

TiAIN-COATED SOLID CARBIDE DREAM DRILLS General without Coolant Holes (3XD)

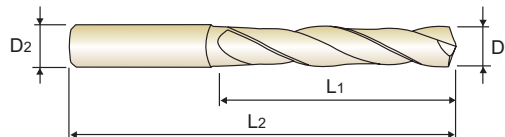
PLAIN SHANK

DH423 SERIES

FLAT SHANK

DH443 SERIES

- ▶ Drilling for Steel, Cast Steel, Cast Iron, Malleable Cast Iron
- ▶ Self centering and chip breaking by R-thinning
- ▶ Wave shape and negative land on the cutting edge for low thrust, stable torque and long tool life
- ▶ Optimized flute shape for strength of drilling and smooth chip evacuation



P. 39

SHORT

3 × D

EDP No. (TiAIN)		Drill Diameter	Shank Diameter	Flute Length	Overall Length
Plain	Flat	D1	D2	L1	L2
DH423030	DH443030	3.0	6	20	62
DH423031	DH443031	3.1	6	20	62
DH423032	DH443032	3.2	6	20	62
DH423033	DH443033	3.3	6	20	62
DH423034	DH443034	3.4	6	20	62
DH423035	DH443035	3.5	6	20	62
DH423036	DH443036	3.6	6	20	62
DH423037	DH443037	3.7	6	20	62
DH423038	DH443038	3.8	6	24	66
DH423039	DH443039	3.9	6	24	66
DH423040	DH443040	4.0	6	24	66
DH423041	DH443041	4.1	6	24	66
DH423042	DH443042	4.2	6	24	66
DH423043	DH443043	4.3	6	24	66
DH423044	DH443044	4.4	6	24	66
DH423045	DH443045	4.5	6	24	66
DH423046	DH443046	4.6	6	24	66
DH423047	DH443047	4.7	6	24	66
DH423048	DH443048	4.8	6	28	66
DH423049	DH443049	4.9	6	28	66
DH423050	DH443050	5.0	6	28	66
DH423051	DH443051	5.1	6	28	66
DH423052	DH443052	5.2	6	28	66
DH423053	DH443053	5.3	6	28	66

Unit : mm

EDP No. (TiAIN)		Drill Diameter	Shank Diameter	Flute Length	Overall Length
Plain	Flat	D1	D2	L1	L2
DH423054	DH443054	5.4	6	28	66
DH423055	DH443055	5.5	6	28	66
DH423056	DH443056	5.6	6	28	66
DH423057	DH443057	5.7	6	28	66
DH423058	DH443058	5.8	6	28	66
DH423059	DH443059	5.9	6	28	66
DH423060	DH443060	6.0	6	28	66
DH423061	DH443061	6.1	8	34	79
DH423062	DH443062	6.2	8	34	79
DH423063	DH443063	6.3	8	34	79
DH423064	DH443064	6.4	8	34	79
DH423065	DH443065	6.5	8	34	79
DH423066	DH443066	6.6	8	34	79
DH423067	DH443067	6.7	8	34	79
DH423068	DH443068	6.8	8	34	79
DH423069	DH443069	6.9	8	34	79
DH423070	DH443070	7.0	8	34	79
DH423071	DH443071	7.1	8	41	79
DH423072	DH443072	7.2	8	41	79
DH423073	DH443073	7.3	8	41	79
DH423074	DH443074	7.4	8	41	79
DH423075	DH443075	7.5	8	41	79
DH423076	DH443076	7.6	8	41	79
DH423077	DH443077	7.7	8	41	79

▶ Other shank types are available on your request.

▶ NEXT PAGE

◎ : Excellent ○ : Good

ISO	P										M				K					
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc	13	25	28	32	30	10	29	32	38	15	35	15	23	10	10	26	3	25	13	21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommended	◎	◎	◎	○	◎	◎	◎	○	○	◎	○	○	○	○	◎	○	◎	○	◎	○

ISO	N							S							H						
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials	Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron			
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommended																					

TiAIN-COATED SOLID CARBIDE DREAM DRILLS
General without Coolant Holes (3XD)

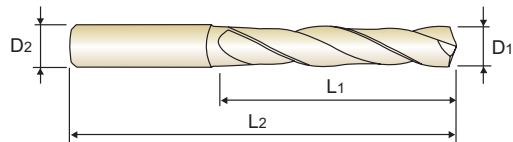
PLAIN SHANK

DH423 SERIES

FLAT SHANK

DH443 SERIES

- ▶ Drilling for Steel, Cast Steel, Cast Iron, Malleable Cast Iron
- ▶ Self centering and chip breaking by R-thinning
- ▶ Wave shape and negative land on the cutting edge for low thrust, stable torque and long tool life
- ▶ Optimized flute shape for strength of drilling and smooth chip evacuation



DIN 6537
CARBIDE
h6
h6
m7
140°
P. 39

SHORT

3 × D

EDP No. (TiAIN)		Drill Diameter	Shank Diameter	Flute Length	Overall Length
Plain	Flat	D1	D2	L1	L2
DH423078	DH443078	7.8	8	41	79
DH423079	DH443079	7.9	8	41	79
DH423080	DH443080	8.0	8	41	79
DH423081	DH443081	8.1	10	47	89
DH423082	DH443082	8.2	10	47	89
DH423083	DH443083	8.3	10	47	89
DH423084	DH443084	8.4	10	47	89
DH423085	DH443085	8.5	10	47	89
DH423086	DH443086	8.6	10	47	89
DH423087	DH443087	8.7	10	47	89
DH423088	DH443088	8.8	10	47	89
DH423089	DH443089	8.9	10	47	89
DH423090	DH443090	9.0	10	47	89
DH423091	DH443091	9.1	10	47	89
DH423092	DH443092	9.2	10	47	89
DH423093	DH443093	9.3	10	47	89
DH423094	DH443094	9.4	10	47	89
DH423095	DH443095	9.5	10	47	89
DH423096	DH443096	9.6	10	47	89
DH423097	DH443097	9.7	10	47	89
DH423098	DH443098	9.8	10	47	89
DH423099	DH443099	9.9	10	47	89
DH423100	DH443100	10.0	10	47	89
DH423101	DH443101	10.1	12	55	102

Unit : mm

EDP No. (TiAIN)		Drill Diameter	Shank Diameter	Flute Length	Overall Length
Plain	Flat	D1	D2	L1	L2
DH423102	DH443102	10.2	12	55	102
DH423103	DH443103	10.3	12	55	102
DH423104	DH443104	10.4	12	55	102
DH423105	DH443105	10.5	12	55	102
DH423106	DH443106	10.6	12	55	102
DH423107	DH443107	10.7	12	55	102
DH423108	DH443108	10.8	12	55	102
DH423109	DH443109	10.9	12	55	102
DH423110	DH443110	11.0	12	55	102
DH423111	DH443111	11.1	12	55	102
DH423112	DH443112	11.2	12	55	102
DH423113	DH443113	11.3	12	55	102
DH423114	DH443114	11.4	12	55	102
DH423115	DH443115	11.5	12	55	102
DH423116	DH443116	11.6	12	55	102
DH423117	DH443117	11.7	12	55	102
DH423118	DH443118	11.8	12	55	102
DH423119	DH443119	11.9	12	55	102
DH423120	DH443120	12.0	12	55	102
DH423123	DH443123	12.3	14	60	107
DH423125	DH443125	12.5	14	60	107
DH423128	DH443128	12.8	14	60	107
DH423130	DH443130	13.0	14	60	107
DH423135	DH443135	13.5	14	60	107

▶ Other shank types are available on your request.

▶ NEXT PAGE

◎ : Excellent ○ : Good

ISO	P										M				K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel				Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRC	13	25	28	32	30	10	29	32	38	15	35	15	23	10	10	26	3	25	21	21	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommended	◎	◎	◎	○	◎	◎	◎	○	○	◎	○	○	○	○	◎	○	◎	○	◎	○	

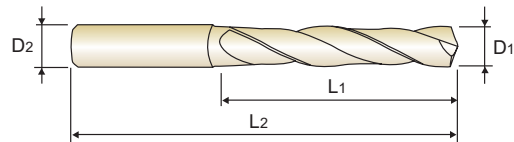
ISO	N										S						H						
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)					Non Metallic Materials		Heat Resistant Super Alloys				Titanium Alloys		Hardened steel		Chilled Cast Iron		Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41		
HRC	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41		
HB	60	100	75	90	130	110	90	100			15	30	25	38	34	400 Rm	1050 Rm	55	60	42	55		
Recommended	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎		

TiAIN-COATED SOLID CARBIDE DREAM DRILLS General without Coolant Holes (3XD)

PLAIN SHANK **DH423** SERIES

FLAT SHANK **DH443** SERIES

- ▶ Drilling for Steel, Cast Steel, Cast Iron, Malleable Cast Iron
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P. 39

SHORT

3 × D

EDP No. (TiAIN)		Drill Diameter	Shank Diameter	Flute Length	Overall Length
Plain	Flat	D1	D2	L1	L2
DH423138	DH443138	13.8	14	60	107
DH423140	DH443140	14.0	14	60	107
DH423145	DH443145	14.5	16	65	115
DH423148	DH443148	14.8	16	65	115
DH423150	DH443150	15.0	16	65	115
DH423155	DH443155	15.5	16	65	115
DH423158	DH443158	15.8	16	65	115
DH423160	DH443160	16.0	16	65	115
DH423165	DH443165	16.5	18	73	123
DH423168	DH443168	16.8	18	73	123

Unit : mm

EDP No. (TiAIN)		Drill Diameter	Shank Diameter	Flute Length	Overall Length
Plain	Flat	D1	D2	L1	L2
DH423170	DH443170	17.0	18	73	123
DH423175	DH443175	17.5	18	73	123
DH423178	DH443178	17.8	18	73	123
DH423180	DH443180	18.0	18	73	123
DH423185	DH443185	18.5	20	79	131
DH423190	DH443190	19.0	20	79	131
DH423195	DH443195	19.5	20	79	131
DH423198	DH443198	19.8	20	79	131
DH423200	DH443200	20.0	20	79	131

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

ISO	P										M					K					
Material Description	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	25	28	32	30	10	29	32	38	15	35	15	23	10	10	26	3	25	130	21	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommended	◎	◎	◎	○	◎	◎	◎	○	○	◎	○	○	○	◎	○	◎	○	◎	○		
ISO	N										S					H					
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel		Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommended																					

RECOMMENDED CUTTING CONDITIONS

**DH404, DH423, DH443,
DH424, DH444** SERIES

without COOLANT HOLES

V_c = m/min
RPM = rev./min.
FEED = mm/rev.

ISO	VDI 3323	Material Description	V _c	Parameter	Drill Diameter (mm)		V _c	Parameter	Drill Diameter (mm)			
					1.0	2.0			3.0	4.0	5.0	6.0
P	2	Non-alloy steel	70	RPM FEED	22280 0.03-0.05	11140 0.05-0.07	100	RPM FEED	10610 0.06-0.12	7960 0.08-0.14	6370 0.14-0.20	5310 0.16-0.22
	3		70	RPM FEED	22280 0.03-0.05	11140 0.05-0.07	100	RPM FEED	10610 0.06-0.12	7960 0.08-0.14	6370 0.14-0.20	5310 0.16-0.22
	4		70	RPM FEED	22280 0.03-0.05	11140 0.05-0.07	100	RPM FEED	10610 0.04-0.10	7960 0.07-0.13	6370 0.10-0.16	5310 0.12-0.18
	5		60	RPM FEED	19100 0.03-0.05	9550 0.05-0.07	80	RPM FEED	8490 0.04-0.10	6370 0.07-0.13	5090 0.10-0.16	4240 0.12-0.18
	6		70	RPM FEED	22280 0.03-0.05	11140 0.05-0.07	100	RPM FEED	10610 0.06-0.12	7960 0.08-0.14	6370 0.14-0.20	5310 0.16-0.22
	7	Low alloy steel	60	RPM FEED	19100 0.03-0.05	9550 0.05-0.07	80	RPM FEED	8490 0.06-0.12	6370 0.08-0.14	5090 0.10-0.20	4240 0.12-0.24
	8		60	RPM FEED	19100 0.02-0.04	9550 0.03-0.05	80	RPM FEED	8490 0.04-0.10	6370 0.07-0.13	5090 0.10-0.16	4240 0.12-0.18
	9		30	RPM FEED	9550 0.02-0.04	4770 0.03-0.05	40	RPM FEED	4240 0.03-0.08	3180 0.05-0.11	2550 0.08-0.14	2120 0.10-0.16
	10	High alloyed steel, and tool steel	50	RPM FEED	15920 0.03-0.05	7960 0.05-0.07	70	RPM FEED	7430 0.04-0.10	5570 0.07-0.13	4460 0.10-0.16	3710 0.12-0.18
	11		30	RPM FEED	9550 0.02-0.04	4770 0.03-0.05	40	RPM FEED	4240 0.03-0.08	3180 0.05-0.11	2550 0.08-0.14	2120 0.10-0.16
	M	12	Stainless steel	50	RPM FEED	15920 0.03-0.05	7960 0.05-0.07	70	RPM FEED	7430 0.06-0.12	5570 0.08-0.14	4460 0.14-0.20
13		35		RPM FEED	11140 0.02-0.04	5570 0.03-0.05	45	RPM FEED	4770 0.04-0.10	3580 0.07-0.13	2860 0.10-0.16	2390 0.12-0.18
K	15	Grey cast iron	70	RPM FEED	22280 0.04-0.06	11140 0.04-0.06	100	RPM FEED	10610 0.08-0.14	7960 0.12-0.18	6370 0.18-0.24	5310 0.14-0.26
	16		65	RPM FEED	20690 0.04-0.06	10350 0.04-0.06	80	RPM FEED	8490 0.06-0.12	6370 0.08-0.14	5090 0.14-0.20	4240 0.16-0.22
	17	Nodular cast iron	70	RPM FEED	22280 0.04-0.06	11140 0.04-0.06	100	RPM FEED	10610 0.08-0.14	7960 0.12-0.18	6370 0.18-0.24	5310 0.14-0.26
	18		50	RPM FEED	15920 0.04-0.06	7960 0.04-0.06	70	RPM FEED	7430 0.06-0.12	5570 0.08-0.14	4460 0.14-0.20	3710 0.16-0.22
	19	Malleable cast iron	60	RPM FEED	19100 0.04-0.06	9550 0.04-0.06	80	RPM FEED	8490 0.08-0.14	6370 0.12-0.18	5090 0.18-0.24	4240 0.14-0.26
	20		50	RPM FEED	15920 0.03-0.05	7960 0.05-0.07	70	RPM FEED	7430 0.06-0.12	5570 0.08-0.14	4460 0.14-0.20	3710 0.16-0.22

ISO	VDI 3323	Material Description	V _c	Parameter	Drill Diameter (mm)						
					8.0	10.0	12.0	14.0	16.0	18.0	20.0
P	2	Non-alloy steel	100	RPM FEED	3980 0.18-0.24	3180 0.22-0.28	2650 0.20-0.30	2270 0.22-0.32	1990 0.24-0.34	1770 0.28-0.38	1590 0.30-0.40
	3		100	RPM FEED	3980 0.18-0.24	3180 0.22-0.28	2650 0.20-0.30	2270 0.22-0.32	1990 0.24-0.34	1770 0.28-0.38	1590 0.30-0.40
	4		100	RPM FEED	3980 0.14-0.2	3180 0.18-0.24	2650 0.14-0.24	2270 0.16-0.26	1990 0.18-0.28	1770 0.20-0.30	1590 0.22-0.32
	5		80	RPM FEED	3180 0.14-0.2	2550 0.18-0.24	2120 0.14-0.24	1820 0.16-0.26	1590 0.18-0.28	1410 0.20-0.30	1270 0.22-0.32
	6		Low alloy steel	100	RPM FEED	3980 0.18-0.24	3180 0.22-0.28	2650 0.20-0.30	2270 0.22-0.32	1990 0.24-0.34	1770 0.28-0.38
	7	80		RPM FEED	3180 0.16-0.28	2550 0.20-0.30	2120 0.21-0.30	1820 0.22-0.35	1590 0.25-0.36	1410 0.28-0.38	1270 0.30-0.40
	8	80		RPM FEED	3180 0.14-0.2	2550 0.18-0.24	2120 0.14-0.24	1820 0.16-0.26	1590 0.18-0.28	1410 0.20-0.30	1270 0.22-0.32
	9	High alloyed steel, and tool steel	40	RPM FEED	1590 0.12-0.18	1270 0.14-0.20	1060 0.12-0.22	910 0.13-0.23	800 0.14-0.24	710 0.16-0.26	640 0.18-0.28
	10		70	RPM FEED	2790 0.14-0.20	2230 0.18-0.24	1860 0.14-0.24	1590 0.16-0.26	1390 0.18-0.28	1240 0.20-0.30	1110 0.22-0.32
	11		40	RPM FEED	1590 0.12-0.18	1270 0.14-0.20	1060 0.12-0.22	910 0.13-0.23	800 0.14-0.24	710 0.16-0.26	640 0.18-0.28
	M	12	Stainless steel	70	RPM FEED	2790 0.18-0.24	2230 0.22-0.28	1860 0.20-0.30	1590 0.22-0.32	1390 0.24-0.34	1240 0.28-0.38
13		45		RPM FEED	1790 0.14-0.20	1430 0.18-0.24	1190 0.14-0.24	1020 0.16-0.26	900 0.18-0.28	800 0.20-0.30	720 0.22-0.32
K	15	Grey cast iron	100	RPM FEED	3980 0.16-0.28	3180 0.24-0.34	2650 0.26-0.36	2270 0.28-0.38	1990 0.30-0.40	1770 0.32-0.42	1590 0.34-0.44
	16		80	RPM FEED	3180 0.18-0.24	2550 0.22-0.28	2120 0.20-0.30	1820 0.22-0.32	1590 0.24-0.34	1410 0.28-0.38	1270 0.30-0.40
	17	Nodular cast iron	100	RPM FEED	3980 0.16-0.28	3180 0.24-0.34	2650 0.26-0.36	2270 0.28-0.38	1990 0.30-0.40	1770 0.32-0.42	1590 0.34-0.44
	18		70	RPM FEED	2790 0.18-0.24	2230 0.22-0.28	1860 0.20-0.30	1590 0.22-0.32	1390 0.24-0.34	1240 0.28-0.38	1110 0.30-0.40
	19	Malleable cast iron	80	RPM FEED	3180 0.16-0.28	2550 0.24-0.34	2120 0.26-0.36	1820 0.28-0.38	1590 0.30-0.40	1410 0.32-0.42	1270 0.34-0.44
	20		70	RPM FEED	2790 0.18-0.24	2230 0.22-0.28	1860 0.20-0.30	1590 0.22-0.32	1390 0.24-0.34	1240 0.28-0.38	1110 0.30-0.40

► Recommend to reduce the feed rate as following
Feed 100% : DH404(3×D), DH423(3×D), DH424(5×D)

SELECTION GUIDE



HOLEMAKING TOOLS

SERIES
 DRILLING DEPTH / STANDARD
 LENGTH
 SIZE MIN
 SIZE MAX
 PAGE

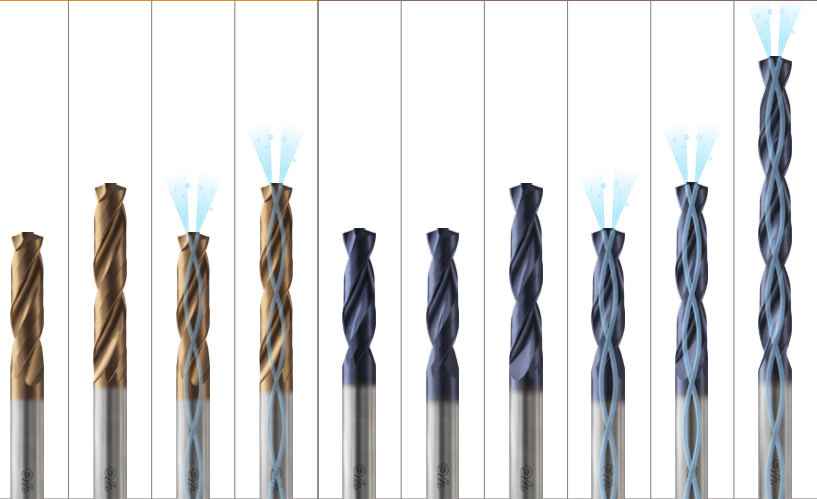
PRO ^{NEW}				GENERAL					
DGN523	DGN526	DGN506	DGN508	DH404	DH423 DH443	DH424 DH444	DH406 DH446	DH408 DH448	DH421
3XD	5XD	3XD	5XD	3XD	3XD	5XD	3XD	5XD	8XD
SHORT	LONG	SHORT	LONG	STUB	SHORT	LONG	SHORT	LONG	EXTRALONG
D3.0	D1.0	D3.0	D1.0	D3.0	D32.0	D1.0	D3.0	D1.0	D3.0
D20.0	D20.0	D20.0	D20.0	D20.0	D20.0	D20.0	D20.0	D20.0	D14.0
8	11	14	16	24	26	29	32	34	37

SURFACE TREATMENT

Z-Coating

TiAIN

SOLID CARBIDE **DREAM DRILLS**



Please visit
globalyg1.com/mat
 for material search

◎ : Excellent ○ : Good

TECHNICAL DATA : P 97

ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment	HB	HRC	DGN523	DGN526	DGN506	DGN508	DH404	DH423 DH443	DH424 DH444	DH406 DH446	DH408 DH448	DH421	
P	1	Non-alloy steel	About 0.15% C Annealed	125												
	2		About 0.45% C Annealed	190 13	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	3		About 0.45% C Quenched & Tempered	250 25	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	4		About 0.75% C Annealed	270 28	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	5		About 0.75% C Quenched & Tempered	300 32	○	○	○	○	○	○	○	○	○	○	○	○
	6	Low alloy steel	Annealed	180 10	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	7		Quenched & Tempered	275 29	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	8		Quenched & Tempered	300 32	○	○	○	○	○	○	○	○	○	○	○	
	9		Quenched & Tempered	350 38	○	○	○	○	○	○	○	○	○	○	○	
	10	High alloyed steel, and tool steel	Annealed	200 15	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	11		Quenched & Tempered	325 35	○	○	○	○	○	○	○	○	○	○	○	
M	12	Stainless steel	Ferritic / Martensitic Annealed	200 15	○	○	○	○	○	○	○	○	○	○	○	
	13		Martensitic Quenched & Tempered	240 23	○	○	○	○	○	○	○	○	○	○	○	
	14		Austenitic	180 10												
K	15	Grey cast iron	Pearlitic / ferritic	180 10	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	16		Pearlitic (Martensitic)	260 26	○	○	○	○	○	○	○	○	○	○		
	17	Nodular cast iron	Ferritic	160 3	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	18		Pearlitic	250 25	○	○	○	○	○	○	○	○	○	○		
	19		Ferritic	130	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎		
20	Malleable cast iron	Pearlitic	230 21	○	○	○	○	○	○	○	○	○	○			
N	21	Aluminum-wrought alloy	Not Curable	60												
	22		Curable Hardened	100												
	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable	75												
	24		≤ 12% Si, Curable Hardened	90												
	25		> 12% Si, Not Curable	130												
	26		Cutting Alloys, PB>1%	110												
	27	Copper and Copper Alloys (Bronze / Brass)	CuZn, CuSnZn (Brass)	90												
	28		CuSn, lead-free copper and electrolytic copper	100												
	29	Non Metallic Materials	Duroplastic, Fiber Reinforced Plastic													
	30		Rubber, Wood, etc.													
S	31	Heat Resistant Super Alloys	Fe Based Annealed	200 15												
	32		Fe Based Cured	280 30												
	33		Annealed	250 25												
	34		Ni or Co Based Cured	350 38												
	35		Cast	320 34												
	36	Titanium Alloys	Pure Titanium	400 _m												
	37		Alpha + Beta Alloys Hardened	1050 _m												
H	38	Hardened steel	Hardened	550 55												
	39		Hardened	630 60												
	40	Chilled Cast Iron	Cast	400 42												
	41	Hardened Cast Iron	Hardened	550 55												