

Efficient manufacturing + Unique design

Ceramics



Contents

Part 1 Grade Information

Grade Information	002
Application examples	007

Part 2 Ceramic Inserts

Code System	010
Application Index	013
Turning	015
Roll Turning	036

Part 3 Tool Holders

Code System	050
Application Index	052
External Toolholders	054

Part 4 Technical Information

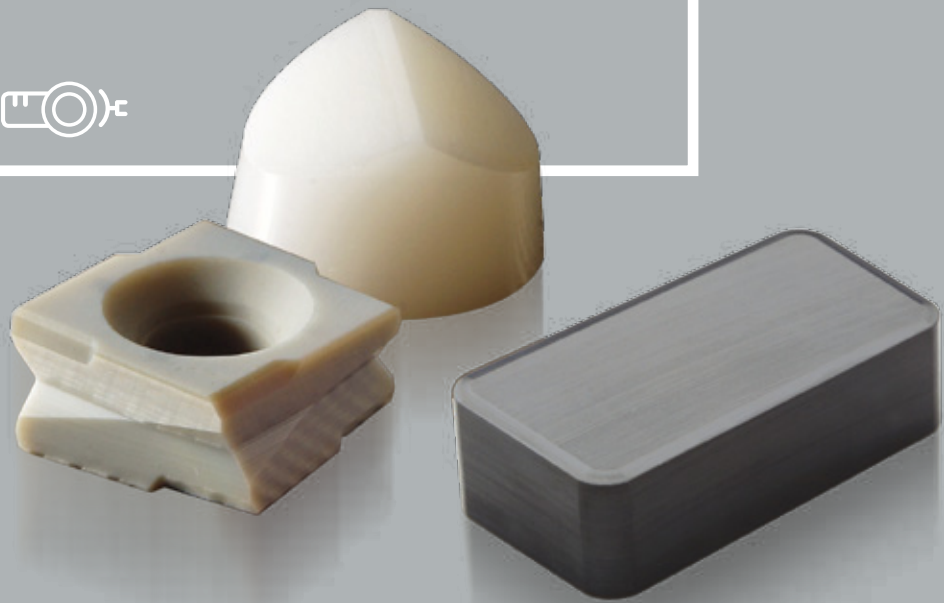
Test Results	097
Trouble Shooting	098
Hardness Calculating Table	099
Grade Comparison	100
The Comparison of Workpiece	101



Part 1

Grade Information

- 01 _ Grade Information
- 02 _ Application examples



Grade Information

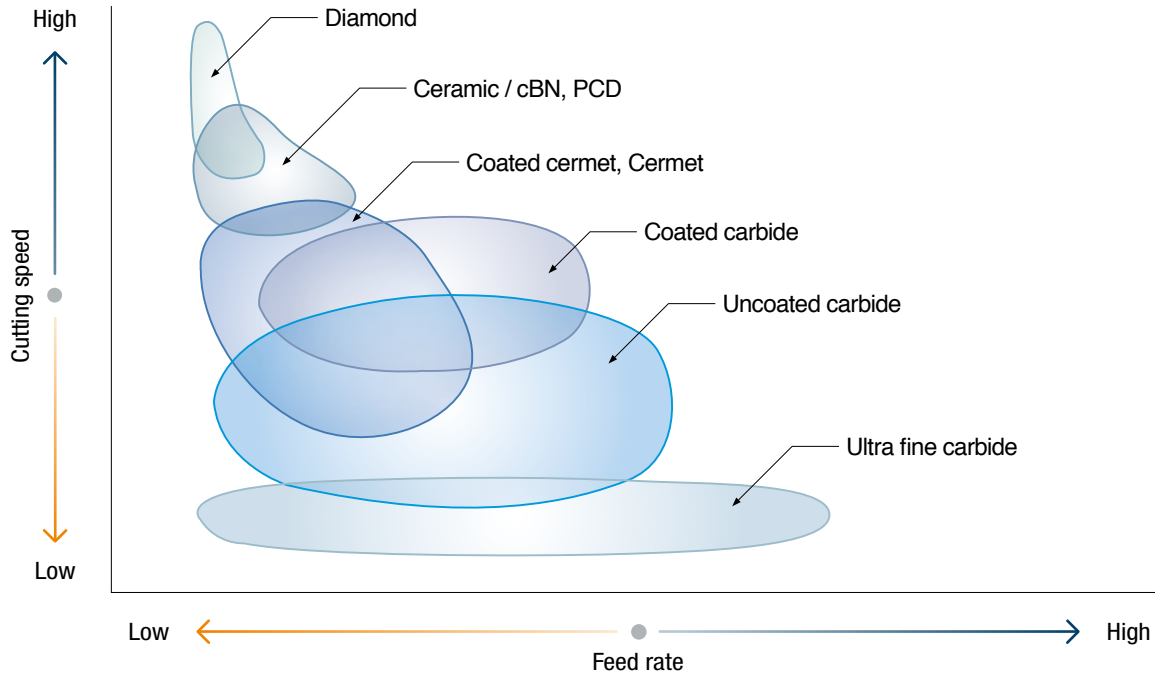
Grade

CERAMIC

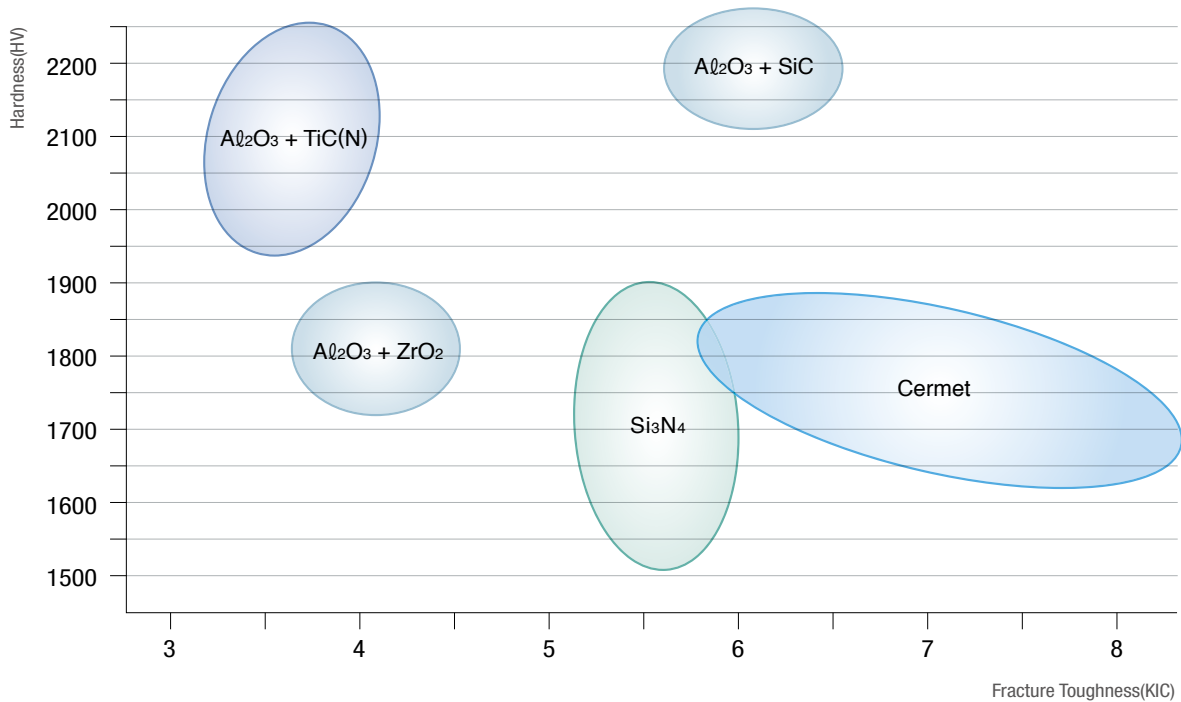
SiC-Whisker	CW40	High Speed Steel, High Chrome Steel in medium or low speed cutting. Roughing and medium cutting with heavy interruption
	CW80	Nickel Base Alloy, Cobalt Base Alloy in high speed cutting. Roughing and finishing with continuous or light interruption
Al ₂ O ₃ +TiC(N)	CAT10	Finishing for hardened steel and cast iron
	CAT30	General machining for hardened steel and cast iron
	CAT50	Fine finishing for hardened steel and cast iron
	CAT90	Fine finishing for hardened steel and cast iron in high speed
TiN Coating	CAT10C	TiN coated on CAT10 grade
	CAT30C	TiN coated on CAT30 grade
AlTiN Coating	CAT30MC	AlTiN coated on CAT30 grade
TiC+Al ₂ O ₃	CAT20	Turning & Milling for ductile cast iron in finish
Al ₂ O ₃ +ZrO ₂	CA20	Medium cutting for cast iron
	CA30	Medium cutting for high hardness cast iron
Si ₃ N ₄	CSN20	Roughing and interrupted cutting for cast iron
	CSN30	Roughing and heavy interrupted cutting for cast iron
	CSN40	General machining for cast iron
	CSN50	Roughing for hard material in high speed
	CSN60	Roughing for hard material with interrupted in high speed
	CSN80(SiAlON)	General machining for high temperature alloy and inconel(Dry)
	CSN100(SiAlON)	General machining for Ni-based alloy and Cobalt-based alloy
Multi Coating	CSN40C	AlTiN/TiN coated on CSN40 grade

Grade Information

Application Range



Mechanical Properties



Ceramic

KORLOY Ceramics take pride in its outstanding wear resistance and thermal shock resistance with high speed cutting. Pure raw materials give stability and fine microstructure to the products. Through HIP process, shaped bodies are completely condensed so that the finished goods are strong and resistant against fracture and wear.

- ▶ Improved work efficiency by increasing cutting speed on extremely higher than carbide inserts.
- ▶ Longer tool life through excellent wear resistance
- ▶ Precise cutting and superior surface roughness

	Grade	Features	Applications	Toughness
Whisker	CW40	Excellent flank & notch wear in high speed cutting Al_2O_3+SiC	High Speed Steel, High Chrome Steel in medium or low speed cutting Roughing and medium cutting with heavy interruption	Tougher ↑
	CW80	Excellent flank & notch wear in high speed cutting Al_2O_3+SiC	Nickel Base Alloy, Cobalt Base Alloy in high speed cutting Roughing and finishing with continuous or light interruption	Harder ↓
Al_2O_3 Series	CAT10	Tougher alternative to CAT30 High thermal shock resistance Al_2O_3+TiC	Universal grade for machining cast iron and hardened steel	Tougher ↑
	CAT30	Excellent wear resistance Al_2O_3+TiCN	A basic choice for machining hardened steel and alloy steel	
	CAT50	Alternative to PCBN fine microstructure Al_2O_3+TiCN	Fine finishing for hardened steel and cast iron	
	CAT90	Excellent wear and thermal shock resistance Al_2O_3+TiCN	Fine finishing for hardened steel and cast iron in high speed	
	CAT10C	Wear resistance improved TiN coated	Finishing for hardened steel and cast iron	
	CAT30C	Excellent wear resistance TiN coated	Finishing for hardened steel and cast iron	Harder ↓
	CAT30MC	Excellent wear resistance & thermal shock resistance	Finishing for hardened steel and cast iron	
	CAT20	High thermal shock resistance Usable with coolant $TiC+Al_2O_3$	Machining ductile cast iron Finishing for ductile cast iron and hard materials	Finishing for ductile cast iron
ZrO ₂ Series	CA20	Toughened by zirconia High chemical stability $Al_2O_3+ZrO_2$	Finishing, semi-finishing of cast iron and steel	Tougher ↑
	CA30	Harder alternative to CA20 $Al_2O_3+ZrO_2$	Finishing, semi-finishing of cast iron and steel	Harder ↓
Si_3N_4 Series	CSN20	Good toughness and thermal shock resistance Well balanced wear resistance and toughness Si_3N_4	First choice for roughing with interrupted cuts Roll turning and milling of cast iron and steel	Roughing in lower speed
	CSN30	Tougher alternative to CSN40 Thermal shock resistance and good toughness Si_3N_4	Roughing and high speed cutting with interruption	Tougher ↑
	CSN40	Excellent wear resistance in high speed cutting Si_3N_4	First choice for roughing of cast iron High speed machining with interrupted cuts	
	CSN50	Harder alternative to CSN40 Improved wear resistance at high cutting speed Si_3N_4	High speed roughing for cast iron	
	CSN60	Excellent wear resistance in interrupted cutting Si_3N_4	Roughing for hard material with interruption and high speed	Harder ↓
	CSN80	Advanced grade with $SiAlON$ contained superior edge strength $SiAlON$	Great performance against notch wear High speed roughing of high temperature alloys and inconel	Harder ↑
	CSN100	Excellent thermal shock resistance and thermal conductivity $SiAlON$	Ni-based Alloy, Cobalt-based Alloy in medium or low speed cutting Roughing and Medium cutting with heavy interruption	Tougher ↓
	CSN40C	Excellent wear resistance & thermal shock resistance	Cast Iron in roughing and semi-finishing cutting	



Physical Properties

Grade	Composition	Color	Density (g/cm ³)	Hardness (HV)	Toughness (MPa·m ^{1/2})	Thermal Conductivity (cal/cm. sec. °C)
CW40	Al ₂ O ₃ +SiC	Green	3.80	2,100	7.00	-
CW80	Al ₂ O ₃ +SiC	Green	3.70	2,100	7.00	-
CAT10	Al ₂ O ₃ +TiC	Black	4.20	2,100	4.00	0.08
CAT30	Al ₂ O ₃ +TiCN	Black	4.40	2,150	4.50	0.08
CAT50	Al ₂ O ₃ +TiCN	Black	4.30	2,200	4.50	0.08
CAT90	Al ₂ O ₃ +TiCN	Black	4.40	2,200	4.50	0.08
CAT10C	CAT10+TiN PVD	Gold	4.20	2,150	4.00	-
CAT30C	CAT30+TiN PVD	Gold	4.40	2,200	4.50	-
CAT30MC	CAT30M+AlTiN PVD	Black	4.40	2,250	4.50	
CAT20	TiC+Al ₂ O ₃	Black	4.60	2,200	4.50	0.07
CA20	Al ₂ O ₃ +ZrO ₂	White	4.00	1,800	4.50	0.07
CA30	Al ₂ O ₃ +ZrO ₂	Pink	4.10	1,850	4.50	0.07
CSN20	Si ₃ N ₄	Black	3.30	1,600	5.00	0.06
CSN30	Si ₃ N ₄	Gray	3.20	1,600	6.00	0.05
CSN40	Si ₃ N ₄	Gray	3.20	1,650	6.00	0.05
CSN50	Si ₃ N ₄	Gray	3.20	1,700	6.00	0.05
CSN60	Si ₃ N ₄	Black	3.20	1,700	6.50	0.07
CSN80	Si ₃ N ₄	Black	3.20	1,900	6.00	0.04
CSN100	Si ₃ N ₄ +Al ₂ O ₃	Gray	3.22	1,600	5.00	0.07
CSN40C	CSN40+PVD(AlTiN/TiN)	Gold	3.20	1,650	6.00	

Choice of Ceramic Grade for Workpiece

		CAT10/CAT30 CAT50/CAT90 CAT10C/CAT30C CAT30MC	CAT20	CA20 CA30	CSN20 CSN30/CSN40 CSN50/CSN60 CSN40C	CSN80 CSN100	CW40	CW80
Cast Iron	Gray Cast Iron	⊙	○	⊙	⊙	○		
	Chilled Cast Iron	⊙		⊙	⊙	⊙		
	Ductile Cast Iron	○	⊙		○	○		○
Steel	Mild Steel			○				
	Carbon Steel			○				
	Alloy Steel	⊙		○		⊙	○	○
	Forged Steel	⊙						
	Heat Treated Steel	⊙						
	High Speed Steel	⊙					⊙	
	High Manganese Steel	○			○	○	⊙	○
	Stainless Steel							
Heat resistance alloy	Heat Resistant Steel	○			○	○	○	○
	Super Alloy Steel	○			○	⊙	○	⊙
	Inconel					⊙	○	⊙

⊙ : Excellent ○ : Good

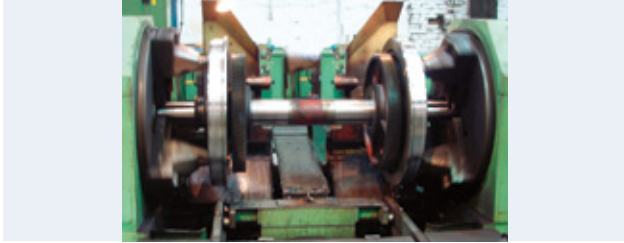
Grade Information

Application	Grade	Workpiece		Machining Type	Cutting speed vc(m/min)	Feed fn(mm/rev)	Depth ap(mm)
Turning	CAT10 CAT30 CAT50 CAT90 CAT10C CAT30C CAT30MC	Gray Cast Iron	Gray Cast Iron (FC) Malleable (FCMB)	Rough Finish	150 ~ 800 200 ~ 1,200	0.20 ~ 0.50 0.30 ~ 0.50	3.0 ~ 6.0 0.1 ~ 0.5
			Chilled Cast Iron	Rough Finish	30 ~ 100 50 ~ 200	0.10 ~ 0.20 0.05 ~ 0.15	0.5 ~ 1.5 0.1 ~ 0.5
		Steel	Carbon Steel Alloy Steel Bearing Steel	Rough Finish	150 ~ 400 200 ~ 800	0.20 ~ 0.50 0.05 ~ 0.20	2.0 ~ 5.0 0.1 ~ 0.5
			Hard Steel (HRC 45≥)	Rough Finish	20 ~ 100 40 ~ 200	0.10 ~ 0.20 0.05 ~ 0.50	0.5 ~ 1.5 0.1 ~ 0.5
	CAT20	Ductile Cast Iron Nodular Cast Iron		Rough Finish	100 ~ 400 200 ~ 800	0.10 ~ 0.20 0.05 ~ 0.25	1.0 ~ 2.0 0.1 ~ 0.5
	CA20 CA30	Gray Cast Iron (FC) Steel (HRC 45≤)		Rough Finish	200 ~ 700 300 ~ 1,200	0.20 ~ 0.40 0.05 ~ 0.30	2.0 ~ 5.0 0.1 ~ 0.5
	CSN20 CSN30 CSN40 CSN50 CSN60	Gray Cast Iron	Gray Cast Iron (FC) Malleable (FCMB)	Rough Finish	150 ~ 1,100 250 ~ 1,200	0.30 ~ 0.80 0.15 ~ 0.40	< 5.0 < 1.0
			Chilled Cast Iron	Rough Finish	20 ~ 100 60 ~ 200	1.00 ~ 2.00 0.50 ~ 1.00	< 5.0 < 1.0
	CSN40C CSN80 CSN100	Ni-Based Alloy Non-Ferrous Metal Inconel		Rough Finish	150 ~ 250 150 ~ 450	0.20 ~ 0.40 0.10 ~ 0.20	< 5.0 < 1.0
	CW40 CW80	High temperature alloys Inconel Stellite		Rough Finish	180 ~ 360 180 ~ 450	0.10 ~ 0.25 0.10 ~ 0.30	1.0 ~ 3.0 0.5 ~ 2.0



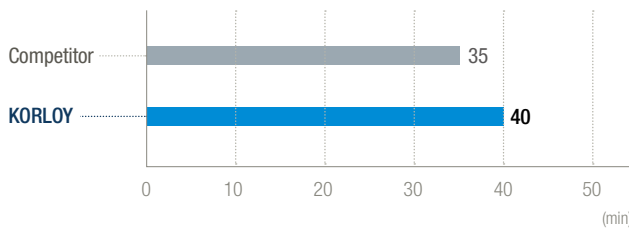
Application examples

Steel Roll



Workpiece _____ Hardened(Chilled)
Hardness _____ HRC 53~60
Cutting condition _____ $vc(m/min) = 240$, $fn(mm/rev) = 0.7$
 $ap(mm) = 0.7\sim 0.8$, Dry
Designation _____ **Insert** : CDH321900AC X635(CAT90)
Holder : HRCD3225/219 - 139

[Tool life]

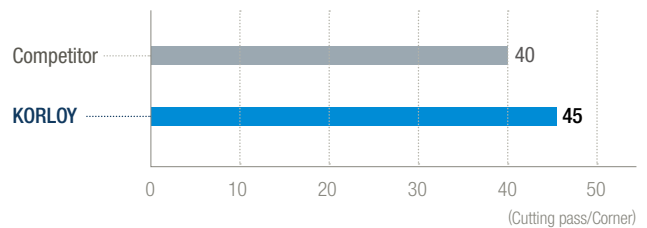


Wheel Bearing

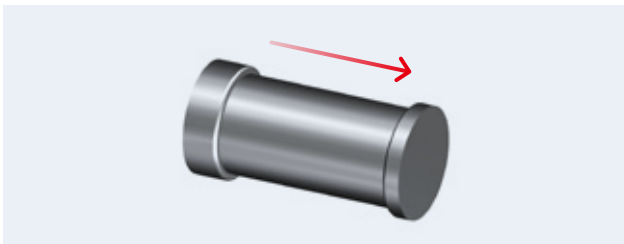


Workpiece _____ Bearing Steel(100Cr6)
Hardness _____ HRC 60~62
Cutting condition _____ $vc(m/min) = 244$, $fn(mm/rev) = 0.05\sim 0.1$
 $ap(mm) = 0.01\sim 0.02$, Wet
Designation _____ **Insert** : DNGA150612 E040(CAT30C)

[Tool life]

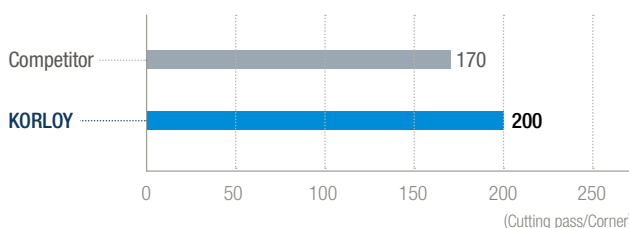


Cylinder Liner

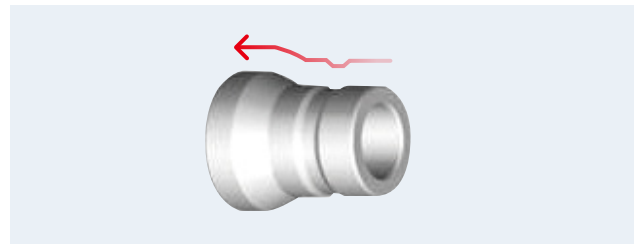


Workpiece _____ Cast Iron(GG25)
Hardness _____ HB 220~280
Cutting condition _____ $vc(m/min) = 660$, $fn(mm/rev) = 0.2$
 $ap(mm) = 0.1$, Wet
Designation _____ **Insert** : TNGN160412 E010(CAT20)
Holder : CTG NR2525M16 - A4

[Tool life]

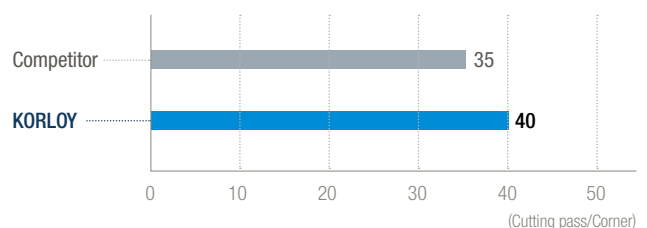


Cylinder Sleeve



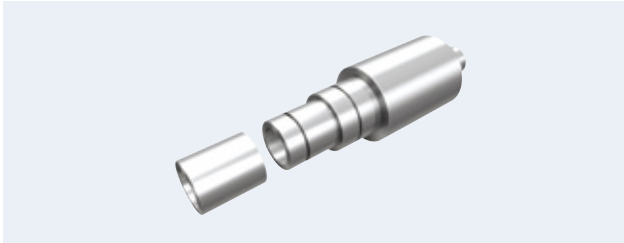
Workpiece _____ Cast Iron(GG25)
Hardness _____ HB 220~280
Cutting condition _____ $vc(m/min) = 450$, $fn(mm/rev) = 0.3$
 $ap(mm) = 1.5$, Dry
Designation _____ **Insert** : SNGN120716 E040(CA30)
Holder : CSY NR2525M12 - A7

[Tool life]



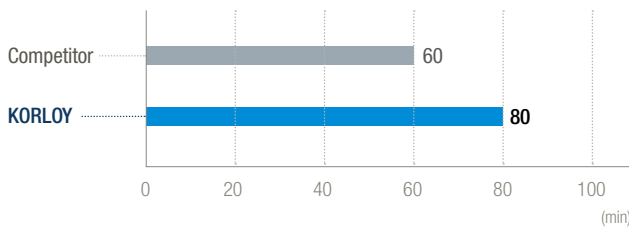
Information

Steel Roll



Workpiece _____ Hardened Steel(Chilled)
Hardness _____ H_RC 53~60
Cutting condition _____ **vc**(m/min) = 22, **vf**(mm/min) = 12
ap(mm) = 5.0~6.0, Dry
Designation _____ **Insert** : LNJ 6688 X435(CSN80)
Holder : CLKNR6060 U66-A

[Tool life]

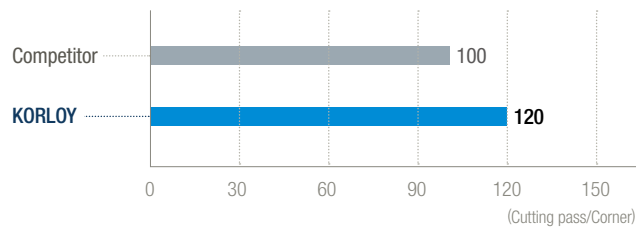


Brake Disc

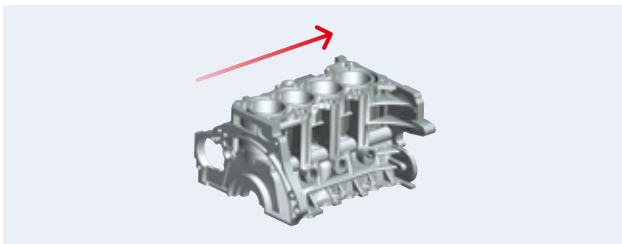


Workpiece _____ Cast Iron(GG25)
Hardness _____ HB 170~200
Cutting condition _____ **vc**(m/min) = 800, **fn**(mm/rev) = 0.4~0.5
ap(mm) = 2.0~3.0, Dry
Designation _____ **Insert** : CNVX 120716 E040(CSN40)
Holder : CCLNR2525M12-X7

[Tool life]

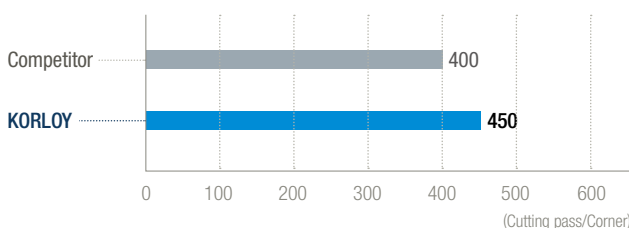


Cylinder Block(Milling)



Workpiece _____ Cast Iron
Hardness _____ HB 170~200
Cutting condition _____ **vc**(m/min) = 247, **vf**(mm/min) = 1750
fz(mm/tooth) = 0.16, **ap**(mm) = 0.8, Wet
Designation _____ **Insert** : SNGN 120416 D020(CSN40)
Holder : CSBNR2525M12-A4

[Tool life]

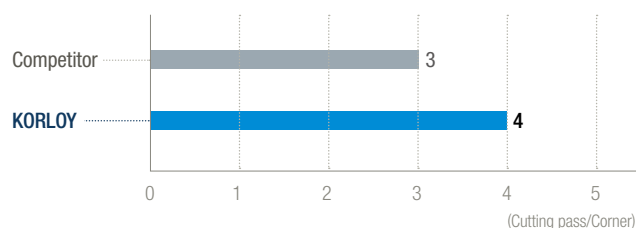


Engine Parts



Workpiece _____ Inconel 718
Hardness _____ H_RC 45
Cutting condition _____ **vc**(m/min) = 133, **fn**(mm/rev) = 0.14
ap(mm) = 3.0, Dry
Designation _____ **Insert** : RCGN 120400 E010(CSN80)

[Tool life]



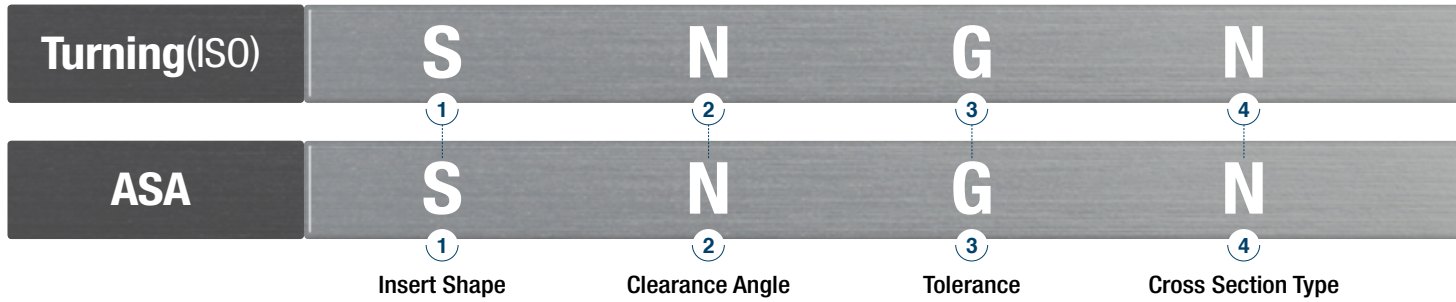
Part 2

Ceramic Inserts

- 01 _ Code System
- 02 _ Application Index
- 03 _ Turning
- 04 _ Roll Turning



Code System - Turning



1 Insert Shape

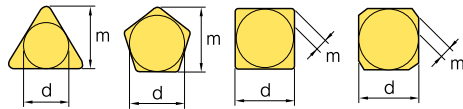
C	D	E	H	L
R	S	T	V	W

2 Clearance Angle

B	C	D	E
		Special type	
N	P	O	

3 Tolerance

d : Inscribed circle
t : Thickness
m : Refer to figure



Class	d	m	t
A	±0.025	±0.005	±0.025
C	±0.025	±0.013	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J*	±0.05 ~ ±0.15	±0.005	±0.025
K*	±0.05 ~ ±0.15	±0.013	±0.025
L*	±0.05 ~ ±0.15	±0.025	±0.025
M*	±0.05 ~ ±0.15	±0.08 ~ ±0.20	±0.13
N*	±0.05 ~ ±0.15	±0.08 ~ ±0.18	±0.025
U*	±0.08 ~ ±0.25	±0.13 ~ ±0.38	±0.13

* Sides are based on unground insert

Tolerance on C,E,H,M,O,P,R,S,T,W Insert Shape(Exceptional case)

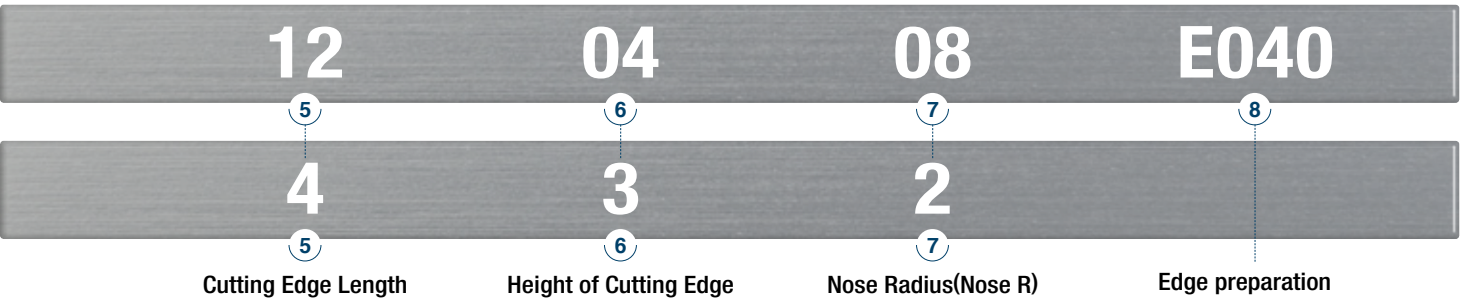
Class	Tolerance on d		Tolerance on m	
	J, K, L, M, N	U	M, N	U
6.35	±0.05	±0.08	±0.08	±0.13
9.525	±0.05	±0.08	±0.08	±0.13
12.7	±0.08	±0.13	±0.13	±0.20
15.875	±0.10	±0.18	±0.15	±0.27
19.05	±0.10	±0.18	±0.15	±0.27
25.4	±0.13	±0.25	±0.18	±0.38

Tolerance on D Insert Shape(Exceptional case)

d	Tolerance on d	Tolerance on m
6.35	±0.05	±0.11
9.525	±0.05	±0.11
12.7	±0.08	±0.15
15.875	±0.10	±0.18
19.05	±0.10	±0.18

4 Cross Section Type

	 C'Sink 70° ~ 90°	 C'Sink 70° ~ 90°
N	P	O
		 C'Sink 70° ~ 90°
N	P	O
 C'Sink 70° ~ 90°		
N	P	O
 C'Sink 40° ~ 60°		 C'Sink 40° ~ 60°
N	P	O
 C'Sink 40° ~ 60°	 C'Sink 40° ~ 60°	Special type
N	P	O

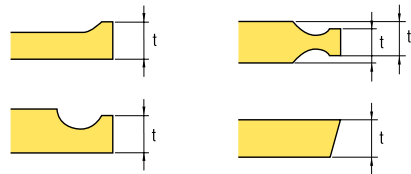


5 Cutting Edge Length

Symbol							Inch	IC
C	d	S	T	R	V	W		
Metric							d(mm)	
3	04	03	06	03	-	02	1.2(5)	3.97
04	05	04	08	04	08	S3	1.5(6)	4.76
05	06	05	09	05	09	03	1.8(7)	5.56
-	-	-	-	06	-	-	-	6.00
06	07	06	11	06	11	04	2	6.35
08	09	07	13	07	13	05	2.5	7.94
-	-	-	-	08	-	-	-	8.00
09	11	09	16	09	16	06	3	9.525
-	-	-	-	10	-	-	-	10.00
11	13	11	19	11	19	07	3.5	11.11
-	-	-	-	12	-	-	-	12.00
12	15	12	22	12	22	08	4	12.70
14	17	14	24	14	24	09	4.5	14.29
16	19	15	27	15	27	10	5	15.875
-	-	-	-	16	-	-	-	16.00
17	21	17	30	17	30	11	5.5	17.46
19	23	19	33	19	33	13	6	19.05
-	-	-	-	20	-	-	-	20.00
22	27	22	38	22	38	15	7	22.225
-	-	-	-	25	-	-	-	25.00
25	31	25	44	25	44	17	8	25.40
32	38	31	54	31	54	21	10	31.75
-	-	-	-	32	-	-	-	32.00

() Symbol for small size insert

6 Height of Cutting Edge



Symbol		Height of Cutting Edge(t)	
Metric	Inch	mm	Inch
01	1(2)	1.59	1/16
T0	1.125	1.79	9/128
T1	1.2	1.98	5/64
02	1.5(3)	2.38	3/32
T2	1.75	2.78	7/64
03	2	3.18	1/8
T3	2.5	3.97	5/32
04	3	4.76	3/16
05	3.5	5.56	7/32
06	4	6.35	1/4
07	5	7.94	5/16
09	6	9.52	3/8
11	7	11.11	7/16
12	8	12.70	1/2

() Symbol for small size insert

7 Nose Radius(Nose R)



Symbol		Corner Radius	
Metric	Inch	Metric	Inch
01	0	0.1	0.004
02	0.5	0.2	0.008
04	1	0.4	1/64
08	2	0.8	1/32
12	3	1.2	3/64
16	4	1.6	1/16
20	5	2.0	5/64
24	6	2.4	3/32
28	7	2.8	7/64
32	8	3.2	1/8
00	-	Round insert(Inch)	
M0	-	Round insert(Metric)	

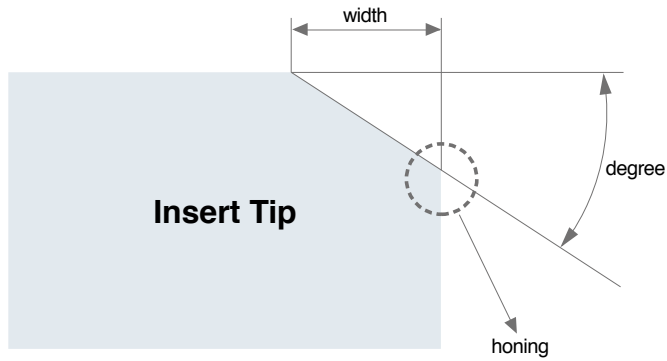
8 Edge preparation

Detailed edge preparations refer to the next page.

Code System - Turning

8 Edge preparation

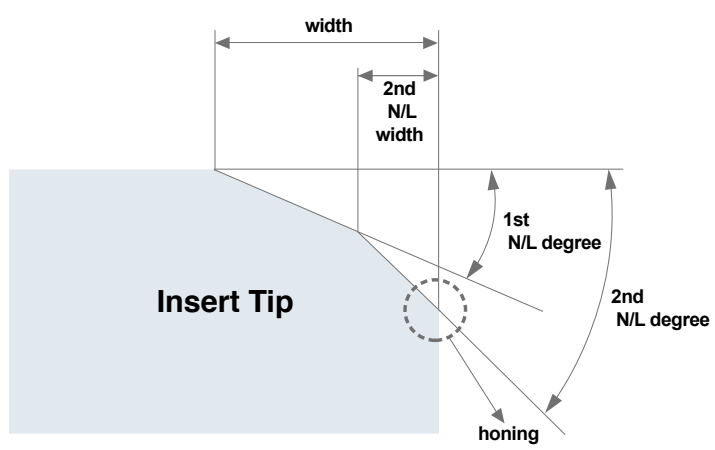
1. Mono N/L



ISO S N G N 1 2 0 4 0 8 E 0 4 0

N/L Degree (°)	N/L Width (mm)		Honing (µm)
E : 20 G : 30	01 : 0.05 02 : 0.10 03 : 0.15 04 : 0.20	20 : 1.00 40 : 2.00	0 : No Honing 1 : 10 2 : 20 3 : 30

2. Double N/L



ISO S N G N 1 9 0 7 1 6 X 5 4 2

1st N/L Degree (°)	1st N/L Width(mm)	2nd N/L Width(mm)×Degree		Honing (µm)
W : 10 X : 15	4 : 1.20 5 : 1.50 6 : 2.00	A : 0.75 B : 1.25 D : 2.30	3 : 0.20×25 4 : 0.10×30 5 : 0.20×30 A : 0.15×30 B : 0.45×25	0 : No Honing 1 : 10 2 : 20 3 : 30 5 : 50



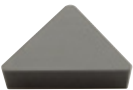
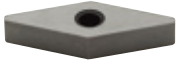


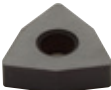





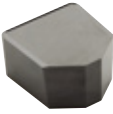
















Index

Turning

CNGA 15p	CNMA 15p	CNGN 16p	CNMM 16p	CNGX 17p
CNVX 17p	CNMX 18p	CNMX .. RD 18p	CCGX 18p	CCGW 19p
CPGN 19p	DNGA 20p	DNMA 20p	DNGN 21p	DNGX 21p
DNMX 22p	DCGX 22p	ENGN 22p	RNGA 23p	RNGN 23p
RPGA 24p	RPGN 24p	RPGX .. DP 25p	RNGX .. DP 25p	RBGN 26p
RCGN 26p	SNGA 27p	SNMA 27p	SNGN 28p	SNGX 29p
SNMX 29p	SNMX .. RD 29p	SCGN 30p	SCGX 30p	SCGW 30p
SPGN 31p	TNGA 31p	TNGN 32p	TCUN 32p	TPGN 33p

Index

☉ Turning

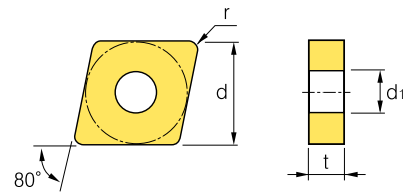
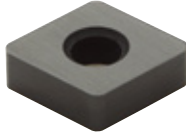
TPUN 33p	VNGA 34p	VNGN 34p	VNGX 35p	WNGA 35p
				
WNGX 35p	CDH 36p	F-Series 36p	F-Series 36p	F-Series 37p
				
F-Series 37p	LNJ 37p	SNGN3812R 38p	RBGX 38p	RCGX 39p
				
RPGX 39p	RXGX 39p	SYBF 40p	SYBR 40p	SGF 41p
				
SGR 41p	SSF 42p	SSR 42p	WFC 43p	WRC 44p
				
WFP 45p	WRP 46p			
				

special

SVW 47p	GVGN 47p	INGN 47p
		

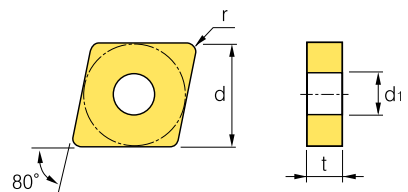
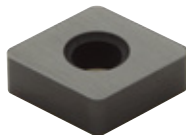
Turning Inserts

CNGA



Type		Grades														Dimensions (mm)									
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	d ₁	
CNGA 120404	CNGA 431	●	○	●	○	○					○											12.70	4.76	0.4	5.16
CNGA 120408	CNGA 432	●	○	●	○	○	○	○	○	○	○	○	●	○	○	○				○	○	12.70	4.76	0.8	5.16
CNGA 120412	CNGA 433	●	○	●					○	○	○	○	●	○	○	○				○	○	12.70	4.76	1.2	5.16
CNGA 120416	CNGA 434	○	○	○							○	○	○			○				○	○	12.70	4.76	1.6	5.16
CNGA 120704	CNGA 451																					12.70	7.94	0.4	5.16
CNGA 120708	CNGA 452	○		○							○	○										12.70	7.94	0.8	5.16
CNGA 120712	CNGA 453	○		○	○						○	○				○				○	○	12.70	7.94	1.2	5.16
CNGA 120716	CNGA 454	○									○	○				○						12.70	7.94	1.6	5.16
CNGA 160608	CNGA 542										○											15.87	6.35	0.8	6.35
CNGA 160612	CNGA 543										○	○								○	○	15.87	6.35	1.2	6.35
CNGA 160616	CNGA 544	○																				15.87	6.35	1.6	6.35
CNGA 160708	CNGA 552	○		○																		15.87	7.94	0.8	6.35
CNGA 160712	CNGA 553	○		○								○										15.87	7.94	1.2	6.35
CNGA 160716	CNGA 554											○										15.87	7.94	1.6	6.35
CNGA 190608	CNGA 642	○									○	○				○						19.05	6.35	0.8	7.93
CNGA 190612	CNGA 643										○									○	○	19.05	6.35	1.2	7.93
CNGA 190616	CNGA 644	○		○																		19.05	6.35	1.6	7.93
CNGA 190712	CNGA 653																					19.05	7.94	1.2	7.93
CNGA 190716	CNGA 654	○																				19.05	7.94	1.6	7.93

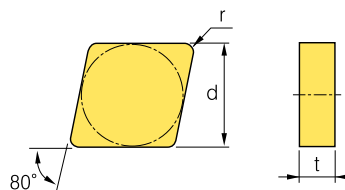
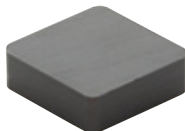
CNMA



Type		Grades														Dimensions (mm)									
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	d ₁	
CNMA 120408	CNMA 432											○	○									12.70	4.76	0.8	5.16
CNMA 120412	CNMA 433											○	○	○	○	○						12.70	4.76	1.2	5.16
CNMA 120416	CNMA 434											○	○	○	○	○						12.70	4.76	1.6	5.16
CNMA 160612	CNMA 543																○	○				15.87	6.35	1.2	6.35
CNMA 160616	CNMA 544																○	○				15.87	6.35	1.6	6.35

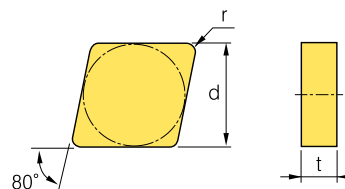
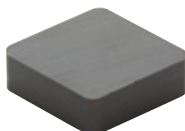
Turning Inserts

CNGN



Type		Grades																Dimensions (mm)						
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	
CNGN 090304	CNGN 321			○																		9.52	3.18	0.4
CNGN 090308	CNGN 322				○											○	○					9.52	3.18	0.8
CNGN 090312	CNGN 323					○										○	○					9.52	3.18	1.2
CNGN 120304	CNGN 421	○																				12.70	3.18	0.4
CNGN 120308	CNGN 422	○																				12.70	3.18	0.8
CNGN 120312	CNGN 423	○																				12.70	3.18	1.2
CNGN 120404	CNGN 431	●	○	●					○													12.70	4.76	0.4
CNGN 120408	CNGN 432	●	○	●	○	○		○	○	○			●	○		○				○	○	12.70	4.76	0.8
CNGN 120412	CNGN 433	●	○	●	○	○		○	○	○			●	○	○	○				○	○	12.70	4.76	1.2
CNGN 120416	CNGN 434	○	○	○	○					○	○	○	○	○	○	○				○	○	12.70	4.76	1.6
CNGN 120704	CNGN 451																			○	○	12.70	7.94	0.4
CNGN 120708	CNGN 452										○	○				○						12.70	7.94	0.8
CNGN 120712	CNGN 453	○	○								○	○	○	○	○	○				○	○	12.70	7.94	1.2
CNGN 120716	CNGN 454	○	○								○	○	○	○	○	○				○	○	12.70	7.94	1.6
CNGN 160608	CNGN 542																					15.87	6.35	0.8
CNGN 160612	CNGN 543	○											○							○	○	15.87	6.35	1.2
CNGN 160616	CNGN 544	○																				15.87	6.35	1.6
CNGN 160708	CNGN 552	○											○									15.87	7.94	0.8
CNGN 160712	CNGN 553	○	○	○							○	○	○	○								15.87	7.94	1.2
CNGN 160716	CNGN 554	○	○	○	○						○	○										15.87	7.94	1.6
CNGN 160720	CNGN 555	○									○	○										15.87	7.94	2.0
CNGN 190612	CNGN 643	○	○																			19.05	6.35	1.2
CNGN 190616	CNGN 644	○	○																			19.05	6.35	1.6
CNGN 190712	CNGN 653	○	○																			19.05	7.94	1.2
CNGN 190716	CNGN 654	○	○																			19.05	7.94	1.6
CNGN 190720	CNGN 655	○																				19.05	7.94	2.0
CNGN 250724	CNGN 856	○																				25.40	7.94	2.4
CNGN 250924	CNGN 866	○	○								○											25.40	9.52	2.4

CNMN



Type		Grades																Dimensions (mm)						
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	
CNMN 120412	CNMN 433												○			○						12.70	4.76	1.2
CNMN 120416	CNMN 434												○			○						12.70	4.76	1.6



Grade Information



Ceramic Inserts



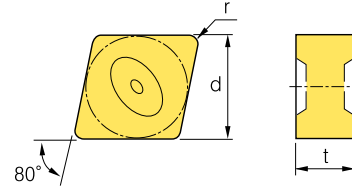
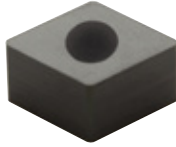
Tool Holders



Technical Information

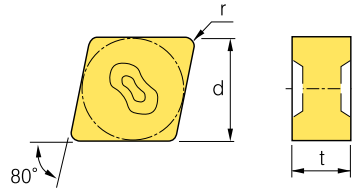
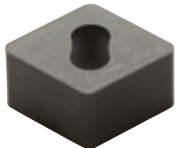
Turning Inserts

CNGX



Type		Grades														Dimensions (mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	
CNGX 120412	CNGX 433											○	○									12.70	4.76	1.2
CNGX 120416	CNGX 434												○									12.70	4.76	1.6
CNGX 120708	CNGX 452	○		○								○										12.70	7.94	0.8
CNGX 120712	CNGX 453	○		○								○	○	○								12.70	7.94	1.2
CNGX 120716	CNGX 454	○		○								○	○	○	○							12.70	7.94	1.6
CNGX 160708	CNGX 552											○										15.87	7.94	0.8
CNGX 160712	CNGX 553											○	○	○								15.87	7.94	1.2
CNGX 160716	CNGX 554											○	○									15.87	7.94	1.6

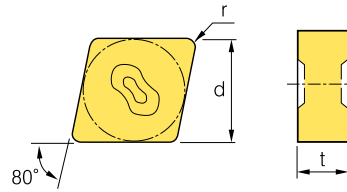
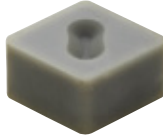
CNVX



Type		Grades														Dimensions (mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	
CNVX 120412	CNVX 433												○									12.70	4.76	1.2
CNVX 120416	CNVX 434												○									12.70	4.76	1.6
CNVX 120708	CNVX 452	○							○			○										12.70	7.94	0.8
CNVX 120712	CNVX 453	○		○					○			○	○	○	○	○						12.70	7.94	1.2
CNVX 120716	CNVX 454			○		○			○			○	○	○	○	○						12.70	7.94	1.6

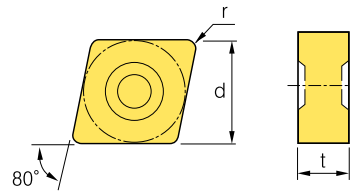
Turning Inserts

CNMX



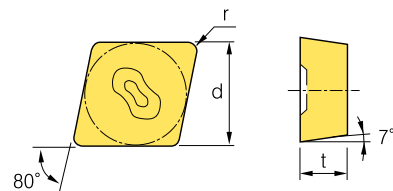
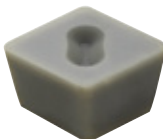
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CNMX 120712	CNMX 453												○	○	○						12.70	7.94	1.2
CNMX 120716	CNMX 454												○	○	○	○					12.70	7.94	1.6

CNMX .. RD



Type		Grades														Dimensions(mm)							
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r
CNMX 120716 RD	CNMX 454 RD												○	○							12.70	7.94	1.2

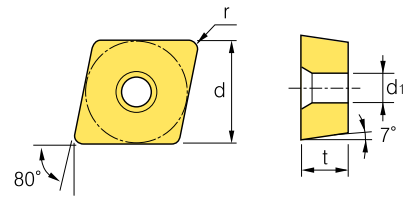
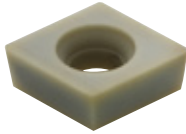
CCGX



Type		Grades														Dimensions(mm)							
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r
CCGX 120608	CCGX 442												○								12.70	6.35	0.8
CCGX 120612	CCGX 443												○	○	○	○					12.70	6.35	1.2
CCGX 120616	CCGX 444												○								12.70	6.35	1.6

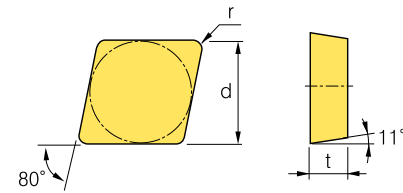
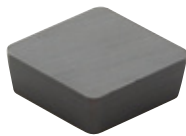
Turning Inserts

CCGW



Type		Grades														Dimensions (mm)								
ISO		CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	d ₁
CCGW 09T304			○									○	○								9.52	3.97	0.4	4.40
CCGW 09T308			○									○	○		○						9.52	3.97	0.8	4.40
CCGW 09T312												○	○		○						9.52	3.97	1.2	4.40
CCGW 120408													○								12.70	4.76	0.8	5.50
CCGW 120412													○								12.70	4.76	1.2	5.50

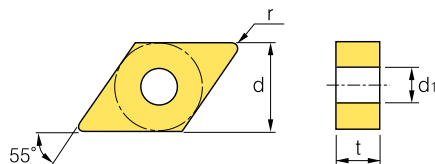
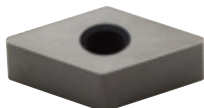
CPGN



Type		Grades														Dimensions (mm)							
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r
CPGN 090304	CPGN 321																				9.52	3.18	0.4
CPGN 090308	CPGN 322																				9.52	3.18	0.8
CPGN 120408	CPGN 432	○																			12.70	4.76	0.8
CPGN 120412	CPGN 433																				12.70	4.76	1.2
CPGN 120416	CPGN 434																				12.70	4.76	1.6

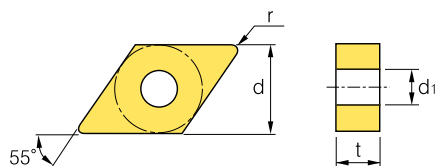
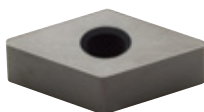
Turning Inserts

DNGA



Type		Grades																Dimensions (mm)						
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	d ₁
DNGA 150404	DNGA 431	●	●	○																	12.70	4.76	0.4	5.16
DNGA 150408	DNGA 432	●	●	○	○		○				○	○	○						○	○	12.70	4.76	0.8	5.16
DNGA 150412	DNGA 433	●	●	○	○							○	○	○			○				12.70	4.76	1.2	5.16
DNGA 150416	DNGA 434	○									○									○	12.70	4.76	1.6	5.16
DNGA 150604	DNGA 441	●	○	●	○	○				○											12.70	6.35	0.4	5.16
DNGA 150608	DNGA 442	●	○	●	○	○					○		●								12.70	6.35	0.8	5.16
DNGA 150612	DNGA 443	●		●	○	○					○		●	○		○					12.70	6.35	1.2	5.16
DNGA 150616	DNGA 444	○	○	○																	12.70	6.35	1.6	5.16
DNGA 150704	DNGA 451	○	○																		12.70	7.94	0.4	5.16
DNGA 150708	DNGA 452	○	○							○	○	○	○								12.70	7.94	0.8	5.16
DNGA 150712	DNGA 453	○	○							○		○	○	○		○					12.70	7.94	1.2	5.16
DNGA 150716	DNGA 454	○	○																		12.70	7.94	1.6	5.16
DNGA 190608	DNGA 542	○	○																		15.87	6.35	0.8	6.35
DNGA 190612	DNGA 543	○	○							○	○		○			○					15.87	6.35	1.2	6.35
DNGA 190616	DNGA 544	○																			15.87	6.35	1.6	6.35

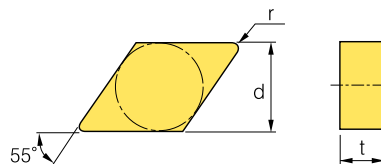
DNMA



Type		Grades																Dimensions (mm)						
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	d ₁
DNMA 150612	DNMA 443											○	○								12.70	6.35	1.2	5.16
DNMA 150616	DNMA 444												○								12.70	6.35	1.6	5.16

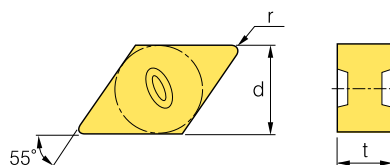
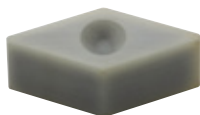
Turning Inserts

DNGN



Type		Grades																Dimensions (mm)						
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	
DNGN 150404	DNGN 431																					12.70	4.76	0.4
DNGN 150408	DNGN 432	●											●						○	○		12.70	4.76	0.8
DNGN 150412	DNGN 433	●	○								○		●						○	○		12.70	4.76	1.2
DNGN 150416	DNGN 434																		○	○		12.70	4.76	1.6
DNGN 150604	DNGN 441																					12.70	6.35	0.4
DNGN 150608	DNGN 442	○				○							○			○						12.70	6.35	0.8
DNGN 150612	DNGN 443	○				○							○			○						12.70	6.35	1.2
DNGN 150616	DNGN 444																					12.70	6.35	1.6
DNGN 150704	DNGN 451	○	○																			12.70	7.94	0.4
DNGN 150708	DNGN 452	○	○	○	○				○	○	○	○				○						12.70	7.94	0.8
DNGN 150712	DNGN 453	○	○	○	○				○	○	○	○	○			○						12.70	7.94	1.2
DNGN 150716	DNGN 454	○	○						○	○	○	○				○						12.70	7.94	1.6

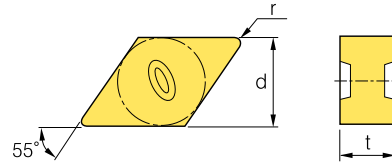
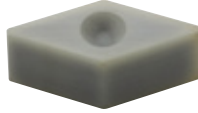
DNGX



Type		Grades																Dimensions (mm)						
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	
DNGX 120708	DNGX 352								○				○									10.00	7.94	0.8
DNGX 120712	DNGX 353								○			○	○	○	○	○	○					10.00	7.94	1.2
DNGX 120716	DNGX 354								○			○	○	○								10.00	7.94	1.6
DNGX 150708	DNGX 452																					12.70	7.94	0.8
DNGX 150712	DNGX 453								○			○	○									12.70	7.94	1.2
DNGX 150716	DNGX 454											○	○	○	○	○						12.70	7.94	1.6

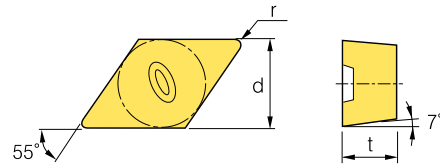
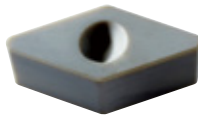
Turning Inserts

DNMX



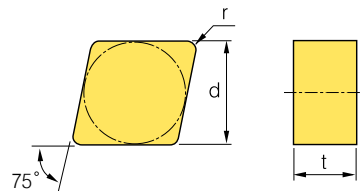
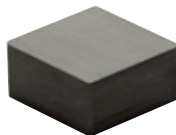
Type		Grades														Dimensions(mm)							
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r
DNMX 120708	DNMX 352												○								10.00	7.94	0.8
DNMX 120712	DNMX 353												○	○	○	○					10.00	7.94	1.2
DNMX 120716	DNMX 354												○								10.00	7.94	1.6

DCGX



Type		Grades														Dimensions(mm)							
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r
DCGX 150612	DCGX 443												○	○	○						12.70	6.35	1.2
DCGX 150616	DCGX 444												○	○	○	○					12.70	6.35	1.6

ENGN



Type		Grades														Dimensions(mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	
ENGN 130404	ENGN 431																				12.70	4.76	0.4	
ENGN 130408	ENGN 432			○							○	○										12.70	4.76	0.8
ENGN 130412	ENGN 433			○							○	○										12.70	4.76	1.2
ENGN 130704	ENGN 451	○	○																		12.70	7.94	0.4	
ENGN 130708	ENGN 452	○	○	○	○				○	○	○	○	○	○							12.70	7.94	0.8	
ENGN 130712	ENGN 453	○	○	○	○						○	○	○			○			○	○	12.70	7.94	1.2	
ENGN 130716	ENGN 454	○	○	○							○	○	○								12.70	7.94	1.6	



Grade Information



Ceramic Inserts



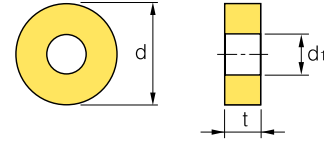
Tool Holders



Technical Information

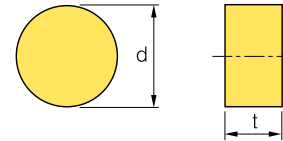
Turning Inserts

RNGA



Type		Grades													Dimensions (mm)									
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	d ₁	
RNGA 120400	RNGA 430	○	○																			12.70	4.76	5.16
RNGA 120700	RNGA 450	○	○																○	○		12.70	7.94	5.16

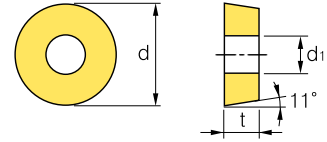
RNGN



Type		Grades													Dimensions (mm)									
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t		
RNGN 060300	RNGN 220			○																		6.35	3.18	
RNGN 060400	RNGN 230	○		○																		6.35	4.76	
RNGN 090300	RNGN 320	○		○							○	○										9.52	3.18	
RNGN 090400	RNGN 330	○	○	○	○						○					○					○	○	9.52	4.76
RNGN 120300	RNGN 420										○					○						12.70	3.18	
RNGN 120400	RNGN 430	●	○	●	○			○		○	○	○	●			○					○	○	12.70	4.76
RNGN 120600	RNGN 440																					12.70	6.35	
RNGN 120700	RNGN 450	●	●	○	○		○	○	○	○	○	○	●			○					○	○	12.70	7.94
RNGN 150700	RNGN 550	○									○	○										15.87	7.94	
RNGN 190600	RNGN 640	○		○							○					○						19.05	6.35	
RNGN 190700	RNGN 650	○		○	○			○			○					○					○	○	19.05	7.94
RNGN 250700	RNGN 850	○			○	○		○	○	○	○	○										25.40	7.94	
RNGN 250900	RNGN 860																					25.40	9.52	
RNGN 320900	RNGN 106	○																				31.75	9.52	
RNGN 0807MO	-	○																				8.00	7.94	
RNGN 1007MO	-	○																				10.00	7.94	
RNGN 1207MO	-	○																				12.00	7.94	

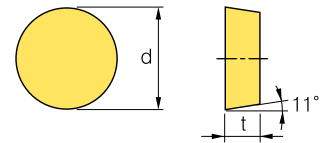
Turning Inserts

RPGA



Type		Grades														Dimensions (mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	d ₁	
RPGA 120400	RPGA 430	○																				12.70	4.76	5.16
RPGA 120700	RPGA 450	○																				12.70	7.94	5.16

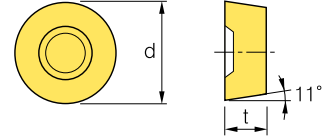
RPGN



Type		Grades														Dimensions (mm)							
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	
RPGN 090300	RPGN 320	○	○														○					9.52	3.18
RPGN 090400	RPGN 330	○	○	○																		9.52	4.76
RPGN 120300	RPGN 420																					12.70	3.18
RPGN 120400	RPGN 430	○	○										○				○			○	○	12.70	4.76
RPGN 120700	RPGN 450	○	○														○					12.70	7.94
RPGN 150700	RPGN 550																					15.87	7.94
RPGN 190700	RPGN 650		○																			19.05	7.94

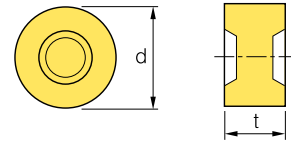
Turning Inserts

RPGX .. DP



Type		Grades														Dimensions (mm)						
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t
RPGX 1204 DP	RPGX 43 DP															○					12.70	4.76
RPGX 1207 DP	RPGX 45 DP															○					12.70	7.94

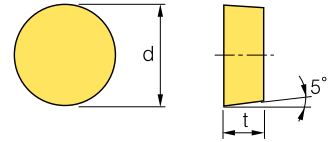
RNGX .. DP



Type		Grades														Dimensions (mm)						
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t
RNGX 1207 DP	RNGX 45 DP															○	○				12.00	7.94

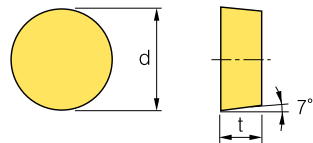
Turning Inserts

RBGN



Type		Grades														Dimensions (mm)							
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	
RBGN 060300	RBGN 220			○																		6.35	3.18
RBGN 060400	RBGN 230			○																		6.35	4.76
RBGN 090300	RBGN 320	○																				9.52	3.18
RBGN 090400	RBGN 330	○																				9.52	4.76
RBGN 120400	RBGN 430	○	○	○									○									12.70	4.76
RBGN 120600	RBGN 440	○																				12.70	6.35
RBGN 120700	RBGN 450	○	○									○	○			○						12.70	7.94
RBGN 0604MO	-			○																		6.00	4.76
RBGN 0804MO	-			○																		8.00	4.76
RBGN 1007MO	-	○												○								10.00	7.94
RBGN 1207MO	-																					12.00	7.94
RBGN 1607MO	-																					16.00	7.94

RCGN



Type		Grades														Dimensions (mm)							
ISO		CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	
RCGN 060400		○	○													○						6.35	4.76
RCGN 060600		○	○	○							○					○						6.35	6.35
RCGN 060700		○	○	○					○							○						6.35	7.94
RCGN 070400			○																			7.94	4.76
RCGN 090700		○	○	○							○					○	○					9.52	7.94
RCGN 120700		○	○	○					○	○	○					○	○					12.70	7.94
RCGN 151000		○	○	○					○	○						○						15.87	10.00
RCGN 191000		○	○	○					○	○						○						19.05	10.00
RCGN 251200		○	○	○					○	○						○						25.40	12.70



Grade Information



Ceramic Inserts



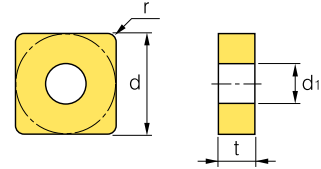
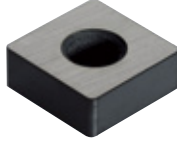
Tool Holders



Technical Information

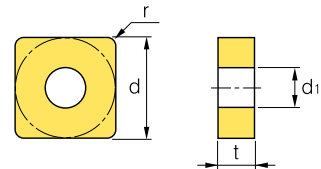
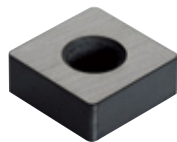
Turning Inserts

SNGA



Type		Grades														Dimensions (mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	d ₁
SNGA 090304	SNGA 321	○	○																		9.52	3.18	0.4	3.81
SNGA 090308	SNGA 322	○	○																		9.52	3.18	0.8	3.81
SNGA 090312	SNGA 323	○	○																		9.52	3.18	1.2	3.81
SNGA 090404	SNGA 331																				9.52	4.76	0.4	3.81
SNGA 090408	SNGA 332																				9.52	4.76	0.8	3.81
SNGA 090412	SNGA 333																				9.52	4.76	1.2	3.81
SNGA 090416	SNGA 334												○								9.52	4.76	1.6	3.81
SNGA 120404	SNGA 431	●	○	○							○										12.70	4.76	0.4	5.16
SNGA 120408	SNGA 432	●	○	●	○	○					○	○		○		○	○		○	○	12.70	4.76	0.8	5.16
SNGA 120412	SNGA 433	●	○	●	○	○		○		○	○	○			○	○	○				12.70	4.76	1.2	5.16
SNGA 120416	SNGA 434	○	○							○					○	○					12.70	4.76	1.6	5.16
SNGA 120708	SNGA 452	○																			12.70	7.94	0.8	5.16
SNGA 120712	SNGA 453	○								○	○										12.70	7.94	1.2	5.16
SNGA 120716	SNGA 454	○								○	○					○					12.70	7.94	1.6	5.16
SNGA 150608	SNGA 542		○																		15.87	6.35	0.8	6.35
SNGA 150612	SNGA 543	○	○																		15.87	6.35	1.2	6.35
SNGA 150616	SNGA 544		○																		15.87	6.35	1.6	6.35
SNGA 190612	SNGA 643	○								○	○										19.05	6.35	1.2	7.94
SNGA 190616	SNGA 644																				19.05	6.35	1.6	7.94

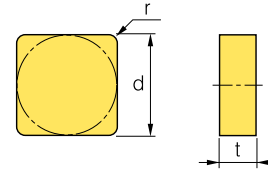
SNMA



Type		Grades														Dimensions (mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	d ₁
SNMA 120408	SNMA 432												○		○						12.70	4.76	0.8	5.16
SNMA 120412	SNMA 433										○	○			○	○					12.70	4.76	1.2	5.16
SNMA 120416	SNMA 434										○	○									12.70	4.76	1.6	5.16
SNMA 150616	SNMA 544										○	○									15.87	6.35	1.6	6.35

Turning Inserts

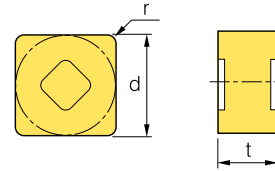
SNGN



Type		Grades													Dimensions (mm)									
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	
SNGN 090304	SNGN 321	○		○																		9.52	3.18	0.4
SNGN 090308	SNGN 322	○	○	○	○						○		○									9.52	3.18	0.8
SNGN 090312	SNGN 323	○		○																		9.52	3.18	1.2
SNGN 090404	SNGN 331																					9.52	4.76	0.4
SNGN 090408	SNGN 332	○												○								9.52	4.76	0.8
SNGN 090412	SNGN 333													○								9.52	4.76	1.2
SNGN 120404	SNGN 431	○									○											12.70	4.76	0.4
SNGN 120408	SNGN 432	●	○	●	○	○		○			○	○	●			○	○			○	○	12.70	4.76	0.8
SNGN 120412	SNGN 433	●	○	●	○	○		○		○	○	○	●		○	○	○			○	○	12.70	4.76	1.2
SNGN 120416	SNGN 434	○	○	○				○		○	○	○	○	○		○	○			○	○	12.70	4.76	1.6
SNGN 120420	SNGN 435	○									○	○	○	○								12.70	4.76	2.0
SNGN 120604	SNGN 441																					12.70	6.35	0.4
SNGN 120608	SNGN 442	○																				12.70	6.35	0.8
SNGN 120612	SNGN 443	○																				12.70	6.35	1.2
SNGN 120616	SNGN 444	○																				12.70	6.35	1.6
SNGN 120704	SNGN 451			○																		12.70	7.94	0.4
SNGN 120708	SNGN 452	○		○					○		○					○				○	○	12.70	7.94	0.8
SNGN 120712	SNGN 453	○	○	○					○		○	○	○	○	○	○	○	○		○	○	12.70	7.94	1.2
SNGN 120716	SNGN 454	○	○	○					○	○	○	○	○	○	○	○	○			○	○	12.70	7.94	1.6
SNGN 120720	SNGN 455	○	○	○					○		○											12.70	7.94	2.0
SNGN 150404	SNGN 531			○																		15.87	4.76	0.4
SNGN 150408	SNGN 532			○																		15.87	4.76	0.8
SNGN 150412	SNGN 533	○							○													15.87	4.76	1.2
SNGN 150416	SNGN 534	○																				15.87	4.76	1.6
SNGN 150708	SNGN 552	○																				15.87	7.94	0.8
SNGN 150712	SNGN 553	○	○	○					○		○	○	○									15.87	7.94	1.2
SNGN 150716	SNGN 554	○							○	○	○	○	○	○	○							15.87	7.94	1.6
SNGN 190608	SNGN 642																					19.05	6.35	0.8
SNGN 190612	SNGN 643	○									○		○			○						19.05	6.35	1.2
SNGN 190616	SNGN 644	○									○					○				○	○	19.05	6.35	1.6
SNGN 190712	SNGN 653	○																				19.05	7.94	1.2
SNGN 190716	SNGN 654	○	○	○					○		○		○			○						19.05	7.94	1.6
SNGN 190720	SNGN 655	○							○		○											19.05	7.94	2.0
SNGN 250720	SNGN 854	○									○											25.40	7.94	2.0
SNGN 250724	SNGN 856	○		○							○	○										25.40	7.94	2.4
SNGN 250924	SNGN 866	○							○		○	○	○			○						25.40	9.52	2.4

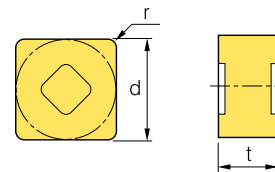
Turning Inserts

SNGX



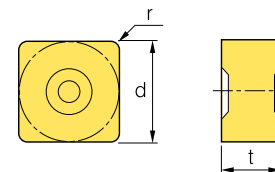
Type		Grades														Dimensions (mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	
SNGX 120408	SNGX 432													○								12.70	4.76	0.8
SNGX 120412	SNGX 433													○								12.70	4.76	1.2
SNGX 120416	SNGX 434													○								12.70	4.76	1.6
SNGX 120708	SNGX 452	○										○		○								12.70	7.94	0.8
SNGX 120712	SNGX 453	○	○									○	○	○		○						12.70	7.94	1.2
SNGX 120716	SNGX 454											○	○	○	○	○						12.70	7.94	1.6
SNGX 150708	SNGX 552	○	○									○		○								15.87	7.94	0.8
SNGX 150712	SNGX 553	○	○									○		○		○						15.87	7.94	1.2
SNGX 150716	SNGX 554											○	○	○								15.87	7.94	1.6

SNMX



Type		Grades														Dimensions (mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	d ₁	
SNMX 120712	SNMX 453											○	○	○	○	○						12.70	7.94	1.2
SNMX 120716	SNMX 454												○									12.70	7.94	1.6

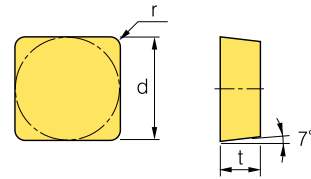
SNMX .. RD



Type		Grades														Dimensions (mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	d ₁	
SNMX 120716 RD	SNMX 454 RD											○			○							12.70	7.94	1.6

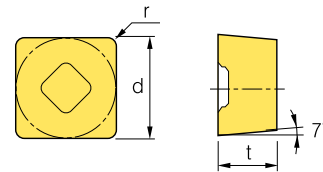
Turning Inserts

SCGN



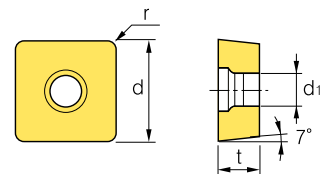
Type		Grades														Dimensions (mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	
SCGN 090412	SCGN 333	○											○									9.52	4.76	1.2
SCGN 090416	SCGN 334	○																				9.52	4.76	1.6
SCGN 120404	SCGN 431		○																			12.70	4.76	0.4
SCGN 120408	SCGN 432	○	○																			12.70	4.76	0.8
SCGN 120412	SCGN 433								○		○	○			○	○						12.70	4.76	1.2
SCGN 120416	SCGN 434	○	○																			12.70	4.76	1.6

SCGX



Type		Grades														Dimensions (mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	
SCGX 120408	SCGX 432																					12.70	4.76	0.8
SCGX 120616	SCGX 444														○							12.70	6.35	1.6
SCGX 120716	SCGX 454																					12.70	7.94	1.6

SCGW



Type		Grades														Dimensions (mm)									
ISO		CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	d ₁	
SCGW 09T304													○									9.52	3.97	0.4	4.40
SCGW 09T308													○									9.52	3.97	0.8	4.40
SCGW 120408													○									12.70	4.76	0.8	5.50



Grade Information

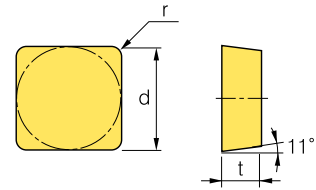
Ceramic Inserts

Tool Holders

Technical Information

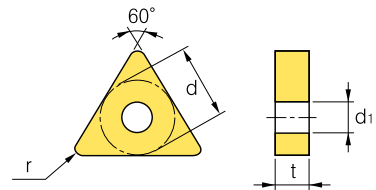
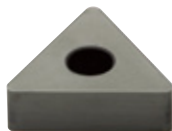
Turning Inserts

SPGN



Type		Grades																Dimensions (mm)							
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r		
SPGN 090304	SPGN 321	○		○							○											9.52	3.18	0.4	
SPGN 090308	SPGN 322	○	○	○								○	○	○						○	○	9.52	3.18	0.8	
SPGN 090312	SPGN 323	○																				9.52	3.18	1.2	
SPGN 120304	SPGN 421	○		○																		12.70	3.18	0.4	
SPGN 120308	SPGN 422	○		○					○		○		○									12.70	3.18	0.8	
SPGN 120312	SPGN 423	○	○	○							○		○		○							12.70	3.18	1.2	
SPGN 120404	SPGN 431																					12.70	4.76	0.4	
SPGN 120408	SPGN 432	○		○	○						○										○	○	12.70	4.76	0.8
SPGN 120412	SPGN 433	○	○	○							○	○	○	○	○	○	○			○	○	12.70	4.76	1.2	
SPGN 120416	SPGN 434	○	○	○																○	○	12.70	4.76	1.6	
SPGN 150408	SPGN 532																					15.87	4.76	0.8	
SPGN 150412	SPGN 533				○																	15.87	4.76	1.2	
SPGN 190412	SPGN 633	○																				19.05	4.76	1.2	
SPGN 190416	SPGN 634	○		○									○	○								19.05	4.76	1.6	

TNGA



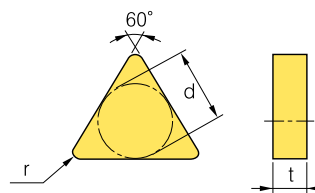
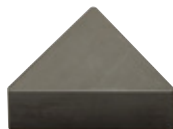
Type		Grades																Dimensions (mm)							
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	d ₁	
TNGA 110304	TNGA 221	○		○																		6.35	3.18	0.4	2.26
TNGA 110308	TNGA 222	○		○																		6.35	3.18	0.8	2.26
TNGA 160304	TNGA 321	○		○																		9.52	3.18	0.4	3.81
TNGA 160308	TNGA 322	○		○					○		○											9.52	3.18	0.8	3.81
TNGA 160312	TNGA 323	○		○																		9.52	3.18	1.2	3.81
TNGA 160404	TNGA 331	●	○	○	○	○					○	○	○	○		○						9.52	4.76	0.4	3.81
TNGA 160408	TNGA 332	●	○	●	○	○					○	○	○	●	○	○				○	○	9.52	4.76	0.8	3.81
TNGA 160412	TNGA 333	○	○	●	○	○					○	○	○	●	○	○						9.52	4.76	1.2	3.81
TNGA 160416	TNGA 334	○	○	○	○				○		○	○	○	○		○						9.52	4.76	1.6	3.81
TNGA 220404	TNGA 431	○		○							○											12.70	4.76	0.4	5.16
TNGA 220408	TNGA 432	○		○							○		○			○						12.70	4.76	0.8	5.16
TNGA 220412	TNGA 433	○		○							○		○			○						12.70	4.76	1.2	5.16
TNGA 220416	TNGA 434	○		○					○		○		○									12.70	4.76	1.6	5.16
TNGA 220708	TNGA 452	○		○																		12.70	7.94	0.8	5.16
TNGA 220712	TNGA 453	○		○																		12.70	7.94	1.2	5.16
TNGA 270608	TNGA 542				○																	15.87	6.35	0.8	6.35
TNGA 270612	TNGA 543				○																	15.87	6.35	1.2	6.35
TNGA 330924	TNGA 666				○																	19.05	9.52	2.4	7.94

Code system 10-12p — ●: Stock item ○: Items in material



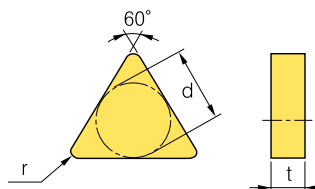
Turning Inserts

TNGN



Type		Grades														Dimensions(mm)							
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r
TNGN 110304	TNGN 221	○	○								○										6.35	3.18	0.4
TNGN 110308	TNGN 222	○	○						○		○										6.35	3.18	0.8
TNGN 160404	TNGN 331	●	○	●					○		○										9.52	4.76	0.4
TNGN 160408	TNGN 332	●	○	●	○	○		○	○		○	○	○		○						9.52	4.76	0.8
TNGN 160412	TNGN 333	○		●	○	○		○			○	○	●						○	○	9.52	4.76	1.2
TNGN 160416	TNGN 334	○	○	○	○	○					○	○	○								9.52	4.76	1.6
TNGN 160704	TNGN 351	○																			9.52	7.94	0.4
TNGN 160708	TNGN 352	○	○	○								○									9.52	7.94	0.8
TNGN 160712	TNGN 353	○	○					○			○	○									9.52	7.94	1.2
TNGN 160716	TNGN 354	○	○								○										9.52	7.94	1.6
TNGN 220404	TNGN 431	○																			12.70	4.76	0.4
TNGN 220408	TNGN 432	○	○								○		○						○	○	12.70	4.76	0.8
TNGN 220412	TNGN 433	○	○								○		○				○			○	12.70	4.76	1.2
TNGN 220416	TNGN 434		○								○		○						○	○	12.70	4.76	1.6
TNGN 220708	TNGN 452	○																			12.70	7.94	0.8
TNGN 220712	TNGN 453		○																		12.70	7.94	1.2
TNGN 220716	TNGN 454		○																		12.70	7.94	1.6
TNGN 270608	TNGN 542	○	○																		15.87	6.35	0.8
TNGN 270612	TNGN 543	○	○																		15.87	6.35	1.2
TNGN 270616	TNGN 544		○														○				15.87	6.35	1.6
TNGN 330924	TNGN 666		○																		19.05	9.52	2.4
TNGN 440932	TNGN 868	○	○								○										25.40	9.52	3.2

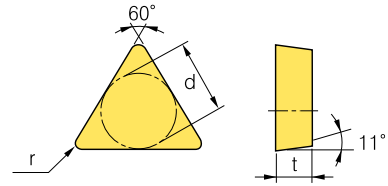
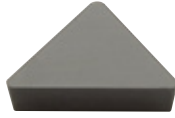
TCUN



Type		Grades														Dimensions(mm)							
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r
TCUN 160408	TCUN 332			○									○	○							9.52	4.76	0.8
TCUN 160412	TCUN 333			○									○	○							9.52	4.76	1.2
TCUN 160416	TCUN 334			○									○								9.52	4.76	1.6

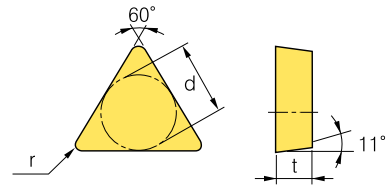
Turning Inserts

TPGN



Type		Grades														Dimensions (mm)							
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r
TPGN 090204	TPGN 731			○																	5.56	2.38	0.4
TPGN 090208	TPGN 732			○																	5.56	2.38	0.8
TPGN 110304	TPGN 221	○	○	○							○		○								6.35	3.18	0.4
TPGN 110308	TPGN 222	○	○	○							○	○	○			○					6.35	3.18	0.8
TPGN 160304	TPGN 321	○	○	○					○		○		○								9.52	3.18	0.4
TPGN 160308	TPGN 322	○	○	○					○		○	○	○			○					9.52	3.18	0.8
TPGN 160312	TPGN 323	○		○									○	○							9.52	3.18	1.2
TPGN 160404	TPGN 331	○																			9.52	4.76	0.4
TPGN 160408	TPGN 332	○		○												○					9.52	4.76	0.8
TPGN 160412	TPGN 333	○														○					9.52	4.76	1.2
TPGN 160416	TPGN 334	○																			9.52	4.76	1.6
TPGN 220404	TPGN 431	○		○																	12.70	4.76	0.4
TPGN 220408	TPGN 432	○	○								○										12.70	4.76	0.8
TPGN 220412	TPGN 433	○	○									○	○								12.70	4.76	1.2
TPGN 220416	TPGN 434	○	○																		12.70	4.76	1.6
TPGN 220712	TPGN 453																				12.70	7.94	1.2
TPGN 220716	TPGN 454																				12.70	7.94	1.6
TPGN 271232	TPGN 588			○																	15.87	12.70	3.2

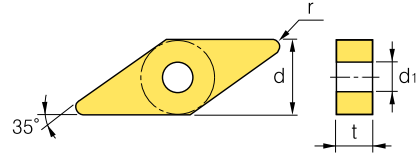
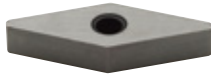
TPUN



Type		Grades														Dimensions (mm)							
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r
TPUN 110308	TPUN 222															○					6.35	3.18	0.8
TPUN 110312	TPUN 223															○					6.35	3.18	1.2

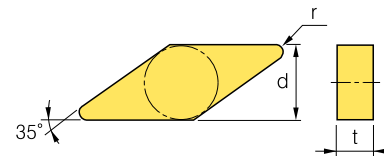
Turning Inserts

VNGA



Type		Grades													Dimensions(mm)									
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	d ₁
VNGA 160404	VNGA 331	○		○	○						○										9.52	4.76	0.4	3.81
VNGA 160408	VNGA 332	○		○	○	○		○		○	○	○	○	○		○					9.52	4.76	0.8	3.81
VNGA 160412	VNGA 333	○		○	○	○				○	○	○	○	○							9.52	4.76	1.2	3.81
VNGA 160604	VNGA 341	○		○																	9.52	6.35	0.4	3.81
VNGA 160608	VNGA 342	○		○																	9.52	6.35	0.8	3.81
VNGA 160612	VNGA 343	○		○																	9.52	6.35	1.2	3.81
VNGA 220404	VNGA 431	○		○																	12.70	4.76	0.4	5.16
VNGA 220408	VNGA 432	○		○									○								12.70	4.76	0.8	5.16
VNGA 220412	VNGA 433	○		○									○								12.70	4.76	1.2	5.16
VNGA 220424	VNGA 436																		○	○	12.70	4.76	2.4	5.16

VNGN



Type		Grades													Dimensions(mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r
VNGN 160404	VNGN 331			○																	9.52	4.76	0.4
VNGN 160408	VNGN 332			○																	9.52	4.76	0.8
VNGN 160704	VNGN 351			○																	9.52	7.94	0.4
VNGN 160708	VNGN 352			○																	9.52	7.94	0.8
VNGN 160712	VNGN 353																				9.52	7.94	1.2
VNGN 160716	VNGN 354																				9.52	7.94	1.6



Grade Information

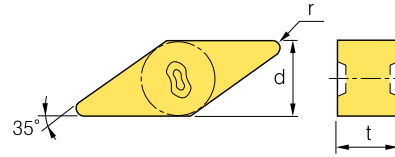
Ceramic Inserts

Tool Holders

Technical Information

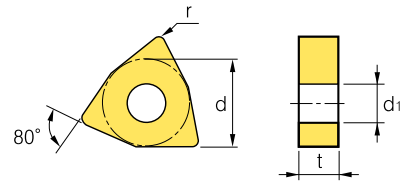
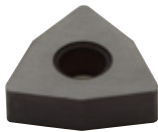
Turning Inserts

VNGX



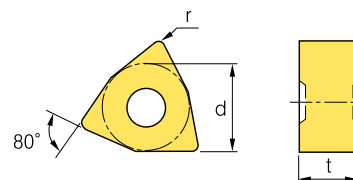
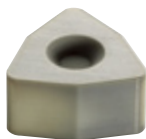
Type		Grades														Dimensions (mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	
VNGX 160708	VNGX 352			○					○				○									9.52	7.94	0.8
VNGX 160712	VNGX 353			○					○				○		○							9.52	7.94	1.2
VNGX 160716	VNGX 354												○									9.52	7.94	1.6

WNGA



Type		Grades														Dimensions (mm)									
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	d ₁	
WNGA 080404	WNGA 431	●		●	○																	12.70	4.76	0.4	5.16
WNGA 080408	WNGA 432	●		●	○						○	○	○	○	○	○				○	○	12.70	4.76	0.8	5.16
WNGA 080412	WNGA 433	●		●	○						○	○	○	○	○	○						12.70	4.76	1.2	5.16

WNGX



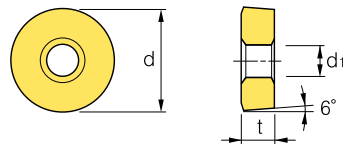
Type		Grades														Dimensions (mm)								
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	
WNGX 080708	WNGX 452															○						12.70	7.94	0.8
WNGX 080712	WNGX 453										○			○	○	○						12.70	7.94	1.2
WNGX 080716	WNGX 454													○								12.70	7.94	1.6

Code system 10~12p — ●: Stock item ○: Items in material



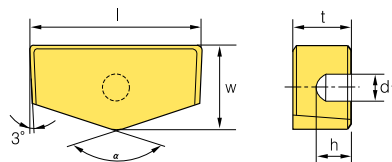
Roll Turning Insert

CDH



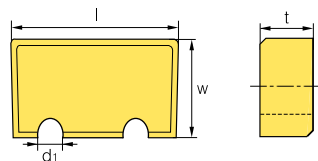
Type		Grades												Dimensions (mm)									
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	d ₁
CDH 120600	CDH 22	○	○	○																	12.70	6.35	3.18
CDH 120900	CDH 23	○																			12.70	9.52	3.18
CDH 190900	CDH 33	○	○	○	○						○										19.05	9.52	6.35
CDH 191200	CDH 34	○																			19.05	12.70	6.35
CDH 251200	CDH 42	○	○	○					○	○											25.40	12.70	6.75
CDH 251900	CDH 43	○							○	○											25.40	19.05	6.75
CDH 320900	CDH 515	○	○						○	○	○										31.75	9.52	10.00
CDH 321900	CDH 53	○	○	○					○	○	○										31.75	19.05	10.00
CDH 381100	-	○																			38.10	11.11	9.93

F-Series



Type	Grades												Dimensions (mm)												
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	l	w	t	d ₁	h	α
F 13941	○	○						○	○	○										32.00	19.05	12.00	6.50	6.00	120°
F 10537	○	○						○	○	○										44.50	25.40	14.20	6.50	7.00	120°

F-Series



Type	Grades												Dimensions (mm)										
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	l	w	t	d ₁
F 10537 V	○	○						○												44.00	26.00	15.00	5.00



Grade Information



Ceramic Inserts



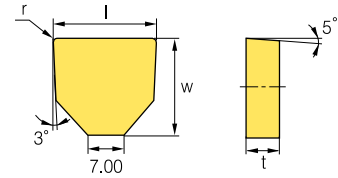
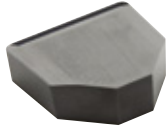
Tool Holders



Technical Information

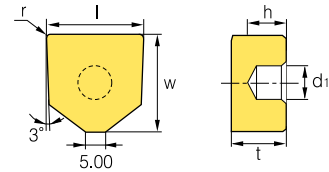
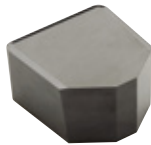
Roll Turning Insert

F-Series



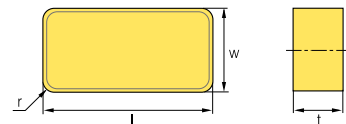
Type	Grades														Dimensions(mm)								
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	l	t	r	w
F 250723			○																	25.00	7.94	1.20	23.00

F-Series



Type	Grades														Dimensions(mm)										
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	l	t	r	w	d ₁	h
F 251425										○										25.00	14.40	2.40	25.40	9.17	10.00
F 251425 H65										○										25.40	14.40	2.40	25.40	6.50	10.00

LNJ

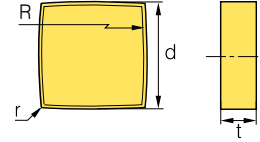


Type	Grades														Dimensions(mm)								
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	l	w	t	r
LNJ 5464	○	○																		25.40	15.87	9.52	1.6
LNJ 5568										○										31.75	15.87	9.52	3.2
LNJ 6588	○	○	○	○				○	○	○										31.75	19.05	12.70	3.2
LNJ 6688	○	○	○	○				○	○	○					○				○	38.10	19.05	12.70	3.2
LNJ 6898										○										48.10	21.05	12.70	3.2

Code system 10-12p — ●: Stock item ○: Items in material

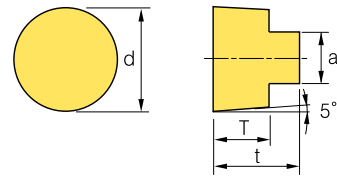
Roll Turning Insert

SNGN3812R



Type	Grades														Dimensions (mm)								
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	r	R
SNGN 3812R	○		○	○																38.10	12.70	0.4	114

RBGX



Type	Grades														Dimensions (mm)								
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	T	a
RBGX 06T	○		○																	6.00	5.00	3.00	3.00
RBGX 08T										○										8.00	6.50	4.00	4.00
RBGX 10T	○		○	○	○			○		○	○									10.00	9.00	6.00	6.00
RBGX 12T	○		○	○	○			○		○	○				○					12.00	9.00	6.00	6.00
RBGX 16T																				16.00	13.00	8.00	8.00
RBGX 20T																				20.00	15.00	10.00	10.00
RBGX 26T										○										26.00	15.00	10.00	14.00



Grade Information



Ceramic Inserts



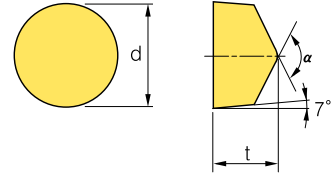
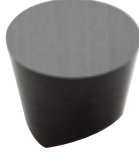
Tool Holders



Technical Information

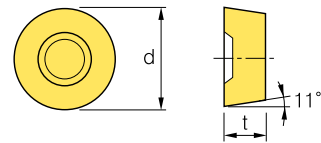
Roll Turning Insert

RCGX



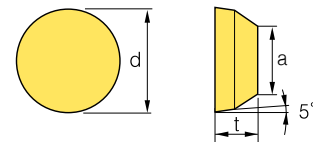
Type		Grades																Dimensions (mm)						
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	α	
RCGX 060400	RCGX 102	○		○													○			○	○	6.35	4.76	120°
RCGX 060600	RCGX 102	○		○	○	○											○					6.35	6.35	120°
RCGX 060700	RCGX 102	○		○	○	○					○						○					6.35	7.94	120°
RCGX 090700	RCGX 103	○		○	○	○	○				○						○	○		○	○	9.52	7.94	120°
RCGX 120700	RCGX 104	○		○	○	○	○				○						○	○		○	○	12.70	7.94	120°
RCGX 151000	RCGX 105	○		○	○	○	○				○						○	○				15.87	10.00	120°
RCGX 191000	RCGX 106	○		○	○	○	○				○						○					19.05	10.00	120°
RCGX 251200	RCGX 108	○		○	○	○	○				○						○					25.40	12.00	140°

RPGX



Type		Grades																Dimensions (mm)						
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	α	
RPGX 060400																				○	○	6.35	4.76	120°
RPGX 090700																	○	○		○	○	9.52	7.94	120°
RPGX 120700																	○	○		○	○	12.70	7.94	120°

RXGX



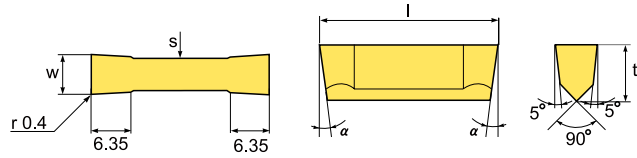
Type		Grades																Dimensions (mm)						
ISO	ASA	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	α	
RXGX 1207MO		○	○																			12.00	7.94	6.90
RXGX 1608MO			○						○													16.00	8.00	9.50
RXGX 2508MO		○							○													25.00	8.00	18.20

Code system 10-12p — ●: Stock item ○: Items in material



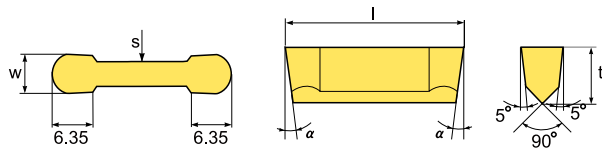
Roll Turning Insert

SYBF



Type	Grades														Dimensions (mm)									
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	t	w	t	s	a
SYBF 3228	○	○																		28.58	3.18	6.35	2.69	5.0°
SYBF 4828	○	○																		28.58	4.78	6.35	3.66	5.0°
SYBF 5528																				28.58	5.54	6.35	3.66	5.0°
SYBF 6428	○	○																		28.58	6.35	8.56	5.13	7.0°
SYBF 7928	○	○																		28.58	7.93	8.56	5.13	7.0°
SYBF 9528																				28.58	9.53	8.56	6.99	7.0°

SYBR



Type	Grades														Dimensions (mm)									
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	t	w	t	s	a
SYBR 3228	○	○																		28.58	3.18	6.35	2.69	5.0°
SYBR 4828	○	○																		28.58	4.78	6.35	3.66	5.0°
SYBR 5528																				28.58	5.54	6.35	3.66	5.0°
SYBR 6428	○	○																		28.58	6.35	8.56	5.13	7.0°
SYBR 7928	○	○																		28.58	7.93	8.56	5.13	7.0°
SYBR 9528																				28.58	9.53	8.56	6.99	7.0°



Grade Information

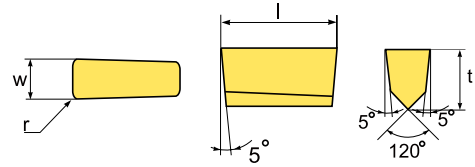
Ceramic Inserts

Tool Holders

Technical Information

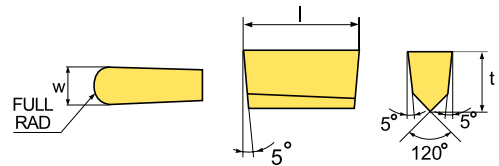
Roll Turning Insert

SGF



Type	Grades														Dimensions(mm)								
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	l	w	t	r
SGF 4012	○	○								○										12.00	4.00	5.00	0.50
SGF 5012	○	○								○										12.00	5.00	5.00	0.80
SGF 6015	○	○								○										15.00	6.00	7.50	0.80
SGF 7015	○	○																		15.00	7.00	7.50	0.80
SGF 8015	○	○																		15.00	8.00	7.50	0.80
SGF 1015	○	○																		15.00	10.00	7.50	0.80

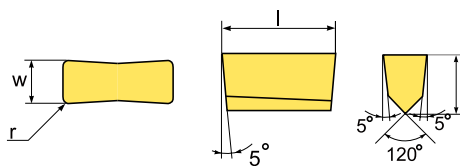
SGR



Type	Grades														Dimensions(mm)							
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	l	w	t
SGR 4012	○	○						○				○					○			12.00	4.00	5.00
SGR 5012	○	○						○				○					○			12.00	5.00	5.00
SGR 6015	○	○						○												15.00	6.00	7.50
SGR 7015	○	○						○												15.00	7.00	7.50
SGR 8015	○	○						○												15.00	8.00	7.50
SGR 1015	○	○						○												15.00	10.00	7.50

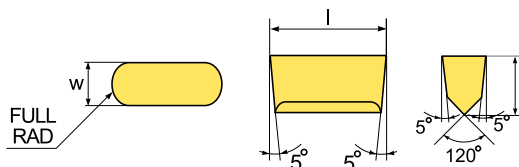
Roll Turning Insert

SSF



Type	Grades														Dimensions (mm)								
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	l	w	t	r
SSF 4012	○	○								○										12.00	4.00	5.00	0.80
SSF 5012	○	○								○										12.00	5.00	5.00	0.80
SSF 6015	○	○								○										15.00	6.00	7.50	0.80
SSF 7015	○	○																		15.00	7.00	7.50	0.80
SSF 8015	○	○																		15.00	8.00	7.50	0.80
SSF 1015	○	○																		15.00	10.00	7.50	0.80

SSR



Type	Grades														Dimensions (mm)							
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	l	w	t
SSR 4012	○	○						○				○					○			12.00	4.00	5.00
SSR 5012	○	○						○				○					○			12.00	5.00	5.00
SSR 6015	○	○						○												15.00	6.00	7.50
SSR 7015	○	○						○												15.00	7.00	7.50
SSR 8015	○	○						○												15.00	8.00	7.50
SSR 1015	○	○						○												15.00	10.00	7.50



Grade Information



Ceramic Inserts

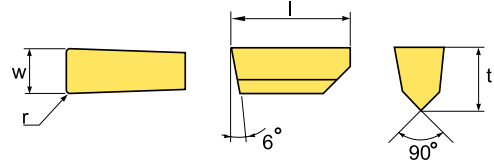


Tool Holders



Technical Information

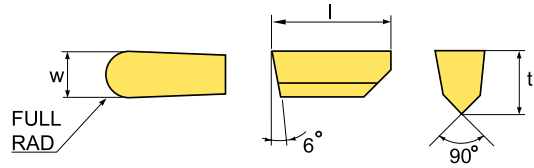
Roll Turning Insert

WFC

Type	Grades													Dimensions (mm)									
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW60	l	w	t	r
WFC 094050-A																				12.70	2.388	4.75	0.40
WFC 094050-B																				12.70	2.388	4.75	0.80
WFC 125050-A																				12.70	3.175	4.75	0.40
WFC 125050-B																				12.70	3.175	4.75	0.80
WFC 156050-A																				12.70	3.962	4.75	0.40
WFC 156050-B																				12.70	3.962	4.75	0.80
WFC 187050-A																				12.70	4.750	4.75	0.40
WFC 187050-B																				12.70	4.750	4.75	0.80
WFC 218075-A																				19.05	5.537	6.35	0.40
WFC 218075-B																				19.05	5.537	6.35	0.80
WFC 250075-A																				19.05	6.350	6.35	0.40
WFC 250075-B																				19.05	6.350	6.35	0.80
WFC 250075-C																				19.05	6.350	6.35	1.20
WFC 281075-A																				19.05	7.137	6.35	0.40
WFC 281075-B																				19.05	7.137	6.35	0.80
WFC 281075-C																				19.05	7.137	6.35	1.20
WFC 312100-A																				25.40	7.925	8.56	0.40
WFC 312100-B																				25.40	7.925	8.56	0.80
WFC 312100-C																				25.40	7.925	8.56	1.20
WFC 312100-D																				25.40	7.925	8.56	1.60
WFC 344100-A																			○	25.40	8.738	8.56	0.40
WFC 344100-B																				25.40	8.738	8.56	0.80
WFC 344100-C																				25.40	8.738	8.56	1.20
WFC 344100-D																				25.40	8.738	8.56	1.60
WFC 375100-A																				25.40	9.525	8.56	0.40
WFC 375100-B																				25.40	9.525	8.56	0.80
WFC 375100-C																				25.40	9.525	8.56	1.20
WFC 375100-D																			○	25.40	9.525	8.56	1.60

Roll Turning Insert

WRC



Type	Grades														Dimensions (mm)							
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	l	w	t
WRC 094050																				12.70	2.388	4.75
WRC 125050																			○	12.70	3.175	4.75
WRC 156050																				12.70	3.962	4.75
WRC 187050																				12.70	4.750	4.75
WRC 218075																				19.05	5.537	6.35
WRC 250075																				19.05	6.350	6.35
WRC 281075																				19.05	7.137	6.35
WRC 312100																				25.40	7.925	8.56
WRC 344100																				25.40	8.738	8.56
WRC 375100																				25.40	9.525	8.56



Grade Information



Ceramic Inserts

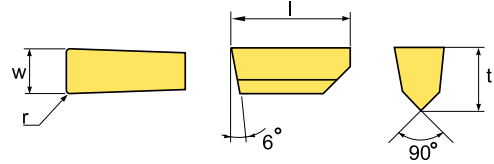


Tool Holders



Technical Information

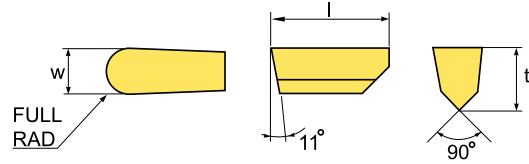
Roll Turning Insert

WFP

Type	Grades														Dimensions(mm)									
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW60	l	w	t	r	
WFP 094050-A																					12.70	2.388	4.75	0.40
WFP 094050-B																					12.70	2.388	4.75	0.80
WFP 125050-A																					12.70	3.175	4.75	0.40
WFP 125050-B																					12.70	3.175	4.75	0.80
WFP 156050-A																					12.70	3.962	4.75	0.40
WFP 156050-B																					12.70	3.962	4.75	0.80
WFP 187050-A																					12.70	4.750	4.75	0.40
WFP 187050-B																					12.70	4.750	4.75	0.80
WFP 218075-A																					19.05	5.537	6.35	0.40
WFP 218075-B																					19.05	5.537	6.35	0.80
WFP 250075-A																					19.05	6.350	6.35	0.40
WFP 250075-B																					19.05	6.350	6.35	0.80
WFP 250075-C																					19.05	6.350	6.35	1.20
WFP 281075-A																					19.05	7.137	6.35	0.40
WFP 281075-B																					19.05	7.137	6.35	0.80
WFP 281075-C																					19.05	7.137	6.35	1.20
WFP 312100-A																					25.40	7.925	8.56	0.40
WFP 312100-B																					25.40	7.925	8.56	0.80
WFP 312100-C																					25.40	7.925	8.56	1.20
WFP 312100-D																					25.40	7.925	8.56	1.60
WFP 344100-A																					25.40	8.738	8.56	0.40
WFP 344100-B																					25.40	8.738	8.56	0.80
WFP 344100-C																					25.40	8.738	8.56	1.20
WFP 344100-D																					25.40	8.738	8.56	1.60
WFP 375100-A																					25.40	9.525	8.56	0.40
WFP 375100-B																					25.40	9.525	8.56	0.80
WFP 375100-C																					25.40	9.525	8.56	1.20
WFP 375100-D																					25.40	9.525	8.56	1.60

Roll Turning Insert

WRP



Type	Grades																Dimensions (mm)					
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	l	w	t
WRP 094050																				12.70	2.388	4.75
WRP 125050																			○	12.70	3.175	4.75
WRP 156050																			○	12.70	3.962	4.75
WRP 187050																			○	12.70	4.750	4.75
WRP 218075																		○	○	19.05	5.537	6.35
WRP 250075																		○	○	19.05	6.350	6.35
WRP 281075																		○	○	19.05	7.137	6.35
WRP 312100																		○	○	25.40	7.925	8.56
WRP 344100																		○	○	25.40	8.738	8.56
WRP 375100																		○	○	25.40	9.525	8.56



Grade Information



Ceramic Inserts



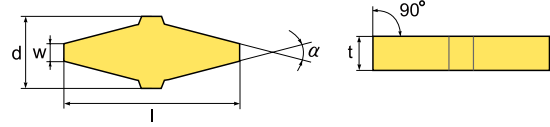
Tool Holders



Technical Information

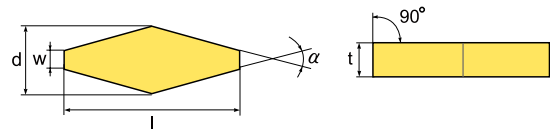
SPECIAL INSERT

SVW



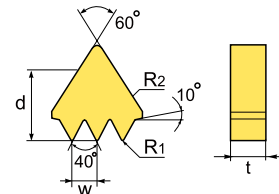
Type	Grades													Dimensions(mm)										
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	l	a	d	t	w
SVW 38260								○												26.00	38°	11.5	7.94	2.23
SVW 38320								○												32.00	38°	14.5	7.94	3.22
SVW 34400								○												40.00	34°	18.5	7.94	5.07

GVGN



Type	Grades													Dimensions(mm)										
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	l	a	d	t	w
GVGN 38320								○												32.00	38°	13.46	7.94	3.22
GVGN 38335								○												33.50	38°	13.28	8.00	3.06
GVGN 36340								○												34.00	36°	13.59	7.94	3.25
GVGN 38360								○												36.00	38°	17.38	7.94	5.98
GVGN 34360								○												36.00	34°	17.42	7.94	7.22

INGN



Type	Grades													Dimensions(mm)										
ISO	CAT10	CAT20	CAT30	CAT50	CAT90	CAT10C	CAT30C	CA20	CA30	CSN20	CSN30	CSN40	CSN50	CSN60	CSN80	CSN100	CSN40C	CW40	CW80	d	t	w	R ₁	R ₂
INGN 160435 F303								○												9.52	4.76	3.56	0.5	0.3
INGN 160435 F304								○												9.52	4.76	3.56	0.5	0.4
INGN 220435 F403								○												12.70	4.76	3.56	0.5	0.3
INGN 220435 F404								○												12.70	4.76	3.56	0.5	0.4

Code system 10~12p — ●: Stock item ○: Items in material

2525M12(43)

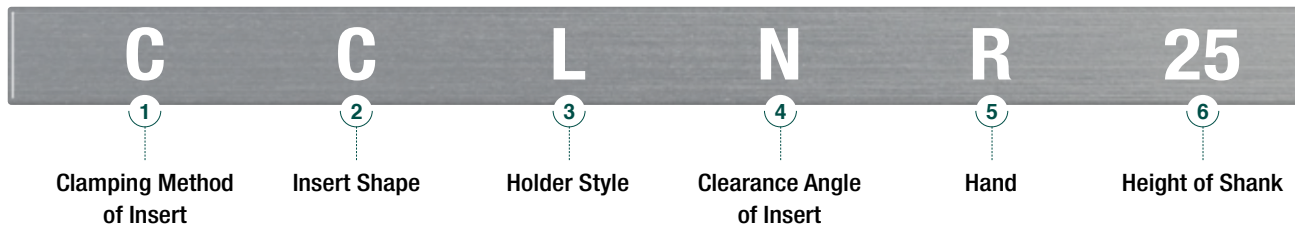
Part 3

Tool Holders

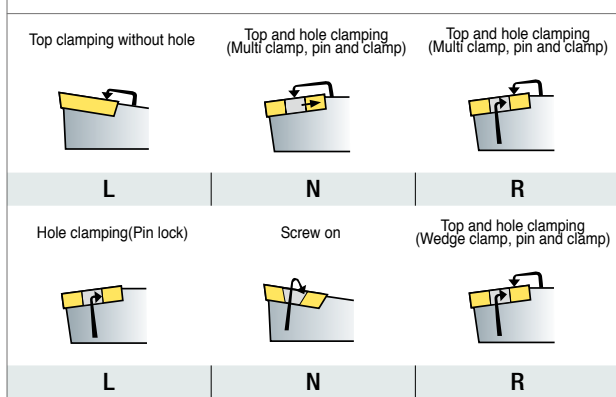
- 01 _ Code System
- 02 _ Application Index
- 03 _ External Toolholders



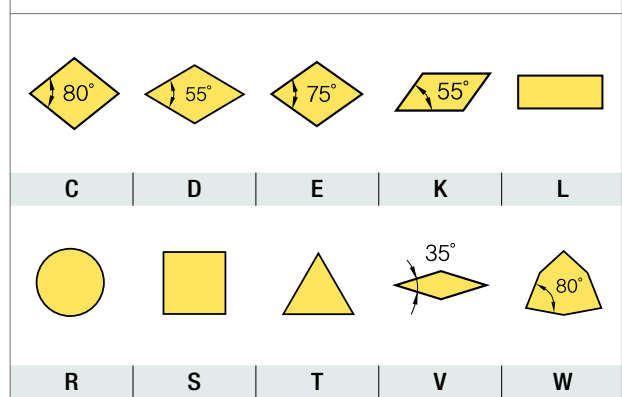
Code System - External Toolholders



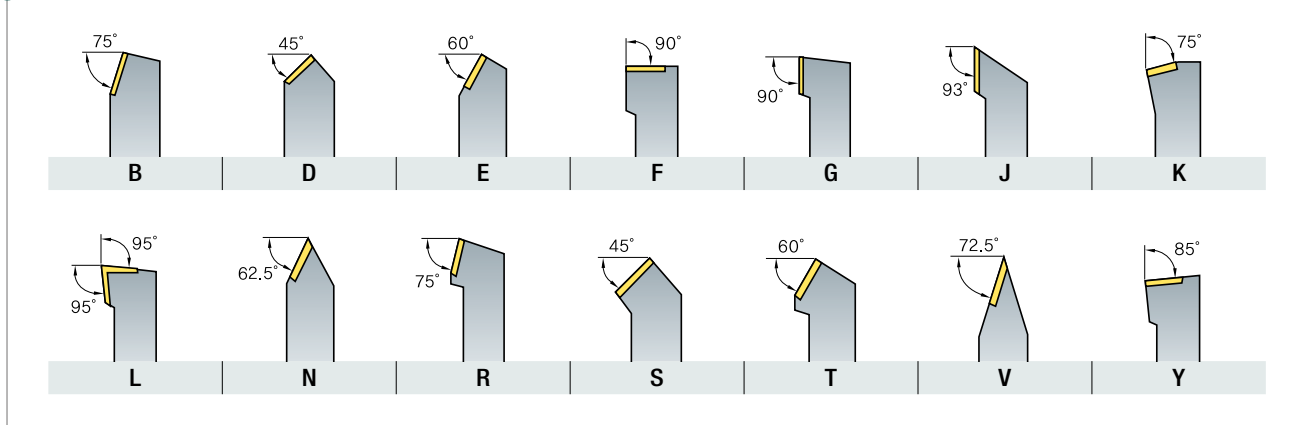
1 Clamping Method of Insert



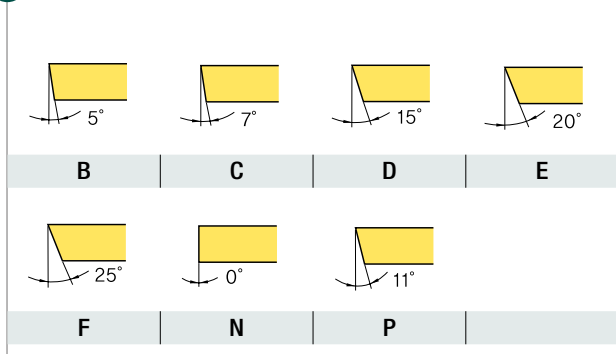
2 Insert Shape



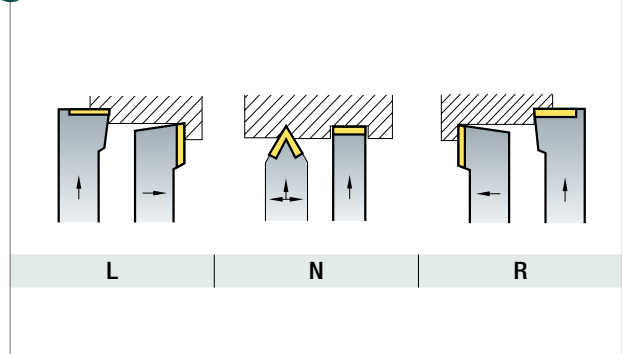
3 Insert Shape

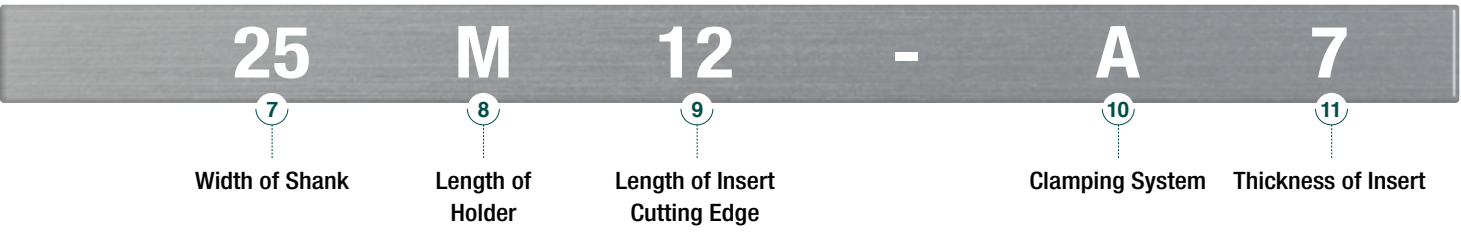


4 Clearance Angle of Insert



5 Hand





6 Height of Shank

7 Width of Shank

8 Length of Holder

A - 32	H - 100	Q - 180	X-Special Item
B - 40	J - 110	R - 200	
C - 50	K - 125	S - 250	
D - 60	L - 140	T - 300	
E - 70	M - 150	U - 350	
F - 80	N - 160	V - 400	
G - 90	P - 170	W - 450	

9 Length of Insert Cutting Edge

10 Clamping System

A type	X type	B type
+	+	+

11 Thickness of Insert

Index	S(mm)
3	3.18
4	4.76
6	6.35
7	7.94
9	9.52

Tool Holders - Index

CCLN

54p



CCBN

55p



CCKN

56p



CDHN

57p



CDJN

58p



CDNN

59p



CEFN

60p



CEGN

61p



CEJN

62p



CRDN

63p



CRGN

64p



CRDB

65p



CRDC

66p



CSBN

67p



CSDN

68p



CSKN

69p



CSRN

70p



CSSN

71p



CSYN

72p



CTFN

73p



CTGN

74p



CWLN

75p



CSRC

76p



CSSC

77p





Grade Information



Ceramic Inserts



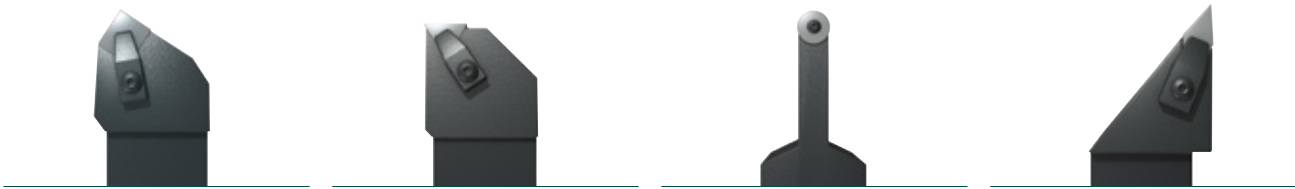
Tool Holders



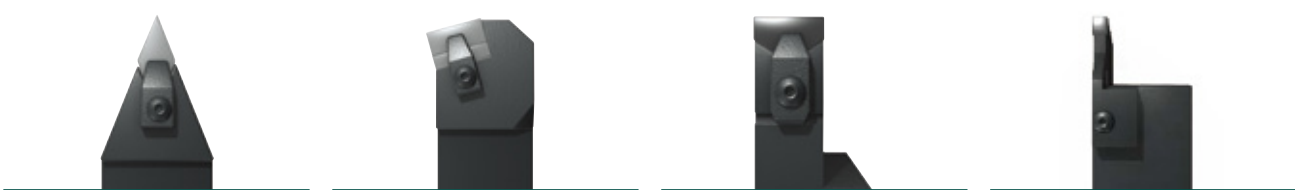
Technical Information

Tool Holders - Index

CSTP 78p **CTFP** 79p **HRC D** 80p **CVJN** 81p



CVVN 82p **CLKN** 83p **CFLN** 84p **CSBF** 85p



CSBR 86p **CSGF** 87p **CSGR** 88p **CSSF** 89p



CSSR 90p **CSSF..N** 91p **CWF/R** 92p **CSVN** 93p

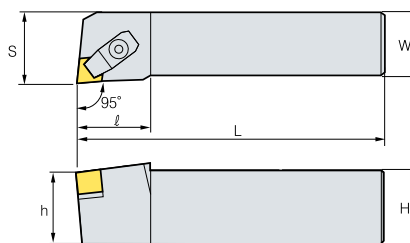
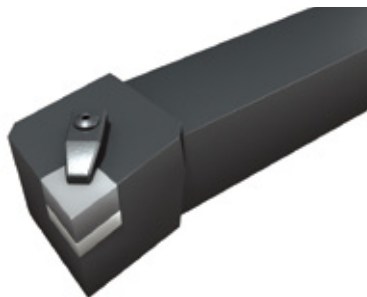


CGVN 94p **CINN** 95p



Tool Holders - External Toolholders

CCLN











(mm)

Designation	H(h)	W	L	Ø	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CCLNR/L 2525M12-A4	25	25	150	35	32	CNGN1204	UH1	SHCN4A	BM510	LW4
CCLNR/L 2525M12-A7	25	25	150	35	32	CNGN1207	UH1	SHCN4A	BM510	LW4
CCLNR/L 2525M12-X7	25	25	150	35	32	CNG(V)X1207	UH5	SHCN4A	BM510	LW4
CCLNR/L 3225P12-A4	32	25	170	35	32	CNGN1204	UH1	SHCN4A	BM510	LW4
CCLNR/L 3225P12-A7	32	25	170	35	32	CNGN1207	UH1	SHCN4A	BM510	LW4
CCLNR/L 3225P12-X7	32	25	170	35	32	CNG(V)X1207	UH5	SHCN4A	BM510	LW4
CCLNR/L 3225P16-X7	32	25	170	35	32	CNG(V)X1607	UH5	SHCN5A	FM510	LW4
CCLNR/L 3225P16-A7	32	25	170	35	32	CNGN1607	UH1	SHCN5A	FM510	LW4
CCLNR/L 4040S19-A7	40	40	250	60	50	CNGN1907	UH4	SHCN6A	FM615	LW6
CCLNR/L 5050T25-A9	50	50	300	65	60	CNGN2509	UH25	SHCN8	FM815	LW6

Available Inserts

CNGN	CNGX	CNVX
		
(16p)	(17p)	(17p)

Parts

Clamp & Clamp Screw				Shim	Shim Screw		Wrench
							
UH1	UH4	UH5	UH25	SHCN4A SHCN5A SHCN6A SHCN8	BM510	FM510 FM615 FM815	LW4 LW6



Grade Information

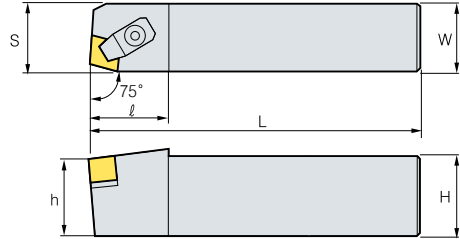


Ceramic Inserts

**Tool Holders**

Technical Information

External Toolholders

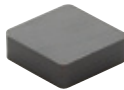
CCBN

(mm)

Designation	H(h)	W	L	ℓ	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CCBNR/L 2525M12-A4	25	25	150	35	22	CNGN1204	UH1	SHCN4A	BM510	LW4
CCBNR/L 2525M12-A7	25	25	150	35	22	CNGN1207	UH1	SHCN4A	BM510	LW4
CCBNR/L 2525M12-X7	25	25	150	35	22	CNG(V)X1207	UH5	SHCN4A	BM510	LW4
CCBNR/L 3225P12-A4	32	25	170	35	22	CNGN1204	UH1	SHCN4A	BM510	LW4
CCBNR/L 3225P12-A7	32	25	170	35	22	CNGN1207	UH1	SHCN4A	BM510	LW4
CCBNR/L 3225P12-X7	32	25	170	35	22	CNG(V)X1207	UH5	SHCN4A	BM510	LW4
CCBNR/L 3225P16-A7	32	25	170	35	27	CNG(V)X1607	UH1	SHCN5A	FM510	LW4
CCBNR/L 3225P16-X7	32	25	170	35	27	CNGN1607	UH5	SHCN5A	FM510	LW4
CCBNR/L 4040S19-A7	40	40	250	60	36	CNGN1907	UH4	SHCN6A	FM615	LW6
CCBNR/L 5050T25-A9	50	50	300	65	45	CNGN2509	UH25	SHCN8	FM815	LW6

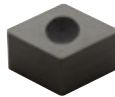
Available Inserts

CNGN



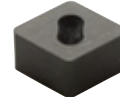
(16p)

CNGX



(17p)

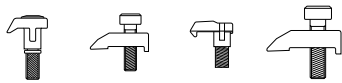
CNVX



(17p)

Parts

Clamp & Clamp Screw

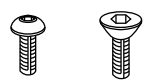


UH1 UH4 UH5 UH25

Shim

SHCN4A
SHCN5A
SHCN6A
SHCN8

Shim Screw

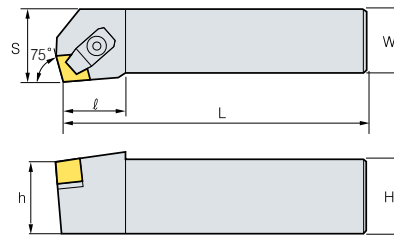
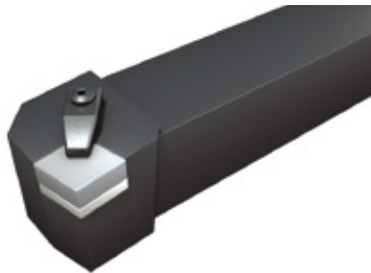
BM510 FM510
FM615
FM815

Wrench

LW4
LW6

External Toolholders

CCKN








(mm)

Designation	H(h)	W	L	Ø	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CCKNR/L 2525M12-A4	25	25	150	29	32	CNGN1204	UH1	SHCN4A	BM510	LW4
CCKNR/L 2525M12-A7	25	25	150	29	32	CNGN1207	UH1	SHCN4A	BM510	LW4
CCKNR/L 2525M12-X7	25	25	150	29	32	CNG(V)X1207	UH5	SHCN4A	BM510	LW4
CCKNR/L 3225P12-A4	32	25	170	29	32	CNGN1204	UH1	SHCN4A	BM510	LW4
CCKNR/L 3225P12-A7	32	25	170	29	32	CNGN1207	UH1	SHCN4A	BM510	LW4
CCKNR/L 3225P12-X7	32	25	170	29	32	CNG(V)X1207	UH5	SHCN4A	BM510	LW4

Available Inserts

CNGN	CNGX	CNVX
		
(16p)	(17p)	(17p)

Parts

Clamp & Clamp Screw		Shim	Shim Screw	Wrench
				
UH1	UH5	SHCN4A	BM510	LW4



Grade Information



Ceramic Inserts



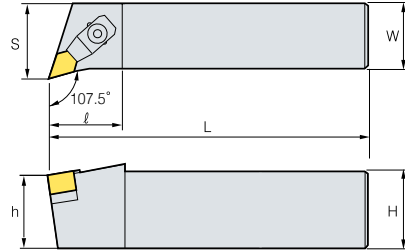
Tool Holders



Technical Information

External Toolholders

CDHN



(mm)

Designation	H(h)	W	L	ℓ	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CDHNR/L 2525M15-A4	25	25	150	33	32	DNGN1504	UH1	SHDN4A	BM510	LW4
CDHNR/L 2525M15-A7	25	25	150	33	32	DNGN1507	UH1	SHDN4A	BM510	LW4
CDHNR/L 2525M12-X7	25	25	150	30	32	DNGX1207	UH5	SHDN3A	TM3507	LW4
CDHNR/L 2525M15-X7	25	25	150	33	32	DNGX1507	UH5	SHDN4A	BM510	LW4
CDHNR/L 3225P15-A4	32	25	170	33	32	DNGN1504	UH1	SHDN4A	BM510	LW4
CDHNR/L 3225P15-A7	32	25	170	33	32	DNGN1507	UH1	SHDN4A	BM510	LW4
CDHNR/L 3225P12-X7	32	25	170	30	32	DNGX1207	UH5	SHDN3A	TM3507	LW4
CDHNR/L 3225P15-X7	32	25	170	33	32	DNGX1507	UH5	SHDN4A	BM510	LW4

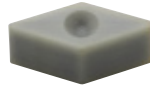
Available Inserts

DNGN



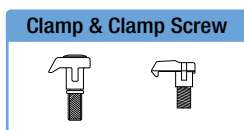
(21p)

DNGX



(21p)

Parts



UH1

UH5

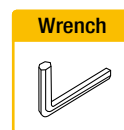


SHDN3A
SHDN4A



TM3507

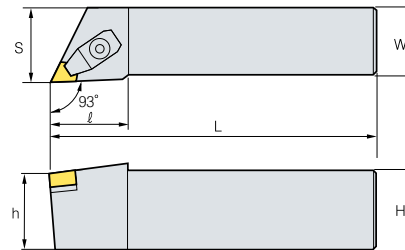
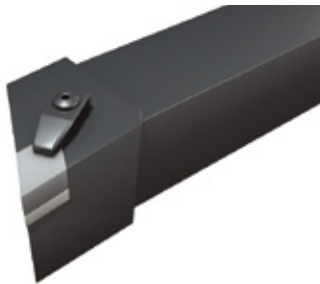
BM510



LW4

External Toolholders

CDJN



(mm)

Designation	H(h)	W	L	Ø	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CDJNR/L 2525M15-A4	25	25	150	38	32	DNGN1504	UH1	SHDN4A	BM510	LW4
CDJNR/L 2525M15-A7	25	25	150	38	32	DNGN1507	UH1	SHDN4A	BM510	LW4
CDJNR/L 2525M12-X7	25	25	150	38	32	DNGX1207	UH5	SHDN3A	TM3507	LW4
CDJNR/L 2525M15-X7	25	25	150	38	32	DNGX1507	UH5	SHDN4A	BM510	LW4
CDJNR/L 3225P15-A4	32	25	170	38	32	DNGN1504	UH1	SHDN4A	BM510	LW4
CDJNR/L 3225P15-A7	32	25	170	38	32	DNGN1507	UH1	SHDN4A	BM510	LW4
CDJNR/L 3225P12-X7	32	25	170	38	32	DNGX1207	UH5	SHDN3A	TM3507	LW4
CDJNR/L 3225P15-X7	32	25	170	38	32	DNGX1507	UH5	SHDN4A	BM510	LW4

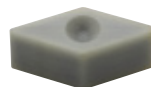
Available Inserts

DNGN



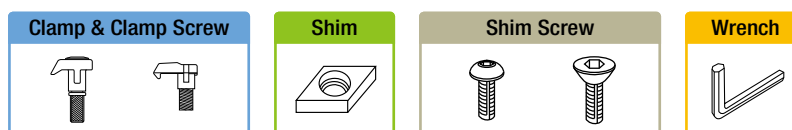
(21p)

DNGX



(21p)

Parts



UH1	UH5	SHDN3A SHDN4A	TM3507	BM510	LW4
-----	-----	------------------	--------	-------	-----



Grade Information



Ceramic Inserts



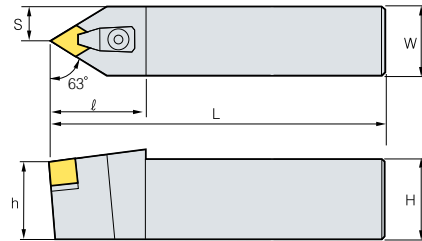
Tool Holders



Technical Information

External Toolholders

CDNN



(mm)

Designation	H(h)	W	L	l	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CDNNN 2525M15-A4	25	25	150	40	12.5	DNGN1504	UH1	SHDN4A	BM510	LW4
CDNNN 2525M15-A7	25	25	150	40	12.5	DNGN1507	UH1	SHDN4A	BM510	LW4
CDNNN 4025M15-A7	40	25	150	40	12.5	DNGN1507	UH1	SHDN4A	BM510	LW4

Available Inserts

DNGN



(21p)

Parts

Clamp & Clamp Screw



UH1

Shim



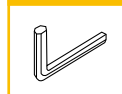
SHCN4A

Shim Screw



BM510

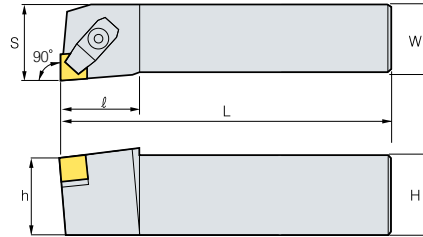
Wrench



LW4

External Toolholders

CEFN

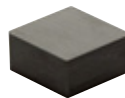


(mm)

Designation	H(h)	W	L	Ø	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CEFNR/L 2525M13-A7	25	25	150	29	32	ENGN1307	UH1	SHEN4A	BM510	LW4
CEFNR/L 3225P13-A7	32	25	170	29	32	ENGN1307	UH1	SHEN4A	BM510	LW4

Available Inserts

ENGN



(22p)

Parts



UH1

SHEN4A

BM510

LW4



Grade Information



Ceramic Inserts



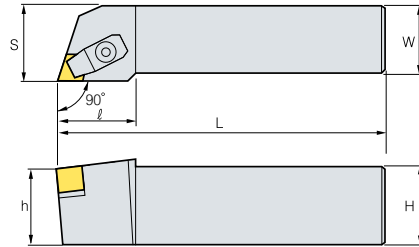
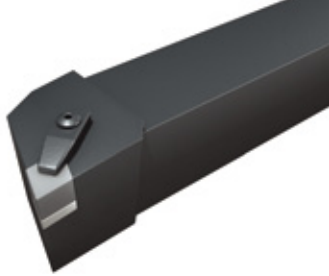
Tool Holders



Technical Information

External Toolholders

CEGN

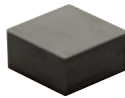


(mm)

Designation	H(h)	W	L	ℓ	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CEGNR/L 2525M13-A7	25	25	150	23	32	ENGN1307	UH1	SHEN4A	BM510	LW4
CEGNR/L 3225P13-A7	32	25	170	23	32	ENGN1307	UH1	SHEN4A	BM510	LW4

Available Inserts

ENGN



(22p)

Parts

Clamp & Clamp Screw



UH1

Shim



SHEN4A

Shim Screw



BM510

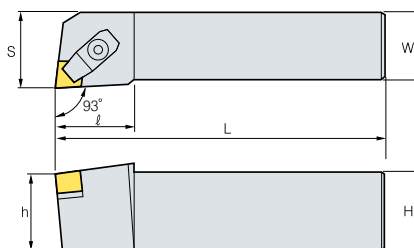
Wrench



LW4

External Toolholders

CEJN

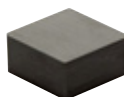


(mm)

Designation	H(h)	W	L	Ø	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CEJNR/L 2525M13-A7	25	25	150	30	32	ENGN1307	UH1	SHEN4A	BM510	LW4
CEJNR/L 3225P13-A7	32	25	170	30	32	ENGN1307	UH1	SHEN4A	BM510	LW4

Available Inserts

ENGN



(22p)

Parts



UH1

SHEN4A

BM510

LW4



Grade Information



Ceramic Inserts



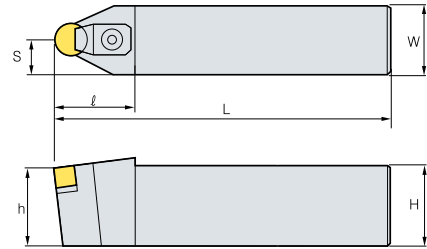
Tool Holders



Technical Information

External Toolholders

CRDN












(mm)

Designation	H(h)	W	L	l	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CRDNN 2525M09-A4	25	25	150	32	12.5	RNGN0904	UH1	SHRN3A	TM3507	LW4
CRDNN 2525M09-A7	25	25	150	32	12.5	RNGN0907	UH1	SHRN3A	TM3507	LW4
CRDNN 2525M12-A4	25	25	150	32	12.5	RNGN1204	UH1	SHRN4A	BM510	LW4
CRDNN 2525M12-A7	25	25	150	32	12.5	RNGN1207	UH1	SHRN4A	BM510	LW4
CRDNN 2525M12-X7	25	25	150	32	12.5	RNGX1207	UH5	SHRN4A	BM510	LW4
CRDNN 3225P12-A4	32	25	170	32	12.5	RNGN1204	UH1	SHRN4A	BM510	LW4
CRDNN 3225P12-A7	32	25	170	32	12.5	RNGN1207	UH1	SHRN4A	BM510	LW4
CRDNN 3225P12-X7	32	25	170	32	12.5	RNGX1207	UH5	SHRN4A	BM510	LW4
CRDNN 3225P15-A7	32	25	170	32	12.5	RNGN1507	UH1	SHRN5A	BM510	LW4
CRDNN 3225P19-A7	32	25	170	32	12.5	RNGN1907	UH4	SHRN6	FM512	LW6

Available Inserts

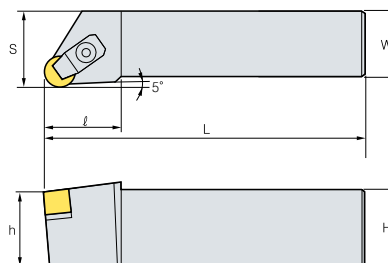
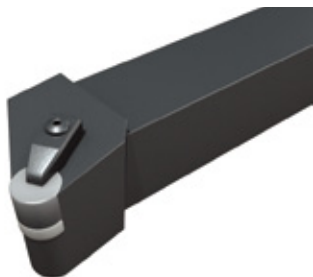
RNGN	RNGX .. DP
	
(23p)	(25p)

Parts

Clamp & Clamp Screw			Shim		Shim Screw			Wrench
								
UH1	UH4	UH5	SHRN3A SHRN4A SHRN5A	SHRN6	BM510	TM3507	FM512	LW4 LW6

External Toolholders

CRGN












(mm)

Designation	H(h)	W	L	Ø	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CRGNR/L 2525M09-A4	25	25	150	32	32	RNGN0904	UH1	SHRN3A	TM3507	LW4
CRGNR/L 2525M09-A7	25	25	150	32	32	RNGN0907	UH1	SHRN3A	TM3507	LW4
CRGNR/L 2525M12-A4	25	25	150	35	32	RNGN1204	UH1	SHRN4A	BM510	LW4
CRGNR/L 2525M12-A7	25	25	150	35	32	RNGN1207	UH1	SHRN4A	BM510	LW4
CRGNR/L 2525M12-X7	25	25	150	35	32	RNGX1207	UH5	SHRN4A	BM510	LW4
CRGNR/L 3225P12-A4	32	25	170	35	32	RNGN1204	UH1	SHRN4A	BM510	LW4
CRGNR/L 3225P12-A7	32	25	170	35	32	RNGN1207	UH1	SHRN4A	BM510	LW4
CRGNR/L 3225P12-X7	32	25	170	35	32	RNGX1207	UH5	SHRN4A	BM510	LW4
CRGNR/L 3225P15-A7	32	25	170	37	32	RNGN1507	UH1	SHRN5A	BM510	LW4
CRGNR/L 3225P19-A7	32	25	170	45	32	RNGN1907	UH4	SHRN6	FM512	LW6

Available Inserts

RNGN	RNGX .. DP
	
(23p)	(25p)

Parts

Clamp & Clamp Screw			Shim		Shim Screw			Wrench
								
UH1	UH4	UH5	SHRN3A SHRN4A SHRN5A	SHRN6	BM510	TM3507	FM512	LW4 LW6



Grade Information



Ceramic Inserts



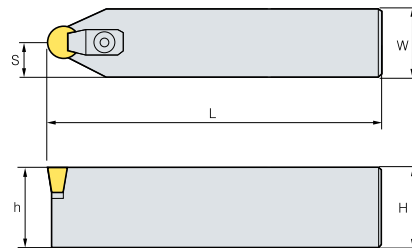
Tool Holders



Technical Information

External Toolholders

CRDB



(mm)

Designation	H(h)	W	L	S	Insert	Parts			
						Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CRDBN 2525M12-A	25	25	150	12.5	RBGX12T	UH1	SHRB12	SH3015	LW4
CRDBN 2525M16-A	25	25	150	12.5	RBGX16T	UH1	SHRB16	SH3515	LW4
CRDBN 3232P12-A	32	32	170	16	RBGX12T	UH1	SHRB12	SH3015	LW4
CRDBN 3232P16-A	32	32	170	16	RBGX16T	UH1	SHRB16	SH3515	LW4
CRDBN 3232P20-A	32	32	170	16	RBGX20T	UH4	SHRB20	SH5015	LW6
CRDBN 3232P26-A	32	32	170	16	RBGX26T	UH4	SHRB26	SH6015	LW6

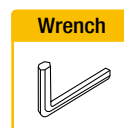
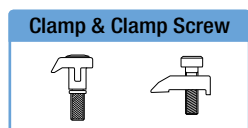
Available Inserts

RBGX



(38p)

Parts



UH1

UH4

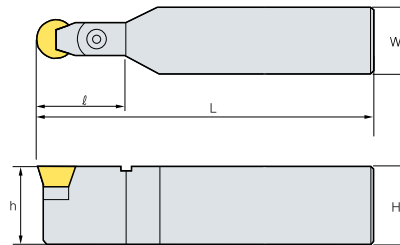
SHRB12
SHRB16
SHRB20
SHRB26

SH3015
SH3515
SH5015
SH6015

LW4
LW6

External Toolholders

CRDC



(mm)

Designation	H(h)	W	L	S	Insert	Parts			
						Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CRDCN 3225P06-A4	32	25	170	20	RCGX0604	CLRC6	SHRC102	FM210	LW3
CRDCN 3225P06-A6	32	25	170	20	RCGX0606	CLRC6	SHRC102	FM210	LW3
CRDCN 3225P06-A7	32	25	170	20	RCGX0607	CLRC6	SHRC102	FM210	LW3
CRDCN 3225P09-A7	32	25	170	20	RCGX0907	CLRC9	SHRC103	FM315	LW4
CRDCN 3225P12-A7	32	25	170	20	RCGX1207	UH1	SHRC104	FM415	LW4
CRDCN 5040T12-A7	50	40	300	30	RCGX1207	UH1	SHRC104	FM415	LW4
CRDCN 5040T15-A10	50	40	300	35	RCGX1510	UH1	SHRC105	FM415	LW4
CRDCN 5040T19-A10	50	40	300	45	RCGX1910	UH4	SHRC106	FM415	LW6
CRDCN 5040T25-A12	50	40	300	50	RCGX2512	UH25	SHRC108	FM615	LW6

Available Inserts

RCGX



(39p)

Parts



CLRC6	CLRC9	SHRC102	SHRC105	FM210	FM415	LW3
UH1	UH4	UH25	SHRC103	SHRC106	FM315	FM615
			SHRC104	SHRC108		LW4
						LW6



Grade Information



Ceramic Inserts



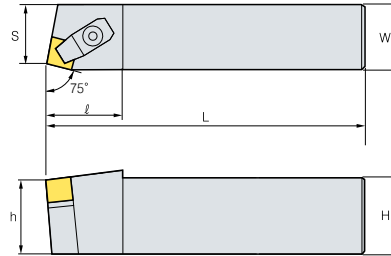
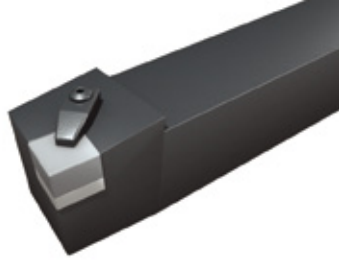
Tool Holders



Technical Information

External Toolholders

CSBN



(mm)

Designation	H(h)	W	L	ℓ	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CSBNR/L 2525M12-A4	25	25	150	34	22	SNGN1204	UH1	SHSN4A	BM510	LW4
CSBNR/L 2525M12-A7	25	25	150	34	22	SNGN1207	UH1	SHSN4A	BM510	LW4
CSBNR/L 2525M12-X7	25	25	150	34	22	SNGX1207	UH5	SHSN4A	BM510	LW4
CSBNR/L 2525M15-A7	25	25	150	34	22	SNGN1507	UH1	SHSN5A	FM512	LW4
CSBNR/L 2525M15-X7	25	25	150	40	22	SNGX1507	UH5	SHSN5A	FM512	LW4
CSBNR/L 3225P12-A7	32	25	170	34	22	SNGN1207	UH1	SHSN4A	BM510	LW4
CSBNR/L 3225P12-X7	32	25	170	34	22	SNGX1207	UH5	SHSN4A	BM510	LW4
CSBNR/L 3225P15-A7	32	25	170	40	22	SNGN1507	UH1	SHSN5A	FM512	LW4
CSBNR/L 3225P15-X7	32	25	170	40	22	SNGX1507	UH5	SHSN5A	FM512	LW4
CSBNR/L 4040S19-A7	40	40	250	54	35	SNGN1907	UH4	SHSN6A	FM612	LW6
CSBNR/L 5050T25-A9	50	50	300	65	45	SNGN2509	UH25	SHSN8	FM815	LW6

Available Inserts

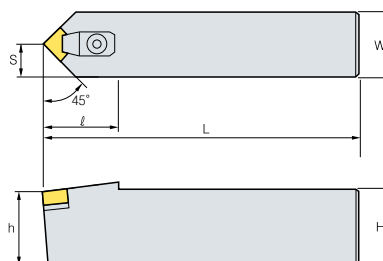
SNGN	SNGX
(28p)	(29p)

Parts

Clamp & Clamp Screw				Shim		Shim Screw		Wrench
UH1	UH4	UH5	UH25	SHSN4A SHSN5A	SHSN6A SHSN8	BM510	FM510 FM615 FM815	LW4 LW6

External Toolholders

CSDN












(mm)

Designation	H(h)	W	L	Ø	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CSDNN 2525M12-A4	25	25	150	35	12.5	SNGN1204	UH1	SHSN4A	BM510	LW4
CSDNN 2525M12-A7	25	25	150	35	12.5	SNGN1207	UH1	SHSN4A	BM510	LW4
CSDNN 2525M12-X7	25	25	150	35	12.5	SNGX1207	UH5	SHSN4A	BM510	LW4
CSDNN 2525M15-A7	25	25	150	38	12.5	SNGN1507	UH1	SHSN5A	FM512	LW4
CSDNN 2525M15-X7	25	25	150	38	12.5	SNGX1507	UH5	SHSN5A	FM512	LW4
CSDNN 3225P12-A7	32	25	170	35	12.5	SNGN1207	UH1	SHSN4A	BM510	LW4
CSDNN 3225P12-X7	32	25	170	35	12.5	SNGX1207	UH5	SHSN4A	BM510	LW4
CSDNN 3225P15-A7	32	25	170	38	12.5	SNGN1507	UH1	SHSN5A	FM512	LW4
CSDNN 3225P15-X7	32	25	170	38	12.5	SNGX1507	UH5	SHSN5A	FM512	LW4
CSDNN 4040S19-A7	40	40	250	60	20	SNGN1907	UH4	SHSN6A	FM612	LW6
CSDNN 5050T25-A9	50	50	300	60	25	SNGN2509	UH25	SHSN8	FM815	LW6

Available Inserts

SNGN	SNGX
	
(28p)	(29p)

Parts

Clamp & Clamp Screw				Shim		Shim Screw		Wrench
								
UH1	UH4	UH5	UH25	SHSN4A SHSN5A	SHSN6A SHSN8	BM510	FM512 FM612 FM815	LW4 LW6



Grade Information

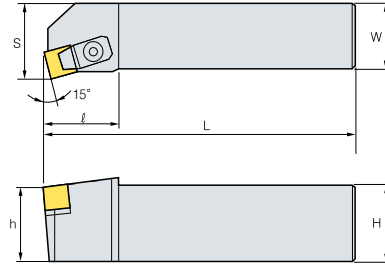
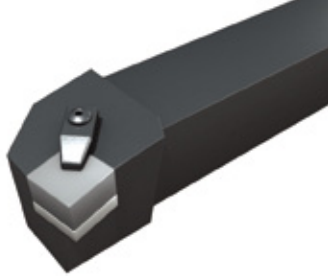


Ceramic Inserts

**Tool Holders**

Technical Information

External Toolholders

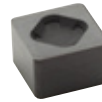
CSKN

(mm)

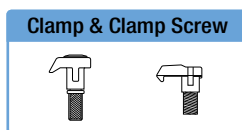
Designation	H(h)	W	L	l	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CSKNR/L 2525M12-A4	25	25	150	34	32	SNGN1204	UH1	SHSN4A	BM510	LW4
CSKNR/L 2525M12-A7	25	25	150	34	32	SNGN1207	UH1	SHSN4A	BM510	LW4
CSKNR/L 2525M12-X7	25	25	150	34	32	SNGX1207	UH5	SHSN4A	BM510	LW4
CSKNR/L 2525M15-A7	25	25	150	40	32	SNGN1507	UH1	SHSN5A	FM512	LW4
CSKNR/L 2525M15-X7	25	25	150	40	32	SNGX1507	UH5	SHSN5A	FM512	LW4
CSKNR/L 3225P12-A7	32	25	170	34	32	SNGN1207	UH1	SHSN4A	BM510	LW4
CSKNR/L 3225P12-X7	32	25	170	34	32	SNGX1207	UH5	SHSN4A	BM510	LW4
CSKNR/L 3225P15-A7	32	25	170	40	32	SNGN1507	UH1	SHSN5A	FM512	LW4
CSKNR/L 3225P15-X7	32	25	170	40	32	SNGX1507	UH5	SHSN5A	FM512	LW4

Available Inserts**SNGN**

(28p)

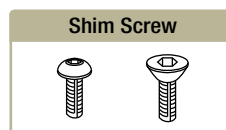
SNGX

(29p)

Parts

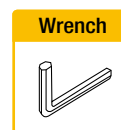
UH1

UH5

SHSN4A
SHSN5A

BM510

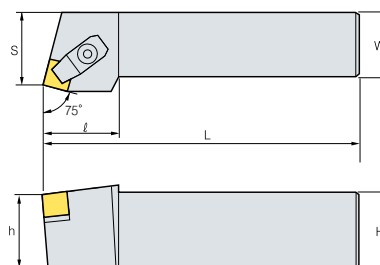
FM512



LW4

External Toolholders


CSRNR












(mm)

Designation	H(h)	W	L	Ø	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CSRNR/L 2525M12-A4	25	25	150	32	27	SNGN1204	UH1	SHSN4A	BM510	LW4
CSRNR/L 2525M12-A7	25	25	150	32	27	SNGN1207	UH1	SHSN4A	BM510	LW4
CSRNR/L 2525M12-X7	25	25	150	32	27	SNGX1207	UH5	SHSN4A	BM510	LW4
CSRNR/L 2525M15-A7	25	25	150	34	27	SNGN1507	UH1	SHSN5A	FM512	LW4
CSRNR/L 2525M15-X7	25	25	150	34	27	SNGX1507	UH5	SHSN5A	FM512	LW4
CSRNR/L 3225P12-A7	32	25	170	32	27	SNGN1207	UH1	SHSN4A	BM510	LW4
CSRNR/L 3225P12-X7	32	25	170	32	27	SNGX1207	UH5	SHSN4A	BM510	LW4
CSRNR/L 3225P15-A7	32	25	170	34	27	SNGN1507	UH1	SHSN5A	FM512	LW4
CSRNR/L 3225P15-X7	32	25	170	34	27	SNGX1507	UH5	SHSN5A	FM512	LW4
CSRNR/L 4040S19-A7	40	40	250	54	43	SNGN1907	UH4	SHSN6A	FM612	LW6
CSRNR/L 5050T25-A9	50	50	300	70	53	SNGN2509	UH25	SHSN8	FM815	LW6

Available Inserts

SNGN	SNGX
	
(28p)	(29p)

Parts

Clamp & Clamp Screw				Shim		Shim Screw		Wrench
								
UH1	UH4	UH5	UH25	SHSN4A SHSN5A	SHSN6A SHSN8	BM510	FM512 FM612 FM815	LW4 LW6



Grade Information



Ceramic Inserts



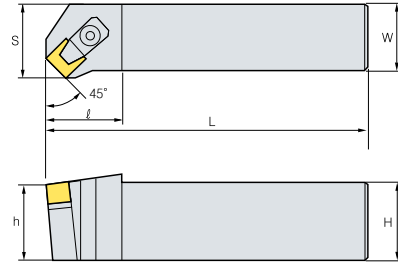
Tool Holders



Technical Information

External Toolholders

CSSN



(mm)

Designation	H(h)	W	L	ℓ	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CSSNR/L 2525M12-A4	25	25	150	35	32	SNGN1204	UH1	SHSN4A	BM510	LW4
CSSNR/L 2525M12-A7	25	25	150	35	32	SNGN1207	UH1	SHSN4A	BM510	LW4
CSSNR/L 2525M12-X7	25	25	150	35	32	SNGX1207	UH5	SHSN4A	BM510	LW4
CSSNR/L 2525M15-A7	25	25	150	37	32	SNGN1507	UH1	SHSN5A	FM512	LW4
CSSNR/L 2525M15-X7	25	25	150	37	32	SNGX1507	UH5	SHSN5A	FM512	LW4
CSSNR/L 3225P12-A7	32	25	170	35	32	SNGN1207	UH1	SHSN4A	BM510	LW4
CSSNR/L 3225P12-X7	32	25	170	35	32	SNGX1207	UH5	SHSN4A	BM510	LW4
CSSNR/L 3225P15-A7	32	25	170	37	32	SNGN1507	UH1	SHSN5A	FM512	LW4
CSSNR/L 3225P15-X7	32	25	170	37	32	SNGX1507	UH5	SHSN5A	FM512	LW4

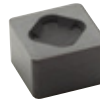
Available Inserts

SNGN



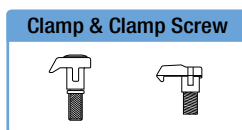
(28p)

SNGX



(29p)

Parts



UH1

UH5

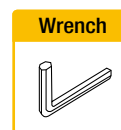


SHSN4A
SHSN5A



BM510

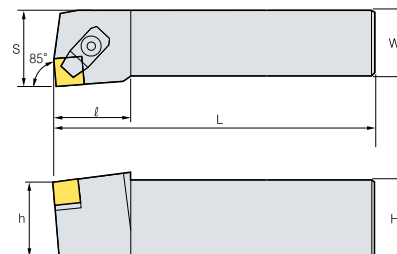
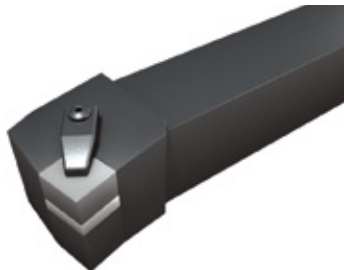
FM512



LW4

External Toolholders


CSYN









(mm)

Designation	H(h)	W	L	Ø	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CSYNR/L 2525M12-A4	25	25	150	27	32	SNGN1204	UH1	SHSN4A	BM510	LW4
CSYNR/L 2525M12-A7	25	25	150	27	32	SNGN1207	UH1	SHSN4A	BM510	LW4
CSYNR/L 2525M12-X7	25	25	150	27	32	SNGX1207	UH5	SHSN4A	BM510	LW4
CSYNR/L 2525M15-A7	25	25	150	27	32	SNGN1507	UH1	SHSN5A	FM512	LW4
CSYNR/L 2525M15-X7	25	25	150	27	32	SNGX1507	UH5	SHSN5A	FM512	LW4
CSYNR/L 3225P12-A7	32	25	170	27	32	SNGN1207	UH1	SHSN4A	BM510	LW4
CSYNR/L 3225P12-X7	32	25	170	27	32	SNGX1207	UH5	SHSN4A	BM510	LW4
CSYNR/L 3225P15-A7	32	25	170	27	32	SNGN1507	UH1	SHSN5A	FM512	LW4
CSYNR/L 3225P15-X7	32	25	170	27	32	SNGX1507	UH5	SHSN5A	FM512	LW4

Available Inserts

SNGN	SNGX
	
(28p)	(29p)

Parts

Clamp & Clamp Screw		Shim	Shim Screw		Wrench
					
UH1	UH5	SHSN4A SHSN5A	BM510	FM512	LW4



Grade Information



Ceramic Inserts



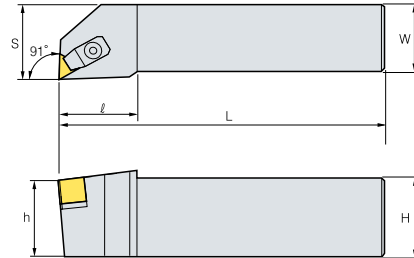
Tool Holders



Technical Information

External Toolholders

CTFN



(mm)

Designation	H(h)	W	L	l	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CTFNR/L 2525M16-A4	25	25	150	29	32	TNGN1604	UH1	SHTN3A	BM408	LW4
CTFNR/L 2525M16-A7	25	25	150	29	32	TNGN1607	UH1	SHTN3A	BM408	LW4
CTFNR/L 2525M22-A4	25	25	150	32	32	TNGN2204	UH1	SHTN4	FM410	LW4
CTFNR/L 2525M22-A7	25	25	150	32	32	TNGN2207	UH1	SHTN4	FM410	LW4
CTFNR/L 3225P16-A4	32	25	170	29	32	TNGN1604	UH1	SHTN3A	BM408	LW4
CTFNR/L 3225P16-A7	32	25	170	29	32	TNGN1607	UH1	SHTN3A	BM408	LW4
CTFNR/L 3225P22-A4	32	25	170	32	32	TNGN2204	UH1	SHTN4	FM410	LW4
CTFNR/L 3225P22-A7	32	25	170	32	32	TNGN2207	UH1	SHTN4	FM410	LW4

Available Inserts

TNGN



(32p)

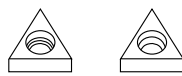
Parts

Clamp & Clamp Screw



UH1

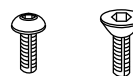
Shim



SHTN3A

SHTN4A

Shim Screw



BM408

FM410

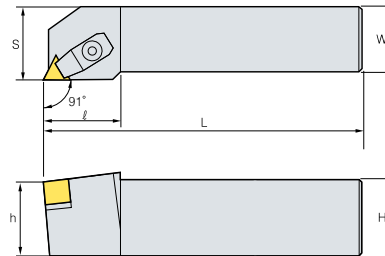
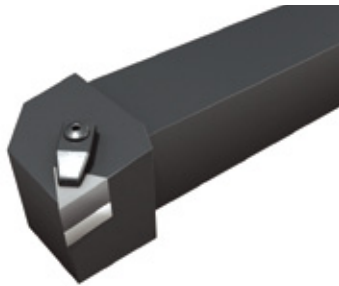
Wrench



LW4

External Toolholders

CTGN



(mm)

Designation	H(h)	W	L	Ø	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CTGNR/L 2525M16-A4	25	25	150	26	32	TNGN1604	UH1	SHTN3A	BM408	LW4
CTGNR/L 2525M16-A7	25	25	150	26	32	TNGN1607	UH1	SHTN3A	BM408	LW4
CTGNR/L 2525M22-A4	25	25	150	26	32	TNGN2204	UH1	SHTN4	FM410	LW4
CTGNR/L 2525M22-A7	25	25	150	26	32	TNGN2207	UH1	SHTN4	FM410	LW4
CTGNR/L 3225P16-A4	32	25	170	26	32	TNGN1604	UH1	SHTN3A	BM408	LW4
CTGNR/L 3225P16-A7	32	25	170	26	32	TNGN1607	UH1	SHTN3A	BM408	LW4
CTGNR/L 3225P22-A4	32	25	170	26	32	TNGN2204	UH1	SHTN4	FM410	LW4
CTGNR/L 3225P22-A7	32	25	170	26	32	TNGN2207	UH1	SHTN4	FM410	LW4

Available Inserts

TNGN

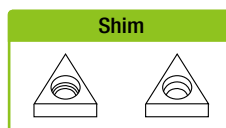


(32p)

Parts



UH1



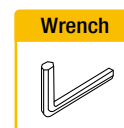
SHTN3A

SHTN4A



BM408

FM410



LW4



Grade Information



Ceramic Inserts



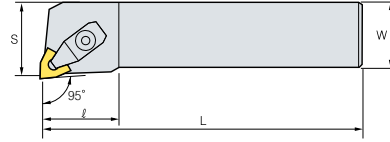
Tool Holders



Technical Information

External Toolholders

CWLN



(mm)

Designation	H(h)	W	L	ℓ	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CWLN/L 2525M08-X7	25	25	150	28	32	WNGX0807	UH5	SHWN4A	TM4010	LW4
CWLN/L 3225M08-X7	32	25	150	28	32	WNGX0807	UH5	SHWN4A	TM4010	LW4

Available Inserts

WNGX



(35p)

Parts

Clamp & Clamp Screw



UH5

Shim



SHWN4A

Shim Screw



TM4010

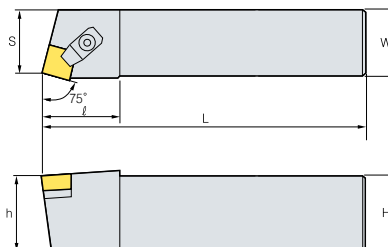
Wrench



LW4

External Toolholders

CSRC



(mm)

Designation	H(h)	W	L	Ø	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CSRCR/L 2525M12-A4	25	25	150	32	27	SCGN1204	UH1	SHSC4A	SP3	LW4
CSRCR/L 3225P12-A4	32	25	170	32	27	SCGN1204	UH1	SHSC4A	SP3	LW4

Available Inserts

SCGN



(30p)

Parts



UH1

SHSC4A

SP3

LW4



Grade Information



Ceramic Inserts



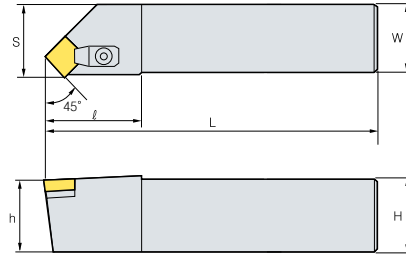
Tool Holders



Technical Information

External Toolholders

CSSC



(mm)

Designation	H(h)	W	L	ℓ	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CSSCR/L 2525M12-A4	25	25	150	35	32	SCGN1204	UH1	SHSC4A	SP3	LW4
CSSCR/L 2525M12-A6	25	25	150	35	32	SCGN1206	UH1	SHSC4A	SP3	LW4
CSSCR/L 3225P12-A4	32	25	170	35	32	SCGN1204	UH1	SHSC4A	SP3	LW4
CSSCR/L 3225P12-A6	32	25	170	35	32	SCGN1206	UH1	SHSC4A	SP3	LW4

Available Inserts

SCGN



(30p)

Parts

Clamp & Clamp Screw



UH1

Shim



SHSC4A

Shim Screw



SP3

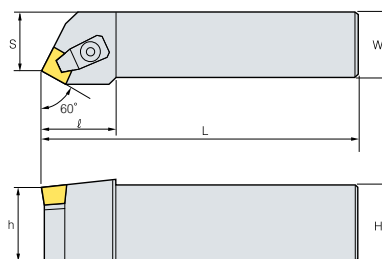
Wrench



LW4

External Toolholders

CSTP



(mm)

Designation	H(h)	W	L	Ø	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CSTPR/L 2020K09-A3	20	20	125	24	17	SPGN0903	UH1	SHSC3A	SP3	LW4
CSTPR/L 2020K12-A3	20	20	125	30	17	SPGN1203	UH1	SHSC4A	SP3	LW4
CSTPR/L 2020K12-A4	20	20	125	30	17	SPGN1204	UH1	SHSC4A	SP3	LW4
CSTPR/L 2525M12-A3	25	25	150	30	22	SPGN1203	UH1	SHSC4A	SP3	LW4
CSTPR/L 2525M12-A4	25	25	150	30	22	SPGN1204	UH1	SHSC4A	SP3	LW4

Available Inserts

SPGN



(31p)

Parts



UH1

SHSC3A
SHSC4A

SP3

LW4



Grade Information



Ceramic Inserts



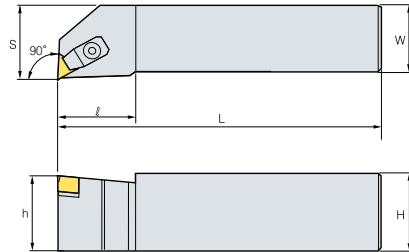
Tool Holders



Technical Information

External Toolholders

CTFP

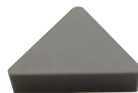


(mm)

Designation	H(h)	W	L	l	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CTFPR/L 2020K16-A3	20	20	125	20	25	TPGN1603	UH1	SHTC3A	SP3	LW4
CTFPR/L 2525M16-A3	25	25	150	20	32	TPGN1603	UH1	SHTC3A	SP3	LW4

Available Inserts

TPGN



(33p)

Parts

Clamp & Clamp Screw



UH1

Shim



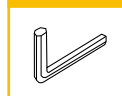
SHTC3A

Shim Screw



SP3

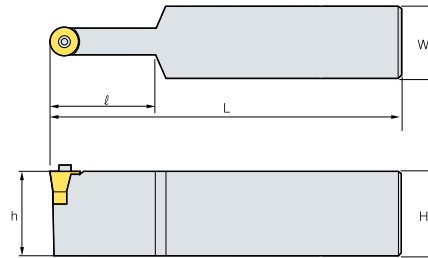
Wrench



LW3
LW4

External Toolholders

HRCD



(mm)

Designation	H(h)	W	L	S	Insert	Parts		
						Clamp & Clamp Screw	Shim	Wrench
HRCD 2525M12-B6	25	25	150	15	CDH1206	HB 2	SHCD22	LW2.5
HRCD 2525M19-B9	25	25	150	15	CDH1909	HB 3	SHCD33	LW5
HRCD 3225R19-B9	32	25	200	38	CDH1909	HB 3	SHCD33	LW5
HRCD 4035S19-B9	40	35	250	45	CDH1909	HB 3	SHCD33	LW5
HRCD 4035S32-B19	40	35	250	45	CDH3219	HB 5	SHCD53	LW6
HRCD 5050T32-B19	50	50	300	50	CDH3219	HB 5	SHCD53	LW6

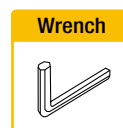
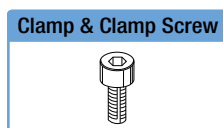
Available Inserts

CDH



(36p)

Parts



HB2
HB3
HB5

SHCD22
SHCD33
SHCD53

LW2.5
LW5
LW6



Grade Information



Ceramic Inserts



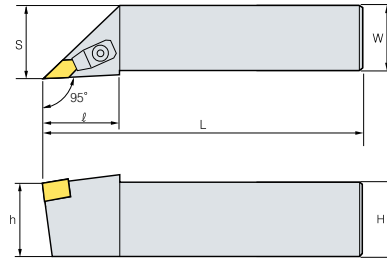
Tool Holders



Technical Information

External Toolholders

CVJN



(mm)

Designation	H(h)	W	L	ϕ	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CVJNR/L 2525M16-A4	25	25	150	41	32	VNGN1604	SM4	SHVN3A	TM412	LW4
CVJNR/L 2525M16-X7	25	25	150	41	32	VNGX1607	SM4	SHVN3A	TM412	LW4
CVJNR/L 3225P16-X7	32	25	170	41	32	VNGX1607	SM4	SHVN3A	TM412	LW4

Available Inserts

VNGN



(34p)

VNGX



(35p)

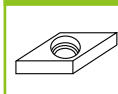
Parts

Clamp & Clamp Screw



SM4

Shim



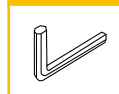
SHVN3A

Shim Screw



TM412

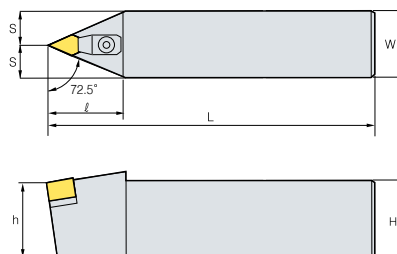
Wrench



LW4

External Toolholders

CVVN



(mm)

Designation	H(h)	W	L	Ø	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CVVNN 2525M16-X7	25	25	150	45	12.5	VNGX1607	SM4	SHVN3A	TM412	LW4
CVVNN 3225P16-X7	32	25	170	45	12.5	VNGX1607	SM4	SHVN3A	TM412	LW4

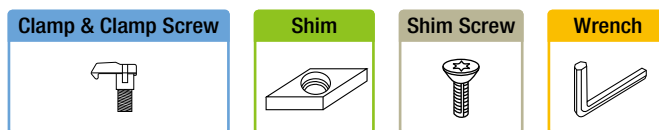
Available Inserts

VNGX



(35p)

Parts



SM4

SHVN3A

TM412

LW4



Grade Information



Ceramic Inserts



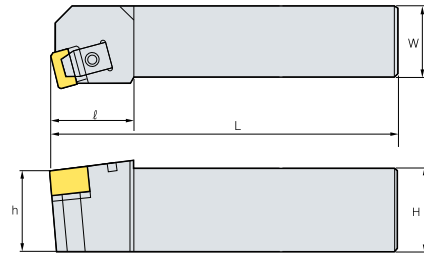
Tool Holders



Technical Information

External Toolholders

CLKN



(mm)

Designation	H(h)	W	L	S	Insert	Parts			
						Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CLKNR/L 6060V65-A	60	60	400	70	LNJ6588	UH25	SHLJ65	BM510	LW6
CLKNR/L 6060V66-A	60	60	400	70	LNJ6688	UH25	SHLJ66	BM510	LW6

Available Inserts

LNJ



(37p)

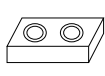
Parts

Clamp & Clamp Screw



UH25

Shim



SHLJ65
SHLJ66

Shim Screw



BM510

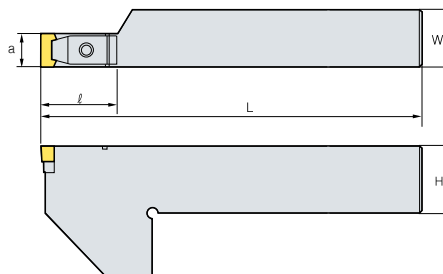
Wrench



LW6

External Toolholders

CFLN



(mm)

Designation	H(h)	W	L	ℓ	S	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CFLNN 6060U44-A	14	60	60	350	80	F10537	UH25	SHF10	BM510	LW6
CFLNN 5050T32-A	12	50	50	300	75	F13941	UH25	SHF13	BM510	LW6
CFLNN 4040R25-A	7	40	40	200	40	F250723	UH4	SHF25	BM510	LW4

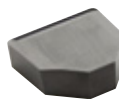
Available Inserts

F-Series



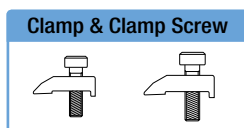
(36p)

F-Series



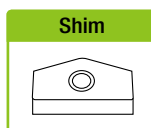
(37p)

Parts



UH4

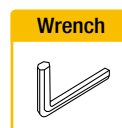
UH25



SHF10
SHF13
SHF25



BM510



LW6



Grade Information

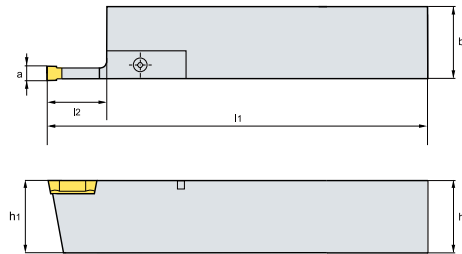


Ceramic Inserts

**Tool Holders**

Technical Information

External Toolholders

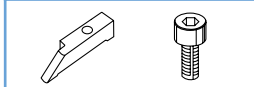
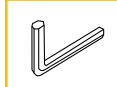
CSBF

(mm)

Type	Dimensions (mm)					Insert	Parts	
	a	H(h ₁)	b	l ₁	l ₂		Clamp & Clamp Screw	Wrench
CSBF 5040P3228R/L	3.18	50	40	170	19	SYBF3228	SGD3 / BM518	LW3
CSBF 5040P4828R/L	4.78	50	40	170	19	SYBF4828	SGD4 / BM518	LW4
CSBF 5040P5528R/L	5.54	50	40	170	19	SYBF5528	SGD4 / BM518	LW4
CSBF 5040P6428R/L	6.35	50	40	170	19	SYBF6428	SGD6 / BM618	LW4
CSBF 5040P7928R/L	7.93	50	40	170	19	SYBF7928	SGD6 / BM618	LW4
CSBF 5040P9528R/L	9.52	50	40	170	19	SYBF9528	SGD9 / BM1018	LW5

Available Inserts**SYBF**

(40p)

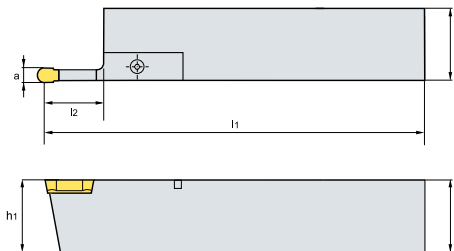
Parts**Clamp & Clamp Screw****Wrench**

SGD3	BM518
SGD4	BM618
SGD6	BM1018
SGD9	

LW3
LW4
LW5

External Toolholders

CSBR



(mm)

Type	Dimensions (mm)					Insert	Parts	
	a	H(h ₁)	b	l ₁	l ₂		Clamp & Clamp Screw	Wrench
CSBF 5040P3228R/L	3.18	50	40	170	19	SYBR3228	SGD3 / BM518	LW3
CSBF 5040P4828R/L	4.78	50	40	170	19	SYBR4828	SGD4 / BM518	LW4
CSBF 5040P5528R/L	5.54	50	40	170	19	SYBR5528	SGD4 / BM518	LW4
CSBF 5040P6428R/L	6.35	50	40	170	19	SYBR6428	SGD6 / BM618	LW4
CSBF 5040P7928R/L	7.93	50	40	170	19	SYBR7928	SGD6 / BM618	LW4
CSBF 5040P9528R/L	9.52	50	40	170	19	SYBR9528	SGD9 / BM1018	LW5

Available Inserts

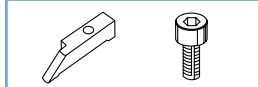
SYBR



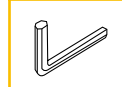
(40p)

Parts

Clamp & Clamp Screw



Wrench



SGD3 BM518
 SGD4 BM618
 SGD6 BM1018
 SGD9

LW3
 LW4
 LW5



Grade Information

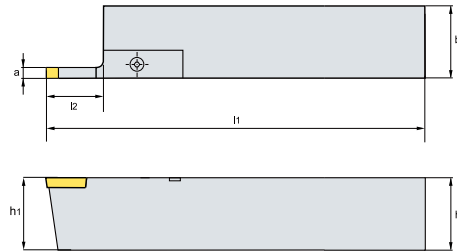


Ceramic Inserts

**Tool Holders**

Technical Information

External Toolholders

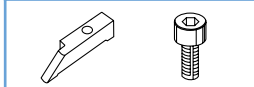
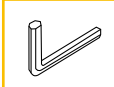
CSGF

(mm)

Type	Dimensions (mm)					Insert	Parts	
	a	H(h ₁)	b	l ₁	l ₂		Clamp & Clamp Screw	Wrench
CSGF 3225P4012R/L	4.0	32	25	170	19	SGF4012	SGL4 / BM518	LW3
CSGF 3225P5012R/L	5.0	32	25	170	19	SGF5012	SGL5 / BM518	LW4
CSGF 3225P6015R/L	6.0	32	25	170	19	SGF6015	SGL5 / BM518	LW4
CSGF 3225P7015R/L	7.0	32	25	170	19	SGF7015	SGL7 / BM618	LW5
CSGF 3225P8015R/L	8.0	32	25	170	19	SGF8015	SGL8 / BM618	LW5
CSGF 3225P1015R/L	10.0	32	25	170	19	SGF1015	SGL8 / BM618	LW5

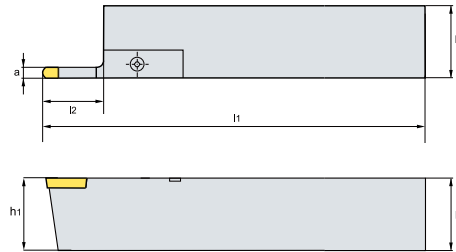
Available Inserts**SGF**

(41p)

Parts**Clamp & Clamp Screw****Wrench**SGL4
SGL5
SGL7
SGL8BM518
BM618LW3
LW4
LW5

External Toolholders

CSGR



(mm)

Type	Dimensions (mm)					Insert	Parts	
	a	H(h ₁)	b	l ₁	l ₂		Clamp & Clamp Screw	Wrench
CSGR 3225P4012R/L	4.0	32	25	170	19	SGR4012	SGL4 / BM518	LW3
CSGR 3225P5012R/L	5.0	32	25	170	19	SGR5012	SGL5 / BM518	LW4
CSGR 3225P6015R/L	6.0	32	25	170	19	SGR6015	SGL5 / BM518	LW4
CSGR 3225P7015R/L	7.0	32	25	170	19	SGR7015	SGL7 / BM618	LW5
CSGR 3225P8015R/L	8.0	32	25	170	19	SGR8015	SGL8 / BM618	LW5
CSGR 3225P1015R/L	10.0	32	25	170	19	SGR1015	SGL8 / BM618	LW5

Available Inserts

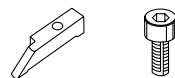
SGR



(41p)

Parts

Clamp & Clamp Screw



Wrench



SGL4 BM518
 SGL5 BM618
 SGL7
 SGL8

LW3
 LW4
 LW5



Grade Information

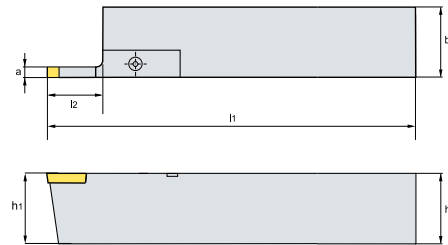


Ceramic Inserts

**Tool Holders**

Technical Information

External Toolholders

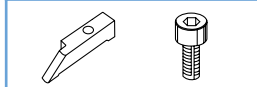
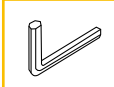
CSSF

(mm)

Type	Dimensions (mm)					Insert	Parts	
	a	H(h ₁)	b	l ₁	l ₂		Clamp & Clamp Screw	Wrench
CSSF 3225P4012R/L	4.0	32	25	170	19	SSF4012	SGL4 / BM518	LW3
CSSF 3225P5012R/L	5.0	32	25	170	19	SSF5012	SGL5 / BM518	LW4
CSSF 3225P6015R/L	6.0	32	25	170	19	SSF6015	SGL5 / BM518	LW4
CSSF 3225P7015R/L	7.0	32	25	170	19	SSF7015	SGL7 / BM618	LW5
CSSF 3225P8015R/L	8.0	32	25	170	19	SSF8015	SGL8 / BM618	LW5
CSSF 3225P1015R/L	10.0	32	25	170	19	SSF1015	SGL8 / BM618	LW5

Available Inserts**SSF**

(42p)

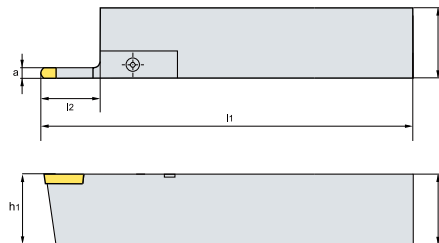
Parts**Clamp & Clamp Screw****Wrench**

SGL4	BM518
SGL5	BM618
SGL7	
SGL8	

LW3
LW4
LW5

External Toolholders

CSSR



(mm)

Type	Dimensions (mm)					Insert	Parts	
	a	H(h ₁)	b	l ₁	l ₂		Clamp & Clamp Screw	Wrench
CSSR 3225P4012R/L	4.0	32	25	170	19	SSR4012	SGL4 / BM518	LW3
CSSR 3225P5012R/L	5.0	32	25	170	19	SSR5012	SGL5 / BM518	LW4
CSSR 3225P6015R/L	6.0	32	25	170	19	SSR6015	SGL5 / BM518	LW4
CSSR 3225P7015R/L	7.0	32	25	170	19	SSR7015	SGL7 / BM618	LW5
CSSR 3225P8015R/L	8.0	32	25	170	19	SSR8015	SGL8 / BM618	LW5
CSSR 3225P1015R/L	10.0	32	25	170	19	SSR1015	SGL8 / BM618	LW5

Available Inserts

SSR



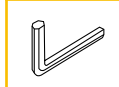
(42p)

Parts

Clamp & Clamp Screw



Wrench



SGL4 BM518
 SGL5 BM618
 SGL7
 SGL8

LW3
 LW4
 LW5



Grade Information



Ceramic Inserts



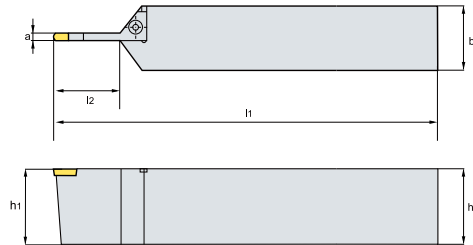
Tool Holders



Technical Information

External Toolholders

CSSR .. N



(mm)

Type	Dimensions (mm)					Insert	Parts	
	a	H(h ₁)	b	l ₁	l ₂		Clamp & Clamp Screw	Wrench
CSSR 4040R4012.N5	4.0	40	40	200	5	SSR4012	GRW4012 / BM518	LW3
CSSR 5040P4012.N19	4.0	50	40	170	19	SSR4012	GRW4012 / BM518	LW3

Available Inserts

SSR



(42p)

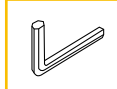
Parts

Clamp & Clamp Screw



GRW4012 BM518

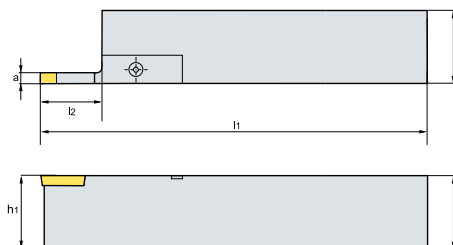
Wrench



LW4

External Toolholders

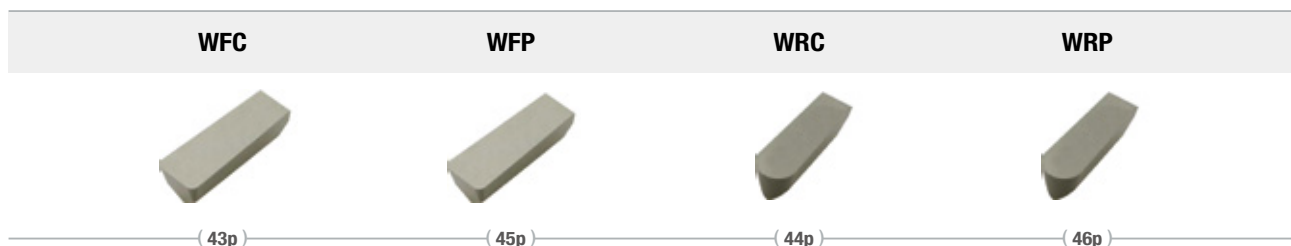
CWF/R



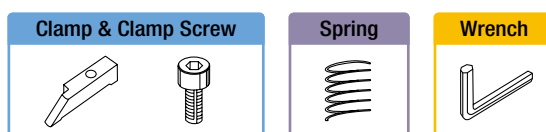
(mm)

Type	Dimensions (mm)					Insert		Parts		
	a	H(h _i)	b	l ₁	l ₂			Clamp & Clamp Screw	Spring	Wrench
CWF/R 2525M094050R/L	2.3	25	25	150	19	WFP094050 WFC094050	WRP094050 WRC094050	WGL2.3 R/L & WCB6	WCS6	LW5
CWF/R 2525M125050R/L	3.1	25	25	150	19	WFP125050 WFC125050	WRP125050 WRC125050	WGL3.1 R/L & WCB6	WCS6	LW5
CWF/R 2525M156050R/L	3.9	25	25	150	19	WFP156050 WFC156050	WRP156050 WRC156050	WGL3.9 R/L & WCB6	WCS6	LW5
CWF/R 2525M187050R/L	4.7	25	25	150	19	WFP187050 WFC187050	WRP187050 WRC187050	WGL4.7 R/L & WCB6	WCS6	LW5
CWF/R 2525M218075R/L	5.5	25	25	150	29	WFP218075 WFC218075	WRP218075 WRC218075	WGL5.5 R/L & WCB6	WCS6	LW5
CWF/R 2525M250075R/L	6.3	25	25	150	29	WFP250075 WFC250075	WRP250075 WRC250075	WGL6.3 R/L & WCB6	WCS6	LW5
CWF/R 2525M281075R/L	7.1	25	25	150	29	WFP281075 WFC281075	WRP281075 WRC281075	WGL7.1 R/L & WCB6	WCS6	LW5
CWF/R 2525M312100R/L	7.9	25	25	150	38	WFP312100 WFC312100	WRP312100 WRC312100	WGL7.9 R/L & WCB6	WCS6	LW5
CWF/R 2525M344100R/L	8.7	25	25	150	38	WFP344100 WFC344100	WRP344100 WRC344100	WGL8.7 R/L & WCB6	WCS6	LW5
CWF/R 2525M375100R/L	9.5	25	25	150	38	WFP375100 WFC375100	WRP375100 WRC375100	WGL9.5 R/L & WCB6	WCS6	LW5

Available Inserts



Parts



WGL2.3 R/L ~WGL9.5 R/L	WCB6	WCS6	LW5
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Grade Information



Ceramic Inserts



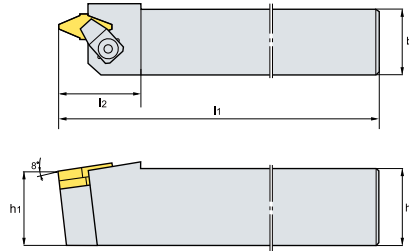
Tool Holders



Technical Information

External Toolholders

CSVN



(mm)

Designation	H(h ₁)	b	l ₁	l ₂	Insert	Parts			
						Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CSVNN 3232P38-A7-26	32	32	170	38	SVW38260	UH1	SHSV3826	FM510	LW4
CSVNN 3232P38-A7-32	32	32	170	40	SVW38320	UH1	SHSV3832	FM510	LW4
CSVNN 3232P34-A7-40	32	32	170	50	SVW34400	UH1	SHSV3440	FM510	LW4

Available Inserts

SVW



(47p)

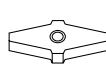
Parts

Clamp & Clamp Screw



UH1

Shim



SHSV3826
SHSV3832
SHSV3440

Shim Screw



FM510

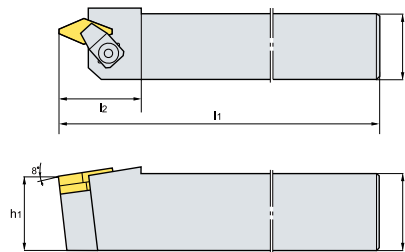
Wrench



LW4

External Toolholders

CGVN



(mm)

Designation	H(h ₁)	b	l ₁	l ₂	Insert	Parts			
						Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CGVNN 3232P38-A7-32	32	32	170	48	GVGN38320	UH1	SHGV3832	FM510	LW4
CGVNN 3232P38-A7-33	32	32	170	46	GVGN38335	UH1	SHGV3833	FM510	LW4
CGVNN 3232P36-A7-34	32	32	170	49	GVGN36340	UH1	SHGV3634	FM510	LW4
CGVNN 3232P38-A7-36	32	32	170	44	GVGN38360	UH1	SHGV3836	FM510	LW4
CGVNN 3232P34-A7-36	32	32	170	44	GVGN34360	UH1	SHGV3436	FM510	LW4

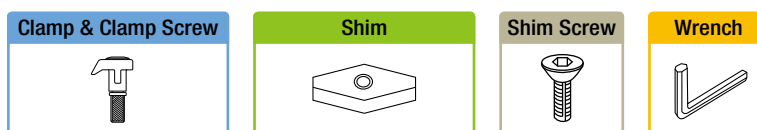
Available Inserts

GVGN



(47p)

Parts



UH1

SHGV3832 SHGV3836
SHGV3833 SHGV3436
SHGV3634

FM510

LW4



Grade Information



Ceramic Inserts



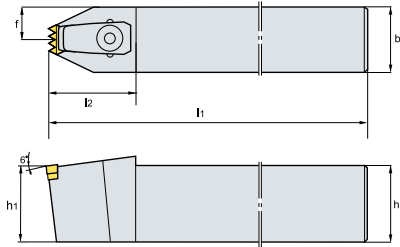
Tool Holders



Technical Information

External Toolholders

CINN



(mm)

Designation	H(h ₁)	b	l ₁	l ₂	f	Insert	Parts			
							Clamp & Clamp Screw	Shim	Shim Screw	Wrench
CINNN 2525M09-A4-F3	25	25	150	30	12.5	INGN160435F3	UH1	SHIN33F3	TM3008	LW4
CINNN 2525M12-A4-F4	25	25	150	34	12.5	INGN220435F4	UH1	SHIN43F4	TM4010	LW4
CINNN 3225P09-A4-F3	32	25	170	30	12.5	INGN160435F3	UH1	SHIN33F3	TM3008	LW4
CINNN 3225P12-A4-F4	32	25	170	34	12.5	INGN220435F4	UH1	SHIN43F4	TM4010	LW4

Available Inserts

INGN



(47p)

Parts

Clamp & Clamp Screw



UH1

Shim



SHIN33F3

Shim Screw



TM3008
TM4010

Wrench



LW4

Part 4

Technical Information

- 01 _ Test Results
- 02 _ Trouble Shooting
- 03 _ Hardness Calculating Table
- 04 _ Grade Comparison
- 05 _ The Comparison of Workpiece





Grade Information



Ceramic Inserts



Tool Holders

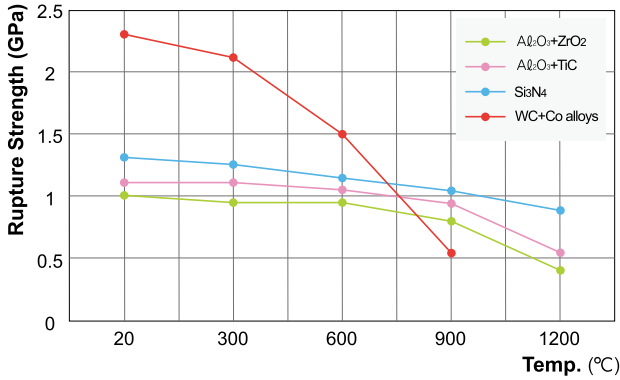


Technical Information

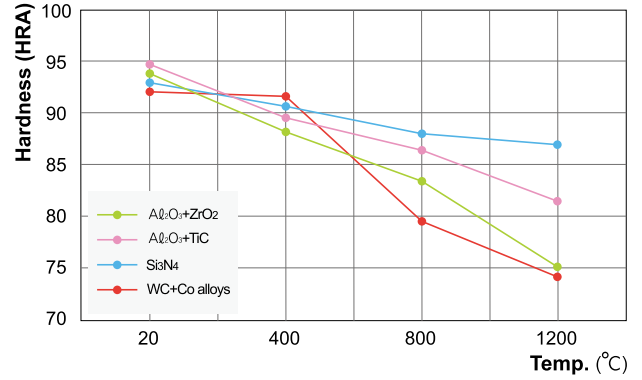
Technical Information

Test Results

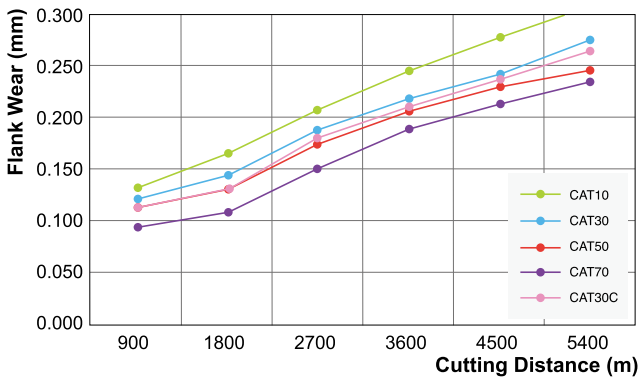
High Temperature Strength



Hardness vs Temperature

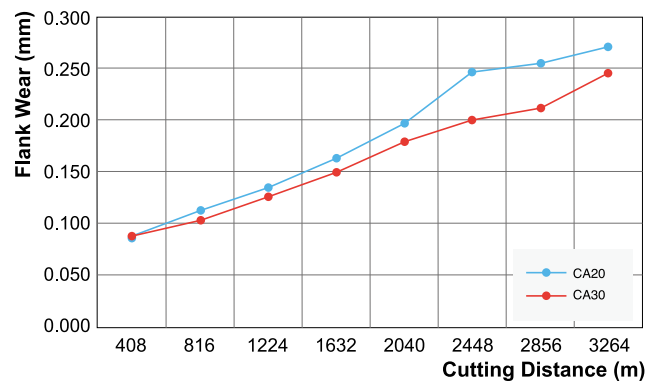


Flank Wear vs Cutting Distance



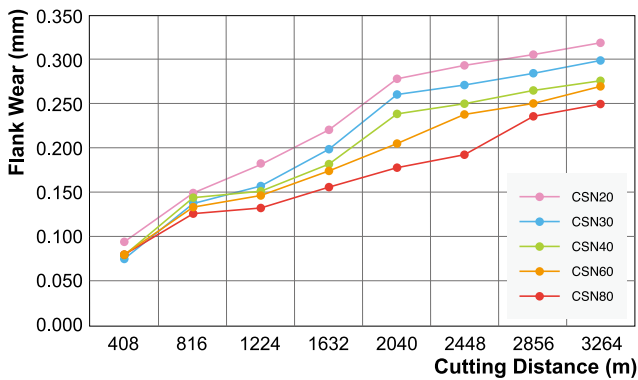
Cutting Condition

Workpiece : 100CrMoV5(H_RC>65)
 vc : 150m/min fn : 0.15mm/rev ap : 0.3mm
 Insert : SNGN 120412 E040



Cutting Condition

Workpiece : GG25(H_RC>45)
 vc : 500m/min fn : 0.5mm/rev ap : 1.2mm
 Insert : SNGN 120412 E040

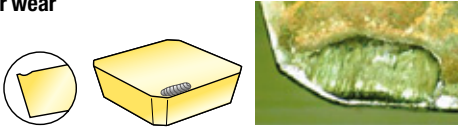
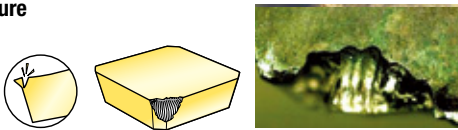


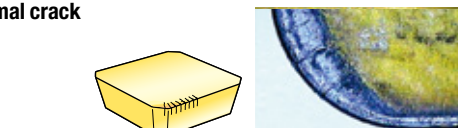

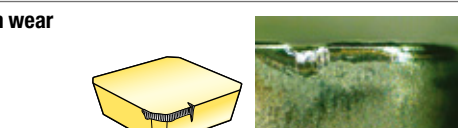
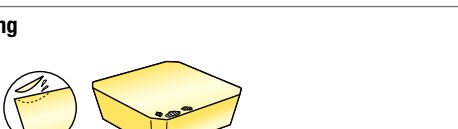

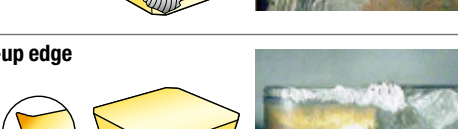


Cutting Condition

Workpiece : FC-25(H_RC>45)
 vc : 800m/min fn : 0.5mm/rev ap : 2.0mm
 Insert : CNGN 120412 E040

Technical Information

🔍 Trouble shooting

Tool failure	Cause	Solution
Crater wear 	<ul style="list-style-type: none"> • Improper grade • Excessive cutting condition 	<ul style="list-style-type: none"> • Choose harder grade • Decrease cutting condition
Fracture 	<ul style="list-style-type: none"> • Improper grade • Excessive feed • Shorten cutting edge strength • Insufficient rigidity of holder 	<ul style="list-style-type: none"> • Choose tougher grade • Decrease feed • Apply to large honed or chamfered edge • Choose bigger size holder
Plastic deformation 	<ul style="list-style-type: none"> • Improper grade • Excessive cutting condition • High cutting temperature 	<ul style="list-style-type: none"> • Choose harder grade • Decrease cutting condition • Choose grade with heat conductivity are big
Wear on nose radius (Flank wear) 	<ul style="list-style-type: none"> • When the hardness of workpiece is too high compare with tool • When machining surface hardened workpiece • Improper grade • Excessive cutting speed • Too small relief angle • Too low feed 	<ul style="list-style-type: none"> • Choose harder grade • Decrease cutting speed • Choose larger relief angle • Increase feed
Thermal crack 	<ul style="list-style-type: none"> • Expansion and shrinking by cutting temperature • Improper grade (*Specially milling operation) 	<ul style="list-style-type: none"> • Apply to dry cutting (In case of wet cutting, use enough coolant) • Choose tougher grade
Chipping 	<ul style="list-style-type: none"> • Improper grade • Excessive feed • Shorten cutting edge strength • Insufficient rigidity of holder 	<ul style="list-style-type: none"> • Choose tougher grade • Decrease feed • Apply to large honing or chamfer edge • Choose bigger size holder
Notch wear 	<ul style="list-style-type: none"> • Surface hardened workpiece • Friction due to bad chip geometry (Generate vibration) 	<ul style="list-style-type: none"> • Choose harder grade • Improve chip control form large rake angle
Flaking 	<ul style="list-style-type: none"> • Deposition on cutting edge • Bad chip control 	<ul style="list-style-type: none"> • Improve cutting performance from large rake angle • Apply to chip pocket with big size
Complete breakage 	<ul style="list-style-type: none"> • Unusable condition due to wear off the most parts of cutting edge by progress of wear 	<ul style="list-style-type: none"> • Reduce the feed rate. • Reduce the depth of cut. • Select a tougher grade. • Select a stronger chipbreaker. • Select a thicker insert.
Built-up edge 	<ul style="list-style-type: none"> • Slow cutting speed • Sticky materials 	<ul style="list-style-type: none"> • Increase cutting speed. • Use more positive rake geometry. • Use tougher grade



Technical Information

Work piece hardness calculating table

Vickers 50kgf HV	Brinell 3000kgf HB		Rockwell				Shore HS	Tensile strength (approximate value) MPa (t)
	Standard ball 10mm	Cemented carbide ball 10mm	A scale 60kgf Diamond particle HRA	B scale 100kgf 1/16in ball HRB	C scale 150kgf Diamond particle HRC	D scale 100kgf Diamond particle HRD		
940	-	-	85.6	-	68.0	76.9	97	
920	-	-	85.3	-	67.5	76.5	96	
900	-	-	85.0	-	67.0	76.1	95	
880	-	(767)	84.7	-	66.4	75.7	93	
860	-	(757)	84.4	-	65.9	75.3	92	
840	-	(745)	84.1	-	65.3	74.8	91	
820	-	(733)	83.8	-	64.7	74.3	90	
800	-	(722)	83.4	-	64.0	74.8	88	
780	-	(710)	83.0	-	63.3	73.3	87	
760	-	(698)	82.6	-	62.5	72.6	86	
740	-	(684)	82.2	-	61.8	72.1	84	
720	-	(670)	81.8	-	61.0	71.5	83	
700	-	(656)	81.3	-	60.1	70.8	81	
690	-	(647)	81.1	-	59.7	70.5	-	
680	-	(638)	80.8	-	59.2	70.1	80	
670	-	630	80.6	-	58.8	69.8	-	
660	-	620	80.3	-	58.3	69.4	79	
650	-	611	80.0	-	57.8	69.0	-	
640	-	601	79.8	-	57.3	68.7	77	
630	-	591	79.5	-	56.8	68.3	-	
620	-	582	79.2	-	56.3	67.9	75	
610	-	573	78.9	-	55.7	67.5	-	
600	-	564	78.6	-	55.2	67.0	74	
590	-	554	78.4	-	54.7	66.7	-	2055
580	-	545	78.0	-	54.1	66.2	72	2020
570	-	535	77.8	-	53.6	65.8	-	1985
560	-	525	77.4	-	53.0	65.4	71	1950
550	(505)	517	77.0	-	52.3	64.8	-	1905
540	(496)	507	76.7	-	51.7	64.4	69	1860
530	(488)	497	76.4	-	51.1	63.9	-	1825
520	(480)	488	76.1	-	50.5	63.5	67	1795
510	(473)	479	75.7	-	49.8	62.9	-	1750
500	(465)	471	75.3	-	49.1	62.2	66	1705
490	(456)	460	74.9	-	48.4	61.6	-	1660
480	488	452	74.5	-	47.7	61.3	64	1620
470	441	442	74.1	-	46.9	60.7	-	1570
460	433	433	73.6	-	46.1	60.1	62	1530
450	425	425	73.3	-	45.3	59.4	-	1495
440	415	415	72.8	-	44.5	58.8	59	1460
430	405	405	72.3	-	43.6	58.2	-	1410
420	397	397	71.8	-	42.7	57.5	57	1370
410	388	388	71.4	-	41.8	56.8	-	1330
100	379	379	70.8	-	40.8	56.0	55	1290
390	369	369	70.3	-	39.8	55.2	-	1240
380	360	360	69.8	(100.0)	38.8	54.4	52	1205
370	350	350	69.2	-	39.9	53.6	-	1170
360	341	341	68.7	(109.0)	36.6	52.8	50	1130
350	331	331	68.1	-	35.5	51.9	-	1095
340	322	322	67.6	(108.0)	34.4	51.1	47	1070
330	313	313	67.0	-	33.3	50.2	-	1035

Vickers 50kgf HV	Brinell 3000kgf HB		Rockwell				Shore HS	Tensile strength (approximate value) MPa (t)
	Standard ball 10mm	Cemented carbide ball 10mm	A scale 60kgf Diamond particle HRA	B scale 100kgf 1/16in ball HRB	C scale 150kgf Diamond particle HRC	D scale 100kgf Diamond particle HRD		
320	303	303	66.4	(107.0)	32.2	49.4	45	1005
310	294	294	65.8	-	31.0	48.4	-	980
300	284	284	65.2	(105.5)	29.8	47.5	42	950
295	280	280	64.8	-	29.2	47.1	-	935
290	275	275	64.5	(104.5)	28.5	46.5	41	915
285	270	270	64.2	-	27.8	46.0	-	905
280	265	265	63.8	(103.5)	27.1	45.3	40	890
275	261	261	63.5	-	26.4	44.9	-	875
270	256	256	63.1	(102.0)	25.6	44.3	38	855
265	252	252	62.7	-	24.8	43.7	-	840
260	247	247	62.4	(101.0)	24.0	43.1	37	825
255	243	243	62.0	-	23.1	42.2	-	805
250	238	238	61.6	99.5	22.2	41.7	36	795
245	233	233	61.2	-	21.3	41.1	-	780
240	228	228	60.7	98.1	20.3	40.3	34	765
230	219	219	-	96.7	(18.0)	-	33	730
220	209	209	-	95.0	(15.7)	-	32	695
210	200	200	-	93.4	(13.4)	-	30	670
200	190	190	-	91.5	(11.0)	-	29	635
190	181	181	-	89.5	(8.5)	-	28	605
180	171	171	-	87.1	(6.0)	-	26	580
170	162	162	-	85.0	(3.0)	-	25	545
160	152	152	-	81.7	(0.0)	-	24	515
150	143	143	-	78.7	-	-	22	490
140	133	133	-	75.0	-	-	21	455
130	124	124	-	71.2	-	-	20	425
120	114	114	-	66.7	-	-	-	390
110	105	105	-	62.3	-	-	-	-
100	95	95	-	56.2	-	-	-	-
95	90	90	-	52.0	-	-	-	-
90	86	86	-	48.0	-	-	-	-
85	81	81	-	41.0	-	-	-	-

Note) 1. 1MPa = 1N/mm²

2. The number in the blank is not generally used ranges

Technical Information

Grade Comparison

Type	-	ISO	KORLOY	NTK	CeramTec	Kennametal	Sandvik	Tungaloy	Greenleaf	Kyocera	Mitsubishi	Ceratizit	TaeguTec	Sumitomo	
P / M	Steel	Al ₂ O ₃ -ZrO ₂	P01-P10	CA20 CA30	HC1 HW2	SN60 SN80E SN180	K060 AC5	CC620	LXA	GEM19	AZ5000 SN60		AW120	W80	
		Al ₂ O ₃ -TiC	P01-P10	CAT10 CAT20	HC2 HC6	SH4	K090		LX21		A65	XD202	CTS3105	AB30 IN23(ISC)	NB90M
		Al ₂ O ₃ -TiCN	P01-P10	CAT30 CAT50 CAT90	HC5 HC7	SH2	KY1615 MC2	CC650		GEM6 GEM7	KT66		CTSH110	AB20 IN22(ISC)	NB90S
K	Cast Iron	Si ₃ N ₄	K10-K30	CSN20 CSN40 CSN50 CSN60	EC1 SX1 SX6	SL406 SL408 SL500 SL808	KY2000 KY3500	CC690 CC6090 CC6190	FX105 CX710	HSN100 GSN100	KS6015 KS6050 KS7050	XE515 X520	SNC1 CTN3105	AS10	NS130 NS260
		SiAlON	K05-K20	CSN80 CSN100	SX9	SL506 SL508 SL606 SL608	KY1310 KY1540 KYS30				KS6030 KS6040		CTI3105	AS500	
		Al ₂ O ₃ -ZrO ₂	K01-K10	CA20 CA30	HC1 HW2	SN60 SN80E SN180	K060 AC5	CC620	LXA	GEM19	AZ5000 SN60			AW120	W80
		Al ₂ O ₃ -TiC	K05-K15	CAT10 CAT20	HC2 HC6	SH4	K090		LX21 M014A		A65	XD202	CTS3105	AB30 IN23(ISC)	NB90M
H	High Hardened	Al ₂ O ₃ -TiCN	H01-H10	CAT50 CAT90	HC5 HC7	SH2	KY1615 MC2	CC650		GEM6 GEM7	KT66		CTSH110	AB20 IN22(ISC)	NB90S
		Al ₂ O ₃ -SiCw	H01-H10	CW80 CW40	WA1 WA5		KY4300 MC3 CW3020(WID)	CC670		WG300			CTKS710 CTKX715	TC430 IW7(ISC)	WX120 WX2000
S	HRSA	SiAlON	S05-S20	CSN80 CSN100	SX3 SX7 SX9		KY1540 KY2100 KYS30	CC6080 CC6060 CC6065 CC6160	TS200 TS300 (OEM)		KS6030 KS6040			TC3020 TC3030	
		Al ₂ O ₃ -SiCw	S01-S15	CW80 CW40	WA1 WA5		KY4300 MC3 CW3020(WID)	CC670	TW43 (OEM)	WG300			CTKS710 CTKX715	TC430 IW7(ISC)	WX120 WX2000

The physical properties of element

Element	Specific gravity (g/cm ³)	Hardness (HB)	Young's modulus (×10 ³ kgf/mm ²)	Thermal conductivity (cal/cmsec°C)	Thermal expansion coefficient (×10 ⁻⁶ /°C)	Melting point (°C)
WC	15.6	2,150	70	0.3	5.1	2,900
TiC	4.94	3,200	45	0.04	7.6	3,200
TaC	14.5	1,800	29	0.05	6.6	3,800
NbC	8.2	2,050	35	0.04	6.8	3,500
TiN	5.43	2,000	26	0.07	9.2	2,950
Al ₂ O ₃	3.98	3,000	42	0.07	8.5	2,050
cBN	3.48	4,500	71	3.1	4.7	-
Diamond	3.52	9,000	99	5.0	3.1	-
Co	8.9	-	10~18	0.165	12.3	1,495
Ni	8.9	-	20	0.22	13.3	1,455



Grade Information



Ceramic Inserts



Tool Holders



Technical Information

Technical Information

Comparison of Workpiece

ISO	Korea KS	United Kingdom BS	America AIS/SAE	German DIN	Spain UNF	Italy UNI	Sweden SS	France AFNOR	Japan JIS
Carbon steels									
	SM15C	080M15	1015	Ck15	C15K	C16	1370	XC12	S15C
	SM25C	-	1025	Ck25	-	-	-	-	S25C
	SM35C	060A35	1035(1037)	Ck35	-	C36	1572	XC38TS	S35C
	SM45C	080M46	1045(1046)	Ck45	C45K	C45	1672	XC42	S45C
	SM50C	060A52	1049	Ck50	-	C53	1674	XC48TS	S50C
	SM55C	070M55	1055	Ck55	C55K	C5	-	XC55	S55C
	SM58C	080A62	1060	Ck58	-	C60	1678	XC60	S58C
	-	212M36	1140	35S20	F210G	-	1957	35MF4	-
	SCMn1	150M28	1330	28Mn6	-	-	-	20M5	SCMn1
	-	230M07	1215	9SMn36	12SMn35	CF9SMn36	-	S300	-
	SMn438(H)	-	1355	36Mn5	36Mn5	-	2120	40M5	SMn738(H)
	sum22	230M07	1213	9SMn28	11SMn28	CF9SMn28	1912	S250	sum22
Low alloy steels									
	SNC815	655M13	3310:3415	14NiCr14	-	-	-	12NC15	SNC815(H)
	SNC415	-	3415	14NiCr10	15NiCr11	16NiCr11	-	14NC11	SNC415(H)
	SNC236	640A35	3435	36NiCr6	-	-	-	35NC6	SNC236
	SCM420,SCM430	1717DS110	41300	25CrMo4	55Cr3	25CrMo(KB)	2225	25CD4	SM420;SCM430
	SCM432,SCCRM3	708A37	4137:4135	34CrMo4	34CrMo4	35CrMo4	2234	35CD4	SM432;SCCRM3
	SCM415	-	-	15CrMo5	12CrMo4	-	2216	12CD4	SCM415(H)
	SCM440	708M40	4140	42CrMo4	42CrMo4	42CrMo4	2244	42CD4	SCM440(H)
	SCM440	708M40	4140:4142	41CrMo4	42CrMo4	41CrMo4	2244	42CD4TS	SCM440
	-	820A16	-	17CrNiMo6	14NiCrMo13	-	-	18NCD6	-
	-	1503-245-420	4520	16Mo5	16Mo5	16Mo5	-	-	-
	SCMnH1	Z120M12	-	G-X120Mn12	X120Mn12	XG120Mn12	-	Z120M12	SCMnH/1
	SCr415	523M15	5015	15Cr3	-	-	-	12C3	SCr415(H)
	-	(527M20)	5115	16MnCr5	16MnCr5	16MnCr5	2511	16MC5	-
	SCr430	530A32	5130	34Cr4	35Cr4	34Cr4(KB)	-	32C4	SCr430(H)
	SCr440	530M40	5140	42Cr4	42Cr4	41Cr4	-	42C4	SCr440(H)
	SPS	735A50	6050	50CrV4	51CrV4	50CrV4	2230	50CA4	SUP10
	SPS9	527M60	5155	55Cr3	-	-	-	55Cr3	SUP9(A)
	-	905M39	-	41CrAlMo7	41CrAlMo7	41CrAlMo7	2940	40CAD6,12	-
	SNCM220	805M20	8620	21NiCrMo22	20NiCrMo2	20NiCrMo2	2506	30NCD2	SNCM22(H)
	SNCM240	311-Type7	8637, 8640	40NiCrMo22	40NiCrMo2	40NiCrMo2(KB)	-	-	SNCM240
	-	250A53	9255	55Si7	56Si7	55Si8	2085	55S7	-
	-	816M40	9840	36CrNiMo4	35NiCrMo4	38NiCrMo4(KB)	-	40NCD3	-
	SU2	534A99	52100	100Cr6	F.131	100Cr6	2258	100C6	SU2
	SUM22L	-	12L13	9SMnPb28	11SMnPb28	CF9SMnPb28	1914	S250Pb	SUM22L
	-	-	12L14	-SMnPb36	12SMnPb25	CF9SMnPb36	1926	S300Pb	-
	-	150-620Gr27	ASTM A182	13CrMo44	14CrMo45	14CrMo45	-	15CD3.5	-
	-	1501-622	ASTM A182	10CrMo910	TU.H	12CrMo9,10	2218	12CD9,10	-
	-	-	ASTM A350LF5	14Ni6	15Ni6	14Ni6	-	16N6	-
	-	1501-240	ASTM A204Gr.A	15Mo3	16Mo3	16Mo3KW	2912	15D3	-
	-	722M24	-32CrMo12	32CrMo12	F124.A	32CrMo12	2240	30CD12	-
High alloy steels									
	STD1	BD3	D3	X210Cr12	X210Cr12	X210CrMoV13KU	-	Z200C12	SKD1
	STS12	-	A2	Z100CrMoV51Z100CDV5	BA2	2260	Z100CrMoV51	Z100CrMoV51KU	SKD12
	-	-	-	X210CrW12	X210CrE12	X215CRW121KU	2312	-	SKD2
	STD61	BH21	H21	X30WCrV9	X30WCrV9	X28W09KU	-	Z30WCV9	SKD5
	-	BH13	H13	X40CrMoV51	X40CrMoV5	X35CrMoVKU	2242	Z40CDV5	SKS31
	STS31	-	-	105WCr6	05WCr5	3KU	2140	105WC13	SKS43
	STS43	BW2	W210	100Vi	-	-	-	Y105V	SKT4
	STF4	-	L6	55NiCrMoV6	F.520.S	-	-	55NCDV7	SUH1
	-	401S45	HW3	X45GrSi93	F322	10WCr6	-	Z45CS9	SKH55
	-	-	-	-	-	-	-	-	-
	SKH55	-	-	S6-5-2-5	HS6-5-2-5	-	2723	Z85WDCV2723	SKH3
	SKH3	BT4	T4	S18-1-2-5	HS18-1-1-5	X78WCo1805KU	-	Z80WKCV	SKH9
	SKH51	BM2	M2	S6-5-2	HS6-5-2	X82WMo0650KU	-2722	Z85WDCV	-
	-	-	-	M7	HS2-9-2	Z100WCWHS2-9-2	2782	S2-9-2	-
	SKH2	BT1	T1	S18-0-1	HS18-0-1	X75W18KU	-	Z08WCV	SKH2
	-	BS1	S1	45WCrV7	45WCrS18	45WCrV8KU	2710	-	-

**P
Steel**

Technical Information

Comparison of Workpiece(Ni-Based Heat Resistant Alloys)

ISO	Korea KS	United Kingdom BS	America AIS/SAE	German DIN	Spain UNF	Italy UNI	Sweden SS	France AFNOR	Japan JIS	
Carbon steels										
	STS301	-	301	X12CrNi177	-	2331	F.3517	Z12CN17.07X12CNi1707	SUS301	
	STS303	-	303	X12CNiS188Z10CNF18.09	-	2346	F.3517	X10CrNiS18.09	SUS303	
	-	-	304	X5CrNi189	304S31	X5CrNi18	2332/2333F.3551	Z6CN18.09	SUS304	
	STS304	304S15	304	X5CrNi189	F.3551	X5CrNi1810	2332	Z6CN18.09	SUS304	
	STS304L	-	304L	X2CrNi1911	304C12	2333	-	-	SUS304L	
	SSC16	-	304LX2CrNi1819	Z2CrNi1810	304S12	2352	F.3503	X2CrNi1011	SCS16	
	STS304L	304S62	304LN	Z2CrNiN,1810	-	-	2371	Z2CN1810	NSUS304LN	
	STR31	-	HW3X45CrSi93	Z45CrSi93	401S45	-	SF322	X45CrSi8	SUH1	
	STR309	-	309	X15CrNiSi201	-	-	-	Z15CNS2012	SUH309	
	STR310	310S24	310S	X12CrNi2521	F.332	X60CrNi2520	2361	Z12CN2520	SUH310	
	STS316	-	316	X5CrNiMo1810	346S16	X5CrNiMo17122347	F.3543	Z6CND1711	SUS316	
	STS316LN	-	316LN	X2CrNiMoN	-	-	2375	X2CND1713	SUS316LN	
	STS316L	-	316L	X2CrNiMo1812	-	-	-	-	SUS316L	
	SSC16	-	316LXCrNiMo	Z2cndCND1712	316S13	2353	-	X2CrNiMo1712	SCS16	
	-	320S17	316Ti	Z2CND1915	F.3535	X6CrNiMoTi1712	2350	Z6VDT17.12	-	
	STS317L	-	317L	X24CrNiMo1816	317S12	2367	-	X2CrNiMo1816	317L	
	-	-	X10CrNi	Z6CNDNb	-	-	-	X6CrNiMoMoNb	318	
	-	-	S32304	"X2CrNiN,234"	-	-	2327	Z2CN23-04AZ	-	
	-	-	S32900	X8CrNiMo.275	-	-	2324	-	-	
	-	-	S31803	X2CrNiMoN	-	-	2377	Z2CND22-0503	-	
	STS321	351S12	321	X10CrNiTi	F.3553	X6CrNiTi1811	2337	Z6CNT18.10	SUS321	
	STS347	-	347	X6CrNiNb189	347S17	X6CrNiNb18.112338	F.3552	Z6CNNb18.10	SUS347	
	STS12	BA2	A2	Z100CnMoV51	Z100CnMoV51	Z100CnMoV51KU	2260	Z100CDV5	SKD12	
High alloy steels										
M Stainless Steel	STS403	403S17	403	X7Cr13	F.3110	X6Cr13	2301	Z6C13	SUS403	
	STS405	403S17	405	X10CrAl13	F.311	X10CrAl13	-	Z10C13	SUS405	
	STS410	410S21	410	X10Cr13	F.3401	L13	2302	Z10C14	SUS410	
	STS420J2	420S45	-	X46Cr13	F.3405	X40Cr145	2304	Z4CM	SUS420J2	
	STS430	430S15	430	X8Cr17	F.3113	X8Cr17	2320	ZBC17	SUS430	
	STS430F	-	430F	X12CrMoS17	F.3117	X10CrS17	2383	Z10CF17	SUS430F	
	STS431	431S29	431	X22CrNi6	F.33427	X16CrNi16	2321	Z15CNI6.02	SUS431	
	STS434	434S17	434	X6CrMo17	-	ZX8CrMo17	2325	ZBCD17.01	SUS434	
	STR446	-	446	X10CrA124	-	X16Cr26	2322	Z10CAC24	SUH446	
	SSC5	425C11	-	X5CrNi134	-	-	-	Z4CND13.4M	SCS5	
	STR35,STR36	348S54	EV8	X53CrMnNiN219	-	X53CrMnNiN	-	Z52CMN21.09	SUH35,SUH36	
	STR4	443S65	HNW6	X80CrNiSi20	F.320B	X80CrSiNi20	-	Z80CSN20.02	SUH4	
	High alloy steels									
		HRHC15	330C11	-	GX40NiCrSi	-	XG50NiCr	-	-	SCH15
		STR330	-	X12NiCrSi	-	-	-	-	Z12NCS35.16	SUH330330
		-	3072-76	4676	NiCu30Al	-	-	-	-	-
	-	-	5390A	-	-	-	-	NC22FeD	-	
	-	3146-3	5391	S-NiCr13A16MoNb	-	-	-	NC12D	-	
	-	HR8	5383	NiCr19Fe19NbMo	-	-	-	NC19rNB	-	
	-	-	5537C	CoCr20W15Ni	-	-	-	KC20WN	-	
	-	-	5660	NiFe35Cr14MoTi	-	-	-	ZSNCDT42	-	
	-	-	5666	NiCr22Mo9Nb	-	-	-	NC22FeDNB	-	
	-	-	AMS5397	NiCr15Cr10MoATi	-	-	-	-	-	
	-	-	AMS5399	NiCr19Co11MoTi	-	-	-	NC19KDT	-	
	-	-	AMS5544	NiCr19Fe19NbMo	-	-	-	NC20K14	-	
	-	-	AMS5772	CoCr22W14Ni	-	-	-	KC22WN	-	
	-	TA10-13/TA28	AMSR56400	TiAl6V4	-	-	-	T-A6V	-	
	-	TA14/17	AMSR54520	TiAl5Sn2.5	-	-	-	T-A5E	-	



Grade Information



Ceramic Inserts



Tool Holders



Technical Information

Technical Information

Comparison of Workpiece(Ni-Based Heat Resistant Alloys)

ISO	Korea KS	United Kingdom BS	America AIS/SAE	German DIN	Spain UNF	Italy UNI	Sweden SS	France AFNOR	Japan JIS
K Cast iron	Gray cast iron								
	GC100	-	No20B	GG10	-	G10	110	Ft10D	FC100
	GC150	Grade150	No25B	GG15	-	G14	115	Ft15D	FC150
	GC200	Grade220	No30B	GG20	-	G20	120	Ft20D	FC200
	GC250	Grade260	No35B	GG25	-	G25	125	Ft25D	FC250
	GC300	Grade300	GNo45B	GG30	-	G30	130	Ft30D	FC300
	GC350	Grade350	No50B	GG35	-	G35	135	Ft35D	FC350
	GCD400	SNG420/2	60-40-18	GGG40	-	GS400-12	0717-02	FCS400-12	FCD400
	GCD500	SNG500/7	65-45-12	GGG50	-	GS500/7	0727-02	HGS500-7	FCD500
	GCD600	SNG600/3	80-55-06	GGG60	-	GS600/3	0732-03	FGS600-3	FCD600
	GCD700	SNG700/2	100-70-03	GGG70	-	GS700/2	0737-01	FGS700-2	FCD700
	Ductile cast iron								
	-	B340/12	32510	GTS-35	-	-	0815	MN35-10	-
	-	P440/7	40010	GTS-45	-	-	0852	-	-
	-	P510/4	50005	GTS-55	-	-	0854	MP50-5	-
	-	P570/3	70003	GTS-65	-	-	0858	MP60-3	-
	Aluminium alloy								
	HRHC15	330C11	-	GX40NiCrSi	-	XG50NiCr	-	-	SCH15
	STR330	-	X12NiCrSi	-	-	-	-	Z12NCS35.16	SUH330330
	-	3072-76	4676	NiCu30Al	-	-	-	-	-
	-	-	5390A	-	-	-	-	NC22FeD	-
-	3146-3	5391	\$-NiCr13A16MoNb	-	-	-	NC12D	-	

Comparison of Workpiece(Ni-Based Heat Resistant Alloys)

Material Condition	Commercial designation	Hardness Brinell HB		Nominal composition Approximate content in %											
		Ann.	Aged	Ni	Cr	Co	Fe	Mo	C	Mn	Si	Al	Ti	Others	
Ni-based Alloys	Haynes 80A	-	-	70.9	20.0	2.0	3.0	-	0.1	-	-	1.5	2.5	-	
	Haynes 75	-	-	73.7	20.0	-	5.0	-	0.12	-	-	0.25	0.4	0.5	
	Haynes 263	-	-	51.4	20.0	20.0	-	6.0	0.06	-	-	1.0	1.5	-	
	Haynes 600	-	-	75.9	16.0	-	8.0	-	0.08	-	-	-	-	-	
	Haynes 625	-	-	61.4	21.0	-	5.0	9.0	0.1	-	-	-	-	3.5	
	Haynes X-750	-	-	74.9	16.0	-	7.0	-	0.08	-	-	0.8	0.25	1.0	
	Haynes 718	-	-	53.5	18.0	-	19.0	3.0	0.08	-	-	0.5	0.9	5.0	
	Inconel 781	-	-	70.0	16.0	-	8.0	-	0.07	2.25	0.15	0.1	3.0	0.2	
	Nimocast PE10	-	-	56.4	20.0	-	-	6.0	-	-	-	-	-	9.0	
	Nimocast PD16	-	-	43.8	16.5	-	34.0	3.3	0.06	-	-	1.2	1.2	-	
	Nimocast PK24	-	-	61.1	9.5	15.0	-	3.0	0.17	-	-	5.5	4.7	1.0	
	Nimocast 842	-	-	57.7	22.0	10.0	-	10.0	0.3	-	-	-	-	-	
	Nimocast 713	-	-	72.6	13.4	-	-	4.5	0.12	-	-	6.2	1.0	2.3	
	Nimonic 95	-	-	49.9	19.5	-	5.0	-	0.11	-	1.0	2.0	3.5	-	
	Nimonic 242	-	-	58.0	21.5	10.0	-	10.5	-	-	-	-	-	-	
	Nimonic PE13	-	-	49.0	21.8	1.5	18.5	9.0	0.1	0.5	0.5	-	-	0.6	
	Nimonic PK25	-	-	49.9	19.0	19.5	-	4.0	0.08	0.8	0.8	2.9	2.9	-	
	Nimonic PK31	-	-	53.8	20.0	14.0	-	4.5	-	-	-	0.4	2.3	5.0	
	Refractaloy 26	-	-	38.0	19.0	20.0	16.0	3.2	0.03	0.8	1.0	0.2	2.75	-	
	Rene 63	-	-	54.4	14.0	15.0	0.5	6.0	0.05	0.1	0.2	3.8	2.5	3.5	
	Rene 77	-	-	57.6	15.0	15.0	0.4	4.2	0.17	0.1	0.1	4.3	3.3	-	
	Rene 80	-	-	61.0	14.0	9.5	-	4.0	0.15	-	-	-	.0	8.0	
	Rene 95	-	-	64.5	14.0	8.0	-	3.5	0.15	-	-	-	2.5	3.5	
	Rene 100	-	-	60.6	10.0	15.0	-	3.0	0.18	-	-	5.5	4.7	-	
	Rene 125	-	-	60.0	8.9	10.0	-	2.0	0.1	-	-	4.7	2.5	7.0	
	TRW 1800	-	-	70.0	13.0	-	-	-	0.1	-	-	6.0	0.06	10.5	
TRW V1 A	-	-	70.5	6.0	7.5	-	2.0	0.13	-	-	5.4	1.0	6.3		
Udimet 630	-	-	41.0	17.0	-	17.5	3.0	0.04	-	-	0.6	1.1	4.1		
Udimet 700	-	-	54.6	15.0	17.5	-	-	0.1	-	-	4.4	3.4	-		
Udimet 710	-	-	55.0	18.0	15.0	0.5	1.5	0.07	-	-	2.5	5.0	1.5		
Annealed or Solution Treated	Hastalloy B	140	-	64.3	0.6	1.25	5.5	28.0	0.1	0.8	0.7	-	-	-	
	Hastalloy C	200	-	54.1	16.0	1.25	5.75	17.0	0.07	0.8	0.7	-	-	4.0	
	Hastalloy N	-	-	72.2	7.0	0.25	3.0	16.5	0.06	0.4	0.25	0.5	-	0.21	
	Hastalloy W	-	-	62.7	5.0	1.25	5.5	24.5	0.06	0.5	0.5	-	-	-	
	Hastalloy X	160	-	47.1	22.0	1.5	18.5	9.0	0.1	0.6	0.6	-	-	0.6	
	Incoloy 804	-	-	41.0	29.5	-	26.0	-	0.1	1.0	0.75	0.25	0.6	0.5	
	Incoloy 825	180	-	42.0	21.0	-	30.0	3.0	0.04	-	-	-	1.0	2.0	
	Inconel 600	170	-	75.0	15.5	-	8.0	-	0.05	-	-	-	-	-	
	Inconel 601	150	-	60.0	23.0	-	14.0	-	0.05	-	-	1.4	-	-	
	Inconel 604	180	-	74.4	15.8	-	7.2	-	0.04	0.2	0.2	-	-	0.1	
	Inconel 625	180	-	61.0	21.5	-	2.5	9.0	0.04	0.5	0.5	0.4	0.4	3.6	
	Monel 400	110	-	64.0	-	-	1.5	-	0.12	1.0	-	-	-	32.0	
Monel R-405	110	-	66.0	-	-	1.2	-	0.15	1.0	-	-	-	31.06		
Nimonic 75	170	-	75.0	19.5	-	4.0	-	0.12	-	-	-	0.4	-		



Grade Information



Ceramic Inserts



Tool Holders



Technical Information

Comparison of Workpiece(Ni-Based Heat Resistant Alloys)

	USA		UK	France	Germany		Others
	SAE	AMS	BS	AFNOR	Werkst.-Nr	DIN1706	
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	5542	-	NC15TNbA	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	NiFe33Cr17Mo	-
	-	5397	-	NK15CAT	LW2.4674	-	-
	-	-	-	-	-	-	-
	5391A	-	HC204	NC13AD	2.4670	S-NiCr13Al6MoNb	-
	-	-	3146	-	-	-	-
	-	-	HC6,204	-	-	-	-
	-	-	-	-	-	-	-
	5536E	5754E	-	NC22FeD	2.4665	NiCr22Fe18Mo	-
	5751A	5753	-	NKOD20ATU	2.4666	NiCr18CoMo	-
	-	-	-	-	-	-	-
	-	-	-	Z6NKCDT38	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	NC14K8	-	-	-
	-	-	-	-	-	NiCo15Cr10MoAlTi	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	NiTa9Co8W6CrAl	-
	-	-	-	-	2.4668	NiCr19NbMo	-
	-	-	-	NCKD20AT	2.4636	NiCo15CrMoAlTi	-
	-	-	-	NC18TDA	-	-	-
	5396A	5596	-	ND37FeV	2.4800	S-NiMo30	N10001
	5388C	5388	-	-	2.4602	NiCr17Mo17FeW	N10002
	5771	5607	-	-	-	-	N10003
	-	5786	-	-	-	-	N10004
	5390A	5390	3072-76	NC22FeD	2.4603	-	N06002
	-	-	3072-76	-	-	-	-
	-	-	-	NC21FeDU	2.4858	NiCr21Mo	N08825
	5540	5580	-	NC15Fe	2.4816	NiCr15Fe	N06600
	-	5715	-	-	2.4851	NiCr23Fe	N06601
	-	-	3072-76	-	-	-	-
	-	5666	-	NC22FeDNB	2.4856	NiCr22Mo9Nb	N06625
	4544	4574	HR5,203-4	NU30	2.4360	NiCu30Fe	N04400
	4674	7234	-	-	-	-	N04405
	-	-	-	NC20T	2.4630	NiCr20Ti	-

Comparison of Workpiece(Ni-Based Heat Resistant Alloys)

Material Condition	Commercial designation	Hardness Brinell HB		Nominal composition Approximate content in %										
		Ann.	Aged	Ni	Cr	Co	Fe	Mo	C	Mn	Si	Al	Ti	Others
Aged or Solution Treated and Aged	Astroloy	-	-	56.9	15.0	15.0	-	5.25	0.06	-	-	4.0	3.5	0.05
	Hastelloy R235	-	-	61.0	15.0	2.5	10.0	5.5	0.15	0.25	0.6	3.0	2.0	-
	Incoloy 901	180	300	44.3	12.5	-	34.0	6.0	0.05	0.24	0.12	0.15	2.7	0.15
	Incoloy 903	-	380	39.0	-	15.0	41.0	-	0.02	-	-	0.7	1.4	3.0
	Inconel 700	-	350	46.0	15.0	23.5	0.7	3.75	0.12	0.10.0	0.3	3.0	2.2	-
	Inconel 702	-	-	79.6	15.6	-	0.35	-	0.04	0.05	0.2	3.0	0.7	-
	Inconel 706	-	-	42.0	16.0	-	40.0	-	0.03	0.2	0.3	0.4	1.75	-
	Inconel 713	-	-	75.0	12.5	-	-	4.2	0.12	-	-	6.1	0.8	-
	Inconel 718	180	380	52.5	19.0	-	19.0	3.0	0.04	0.35	0.35	0.9	0.9	0.1
	Inconel 722	-	380	74.8	15.0	-	6.5	-	0.04	0.55	0.2	0.6	2.4	-
	Inconel X-750	-	390	73.0	15.5	-	7.0	-	0.04	0.35	0.35	0.7	2.5	-
	Inconel 751	-	-	70.0	15.5	-	7.0	-	0.1	1.0	0.5	1.5	2.6	0.5
	Jethete M-252	-	320	55.3	20.0	10.0	-	10.0	0.15	0.5	0.5	1.0	2.6	-
	MAR-M 246	-	270	59.5	9.0	10.0	0.2	2.5	0.15	-	-	5.5	1.5	11.5
	MAR-M 421	-	-	62.3	15.5	10.0	-	1.7	0.15	-	-	4.3	1.75	5.3
	MAR-M 432	-	-	52.3	15.5	20.0	-	-	0.15	-	-	2.8	4.3	5.0
	Monel K-500	120	290	64.0	-	-	1.0	-	0.13	0.8	-	2.8	0.6	30.0
	Nimocast 80	-	-	69.9	20.0	2.0	5.0	-	0.1	-	-	1.0	2.0	-
	Nimocast 90	-	-	52.9	20.0	18.0	5.0	-	0.1	-	-	1.5	2.5	-
	Nimonic 80A	-	350	75.0	19.5	-	-	-	0.08	-	-	1.4	2.4	-
	Nimonic 90	-	346	59.0	19.5	16.5	-	-	0.08	-	-	1.5	2.5	-
	Nimonic 105	-	320	53.0	15.0	20.0	-	5.0	0.12	-	-	4.7	1.2	-
	Nimonic 115	-	350	59.0	14.2	13.2	-	4.0	0.16	-	-	5.0	4.0	-
	Nimonic 901	-	350	44.0	12.5	-	35.0	5.7	0.04	-	-	0.3	2.9	-
	Nimonic 263/C263	-	275	51.5	20.2	20.0	-	6.0	0.06	-	-	0.5	2.0	-
	Nimonic PE16	-	250	43.5	16.5	-	34.0	3.3	0.06	-	-	1.2	1.2	-
	Nimonic PK33	-	350	55.9	18.0	14.0	0.5	7.0	0.05	0.25	0.25	2.1	2.2	-
	R-235	-	-	63.3	15.0	1.2	10.0	5.5	0.12	0.1	0.3	2.0	2.5	-
	Rene 41	-	-	53.1	19.0	11.0	1.8	10.5	0.09	0.3	0.3	1.5	3.1	-
	Udimet 500	-	-	51.7	19.0	19.0	-	4.0	0.4	0.1	0.1	3.0	3.0	-
Udimet 718	180	380	52.5	18.0	-	18.0	3.0	0.05	-	-	0.6	0.1	5.2	
Waspaloy	-	-	56.9	19.8	13.5	0.8	4.45	0.07	0.1	0.1	1.4	3.0	-	
Cast or Cast and Aged	GMR 235	-	-	63.3	15.5	-	10.0	5.2	0.15	0.25	0.6	3.0	2.0	0.06
	GMR 235D	-	-	63.0	15.5	-	4.5	5.0	0.15	0.1	0.3	3.5	2.5	0.05
	IN-100	-	-	61.6	10.0	15.0	-	3.0	0.18	1.2	0.5	5.5	4.75	-
	Jessop G39	130	-	67.5	19.5	-	5.0	3.0	0.5	-	-	-	-	4.5
	Jessop G64	220	-	60.7	11.0	-	2.0	3.0	0.15	-	-	6.0	-	4.0
	Jessop G81	-	300	79.3	20.0	13.0	-	-	0.05	-	-	1.3	2.3	-
	MAR-M 200	-	-	69.4	9.0	10.0	-	-	0.15	-	-	5.0	2.0	13.5



Grade Information



Ceramic Inserts



Tool Holders



Technical Information

Comparison of Workpiece(Ni-Based Heat Resistant Alloys)

	USA		UK	France	Germany		Others
	SAE	AMS	BS	AFNOR	Werkst.-Nr	DIN1706	
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	5660	-	ZSNCDT42	LW2.4662	NiFe35Cr14MoTi	N09901
-	-	-	-	-	-	-	-
-	-	-	-	NK27CADT	-	NiCo29Cr15MoAlTi	-
-	-	5550	-	-	-	-	N07702
-	-	5702	-	-	-	-	N09707
-	-	5391	3146-3	NC12AD	LW2.4670	S-NiCr13Al6MoNb	-
5383	5589	5589	HR8	NC19FeNB	LW24668	NiCr19Fe19NbMo	N07713
-	-	5541	-	NC16FeTi	-	NiCr16FeTi	N07722
5542G	5582	5582	-	NC16FeTNb	2.4669	NiCr16FeTi	N07750
-	-	-	-	-	-	-	N07751
-	-	5551	-	-	2.4916	S-NiCr19Co	N07252
-	-	-	-	-	2.4675	NiCo10W10Cr9AlTi	-
-	-	-	-	-	-	NiCr16Co10WAlTi	-
-	-	-	-	-	-	NiCo20Cr16WAlTi	-
4676	-	-	3072-76	-	2.4375	NiCu30Al	N05500
-	-	-	3146	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	Hr401,601	NC20TA	2.4631	NiCr20TiAk	N07080
-	-	-	Hr2,202	NC20ATV	2.4632	NiCr20Co18Ti	N07090
-	-	-	HR3	NCKD20ATV	2.4634	NiCo20C15MoAlTi	-
-	-	-	HR4	NCK15ATD	2.4636	NiCo15C15MoAlTi	-
5660C	5661A	5661A	-	ZSNCDT42	2.4662	NiCr15MoTi	-
-	-	-	HR10	NCK20D	2.4650	NiCr15Co19MoTi	-
-	-	-	HR207	NW11AC	-	NiFe33Cr17Mo	-
-	-	-	-	NC19KDUV	-	NiCr20Co16MoTi	-
-	-	-	-	-	-	-	-
-	-	5399	-	NC19KDT	2.4973	NiCr19Co11MoTi	N07041
-	-	5751	-	NCK19DAT	2.4983	NiCr18Co18MoTi	N07500
5383	5589	5589	HR8	NC19FeN	LW2.4668	NiCr19Co19NbMo	N07718
-	-	5544	-	NC20K14	LW2.4668	NiCr19Co19NbMo	N07001
-	-	-	-	-	-	-	AISI:686
-	-	-	-	-	-	NiCr16MoAl	-
-	-	5397	-	-	LW2.4674	NiCo15Cr10MoAlTi	N13100
-	-	-	-	-	-	NiCr20MoW	-
-	-	-	-	-	-	NiCr11AlWNb	-
-	-	-	-	-	-	NiCr20Co18Ti	-
-	-	-	-	-	-	NiW13Co10Cr9AlTi	-

Comparison of Workpiece(Ni-Based Heat Resistant Alloys)

Material Condition	Commercial designation	Hardness Brinell HB		Nominal composition Approximate content in %											
		Ann.	Aged	Ni	Cr	Co	Fe	Mo	C	Mn	Si	Al	Ti	Others	
Co-based Alloys	Air Resist 13	-	-	1.0	-	79.6	2.5	-	11.0	-	-	3.5	-	4.12	
	Air Resist 213	-	-	-	19.0	65.8	-	-	4.7	-	-	3.5	-	6.68	
	Altemp S 816	-	-	20.0	20.0	47.6	-	4.0	4.0	-	-	-	-	0.4	
	FSX 414	-	-	10.0	29.0	52.8	1.0	-	7.0	-	-	-	-	0.25	
	Haynes 36	-	-	10.0	18.5	52.8	2.0	-	14.5	1.2	0.6	-	-	0.4	
	Haynes 151	-	-	-	20.0	65.6	-	-	12.8	0.5	0.5	-	0.15	0.47	
	HS 25	-	-	10.0	20.0	48.4	3.0	-	15.0	1.5	2.0	-	-	0.1	
	HS 30	-	-	16.0	24.0	51.4	1.0	6.0	-	0.6	0.6	-	-	0.4	
	HS 31	-	-	10.0	25.0	53.8	1.5	-	8.0	0.6	0.8	-	-	0.4	
	HS 36	-	-	10.0	18.0	53.1	2.0	-	15.0	1.5	-	-	-	0.4	
	Jessop 832	-	-	12.0	19.0	44.0	17.0	2.0	-	0.8	0.3	-	-	3.5	
	Jessop 834	-	-	12.0	19.0	42.0	20.0	2.0	-	-	-	-	-	6.5	
	Jessop 865	-	-	10.5	25.5	53.0	2.0	-	7.5	0.6	0.6	-	-	0.45	
	Jessop 875	-	-	-	21.0	66.0	-	-	11.0	-	-	-	-	2.45	
	Jessop 887	-	-	- 10.0	20.0	50.0	3.0	-	15.0	0.5	1.5	-	-	0.1	
	Jetallloy 209	-	-	10.0	20.0	52.0	1.0	-	15.0	-	-	-	2.0	0.02	
	L-251	-	-	10.0	19.0	56.0	1.0	-	14.0	-	-	-	-	0.4	
	L-605	-	-	10.0	20.0	51.0	1.6	-	15.0	1.5	0.6	-	-	0.1	
	M 203	-	-	25.0	20.0	38.0	1.6	-	12.0	0.8	1.0	0.7	2.0	1.67	
	M 204	-	-	25.0	18.0	42.0	1.6	-	12.0	-	-	-	-	1.27	
	M 205	-	-	25.0	18.0	40.0	1.6	-	12.0	-	-	2.7	-	1.67	
	MAR-M 302	-	-	-	21.5	57.0	0.75	-	10.0	0.1	0.2	-	-	10.0	
	MAR-M 322	-	-	-	21.5	60.0	0.75	-	9.0	0.1	0.1	-	0.75	7.7	
	MAR-M 509	-	-	10.0	23.0	55.0	-	-	7.0	0.05	0.05	-	0.2	4.6	
	MAR-M 905	-	-	20.0	20.0	55.0	-	-	-	-	-	-	0.5	7.65	
	MAR-M 918	-	-	20.0	20.0	52.0	0.4	-	-	0.1	0.1	-	0.5	7.65	
	Refractaloy 70	-	-	20.0	21.0	46.0	0.5	8.0	4.0	-	-	-	-	0.08	
	V-36	-	-	20.0	25.0	43.2	2.4	4.0	2.0	0.6	0.5	-	-	2.29	
	WI-52	-	-	0.5	21.0	62.6	2.0	-	11.0	0.25	0.25	-	-	2.45	
	Jessop X-40	-	-	10.5	25.5	53.0	1.5	-	7.5	0.75	0.75	-	-	0.5	
Jessop X-45	-	-	10.5	25.5	54.7	2.0	-	7.0	-	-	-	-	0.25		
Jessop X-50	-	-	20.5	25.5	40.3	4.0	-	12.0	-	-	-	-	0.75		
Jessop X-63	-	-	10.0	25.0	57.6	1.0	6.0	-	-	-	-	-	0.45		
Annealed or SolutionTreated	J 1650	-	-	27.0	19.0	38.0	-	-	12.0	-	-	-	-	0.2	
In Aged Condition	Haynes 25	-	-	10.0	20.0	49.0	3.0	-	15.0	0.5	0.5	-	-	0.1	
	Haynes 188	-	-	22.0	22.0	38.0	2.5	-	14.0	0.4	0.4	-	-	0.1	
	HS 6	-	-	2.5	28.0	60.5	3.0	-	5.0	-	-	-	-	1.0	
	HS 21	-	-	3.0	27.0	62.6	2.0	5.0	-	0.6	0.6	-	-	0.25	
	J1570	-	-	28.0	19.0	39.0	2.0	-	7.0	-	-	-	-	-	



Grade Information



Ceramic Inserts



Tool Holders



Technical Information

Comparison of Workpiece(Ni-Based Heat Resistant Alloys)

	USA		UK	France	Germany		Others
	SAE	AMS	BS	AFNOR	Werkst.-Nr	DIN1706	
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	(5534)	-	-	LW2.4989	CoCr20Ni20W	-
	-	-	-	-	-	-	-
	-	-	-	-	-	CoCr19W14NiB	-
	-	-	-	-	-	CoCr20W13	-
	-	5759	-	KC20WN	LW2.4964	CoCr20W15Ni	-
	5380	-	-	-	-	CoCr25NiW	R30030
	5382	-	3146	-	LW2.4670	CoCr25NiW	R30031
	-	-	-	-	-	CoCr19W14NiB	-
	-	-	-	-	-	CoCr19Fe16NiMoVNb	-
	-	-	-	-	-	CoCr19Fe20NiMoVNb	-
	-	-	-	-	-	CoCr25NiW	-
	-	-	-	-	-	CoCr21W11Nb	-
	-	-	-	-	-	CoCr20W15Ni	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	5759	-	-	2.4964	CoCr20W15Ni	R30605
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	CoCrW10TaZrB	-
	-	-	-	-	-	CoCr22W9TaZrNb	-
	-	-	3146-3	-	-	CoCr24Ni10WTaZrB	-
	-	-	-	-	-	-	-
	-	-	-	-	-	CoCr20Ni20Ta	-
	-	-	-	-	-	-	-
	-	-	-	-	-	CoCr25NiMoWNB	-
	-	-	-	-	-	CoCr12MoW	-
	-	5382	3156-2	-	LW2.4670	CoCr25NiW	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	-	-	-	-	-	-	-
	5537C	5759	-	KC20WN	LW2.4964	CoCr20W15Ni	-
	-	5772	-	KC22WN	-	CoCr22W14Ni	-
	-	5373	-	-	-	-	R30006
	-	5385	3531	-	-	CoCr29Mo	R30021
	-	-	-	-	-	-	-

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