	1	FBR0200208
11.11	7/16"	94	175	1	FBR0200209
11.50		94	175	1	FBR0200210
11.91	15/32"	101	182	1	FBR0200211
12.00		101	182	1	FBR0200116
12.50		101	182	1	FBR0200212
12.70	1/2"	101	182	1	FBR0200118
13.00		101	182	1	FBR0200117
13.49	17/32"	108	189	1	FBR0200213
13.50		108	189	1	FBR0200214
13.89	35/64"	108	189	1	FBR0200215
14.00		108	189	1	FBR0200119
14.29	9/16"	114	212	2	FBR0200120
14.50		114	212	2	FBR0200216
15.00		114	212	2	FBR0200121
15.50		120	218	2	FBR0200217
15.87	5/8"	120	218	2	FBR0200122
16.00		120	218	2	FBR0200123
16.50		125	223	2	FBR0200218
17.00		125	223	2	FBR0200219
17.46	11/16"	130	228	2	FBR0200124
17.50		130	228	2	FBR0200220

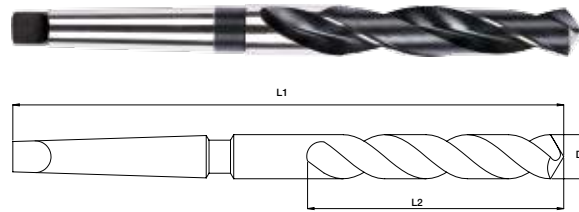
Size (D1)		Flute Length (L2)	Overall Length (L1)	MT Shank No	EDP No
mm	inch				
18.00		130	228	2	FBR0200125
18.50		135	233	2	FBR0200221
19.00		135	233	2	FBR0200126
19.05	3/4"	140	238	2	FBR0200127
19.50		140	238	2	FBR0200222
20.00		140	238	2	FBR0200128
20.50		145	243	2	FBR0200223
20.64	13/16"	145	243	2	FBR0200129
21.00		145	243	2	FBR0200130
21.50		150	248	2	FBR0200224
22.00		150	248	2	FBR0200308
22.22	7/8"	150	248	2	FBR0200131
22.50		155	253	2	FBR0200309
23.00		155	253	2	FBR0200225
23.50		155	276	3	FBR0200226
24.00		160	281	3	FBR0200132
24.50		160	281	3	FBR0200227
25.00		160	281	3	FBR0200133
25.40	1"	165	286	3	FBR0200134
25.50		165	286	3	FBR0200228
26.00		165	286	3	FBR0200135
26.50		165	286	3	FBR0200229
27.00		170	291	3	FBR0200230
27.50		170	291	3	FBR0200231
28.00		170	291	3	FBR0200136
28.50		175	296	3	FBR0200232
28.57	1.1/8"	175	296	3	FBR0200138
29.00		175	296	3	FBR0200137
29.50		175	296	3	FBR0200310
30.00		175	296	3	FBR0200139
30.50		180	301	3	FBR0200233
31.00		180	301	3	FBR0200234

HSS DRILLS



High Speed Steel Drills

HSS taper shank twist drill series



HSS DRILLS

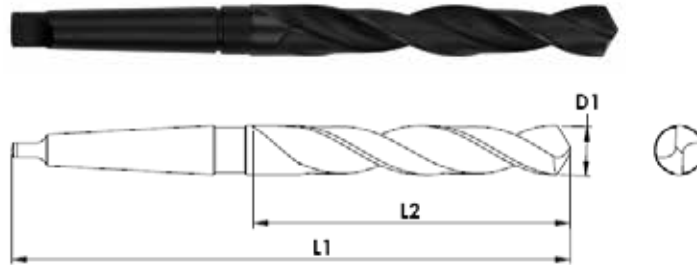
Size (D1)		Flute Length (L2)	Overall Length (L1)	MT Shank No	EDP No
mm	inch	mm	mm		
31.75	1-1/4"	185	306	3	FBR0200312
31.50		180	301	3	FBR0200235
32.00		185	334	4	FBR0200140
32.50		185	334	4	FBR0200236
33.00		185	334	4	FBR0200237
33.50		185	334	4	FBR0200238
34.00		190	339	4	FBR0200239
34.50		190	339	4	FBR0200240
34.93	1-3/8"	190	339	4	FBR0200475
35.00		190	339	4	FBR0200241
35.50		190	339	4	FBR0200242
36.00		195	344	4	FBR0200243
36.50		195	344	4	FBR0200244
36.51	1-7/16"	195	344	4	FBR0200476
37.00		195	344	4	FBR0200245
37.50		195	344	4	FBR0200246
38.00		200	349	4	FBR0200247
38.10	1-1/2"	200	349	4	FBR0200477
38.50		200	349	4	FBR0200248
39.00		200	349	4	FBR0200249
39.50		200	349	4	FBR0200250
40.00		200	349	4	FBR0200251
40.50		205	354	4	FBR0200252
41.00		205	354	4	FBR0200253
41.28	1-5/8"	205	354	4	FBR0200938
41.50		205	354	4	FBR0200254
42.00		205	354	4	FBR0200255
43.00		210	359	4	FBR0200256
44.00		210	359	4	FBR0200257
44.45	1-3/4"	210	359	4	FBR0200939
45.00		210	359	4	FBR0200258

Size (D1)		Flute Length (L2)	Overall Length (L1)	MT Shank No	EDP No
mm	inch	mm	mm		
46.00		215	364	4	FBR0200259
47.00		215	364	4	FBR0200260
48.00		220	369	4	FBR0200261
49.00		220	369	4	FBR0200262
50.00		220	369	4	FBR0200263
51.00		225	412	5	FBR0200922
50.80	2"	225	374	4	FBR0200478
52.00		225	412	5	FBR0200921
53.00		225	412	5	FBR0200923
54.00		230	417	5	FBR0200533
55.00		230	417	5	FBR0200639
56.00		230	417	5	FBR0200924
57.00		235	422	5	FBR0200925
58.00		235	422	5	FBR0200926
59.00		235	422	5	FBR0200927
60.00		235	422	5	FBR0200525
61.00		240	427	5	FBR0200928
62.00		240	427	5	FBR0200929
63.00		240	427	5	FBR0200930
64.00		245	432	5	FBR0200931
65.00		245	432	5	FBR0200526
66.00		245	432	5	FBR0200468
67.00		245	432	5	FBR0200932
68.00		250	437	5	FBR0200933
69.00		250	437	5	FBR0200934
70.00		250	437	5	FBR0200527
71.00		250	437	5	FBR0200935
72.00		255	442	5	FBR0200936
73.00		255	442	5	FBR0200920
74.00		255	442	5	FBR0200937
75.00		255	442	5	FBR0200528



High Speed Steel Drills

HSS taper shank twist drill - forge flute



IS 5103 : 2002 , DIN 345 : 1978 , ISO 235 / 1 : 1980, BS 238

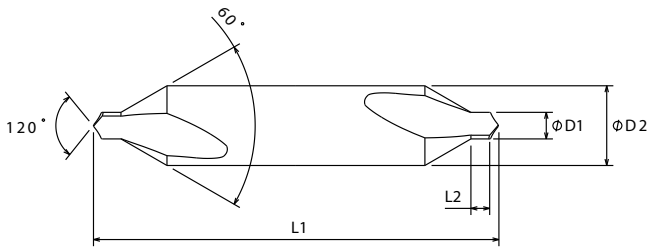
Size (D1)	Flute Length (L2)	Overall Length (L1)	MT Shank No	EDP No
mm	mm	mm		
12.00	101	182	1	FBR0202188
12.50	101	182	1	FBR0202189
13.00	101	182	1	FBR0202190
13.50	108	189	1	FBR0202379
14.00	108	189	1	FBR0202191
14.50	114	212	2	FBR0202192
15.00	114	212	2	FBR0202193
15.50	120	218	2	FBR0202380
16.00	120	218	2	FBR0202194
16.50	125	223	2	FBR0202195
17.00	125	223	2	FBR0202196
17.50	130	228	2	FBR0202239
18.00	130	228	2	FBR0202240
18.50	135	233	2	FBR0202241
19.00	135	233	2	FBR0202197
19.50	140	238	2	FBR0202198
20.00	140	238	2	FBR0202199
20.50	145	243	2	FBR0202242
21.00	145	243	2	FBR0202381
21.50	150	248	2	FBR0202200
22.00	150	248	2	FBR0202201
22.50	155	253	2	FBR0202382
23.00	155	253	2	FBR0202243
23.50	155	276	3	FBR0202244
24.00	160	281	3	FBR0202245
24.50	160	281	3	FBR0202202
25.00	160	281	3	FBR0202246
25.50	165	286	3	FBR0202383
26.00	165	286	3	FBR0202247

Size (D1)	Flute Length (L2)	Overall Length (L1)	MT Shank No	EDP No
mm	mm	mm		
26.50	165	286	3	FBR0202248
27.00	170	291	3	FBR0202249
27.50	170	291	3	FBR0202384
28.00	170	291	3	FBR0202385
28.50	175	296	3	FBR0202203
29.00	175	296	3	FBR0202204
29.50	175	296	3	FBR0202250
30.00	175	296	3	FBR0202386
30.50	180	301	3	FBR0202205
31.00	180	301	3	FBR0202206
31.50	180	301	3	FBR0202387
32.00	185	334	4	FBR0202207
32.50	185	334	4	FBR0202208
33.00	185	334	4	FBR0202251
33.50	185	334	4	FBR0202388
34.00	190	339	4	FBR0202252
34.50	190	339	4	FBR0202389
35.00	190	339	4	FBR0202253
35.50	190	339	4	FBR0202209
36.00	195	344	4	FBR0202254
36.50	195	344	4	FBR0202390
37.00	195	344	4	FBR0202391
37.50	195	344	4	FBR0202210
38.00	200	349	4	FBR0202255
38.50	200	349	4	FBR0202392
39.00	200	349	4	FBR0202211
39.50	200	349	4	FBR0202393
40.00	200	349	4	FBR0202256

HSS DRILLS



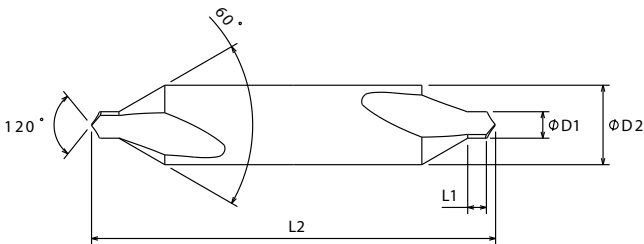
Centre drill



AS PER BS 328 - PART II - 1990

Size B.S. No	Pilot Dia (D1)	Body Dia (D2)	Pilot Length (L2) (mm)		Overall Length (L1) (mm)		EDP No
	Inch	Inch	MAX	MIN	MAX	MIN	
BS1	3/64	1/8	1.98	1.58	38.89	37.31	FBR0201789
BS2	1/16	3/16	2.38	1.98	45.22	43.68	FBR0201790
BS3	3/32	1/4	3.96	3.17	52.39	49.21	FBR0201791
BS4	1/8	5/16	4.76	3.96	58.74	55.56	FBR0201792
BS5	3/16	7/16	7.14	6.35	65.88	61.12	FBR0201793
BS6	1/4	5/8	9.52	7.93	78.58	73.82	FBR0201794
BS7	5/16	3/4	11.90	10.31	91.28	86.52	FBR0201795

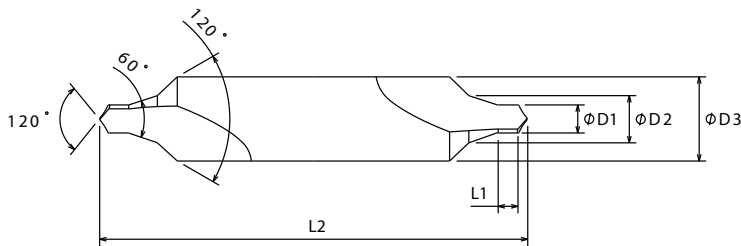
HSS DRILLS



TYPE A - AS PER IS 6708 - 1977

Pilot Dia (D1)	Body Dia (D2)	Pilot Length (L2) (mm)		Overall Length (L1) (mm)		EDP No
		MAX	MIN	MAX	MIN	
1.0	3.15	1.9	1.3	33.5	29.5	FBR0201769
1.25	3.15	2.2	1.6	33.5	29.5	FBR0201770
1.60	4.0	2.8	2.0	37.5	33.5	FBR0201771
2.0	5.0	3.3	2.5	42.0	38.0	FBR0201772
2.50	6.3	4.1	3.1	47.0	43.0	FBR0201773
3.15	8.0	4.9	3.9	52.0	48.0	FBR0201774
4.0	10.0	6.2	5.0	59.0	53.0	FBR0201775
5.0	12.5	7.5	6.3	66.0	60.0	FBR0201776
6.30	16.0	9.2	8.0	74.0	68.0	FBR0201777
8.0	20.0	11.5	10.1	83.0	77.0	FBR0201778
10.0	25.0	14.2	12.8	103.0	97.0	FBR0201779

Centre drill



TYPE B - AS PER IS 6709 - 1977 ; ISO 2540 - 1972

Pilot Dia (D1) mm	Body Dia (D2) mm	Pilot Length (L2) (mm)		Overall Length (L1) (mm)		EDP No
		MAX	MIN	MAX	MIN	
1.6	6.3	2.8	2.0	47.0	43.0	FBR0201780
2.0	8.0	3.3	2.5	52.0	48.0	FBR0201781
2.5	10.0	4.1	3.1	59.0	53.0	FBR0201782
3.15	11.2	4.9	3.9	63.0	57.0	FBR0201783
4.0	14.0	6.2	5.0	70.0	64.0	FBR0201784
5.0	18.0	7.5	6.8	78.0	72.0	FBR0201785
6.3	20.0	9.2	8.0	83.0	77.0	FBR0201786
8.0	25.0	11.5	10.1	103.0	97.0	FBR0201787
10.0	31.5	14.2	12.8	128.0	122.0	FBR0201788

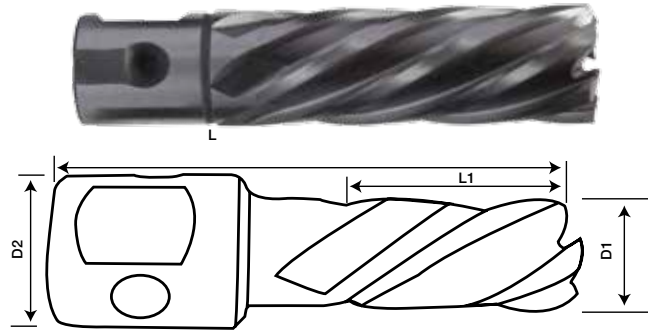
1. Made from premium grade High Speed Steel
2. Used for producing centre holes in metal work pieces
3. Also used for work-pieces requiring machining between centres
4. Stable cutting edge
5. Superior tool life
6. Also available in HSS-E (5% Cobalt) material on request



High speed steel annular cutter



WELDON SHANK



HSS DRILLS

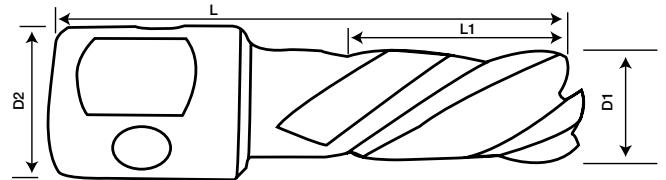
Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
14	19.05	30	63	FBR0202635
16	19.05	30	63	FBR0202636
18	19.05	30	63	FBR0202637
20	19.05	30	63	FBR0202638
22	19.05	30	63	FBR0202639
24	19.05	30	63	FBR0202640
25	19.05	30	63	FBR0202641
26	19.05	30	63	FBR0202642
28	19.05	30	63	FBR0202643
30	19.05	30	63	FBR0202644
32	19.05	30	63	FBR0202645

Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
34	19.05	30	63	FBR0202646
36	19.05	30	63	FBR0202647
38	19.05	30	63	FBR0202648
40	19.05	30	63	FBR0202649
42	19.05	30	63	FBR0202650
44	19.05	30	63	FBR0202651
46	19.05	30	63	FBR0202652
48	19.05	30	63	FBR0202653
50	19.05	30	63	FBR0202654
55	19.05	30	63	FBR0202655

High speed steel annular cutter



WELDON SHANK



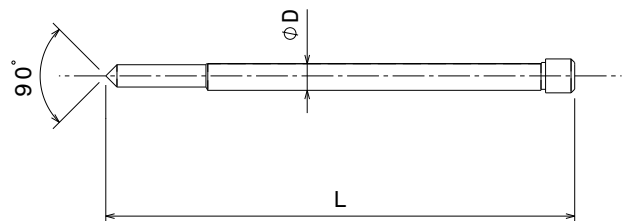
Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
12	19.05	55	88	FBR0202656
14	19.05	55	88	FBR0202657
16	19.05	55	88	FBR0202658
18	19.05	55	88	FBR0202659
20	19.05	55	88	FBR0202456
22	19.05	55	88	FBR0202660
24	19.05	55	88	FBR0202661
25	19.05	55	88	FBR0202662
26	19.05	55	88	FBR0202663
28	19.05	55	88	FBR0202664
30	19.05	55	88	FBR0202457
32	19.05	55	88	FBR0202458
34	19.05	55	88	FBR0202630

Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
35	19.05	55	88	FBR0202459
36	19.05	55	88	FBR0202460
38	19.05	55	88	FBR0202461
40	19.05	55	88	FBR0202462
42	19.05	55	88	FBR0202463
44	19.05	55	88	FBR0202464
46	19.05	55	88	FBR0202465
48	19.05	55	88	FBR0202665
50	19.05	55	88	FBR0202466
52	19.05	55	88	FBR0202666
55	19.05	55	88	FBR0202667
60	19.05	55	88	FBR0202668

HSS DRILLS

MATCHING PILOT

Size (D)	Cutting Depth (L)	EDP No
mm	mm	
6.34 X 77	30	FBR0201990
6.34 X 103	55	FBR0201991



- Made from premium grade High Speed Steel
- Applicable to hole cutting & process of annular groove on various magnetic drills
- Multi – cut geometry for ply – cutting & lower friction to reach better performance of endurance & removal of chips
- Meets requirements of hole cutting on various materials
- Also available in One Touch Shank (Universal shank Dia ¾" or 19.05 mm)
- Available from Diameter 12 MM to 50 MM & Depth of Cut 30mm max & 55mm max

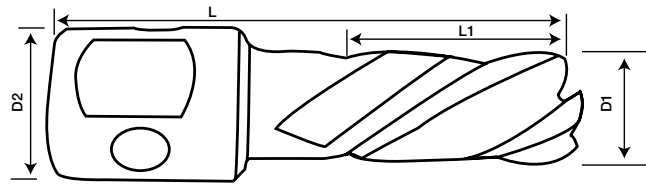


High speed steel annular cutter

HSS-E

6535 HB

BF



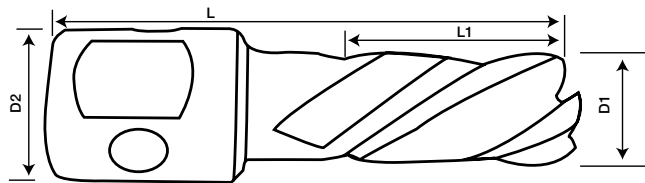
HSS DRILLS

Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
12	19.05	30	63	FBR0201689
13	19.05	30	63	FBR0201690
14	19.05	30	63	FBR0201691
15	19.05	30	63	FBR0201692
16	19.05	30	63	FBR0201693
17	19.05	30	63	FBR0201694
18	19.05	30	63	FBR0201695
19	19.05	30	63	FBR0201696
20	19.05	30	63	FBR0201697
21	19.05	30	63	FBR0201698
22	19.05	30	63	FBR0201699
23	19.05	30	63	FBR0201700
24	19.05	30	63	FBR0201701
25	19.05	30	63	FBR0201702
26	19.05	30	63	FBR0201703
27	19.05	30	63	FBR0201704
28	19.05	30	63	FBR0201705
29	19.05	30	63	FBR0201706
30	19.05	30	63	FBR0201707
31	19.05	30	63	FBR0201708

Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
32	19.05	30	63	FBR0201709
33	19.05	30	63	FBR0201710
34	19.05	30	63	FBR0201711
35	19.05	30	63	FBR0201712
36	19.05	30	63	FBR0201713
37	19.05	30	63	FBR0201714
38	19.05	30	63	FBR0201715
39	19.05	30	63	FBR0201716
40	19.05	30	63	FBR0201717
41	19.05	30	63	FBR0201718
42	19.05	30	63	FBR0201719
43	19.05	30	63	FBR0201720
44	19.05	30	63	FBR0201721
45	19.05	30	63	FBR0201722
46	19.05	30	63	FBR0201723
47	19.05	30	63	FBR0201724
48	19.05	30	63	FBR0201725
49	19.05	30	63	FBR0201726
50	19.05	30	63	FBR0201727



High speed steel annular cutter



Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
12	19.05	55	88	FBR0201728
13	19.05	55	88	FBR0201729
14	19.05	55	88	FBR0201730
15	19.05	55	88	FBR0201731
16	19.05	55	88	FBR0201732
17	19.05	55	88	FBR0201733
18	19.05	55	88	FBR0201734
19	19.05	55	88	FBR0201735
20	19.05	55	88	FBR0201736
21	19.05	55	88	FBR0201737
22	19.05	55	88	FBR0201738
23	19.05	55	88	FBR0201739
24	19.05	55	88	FBR0201740
25	19.05	55	88	FBR0201741
26	19.05	55	88	FBR0201742
27	19.05	55	88	FBR0201743
28	19.05	55	88	FBR0201744
29	19.05	55	88	FBR0201745
30	19.05	55	88	FBR0201746
31	19.05	55	88	FBR0201747

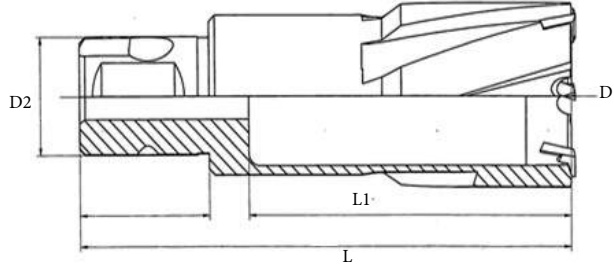
Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
32	19.05	55	88	FBR0201748
33	19.05	55	88	FBR0201749
34	19.05	55	88	FBR0201750
35	19.05	55	88	FBR0201751
36	19.05	55	88	FBR0201752
37	19.05	55	88	FBR0201753
38	19.05	55	88	FBR0201754
39	19.05	55	88	FBR0201755
40	19.05	55	88	FBR0201756
41	19.05	55	88	FBR0201757
42	19.05	55	88	FBR0201758
43	19.05	55	88	FBR0201759
44	19.05	55	88	FBR0201760
45	19.05	55	88	FBR0201761
46	19.05	55	88	FBR0201762
47	19.05	55	88	FBR0201763
48	19.05	55	88	FBR0201764
49	19.05	55	88	FBR0201765
50	19.05	55	88	FBR0201766

HSS DRILLS



TCT annular cutter

TCT 6535 HB BF



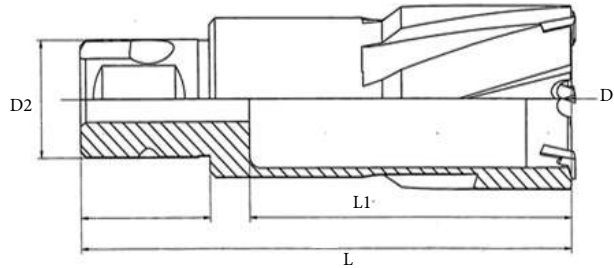
- P1-P4
- K1
- M1-M2
- N1

HSS DRILLS

Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
11	19.05	40	74	FBR0202349
12	19.05	40	74	FBR0202350
13	19.05	40	74	FBR0202351
14	19.05	40	74	FBR0202352
15	19.05	40	74	FBR0202353
16	19.05	40	74	FBR0202354
17	19.05	40	74	FBR0202355
18	19.05	40	74	FBR0202356
19	19.05	40	74	FBR0202357
20	19.05	40	74	FBR0202358
21	19.05	40	74	FBR0202359
22	19.05	40	74	FBR0202360
23	19.05	40	74	FBR0202361
24	19.05	40	74	FBR0202362
25	19.05	40	74	FBR0202363

Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
26	19.05	40	74	FBR0202364
27	19.05	40	74	FBR0202365
28	19.05	40	74	FBR0202366
29	19.05	40	74	FBR0202367
30	19.05	40	74	FBR0202368
31	19.05	40	74	FBR0202369
32	19.05	40	74	FBR0202370
33	19.05	40	74	FBR0202371
34	19.05	40	74	FBR0202372
35	19.05	40	74	FBR0202373
36	19.05	40	74	FBR0202374
37	19.05	40	74	FBR0202375
38	19.05	40	74	FBR0202376
39	19.05	40	74	FBR0202377
40	19.05	40	74	FBR0202378

TCT annular cutter



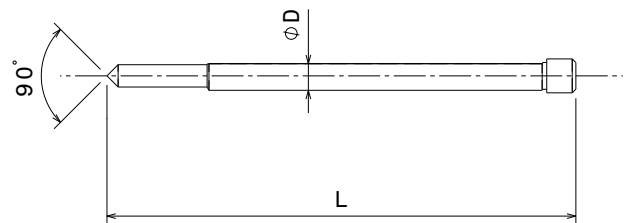
Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
11	19.05	55	92	FBR0202319
12	19.05	55	92	FBR0202320
13	19.05	55	92	FBR0202321
14	19.05	55	92	FBR0202322
15	19.05	55	92	FBR0202323
16	19.05	55	92	FBR0202324
17	19.05	55	92	FBR0202325
18	19.05	55	92	FBR0202326
19	19.05	55	92	FBR0202327
20	19.05	55	92	FBR0202328
21	19.05	55	92	FBR0202329
22	19.05	55	92	FBR0202330
23	19.05	55	92	FBR0202331
24	19.05	55	92	FBR0202332
25	19.05	55	92	FBR0202333
26	19.05	55	92	FBR0202334
27	19.05	55	92	FBR0202335
28	19.05	55	92	FBR0202336

Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
29	19.05	55	92	FBR0202337
30	19.05	55	92	FBR0202338
31	19.05	55	92	FBR0202339
32	19.05	55	92	FBR0202340
33	19.05	55	92	FBR0202341
34	19.05	55	92	FBR0202342
35	19.05	55	92	FBR0202343
36	19.05	55	92	FBR0202344
37	19.05	55	92	FBR0202345
38	19.05	55	92	FBR0202346
39	19.05	55	92	FBR0202347
40	19.05	55	92	FBR0202348
42	19.05	55	92	FBR0202669
44	19.05	55	92	FBR0202670
46	19.05	55	92	FBR0202671
48	19.05	55	92	FBR0202672
50	19.05	55	92	FBR0202673
55	19.05	55	92	FBR0202674

HSS DRILLS

MATCHING PILOT

Size	Cutting length	EDP No
mm	mm	
7.98 X 105	40	FBR0202131
7.98 X 160	55	FBR0202132



OPERATIONAL MANUAL

- For Speed choice refer to cutting parameter table
- Feed recommendation: 0.06-0.15 mm/cycle. Feed is the key point for hole cutting. Different feed forms different shaped chips, which determine the performance of chips removal
- During the beginning and termination of hole cutting, decrease feed by 1/3, this can reduce damage of cutter
- Sufficient coolant supply can increase the smoothness of holes as well as number of holes to be cut
- Some materials like Cast Iron/Copper create lots of powder when cutting, so here compressed air is recommended for cooling instead of coolant
- Remove the chips twining around the cutter from time to time, which is the better way for chip removal
- When the wear width of the cutting edges reaches 0.4mm, cutter should be replaced

Speed and feed used in drilling various materials

Material	Tensile Strength (kg/mm)	m/mm.mm/rev. V_c or F	Drill Diameter D (mm)				
			2-5	6.11	12-18	19-25	26-50
Steel	50-<	V_c	20-25	20-25	30-35	30-35	25-30
		F	0.1	0.2	0.25	0.3	0.4
	50-70	V_c	20-25	20-25	25-25	25-30	25
		F	0.1	0.2	0.2	0.2	0.2
	70-90	V_c	15-18	15-18	15-18	18-22	15-20
		F	0.05	0.1	0.2	0.3	0.35
	90-100	V_c	10-14	10-14	12-18	16-20	14-16
		F	0.05	0.1	0.15	0.2	0.3
Cast Iron	12-18	V_c	25-20	30-40	25-30	20	20
		F	0.1	0.2	0.35	0.6	1
	18-30	V_c	12-18	14-18	16-20	16-20	16-18
		F	0.1	0.15	0.2	0.3	0.4
Brass Bronze	Soft	V_c	50 <	50 <	50 <	50 <	50 <
		F	0.05	0.15	0.3	0.45	-
	Hard	V_c	35 <	35 <	35 <	35 <	35 <
		F	0.05	0.1	0.2	0.35	-

HSS right hand cutting straight shank jobber drill

Type of HSS Jobber Drills	Application
Type N (Right Hand Cutting)	Standard drill for drilling Steel and Cast Steel, Alloyed and Non-Allowed Grey Cast Iron, Spheroidal Iron, Silver, Graphite, Malleable Cast Iron etc.
Type H (Right Hand Cutting)	For Drilling hard, crumbly materials such as Brass, Magnesium Alloy, Bronze Phosphor Bronze, Mica, Pertinax, Zamak (thin section) , Electron (thin sections)
	Insulating Materials, Ebonite, Bakelite, Galalithe, Fiber, Celluloid, Synthetic Resins, Horn Compounds, Eternit, Hardboard, Perspex and Plastic Laminates.
	For these and similar materials a 140 Degree point angle is recommended when drilling in the plane of the laminations for drilling at right angles to the laminations a point angle of 80-100 Degree will give the best results.
	Note: Polishing of the cutting surfaces will improve drill performance in Eternit or Hardboard
Type S (Right Hand Cutting)	For drilling soft material forming long stringy swarf, such as aluminium, aluminum alloys. Zinc, refined Copper, Argalium, Soft Synthetic materials Wood etc.



Drill selection guide based on workpiece material

(A) FERROUS MATERIALS					
Material	Drill material	Point angle (Degree)	SFM	Feed range no. See table 1	Coolant
Free cutting mild Steel hardness up to 72.000psi (500 N/mm)	HSS	118 (130)	95-160	4	Soluble Oil
Non alloyed Carbon Steel 0.4% Carbon 113.000psi (800 N/mm)	HSS	118	65-95	4	Soluble Oil
Non Alloyed Carbon Steel with 0.4% Carbon, hardness 113-142psi (800-1000 N/mm) and purified Alloy Steel with a hardness 98 psi (700N/mm)	HSS	118 (135)	50-65	3	Soluble Oil
Non Alloyed Tool Steel with a hardness of 113.000-142.000psi (800-1000 N/mm) and refined Alloy Steel with a hardness of 98.000-142.000 psi (700-1000 N/mm)	HSS	118 (135)	40-50	3	Soluble Oil
Alloyed Tool Steel Hardness of 113.000-142.000 psi (800-1000N/mm) and refined Alloy Steels with a hardness of 142.000-170.000psi (1000-1200 N/mm)	HSSE	118 (135)	30-50	2	Soluble Oil
Retined Alloyed Steel with a hardness of 170.000 psi (1200 N/mm)	HSSE	135	15-25	1	Soluble Oil, Cutting Oil
Chrome Molybdenum Stainless Steels	HSSE	135	25-40	1	Soluble Oil, Cutting Oil
Stainless Austenitic, Nickel Chrome, heat resisitng Steel.	HSSE	135	10-25	1	Cutting Oil
Manganese Steels containing up to 10% Molybdenum	HSSE	135	10-15	1	Dry
Spring Steels	HSSE	135	15-30	1	Soluble Oil
Nimonic Alloys	HSSE	135	10-25	1	Cutting Oil
Ferritic	HSSE	118	10-15	1	Dry Compressed Air
Titanium and Titanium Alloys	HSSE	113	10-15	1	Cutting Oil
Grey Cast Iron up to GG 26 and Malleable Iron	HSS / HSSE	118	50-80	5	Dry Soluble Oil
Hard Cast Iron up to 350 Brinell	HSSE	118	25-40	4	Dry Soluble Oil
(B) NON FERROUS MATERIALS					
Brass to MS 58	HSS	118	200-260	6	Cutting Oil
Brass from MS60	HSS	118	100-200	5	Soluble Oil
Red Copper	HSS	130	100-200	5	Soluble Oil
Electrolytic Copper	HSS	130	65-100	5	Soluble Oil
German Silver	HSS	118	65-100	3	Cutting Oil, Soluble Oil
Copper Nickel	HSS	130	65-100	3	Cutting Oil
Copper Tin Alloys					Soluble Oil
Copper-Aluminium Alloys	HSS	130	30-100	3	Soluble Oil
Alloys of Copper and Beryllium	HSS	130	30-50	2	Cutting Oil, Soluble Oil
Pure Aluminium	HSS	130	130-200	5	Soluble Oil

HSS DRILLS



Drill selection guide based on workpeice material

Aluminium Manganese and Aluminium Chrome Alloys	HSS	135	130-200	5	Soluble Oil
Aluminium Alloyed with Lead, Antimony or Tin	HSS	135	200-325	5	Soluble Oil
Aluminium Copper Alloys containing Silicon, Magnesium, Lead, Tin, Titanium or Beryllium	HSS	135	130-200	5	Soluble Oil
Aluminium Silicon Alloys containing Copper, Magnesium, Manganese or Chrome Aluminium, Magnesium Alloy with Silicon Manganese or Chrome	HSS	135	200-325	5	Soluble Oil
Magnesium Alloys (Electron)	HSS	135	260-325	5	Dry
	HSS	135	260-325	5	Dry
Zinc	HSS	118	100-130	4	Soluble Oil
(C) SYNTHETIC MATERIALS, PLASTICS, HARDBOARD ETC.					
Hard Duroplastics	HSS	80	30-65 (160-325)	3	Dry (Compressed Air)
Soft Thermoplastic	HSS	135	50-200	3	Water (Compressed Air)
Hardboard and the like	HSS	135	50-80	3	Dry (Compressed Air)

Note

Above recommendations hold good only, if the following condition are met:

- a) Uniform consistency of the material to be drilled
- b) Totem Drills to be used
- c) Totem Drill of HSS and HSSE material are used
- d) Maximum depth does not exceed 3 times the drill diameter
- e) Good machine condition and rigid mounting of the workpiece
- f) No drill bushing are used
- g) Correct quality of coolant with sufficient flow
- h) No excessive run-out of the machine spindle or drill

Feed chart (Table-1)

Drill Diameter MM	mm pr					
	1	2	3	4	5	6
2	0.02	0.25	0.03	0.04	0.05	0.06
2.5	0.025	0.3	0.04	0.05	0.06	0.08
3	0.03	0.4	0.05	0.06	0.08	0.1
4	0.04	0.05	0.06	0.08	0.1	0.13
5	0.04	0.05	0.06	0.08	0.1	0.13
6.4	0.05	0.06	0.08	0.1	0.13	0.16
8	0.06	0.08	1	0.13	0.16	0.2
10	0.08	0.1	0.12	0.16	0.2	0.25
12.5	0.08	0.1	0.12	0.16	0.2	0.25
16	0.1	0.12	0.15	0.2	0.25	0.3
22	0.13	0.16	0.2	0.25	0.3	0.4
25	0.16	0.2	0.25	0.3	0.4	0.5
31.75	0.16	0.2	0.25	0.3	0.4	0.5
40	0.2	0.25	0.3	0.4	0.5	0.6
50	0.25	0.3	0.4	0.5	0.6	0.8
63	0.3	0.4	0.5	0.6	0.8	1
80	0.4	0.5	0.6	0.8	1	1.3

Trouble shooting and remedies for HSS drills

	Problems	Reasons	Remedies
1	Oversize Hole	1) Lip Angles are not equal 2) Lip Lengths unequal	Regrind the Drill Point to correct lip angle with proper relief maintaining lip lengths equal
2	Buckling of the Drill	Drill Deflects Axially	Use Correct guide bush
3	Drill Chattering	1) Hard, Tough work piece 2) Torsional deflection of the drill	Increase Torsional stiffness by replacing thicker web drill. Reduce drill length and shorten flute length
4	Drill Breaking	1) Fixture not rigid 2) Web thickness more 3) Speed & feed not Proper	1) Use Rigid Fixture 2) Web thinning to be Implemented 3) Use Proper speed & feed according to work material
5	Drill Breaking in deep hole drilling	1) Chips blocking in flutes 2) No uniform back taper 3) Drill runout on OD	1) Use wood check uniform 2) Before using check uniform back taper and concentricity
6	Drill Rubbing	1) No proper relief on point 2) No uniform back taper	1) Regrind with proper point relief 2) Check uniform back taper at no point negative back taper should occur on drill dia.
7	Heat Generation while drilling	1) Coolant insufficient 2) Proper coolant not used 3) Work piece is hard	1) Use Proper coolant flow 2) Use proper coolant 3) select drill with correct geometry for the material



Conversion chart for drill gauge & letter sizes

Drill Gauge Size	Decimal equivalent inches	mm	Decimal equivalent inches
70	0.028	0.7	0.0276
69	0.0292	0.75	0.0295
68	0.031	1/32	0.0312
67	0.032	0.82	0.0323
66	0.033	0.85	0.0335
65	0.035	0.9	0.0354
64	0.036	0.92	0.0362
63	0.037	0.95	0.0374
62	0.038	0.98	0.0386
61	0.039	1	0.0394
60	0.04	1	0.0394
59	0.041	1.05	0.0413
58	0.042	1.05	0.0413
57	0.043	1.1	0.0433
56	0.0465	3/64	0.0469
55	0.052	1.3	0.0512
54	0.055	1.4	0.0551
53	0.0595	1.5	0.059
52	0.0635	1.6	0.063
51	0.067	1.7	0.0669
50	0.07	1.8	0.0709
49	0.073	1.85	0.0728
48	0.076	1.95	0.0786
47	0.0785	2	0.0787
46	0.081	2.05	0.0807
45	0.082	2.1	0.0827
44	0.086	2.2	0.0866
43	0.089	2.25	0.0866
42	0.0935	3/32	0.0938
41	0.096	2.45	0.0965
40	0.098	2.5	0.0984
39	0.1015	2.55	0.1004
38	0.104	2.6	0.1024
37	0.1065	2.65	0.1043
36	0.1065	2.7	0.1063
35	0.11	2.8	0.1102
34	0.111	2.8	0.1102
33	0.113	2.85	0.1122
32	0.116	2.95	0.1161
31	0.12	3	0.1181



Conversion chart for drill gauge & letter sizes

Drill Gauge Size	Decimal equivalent inches	mm	Decimal equivalent inches
30	0.1285	3.3	0.1299
29	0.136	3.5	0.1378
28	0.1405	9/64	0.1406
27	0.144	3.7	0.1457
26	0.147	3.7	0.1457
25	0.1495	3.8	0.1496
24	0.152	3.9	0.1535
23	0.154	3.9	0.1535
22	0.157	4	0.1575
21	0.159	4	0.1575
20	0.161	4.1	0.1614
19	0.166	4.2	0.1654
18	0.1695	4.3	0.1693
17	0.173	4.4	0.1732
16	0.177	4.5	0.1772
15	0.18	4.6	0.1811
14	0.182	4.6	0.1811
13	0.185	4.7	0.185
12	0.189	4.8	0.189
11	0.191	4.9	0.1929
10	0.1935	4.9	0.1929
9	0.196	5	0.1968
8	0.199	5.05	0.199
7	0.201	5.1	0.2008
6	0.204	5.2	0.2047
5	0.2055	5.2	0.2047
4	0.209	5.3	0.2087
3	0.213	5.4	0.2126
2	0.221	5.6	0.2205
1	0.228	5.8	0.2283
A	0.234	15/64	0.2344
B	0.238	6	0.2362
C	0.242	6.1	0.2402
D	0.246	6.2	0.2441
E	0.25	1/4	0.25
F	0.257	6.5	0.2559
G	0.261	6.6	0.2598
H	0.266	17/64	0.2656
I	0.272	6.9	0.2717
J	0.277	7	0.2756
K	0.281	9/32	0.2812



Conversion chart for drill gauge & letter sizes

Drill Gauge Size	Decimal equivalent inches	mm	Decimal equivalent inches
L	0.29	7.4	0.2913
M	0.295	7.5	0.2953
N	0.302	7	0.3031
O	0.316	8	0.315
P	0.323	8.2	0.3228
Q	0.332	8.4	0.3307
R	0.339	8.6	0.3386
S	0.348	8.8	0.3465
T	0.358	9.1	0.3583
U	0.368	9.3	0.3661
V	0.377	3/8	0.375
W	0.386	9.8	0.3858
X	0.397	10.1	0.3976
Y	0.404	10.3	0.4055
Z	0.413	10.5	0.4134

Conversion tables fraction and decimal to mm

Fraction	Inch	Decimal	mm
1/64		0.015625	0.3969
	1/32	0.03125	0.7938
3/64		0.046875	1.1906
	1/16	0.0625	1.5875
5/64		0.078125	1.9844
	3/32	0.09375	2.3812
7/64		0.109375	2.7781
	1/8	0.125	3.175
9/64		0.140625	3.5719
	5/32	0.15625	3.9688
11/64		0.171875	4.3656
	3/16	0.1875	4.7625
13/64		0.203125	5.1594
	7/32	0.21875	5.5562
15/64		0.234375	5.9531
	1/4	0.25	6.35
17/64		0.265625	6.7469
	9/32	0.28125	7.1438
19/64		0.296875	7.5406
	5/16	0.3125	7.9375
21/64		0.328125	8.3344
	11/32	0.34375	8.7312



Conversion tables fraction and decimal to mm

Fraction	Inch	Decimal	mm
23/64		0.359375	9.1281
	3/8	0.375	9.525
25/64		0.390625	9.9219
	13/32	0.40625	10.3188
27/64		0.421875	10.7156
	7/16	0.4375	11.1125
29/64		0.453125	11.5094
	15/32	0.46875	11.9062
31/64		0.46875	12.3031
	1/2	0.5	12.7
33/64		0.515625	13.0969
	17/32	0.53125	13.4938
35/64		0.546875	13.8906
	9/16	0.5625	14.2875
37/64		0.578125	14.6844
	19/32	0.59375	15.0812
39/64		0.609375	15.4781
	5/8	0.625	15.875
41/64		0.640625	16.2719
	21/32	0.65625	16.6688
43/64		0.671875	17.0656
	11/16	0.6875	17.4625
45/64		0.703125	17.8594
	23/32	0.71875	18.2562
47/64		0.734375	18.6531
	3/4	0.75	19.05
49/64		0.765625	19.4469
	25/32	0.78125	19.8438
51/64		0.796875	20.2406
	13/16	0.8125	20.6375
53/64		0.828125	21.0344
	27/32	0.84375	21.4312
55/64		0.859375	21.8281
	7/8	0.875	22.225
57/64		0.890625	22.6219
	29/32	0.90625	23.0188
59/64		0.921875	23.4156
	15/16	0.9375	23.8125
61/64		0.953125	24.2094
	31/32	0.96875	24.6062
63/64		0.984375	25.0031
	1	1	25.4



Conversion chart for different scale hardness

Tenstgth N/mm	VPN	HB	HRc	Tenstgth N/mm	VPN	HB	HRc	Tenstgth N/mm	VPN	HB	HRc
200	63	60	-	540	168	160	-	880	275	261	-
210	65	62	-	550	172	163	-	890	278	264	-
220	69	66	-	560	175	166	-	900	280	266	27
225	70	67	-	570	178	169	-	910	283	269	-
230	72	68	-	575	180	171	-	915	285	271	-
240	75	71	-	580	181	172	-	920	287	273	28
250	79	75	-	590	184	175	-	930	290	276	-
255	80	76	-	595	185	176	-	940	293	278	29
260	82	78	-	600	187	178	-	950	295	280	-
270	85	81	-	610	190	181	-	960	299	284	-
280	88	84	-	620	193	184	-	965	300	285	-
285	90	86	-	625	195	185	-	970	302	287	30
290	91	87	-	630	197	187	-	980	305	290	-
300	94	89	-	640	200	190	-	990	308	293	-
305	95	90	-	650	203	193	-	995	310	295	31
310	97	92	-	660	205	195	-	1000	311	296	-
320	100	95	-	670	208	198	-	1010	314	299	-
330	103	98	-	675	210	199	-	1020	317	301	32
335	105	100	-	680	212	201	-	1030	320	304	-
340	107	102	-	690	215	204	-	1040	323	307	-
350	110	105	-	700	219	208	-	1050	327	311	33
360	113	107	-	705	220	209	-	1060	330	314	-
370	115	109	-	710	222	211	-	1070	333	316	-
380	119	113	-	720	225	214	-	1080	336	319	34
385	120	114	-	730	228	216	-	1090	339	322	-
390	122	116	-	740	230	219	-	1095	340	323	-
400	125	119	-	750	233	221	-	1100	342	325	-
410	128	122	-	755	235	223	-	1110	345	328	35
415	130	124	-	760	237	225	-	1120	349	332	-
420	132	125	-	770	240	228	-	1125	350	333	-
430	135	128	-	870	243	231	21	1130	352	334	-
440	138	131	-	785	245	233	-	1140	355	337	36
450	140	133	-	790	247	235	-	1150	358	340	-
460	143	136	-	800	250	238	22	1155	360	342	-
465	145	138	-	810	253	240	-	1160	361	343	-
470	147	140	-	820	255	242	23	1170	364	346	37
480	150	143	-	830	258	245	-	1180	367	349	-
490	153	145	-	835	260	247	24	1190	370	352	-
495	155	147	-	840	262	249	-	1200	373	354	38
500	157	149	-	850	265	252	-	1210	376	357	-
510	160	152	-	860	268	255	25	1220	380	361	-
520	163	155	-	865	270	257	-	1230	382	363	39
530	165	157	-	870	272	258	-	1240	385	366	-
1250	338	369	-	1570	484	460	48	1900	575	546	-
1255	390	371	-	1580	486	462	-	1910	578	549	54



Conversion chart for different scale hardness

Tenstgth N/mm	VPN	HB	HRc	Tenstgth N/mm	VPN	HB	HRc	Tenstgth N/mm	VPN	HB	HRc
1260	392	372	40	1590	489	465	-	1920	580	551	-
1270	394	374	-	1595	490	466	-	1930	583	554	-
1280	397	377	-	1600	491	467	-	1940	586	557	-
1290	400	380	-	1610	494	470	-	1950	589	560	-
1300	403	383	41	1620	497	472	49	1955	590	561	-
1310	407	387	-	1630	500	475	-	1960	591	562	-
1320	410	390	-	1640	503	478	-	1970	594	564	-
1330	413	393	42	1650	506	481	-	1980	596	567	55
1340	417	396	-	1660	509	483	-	1990	599	569	-
1350	420	399	-	1665	510	485	-	1995	600	570	-
1360	423	402	43	1670	511	486	-	2000	602	572	-
1370	426	405	-	1680	514	488	50	2010	605	575	-
1380	429	408	-	1690	517	491	-	2020	607	577	-
1385	430	409	-	1700	520	494	-	2030	610	580	-
1390	431	410	-	1710	522	496	-	2040	613	582	-
1400	434	413	44	1720	525	499	-	2050	615	584	56
1410	437	415	-	1730	527	501	51	2060	618	587	-
1420	440	418	-	1740	530	504	-	2070	620	589	-
1430	443	421	-	1750	533	506	-	2080	623	592	-
1440	446	424	45	1760	536	509	-	2090	626	595	-
1450	449	427	-	1770	539	512	-	2100	629	598	-
1455	450	428	-	1775	540	513	-	2105	630	599	-
1460	452	429	-	1780	541	514	-	2110	631	600	-
1470	455	432	-	1790	544	517	52	2120	634	602	-
1480	458	435	46	1800	547	520	-	2130	636	604	-
1485	460	437	-	1810	550	523	-	2140	639	607	57
1490	461	438	-	1820	553	525	-	2145	640	608	-
1500	464	441	-	1830	556	528	-	2150	641	609	-
1510	467	444	-	1840	559	531	-	2160	644	612	-
1520	470	447	-	1845	560	532	53	2170	647	615	-
1530	473	449	47	1850	561	533	-	2180	650	618	-
1540	476	452	-	1860	564	536	-	2190	653	620	-
1550	479	455	-	1870	567	539	-	2200	655	622	58
1555	480	456	-	1880	570	542	-	-	675	-	59
1560	481	457	-	1890	572	543	-	-	698	-	60
-	-	-	-	-	-	-	-	-	72	-	61
-	-	-	-	-	-	-	-	-	745	-	62
-	-	-	-	-	-	-	-	-	773	-	63
-	-	-	-	-	-	-	-	-	800	-	64
-	-	-	-	-	-	-	-	-	829	-	65
-	-	-	-	-	-	-	-	-	864	-	66
-	-	-	-	-	-	-	-	-	900	-	67
-	-	-	-	-	-	-	-	-	940	-	68

HSS DRILLS



Table of cutting speeds - fractional size drills - HSS drill

Vc (ft/min)	50	60	70	80	100
Vc (m/min)	15	18	21	24	30
Drill dia (inch)	Revolutions Per Minute (RPM)				
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

HSS DRILLS



Table of cutting speeds - metric size drills - HSS Drill

Vc (ft/min)	50	60	70	80	100
Vc (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

HSS DRILLS



Recommended cutting rotation speed of annular cutter

Diameter (mm)	Mild Steel 500N/mm	Medium Carbon Steel 750N/mm	High Carbon Steel 900N/mm	Alloy tool Steel 1200 N/mm	Carbon tool Steel 1400 N/mm	Stainless Steel	Aluminium	Cast Iron	Cast Copper
12	663	531	345	265	186	318	1327	478	1062
13	612	490	318	245	171	294	1225	441	980
14	569	455	296	227	159	273	1137	409	910
15	531	425	276	212	149	255	1062	382	849
16	498	398	259	199	139	239	995	358	796
17	468	375	244	187	131	225	937	337	749
18	442	354	230	177	124	212	885	318	708
19	419	335	218	168	117	201	838	302	670
20	398	318	207	159	111	191	796	287	637
21	379	303	197	152	106	182	758	273	607
22	362	290	188	145	101	174	724	261	579
23	346	277	180	138	97	166	692	249	554
24	332	265	173	133	93	159	663	239	531
25	318	255	166	127	89	153	637	229	510
26	306	245	159	122	86	147	612	220	490
27	295	236	153	118	83	142	590	212	472
28	284	227	148	114	80	136	569	205	455
29	275	220	143	110	77	132	549	198	439
30	265	212	138	106	74	127	531	191	425
31	257	205	134	103	72	123	514	185	411
32	249	199	129	100	70	119	498	179	398
33	241	193	125	97	68	116	483	174	386
34	234	187	122	94	66	112	468	169	375
35	227	182	118	91	64	109	455	164	364
36	221	177	115	88	62	106	442	159	354
37	215	172	112	86	60	103	430	155	344
38	210	168	109	84	59	101	419	151	335
39	204	163	106	82	57	98	408	147	327
40	199	159	104	80	56	96	398	143	318
41	194	155	101	78	54	93	388	140	311
42	190	152	99	76	53	91	379	136	303
43	185	148	96	74	52	89	370	133	296
44	181	145	94	72	51	87	362	130	290
45	177	142	92	71	50	85	354	127	283
46	173	138	90	69	48	83	346	125	277
47	169	136	88	68	47	81	339	122	271
48	166	133	86	66	46	80	332	119	265
49	162	130	84	65	45	78	325	117	260
50	159	127	83	64	45	76	318	115	255
51	156	125	81	62	44	75	312	112	250
52	153	122	80	61	43	73	306	110	245
53	150	120	78	60	42	72	300	108	240
54	147	118	77	59	41	71	295	106	236
55	145	116	75	58	41	69	290	104	232
56	142	114	74	57	40	68	284	102	227
57	140	112	73	56	39	67	279	101	223
58	137	110	71	55	38	66	275	99	220
59	135	108	70	54	38	65	270	97	216
60	133	106	69	53	37	64	265	96	212

HSS DRILLS



Recommended cutting rotation speed for TCT cutter

Diameter (mm)	Mild Steel 500N/mm	Medium Carbon Steel 750N/mm	High Carbon Steel 900N/mm	Alloy tool Steel 1200 N/mm	Carbon tool Steel 1400 N/mm	Stainless Steel	Aluminium	Cast Iron	Cast Copper
12	1062	982	929	796	663	531	2389	1592	929
13	980	906	857	735	612	490	2205	1470	857
14	910	842	796	682	569	455	2047	1470	796
15	849	786	743	637	531	425	1911	1274	743
16	796	736	697	597	498	398	1791	1194	697
17	749	693	656	562	468	375	1686	1124	656
18	708	655	619	531	442	354	1592	1062	619
19	670	620	587	503	419	335	1509	1006	587
20	637	589	557	478	398	318	1433	955	557
21	607	561	531	455	379	303	1365	910	531
22	579	536	507	434	362	290	1303	869	507
23	554	512	485	415	346	277	1246	831	485
24	531	491	464	398	332	265	1194	796	464
25	510	471	446	382	318	255	1146	764	446
26	490	453	429	367	306	245	1102	735	429
27	472	436	413	354	295	236	1062	708	413
28	455	421	398	341	284	227	1024	682	398
29	439	406	384	329	275	220	988	659	384
30	425	393	372	318	265	212	955	637	372
31	411	380	360	308	257	205	925	616	360
32	398	368	348	299	249	199	896	597	348
33	386	357	338	290	241	193	869	579	338
34	375	347	328	281	234	187	843	562	328
35	364	337	318	273	227	182	819	546	318
36	354	327	310	265	221	177	796	531	310
37	344	318	301	258	215	172	775	516	301
38	335	310	293	251	210	168	754	503	293
39	327	302	286	245	204	163	735	490	286
40	318	295	279	239	199	159	717	478	279
41	311	287	272	233	194	155	699	466	272
42	303	281	265	227	190	152	682	455	265
43	296	274	259	222	185	148	667	444	259
44	290	268	253	217	181	145	651	434	253
45	283	262	248	212	177	142	637	425	248
46	277	256	242	208	173	138	623	415	242
47	271	251	237	203	169	136	610	407	237
48	265	245	232	199	166	133	597	398	232
49	260	240	227	195	162	130	585	390	227
50	255	236	223	191	159	127	573	382	223
51	250	231	219	187	156	125	562	375	219
52	245	227	214	184	153	122	551	367	214
53	240	222	210	180	150	120	541	361	210
54	236	218	206	177	147	118	531	354	206
55	232	214	203	174	145	116	521	347	203
56	227	210	199	171	142	114	512	341	199
57	223	207	196	168	140	112	503	335	196
58	220	203	192	165	137	110	494	329	192
59	216	200	189	162	135	108	486	324	189
60	212	196	186	159	133	106	478	318	186

HSS DRILLS

Recommended Feed Rate for Totem HSS Annular Cutter & TCT Annular Cutter

Material	Feed rate (mm/r)
Mild steel	0.08-0.13
Medium carbon steel	0.08-0.13
High carbon steel	0.05-0.1
Alloy tool steel	0.05-0.1
Carbon tool steel	0.05-0.1

Material	Feed rate (mm/r)
Stainless Steel	0.05-0.1
Aluminium	0.1-0.15
Cast Iron	0.07-0.12
Cast Copper	0.08-0.13



Dos & don'ts for HSS / HSS-E drills

1. Adjust drilling condition according to the rigidity of machine or the work clamp state
2. Adjust drilling condition when unusual vibration, different sound occurs while cutting
3. Provide sufficient amount cutting fluid to the cutting point & in the flute
4. When the hole depth is more than $3 \times D$, reduce the rotation & feed by 20%
5. When the hole depth is more than $3 \times D$, add step seeding. The depth of step should be from 0.2 to 1.0 diameter
6. For Stainless Steel material drilling, use step feed. In step feed, return to the entrance hole
7. Adjust the drill run out to the lowest value possible
8. Ensure the correct Point Angle, Lip position & Lip Length post regrinding operation
9. Do not allow the choking of swarf

Dos & don'ts for annular cutter

1. Different feed forms different shaped chips, which determines the chip evacuation efficiency
2. During the beginning & before the end of hole cutting, decrease feed rate by $1/3$ to reduce the damage on cutter
3. Sufficient coolant supply is necessary to increase the smoothness of hole as well as the quantities of holes to be cut
4. Some materials like Cast Iron, Copper etc result in chips in powder form while cutting. Hence compressed air is recommended for cooling instead of coolant
5. Remove the chips twining around the cutter from time to time
6. When the wear width of cutting edges reaches 0.4 mm, cutter should be replaced

Bradmag: Magnetic drilling machine from Bradma



WHAT IS A MAGNETIC DRILL MACHINE?

It is a Portable drilling machine with an electromagnetic base or a permanent magnet base. It is used to drill hole using Annular Cutters, TCT cutters, and Morse Taper shank drills in various materials thereby producing accurate, burr free holes. The machine can also be used for tapping for specific models*

WHY TO USE THE MAGNETIC DRILLING MACHINE?

Fabrication is done at site for the structural components. Owing to its portability, it is ideal for use at site.

*Please consult our application engineer for technical details and optimum use

■ SPECIFICATION ■

	BRADMAG 35	BRADMAG 50	BRADMAG 120
Motor rated power (W)	1550	1700	2690
No Load Speed (RPM)	100-830	100-810	100-130/100-30/ 100-620
Rotating direction Clockwise	Clockwise	Clockwise	Clockwise & Counter clockwise
Arbor Bore (mm)	19.05	19.05	-
Cooling Method	Internal Cooling	Internal Cooling	Internal Cooling
Voltage	AC 220V~240V	AC 220V~240V	AC 220V~240V
Frequency Range (Hz)	50-60	50-60	50-60
Magnetic Deadlift (N)	14800	15600	18600
Motor Height Adjustment (mm)	300-470	300-490	530-730
Max Cutting Dia - Annular Cutter (mm)	35 (1-3/8 ")	50	130
Max Cutting Depth (mm)	30	35	75
Maximum Diameter Twist Drill (mm)	13	16	32
MT Shank	-	-	MT3
Tapping	-	-	M28
Stroke (mm)	120	130	340
Magnet Footprint (mm)	166x80x50	166x80x50	115x280x56.5
Weight (Kgs)	15	16	33
Dimensions (cm)	53x17x43	53x17x43	62x20x51
Max Attraction (N)	14800	15600	18600
Cutting Depth (mm)	30	35	75
Stroke (mm)	120	130	340
Wire (m)	3.5	3.5	3.5
Magnetic Base Size (mm)	166x80x50	166x80x50	200x100x68
Net / Gross Weight (Kgs)	12/15	13/16	28/33
Packing Size (cm)	53x17x43	53x17x43	62x20x51
Warranty (Months)	12	12	12

INDUSTRY APPLICATIONS



Steel Fabrication



Building & Construction



Automobile



Mining



Oil Fields



Railways



Ship Building



Bridges



Workshops

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