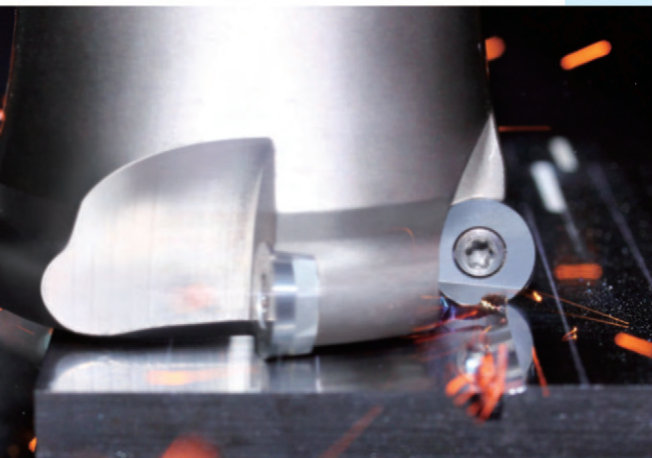
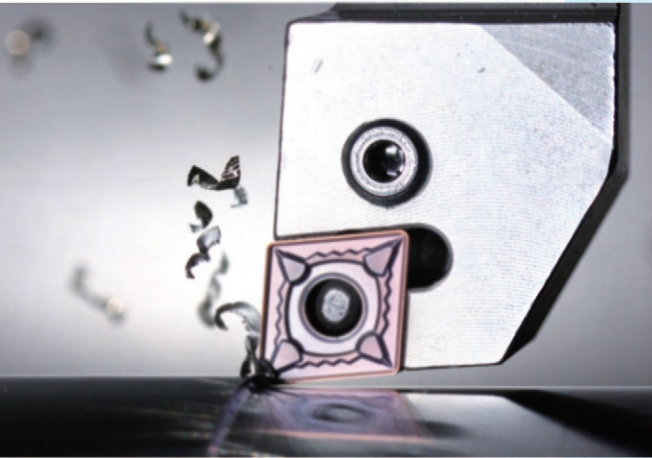


Cemented Carbide products safety standard



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.

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

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	-

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	-	-

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	Z85WDKCV	HS6-5-2-5	HS6-5-2-5	SKH55
	W18Cr4VCo5	T4	1.3255	S18-1-2-5	BT4	-	-	Z80WKC 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

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

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	X16CNi16	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	X2CrNiMo17133	-	-	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	-

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

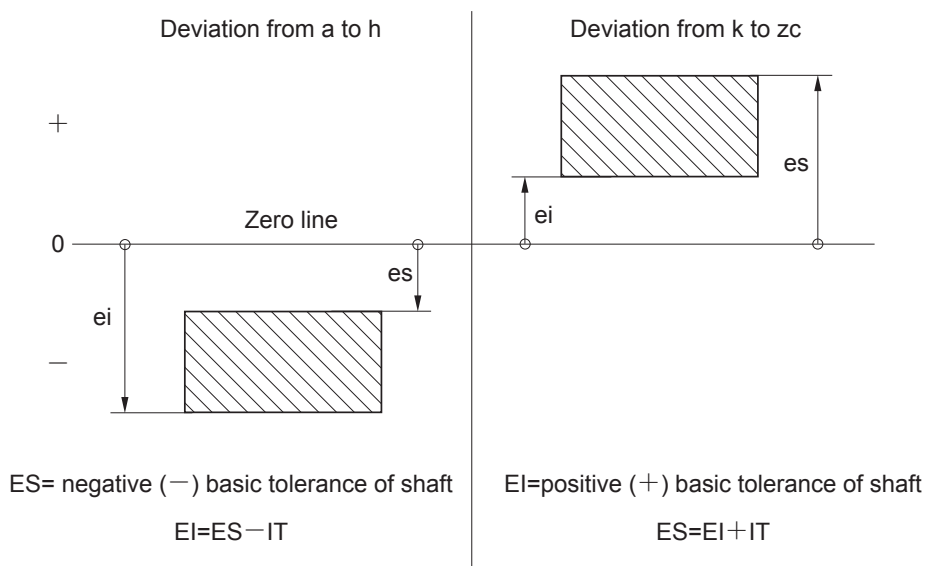
Basic dimensions (mm)		Standard tolerance class of holes																	
		IT1	IT2	IT3	IT4	IT5	IT6	IT7	IT8	IT9	IT10	IT11	IT12	IT13	IT14	IT15	IT16	IT17	IT18
>	≅	μm												mm					
---	3	0.8	1.2	2	3	4	6	10	14	25	40	60	0.1	0.14	0.25	0.4	0.6	1	1.4
3	6	1	1.5	2.5	4	5	8	12	18	30	48	75	0.12	0.18	0.3	0.48	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:

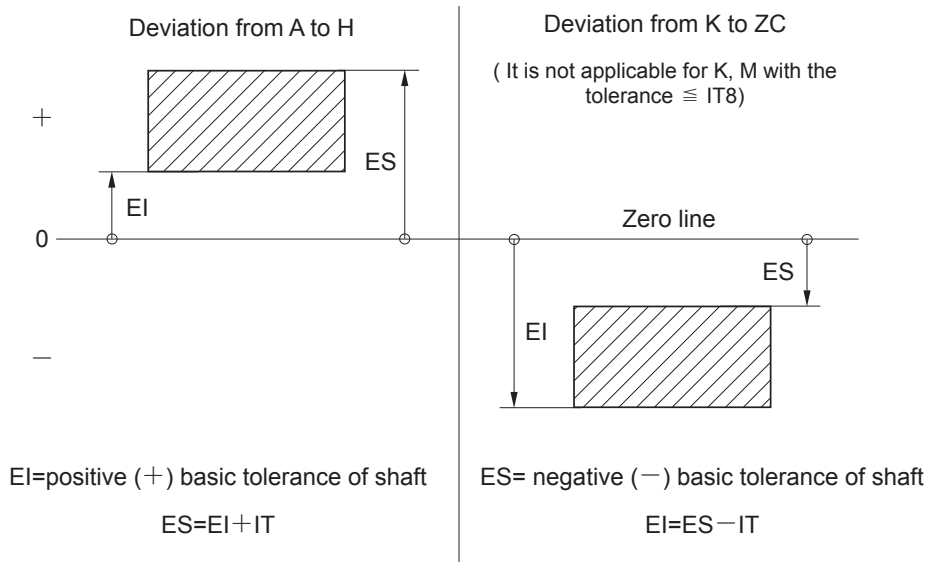
1. From IT1 to IT5, the standard tolerance with basic dimension more than 500 mm is on trial.
2. When the basic dimension $\cong 1$ mm, the tolerances from IT4 to IT8 are invalid.

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(E_i) and upper deviation (E_s) 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 $E_i=0$ 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 $ES=E_i+IT=10\mu\text{m}$. 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 = $\pm \frac{IT_n - 1}{2}$.

Fitting dimension tolerance

μm

Basic deviation value																		
Lower deviation <i>e</i>																		
IT5 IT6	IT7	IT8	IT4 IT7	≤IT3 >IT7	Standard tolerance class													
<i>j</i>			<i>k</i>		<i>m</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>s</i>	<i>t</i>	<i>u</i>	<i>v</i>	<i>x</i>	<i>y</i>	<i>z</i>	<i>zn</i>	<i>zb</i>	<i>zc</i>
-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	+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			+145	+85		+43		+14		0	+18	+26	+41	-3+Δ		-15+Δ	-15	-27+Δ		0
140	160	+520	+280	+210																				
160	180	+580	+310	+230											+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					0		-30		-50			
560	630																							
630	710					+290	+160		+80		+24	0					0		-34		-56			
710	800																							
800	900					+320	+170		+86		+26	0				0		-40		-66				
900	1000																							
1000	1120					+350	+195		+98		+28	0				0		-48		-78				
1120	1250																							
1250	1400					+390	+220		+110		+30	0				0		-58		-92				
1400	1600																							
1600	1800					+430	+240		+120		+32	0				0		-68		-110				
1800	2000																							
2000	2240					+480	+260		+130		+34	0				0		-76		-135				
2240	2500																							
2500	2800					+520	+290		+145		+38	0				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 ITn 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.

4. Special cases: within the range 250~315mm of M5, ES=-9μm (instead -11μm).

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
Rockwell hardness		Vickers hardness	Brinell hardness	
HRC	HRA	HV	HB	
70.0	86.6	1037	—	—
69.5	86.3	1017	—	—
69.0	86.1	997	—	—
68.5	85.8	978	—	—
68.0	85.5	959	—	—
67.5	85.2	941	—	—
67.0	85.0	923	—	—
66.5	84.7	906	—	—
66.0	84.4	889	—	—
65.5	84.1	872	—	—
65.0	83.9	856	—	—
64.5	83.6	840	—	—
64.0	83.3	825	—	—
63.5	83.1	810	—	—
63.0	82.8	795	—	—
62.5	82.5	780	—	—
62.0	82.2	766	—	—
61.5	82.0	752	—	—
61.0	81.7	739	—	—
60.5	81.4	726	—	—
60.0	81.2	713	—	2555
59.5	80.9	700	—	2500
59.0	80.6	688	—	2450
58.5	80.3	676	—	2395
58.0	80.1	664	—	2345
57.5	79.8	653	—	2295
57.0	79.5	642	—	2250
56.5	79.3	631	—	2205
56.0	79.0	620	—	2160
55.5	78.7	609	—	2115
55.0	78.5	599	—	2075
54.5	78.2	589	—	2035
54.0	77.9	579	—	1995
53.5	77.7	570	—	1955
53.0	77.4	561	—	1920
52.5	77.1	551	—	1885
52.0	76.9	543	—	1850
51.5	76.6	534	—	1815

Hardness				Tensile strength N/mm ²
Rockwell hardness		Vickers hardness	Brinell hardness	
HRC	HRA	HV	HB	
51.0	76.3	525	501	1780
50.5	76.1	517	494	1750
50.0	75.8	509	488	1720
49.5	75.5	501	481	1690
49.0	75.3	493	474	1660
48.5	75.0	485	468	1630
48.0	74.7	478	461	1605
47.5	74.5	470	455	1575
47.0	74.2	463	449	1550
46.5	73.9	456	442	1525
46.0	73.7	449	436	1500
45.5	73.4	443	430	1475
45.0	73.2	436	424	1450
44.5	72.9	429	418	1430
44.0	72.6	423	413	1405
43.5	72.4	417	407	1385
43.0	72.1	411	401	1360
42.5	71.8	405	396	1340
42.0	71.6	399	391	1320
41.5	71.3	393	385	1300
41.0	71.1	388	380	1280
40.0	70.8	382	375	1260
40.0	70.5	377	370	1245
39.5	70.3	372	365	1225
39.0	70.0	367	360	1210
38.5	—	362	355	1190
38.0	—	357	350	1175
37.5	—	352	345	1160
37.0	—	347	341	1140
36.5	—	342	336	1125
36.0	—	338	332	1110
35.5	—	333	327	1095
35.0	—	329	323	1080
34.5	—	324	318	1065
34.0	—	320	314	1050
33.5	—	316	310	1035
33.0	—	312	306	1020
32.5	—	308	302	1010

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.

Application	ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	mitsubishi	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENNAMETAL	SECO	ISCAR
Turning	P01		GC4005 GC4205	NC3010		WAP01	UE6005	AC700G	T9005	CA5505	JC110V	HG3305	KC910	TP1000 TX100	IC9015, IC9150 IC9080, IC4100
	P10	YBC152 YBC151	GC4215 GC4015	NC3010 NC3015	TT1300	WAP10	UE6005, UE6010 UE6020, UC6010	AC700G AC820P AC2000	T9005 T9015	CA5505 CA5515	JC110V JC215V JC730U	HG8010 GM8015 GM10	KC9110 KC9010	TP1000 TP100 TX150	IC9150, IC9250 IC9015, IC9025 IC520M, IC4050
	P20	YBC251 YBC252	GC4015 GC4225 GC4025 GC4215 LC25	NC3015 NC3020 NC500H	TT1500	WAP20	UC6010 UE6110 UE6020 F7030	AC2000 AC3000 AC820P	T9015 T9025	CA5515 CA5525 CA5535 CA5025 CR9025	JC110V JC215V JC730U	HG8025 GM8020	KC8050 KC9025 KC9125	TP2000 TP2500 TK2000 T250M	IC9015, IC9025 IC9150, IC9250 IC9350, IC4050
	P30	YBC252 YBC351 YBC352	GC4225 GC4235 GC4025 GC4035 GC2135	NC3020 NC3030 NC500H	TT3500 TT5100	WAP30	UE6035 UH6400 F7030	AC830P AC630M AC3000	T9025 T9035 T3130	CA5525 CA5535 CR9025	JC215V JC325V	GM25	KC5025 KC9040 KC9140	TP2000 TP2500 TP3000 MK3000 T350M	IC9025, IC9250 IC9350, IC635 IC656, IC4050
Turning	P40	YBC351 YBC352	GC4235 GC4035 GC235		TT450		UE6035 UH6400 US735	AC630M AC830P	T9035	CA5535	JC325V JC450V	GM8035 GX30 GF30	KC9240 KC9045	TP3000 TP400 TP40 T350M	IC9350 IC635
	M10		GC2015	NC9020		WAM10	US7020	AC610M	T9015	CA6515 CA6015	JC110V	GM10	KC5010, KC9010 KC9110, KC9215	TP200	IC9250 IC9350
	M20	YBM151 YBM153	GC2025	NC9020 PC9030	TT2500	WAM20	US7020 F7030	AC610M AC630M	T6020 T9025	CA6525 CA6015	JC110V JC1341 JC215V JC730U	GM8020	KC9225 KC9025 KC8050 KC9125	TP200 TP3000 T250M TM2000	IC9250, IC9025 IC9350, IC9054
	M30	YBM151 YBM251	GC2135 GC235	PC9030 NC3030	TT3500	WAM30	US735 F7030	AC630M	T6030 T3130		JC215V JC325V	HG8025 GM25	KC9040 KC9240	TP3000 TP400 TP40 T350M T25M	IC9025 IC635 IC656
Turning	M40	YBM253	GC2025		TT5100		US735				JC325V JC450V	GX30 GF30	KC9045 KC9245	TP400 TP40	IC656 IC635
	K01	YBD052	GC3205 GC3210	NC305K			UC5005 UC5015	AC300G	T5105	CA4505 CA5505	JC105V JC600	GM3005	KC5410, KC9315 KC910	TK1000	IC9150
	K10	YBD102	GC3205 GC3210 GC3215	NC305K NC6010 NC315K	TT1300	WAK10	UC5015 UC5115 UE6010	AC410K AC700G	T5105 T5115 T5010 T1015	CA4505 CA4515 CA5505	JC105V JC110V JC600 JC610	HG8010 GM8015	KC5010 KC7310 KC9010	TK1000 TK2000 MK1500	IC9150, IC9015 IC4100, IC418 IC428, IC9080
	K20	YBD152 YBD252	GC3215 GC3020 K20W	NC315K	TT1500	WAK20	UE6010	AC700G AC820P	T5115 T5125 T5020	CA4515	JC110V JC215V JC610	HG8025 GM8020	KC8050, KC9025 KC9120, KC9325	TK2000 TP200 T150M T200M	IC9015, IC9150 IC418, IC520M

Grades comparison table

Application	ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	mitsubishi	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENAMETAL	SECO	ISCAR
CVD coating	P01														
	P10							ACP100			JC730U		TN2510 TN25M		IC9080 IC4100
	P20	YBC301 YBM251	GC4020 GC4220			WAP25	FH7020 F7030	ACP100			JC730U		TN7525	T200M T250M	IC520M
	P30	YBM351	GC4030 GC4230	NCM335	TT7300	WAP35	F7030	AC230	T3030				KC930M	T250M T350M T25M	IC4050
	P40	YBC302	GC4240 GC4040					AC230				GF30 GX2030 GX30	KC935M TN7535	T350M	
	M01														
	M10												TN25M		
	M20	YBM251 YBM253					F7030				JC730U		TN7525	T350M T25M	IC520M
	M30	YBC302	GC2040	NCM335		WTP35	F7030		T3030				KC930M TN7535	T250M T25M	IC4050
	M40	YBM351										GF30 GX30			
Milling	K01										JC600				IC9080
	K10	YBD152		NCM310		WAK15	F5010	ACK200 AC211	T1015		JC600		TN5505 TN5515		IC4100
	K20	YBD252	GC3220 GC3020 K20D K20W	NCM320		WAK25	F5020	ACK200	T1015		JC610		KC915M TN5520	T150M T200M	C520M DT7150
	K30	YBD252	GC3040								JC610		KC930M KC935M	T200M	IC4050

Application	ISO Code	ZCC-CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENAMETAL	SECO	ISCAR
P	P01									PR915 PR1005	JC5003				
	P10	YBG102	GC1525 GC1025				VP10MF		AH710	PR915 PR930 PR1025 RR1115	JC5003		KC5010 KC5510 KU10T	CP200 TS2000	IC250 IC507 IC570
	P20	YBG202	GC1525 GC1020 GC1025 GC1125	PC230			VP15TF VP20MF		AH710 AH330	PR630 PR915 PR930 PR660 PR1025 RR1225	JC5015		KC5025 KU25T	CP250 TS2500	IC908 IC928 IC1008 IC1028 IC3028
	P30	YBG202	GC1025 GC1125				VP15TF VP20RT		GH330 GH730 AH120 AH330 AH740	PR630 PR660	JC5015		KC7015 KC7020 KC7235	CP500	IC928 IC1008 IC1028 IC3028
M	P40		GC1020 GC2145	PC240			VP15TF VP20RT		AH120	PR660			KC7040	CP500	IC928 IC1008 IC1028
	M01									PR915 PR1025					
	M10	YBG202 YBG205	GC1005 GC1025 GC1125				VP10MF	AC510N		PR915 PR930 PR1125 PR1225	JC5003		KC5010 KC5510	CP200 TS2000	IC330 IC354 IC507 IC507 IC3028
	M20	YBG202 YBG205	GC1020 C1025 GC4125	PC9030			VP15TF VP20MF	AC520U	GH330 GH730	PR630 PR915 PR930	JC5015		KC5025 KC730 KC5525	CP200 CP500 TS2500	IC228 IC250 IC354 IC3028
K	M30		GC1020 GC2035	PC9030			VP15TF VP20MF	AC520U AC530U	AH120	PR630 PR660	JC5015		KC5025 KC5525	CP500	IC908 IC928 IC1008 IC1028
	M40		GC2035 GC2145					AC530U		PR660					IC228 IC328
	K01							EH10Z	AH110		JC5003				
	K10			PC205K				EH10Z	GH110 AH110		JC5003 JC5015		KC5010 KC5510	CP200 TS2000	
S	K20		GC1020	PC215K			VP10RT VP15TF VP20RT	EH20Z	AH120		JC5015		KC7015 KC7020	CP200 CP250	IC928 IC1008 IC908 IC22
	K30		GC4125				VP15TF						KC7225	CP500	IC928 IC1008 IC908 IC22
	S01		GC1105				VP05RT		AH110	PR915	JC5003				IC507
	S10	YBG102 YBG105 YBG202	GC1005 GC1025 GC1125				VP05RT VP10RT	AC510U	AH120	PR915 PR1125	JC5015		KC5410 KC5010	CP200 CP250	IC903
S	S20	YBG212	GC4125				VP10RT VP15TF	AC510U AC520U		PR915			KC5025 KC5525	CP250 CP500	IC300 IC808 IC928
	S30		GC1125 GC2145				VP15TF	AC520U		PR1125					

Grades comparison table

Application	ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENAMETAL	SECO	ISCAR
Milling	P	P01						ACP100			JC5003	PTH08M PCA08M PCS08M TB6005 JX1005			
		P10				WXH15 WXM15		ACZ310 ACP100 ACP200		PR730 PR830 PR1025 PR1225	JC5003 JC5030	PCA12M TB6005 JX1020 PC20M	KC715M		IC250 IC903 IC950
		P20					VP15TF	ACZ310 ACZ330 ACP200		PR630 PR730 PR830 PR660 PR1025 PR1225	JC5015 JC5030 JC5040	TB6020 CY150 JX1015	KC522M KC525M	F25M F30M MP3000	IC950 IC900 IC908 IC910
		P30					VP15TF VP30RT	ACZ300 ACZ350 ACZ200	GH330 AH330 AH120 AH740	PR630 PR660 PR730 PR830 PR1230	JC5015 JC5040	TB6045 CY250 CY25 HC844 JX1045 PTH30E	KC725M	F25M, F30M MP3000	IC900 IC928 IC300 IC328 IC1008
	P40							ACZ350 ACP300	AH120	PR660 PR1230	JC5040	PTH30E TB6060 PTH40H	KC735M	F40M, T60M	IC900 IC928 IC300 IC328
	M	M01										PCS08M			
		M10				WXM15		ACP200		PR630 PR730 PR830	JC5003	CY9020 JX1020	KC715M		IC903
		M20					VP15TF VP20RT	ACZ310 EH20Z ACP300	GH330	PR630 PR730 PR830 PR660	JC5015 JC5030 JC5040	TB6020 CY150 JC1015	KC730 KC522M KC525M	F25M	IC900 IC903 IC908 IC928
		M30				WXM35	VP15TF VP20RT VP30RT	ACZ330 EH20Z ACZ350	AH120	PR630 PR660 PR730 PR830 PR1225	JC5015 JC5030 JC5040	TB6045 CY250 HC844	KC725M KC735M	F30M F40M	IC928 IC328 IC1008
		M40					VP30RT	ACZ350 ACP300	AH140	PR660	JC5015	TB6060 PTH40H JX1060			IC928 IC328

PVD coating

PVD coating

ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENNAMETAL	SECO	ISCAR
K01								AH110	PR510 PR905	JC5003	PTH08M PCA08M PCS08M			
K10	YBG102 YBG252	GC1010	PC205K		WXH15 WXM15		ACZ310 ACK200	AH110 GH110	PR510 PR905	JC5003	CY9020 TB6005 CY100H	KC510M		IC900 IC910
K20	YBG152	GC1010 GC1020	PC215K	TT6030		VP15TF VP20RT	ACZ310 ACK200	AH120	PR510 PR905	JC5015	TB6020 CY150 PTH13S	KC520M KC525M	MK2000	IC910 IC950
K30		GC1020				VP15TF VP20RT	ACZ330 ACK300			JC5015	TB6045 CY250 PTH40H	KC725M KC735M		IC908 IC950 IC928
S01										JC5003				
S10	YBG102	GC1025		TT6030		VP15TF	EH520Z	AH120	PR660	JC5015	PCS08M	KC510M		IC908
S20		GC1025		TT8020	WXM35	VP15TF	EH520Z EH20Z		PR660		CY100H CY10H	KC522M KC525M		IC908
S30		GC2030 S30T		TT8030 TT9030			ACK300		PR660			KC725M	F40M	IC328 IC928
H01										JC5003				IC903
H10		GC1010 GC1030			WXH15	VP15TF				JC5015	PTH08M PCA08M JX1005	KC635M	MH1000 F15M	IC900
H20		GC1010			WXP45	VP15TF						KC635M	F15M	IC1008 IC808
H30		GC1030										KC530M	F30M MP3000	IC1008 IC908
Application	Milling													

Grades comparison table

ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTE	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENAMETAL	SECO	ISCAR
P01			CC105 CN100			AP25N	T110A T2000Z	NS520 AT520 GT520 GT720	TN30 PV30	LN10 CX50				IC20N IC520N
P10	YNG151 YNG151C	CT5015 GC1525	CC15 CN200 CT10	PV3010		AP25N NX2525	T1200A T2000Z	NS520 AT530 GT720 GT730	TN60 TN6020 PV60 PV7020	CX50 CX75	CZ25	KT125 KT315	CM CMP	IC20N IC520N IC530N
P20		GC1525		CT3000		AP25N UP35N NX2525 NX3035	T1200A T2000Z T3000Z	NS530 GT530 GT730 NS730	TN10 TN6020 PV90 PV7020	CX75	CH550	KT5020 KT325 KT1120		IC20N IC75T IC30N IC520N IC530N
P30						VP45N	T3000Z	NS530 NS730						IC75T IC30N
M01														
M10	YNG151 YNG151C	GC1525		PV3010		NX2525 AP25N	T110A T2000Z	NS520 AT530 GT530 GT720	TN60 TN6020 PV60 PV7020	LN10 CX50		KT125	CM CMP	
M20				CT3000		NX2525, AP25N NX3035	T1200A T2000Z	NS530 GT730 NS730	TN90 TN6020 PV90 PV7020	CX50 CX75	CH550			
M30							T3000Z							
K01			CC105 CN100			AP25N NX2525	T110A T2000Z	NS520 AT520 GT520 GT720	TN30 PV30	LN10				
K10	YNG151 YNG151C	CT5015	CC115	CT3000		AP25N NX2525	T1200A T2000Z	NS520 GT530 GT730 NS730	TN60 TN6020 PV60 PV7020	LN10		KT325 KT125		
K20						AP25 NX2525	T3000Z			CX75				
Application	Turning													

Cermet

ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTE	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENAMETAL	SECO	ISCAR
P01														
P10	YNG151 YNG151C		CN100	CT3000		NX2525			TN60	CX75			C15M	IC30N
P20		CT530	CN20	CT520		NX2525		NS530	TN100M	CX75 CX90	CH550 CH7030 MZ1000 MZ2000	KT530M HT7 KT605M	C15M	IC30N
P30			CN30			NX4545	T250A	NS530 NS540 NS740		CX90 CX99	MZ3000 CH7035			IC30N
M01														
M10	YNG151 YNG151C			CT3000		NX2525			TN60					IC30N
M20		CT530		CT520		NX2525		NS530	TN100M	CX75	CH550 CH7030 MZ1000 MZ2000	KT530M HT7 KT605M	C15M	IC30N
M30						NX4545	T250A	NS540 NS740		CX90 CX99	MZ3000 CH7035			
K01														
K10	YNG151 YNG151C			CT520		NX2525		NS530	TN60					
K20						NX2525				CX75		KT530M HT7		
K30														
Application	Milling													

Grades comparison table

PCBN grade

ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	SECO	Element Six
H01					WCB30	MBC010 MB810	BNX10 BNC30	BXM10 BX310 BXC30			CBN050C CBN100	
H10	YCB012	CB7015 CB7020 CB20	KB320 KB330 KB420	KB90 KB90A	WCB50	MBC020 MB8025 MB820	BNC80 BNX20 BNC160	BXM20 BX330 BXA30	KBN510	JBN300	CBN10 CBN200	DBC50
H20		CB7025 CB7050 CB50				MBC020 MB8025 MB825	BN250 BNC200 BNX25	BXC50	KBN525	JBN245	CBN150 CBN200	DBN45
H30						MBC020 MB835	BNC300 BN350	BX380			CBN300 CBN350	
S01						MB730	BN600 BN700	BX450 BX950 BX480				
S10												
S20												
S30												
K01	YCB011					MB710	BN500	BX930			CBN300 CBN300P	
K10	YZB221	CB50 CB7050	KB350 KB360	KB90 KB90A	WCB50	MB710 MB730	BN700	BX480 BX950	KBN65B	JBN795	CBN200	DBA80
K20	YZB221					MB730 MBS140	BN700 BNS800	BXC90	KBN900	JBN330	CBN300	
K30						MBS140	BNS800	BXC90			CBN350	
Application	Turning											

PCD grade

ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	SECO	Element Six
N01						MD205	DA90	DX180	KPD001 KPD025	JDA735	1700 1800	CTH025
N10	YCD011	CD10	DP90 DP150 DP200	KP500	WCD10	MD205 MD220	DA150	DX160	KPD010	JDA745	1500	CTB010
N20						MD220 MD230	DA200 DA2200	DX140 DX120	KPD002 KPD230	JDA715 JDA10	1300	CTB002
N30						MD230	DA1000 DA2200		KPD001		1600	
Application	Turning											

Cemented carbide material

Application	ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENNAMETAL	SECO	ISCAR
Turning	P01			ST05											
	P10	YC10	S1P	ST10	P10			ST10P	TX10S		SRT	WS10	P10		IC70
	P20		SMA	ST20	P20		UT120T	ST20E	TX20 TX25		SRT DX30	EX35	K125M TTM		IC70 IC50M
	P30		SM30	ST30A	P30		UT120T	A30 A30N	TX30 UX30	PW30	SR30 DX30	EX35 EX40	GK K600 TTR		IC50M IC54
	P40	YC40	S6					ST40E	TX40		SR30 DX35	EX45	G13		IC54
	M10		H10A	U10	M10			EH510 U10E	TU10		UMN	WA10B	K313	890	
	M20		H13A	U20	M20		UT120T	EH520 U2	TU20 UX30		DX25 UMS	EX35	K68 KMF K125M TTM	HX 883	IC08
	M30		H10F SM30	ST30A			UT120T	A30 A30N	UX30		DX25 UMS	EX40 EX45	K600 TTR		IC08 IC28
	M40		S6	U40	M40				TU40		UM40	EX45	G13		IC128
	K01	YD051	H1P	H02			UT105T	H1 H2	TH03 KS05F		KG03	WH05	K605		
	K10	YD101	H1P H10 HM	H01	K10		HT110	EH10 EH510	G1F TH10	KW10	KG10 KT9	WH10	K313 K110M THM THM-U	890	IC20
	K20	YD201	H13A	G10	K20		UT120T	G10E EH20 EH520	G2F KS15F G2 KS20	GW10	CR1 KG20	WH20	K715 KMF K600	890 HX 883	IC20 IC10
	K30			G3			UT120T	G10E	G3		KG30		THR	883	IC10 IC28
	N01		H10 H13A					H1 H2	KS05F		KG03		K605		
	N10	YD101		H01	K10	WK10	HT110	EH10 EH510	TH10 H10T		KG10 KT9		K313 K110M THM THM-U	890 H15	
	N20				K20			G10E EH20 EH520	KS15F		CR1 KG20		K715 KMF K600	HX KX 883 H15 H25	
	N30										KG30		G13 THR	H25	
	S01						RT9005				KG03				
	S10	YD101	H10 H10A H10F H13A	H01	K10		RT9005 RT9010	EH10 EH510	KS05F TH10		FZ05 KG10		K10 K313 THM	890	
	S20						RT9010 TF15	EH20 EH520	KS15F KS20		FZ15 KG20		K715 KMF	890 883 HX H25	
	S30						TF15				KG30		G13 K600 THR		

Grades comparison table

Application	ISO Code	ZCC.CT	SANDVIK	KORLOY	TaeguTec	WALTER	MITSUBISHI	SUMITOMO	TUNGALOY	KYOCERA	DIJET	HITACHI	KENNAMETAL	SECO	ISCAR
	P10	YC10	S1P								SRT				
	P20			ST20	P10		UT120T	A30N	TX25		SRT DX30	EX35	K125		IC50M IC28
	P30			ST30A	P20		UT120T	A30N	UX30	PW30	SR30 DX30	EX35 EX40	GX K600		IC50M IC28
	P40	YC30S		ST40	P30					PW30	SR30	EX45			IC28
	M10	YC10		U10	M10						UMN		K110M		
	M20			U20	M20		UT120T	A30N			DX25 UMS	EX35	K313		
	M30	YC30S					UT120T	A30N	UX30		DX25 UMS	EX40 EX45	KFM K600		IC28
	M40			U40	M40				TU40			EX45			IC28
	K01	YD051		H01			UT105T				KG03				
	K10	YD051	H1P	H05 H10	K10	WK10	HT110	G10E	TH10	KW10	KG10	WH10	K110M K313		IC20
	K20	YD201		G10	K20		UT120T	G10E			KT9 CR1 KG20	WH20	KFM HX		IC20 IC10
	K30						UT120T				KG30				IC10 IC28
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APMT□PDR	B184
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CCGX-LH	A91-92
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CCMT-EM	A90
CCMT-HF	A91
CCMT-HM	A90
CCMT-HR	A91
CCMW	A92
CNE□□□A/B	B165
CNEG-NF	A55
CNGA	A121
CNGN	A122
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
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DCMT-EM	A94
DCMT-HF	A93
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DCMT-HR	A95
DCMW	A95
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DNEG-NGF	A62
DNGA	A123
DNGN	A124
DNMA	A66
DNMG	A66
DNMG-DF	A61
DNMG-DM	A64
DNMG-DR	A65
DNMG-EF	A62
DNMG-EM	A64
DNMG-ER	A65
DNMM-LR	A65
DNMX-WGF	A61
DNMX-WGM	A63
DNMG-NM	A64
DNMG-PM	A63
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SRDCN	A191
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SSBCR/L	A183
SSDCN	A184
SSKCR/L	A185
SSSCR/L	A186
STACR/L	A187
STECR/L	A189
STFCR/L	A187
STGCR/L	A188
SVABR/L	A179
SVJBR/L	A178
SVJCR/L	A182
SVVBN	A180
SVVCN	A181
SWACR/L	A190

T

TMP01	B166
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U

UM-4E	B248
UM-4EL	B249
UM-4EFP	B250
UM-4R	B251
UM-4RL	B252
UM-4RFP	B253

V

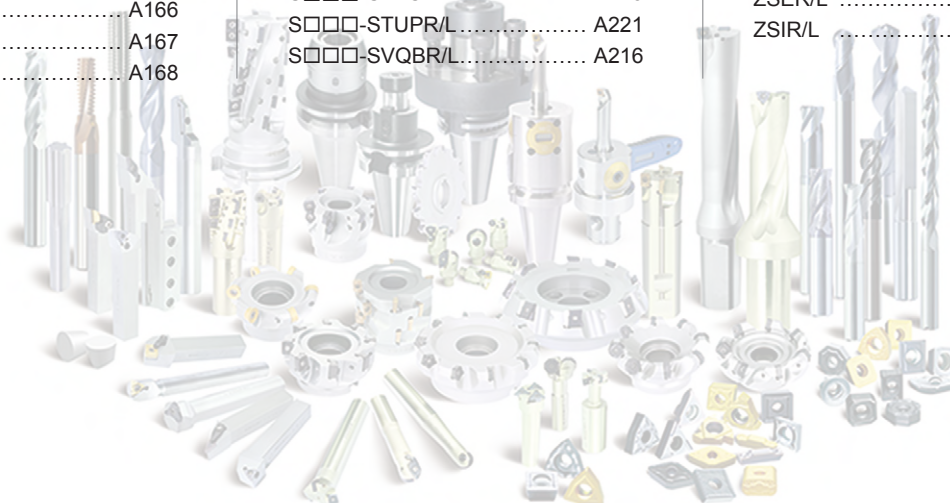
VSM-4E	B390
VSM-4EFP	B391
VSM-4R	B393
VSM-4RFP	B394

X

XMP01	B164
XMR01	B154-158

Z

ZD03	C96-97
ZTD02/03/04/05	C89-95
ZSER/L	A288
ZSIR/L	A289





Safety & environmental protection

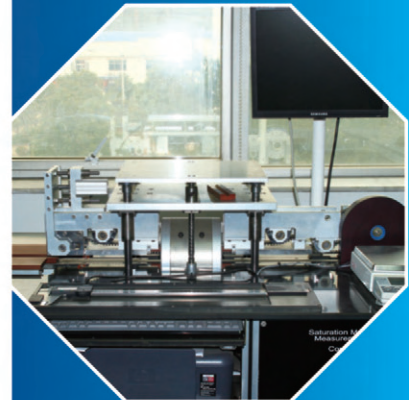
Cemented carbide products are hard and fragile, which are easily damaged due to improper carrying or clamping, so please be careful with them.

Spattering of chips may occur and a lot of cooling liquid is used during the machining process, so protective measures should be used, such as ventilating equipment, machine protective shield, safeguard glasses, protective clothes, and so on. Please take care to protect hand when clamping inserts with sharp edge.



Quality guarantee

We have been awarded GB/T19001-ISO9001 Quality System Certificate.
All our products are inspected strictly.



Welcome to call our technical service hotline: 4008815915



Zhuzhou Cemented Carbide Cutting Tool Co.Ltd(ZCCCT) is the research, production and sales base of CNC cutting tools with large production scale, advanced equipments and leading technology strength in China.

—Starting from the very beginning of material selection, we strictly control each procedure and implement refined management to guarantee the stable quality of products.

—Our research and application experts constantly pay close attention to the latest development of materials and cutting technology to provide high-quality and high-efficiency cutting tools and complete solutions to our customers.

—Our sales and service network can be found all over China and spanning the globe. We offer considerate and professional technology services regarding orders of standard or non-standard tailor-made products.



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