

Cemented Carbide products safety standard

1、 Safety responsibilities

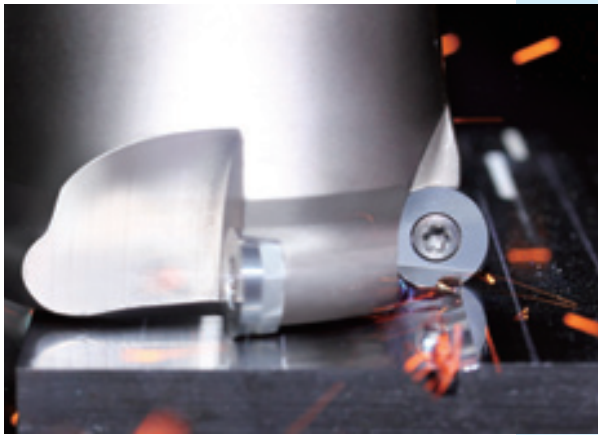
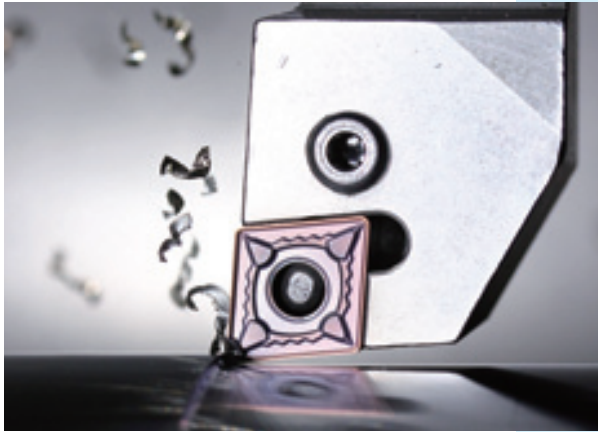
Before using ZCCCT products, please provide necessary safety training for operators, and carefully read the 'NOTE' and 'CAUTION' contents on the product package. We are not liable for any responsibility caused by not complying with the request for operation.

2、 Features of cemented carbide materials

Cemented carbide cutting tools are mainly composed of W, C, Co, N, Ti, Si, Al, O, etc elements and their chemical compound, and come into shape after sintering and a series of subsequent machining. Cemented carbide tool has good chemical stability and high strength. It is the ideal tool to cut most metals and high-strength nonmetals.

3、 Cautions for safely using cemented carbide tools

- 1) Cemented carbide is hard and frangible material, liable to brittle rupture and breakage due to larger force or partial stress, which causes sharp edge.
- 2) Most cemented carbide is mainly composed of W and Co with high density. In the process of transport and storage, it should be treated as great heavy object and be handled with care.
- 3) Cemented carbide and steel have different thermal expansion coefficients. To avoid breakage caused by concentrated stress, welding should be conducted under suitable temperature.
- 4) Cemented carbide tools should be stored in dry environment, away from corrosive atmosphere.
- 5) In the cutting process, it is unavoidable to generate chips and brittle discs, etc. Please make sure necessary labor protection articles are prepared before machining.
- 6) If coolant is needed in the cutting process, please select correct coolant to prolong machine and tool life.
- 7) If cracks are generated in the machining process, please stop using the tool.
- 8) Long use of cemented carbide tool will lead to cutting edge passivation and lower strength. Please make sure it is reground by professionals
- 9) Please collect the broken tools and chips properly to avoid injury to other people.





GENERAL TECHNICAL INFORMATION

Cautions for safely using cutting tools

Danger	Protective measure
Direct contact with the sharp cutting edges may cause injuries.	Please use labor protection articles such as gloves when assembling or disassembling cutting tools on machine.
Improper use of tools may cause tool breakage and expulsion from machine, causing injuries.	Please read catalogue and safety standard before operating.
	Please wear safeguard glasses and protective clothes.
Rapid increase of cutting resistance due to excessive abrasion and severe impact may lead to breakage of tool and spatter of chips, thus cause injuries to operator.	Change the tool with excessive abrasion without delay.
	Please wear safeguard glasses and protective clothes.
In the cutting process, hot chips may cause scald and scratch on operator.	Please use tools such as pliers to clear away the chips in time.
	Please wear safeguard glasses and protective clothes.
In cutting process, sparks and hot chips may cause fire and explosion hazard.	Clear away the Inflammable and explosive materials in the cutting area.
	Please make sure the fire extinguishers are ready for use.
At high speed, the machine will vibrate severely because of poor balance of holder, causing tool breakage.	Check whether the machine is loose or has any abnormal noise before cutting.
	Please wear safeguard glasses and protective clothes.
Burrs on workpiece are very sharp and likely to cause injuries.	Do not touch the burrs on the workpiece with bare hand.
	Please wear protective gloves and clothes.
Machining workpiece held infirmly will cause tool breakage and spatter of workpiece.	Make sure the workpiece is clamped firmly.
	Please wear safeguard glasses and protective clothes.
If inserts or spare parts are not clamped properly, they may become loose and fly off, causing risk of injuries.	Make sure the inserts and spare parts are clamped firmly before machining.
If Inserts and tool are clamped too tightly with screw and clamp, they face the risk of breakage and spatter.	Please do not clamp tools too tightly with bushing.
Inserts or spare parts may fly off due to inertial centrifugal force at high cutting speed.	Use the tools within recommended cutting conditions.
	Please wear safeguard glasses and protective clothes.
Milling cutters have sharp cutting edges and direct contact with them may cause injuries.	For your safety, please wear protective gloves if you need to touch inserts.
During rotary cutting, clothes, gloves, etc. are easily to get wringed in the machine at high speed, thus cause casualties.	The operator should not wear gloves during rotary cutting.
	Please pay attention that the clothes should not contact the operational parts of machine.
Off-center or poor balance of tools in rotating machining will cause vibration, breakage and splash of tool, thus will cause injuries.	Please use the tools within the range of recommended rotating speed.
	Check and adjust machine balance periodically.
During cutting at high speed, the chips flying off rapidly may cause injuries.	Safeguard articles such as protective cover, screen, etc. should be used.
	Please wear safeguard glasses, protective clothes and gloves.
Using the extremely small drill is likely to cause tool breakage and spatter, and it would be hard to take out the broken part.	Reduce tool vibration and conduct machining at suitable speed.
	Please wear safeguard glasses, protective clothes and gloves.
Machine and tools may be damaged if they are used beside the range of specified purposes, thus may cause other risks.	Please use them strictly according to instructions and specified purposes.

Note: We are not responsible for any accidents caused by private modified tools without our permission.



Threading pre-hole diameter

● Metric common thread

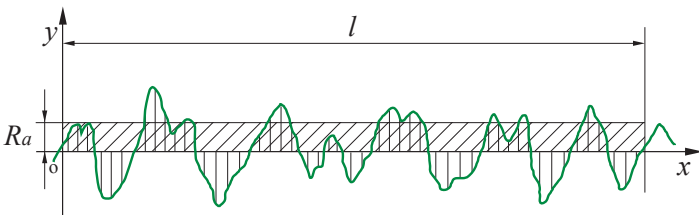
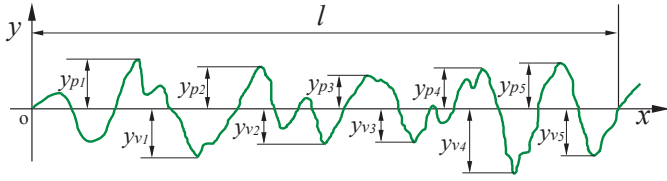
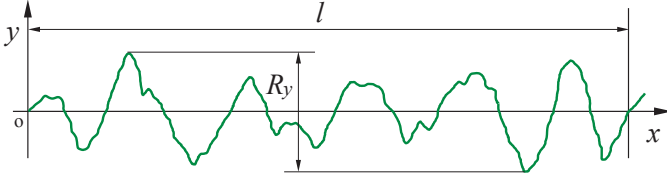
Thread code	Recommended hole diameter (mm)
M3×0.5	2.5
M3.5×0.6	2.9
M4×0.7	3.3
M5×0.8	4.2
M6×1.0	5.0
M7×1.0	6.0
M8×1.25	6.75
M9×1.25	7.75
M10×1.5	8.5
M11×1.5	9.5
M12×1.75	10.25
M14×2.0	12.0
M16×2.0	14.0
M18×2.5	15.5
M20×2.5	17.5
M24×3.0	21.0
M27×3.0	24.0
M30×3.5	26.5

● Metric fine screw

Thread code	Recommended hole diameter (mm)	Thread code	Recommended hole diameter (mm)
M3×0.35	2.65	M14×1.5	12.5
M3.5×0.35	3.15	M14×1.0	13.0
M4×0.5	3.5	M15×1.5	13.5
M4.5×0.5	4.0	M15×1.0	14.0
M5×0.5	4.5	M16×1.5	14.5
M5.5×0.5	5.0	M16×1.0	15.0
M6×0.75	5.25	M17×1.5	15.5
M7×0.75	6.25	M17×1.0	16.0
M8×1.0	7.0	M18×2.0	16.0
M8×0.75	7.25	M18×1.5	16.5
M9×1.0	8.0	M18×1.0	17.0
M9×0.75	8.25	M20×2.0	18.0
M10×1.25	8.75	M20×1.5	18.5
M10×1.0	9.0	M20×1.0	19.0
M10×0.75	9.25	M22×2.0	20.0
M11×1.0	10.0	M22×1.5	20.5
M11×0.75	10.25	M22×1.0	21.0
M12×1.5	10.5	M24×2.0	22.0
M12×1.25	10.75	M24×1.5	22.5
M12×1.0	11.0	M24×1.0	23.0

Surface roughness

The surface roughness refers to the small space and unevenness from peak to valley on workpiece surface. Surface roughness has close relationship with the matching property of machine elements, wear resistance, machining precision and corrosion resistance. It influences the reliability and life of machine and instrument.

Type	Code	Calculation method	Calculation example (figure)
Arithmetic average deviation of profile	Ra	Within sampling length l, the arithmetic average absolute value of profile deviation is $R_a = \frac{1}{l} \int_0^l y(x) dx$ In the formula, the profile deviation y is the distance between profile points and reference line in the measuring direction. Reference line is the profile least-square average line O. This line divides the profile and makes the sum of squares of profile deviation to be the minimum within the sampling length.	
Irregularity Ten-point height	Rz	Within sampling length l, the sum of the average value of heights of five highest profile peak and the depths of five deepest profile valleys $R_z = \frac{\sum_{i=1}^5 y_{pi} + \sum_{i=1}^5 y_{vi}}{5}$ In the formula, y_{pi} means the height of the i'th highest profile peak. In the formula, y_{vi} means the depth of the i'th deepest profile valley. Maximum height of profile R_y: the distance between the top profile peak line and the bottom profile valley line in the longitudinal direction within the sampling length l.	
Maximum height of profile	Ry	The distance between the inner profile peak line and the bottom profile valley line in the longitudinal direction within the sampling length l. Top profile peak line is the line that parallels to the reference line and passes through the highest point of profile peak. Bottom profile line is the line that parallels to the reference line and passes through the lowest point of profile valley.	

The value of sampling length l and evaluated length ln

$R_a / \mu m$	$R_z / \mu m$	l/mm	$ln=5l /mm$
$\geq 0.008 \sim 0.02$	$\geq 0.025 \sim 0.10$	0.08	0.4
$> 0.02 \sim 0.1$	$> 0.1 \sim 0.50$	0.25	1.25
$> 0.1 \sim 0.2$	$> 0.50 \sim 10.0$	0.8	4.0
$> 0.2 \sim 10.0$	$> 10.0 \sim 50.0$	2.5	12.5
$> 10.0 \sim 80.0$	$> 50 \sim 320$	8.0	40.0

GENERAL TECHNICAL INFORMATION

Material cross comparison table

Material cross comparison table

ISO	Country and Standard										
	China	USA	Germany		Great Britain		Sweden	France	Italy	Spain	Japan
	GB	AISI/SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS
P	Structural steel										
	15	1015	1.0401	C15	080M15	-	1350	CC12	C15C16	F.111	-
	20	1020	1.0402	C22	050A20	2C	1450	CC20	C20C21	F.112	-
	35	1035	1.0501	C35	060A35	-	1550	CC35	C35	F.113	-
	45	1045	1.0503	C45	080M40	-	1650	CC45	C45	F.114	-
	55	1055	1.0535	C55	070M55	-	1655	-	C55	-	-
	60	1060	1.0601	C60	080A62	43D	-	CC55	C60	-	-
	Y15	1213	1.7015	9SMn28	230M07	-	1912	S250	CF9SMn28	11SMn28	SUM22
	-	12L13	1.0718	9SMnPb28	-	-	1914	S250Pb	CF9MnPb28	11SMnPb28	SUM22L
	-	-	1.0722	10SPb20	-	-	-	10PbF2	CF10Pb20	10SPb20	-
	-	1140	1.0726	35S20	212M36	8M	1957	35MF4	-	F210G	-
	Y13	1215	1.0736	9SMn36	240M07	1B	-	S300	CF9SMn36	12SMn35	-
	-	12L14	1.0737	9SMnPb36	-	-	1926	S300Pb	CF9SMnPb36	12SMnP35	-
	55Si2Mn	9255	1.0904	55Si9	250A53	45	2085	55S7	55Si8	56Si7	-
	-	9262	1.0961	60SiCr7	-	-	-	60SC7	60SiCr8	60SiCr8	-
	15	1015	1.1141	Ck15	080M15	32C	1370	XC12	C16	C15K	S15C
	40Mn	1039	1.1157	40Mn4	150M36	15	-	35M5	-	-	-
	25	1025	1.1158	Ck25	-	-	-	-	-	-	S25C
	35Mn2	1335	1.1167	36Mn5	-	-	2120	40Mn5	-	36Mn5	SMn438(H)
	30Mn	1330	1.1170	28Mn6	150M28	14A	-	20M5	C28Mn	-	SCMn1
	35Mn	1035	1.1183	Cf35	060A35	-	1572	XS38TS	C36	-	S35C
	Ck45	1045	1.1191	45	080M46	-	1672	XC42	C45	C45K	S45C
	55	1055	1.1203	Ck55	070M55	-	-	XC45	C50	C55K	S55C
	50	1050	1.1213	Cf53	060A52	-	1674	XC48TS	C53	-	S50C
	60Mn	1060	1.1221	Ck60	080A62	43D	1678	XC60	C60	-	S58C
	-	1095	1.1274	Ck101	060A96	-	1870	-	-	-	SUP4
	-	-	1.3401	X120Mn12	Z120M12	-	-	X120M12	XG120Mn12	X120Mn12	SCMnH/1
	Gr15;45Gr	52100	1.3505	100Cr6	534A99	31	2258	100C6	100Cr6	F.131	SUJ2
	-	ASTM A204Gr.A	1.5415	15Mo3	1501-240	-	2912	15D3	16Mo3KW	16Mo3	-
	-	4520	1.5426	16Mo5	1503-245-420	-	-	-	16Mo5	16Mo5	-
	-	ASTM A350LF5	1.5622	14Ni6	-	-	-	16N6	14Ni6	15Ni6	-
	-	ASTM A353	1.5662	X8Ni9	1501-509;510	-	-	-	X10Ni9	XBNI09	-



GENERAL TECHNICAL INFORMATION

Material cross comparison table

ISO	Country and Standard										
	China	USA	Germany		Great Britain		Sweden	France	Italy	Spain	Japan
	GB	AISI/SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS
P	Structural steel										
	-	2515	1.5680	12Ni19	-	-	-	Z18N5	-	-	-
	-	3135	1.5710	36NiCr6	640A35	111A	-	35NC6	-	-	SNC236
	-	3415	1.5732	14NiCr10	-	-	-	14NC11	16NiCr11	15NiCr11	SNC415(H)
	-	3415 3310	1.5752	14NiCr14	655M13 655A12	36A	-	12NC15	-	-	SNC815(H)
	-	9840	1.6511	36CrNiMo4	816M40	110	-	40NCD3	38CrNiMo4(KB)	35CrNiMo4	-
	-	8620	1.6523	21NiCrMo2	850M20	362	2503	20NCD2	20NiCrMo2	20NiCrMo2	SNCCM220(H)
	-	8740	1.6546	40NiCrMo2	311-Type7	-	-	-	40NiCrMo2(KB)	40NiCrMo2	SNC240
	40CrNiMoA	4340	1.6582	34CrNiMo6	817M40	24	2541	35NCD6	35CrNiMo6(KB)	-	-
	-	-	1.6587	17CrNiMo6	820A16	-	-	18NCD6	-	14CrNiMo13	-
	15Cr	5015	1.7015	15Cr3	523M15	-	-	12C3	-	-	SCr415(H)
	35Cr	5132	1.7033	34Cr4	530A32	18B	-	32C4	34Cr4(KB)	35Cr4	SCr430(H)
	40Cr	5140	1.7035	41Cr4	530M40	18	-	42C4	41Cr4	42Cr4	SCr440(H)
	40Cr	5140	1.7045	42Cr4	-	-	2245	-	-	42Cr4	SCr440
	18CrMn	5115	1.7131	16MnCr15	(527M20)	-	2511	16MC5	16MnCr15	16MnCr15	-
	20CrMn	5155	1.7176	55Cr3	527A60	48	-	55C3	-	-	SUP9(A)
	30CrMn	4130	1.7218	25CrMo4	1717CDS110	-	2225	25CD4	25CrMo4(KB)	55Cr3	SCM420; SCM430
	35CrMo	4137;4135	1.7220	34CrMo4	708A37	19B	2234	35CD4	35CrMo4	34CrMo4	SCM432; SCRRM3
	40CrMoA	4140;4142	1.7223	41CrMo4	708M40	19A	2244	42CD4TS	41CrMo4	41CrMo4	SCM440
	42CrMo 42CrMnMo	4140	1.7225	42CrMo4	708M40	19A	2244	42CD4	42CrMo4	42CrMo4	SCM440(H)
	-	-	1.7262	15CrMo5	-	-	2216	12CD4	-	12CrMo4	SCM415(H)
	-	ASTM A182 F11;F12	1.7335	13CrMo44	1501- 620Gr.27	-	-	15CD3.5; 15CD4.5	14CrMo44	14CrMo45	-
	-	-	1.7361	32CrMo12	722M24	40B	2240	30CD12	32CrMo12	F.124.A	-
	-	ASTM A182 F.22	1.7380	10CrMo910	1501- 622Gr.31;45	-	2218	12CD9;10	12CrMo9,10	TU.H	-
	-	-	1.7715	14MoV63	1503-660-440	-	-	-	-	13MoCrV6	-
	50CrVA	6150	1.8159	50CrV4	735A50	47	2230	50CV4	50CrV4	51CrV4	SUP10
	-	-	1.8509	41CrAlMo7	905M39	41B	2940	40CAD6,12	41CrAlMo7	41CrAlMo7	-
	-	-	1.8523	39CrMoV139	897M39	40C	-	-	36CrMoV12	-	-

GENERAL TECHNICAL INFORMATION

Material cross comparison table

ISO	Country and Standard										
	China	USA	Germany		Great Britain		Sweden	France	Italy	Spain	Japan
	GB	AISI/SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS
P	Tool steel										
	T10	W.110	1.1545	C105W1	-	-	1880	Y1105	C98KU C100KU	F.515 F.516	-
	T12A	W.112	1.1663	C125W	-	-	-	Y2120	C120KU	(C120)	SK2
	CrV;9SiCr	L3	1.2067	100Cr6	BL3	-	-	Y100C6	-	100Cr6	-
	Cr12	D3	1.2080	X210Cr12	BD3	-	-	Z200Cr12	X210Cr13KU X250Cr12KU	X210Cr12	SKD1
	4Cr5MoVSi	H13	1.2344	X40CrMoV5 1	BH13	-	2242	Z40CDV5	X35CrMoV05KU X40CrMoV51KU	X40CrMoV5	SKD61
	Cr6WV	A2	1.2363	X100CrMoV5 1	BA2	-	2260	Z100CDV5	X100CrMoV51KU	X100CrMoV5	SKD12
	CrWMo	-	1.2419	105WCr6	-	-	2140	105WC13	10WCr6 107WCr5KU	105WCr5	SKS31 SKS2 SKS3
	Cr12W	-	1.2436	X210CrW12	-	-	2312	-	X215CrW12 1KU	X210CrW12	SKD2
	5CrNiMo	S1	1.2542	45WCrV7	BS1	-	2710	-	45WCrV8KU	45WCrSi8	-
	3Cr2W8V	H21	1.2581	X30WCrV9 3 X30WCrV93KU	BH21	-	-	Z30WCV9	X28W09KU X30WCrV9 3KU	X30WCrV9	SKD5
	Cr12MoV	-	1.2601	X165CrMoV 12	-	-	2310	-	X165CrMoW12KU	X160CrMoV12	SKD11
	5CrNiMo	L6	1.2713	55NiCrMoV6	-	-	-	55NCDV7	-	F.250.S	SKT4
	V	W210	1.2833	100V1	BW2	-	-	Y1105V	-	-	SKS43
	W6Mo5Cr4V2Co5	-	1.3243	S6-5-2-5	-	-	2723	Z85WDCV	HS6-5-2-5	HS6-5-2-5	SKH55
	W18Cr4VCo5	T4	1.3255	S18-1-2-5	BT4	-	-	Z80WKCV 10-05-04-01	X78WCo1805KU	HS18-1-1-5	SKH3
	W6Mo5Cr4V2	M2	1.3343	S6-5-2	BM2	-	2722	Z85WDCV 06-05-04-02	X82WMo0605KU	HS6-5-2	SKH9
	-	M7	1.3348	S2-9-2	-	-Z-	2782	Z100WCWV 09-02-04-02	HS2-9-2	HS2-9-2	-
	W18Cr4V	T1	1.3355	S18-0-1	BT1	-	-	Z80WCV 18-04-01	X75W18KU	HS18-0-1	SKH2
	W6Mo5Cr4V3	M3	-	S6-5-3	-	-	-	-	-	-	SKH52
	-	M42	-	-	BM42	-	-	-	-	-	SKH59



GENERAL TECHNICAL INFORMATION

Material cross comparison table

ISO	Country and Standard					Main application
	China	USA	Germany	Japan	Daido Steel Co., Ltd (Japan)	
	GB	AISI/SAE	DIN	JIS	DAIDO	
P	Plastic die steel					
	-	P20 mod.		-	PX5N	For mass production of large mirror dies. Automobile rear light, front fender of car, video camera, household electrical appliances etc
	-	-		-	NAK55	For high-precision mirror die. Video camera, music disc, cosmetic containers, transparent covers, transparent films etc
	-	-		-	NAK80	For high-precision mirror dies. Video camera, music disc, cosmetic containers, transparent covers, transparent films etc
	3Cr13	420 mod.		SUS420J2 mod.	S-STAR	For ultra-mirror corrosion resistant precise dies. Accessories of camera, CD, lens, watch case
	Cold-working die steel					
	-	02	-	SKS93	YK30	Stamping die, gauge calipers, paper cutter, auxiliary tools
	9CrWMn	01 mod.	-	SKS3 mod.	GOA	Blanking die, gauge calipers, drawing die, taps, Perforated punch
	Cr12MoV	D2	X165CrMoV12	SKD11	DC11	Blanking die, cold forming die, cold drawing die, forming roller, punch
	-	D2 mod.	-	SKD11 mod.	DC53	Blanking die, cold forming die, cold drawing die, forming roll, punch
	Hot-working die steel					
	4Cr5MoSiV1	H13	X40CrMoV51	SKD61	DHA1	Aluminum compression die, connecting parts of compression die, hot stamping die, hot extrusion die, thermal shear cutting blade
	-	-	-	-	DH21	Long life aluminum compression die
	-	-	-	-	DH31-S	Large compression die
	-	-	-	-	DH2F	Compression die, plastic die

GENERAL TECHNICAL INFORMATION

Material cross comparison table

ISO	Country and Standard										
	China	USA	Germany		Great Britain		Sweden	France	Italy	Spain	Japan
	GB	AISI/ SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS
M	Stainless steel										
	0Cr13; 1Cr12	403	1.4000	X6Cr13	403S17	-	2301	Z6C13	X6Cr13	F.3110	SUS403
	-	-	1.4001	X7Cr14	-	-	-	-	-	F.8401	-
	1Cr13	410	1.4006	X10Cr13	410S21	56A	2302	Z10C14	X12Cr13	F.3401	SUS410
	1Cr17	430	1.4016	X6Cr17	430S15	60	220	Z8C17	X8Cr17	F.3113	SUS430
	2Cr13	410	1.4021	X20Cr13	S62	56B; 56C	-	Z20C13	X20C13	F.3401	SUS410
	-	-	1.4027	G-X20Cr14	420C29	56B	-	Z20C13M	-	-	SCS2
	4Cr13	-	1.4034	X46Cr13	420S45	56D	2304	Z40CM Z38C13M	X40Cr14	F.3405	SUS420J2
	1Cr17Ni2	431	1.4057	X20CrNi172	431S29	57	2321	Z15CNi6.02	X16CrNi16	F.3427	SUS431
	Y1Cr17	430F	1.4104	X12CrMoS17	-	-	2383	Z10CF17	X10CrS17	F.3117	SUS430F
	1Cr17Mo	434	1.4113	X6CrMo171	434S17	-	2325	Z8CD17.01	X8CrMo17	-	SUS434
	-	-	1.4313	X5CrNi134	425C11	-	-	Z4CND13.4M	-	-	SCS5
	-	-	1.4408	G-X6CrNiMo1810	316C16	-	-	-	-	F.8414	SCS14
	4Cr9Si2	HW3	1.4718	X45CrSi93	401S45	52	-	Z45CS9	X45CrSi8	F.322	SUH1
	0Cr13Al	405	1.4724	X10CrAl13	403S17	-	-	Z10C13	X10CrAl12	F.311	SUS405
	Cr17	430	1.4742	X10CrAl18	430S15	60	-	Z10CAS18	X8Cr17	F.3113	SUS430
	8Cr20Si2Ni	HNV6	1.4757	X80CrNiSi20	443S65	59	-	Z80CSN20.02	X80CrSiNi20	F.320V	SUH4
	2Cr25N	446	1.4762	X10CrAl24	-	-	2322	Z10CAS24	X16Cr26	-	SUH446
	Austenitic stainless steel										
	0Cr18Ni9	304	1.4301	X5CrNi1810	304S15	58E	2332	Z6CN18.09	X5CrNi1810	F.3551; F.3541; F.3504	SUS304
	1Cr18Ni9MoZr	303	1.4305	X10CrNiS189	303S21	58M	2346	Z10CNF18.09	X10CrNiS18.09	F.3508	SUS303
	0Cr19Ni10	304L	1.4306	X2CrNi1911	304S12	-	2352	Z2CN18.10	X2CrNi18.11	F.3503	SCS19
	-	-	1.4308	G-X6CrNi189	304C15	-	-	Z6CN18.10M	-	-	SCS13
	Cr17Ni7	301	1.4310	X12CrNi177	-	-	2331	Z12CN17.07	X12CrNi1707	F.3517	SUS301
	-	304LN	1.4311	X2CrNiN1810	304S62	-	2371	Z2CN18.10	-	-	SUS304LN
	0Cr19Ni9	304	1.4350	X5CrNi189	304S31	58E	-	Z6CN18.09	X5CrNi1810	-	SUS304
	0Cr17Ni11Mo2	316	1.4401	X5CrNiMo1712	316S16	Z6CND17.11	2347	1.4401	X5CrNiMo1712	F.3543	SUS316
	00Cr17Ni13Mo2	316LN	1.4429	X2CrNiMoN17133	-	-	2375	Z2CND17.13	-	-	SUS316LN
	0Cr27Ni12Mo3	316L	1.4435	X2CrNiMo18143	316S12	-	2353	Z2CDN17.13	X2CrNiMo1713	-	SCS16,
	00Cr19Ni13Mo3	317L	1.4438	X2CrNiMo17133	317S12	-	2367	Z2CND19.15	X2CrNiMo18.16	-	SUS317L
	-	329L	1.4460	X8CrNiMo275	-	-	2324	-	-	-	SUS329L; SCH11; SCS11
	1Cr18Ni9Ti	321	1.4541	X6CrNiTi1810	2337	321S12	58B	Z6CNT18.10	X6CrNiTi1811	F.3553	SUS321
	1Cr18Ni11Nb	347	1.4550	X6CrNiNb1810	347S17	58F	2338	Z6CNNb18.1	X6CrNiTi1811	F.3552	SUS347
	Cr18Ni12Mo2Ti	316Ti	1.4571	X6CrNiMoTi17122	320S17	58J	2350	Z6NDT17.12	X6CrNiMoTi17	F.3535	-



GENERAL TECHNICAL INFORMATION

Material cross comparison table

ISO	Country and Standard										
	China	USA	Germany		Great Britain		Sweden	France	Italy	Spain	Japan
	GB	AISI/ SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS
M	Austenitic stainless steel										
	-	-	1.4581	G-X5CrNiMoNb1810	318C7	-	-	Z4CNDNb1812M	XG8CrNiMo18	-	SCS22
	Cr17Ni12Mo3Nb	318	1.4583	X10CrNiMoNb1812	-	-	-	Z6CNDNb1713B	X6CrNiMoTiNb17	-	-
	1Cr23Ni13	309	1.4828	X15CrNiSi2012	309S24	-	-	Z15CNS20.1	-	-	SUH309
	0Cr25Ni20	310S	1.4845	X12CrNi2521	310S24	-	2361	Z12CN2520	X6CrNi2520	F.331	SUH310
	Cr15Ni36W3Ti	330	1.4864	X12NiCrSi3616	-	-	-	Z12CNS35.1	-	-	SUH330
	-	-	1.4865	G-X40NiCrSi3818	330C11	-	-	-	XG50NiCr3919	-	SCH15
	5Cr2Mn9Ni4N	EV8	1.4871	X53CrMnNiN219	349S54; 321S12	- 58B	-	Z52CMN21.0	X53CrMnNiN219	-	SUH35
	1Cr18Ni9Ti	321	1.4878	X12CrNiTi189	321S320	58C	-	Z6CNT18.12	X6CrNiTi1811	F.3523	SU321

ISO	Country and Standard								
	China	USA	Germany	Great Britain	Sweden	France	Italy	Spain	Japan
K	Nodular cast iron								
	QT400-18	60-40-18	GGG40	400/17	0717-02	FGS370-17	GS370-17	FGE38-17	FCD400
	QT450-10	65-45-12	--	420/12	--	FGS400-12	GS400-12	FGE42-12	FCD450
	QT500-7	70-50-05	GGG50	500/7	0727-02	FGS500-7	GS500-7	FGE50-7	FCD500
	QT600-3	80-60-03	GGG60	600/7	0732-03	FGS600-2	GS600-2	FGE60-2	FCD600
	QT700-2	100-70-03	GGG70	700/2	0737-01	FGS700-2	GS700-2	FGE70-2	FCD700
	QT800-2	120-90-02	GGG80	800/2	0864-03	FGS800-2	GS800-2	FGE80-2	FCD800
	QT900-2	--	--	900/2	--	--	--	--	--
	Grey cast iron								
	--	NO.60	GG40	--	0140	FGL400	--	--	--
	HT350	NO.50	GG35	350	0135	FGL350	G35	FG35	FC350
	HT300	NO.45	GG30	300	0130	FGL300	G30	FG30	FC300
	HT250	NO.35	GG25	250	0125	FGL250	G25	FG25	FC250
	HT200	NO.30	GG20	200	0120	FGL200	G20	FG20	FC200
	HT150	NO.20	GG15	150	0115	FGL150	G15	FG15	FC150
	HT100	--	--	100	0110	--	G10	--	FC100

Fitting tolerance

Basic dimensions (mm)		Standard tolerance class of holes																	
		IT1	IT2	IT3	IT4	IT5	IT6	IT7	IT8	IT9	IT10	IT11	IT12	IT13	IT14	IT15	IT16	IT17	IT18
>	≡	μm											mm						
---	3	0.8	1.2	2	3	4	6	10	14	25	40	60	0.1	0.14	0.25	0.4	0.6	1	1.4
3	6	1	1.5	2.5	4	5	8	12	18	30	48	75	0.12	0.18	0.3	0.48	0.75	1.2	1.8
6	10	1	1.5	2.5	4	6	9	15	22	36	58	90	0.15	0.22	0.36	0.58	0.9	1.5	2.2
10	18	1.2	2	3	5	8	11	18	27	43	70	110	0.18	0.27	0.43	0.7	1.1	1.8	2.7
18	30	1.5	2.5	4	6	9	13	21	33	52	84	130	0.21	0.33	0.52	0.84	1.3	2.1	3.3
30	50	1.5	2.5	4	7	11	16	25	39	62	100	160	0.25	0.39	0.62	1	1.6	2.5	3.9
50	80	2	3	5	8	13	19	30	46	74	120	190	0.3	0.46	0.74	1.2	1.9	3	4.6
80	120	2.5	4	6	10	15	22	35	54	87	140	220	0.35	0.54	0.87	1.4	2.2	3.5	5.4
120	180	3.5	5	8	12	18	25	40	63	100	160	250	0.4	0.63	1	1.6	2.5	4	6.3
180	250	4.5	7	10	14	20	29	46	72	115	185	290	0.46	0.72	1.15	1.85	2.9	4.6	7.2
250	315	6	8	12	16	23	32	52	81	130	210	320	0.52	0.81	1.3	2.1	3.2	5.2	8.1
315	400	7	9	13	18	25	36	57	89	140	230	360	0.57	0.89	1.4	2.3	3.6	5.7	8.9
400	500	8	10	15	20	27	40	63	97	155	250	400	0.63	0.97	1.55	2.5	4	6.3	9.7
500	630	9	11	16	22	32	44	70	110	175	280	440	0.7	1.1	1.75	2.8	4.4	7	11
630	800	10	13	18	25	36	50	80	125	200	320	500	0.8	1.25	2	3.2	5	8	12.5
800	1000	11	15	21	28	40	56	90	140	230	360	560	0.9	1.4	2.3	3.6	5.6	9	14
1000	1250	13	18	24	33	47	66	105	165	260	420	660	1.05	1.65	2.6	4.2	6.6	10.5	16.5
1250	1600	15	21	29	39	55	78	125	195	310	500	780	1.25	1.95	3.1	5	7.8	12.5	19.5
1600	2000	18	25	35	46	65	92	150	230	370	600	920	1.5	2.3	3.7	6	9.2	15	23
2000	2500	22	30	41	55	78	110	175	280	440	700	1100	1.75	2.8	4.4	7	11	17.5	28
2500	3150	26	36	50	68	96	135	210	330	540	860	1350	2.1	3.3	5.4	8.6	13.5	21	33

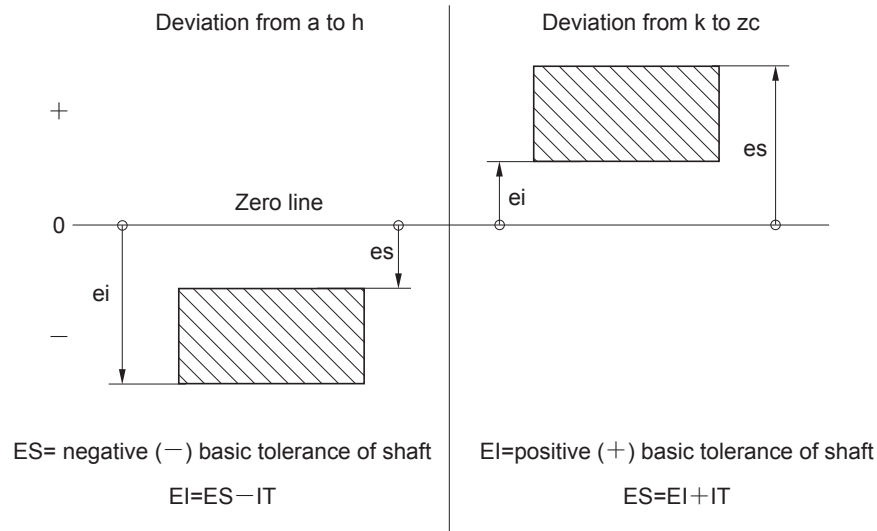
Note:

1. From IT1 to IT5, the standard tolerance with basic dimension more than 500 mm is on trial.
2. When the basic dimension ≤ 1 mm, the tolerances from IT4 to IT8 are invalid.

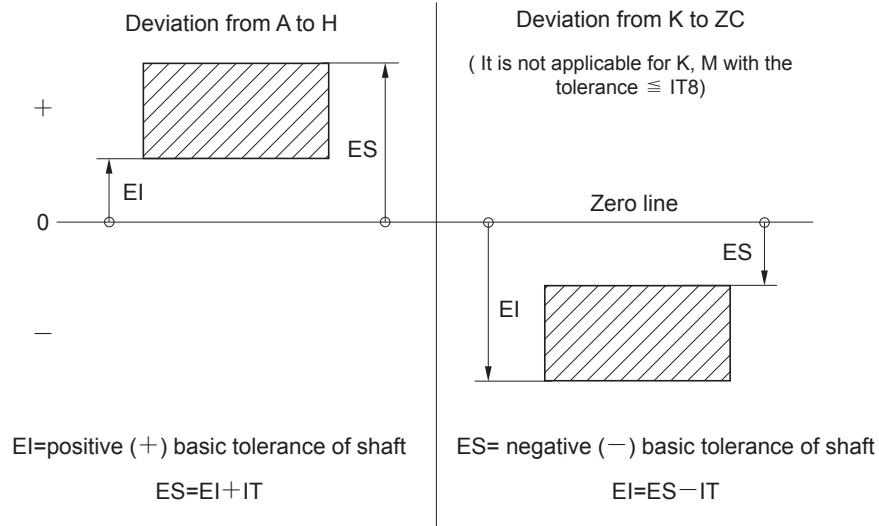
D GENERAL TECHNICAL INFORMATION

Fitting tolerance

The shaft lower deviation(e_i) and upper deviation (e_s) can be obtained by basic tolerance and standard tolerance (IT) of shaft.



The hole lower deviation(EI) and upper deviation (ES) can be obtained by basic tolerance and standard tolerance (IT) of hole.



For example: for a hole with diameter 3 mm and tolerance H7, we can find that the lower deviation $EI=0$ in relation to H7 from the basic tolerance table, and the standard tolerance $IT=10\mu\text{m}$ corresponding to H7, thus the upper deviation $ES=EI+IT=10\mu\text{m}$. Therefore the hole fitting dimension is $\varnothing 3 \begin{smallmatrix} +0.01 \\ 0 \end{smallmatrix} \text{ mm}$.

● Basic deviations value of shaft

Dimensions (mm)		Basic deviation value											
		Upper deviation es											
		Standard tolerance class											
>	≤	a	b	c	cd	d	e	ef	f	fg	g	h	js
---	3	-270	-140	-60	-34	-20	-14	-10	-6	-4	-2	0	
3	6	-270	-140	-70	-46	-30	-20	-14	-10	-6	-4	0	
6	10	-280	-150	-80	-56	-40	-25	-18	-13	-8	-5	0	
10	14	-290	-150	-95		-50	-32		-16		-6	0	
14	18												
18	24	-300	-160	-110		-65	-40		-20		-7	0	
24	30												
30	40	-310	-170	-120		-80	-50		-25		-9	0	
40	50	-320	-180	-130									
50	65	-340	-190	-140		-100	-60		-30		-10	0	
65	80	-360	-200	-150									
80	100	-380	-220	-170		-120	-72		-36		-12	0	
100	120	-410	-240	-180									
120	140	-460	-260	-200		-145	-85		-43		-14	0	
140	160	-520	-280	-210									
160	180	-580	-310	-230		-170	-100		-50		-15	0	
180	200	-660	-340	-240									
200	225	-740	-380	-260		-190	-110		-56		-17	0	
225	250	-820	-420	-280									
250	280	-920	-480	-300		-210	-125		-62		-18	0	
280	315	-1050	-540	-330									
315	355	-1200	-600	-360		-230	-135		-68		-20	0	
355	400	-1350	-680	-400									
400	450	-1500	-760	-440		-260	-145		-76		-22	0	
450	500	-1650	-840	-480									
500	560					-290	-160		-80		-24	0	
560	630												
630	710					-320	-170		-86		-26	0	
710	800												
800	900					-350	-195		-98		-28	0	
900	1000												
1000	1120					-390	-220		-110		-30	0	
1120	1250												
1250	1400					-430	-240		-120		-32	0	
1400	1600												
1600	1800					-480	-260		-130		-34	0	
1800	2000												
2000	2240					-520	-290		-145		-38	0	
2240	2500												
2500	2800												
2800	3150												

In the formula Deviation = $\pm \frac{IT_n}{2}$, IT_n is the IT value corresponding to 'n'.

Note: 1. If basic dimension ≤ 1mm, the basic deviation a and b are not adopted.

2. Within the range from js7 to js11, if the value of IT_n is odd number, then the final deviation = $\pm \frac{IT_{n-1}}{2}$.



GENERAL TECHNICAL INFORMATION

Fitting dimension tolerance

μm

Basic deviation value																		
Lower deviation ei																		
IT5 IT6	IT7	IT8	IT4 IT7	≤IT3 >IT7	Standard tolerance class													
j			k		m	n	p	r	s	t	u	v	x	y	z	zn	zb	zc
-2	-4	-6	0	0	+2	+4	+6	+10	+14		+18		+20		+26	+32	+40	+60
-2	-4		+1	0	+4	+8	+12	+15	+19		+23		+28		+35	+42	+50	+80
-2	-5		+1	0	+6	+10	+15	+19	+23		+28		+34		+42	+52	+67	+97
-3	-6		+1	0	+7	+12	+18	+23	+28		+33		+40		+50	+64	+90	+130
												+39	+45		+60	+77	+108	+150
-4	-8		+2	0	+8	+15	+22	+28	+35		+41	+47	+54	+63	+73	+98	+136	+188
										+41	+48	+55	+64	+75	+88	+118	+160	+218
-5	-10		+2	0	+9	+17	+26	+34	+43		+48	+60	+68	+80	+94	+112	+148	+200
										+48	+60	+68	+80	+94	+112	+148	+200	+274
										+54	+70	+81	+97	+114	+136	+180	+242	+325
-7	-12		+2	0	+11	+20	+32	+41	+53	+66	+87	+102	+122	+144	+172	+226	+300	+405
								+43	+59	+75	+102	+120	+146	+174	+210	+274	+360	+480
-9	-15		+3	0	+13	+23	+37	+51	+71	+91	+124	+146	+178	+214	+258	+335	+445	+585
								+54	+79	+104	+144	+172	+210	+254	+310	+400	+525	+690
-11	-18		+3	0	+15	+27	+43	+63	+92	+122	+170	+202	+248	+300	+365	+470	+620	+800
								+65	+100	+134	+190	+228	+280	+340	+415	+535	+700	+900
								+68	+108	+146	+210	+252	+310	+380	+465	+600	+780	+1000
-13	-21		+4	0	+17	+31	+50	+77	+122	+166	+236	+284	+350	+425	+520	+670	+880	+1150
								+80	+130	+180	+258	+310	+385	+470	+575	+740	+960	+1250
								+84	+140	+196	+284	+340	+425	+520	+640	+820	+1050	+1350
-16	-26		+4	0	+20	+34	+56	+94	+158	+218	+315	+385	+475	+580	+710	+920	+1200	+1550
								+98	+170	+240	+350	+425	+525	+650	+790	+1000	+1300	+1700
-18	-28		+4	0	+21	+37	+62	+108	+190	+268	+390	+475	+590	+730	+900	+1150	+1500	+1900
								+114	+208	+294	+435	+530	+660	+820	+1000	+1300	+1650	+2100
-20	-32		+5	0	+23	+40	+68	+126	+232	+330	+490	+595	+740	+920	+1100	+1450	+1850	+2400
								+132	+252	+360	+540	+660	+820	+1000	+1250	+1600	+2100	+2600
			0	0	+26	+44	+78	+150	+280	+400	+600							
								+155	+310	+450	+660							
			0	0	+30	+50	+88	+175	+340	+500	+740							
								+185	+380	+560	+840							
			0	0	+34	+56	+100	+210	+430	+620	+940							
								+220	+470	+680	+1050							
			0	0	+40	+66	+120	+250	+520	+780	+1150							
								+260	+580	+840	+1300							
			0	0	+48	+78	+140	+300	+640	+960	+1450							
								+330	+720	+1050	+1600							
			0	0	+58	+92	+170	+370	+820	+1200	+1850							
								+400	+920	+1350	+2000							
			0	0	+68	+110	+195	+440	+1000	+1500	+2300							
								+460	+1100	+1650	+2500							
			0	0	+76	+135	+240	+550	+1250	+1900	+2900							
								+580	+1400	+2100	+3200							



Basic deviations value of hole

Dimensions (mm)		Basic deviation value																					
		Lower deviation EI												Upper deviation ES									
														IT6	IT7	IT8	≤IT8	>IT8	≤IT8	>IT8	≤IT8	>IT8	≤IT7
>	≤	A	B	C	CD	D	E	EF	F	FG	G	H	JS	J			K		M		N		P to ZC
---	3	+270	+140	+60	+34	+20	+14	+10	+6	+4	+2	0	In the formula Deviation =± $\frac{IT_n}{2}$, ITn is the IT value corresponding to ' n ' .	+2	+4	+6	0	0	-2	-2	-4	-4	If IT ≥IT7, add a Δ value to the relevant value
3	6	+270	+140	+70	+46	+30	+20	+14	+10	+6	+4	0		+5	+6	+10	-1+Δ		-4+Δ	-4	-8+Δ	0	
6	10	+280	+150	+80	+56	+40	+25	+18	+13	+8	+5	0		+5	+8	+12	-1+Δ		-6+Δ	-6	-10+Δ	0	
10	14	+290	+150	+95		+50	+32		+16		+6	0		+6	+10	+15	-1+Δ		-7+Δ	-7	-12+Δ	0	
14	18																						
18	24	+300	+160	+110		+65	+40		+20		+7	0		+8	+12	+20	-2+Δ		-8+Δ	-8	-15+Δ	0	
24	30																						
30	40	+310	+170	+120		+80	+50		+25		+9	0		+10	+14	+24	-2+Δ		-9+Δ	-9	-17+Δ	0	
40	50	+320	+180	+130																			
50	65	+340	+190	+140		+100	+60		+30		+10	0		+13	+18	+28	-2+Δ		-11+Δ	-11	-20+Δ	0	
65	80	+360	+200	+150																			
80	100	+380	+220	+170		+120	+72		+36		+12	0		+16	+22	+34	-3+Δ		-13+Δ	-13	-23+Δ	0	
100	120	+410	+240	+180																			
120	140	+460	+260	+200								0		+18	+26	+41	-3+Δ		-15+Δ	-15	-27+Δ	0	
140	160	+520	+280	+210																			
160	180	+580	+310	+230								0		+22	+30	+47	-4+Δ		-17+Δ	-17	-31+Δ	0	
180	200	+660	+340	+240																			
200	225	+740	+380	+260		+170	+100		+50		+15	0		+25	+36	+55	-4+Δ		-20+Δ	-20	-34+Δ	0	
225	260	+820	+420	+280																			
260	280	+920	+480	+300		+190	+110		+56		+17	0		+29	+39	+60	-4+Δ		-21+Δ	-21	-37+Δ	0	
280	315	+1050	+540	+330																			
315	355	+1200	+600	+360		+210	+125		+62		+18	0		+33	+43	+66	-5+Δ		-23+Δ	-23	-40+Δ	0	
355	400	+1350	+680	+400																			
400	450	+1500	+760	+440		+230	+135		+68		+20	0							-26		-44		
450	500	+1650	+840	+480																			
500	560					+260	+145		+76		+22	0							-30		-50		
560	630																						
630	710					+290	+160		+80		+24	0							-34		-56		
710	800																						
800	900					+320	+170		+86		+26	0						-40		-66			
900	1000																						
1000	1120					+350	+195		+98		+28	0						-48		-78			
1120	1250																						
1250	1400					+390	+220		+110		+30	0						-58		-92			
1400	1600																						
1600	1800					+430	+240		+120		+32	0						-68		-110			
1800	2000																						
2000	2240					+480	+260		+130		+34	0						-76		-135			
2240	2500																						
2500	2800					+520	+290		+145		+38	0											
2800	3150																						

Note: 1. If basic dimension ≤1mm, the basic deviation A and B are not adopted, so is the N when IT≥IT8.

2. Within the range from JS7 to JS11, if the value of IT_n is odd number, then the final deviation=± $\frac{IT_n-1}{2}$.

3.Regarding to the K,M, N with IT≤IT8 or the P to ZC with IT≤IT7, the Δ value can be selected from the right-side sheet.

For example,: within the range 8~30mm of K7, Δ=8μm, therefore ES=+2+8=+6μm within the range 18~30mm of S6:Δ=4μm, therefore ES=-35+4=-31μm.



GENERAL TECHNICAL INFORMATION

Fitting dimension tolerance

μm

Basic deviation value												Δ					
Upper deviationES																	
Standard tolerance class >IT7												Standard tolerance class					
P	R	S	T	U	V	X	Y	Z	ZA	ZB	ZC	IT3	IT4	IT5	IT6	IT7	IT8
-6	-10	-14		-18		-20		-26	-32	-40	-60	0	0	0	0	0	0
-12	-15	-19		-23		-28		-35	-42	-50	-80	1	1.5	1	3	4	6
-15	-19	-23		-28		-34		-42	-52	-67	-97	1	1.5	2	3	6	7
-18	-23	-28		-33		-40		-50	-64	-90	-130	1	2	3	3	7	9
					-39	-45		-60	-77	-108	-150						
-22	-28	-35		-41	-47	-54	-63	-73	-98	-136	-188	1.5	2	3	4	8	12
			-41	-48	-55	-64	-75	-88	-118	-160	-218						
-26	-34	-43	-48	-60	-68	-80	-94	-112	-148	-200	-274	1.5	3	4	5	9	14
			-54	-70	-81	-97	-114	-136	-180	-242	-325						
-32	-41	-53	-66	-87	-102	-122	-144	-172	-226	-300	-405	2	3	5	6	11	16
	-43	-59	-75	-102	-120	-146	-174	-210	-274	-360	-480						
-37	-51	-71	-91	-124	-146	-178	-214	-258	-335	-445	-585	2	4	5	7	13	19
	-54	-79	-104	-144	-172	-210	-254	-310	-400	-525	-690						
-43	-63	-92	-122	-170	-202	-248	-300	-365	-470	-620	-800	3	4	6	7	15	23
	-65	-100	-134	-190	-228	-280	-340	-415	-535	-700	-900						
	-68	-108	-146	-210	-252	-310	-380	-465	-600	-780	-1000						
-50	-77	-122	-166	-236	-284	-350	-425	-520	-670	-880	-1150	3	4	6	9	17	26
	-80	-130	-180	-258	-310	-385	-470	-575	-740	-960	-1250						
	-84	-140	-196	-284	-340	-425	-520	-640	-820	-1050	-1350						
-56	-94	-158	-218	-315	-385	-475	-580	-710	-920	-1200	-1550	4	4	7	9	20	29
	-98	-170	-240	-350	-425	-525	-650	-790	-1000	-1300	-1700						
-62	-108	-190	-268	-390	-475	-590	-730	-900	-1150	-1500	-1900	4	5	7	11	21	32
	-114	-208	-294	-435	-530	-660	-820	-1000	-1300	-1650	-2100						
-68	-126	-232	-330	-490	-595	-740	-920	-1100	-1450	-1850	-2400	5	5	7	13	23	34
	-132	-252	-360	-540	-660	-820	-1000	-1250	-1600	-2100	-2600						
-78	-150	-280	-400	-600													
	-155	-310	-450	-660													
-88	-175	-340	-500	-740													
	-185	-380	-560	-840													
100	-210 -220	-430 -470	-620 -680	-940 -1050													
-120	-250 -260	-520 -580	-780 -840	-1150 -1300													
-140	-300 -330	-640 -720	-960 -1050	-1450 -1600													
-170	-370	-820	-1200	-1850													
	-400	-920	-1350	-2000													
-195	-440 -460	-1000 -1100	-1500 -1650	-2300 -2500													
-240	-550 -580	-1250 -1400	-1900 -2100	-2900 -3200													

Hardness reference table(conversion of hardness and strength for ferrous metal)

Hardness				Tensile strength N/mm ²	Hardness				Tensile strength N/mm ²
Rockwell hardness		Vickers hardness	Brinell hardness		Rockwell hardness		Vickers hardness	Brinell hardness	
HRC	HRA	HV	HB		HRC	HRA	HV	HB	
70.0	86.6	1037	—	—	51.0	76.3	525	501	1780
69.5	86.3	1017	—	—	50.5	76.1	517	494	1750
69.0	86.1	997	—	—	50.0	75.8	509	488	1720
68.5	85.8	978	—	—	49.5	75.5	501	481	1690
68.0	85.5	959	—	—	49.0	75.3	493	474	1660
67.5	85.2	941	—	—	48.5	75.0	485	468	1630
67.0	85.0	923	—	—	48.0	74.7	478	461	1605
66.5	84.7	906	—	—	47.5	74.5	470	455	1575
66.0	84.4	889	—	—	47.0	74.2	463	449	1550
65.5	84.1	872	—	—	46.5	73.9	456	442	1525
65.0	83.9	856	—	—	46.0	73.7	449	436	1500
64.5	83.6	840	—	—	45.5	73.4	443	430	1475
64.0	83.3	825	—	—	45.0	73.2	436	424	1450
63.5	83.1	810	—	—	44.5	72.9	429	418	1430
63.0	82.8	795	—	—	44.0	72.6	423	413	1405
62.5	82.5	780	—	—	43.5	72.4	417	407	1385
62.0	82.2	766	—	—	43.0	72.1	411	401	1360
61.5	82.0	752	—	—	42.5	71.8	405	396	1340
61.0	81.7	739	—	—	42.0	71.6	399	391	1320
60.5	81.4	726	—	—	41.5	71.3	393	385	1300
60.0	81.2	713	—	2555	41.0	71.1	388	380	1280
59.5	80.9	700	—	2500	40.0	70.8	382	375	1260
59.0	80.6	688	—	2450	40.0	70.5	377	370	1245
58.5	80.3	676	—	2395	39.5	70.3	372	365	1225
58.0	80.1	664	—	2345	39.0	70.0	367	360	1210
57.5	79.8	653	—	2295	38.5	—	362	355	1190
57.0	79.5	642	—	2250	38.0	—	357	350	1175
56.5	79.3	631	—	2205	37.5	—	352	345	1160
56.0	79.0	620	—	2160	37.0	—	347	341	1140
55.5	78.7	609	—	2115	36.5	—	342	336	1125
55.0	78.5	599	—	2075	36.0	—	338	332	1110
54.5	78.2	589	—	2035	35.5	—	333	327	1095
54.0	77.9	579	—	1995	35.0	—	329	323	1080
53.5	77.7	570	—	1955	34.5	—	324	318	1065
53.0	77.4	561	—	1920	34.0	—	320	314	1050
52.5	77.1	551	—	1885	33.5	—	316	310	1035
52.0	76.9	543	—	1850	33.0	—	312	306	1020
51.5	76.6	534	—	1815	32.5	—	308	302	1010



GENERAL TECHNICAL INFORMATION

Hardness reference table

Hardness				Tensile strength N/mm ²	Hardness				Tensile strength N/mm ²
Rockwell hardness		Vickers hardness	Brinell hardness		Rockwell hardness		Vickers hardness	Brinell hardness	
HRC	HRA	HV	HB		HRC	HRA	HV	HB	
32.0	—	304	298	995	24.0	—	249	245	820
31.5	—	300	294	980	23.5	—	246	242	810
31.0	—	296	291	970	23.0	—	243	240	800
30.5	—	292	287	960	22.5	—	240	237	790
30.0	—	289	283	950	22.0	—	237	234	785
29.5	—	285	280	935	21.5	—	234	232	775
29.0	—	281	276	920	21.0	—	231	229	765
28.5	—	278	273	910	20.5	—	229	227	760
28.0	—	274	269	900	20.0	—	226	225	750
27.5	—	271	266	890	19.5	—	223	222	745
27.0	—	268	263	880	19.0	—	221	220	735
26.5	—	264	260	870	18.5	—	218	218	730
26.0	—	261	257	860	18.0	—	216	216	725
25.5	—	258	254	850	17.5	—	214	214	715
25.0	—	255	251	835	17.0	—	211	211	710
24.5	—	252	248	830					

Note: The conversion values for steel in the table are commonly applicable for the steels with low and high carbon content.

The tensile strength in the table are applicable for the steels without high conversion precision requirement 1N/mm²=1Mpa.

This table is selected from GB1172-74.

GENERAL TECHNICAL INFORMATION



Grades comparison table

CVD coating		ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENNAMETAL	SECO	ISCAR
Application	P	P01		GC4305 GC4205		TT8115	WPP01 WPP05 WPP05S	UE6105	AC810P AC700G	T9105	CA510 CA5505	JC110V	HG8010	KCP05B KCP05 KC9105	TP0501 TP0500 TP1501 TP1500	IC9150 IC8150 IC428
		P10	YBC152 YBC151	GC4315 GC4215 GC4325	NC310 NC3015	TT8115	WPP05 WAK20 WPP05S WPP10S	UE6105 MC6015 UE6110 MY5015	AC8015P AC810P AC700G AC820P AC2000	T9105 T9115	CA510 CA505 CA515 CA5515 CA025P	JC110V JC215V	HG8010 HG8025 GM8020	KCP10B KCP10 KCP25 KC9110	TP1501 TP1500 TP2501 TP2500	IC9150 IC8150 IC8250
		P20	YBC251 YBC252	GC4315 GC4215 GC4325 GC4225	NC3020	TT8125 TT5100	WPP20 WPP20S	MC6015 UE6110 MC6025 UE6020 MY5015	AC820P AC2000 AC8025P AC830P	T9115 T9125	CA515 CA5515 CA525 CA5525 CA530 CA5535 CR9025 CA025P	JC110V JC215V	HG8025 GM8020 GM25	KCP25B KCP30B KCP25 KC9125	TP2501 TP2500	IC8250 IC9250 IC8350
		P30	YBC252 YBC351 YBC352	GC4335 GC4325 GC4225 GC4025 GC4235	NC330	TT8125 TT5100 TT8135	WPP30 WAK30 WPP30S	MC6025 UE6020 MC6035 UE6035 UH6400	AC8035P AC830P AC630M	T9125 T9135 T6130	CA525 CA5525 CA530 CA5535 CR9025	JC325V JC215V	GM25 GM8035	KCP30B KCP30	TP3501 TP3500 TP3000	IC8350 IC9250 IC9350
	M	P40	YBC351 YBC352	GC4335 GC4235		TT7100 TT8135	WPP30 WAK30 WPP30S	MC6035 UE6035 UH6400	AC8035P AC630M	T9135 T6130	CA530 CA5535	JC325V	GM8035 GX30	KCP40B KCP40 KC9140 KC9240	TP3501 TP3500 TP3000	IC9350
		M10		GC2015 GC2220		TT9215		MC7015 US7020	AC610M AC6020M	T9115	CA6515	JX605X JC110V		KCM15B KCM15	TM2000	IC6015 IC8250
		M20	YBM151 YBM153	GC2220 GC2015	NC9020	TT9215 TT9225		MC7015 US7020 MC7025	AC610M AC6030M AC630M	T6120 T9125	CA6515 CA6525	JC110V	HG8025 GM25	KCM15 KC9225 KCM25B	TM2000	IC6015
		M30	YBM151 YBM251	GC2025	NC330	TT9225 TT9235		MC7025 US735	AC6030M AC630M	T6130	CA6525	JX525X	GM8035 GX30	KCM25 KC9230 KCM35B	TM4000	IC6025
	K	M40	YBM253	GC2025		TT9235		US735	AC6030M AC630M			JX525X	GX30	KCM35B KCM35 KC9240 KC9245	TM4000	IC6025
		K01	YBD052	GC3205 GC3210			WAK10 WPP01	MC5005 UC5015	AC405K AC410K	T5105	CA4505 CA4010 CA310	JC050W JC105V	HX3505	KCK05B KCK05	TK0501 TH1500	IC5005
		K10	YBD102	GC3205 GC3210	N305K	TT7005	WPP10 WAK10 WKK10S	MC5015 UC5115 MY5015	AC405K AC410K AC415K AC420K AC700G	T5105 T5115 T5115	CA315 CA4515 CA4010 JC105V CA4115	JC108W JC050W JC105V JC110V	HX3515 HG8010	KCK15B KCK15 KCK20 KC9315 KCK20B	TK0501 TH1501	IC5005 IC5010 IC428
		K20	YBD152 YBD252	GC3225 GC3215	N315K	TT7310	WPP20 WAK20 WKK20S	MC5015 UC5115 UE6110 MY5015	AC415K AC420K AC700G AC820P	T515 T5115 T5125	CA320 CA4515 CA4115 CA4120	JC108W JC110V JC215V	HG8025 GM8020	KCK20B KCK20 KC9325 KCPK05	TK1501	IC5010 IC8150
	K30			GC3225			WAK30 WKP30S	UE6110	AC820P	T9115 T5125		JC215	HG8025 GM8020	KCPK05		
	S	S01		S05F				US905			CA6515 CA6525 CA6535		HS9105 HS9115			

General Technical
Information

D GENERAL TECHNICAL INFORMATION

Grades comparison table

CVD coating

Application	ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENAMETAL	SECO	ISCAR
P	P10					WKP25					JC730U			MP1500	IC9080 IC4100 IC9015
	P20	YBC301 YBM251	GC4220		TT7800	WKP25 WKP35 WKP35S	F7030 MC7020	ACP100	T3225		JC730U	GX2140		MP1500 MP2500	IC5500 IC5100 IC520M
	P30	YBM351	GC4230	NCM335	TT7800	WKP25 WKP35 WKP35S	F7030 MC7020	ACP100	T3130 T3225			GX2140 GX2160	KCPK30 KC930M	MP2500	IC5500 IC4050
	P40	YBC302	GC4240		TT7800	WKP35 WKP35S						GX2030 GX30 GX2160	KC935M KC530M		
M	M10														IC9250
	M20	YBM251 YBM253			TT7800		F7030 MC7020	ACP100 ACM200	T3225	CA6535	JC730U	AX2040 GX2140	KC925M	MP2500 MM4500	IC520M IC9350
	M30	YBC302	GC2040	NCM335	TT7800		F7030 MC7020	ACP100	T3130 T3225	CA6535		AX2040 GX2140 GX2160 GX30	KC930M	MP2500 MM4500	IC9350 IC4050
	M40	YBM351										GX2030 GX2160 GX30	KC930M KC935M		IC635
K	K01					WKP15					JC600				
	K10	YBD152		NCM310	TT6800	WKP15 WKP25	MC5020	ACK100	T1215 T1115	CA420M	JC600				
	K20	YBD252	GC3220 GC3330 K20W	NCM320	TT6800	WKP15 WKP25 WKP35 WKP35S	MC5020	ACK200	T1215		JC610		KC915M	MK1500 MK2000	IC5100 IC9150
	K30	YBD252	GC3330 GC3040			WKP25 WKP35 WKP35S					JC610	GX30	KC920M KC925M KCPK30 KC930M KC935M	MK2000 MK3000	IC4100 IC4050 IC520M

GENERAL TECHNICAL INFORMATION



Grades comparison table

PVD coating		ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	mitsubishi	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENNAMETAL	SECO	ISCAR
Application	Turning	P01					WXN10				PR1005					
		P10	YBG102	GC1125			WSM10 WSM21	VP10MF MS6015		AH710	PR1005 PR930 PR1025 PR115 PR1225 PR1425			KCU10 KC5010 KC5510 KU10T	CP200 TS2000	IC250 IC507 IC570 IC807 IC907 IC908
		P20	YBG202	GC1125 GC15	PC230	TT9030	WSM21 WSM20	VP10RT VP20RT VP15TF VP20MF MS6015	AC520U	AH120 AH730 AH725 SH725 SH730 J740	PR930 PR1025 PR1115 PR1225 PR1425 PR1535		IP2000	KCU10 KC5025 KC5525 KU25T	TS2500	IC1007 IC250 IC308 IC507 IC807 IC908 IC907 IC908 IC1008 IC1028 IC3028
		P30	YBG202	GC1125		TT9030 TT8020	WSM30	VP10RT VP20RT VP15TF VP20MF	AC1030U AC530U	AH725 AH120 AH730 SH730 GH330 GH730 J740 SH725	PR1025 PR1225 PR1425 PR1535 PR1625		IP3000	KCU25 KC5525 KU25T	CP500	IC228 IC250 IC328 IC330 IC354 IC528 IC1008 IC1028 IC3028
		P40			PC240	TT8020				AH120 AH725 AH645	PR1535				CP500 CP600	IC228 IC328 IC528 IC928 IC1008 IC1028 IC3028
	Turning	M10	YBG202 YBG205	GC1115 GC15 GC1105			WSM10 WSM10S	VP10MF MS6015		AH630	PR1025 PR1225 PR1425	JC5003 JC8015		KCU10 KC5010 KC5510	CP200 TS2000	IC354 IC507 IC520 IC807 IC907 IC1007 IC5080T
		M20	YBG202 YBG205	GC1115 GC15 GC1125	PC9030	TT9030 TT8010	WSM20 WSM21 WSM20S	VP10RT VP20RT VP15TF VP20MF	AC520U	AH725 AH120 SH730 AH630 SH725	PR1025 PR1125 PR1225 PR1425 PR915 PR930 PR1535	JC5003 JC5015 JC8015 JC5118	IP100S	KCU10 KC5010 KC5510	TS2500 CP500	IC354 IC808 IC908 IC1008 IC1028 IC3028 IC5080T
		M30		GC1125 GC2035	PC9030	TT8020	WSM30 WSM30S	VP10RT VP20RT VP15TF VP20MF MP7035	AC520U AC530U AC1030U AC6040U	AH725 AH120 SH730 J740 AH645 SH725	PR1125 PR1425 PR1535	JC5015 JC8015 JC5118		KCU25 KC5525 KU25T	CP500 CP600	IC228 IC250 IC328 IC330 IC1008 IC1028 IC9080T
		M40		GC2035				MP7035	AC530U AC6040U	AH645	PR1535	JC5118				IC328 IC928 IC1008 IC1028 IC3028 IC9080T



GENERAL TECHNICAL INFORMATION

Grades comparison table

PVD coating															
Application	ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	mitsubishi	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENAMETAL	SECO	ISCAR
	K01								AH110						
K	K10		GC15	PC205K	TT9030			AC510U	GH110 AH110				KCU10 KC5010 KC5510	CP200 TS2000	IC350 IC910 IC1008
	K20			PC215K	TT9030		VP10RT VP20RT VP15TF		AH120				KCU15 KCU25	CP200 TS2000 TS2500	IC228 IC350 IC808 IC830 IC908 IC1007 IC1008
	K30				TT9030		VP10RT VP20RT VP15TF		AH120 GH130				KCU25 KC5525 KU25T	CP500	IC228 IC350 IC808 IC830 IC908 IC1007 IC1008
	S01					WSM10	MP9005 VP05RT		AH8005	PR005S PR1305	JC5003 JC8015	JP9105		TH1000	IC507 IC807 IC903 IC806 IC5080T
S	S10	YBG102 YBG105 YBG202	GC1105 GC15		TT8010	WSM10 WSM10S	MP9005 MP9015 VP10RT	AC510U	AH8005 AH8015	PR005S PR1310 PR015S	JC5003 JC5015 JC8015	JP9115	KCU10 KC5010 KC5410 KC5510	CP200 CP250 TS2000 TS2050 TS2500 TH1000	IC228 IC300 IC328 IC808 IC908 IC928 IC3028 IC806 IC9080T
	S20	YBG212	GC1125		TT8020	WSM20 WSM20S WSM21	MP9005 MT9015	AC510U AC520U	AH8015	PR015S PR1125 PR1325	JC5015 JC8015 JC5118		KCU10 KCU25 KC5025 KC5525	TS2500 CP500	IC928 IC830
	S30		GC1125			WSM30 WSM30S	VP15TF MP9025 VP20RT	AC1030U	AH630 AH7025	PR1125 PR1535	JC5118		KC5525	CP600	
Turning															

GENERAL TECHNICAL INFORMATION



Grades comparison table

PVD coating															
Application	ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENAMETAL	SECO	ISCAR
P	P01				TT2510 TT5505				AH110 AH710		JC8003	ATH80D ATH08M TH308 PN208 JP4105 PN15M			IC903
	P10	YBG252	GC1010 GC1130		TT2510 TT5505 TT5515 TT7080	WXH15 WXM15		ACP200	AH120 AH725	PR830 PR1225	JC8003 JC8015 JC5015 JC5118	PN15M PN215 PCA12M JP4115	KC505M KC715M KC510M KC515M		IC250 IC350 IC808 IC810 IC900 IC903 IC908 IC910 IC950
	P20	YBG205 YBG202 YBG9320 YBG252	GC1010 GC1030 GC1130 GC2030	PC230	TT2510 TT5505 TT5525 TT7080 TT9030 TT9080	WHH15 WXM15	MP6120 VP15TF	ACP200	AH725 AH120 AH3135 AH9030	PR830 PR1225 PR1230 PR1525	JC5015 JC5040 JC6235 JC8015 JC5118 JC7560P JC8118P	CY9020 JP4120 CY150	KC522M KC525M KC527M KC610M KC620M KC635M KC715M KC720M KC730M KTPK20	F25M MP3000	IC250 IC300 IC328 IC330 IC350 IC808 IC810 IC830 IC900 IC908 IC910 IC928 IC950 IC1008
	P30	YBG302	GC1010 GC1030 GC1130 GC2030	PC3530 PC130	TT5525 TT7080 TT8020 TT8080 TT9030 TT9080	WSP45 WSP46	MP6120 VP15TF MP6130 VP30RT	ACP200 ACP300	AH725 AH120 AH130 AH3135 AH6030	PR1230 PR1525	JC6235 JC7560 JC8050 JC7560P JC5015 JC8118 JC5040 JC8118P JC8015 JC5118	JS4045 CY250 CY250V CY25 HC844	KC735M KC725M KC530M KC537M KCPM40	F25M MP3000 F30M	IC250 IC300 IC328 IC330 IC350 IC830 IC845 IC900 IC928 IC950 IC1008
	P40	YBG302	GC1030 GC1130 GC2030		TT8020	WSP45 WSP46	VP30RT	ACP300	AH140	PR1525	JC6235 JC7560 JC8050 JC7560P JC5040 JC8118 JC5118 JC8118P JC5118	JS4060 PTH30E PTH40H JX1060 JS4060	KC735M KC537M KCPM40	F40M T60M	IC300 IC328 IC330 IC830 IC928 IC1008

General Technical
Information

GENERAL TECHNICAL INFORMATION

Grades comparison table

PVD coating																
Milling																
Application		ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENNAMETAL	SECO	ISCAR
M	M01												PN08M PN208			IC907
	M10		YBG252	GC1025 GC1130 GC1030 GC1010		TT5525 TT9030 TT9080	WXM15		ACM100	AH725	PR1225		PN15M PN215	KC735M KC515M		IC903
	M20		YBG205 YBG202 YBG9320 YBG252	GC1025 GC1030 GC1040 GC2030 S30T		TT8020 TT8080	WXM15 WSM35 WSM36	VP15TF MP7130 MP7030 VP20RT	ACP200	AH725 AH130 AH6030 AH3135	PR1025 PR1225	JC5015 JC5118 JC8015	JP4120	KC610M KC5635M KC730M KC720M KC522M KC525M KCPM40 KCPK20	F25M MP3000	IC250 IC300 IC808 IC830 IC900 IC908 IC928 IC1008
	M30		YBG302	S30T GC1040 GC2030	PC9530	TT8020 TT8080	WSM35 WSM36 WSP45 WSP46	VP15TF MP7130 MP7030 VP20RT MP7140 VP30RT	ACP200 ACP300 ACM300	AH130 AH3135	PR830 PR1225 PR1525 PR1535	JC5015 JC7560 JC8015 JC7560P JC3050 JC8118 JC5118 JC8118P	JS4045 CY250 HC844	KC537M KC725M KC735M KCPM40 KC530M	F30M F40M MP3000	IC250 IC300 IC328 IC330 IC830 IC928 IC1008 IC380 IC882
M40		YBG302				TT8020	WSM35 WSM36 WSP45 WSP46	MP7140 VP30RT	ACP300 ACM300	AH140	PR1525 PR1535	JC5015 JC7560 JC5118 JC7560P JC8050 JC8118 JC8118P	PTH30E PTH40H JM4160		F40M	IC250 IC300 IC328I C330 IC1008 IC882

GENERAL TECHNICAL INFORMATION

Grades comparison table

PVD coating	ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENNAMETAL	SECO	ISCAR
Application	K01				TT6080		MP8010		AH110		JC8003	ATH80D ATH08M TH308			IC350 IC810 IC830 IC900 IC910 IC928 IC950 IC380 IC1008
	K10	YBG102 YBG252	GC1010	PC205K	TT6080	WHH15 WXM15 WKK25	MP8010		AH110 AH120	PR1210 PR1510	JC8015	ATH10E TH315 CY100H	KC514M KC515M KC527M KC635M	MK2050	IC350 IC808 IC810 IC830 IC900 IC908 IC910 IC928 IC950 IC1008
	K20	YBG152	GC1010 GC1020	PC215K		WHH15 WXM15 WKK25	VP15TF VP20RT	ACK300	AH120 AH9030	PR1210 PR1510	JC5015 JC8015 JC6235	CY150 JP4120 CY9020 PTH13S	KTPK20 KC514M KC610M KC520M KC620M KC524M	MK2000 MK2050	IC350 IC808 IC810 IC830 IC900 IC908 IC910 IC928 IC950 IC1008
	K30		GC1020			WKK25	VP15TF VP20RT	ACK300	AH120		JC6235 JC5015 JC8015 JC8118 JC8118P	CY250 JS4045	KC522M KC725M KC524M KC735M KC537M	MK2050	IC350 IC808 IC830 IC908 IC928 IC950 IC1008
	S01								AH110 AH710	PR1210	JC8003 JC8015 JC5118	PN08M PN208			IC907 IC908 IC808 IC903
	S10	YBG202 YBS205	GC1130 GC1010 GC1030 GC2030		TT9030 TT9080 TT8080		MP9120 VP15TF	EH520Z EH20Z ACM100	AH120 AH725	PR1210	JC8003 JC8015 JC5118 JC5015	JS1025 JP4120	KC510M	MS2050	IC903 IC907 IC908 IC840 IC910 IC808
	S20	YBS203 YBS303	S30T GC2030 GC1030 GC1130		TT8020 TT8080	WSM35 WSM36	MP9120 VP15TF MP9130 MP9030	EH520Z EH20Z ACK300 ACP300	AH725 AH130 AH6030	PR1535	JC8050 JC8015 JC5118 JC5015	PTH30H	KC522M KC525M KCSM30 KCPM40	MS2050	IC300 IC908 IC808 IC900 IC830 IC928 IC328 IC330 IC840 IC882 IC380
	S30	YBS303	GC2030 GC1040		TT8020	WSM35 WSM36 WSP45 WSP46		ACM300 ACP300	AH130	PR1535	JC8050 JC7560 JC5118	JM4160	KC725M KCPM40	MS2050 F40M KCSM40	IC830 IC882 IC928
	H01				TT2510 TT5505		MP8010 VP05HT		AH110		JC8003 DH103 JC8008 DH102				IC903
	H10		GC1130 GC1010 GC1030		TT5515 TT6080	WHH15	VP15TF VP10H		AH120		JC8003 JC8008 JC8015 JC5118 JC8118P	JP4105 TH308 TH303 PTH08M ATH08M ATH80D	KC505M KC510M	MH1000 F15M	IC900 IC808 IC907 IC905
	H20		GC1030 GC1130		TT5515 TT6080	WHH15	VP15TF		AH120 AH725 AH9030		JC8015 JC5118 JC8118P	JP4115 TH315		F15M	IC900 IC808 IC908 IC380 IC1008
	H30											JP4120		MP3000 F30M	IC380 IC900 IC1008

General Technical
Information



GENERAL TECHNICAL INFORMATION

Grades comparison table

ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENNAMETAL	SECO	ISCAR
P01			CC105 CN100	PV3010 CT3000		AP25N* VP25N*	T110A T1000A	NS520	TN30 TN610 PV710* PV30* TN6010 PV7010*	LN10 CX50				IC20N IC520N*
P10	YNG151 YNG151C	CT5015 GC1525*	CC15 CN200 CT10	PV3010 CT3000	WCE10	NX2525 AP25N* VP25N*	T1200A T2000Z* T1500A T1500Z*	GT9530* J9530	TN60TN610 PV710* PV60* TN6010 PV7010*	CX50 CX75 PX75*	CZ25*	KT315 KT125	TP1020 TP1030* CM CMP*	IC20N IC520N* IC530N*
P20		GC1525*		PV3010 CT3000	WCE10	NX2525 AP25N* VP25N* NX3035 MP3025*	T1200A T2500A T2000Z* T3000Z* T1500A T1500Z*	GT9530* NS9530 J9530	TN60 PV60* TN620 PV720* TN6020 PV7020* PV7025*	CX75 PX75* PX90*	CH550	KT325 KT1120 KT5020*	TP1020 TP1030* CM CMP*	IC20N IC520N* IC30N IC530N* IC75T
P30						MP3025* VP45N*	T3000Z*	NS9530	PV7025* PV90*	PX90*				IC75T
M10	YNG151 YNG151C	GC1525*		PV3010 CT3000		NX2525 AP25N VP25N	T110A T1000A T2000Z T1500Z	NS520	TN60 PV60* TN620 PV720* TN6020 PV7020*	LN10 CX50		KT125	TP1020 TP1030* CM CMP*	
M20				PV3010 CT3000		NX2525 AP25N* VP25N*	T1200A T2000Z T1500A T1500Z	GT9530 NS9530 J9530	TN90 TN6020 TN620 PV720* PV90* PV7020* PV7025*	CX50 CX75 PX75	CH550			
M30								NS9530						
M40														
K01			CC105 CN100	PV3010 CT3000		NX2525 AP25N*	T110A T1000A T2000Z* T1500Z*	NS520	TN30 PV30* PV7005* TN610 PV710* TN6010 PV7010*	LN10				
K10	YNG151 YNG151C	CT5015	CC115	CT3000		NX2525 AP25N*	T1200A T2000Z* T1500A T1500Z*	GT9530 NS9530 J9530	TN60 PV60* TN6020 TN620 PV720* PV7020* PV7025*	LN10		KT325 KT125		
K20						NX2525 AP25N*	T3000Z*	NS9530		CX75				
K30														
Application	Turning													

GENERAL TECHNICAL INFORMATION



Grades comparison table

Cermet		ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	mitsubishi	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENAMETAL	SECO	ISCAR
Application	P	P01				CT3000										
		P10	YNG151 YNG151C		CN100	CT3000 CT7000		NX2525		NS740	TN60	CX75	MZ1000*		C15M	IC30N
		P20		CT530	CN20	CT3000 CT7000		NX2525 MX3020	T250A	NS740	TN100M TN60	CX75 CX90	CH650 CH7030 MZ1000* MZ2000*	KT530M HT7 KT605M	C15M MP1020	IC30N
		P30			CN30	CT7000		MX3030 NX4545	T250A T4500A			CX90 CX99	MZ3000* CH7035			IC30N
	M	M01														
		M10	YNG151 YNG151C			CT3000 CT7000		NX2525		NS740	TN60					IC30N
		M20		CT530		CT7000		NX2525 MX3020		NS740	TN100M	CX75	CH650 CH7030 MZ1000* MZ2000*	KT530M HT7 KT605M	C15M	IC30N
		M30						MX3030 NX4545	T250A			CX90 CX99	MZ3000* CH7035			
		M40														
	K	K01														
		K10	YNG151 YNG151C			CT7000		NX2525		NS740	TN60					
		K20						NX2525				CX75		KT530M HT7		
		K30														

General Technical
Information



GENERAL TECHNICAL INFORMATION

Grades comparison table

PCBN grade		ISO Code	ZCC.CT	SUMITOMO	TUNGALOY	KYOCERA	SECO	SANDVIK
Application	K	K01-K10	BK1011 BK1021	BN7000 BN500	BX910 BX930	KBN475 KBN60M	CBN200	CB50 CB7525
		K20	BK2511 BK2541	BN7000 BNS800	BX480 BX90S	KBN900	CBN300 CBN350	CB7925
		K25						
	H	H01	BH0121	BNC2010 BNC100	KBN05M KBN510	BXM10 BX310	CH0550 CBN050C	CB7105
		H10	BH1020	BNC2020 BNC160 BN1000	KBN10M KBN525	BX330 BXC30	CBN060K CBN100	CB7115 CB7025 CB7015
		H20-H25	BH2011 BH2511	BNC200 BN2000	KBN25M	BXA20 BXM20 BX360	CH2540 CBN150	CB7125
	S	H35	BH3511	BNC300 BN350	KBN35M	BXC50 BX380	CH3515	CB7135 CB7525
		S10	BS1011	BN7000	BX940 BX950	KBN475 KBN60M	CBN200	CB7525
		S20	BS2011	BN500	BX470 BX480	KBN900	CBN300 CBN350	CB7925
		S30	BS3011	BNS800	BXC90			

PCD grade		ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	Element Six
Application	Turning	N01	DN0121	DA1000 DA90	DX180 DX160	KPD001	PCD05	CD05
		N10	DN1011 DN0511	DA1000 DA150	DX110 DX140	KPD010	PCD10	CD10
		N20	DN1031	DA1000 DA2200	DX110 DX120	KPD230	PCD20	CD1810
		N30	DN3021		DX110		PCD30	

GENERAL TECHNICAL INFORMATION



Grades comparison table

Cemented carbide material															
Application	ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENNAMETAL	SECO	ISCAR
	P	P01		ST05											
M	P10	YC10		ST10	P10			ST10P	TH10		SRT				IC70
	P20		SMA	ST20	P20		UT120T	ST20E	KS20		SRT DX30	EX35			IC70 IC50M
	P30		SM30	ST30A	P30		UT120T	A30	KS15F UX30	PW30	SR30 DX30	EX35			IC50M IC54
	P40	YC40			P40			ST40E	TX40		SR30	EX45			IC54
K	M10		H10A	U10	M10			EH510 U10E	TH10		UMN	WA10B	KU10 K313 K68	890	IC07
	M20		H13A	U20	M20		UT120T	EH520 U2	KS20		DX25 UMS	EX35	KU10 K313 K68	HX	IC07 IC08 IC20
	M30		H10F SM30	ST30A			UT120T	A30	UX30		DX25 UMS	EX45		883	IC08 IC20 IC28
	M40			U40	M40				TU40		UM40	EX45			IC28
N	K01	YD051		H02	UF1		HT105T	H1 H2	KS05F		KG03	WH05	KU10 K313 K68		
	K10	YD201	H10 HM	H01	K10		HT110	EH10 EH510	TH10	KW10 GW15	KG10 KT9	WH10	KU10 K313 K68	890	IC20
	K20	YD201	H13A	G10	K20		UT120T	G10E EH20 EH520	KS15F KS20	GW25	CR1 KG20		KU10 K313 K68	HX	IC20
	K30			G3	K30		UT120T	G10E			KG30			883	
S	N01		H10 H13A					H1 H2	KS05F	KW10					
	N10	YD101		H01	K10	WK1 WK10	HT110	EH10 EH510	TH10	KW10 GW15	KT9	WH10	KU10 K313 K68	H15	IC08 IC20
	N20				K20	WK1 WK10		G10E EH20 EH520	KS15F		CR1	WH20	KU10 K313 K68	HX	IC08 IC20
	N30					WK40 WMG40					KG30			H25	
S	S01						RT9005			SW05	KG03				
	S10	YD101	H10 H10A H10F H13A	H01	K10	WK1	RT9005 RT9010 MT9015	EH10 EH510	KS05F TH10	SW10	FZ05 KG10	WH135	KU10 K313 K68	HX	IC07 IC08
	S20				K20	WK1 WMG40	RT9010 TF15	EH20 EH520	KS15F KS20	SW25	FZ15 KG20		KU10 K313 K68	H25	IC07 IC08
	S30						WMG40	TF15			KG30				

General Technical Information

D GENERAL TECHNICAL INFORMATION

Grades comparison table

Cemented carbide material													
ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	mitsubishi	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENNAMETAL	SECO
P10		S1P								SRT			
P20			ST20	P30		UT120T	A30N			SRT DX30	EX35	K125M	IC50M IC28
P30			ST30A	P30		UT120T	A30N	UX30	PW30	SR30 DX30	EX35	GX	IC50M IC28
P40	YC30S		ST40						PW30	SR30	EX45		IC28
M10			U10	M10									
M20			U20	M20						UMN			
M30	YC30S					UT120T	A30N			DX25 UMS	EX35		IC08 IC20
M40		SM30	U40	M40		UT120T	A30N			DX25 UMS	EX35		IC08 IC28
K01	YD051		H01	K10		HT105T				KG03		K115M K313	
K10	YD051		H05 H10	K10	WK10	HT110	G10E	TH10	KW10 GW25	KG10	WH10	K115M K313	IC20
K20	YD201	H13A	G10			UT120T	G10E		GW25	KT9 CR1 KG20			HX IC20
K30						UT120T				KG30			
Application	Milling												

Insert index

175.32-22/27	A88
175.32-24	A88
175.32-25	A88
175.32-28	A88

A

ANG(M)X-GM	B208
ANGX-LH	B208
APHT-AL	B206
APHT-CBN	B206
APHT-PCD	B206
APHT-W	B206
APKT-ALH	B207
APKT-APF	B207
APKT-APM	B207
APKT-PM/KM	B207

C

CCGT-SF	A89
CCGT-USF	A89
CCGW	A139
CCGX-LC	A91
CCGX-LH	A91-92
CCMT-EF	A90
CCMT-EM	A90
CCMT-HF	A89
CCMT-HM	A90
CCMT-HR	A91
CCMW	A92
CCMX	A144
CNEG-NF	A55
CNGA	A118-119
CNGN	A120
CNMA	A59
CNMG	A60
CNMG-DF	A54
CNMG-DM	A56
CNMG-DR	A58
CNMG-EF	A54
CNMG-EM	A56
CNMG-ER	A58
CNMG-NM	A57
CNMG-PM	A55
CNMG-SF	A54
CNMG-SNR	A58

CNMG-WGF	A54
CNMG-WGM	A55
CNMM	A60
CNMM-DR	A58
CNMM-ER	A58
CNMM-LR	A57
CNMM-HDR	A59
CNMM-HPR	A59
CPGT-SF	A110

D

DCGT-SF	A93
DCGT-USF	A93
DCGW	A140
DCGX-LC	A95
DCGX-LH	A95
DCMT-EF	A94
DCMT-EM	A94
DCMT-HF	A93
DCMT-HM	A94
DCMT-HR	A95
DCMW	A95
DCMX	A145
DNEG-NF	A62
DNEG-NGF	A62
DNGA	A121-124
DNGN	A125
DNMA	A66
DNMG	A66
DNMG-DF	A61
DNMG-DM	A64
DNMG-DR	A65
DNMG-EF	A62
DNMG-EM	A64
DNMG-ER	A65
DNMG-NM	A64
DNMG-PM	A63
DNMG-SF	A62
DNMG-SNR	A65
DNMM-DR	A65
DNMM-ER	A65
DNMM-LR	A65
DNMM-HDR	A66
DNMX-WGF	A61

DNMX-WGM	A63
DPGT-SF	A111
DPGT-USF	A111

E

EDC-GD/KD/LD	C136-140
--------------------	----------

H

HNEX-DF	B208
HNEX-DM	B208
HNEX-DR	B208

K

KNUX	A87
------------	-----

L

LNGX-GM	B209
LNKT-ZR	B209
LNKT□PNR-GM	B210
LNKT□PNR-GL	B210
LNMT□PNR-GM	B210

M

MPHT	B210
------------	------

O

ODHT-GL	B211
ODHT-GM	B211
ODHT-GH	B211
ODHT-LH	B211
ODMT-GL	B211
OFKT-DF	B211
OFKT-DM	B211
OFKT-LH	B211
ONHU-GM	B212
ONHU-GH	B212
ONHU-GL	B212
ONHU-PF	B212
ONHU-PM	B212
ONHU-W	B212
ONMU-GM	B212
ONMU-GH	B212

P

PNEG-CF/CM/CR/PF/PM/PR	
.....	B213-214

Insert index

PNEG□-GH/GL/GM B213
PNEG□-KH/KL/KM B214

Q

QC□□L B215
QC□□R/L A267-268
QC□□R/L□□□R A268

R

RCGN A152
RCGX-LH A96
RCKT-DM B216
RCKT-DR B216
RCKT-ER B216
RCKT□MO-NM B216
RCM(G)T A96
RCMW B216
RCMX A97
RDKT□MO-NM B217
RDKW□MO B217
ROHX B217
RPGN A152
RT□□□□N-A(G)B A307
RT□□□□N-BSPTB A310
RT□□□□N-GMB A306
RT□□□□N-NPTB A311
RT□□□□N-UNB A309
RT□□□□N-WB A308
RT□□□□W-A(G)B A307
RT□□□□W-BSPTB A310
RT□□□□W-GMB A306
RT□□□□W-NPTB A311
RT□□□□W-UNB A309
RT□□□□W-WB A308

S

SCGX-LC A99
SCGX-LH A99
SCMT A99
SCMT-EF A98
SCMT-EM A98
SCMT-HF A98
SCMT-HM A98
SCMT-HR A99
SCMW A99
SDMT-DM/PM/NM B218

SDMT B218
SEET-CF B219
SEET-CM B219
SEET-CR B219
SEET-DF B219
SEET-DM B219
SEET-DR B219
SEET-EF B219
SEET-EM B219
SEET-LH B219
SEET-W B219
SEET□PER-APF B221
SEET□PER-APM B221
SEET□PER-APR B221
SEHT-AL B224
SEHT-CBN B224
SEHT-PCD B224
SEK(E)N B220
SEKR B220
SNCU-W4 B223
SNEG-GM/HGR/W B221
SNGA A126-128
SNGN A129
SNGX□□ANN-GL/GM/GH ... B222
SNGX□□ENN-GL/GM/GH ... B222
SNGX□□PNN-GL/GM/GH ... B223
SNGU□□-GM B223
SNMA A74
SNMG A73
SNMG-DF A67
SNMG-DM A68
SNMG-DR A70
SNMG-EF A67
SNMG-EM A69
SNMG-ER A71
SNMG-NM A69
SNMG-PM A68
SNMG-SF A67
SNMG-SNR A71
SNMM A73-74
SNMM-DR A70-71
SNMM-ER A71
SNMM-LR A69
SNMM-HDR A72

SNMM-HPR A72
SNMX-GL/GM/GH B222-223
SPEX B227
SPGT-PM/EM C125
SPKR-GM B226
SPKT B224
SPKW B226
SPMR B227
SPMT B224
SPMT-PM/KM B224
SPMW A112
SPMX-EM/LM/XM C124
SP□N B225
SP□N B228

T

TBGH-L A112
TCGT-SF A100
TCGT-USF A100
TCGW A141
TCGX-LC A103
TCGX-LH A104
TCMT A104
TCMT-EF A102
TCMT-EM A102
TCMT-HF A101
TCMT-HM A103
TCMT-HR A103
TCMW A104
TCMX A146
TNGA A130
TNGN A132
TNMA A80
TNMG A79
TNMG-DF A75
TNMG-DM A77
TNMG-DR A78
TNMG-EF A76
TNMG-EM A77
TNMG-ER A78
TNMG-PM A76
TNMG-SF A75
TNMG-SNR A78
TNMM A80

Insert index

TNMM-DR	A78
TNMM-LR	A77
TNMM-HDR	A79
TNMX-WGF	A75
TNMX-WGM	A76
TPGH-L	A113
TPGN	B229
TPGT-SF	A113
TPKN	B229
TPMR	B230
TPUN	B230

V

VBET-NF	A108
VBET-NGF	A108
VBGT-SF	A108
VBGW	A142
VBMT-EF	A108
VBMT-EM	A109
VBMT-HF	A108
VBMT-HM	A109
VBMT-HR	A109
VBMT-SNR	A109
VBMX	A147
VCGT-HF	A105
VCGT-NF	A105
VCGT-NGF	A105
VCGT-SF	A105
VCGT-USF	A105
VCGW	A143
VCGX-LC	A106
VCGX-LH	A106
VCMX	A148
VNEG-NF	A81
VNEG-NGF	A81
VNGA	A133-134
VNGN	A135
VNMG	A82
VNMG-DF	A81
VNMG-DM	A82
VNMG-EF	A81
VNMG-EM	A82
VNMG-NM	A82
VNMG-PM	A82

VNMG-SF	A81
VNMG-SNR	A82
VPGT-USF	A114

W

WCMX-53	A107
WCMX-53	C126
WCMX-PG	C126
WNEG-NF	A84
WNGA	A137
WNGN	A138
WNHU-GM	B231
WNHU-LH	B231
WNMA	A86
WNMG-DF	A83
WNMG-DM	A85
WNMG-DR	A86
WNMG-EF	A84
WNMG-EM	A85
WNMG-NM	A86
WNMG-PM	A85
WNMG-SF	A83
WNMG-SNR	A86
WNMG-WGF	A83
WNMG-WGM	A84
WPGT-PM	B231

X

XPHT-GM	B232
XSEQ	B232

Z

Z□□ER□□ISO	A298
Z□□ERA(G)(N)□□	A300
Z□□ER□□W	A301
Z□□ER□□UN	A302
Z□□ER□□BSPT	A303
Z□□ER□□NPT	A304
Z□□EL□□ISO	A298
Z□□ELA(G)(N)□□	A300
Z□□EL□□W	A301
Z□□EL□□UN	A302
Z□□EL□□BSPT	A303
Z□□EL□□NPT	A304
Z□□ILO□□ISO	A299

Z□□ILA(G)(N)□□	A300
Z□□ILO□□W	A301
Z□□ILO□□UN	A302
Z□□ILO□□BSPT	A303
Z□□ILO□□NPT	A304
Z□□IRO□□ISO	A299
Z□□IRA(G)(N)□□	A300
Z□□IRO□□W	A301
Z□□IRO□□UN	A302
Z□□IRO□□BSPT	A303
Z□□IRO□□NPT	A304
ZDET	B232
ZIGQ-NF	A264
ZIGQ-NM	A264
ZILD-LC	A265
ZIMF-NM	A262
ZIMF-SM	A262
ZOHX-GF	B233
ZOHX-GM	B233
ZPNT	B233
ZP□D-MG	A259
ZP□S-MG	A259
ZQMX-1E	A269
ZR□D-EG	A263
ZR□D-LH	A265
ZR□D-MG	A263
ZR□D-NM	A263
ZT□D-EG	A261
ZT□D-MG	A260
ZT□S-MG	A260
ZT□D-MM	A260

Tool index

1101SC05	C68-71
1105SC03	C68-71
1143SC120	C78
1143SC90	C78
1165PA03	C72-75
1534SP03C	C52-53
1534ST03C	C54-67
1536ST05C	C54-67
1576PC05	C76-77
1579PC15C	C76-77
1588SL12/20/30C	C48-51
1736ST05C	C54-67
3101H7	C148
3102H7	C149
3103H7	C150
4111	C175
4122A	C162
4122M	C164
4201A	C170-171
4201C	C166-167
4202A	C172-173
4202C	C168-169
4222A	C163
4222M	C165

A

AMA01	B27
AMP01	B29
AL-2B	B445
AL-2E	B441
AL-2EL	B442
AL-2R-AIR	B447
AL-2RL-AIR	B448
AL-3E	B443
AL-3EL	B444
AL-3R-AIR	B449
AL-3RL-AIR	B450
AL-3W	B446
ALG-2E	B452
ALG-2R	B454
ALG-3E	B453
ALG-3R	B455

B

BMR01	B141
-------------	------

BMR02	B143
BMR03	B145-148
BMR04	B157-158
BT□□-QCH-Q□□-□□S..	B588-589

C

C40X-Q□DR/L	A284
CKJNR/L	A204
CKNNR/L	A204
C□□□-SCLPR/L	A235
C□□□-SDQPR/L	A236
C□□□-SDUPR/L	A237
C□□□-STUPR/L	A238
C□□□-SVQCR/L	A239
C□□□-SVUCR/L	A240
CM-2E	B464
CM-4E	B465
CMA01	B199
CMD01	B200
CMZ01	B198
CRDCR/L	A205
CRDPR/L	A205
C□□□-Q□DR/L	A284

D

DCLNR/L	A166
DDJNR/L	A167
DSBNR/L	A168
DTGNR/L	A169
DVJNR/L	A170
DVVNN	A170
DWLNLR/L	A171

E

EMP01	B112-114
EMP02	B118
EMP03	B121
EMP04	B122
EMP09	B126-130
EMP09 BT	B131
EMP09 JT	B132
EMP13	B136-139

F

FMA01	B31-32
FMA03	B36

FMA03(A)	B37
FMA04(OFKT05□□)	B40
FMA04(ODHT/ODMT06□□)...	B42
FMA07	B46-47
FMA11	B51-52
FMA12	B55-56
FMA14	B59
FMA17	B61
FMD02(PN11)	B64-65
FMD02(HN09)	B69
FMD03	B71
FME02	B73
FME03	B75
FME04	B79
FME17	B81
FMP01	B83
FMP02	B85
FMP03	B90
FMP12	B93-94
FMP17	B96-97
FMR01	B99
FMR02	B102
FMR03	B106
FMR04	B109

G

GD03	C9-44
GD03C	C11-44
GD05	C9-44
GD05C	C11-44
GD08C	C11-41
GM-2B	B382
GM-2BFP	B384
GM-2BL/M/X	B383
GM-2BP	B388-389
GM-2BS	B387
GM-2E	B355
GM-2EBL/X	B361
GM-2EFP	B360
GM-2EL	B357
GM-2EP	B379-380
GM-2ES	B381
GM-2EX	B359
GM-2F	B356
GM-2FL	B358

Tool index

GM-2R	B390
GM-3E	B362-363
GM-3EL	B364
GM-4B	B385
GM-4BL/M/X	B386
GM-4E	B372-373
GM-4EBL/X	B376
GM-4EBL/X-G	B371
GM-4EFP	B375
GM-4E-G	B365-366
GM-4EL	B374
GM-4EL-G	B368
GM-4EX-G	B370
GM-4F-G	B367
GM-4FL-G	B369
GM-4R	B391
GM-4RL/M/X	B392-393
GM-4W	B394
GM-6E	B377
GM-6EL	B378
GQCR/L	A286
G□□-QCH-Q□□-□□S/C ...	B586-587
G□□-QCH-Q□□-□□C-ZJ□□	B586-587

H

HMX-2B	B410
HMX-2BFP	B412
HMX-2BL/M/X	B411
HMX-2BP	B416-417
HMX-2BS	B415
HMX-2E	B396-397
HMX-2EBL/X	B399
HMX-2EFP	B398
HMX-2EP	B407-408
HMX-2ES	B409
HMX-4B	B413
HMX-4BL	B414
HMX-4E	B400-401
HMX-4EBL/X	B404
HMX-4EFP	B403
HMX-4EL	B402
HMX-4R	B418-419
HMX-4RBL/M/X	B420
HMX-4RF	B421

HMX-4RP	B422
HMX-6R-MAX	B423
HMX-6E	B405
HMX-6EL	B406
HMP01	B193-194
HMP01 EC	B195

J

JT□□-QCH-Q□□-□□S ..	B588-589
---------------------	----------

N

NM-2B	B438
NM-2BP	B439
NM-2E	B435
NM-2EP	B437
NM-4E	B436

P

PCBNR/L	A172
PCLNR/L	A173
PDJNR/L	A174
PDPNN	A175
PM-2B	B332
PM-2BC	B337-340
PM-2BFP	B334
PM-2BL/M/X	B333
PM-2E	B308
PM-2EBL/X	B313
PM-2EFP	B312
PM-2EL	B310
PM-2F	B309
PM-2FL	B311
PM-2R	B341-342
PM-3E-H	B314
PM-3EL-H	B315
PM-4B	B335
PM-4BL/M/X	B336
PM-4E	B323-324
PM-4EBL/X	B329
PM-4EBL/X-G	B322
PM-4EFP	B328
PM-4E-G	B316-317
PM-4EL	B325
PM-4E-H	B326
PM-4EL-H	B327
PM-4EL-G	B319

PM-4EX-G	B321
PM-4F-G	B318
PM-4FL-G	B320
PM-4H	B351
PM-4HL	B352
PM-4R	B343-344
PM-4RBL/M/X	B345-346
PM-4RBL/M/X-H	B349
PM-4R-H	B347-348
PM-4RFP	B350
PM-6E	B330
PM-6EL	B331
PML-2B	B297
PML-2BFP	B299
PML-2BL	B298
PML-2E	B278
PML-2EFP	B282
PML-2EL	B280
PML-2F	B279
PML-2FL	B281
PML-2R	B302
PML-3E-H	B283
PML-3EL-H	B284
PML-4B	B300
PML-4BL	B301
PML-4E	B290
PML-4EFP	B294
PML-4E-G	B285
PML-4EL	B291
PML-4E-H	B292
PML-4EL-H	B293
PML-4EL-G	B287
PML-4EX-G	B289
PML-4F-G	B286
PML-4FL-G	B288
PML-4R	B303
PML-4R-H	B304
PML-4RFP	B305
PML-6E	B295
PML-6EL	B296
PSBNR/L	A176
PSDNN	A177
PSKNR/L	A178
PSSNR/L	A179

Tool index

PTFNR/L	A180
PTGNR/L	A182
PTTNR/L	A181
PWLNRL/L	A183

Q

Q□-HMX-2B/4B	B578
Q□-HMX-4E	B577
Q□-HMX-4R	B579
Q□-PM-2B/4B	B575
Q□-PM-4E	B574
Q□-PM-4R	B576
Q□-XM-2B	B582
Q□-XM-2C	B583
Q□-XM-2CR	B584
Q□-XM-2E	B580
Q□-XM-2H	B585
Q□-XM-2R	B581
QECNR/L	A273
QE□SR/L	A274
QE□S□□N	A275
QE□□R/L	A272-273
QF□□R/L-H	A276-277
QF□□R/L-L	A282-283
QF□□RR/LL	A278-281
QX□□R/L	A274
QZQ□□R/L	A288
QZS□	A275

S

SCACR/L	A184
SCLCR/L	A185
SDACR/L	A186
SDJCR/L	A187
SDNCN	A188
SM-3E	B458
SM-4R	B461
SMP01	B164-165
SMP03	B167-168
SMP05	B171

SMP09	B173-176
S□□□-PCLNR/L	A212
S□□□-PDPNR/L	A213
S□□□-PDUNR/L	A214
S□□□-PSKNR/L	A215
S□□□-PTFNR/L	A216
S□□□-PWLNR/L	A217
S□□□-SCFCR	A232
S□□□-SCLCR	A233
S□□□-SCLCR/L	A218
S□□□-SCLPR/L	A228
S□□□-SDQCR/L	A219
S□□□-SDQPR/L	A229
S□□□-SDUCR/L	A220
S□□□-SDUPR/L	A230
S□□□-SDZCR/L	A221
S□□□-SSKCR/L	A222
S□□□-STFCR/L	A223
S□□□-STUPR/L	A231
S□□□-SVQBR/L	A226
S□□□-SVQCR/L	A224
S□□□-SVUBR/L	A227
S□□□-SVUCR/L	A225
SRDCN	A202
SRGCR/L	A203
SSBCR/L	A194
SSDCN	A195
SSKCR/L	A196
SSSCR/L	A197
STACR/L	A198
STFCR/L	A198
STGCR/L	A199
STECR/L	A200
SVABR/L	A190
SVJBR/L	A189
SVJCR/L	A193
SVVBN	A191
SVVCN	A192
SWACR/L	A201

S□□□-QC□□□□R/L	A286
----------------------	------

T

TM-4E	B425
TM-4B	B426
TM-4R	B427-429
TM-4RP	B430
TM-5R	B431-432
TM-6R	B433
TMP01	B191

U

UM-4E	B271
UM-4EFP	B273
UM-4EL	B272
UM-4R	B274
UM-4RFP	B276
UM-4RL	B275

V

VPM-4E	B262
VPM-4EBL/X	B263
VPM-4EFP	B264
VPM-4R	B265-B266
VPM-4RBL/X	B267-B268
VPM-4RFP	B269
VSM-4E	B459
VSM-4EFP	B460
VSM-4R	B462
VSM-4RFP	B463

X

XMR01	B178-182
XMR03	B189

Z

ZTD02/03/04/05	C118-121
ZTK015/03/05/08	C132-135
ZSD02/03/04/05	C103-114
ZSIR/L	A314
ZSER/L	A313

