



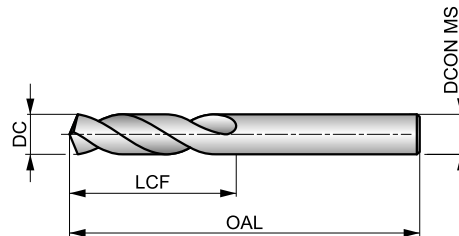
A120

DORMER



HSS Stub Drill, Steam Tempered Finish

Versatile drill with Steam tempered finish. A 135° split point reduces the forces when drilling and prevents the drill from wandering over the surface of the material. Steam tempered finish retains cutting fluid and prevents chip to tool welding. Suitable for hand-held and machine drilling of many materials.



HSS	DIN 1897	2.5×D
135°	ST	
λ 20-35°	R	DC h8

Workpiece material group suitability, starting values for cutting speed (m/min) and feed Alpha Code. Tables with feed per revolution can be found starting from page 175.

P1.1 ■ 36 J	P1.2 ■ 40 J	P1.3 ■ 41 J	P2.1 ■ 31 J	P2.2 ■ 27 G	P2.3 ■ 24 F	P3.1 ■ 21 G	P3.2 ■ 17 G	P3.3 ■ 14 F	P4.1 ■ 12 G	P4.2 ■ 10 F	P4.3 ■ 9 E	M1.1 ■ 22 F	M1.2 ■ 19 F
M2.1 ■ 20 F	M2.2 ■ 16 F	M3.1 ■ 10 H	M3.2 ■ 9 H	M3.3 ■ 8 H	M4.1 ■ 10 D	K1.1 ■ 32 J	K1.2 ■ 24 G	K1.3 ■ 18 G	K2.1 ■ 25 F	K2.2 ■ 20 F	K2.3 ■ 16 F	K3.1 ■ 22 F	K3.2 ■ 17 F
K3.3 ■ 13 F	K4.1 ■ 20 F	K4.2 ■ 15 F	K4.3 ■ 11 F	K4.4 ■ 10 F	K4.5 ■ 8 F	K5.1 ■ 23 F	K5.2 ■ 17 F	K5.3 ■ 13 F	N1.1 ■ 33 K	N1.2 ■ 25 K	N1.3 ■ 17 J	N2.1 ■ 46 I	N2.2 ■ 42 I
N2.3 ■ 30 I	N3.1 ■ 64 I	N3.2 ■ 38 J	N3.3 ■ 19 H	N4.1 ■ 30 K	N4.2 ■ 35 I	N4.3 ■ 17 G	S1.1 ■ 27 G	S1.2 ■ 16 E	S1.3 ■ 8 C	S2.1 ■ 11 F	S2.2 ■ 6 B	S3.1 ■ 8 F	S3.2 ■ 4 B
S4.1 ■ 6 F	S4.2 ■ 3 B												

DC ≤ 1mm Bright; 2.9mm ⇒ DC ≥ 13.0mm 118° Point.

Product	DC	DC	DC	LCF	OAL	DCON MS
	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]
A120.5	—	0.50	0.0197	3.0	20.0	0.50
A120.6	—	0.60	0.0236	3.5	21.0	0.60
A120.7	—	0.70	0.0276	4.5	23.0	0.70
A1201/32	1/32	0.79	0.0313	5.0	24.0	0.79
A120.8	—	0.80	0.0315	5.0	24.0	0.80
A120.9	—	0.90	0.0354	5.5	25.0	0.90
A1201.0	—	1.00	0.0394	6.0	26.0	1.00
A1201.1	—	1.10	0.0433	7.0	28.0	1.10
A1203/64	3/64	1.19	0.0469	8.0	30.0	1.19
A1201.2	—	1.20	0.0472	8.0	30.0	1.20
A1201.3	—	1.30	0.0512	8.0	30.0	1.30
A1201.4	—	1.40	0.0551	9.0	32.0	1.40
A1201.5	—	1.50	0.0591	9.0	32.0	1.50
A1201/16	1/16	1.59	0.0625	10.0	34.0	1.59
A1201.6	—	1.60	0.0630	10.0	34.0	1.60
A1201.7	—	1.70	0.0669	10.0	34.0	1.70
A1201.8	—	1.80	0.0709	11.0	36.0	1.80
A1201.9	—	1.90	0.0748	11.0	36.0	1.90
A1205/64	5/64	1.98	0.0781	12.0	38.0	1.98
A1202.0	—	2.00	0.0787	12.0	38.0	2.00
A1202.1	—	2.10	0.0827	12.0	38.0	2.10
A1202.2	—	2.20	0.0866	13.0	40.0	2.20
A1202.25	—	2.25	0.0886	13.0	40.0	2.25

Product	DC	DC	DC	LCF	OAL	DCON MS
	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]
A1202.3	—	2.30	0.0906	13.0	40.0	2.30
A1203/32	3/32	2.38	0.0938	14.0	43.0	2.38
A1202.4	—	2.40	0.0945	14.0	43.0	2.40
A1202.5	—	2.50	0.0984	14.0	43.0	2.50
A1202.6	—	2.60	0.1024	14.0	43.0	2.60
A1202.65	—	2.65	0.1043	14.0	43.0	2.65
A1202.7	—	2.70	0.1063	16.0	46.0	2.70
A1207/64	7/64	2.78	0.1094	16.0	46.0	2.78
A1202.8	—	2.80	0.1102	16.0	46.0	2.80
A1202.9	—	2.90	0.1142	16.0	46.0	2.90
A1203.0	—	3.00	0.1181	16.0	46.0	3.00
A1203.1	—	3.10	0.1220	18.0	49.0	3.10
A1201/8	1/8	3.18	0.1252	18.0	49.0	3.18
A1203.2	—	3.20	0.1260	18.0	49.0	3.20
A1203.25	—	3.25	0.1280	18.0	49.0	3.25
A1203.3	—	3.30	0.1299	18.0	49.0	3.30
A1203.4	—	3.40	0.1339	20.0	52.0	3.40
A1203.5	—	3.50	0.1378	20.0	52.0	3.50
A1209/64	9/64	3.57	0.1406	20.0	52.0	3.57
A1203.6	—	3.60	0.1417	20.0	52.0	3.60
A1203.7	—	3.70	0.1457	20.0	52.0	3.70
A1203.8	—	3.80	0.1496	22.0	55.0	3.80
A1203.9	—	3.90	0.1535	22.0	55.0	3.90

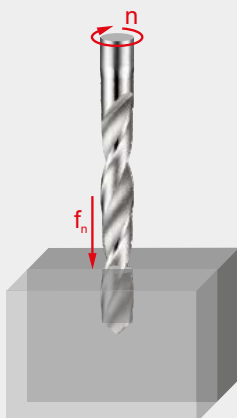


Product	DC	DC	DC	LCF	OAL	DCON MS
	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]
A1205/32	5/32	3.97	0.1563	22.0	55.0	3.97
A1204.0	—	4.00	0.1575	22.0	55.0	4.00
A1204.1	—	4.10	0.1614	22.0	55.0	4.10
A1204.2	—	4.20	0.1654	22.0	55.0	4.20
A1204.3	—	4.30	0.1693	24.0	58.0	4.30
A12011/64	11/64	4.37	0.1719	24.0	58.0	4.37
A1204.4	—	4.40	0.1732	24.0	58.0	4.40
A1204.5	—	4.50	0.1772	24.0	58.0	4.50
A1204.6	—	4.60	0.1811	24.0	58.0	4.60
A1204.7	—	4.70	0.1850	24.0	58.0	4.70
A1203/16	3/16	4.76	0.1875	26.0	62.0	4.76
A1204.8	—	4.80	0.1890	26.0	62.0	4.80
A1204.9	—	4.90	0.1929	26.0	62.0	4.90
A1205.0	—	5.00	0.1969	26.0	62.0	5.00
A1205.1	—	5.10	0.2008	26.0	62.0	5.10
A12013/64	13/64	5.16	0.2031	26.0	62.0	5.16
A1205.2	—	5.20	0.2047	26.0	62.0	5.20
A1205.3	—	5.30	0.2087	26.0	62.0	5.30
A1205.4	—	5.40	0.2126	28.0	66.0	5.40
A1205.5	—	5.50	0.2165	28.0	66.0	5.50
A1207/32	7/32	5.56	0.2188	28.0	66.0	5.56
A1205.6	—	5.60	0.2205	28.0	66.0	5.60
A1205.7	—	5.70	0.2244	28.0	66.0	5.70
A1205.8	—	5.80	0.2283	28.0	66.0	5.80
A1205.9	—	5.90	0.2323	28.0	66.0	5.90
A12015/64	15/64	5.95	0.2344	28.0	66.0	5.95
A1206.0	—	6.00	0.2362	28.0	66.0	6.00
A1206.1	—	6.10	0.2402	31.0	70.0	6.10
A1206.2	—	6.20	0.2441	31.0	70.0	6.20
A1206.3	—	6.30	0.2480	31.0	70.0	6.30
A1201/4	1/4	6.35	0.2500	31.0	70.0	6.35
A1206.4	—	6.40	0.2520	31.0	70.0	6.40
A1206.5	—	6.50	0.2559	31.0	70.0	6.50
A1206.6	—	6.60	0.2598	31.0	70.0	6.60
A1206.7	—	6.70	0.2638	31.0	70.0	6.70
A1206.8	—	6.80	0.2677	34.0	74.0	6.80
A1206.9	—	6.90	0.2717	34.0	74.0	6.90
A1207.0	—	7.00	0.2756	34.0	74.0	7.00
A1207.1	—	7.10	0.2795	34.0	74.0	7.10
A1209/32	9/32	7.14	0.2813	34.0	74.0	7.14
A1207.2	—	7.20	0.2835	34.0	74.0	7.20
A1207.3	—	7.30	0.2874	34.0	74.0	7.30
A1207.4	—	7.40	0.2913	34.0	74.0	7.40
A1207.5	—	7.50	0.2953	34.0	74.0	7.50
A1207.6	—	7.60	0.2992	37.0	79.0	7.60
A1207.7	—	7.70	0.3031	37.0	79.0	7.70
A1207.8	—	7.80	0.3071	37.0	79.0	7.80
A1207.9	—	7.90	0.3110	37.0	79.0	7.90
A1205/16	5/16	7.94	0.3125	37.0	79.0	7.94
A1208.0	—	8.00	0.3150	37.0	79.0	8.00
A1208.1	—	8.10	0.3189	37.0	79.0	8.10
A1208.2	—	8.20	0.3228	37.0	79.0	8.20
A1208.3	—	8.30	0.3268	37.0	79.0	8.30
A1208.4	—	8.40	0.3307	37.0	79.0	8.40
A1208.5	—	8.50	0.3346	37.0	79.0	8.50
A1208.6	—	8.60	0.3386	40.0	84.0	8.60
A1208.7	—	8.70	0.3425	40.0	84.0	8.70
A12011/32	11/32	8.73	0.3438	40.0	84.0	8.73
A1208.8	—	8.80	0.3465	40.0	84.0	8.80
A1208.9	—	8.90	0.3504	40.0	84.0	8.90
A1209.0	—	9.00	0.3543	40.0	84.0	9.00
A1209.1	—	9.10	0.3583	40.0	84.0	9.10
A1209.2	—	9.20	0.3622	40.0	84.0	9.20
A1209.3	—	9.30	0.3661	40.0	84.0	9.30
A1209.4	—	9.40	0.3701	40.0	84.0	9.40

Product	DC	DC	DC	LCF	OAL	DCON MS
	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]
A1209.5	—	9.50	0.3740	40.0	84.0	9.50
A1203/8	3/8	9.52	0.3750	43.0	89.0	9.52
A1209.6	—	9.60	0.3780	43.0	89.0	9.60
A1209.7	—	9.70	0.3819	43.0	89.0	9.70
A1209.8	—	9.80	0.3858	43.0	89.0	9.80
A1209.9	—	9.90	0.3898	43.0	89.0	9.90
A12010.0	—	10.00	0.3937	43.0	89.0	10.00
A12010.1	—	10.10	0.3976	43.0	89.0	10.10
A12010.2	—	10.20	0.4016	43.0	89.0	10.20
A12010.3	—	10.30	0.4055	43.0	89.0	10.30
A12013/32	13/32	10.32	0.4063	43.0	89.0	10.32
A12010.4	—	10.40	0.4094	43.0	89.0	10.40
A12010.5	—	10.50	0.4134	43.0	89.0	10.50
A12010.6	—	10.60	0.4173	43.0	89.0	10.60
A12010.7	—	10.70	0.4213	47.0	95.0	10.70
A12010.8	—	10.80	0.4252	47.0	95.0	10.80
A12010.9	—	10.90	0.4291	47.0	95.0	10.90
A12011.0	—	11.00	0.4331	47.0	95.0	11.00
A12011.1	—	11.10	0.4370	47.0	95.0	11.10
A1207/16	7/16	11.11	0.4375	47.0	95.0	11.11
A12011.2	—	11.20	0.4409	47.0	95.0	11.20
A12011.3	—	11.30	0.4449	47.0	95.0	11.30
A12011.5	—	11.50	0.4528	47.0	95.0	11.50
A12011.6	—	11.60	0.4567	47.0	95.0	11.60
A12011.7	—	11.70	0.4606	47.0	95.0	11.70
A12011.8	—	11.80	0.4646	47.0	95.0	11.80
A12011.9	—	11.90	0.4685	51.0	102.0	11.90
A12012.0	—	12.00	0.4724	51.0	102.0	12.00
A12012.1	—	12.10	0.4764	51.0	102.0	12.10
A12012.2	—	12.20	0.4803	51.0	102.0	12.20
A12012.5	—	12.50	0.4921	51.0	102.0	12.50
A1201/2	1/2	12.70	0.5000	51.0	102.0	12.70
A12013.0	—	13.00	0.5118	51.0	102.0	13.00
A12013.5	—	13.50	0.5315	54.0	107.0	13.50
A12014.0	—	14.00	0.5512	54.0	107.0	14.00
A1209/16	9/16	14.29	0.5625	56.0	111.0	14.29
A12014.5	—	14.50	0.5709	56.0	111.0	14.50
A12015.0	—	15.00	0.5906	56.0	111.0	15.00
A12015.5	—	15.50	0.6102	58.0	115.0	15.50
A1205/8	5/8	15.88	0.6250	58.0	115.0	15.88
A12016.0	—	16.00	0.6299	58.0	115.0	16.00
A12016.5	—	16.50	0.6496	60.0	119.0	16.50
A12017.0	—	17.00	0.6693	60.0	119.0	17.00
A12011/16	11/16	17.46	0.6875	62.0	123.0	17.46
A12017.5	—	17.50	0.6890	62.0	123.0	17.50
A12018.0	—	18.00	0.7087	62.0	123.0	18.00
A12018.5	—	18.50	0.7283	64.0	127.0	18.50
A12019.0	—	19.00	0.7480	64.0	127.0	19.00
A1203/4	3/4	19.05	0.7500	66.0	131.0	19.05
A12019.5	—	19.50	0.7677	66.0	131.0	19.50
A12020.0	—	20.00	0.7874	66.0	131.0	20.00
A12020.5	—	20.50	0.8071	68.0	136.0	20.50
A12013/16	13/16	20.64	0.8125	68.0	136.0	20.64
A12021.0	—	21.00	0.8268	68.0	136.0	21.00
A12022.0	—	22.00	0.8661	70.0	141.0	22.00
A1207/8	7/8	22.22	0.8750	70.0	141.0	22.22
A12023.0	—	23.00	0.9055	72.0	146.0	23.00
A12015/16	15/16	23.81	0.9375	75.0	151.0	23.81
A12024.0	—	24.00	0.9449	75.0	151.0	24.00
A12025.0	—	25.00	0.9843	75.0	151.0	25.00



DRILLING FEED RATE CHART



Feed per revolution (f_n in mm/rev)
Depending on the working conditions
it might be necessary to adjust these
values $\pm 25\%$.

How to use this table to find the feed per revolution (f_n):

1. Find your Alpha Code on the product page (example: 46J, "J" is the Alpha Code).
2. Find the closest diameter for your cutting application in the top row of the table.
3. Find your Alpha Code in the left column of the table.
4. The intersection (cell) of the Diameter and Alpha Code is the feed per revolution (f_n).

		$\varnothing$ DC [mm]																		
		0.15	0.50	1.00	2.00	3.00	4.00	5.00	6.00	8.00	10.00	12.00	15.00	16.00	20.00	25.00	30.00	40.00	50.00	100.00
Feed rates	A	0.003	0.006	0.012	0.023	0.029	0.032	0.036	0.042	0.054	0.062	0.069	0.082	0.086	0.110	0.125	0.135	0.155	0.175	0.263
	B	0.004	0.007	0.014	0.028	0.037	0.041	0.046	0.053	0.067	0.080	0.090	0.103	0.108	0.135	0.153	0.165	0.188	0.208	0.312
	C	0.004	0.008	0.015	0.032	0.044	0.050	0.056	0.064	0.080	0.098	0.110	0.125	0.130	0.160	0.180	0.195	0.220	0.240	0.360
	D	0.004	0.008	0.016	0.038	0.053	0.060	0.068	0.078	0.098	0.119	0.130	0.149	0.155	0.188	0.210	0.228	0.253	0.275	0.413
	E	0.004	0.009	0.017	0.043	0.062	0.071	0.080	0.092	0.115	0.140	0.150	0.173	0.180	0.215	0.240	0.260	0.285	0.310	0.465
	F	0.005	0.009	0.018	0.050	0.073	0.084	0.095	0.109	0.138	0.165	0.178	0.202	0.210	0.248	0.275	0.295	0.320	0.343	0.515
	G	0.005	0.010	0.019	0.056	0.084	0.096	0.109	0.126	0.160	0.190	0.205	0.231	0.240	0.280	0.310	0.330	0.355	0.375	0.563
	H	0.005	0.010	0.020	0.066	0.102	0.116	0.130	0.150	0.190	0.228	0.243	0.271	0.280	0.320	0.355	0.375	0.398	0.418	0.627
	I	0.005	0.011	0.021	0.076	0.119	0.134	0.150	0.173	0.220	0.265	0.280	0.310	0.320	0.360	0.400	0.420	0.440	0.460	0.690
	J	0.006	0.012	0.024	0.084	0.135	0.152	0.170	0.197	0.250	0.298	0.315	0.349	0.360	0.405	0.445	0.465	0.485	0.503	0.755
	K	0.007	0.013	0.026	0.092	0.150	0.170	0.190	0.220	0.280	0.330	0.350	0.388	0.400	0.450	0.490	0.510	0.530	0.545	0.818
	L	0.007	0.014	0.028	0.101	0.165	0.186	0.208	0.240	0.305	0.360	0.385	0.419	0.430	0.485	0.525	0.545	0.568	0.588	0.882
	M	0.008	0.015	0.030	0.110	0.180	0.202	0.225	0.260	0.330	0.390	0.420	0.450	0.460	0.520	0.560	0.580	0.605	0.630	0.945
	N	0.008	0.016	0.032	0.119	0.195	0.218	0.242	0.280	0.355	0.420	0.455	0.481	0.490	0.555	0.595	0.615	0.642	0.672	1.008
	S	0.002	0.004	0.008	0.014	0.020	0.025	0.030	0.037	0.050	0.080	0.100	0.123	0.130	0.150	0.170	0.190	0.220	0.240	–
	T	0.004	0.008	0.015	0.028	0.040	0.050	0.060	0.070	0.090	0.110	0.130	0.160	0.170	0.190	0.210	0.230	0.260	0.275	–
	U	0.007	0.013	0.026	0.048	0.070	0.080	0.090	0.107	0.140	0.170	0.200	0.223	0.230	0.240	0.270	0.300	0.360	0.375	–
	V	0.010	0.019	0.038	0.069	0.100	0.115	0.130	0.153	0.200	0.250	0.280	0.310	0.320	0.340	0.400	0.440	0.510	0.530	–
	W	0.012	0.025	0.049	0.089	0.130	0.150	0.170	0.200	0.260	0.330	0.380	0.418	0.430	0.450	0.470	0.490	0.520	0.540	–
	X	0.014	0.028	0.056	0.103	0.150	0.180	0.210	0.250	0.330	0.420	0.480	0.533	0.550	0.580	–	–	–	–	–
	Y	0.017	0.034	0.068	0.124	0.180	0.220	0.260	0.317	0.430	0.550	0.700	0.700	0.700	0.740	–	–	–	–	–
	Z	0.024	0.047	0.094	0.172	0.250	0.325	0.400	0.533	0.800	1.000	1.100	1.175	1.200	1.200	–	–	–	–	–



WMG (WORK MATERIAL GROUP)

ISO group		WMG (Work Material Group)			Hardness (HB or HRC)	Ultimate Tensile Strength (MPa)	
P	P1	P1.1	Free machining steel (carbon steels with increased machinability)	Sulfurized	< 240 HB	≤ 830	
		P1.2		Sulfurized and phosphorized	< 180 HB	≤ 620	
		P1.3		Sulfurized/phosphorized and leaded	< 180 HB	≤ 620	
	P2	P2.1	Plain carbon steel (steels comprised of mainly iron and carbon)	Containing <0.25 % C	< 180 HB	≤ 620	
		P2.2		Containing <0.55 % C	< 240 HB	≤ 830	
		P2.3		Containing >0.55 % C	< 300 HB	≤ 1030	
	P3	P3.1	Alloy steel (carbon steels with an alloying content ≤ 10%)	Annealed	< 180 HB	≤ 620	
		P3.2		Hardened and tempered	180 – 260 HB	> 620 ≤ 900	
		P3.3			260 – 360 HB	> 900 ≤ 1240	
	P4	P4.1	Tool steel (special alloy steel for tools, dies and molds)	Annealed	< 26 HRC	≤ 900	
P4.2		Hardened and tempered		26 – 39 HRC	> 900 ≤ 1240		
P4.3				39 – 45 HRC	> 1240 ≤ 1450		
M	M1	M1.1	Ferritic stainless steel (straight chromium non-hardenable alloys)		< 160 HB	≤ 520	
		M1.2		160 – 220 HB	> 520 ≤ 700		
	M2	M2.1	Martensitic stainless steel (straight chromium hardenable alloys)	Annealed	< 200 HB	≤ 670	
		M2.2		Quenched and tempered	200 – 280 HB	> 670 ≤ 950	
		M2.3		Precipitation-hardened	280 – 380 HB	> 950 ≤ 1300	
	M3	M3.1	Austenitic stainless steel (chromium-nickel and chromium-nickel-manganese alloys)		< 200 HB	≤ 750	
		M3.2		200 – 260 HB	> 750 ≤ 870		
		M3.3		260 – 300 HB	> 870 ≤ 1040		
	M4	M4.1	Austenitic-ferritic (DUPLEX) or super-austenitic stainless steel		< 300 HB	≤ 990	
		M4.2		Precipitation hardening austenitic stainless steel	300 – 380 HB	≤ 1320	
K	K1	K1.1	Gray iron or Automotive Gray iron (GG) (iron-carbon castings with a lamellar graphite microstructure)	Ferritic or ferritic-pearlitic	< 180 HB	≤ 190	
		K1.2		Ferritic-pearlitic or pearlitic	180 – 240 HB	> 190 ≤ 310	
		K1.3		Pearlitic	240 – 280 HB	> 310 ≤ 390	
	K2	K2.1	Malleable iron (GTS/GTW) (iron-carbon castings with a graphite-free microstructure)	Ferritic	< 160 HB	≤ 400	
		K2.2		Ferritic or pearlitic	160 – 200 HB	> 400 ≤ 550	
		K2.3		Pearlitic	200 – 240 HB	> 550 ≤ 660	
	K3	K3.1	Ductile iron (GGG) (iron-carbon castings with a nodular graphite microstructure)	Ferritic	< 180 HB	≤ 560	
		K3.2		Ferritic or pearlitic	180 – 220 HB	> 560 ≤ 680	
		K3.3		Pearlitic	220 – 260 HB	> 680 ≤ 800	
	K4	K4.1	Austenitic gray iron (ASTM A436) (iron-carbon alloy castings with an austenitic lamellar graphite microstructure)		< 180 HB	≤ 190	
K4.2		Austenitic ductile iron (ASTM A439 or ASTM A571) (iron-carbon alloy castings with an austenitic nodular graphite microstructure)		< 240 HB	≤ 740		
K4.3		Austempered ductile iron (ASTM A897) (iron-carbon alloy castings with an ausferrite microstructure)		< 280 HB	> 840 ≤ 980		
K4.4				280 – 320 HB	> 980 ≤ 1130		
K4.5				320 – 360 HB	> 1130 ≤ 1280		
K5	K5.1	Compacted graphite iron CGI (ASTM A842) (iron-carbon castings with a vermicular graphite structure)	Ferritic	< 180 HB	≤ 400		
	K5.2		Ferritic-pearlitic	180 – 220 HB	> 400 ≤ 450		
	K5.3		Pearlitic	220 – 260 HB	> 450 ≤ 500		
N	N1	N1.1	Commercially pure wrought aluminium		< 60 HB	≤ 240	
		N1.2		Wrought aluminium alloys	Half hard tempered	60 – 100 HB	> 240 ≤ 400
		N1.3			Full hard tempered	100 – 150 HB	> 400 ≤ 590
	N2	N2.1	Cast aluminium alloys		< 75 HB	≤ 240	
		N2.2		75 – 90 HB	> 240 ≤ 270		
		N2.3		90 – 140 HB	> 270 ≤ 440		
	N3	N3.1	Free-cutting copper-alloys materials with excellent machining properties		–	–	
		N3.2		Short-chip copper-alloys with good to moderate machining properties	–	–	
		N3.3		Electrolytic copper and long-chip copper-alloys with moderate to poor machining properties	–	–	
	N4	N4.1	Thermoplastic polymers		–	–	
N4.2		Thermosetting polymers		–	–		
N4.3		Reinforced polymers or composites		–	–		
N5	N5.1	Graphite		–	–		
S	S1	S1.1	Titanium or titanium alloys		< 200 HB	≤ 660	
		S1.2		200 – 280 HB	> 660 ≤ 950		
		S1.3		280 – 360 HB	> 950 ≤ 1200		
	S2	S2.1	Fe-based high-temperature alloys		< 200 HB	≤ 690	
		S2.2		200 – 280 HB	> 690 ≤ 970		
	S3	S3.1	Ni-based high-temperature alloys		< 280 HB	≤ 940	
		S3.2		280 – 360 HB	> 940 ≤ 1200		
	S4	S4.1	Co-based high-temperature alloys		< 240 HB	≤ 800	
S4.2		240 – 320 HB		> 800 ≤ 1070			
H	H1	H1.1	Chilled cast iron		< 440 HB	–	
	H2	H2.1	Hardened cast iron		< 55 HRC	–	
		H2.2		> 55 HRC	–		
	H3	H3.1	Hardened steel <55 HRC		< 51 HRC	–	
		H3.2		51 – 55 HRC	–		
	H4	H4.1	Hardened steel >55 HRC		55 – 59 HRC	–	
H4.2		> 59 HRC		–			