



Engraving

This is a revolutionary new concept of engraving tools with indexable carbide inserts. They offer you the ability to produce HIGH QUALITY ENGRAVING in most materials. The latest coated carbide grades help you to obtain higher speed and feed rate, dramatically reducing your cycle time.

Features

► High Positive Rake Angle

- Indexable insert.
- Suitable for engraving all types of materials, such as plastic, non-ferrous metal, aluminum, copper, carbon steel and stainless steel.

► Multi-Side Grinding

- Full peripherally ground insert to ensure efficient repeatability.
- It performs excellently without producing any burrs, especially in copper, aluminum and stainless steel.

► High Speed, High Feed Rate

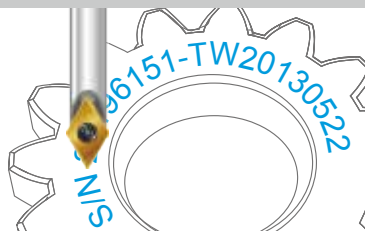
- Designed to run at high speed, up to 40,000 r.p.m.
- Feed rate 0.08mm (0.003") / rev. apply to aluminum; 0.05mm (0.002") / rev. apply to stainless steel.
- Reduces engraving cycle time!

► Economical

- Each indexable insert has 2 cutting edges.
- No resharpener required. Tool length is unchanged.
- No need to reset after changing insert or cutting edge.
- Excellent repeatability!



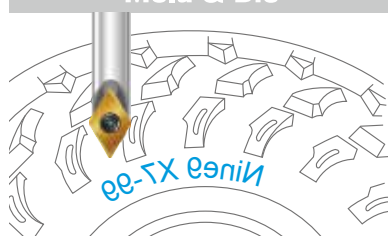
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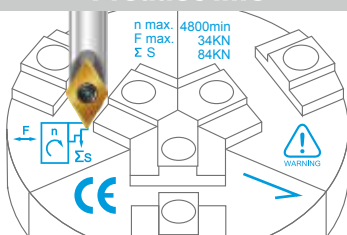
Logo outlines



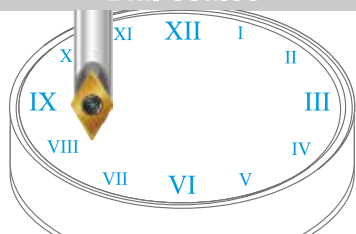
Mold & Die



Product info



Dial scales



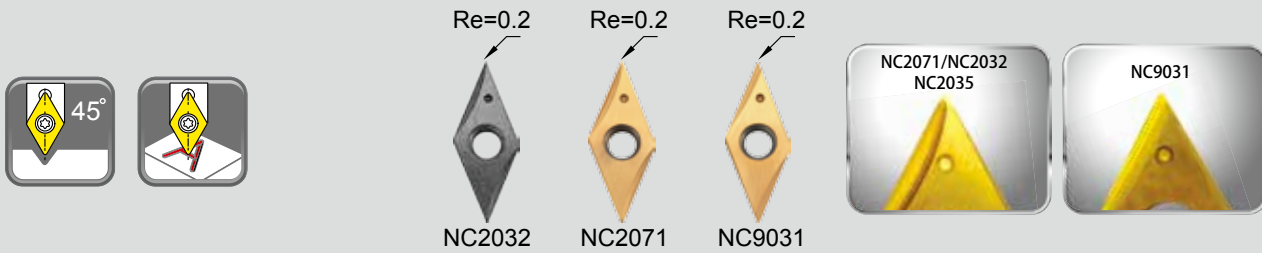
► Applications

- Serial numbers, product codes, dial scales, signs, logo, graph and almost any character which can be created by the NC programming system.



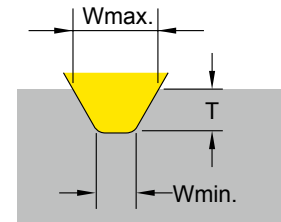
- ▲ Widely be used for marking on machine components, medical components, gun components, mold and die, automotive parts, gears, bearings and luxury goods.

Engraving Tool 45°



► Inserts >>

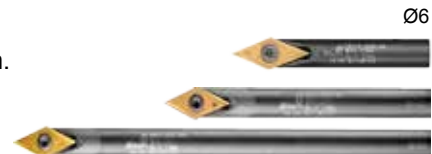
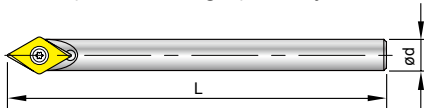
- NC2032:**
- Long tool life
 - For all kinds of steel from 30~50 HRC, carbon steel, alloy steel, and cast iron.
- NC2071:**
- Strong edge on chip groove best suited for min. DOC 0.2 mm
 - Universal grade for all kinds of steel <30HRC, non-ferrous metal and stainless steel.
- NC9031:**
- Fully positive ground rake angle, very sharp edge for shallow engraving.
 - For non-ferrous metal such as aluminum, brass, copper, titanium, plastic and acrylic.



Code	Parts No.	Coating	Grade		Dimensions			W		T	
					L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.
0104501	NC2071	TiN	K20F		6.35	2.0	0.2	0.65	2.1	0.20	2.0
0104502	NC2032	TiAlN						0.65		0.20	
0104504	NC9031	TiN						0.45		0.05	

► Holder >>

- Carbide shank holders designed for shrink-fit holder, engraving machines, high speed cutting.
- XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.



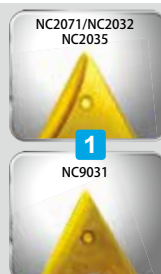
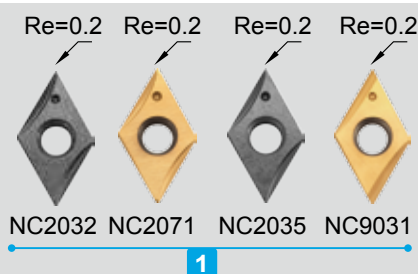
Code	Parts No.	Angle	Ød	L	L1	Screw / Key
691001	00-99619-V045-06	45°	6	40	---	 NS-22044 0.9Nm NK-T7
* 691002	00-99619-V045-06L			60	---	
* 691003	00-99619-V045-06XL			100	---	

Note: • DC Slim chuck, see page 69.

► Starter Kit >>

Code	Parts No.	Shank Ø	Angle	Insert included	Content
691201-4501	00-99619-V045-03K-71	Ø6	45°	V04506T1W06-NC2071	1 x Holder 1 x T7 Key 3 x inserts
691201-4502	00-99619-V045-03K-32			V04506T1W06-NC2032	
691201-4504	00-99619-V045-03K-31			V04506T1W06-NC9031	
692201-6001	00-99619-V060-03K-71	Ø6	60°	V06006T1W06-NC2071	
692201-6002	00-99619-V060-03K-32			V06006T1W06-NC2032	
692201-6003	00-99619-V060-03K-35			V06006T1W06-NC2035	
692201-6004	00-99619-V060-03K-31			V06006T1W06-NC9031	

Engraving Tool 60°



► Inserts >>

- NC2032:** • Long tool life
• For all kinds of steel from 30~50 HRC, carbon steel, alloy steel, and cast iron.
- NC2071:** • Strong edge on chip groove best suited for min. DOC 0.2 mm
• Universal grade for all kinds of steel <30HRC, non-ferrous metal and stainless steel.
- NC2035:** • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to 56 HRC.
- NC9031:** • Fully positive ground rake angle very sharp edge for shallow engraving.
• For non-ferrous metals such as aluminum, brass, copper, titanium, plastic and acrylic.
- NC9036:** • DLC coating, very sharp edge produces excellent surface finish.
• For non ferrous metals such as aluminum, brass, copper, titanium, plastic and acrylic.

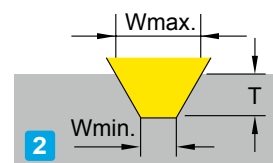
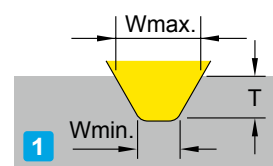
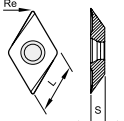
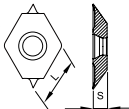
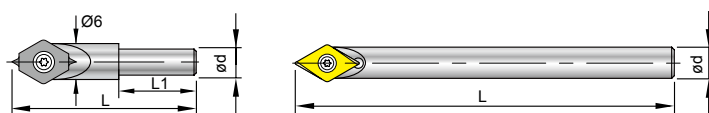


Fig	Code	Parts No.	Coating	Grade		Dimensions			W		T		
						L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.	
1	0106001	V06006T1W06	NC2071	TiN	K20F		6.35	2.0	0.2	0.65	2.7	0.20	2.0
	0106002		NC2032	TiAlN						0.65		0.20	
	0106003		NC2035	ALDURA						0.65		0.20	
	0106004		NC9031	TiN						0.45		0.05	
Fig	Code	Parts No.	Coating	Grade		Dimensions			W		T		
						L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.	
2	0106006	V06006T1W03	NC2032	TiAlN	K20F		6.35	2.0	---	0.25	1.1	0.05	0.8
	0106007		NC9036	DLC									

► Holder >>

- Carbide shank holders designed for shrink-fit holder, engraving machines, high speed cutting.
- XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.

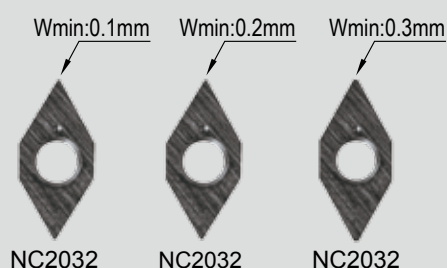
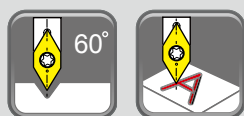


Code	Parts No.	Angle	Ød	L	L1	Screw / Key
692004	00-99619-V060-04	60°	4	30	12	NS-22044 0.9Nm NK-T7
692001	00-99619-V060-06		6	40	---	
* 692002	00-99619-V060-06L		6	60	---	
* 692003	00-99619-V060-06XL		6	100	---	

W060 Engraving Tools

W060
SW

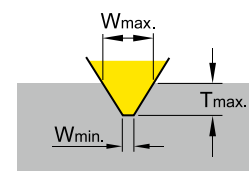
NEW



► Inserts >>

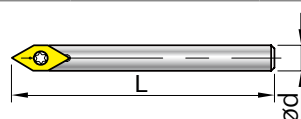
- Limited design, simply for thin or light engraving, used on engraving machine .
- Shank diameter 4mm is same as insert's size. Slim fits!
- Each insert has 2 cutting edges.

NC2032: • Universal grade for all unhardened steel.



New	Code	Parts No.	Angle	Coating		Dimensions		Wmin.	Wmax.	Tmax.
						L	S			
	01W2001	W06004S101-NC2032	60°	TiAlN		4.5	1.3	0.1	0.33	0.2
	01W2002	W06004S102-NC2032						0.2	0.66	0.4
	01W2003	W06004S103-NC2032						0.3	0.99	0.6

► Holder >>



New	Code	Parts No.	Angle	Ød	L	Screw	Key
	69W001	00-99619-W060-04	60°	4	40	NS-18037 0.6Nm	NK-T6

N9MT080201W

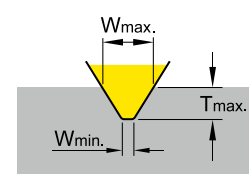


► Inserts >>

- No need to reset tool length after changing insert or cutting edge.
- Each insert has 4 cutting edges.

NC40: • Universal grade for all unhardened steel.

NC10: • Universal grade for non-ferrous metal and cast iron.



Code	Parts No.		Angle	Coating	Grade		Dimensions		Wmin.	Wmax.	Tmax.
							L	S			
013404	N9MT080201W	60-NC40	60°	TiN	K20F		8	2.38	0.1	1.1	0.8
013405		NC40	90°	TiN	K20F		8	2.38	0.1	2.0	0.9
013406		NC10	90°	TiAlN	K20F		8	2.38	0.1	2.0	0.9

► Holder >> • For SW engraving using **NC Spot Drill** shank.

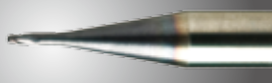


Code	Parts No.	Ød	L	Screw	Key
603001	00-99616-10	10	90	NS-30055 2.0 Nm	NK-T8
613001	00-99616-3/8	3/8"	90		

Performance

► Comparison >>



Tool			
Cutting data	00-99619-V060-06 V06006T1W06-NC2071	Engraving tool	Ball nose end mill Radius 0.4 mm
Workpiece material	Tool steel SKD 61 (JIS G 4404), Hardness: HRB92~93 (HB 200)		
Spindle speed r.p.m.	10000	10000	10000
Feed rate mm/min.	100	100	300
Cutting depth A_p	0.2 mm	0.2 mm	0.05 mm, 4 times to cut to 0.2 mm
Roughness of bottom R_a	0.36 μm	0.83 μm	0.46 μm
Change and resetting	No need	Need	Need
Tool life	Long	Short	Short
Measured result by Alicona IFM system			

Tool	00-99619-V060-06 V06006T1W06-NC2071	00-99619-V060-06 V06006T1W06-NC2071	00-99619-V060-06 V06006T1W06-NC2035
Cutting data			
Workpiece material	SKD 51	SS	SKD 61 (50HRC)
Spindle speed r.p.m.	10000	10000	10000
Feed rate mm/min.	300	300	100
Cutting depth A_p	0.1 mm	0.35 mm	0.2 mm
Change and resetting	No need	No need	No need
Tool life	24 min.(1440 sec.)	7.2 meters	3.5 meters

► Attention >>

- **Selecting the speed and feed rate**
 - Select the spindle speed and feed rate according to the selected material's cutting data.
 - The downward feed rate of the Z-axis should be reduced to **50%** of the table feed rate.
- **Cutting fluid and cooling condition**
 - Emulsion is recommended for engraving on steel, stainless steel, Al and Al-alloy.
 - Blown cooled air is recommended for engraving on cast iron and plastic.
- **Setting-up the tool holder**
 - The tool shank runout should be below 0.01 mm.
 - Shrink fit chucks, hydraulic chuck and high precision spring collet chucks are recommended.
 - Pre-balance the tool holder minimum G6.3/10,000 R.P.M. is necessary.
- **Clamping the engraving insert**
 - Place and hold the insert in the insert pocket against the positioning side.
 - See illustration below:



Engraving Applications

► Tip >>

Use the V045 and V060 style engravers in materials that tend to push burrs such as stainless steels and high temp alloys. These inserts have a 0.2mm(0.008") radius with a very sharp cutting edge and cut very freely. Character widths start around 0.45mm(0.017").

This tool best replaces ball nose endmills. This tool is considered to be first choice for all but fine engraving width below 0.25mm.



Components



Luxury goods



Engraving Tool

Mold & Die



Product



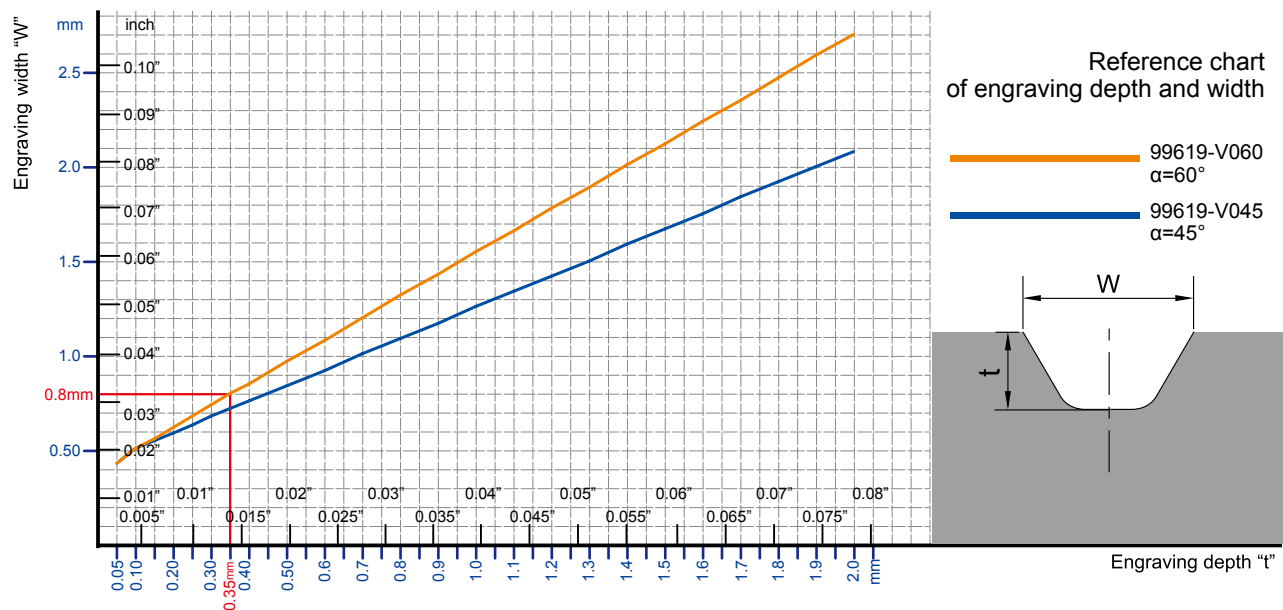
Cutting Data

Engraving Depth and Width Reference Chart



- To use the engraving chart, select your engraving width (w) on the vertical axis. Select your engraving insert angle (45° or 60°), and follow the horizontal line from the (w) axis to the intersection with the insert angle.
- Follow the vertical line from this intersection point to the engraving depth (t) axis to determine the engraving depth.

V045/V060 T1W06 >>



Work Material	S RPM	f (mm/rev.)	Grade of Insert
Carbon steel	5000~40000	0.008~0.05	NC2071,NC2032
Alloy steel	5000~40000	0.008~0.03	NC2032,NC2071
Stainless Steel	5000~40000	0.008~0.05	NC2071,NC9031
Cast iron	5000~40000	0.008~0.03	NC2032
Aluminum≧Non-Ferrous Metal	5000~40000	0.008~0.08	NC2071,NC9031
Hardened steel up to 56 HRC	6000~35000	0.003~0.01	NC2035

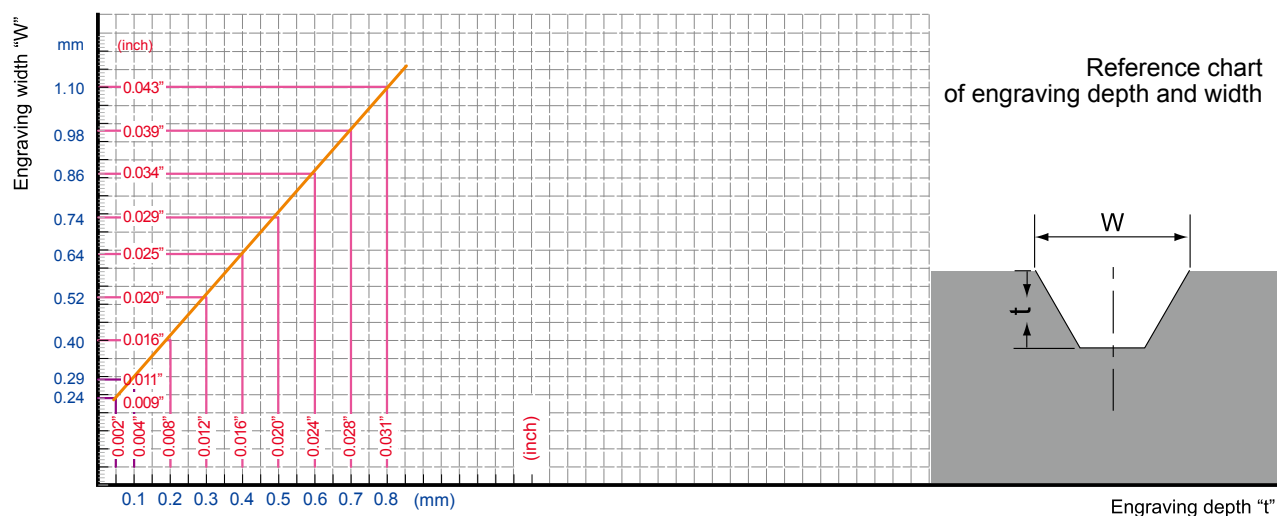
Tmax.:2mm

Material	Ap	1st	2nd	3rd	4th	5th	6th	~	Fine finishing
Carbon steel		0.8	0.6	0.3	0.2	0.1	~	~	0.1
Alloy steel		0.5	0.4	0.3	0.3	0.2	0.2	0.1	0.1
Stainless Steel		0.5	0.4	0.3	0.3	0.2	0.2	0.1	0.05
Cast iron		0.8	0.6	0.3	0.2	0.1	~	~	0.1
Aluminum≧Non-Ferrous Metal		1.0	0.8	0.2	~	~	~	~	0.1
Hardened steel up to 56 HRC		0.2	0.2	0.15	0.15	0.1	0.1	0.1	0.05

Cutting Data



► V060 T1W03 >>



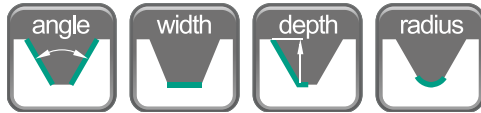
Work Material	S RPM	f (mm/rev.)	Grade of Insert
Carbon steel C<0.3%	8000 ~ 40000	0.005 ~ 0.010	NC2032
Carbon steel C>0.3%	8000 ~ 40000	0.005 ~ 0.015	NC2032
Alloy steel	6000 ~ 35000	0.005 ~ 0.010	NC2032
Stainless Steel	8000 ~ 35000	0.003 ~ 0.010	NC9036
Cast iron	6000 ~ 35000	0.005 ~ 0.015	NC2032
Aluminum	8000 ~ 40000	0.005 ~ 0.015	NC9036
Copper, Brass	8000 ~ 40000	0.005 ~ 0.010	NC9036
Titanium	6000 ~ 15000	0.003 ~ 0.010	NC9036

Tmax.:0.8mm

Material	Ap	1st	2nd	3rd	4th	5th	~	Fine finishing
Carbon steel C<0.3%		0.3	0.2	0.1	0.1	0.05	0.05	0.03
Carbon steel C>0.3%		0.3	0.2	0.1	0.1	0.05	0.05	0.03
Alloy steel		0.3	0.1	0.1	0.05	0.05	0.05	0.03
Stainless Steel		0.2	0.1	0.1	0.1	0.05	0.05	0.03
Cast iron		0.2	0.1	0.1	0.1	0.05	0.05	0.03
Aluminum		0.2	0.1	0.1	0.1	0.05	0.05	0.03
Copper, Brass		0.2	0.1	0.1	0.1	0.05	0.05	0.03
Titanium		0.2	0.1	0.1	0.1	0.05	0.05	0.03



Engraving X060 >>



Features

► Custom forms based on your specification of angle, width, depth and corner radius.

► Economical

- Each indexable insert has 2 cutting edges.
- No resharpener required. Tool length is unchanged.
- No need to reset after changing insert or cutting edge.



► Insert >>

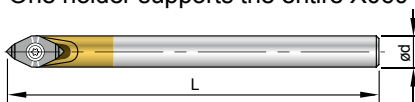
- Minimum width of bottom : 0.1mm.
- Angle is possible from 10° up to 120°, related to the minimum width.
- Replace solid carbide engraving tool and ball nose end mill.

Angled form			Radius angled form		Radius form	
Inserts Grade	Coating	Carbide	Material			
NC2071	TiN	K20F	For all kind of steel < 30 HRC.			P M K N H S
NC2032	TiAlN	K20F	For all kind of steel from 30-50HRC, carbon steel, alloy steel and casting iron.			● ○ ● ○ ● ○
NC2035	ALDURA	K20F	For steel with heat treatment up to 56 HRC.			● ○ ○ ○ ● ○
NC9036	DLC	K20F	For non-ferrous metal, Al, Al-alloy, Brass, copper and long cutting chip metal.			○ ○ ○ ● ○ ○

● Best ◎ Suit ○ Possible

► Holder >>

- One holder supports the entire X060 series of engraving inserts.



Carbide Type

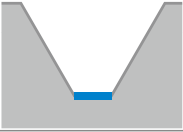
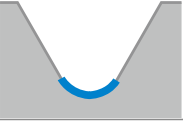


Code	Parts No.	Ød	L	Screw	Key
69X001	00-99619-X060-06	6	40	NS-22044 0.9Nm	NK-T7
69X002	00-99619-X060-06L	6	60		

► Enquiry Example >> X060 A 30 W 030 S - NC2032

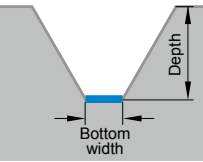
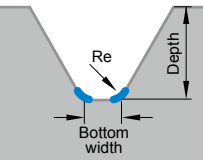
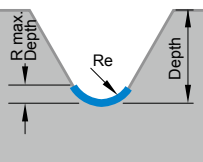
Series	Angle	Bottom Form	Bottom Width	Depth	Corner Shape	Insert Grade
X060	A 30 from 10°~120°	☒ W ☐ R	030	T 0.05	☒ S Flat ☐ R Radius	☒ NC2032 ☐ NC2035 ☐ NC9036 ☐ NC2017

► Profile Example >>

Angled form	Angle	Bottom Form	Bottom Width	Corner Shape	Comment
  	30°	W	0.30	S	Angle Possible from 10° up to 120°
  	60°	W	0.50	R	Bottom Form W for flat shape or R for radius shape
  	60°	R	0.50		Bottom Width Bottom Width of engraving. Minimum width of bottom: 0.1 mm or 0.005"
					Depth Depth of engraving
					Corner Shape S for flat shape or R for radius shape
					Grade Refer to previous page

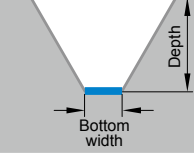
► Developed inserts (Non-stock)

● Best ◎ Suit ○ Possible

Angled form	Developed Non-Stock	Angle	Coating	Re	Bottom width	Depth	P	M	K	N	H	S
	X060A30W051S-NC2032	30°	TiALN	—	0.508	2.0	●	○	●			
	X060A60W020S-NC9036	60°	DLC	—	0.2	1.2		◎		●		◎
	X060A60W030S-NC9036				0.3	2.0		◎		●		◎
Radius angled form	Developed Non-Stock	Angle	Coating	Re	Bottom width	Depth	P	M	K	N	H	S
	X060A30W040R-NC9036	30°	DLC	0.08	0.4	2.0		◎		●		◎
	X060A45W010R-NC2035	45°	ALDURA	0.02	0.1	1.5	◎		○		●	
	X060A90W030R-NC2032	90°	TiALN	0.06	0.3	0.5	●	○	●			
Radius form	Developed Non-Stock	Angle	Coating	Re	Rmax. Depth	Depth	P	M	K	N	H	S
	X060A60R040-NC2035	60°	ALDURA	0.4	0.2	1.0	◎		○		●	
	X060A60R040-NC2071		TiN	0.4	0.2	1.0	◎	●		◎		
	X060A60R050-NC2035		ALDURA	0.5	0.25	1.0	◎		○		●	

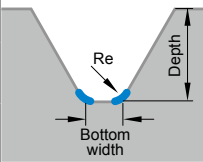
► Developed inserts (Non-stock)

● Best ◎ Suit ○ Possible

Angled form	Developed Non-Stock	Angle	Coating	Re	Bottom width	Depth	P	M	K	N	H	S
	X060A10W025S-NC9036	10°	DLC	—	0.25	0.5	●	◎	○	●		◎
	X060A20W010S-NC2032	20°	TiALN	-	0.10	0.6	●	○	●			
	X060A20W025S-NC2032		TiALN	—	0.25	1.0	●	○	●			
	X060A20W030S-NC2032		TiALN	—	0.30	2.0	●	○	●			
	X060A20W035S-NC2032		TiALN	—	0.35	1.0	●	○	●			
	X060A20W050S-NC2032		TiALN	—	0.50	1.0	●	○	●			
	X060A20W100S-NC2032		TiALN	—	1.00	1.0	●	○	●			
	X060A30W010S-NC2032	30°	TiALN	—	0.10	1.5	●	○	●			
	X060A30W010S-NC2035		ALDURA	—	0.10	1.5	◎	○	○		●	
	X060A30W030S-NC2032		TiALN	—	0.30	2.0	●	○	●			
	X060A30W040S-NC2032		TiALN	—	0.40	1.0	●	○	●			
	X060A30W051S-NC2032		TiALN	—	0.51	2.0	●	○	●			
	X060A30W100S-NC2032		TiALN	—	1.00	1.0	●	○	●			
	X060A40W010S-NC9036	40°	DLC	—	0.10	1.0	●	◎	○	●		◎
	X060A40W015S-NC9036		DLC	—	0.15	1.5	●	◎	○	●		◎
	X060A40W025S-NC2032		TiALN	—	0.25	1.0	●	○	●			
	X060A50W007S-NP9001	50°	-	—	0.07	1.0	●	◎	○	●		◎
	X060A60W010S-NC2032	60°	TiALN	—	0.10	0.5	●	○	●			
	X060A60W010S-NC9036		DLC	—	0.10	0.5	●	◎	○	●		◎
	X060A60W015S-NC9036		DLC	—	0.15	0.5	●	◎	○	●		◎
	X060A60W020S-NC2032		TiALN	—	0.20	1.2	●	○	●			
	X060A60W020S-NC9036		DLC	—	0.20	1.2	●	◎	○	●		◎
	X060A60W030S-NC2032		TiALN	—	0.30	2.0	●	○	●			
	X060A60W030S-NC9036		DLC	—	0.30	2.0	●	◎	○	●		◎
	X060A60W040S-NC9036		DLC	—	0.40	1.0	●	◎	○	●		◎
	X060A60W050S-NC2032		TiALN	—	0.50	1.0	●	○	●			
	X060A60W050S-NC9036		DLC	—	0.50	1.0	●	◎	○	●		◎
	X060A60W070S-NC2032		TiALN	—	0.70	1.0	●	○	●			
	X060A60W070S-NP9001		-	—	0.70	2.0	●	◎	○	●		◎
	X060A60W075S-NC9036		DLC	—	0.75	1.0	●	◎	○	●		◎
	X060A60W090S-NC9036		DLC	—	0.90	1.0	●	◎	○	●		◎
	X060A60W100S-NC2032		TiALN	—	1.00	1.0	●	○	●			
	X060A60W110S-NC9036		DLC	—	1.10	1.0	●	◎	○	●		◎
	X060A66W030S-NC2032	66°	TiALN	—	0.30	1.0	●	○	●			
	X060A70W020S-NC2032	70°	TiALN	—	0.20	1.0	●	○	●			
	X060A90W015S-NC9036	90°	DLC	—	0.15	1.0	●	◎	○	●		◎
	X060A90W030S-NC9036		DLC	—	0.30	1.0	●	◎	○	●		◎
	X060A90W050S-NC9036		DLC	—	0.50	1.0	●	◎	○	●		◎
	X060A90W080S-2T-NC9036		DLC	—	0.80	1.8	●	◎	○	●		◎

► Developed inserts (Non-stock)

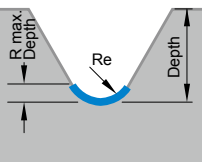
● Best ◎ Suit ○ Possible

Radius angled form	Developed Non-Stock	Angle	Coating	Re	Bottom width	Depth	P	M	K	N	H	S
	X060A10W020R-NC2035	10°	ALDURA	0.04	0.20	0.5	◎		○		●	
	X060A30W040R-NC2032	30°	TiALN	0.08	0.40	2.0	●	○	●			
	X060A30W040R-NC9036		DLC	0.08	0.40	2.0		◎		●		◎
	X060A30W040R-NC2038		TiCN	0.08	0.40	2.0	◎	●		◎		
	X060A35W010R-NC2035	35°	ALDURA	0.02	0.10	2.0	◎		○		●	
	X060A45W010R-NC2035	45°	ALDURA	0.02	0.10	1.5	◎		○		●	
	X060A45W020R-NC2032		TiALN	0.04	0.20	1.2	●	○	●			
	X060A45W040R-NC2038		TiCN	0.08	0.40	2.0	◎	●		◎		
	X060A45W040R-NC9036		DLC	0.08	0.40	2.0		◎		●		◎
	X060A45W040R-NP9001		-	0.08	0.40	2.0		◎		●		◎
	X060A50W020R-NC9036	50°	DLC	0.04	0.20	1.5		◎		●		◎
	X060A55W043R-NC2032	55°	TiALN	0.20	0.43	0.75	●	○	●			
	X060A55W070R-NC2032		TiALN	0.14	0.70	2.0	●	○	●			
	X060A60W010R-NC2032	60°	TiALN	0.02	0.10	1.0	●	○	●			
	X060A60W012R-NC2032		TiALN	0.07	0.12	1.5	●	○	●			
	X060A60W020R-NC2032		TiALN	0.04	0.20	1.2	●	○	●			
	X060A60W034R-NC9036		DLC	0.07	0.34	1.5		◎		●		◎
	X060A60W040R-NC2032		TiALN	0.08	0.40	2.0	●	○	●			
	X060A60W040R-NC2038		TiCN	0.08	0.40	2.0	◎	●		◎		
	X060A60W040R-NC9036		DLC	0.08	0.40	2.0		◎		●		◎
	X060A60W040R-NP9001		-	0.08	0.40	2.0		◎		●		◎
	X060A60W051R-NC2032		TiALN	0.10	0.51	2.0	●	○	●			
	X060A60W080R-NC2032		TiALN	0.20	0.80	1.7	●	○	●			
	X060A60W090R-NC2032		TiALN	0.18	0.90	1.5	●	○	●			
	X060A70W020R-NC2035	70°	ALDURA	0.04	0.20	1.0	◎		○		●	
	X060A80W060R-NC9036	80°	DLC	0.12	0.60	1.3		◎		●		◎
	X060A90W010R-NC2032	90°	TiALN	0.02	0.10	0.7	●	○	●			
	X060A90W030R-NC2032		TiALN	0.06	0.30	0.5	●	○	●			

2016.08.31

► Developed inserts (Non-stock)

● Best ◎ Suit ○ Possible

Radius form	Developed Non-Stock	Angle	Coating	Re	Rmax. Depth	Depth	P	M	K	N	H	S
	X060A20R010-NC9036	20°	DLC	0.10	0.08	0.50	◎	◎	●	●	◎	◎
	X060A21R060(T1.2)-NC2032	21°	TiALN	0.60	0.49	1.20	●	○	●	●	◎	◎
	X060A30R010-NC2032	30°	TiALN	0.10	0.07	1.00	●	○	●	●	◎	◎
	X060A30R010-NC9036		DLC	0.10	0.07	2.00	◎	◎	●	●	◎	◎
	X060A30R030-NC2032		TiALN	0.30	0.22	1.50	●	○	●	●	◎	◎
	X060A30R030-NC2071	32.5°	TiN	0.30	0.22	1.50	◎	●	◎	◎	◎	◎
	X060A325R06(T1.2)-NC2032		TiALN	0.60	0.43	1.20	●	○	●	●	◎	◎
	X060A40R040-NC2032	40°	TiALN	0.40	0.26	1.00	●	○	●	●	◎	◎
	X060A40R080-NC2032		TiALN	0.80	0.53	1.50	●	○	●	●	◎	◎
	X060A45R010-NC2032	45°	TiALN	0.10	0.06	1.00	●	○	●	●	◎	◎
	X060A45R010-NC2035		ALDURA	0.10	0.06	1.00	◎	◎	○	●	●	◎
	X060A45R013-NC2032		TiALN	0.13	0.08	0.28	●	○	●	●	◎	◎
	X060A60R010-NC2032	60°	TiALN	0.10	0.05	0.20	●	○	●	●	◎	◎
	X060A60R010-NC2035		ALDURA	0.10	0.05	0.2	◎	◎	○	●	●	◎
	X060A60R012-NC2032		TiALN	0.12	0.06	1.00	●	○	●	●	◎	◎
	X060A60R012-NC2071		TiN	0.12	0.06	1.00	◎	●	◎	◎	◎	◎
	X060A60R012-NP9001		-	0.12	0.06	1.00	◎	◎	●	●	◎	◎
	X060A60R040-NC2032		TiALN	0.40	0.20	1.00	●	○	●	●	◎	◎
	X060A60R040-NC2035		ALDURA	0.40	0.20	1.00	◎	◎	○	●	●	◎
	X060A60R040-NC2071		TiN	0.40	0.20	1.00	◎	●	◎	◎	◎	◎
	X060A60R050-NC2035		ALDURA	0.40	0.25	1.00	◎	◎	○	●	●	◎
	X060A60R060-NC2032		TiALN	0.60	0.30	1.70	●	○	●	●	◎	◎
	X060A90R010-NC2035	90°	ALDURA	0.10	0.03	0.60	◎	◎	○	●	●	◎
	X060A90R010-NC2071		TiN	0.10	0.03	0.60	◎	●	◎	◎	◎	◎
	X060A90R010-NC9036		DLC	0.10	0.03	0.60	◎	◎	●	●	◎	◎

2016.08.31

NC Deburring

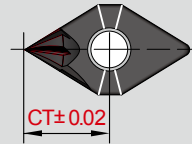
DB
60°
90°

Patent Pending



► Features >>

- High feed rate for high speed deburring on CNC machines.
- Indexable type ensures the relative position of deburring.

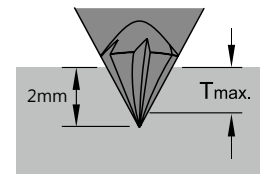


NC2032

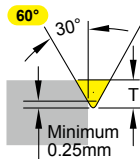


► Inserts >>

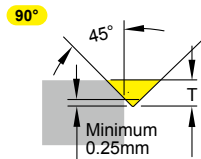
- Smallest counter sink diameter Ø0.5 mm.
- Ideal for fine hole deburring.
- Each insert has one cutting edge.
- Using same tool holder of X060 engraving tool.
- Indexable type. Relative position of deburring depth and diameter are accurate.
- TiAlN coated carbide insert can stand very long life.



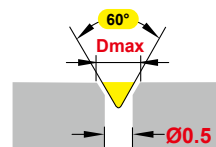
Code	Parts No.	Angle	Coating	Grade		Dimensions			Tmax.	AP	
						L	S	Re		min.	max.
01X601	X060A60T6-NC2032	60°	TiAlN	K20F		6	2.0	--	1.75	0.1	1.0
01X901	X060A90T6-NC2032	90°				6	2.0	--	1.75	0.1	1.0
Deburring					Counter sinking						



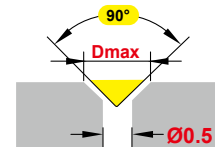
Tmin. :0.25
Tmax.:1.75



Tmin. :0.25
Tmax.:1.75



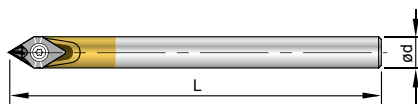
Dmax.:2.0



Dmax.:3.5

► Holder >>

- Provides high rigidity and anti-vibration.
- One holder supports the entire X060 series of engraving inserts.



Steel Type



Carbide Type



Code	Parts No.	Ød	L	Screw	Key
69X001	00-99619-X060-06	6	40	NS-22044 0.9Nm	NK-T7
* 69X002	00-99619-X060-06L	6	60		

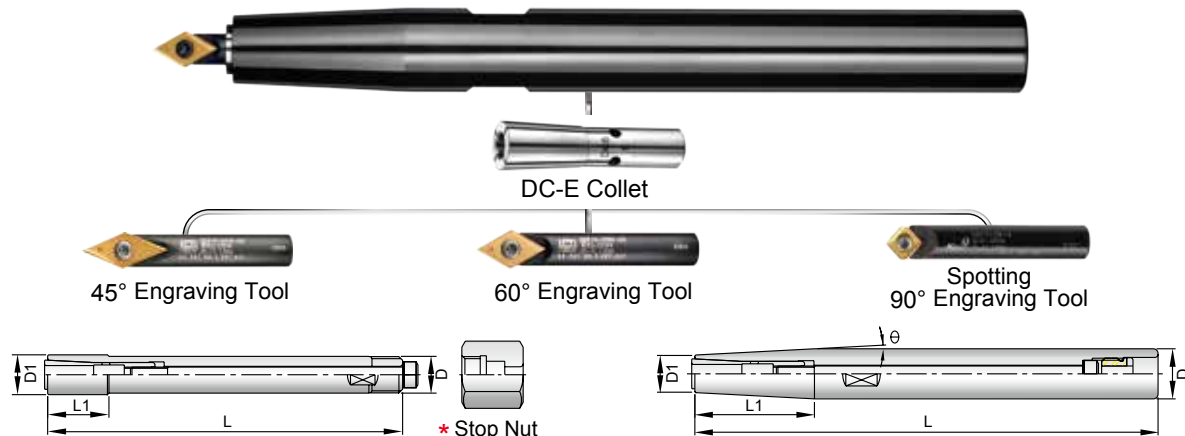
► Starter Kit >>

Code	Parts No.	Shank Ø	Angle	Insert included	Content
69X202-X601	00-99619-X060-DB60-02K-32	6	60°	X060A60T6-NC2032	1 x Holder 1 x T7 Key 2 x inserts
69X202-X901	00-99619-X060-DB90-02K-32		90°	X060A90T6-NC2032	



DC Slim Chuck

Extension Adaptor >>

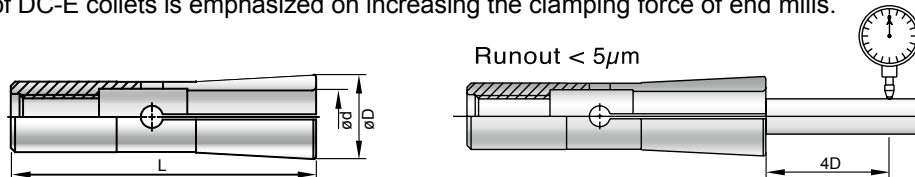


Parts No.	Type of Holder	d	L	L1	øD	D1	θ	Collet	Back Screw	Stop Screw	Hexagon Key	Stop Nut
0-329090-102	ST10-DC4-90	2~4	90	14	12	9	--	DC4	M4 * L60	--	0-301940~632	TP-M8
-112	ST12-DC4-120	2~4	120	38	12	9	3°		M4 * L85	OP-M8		--
0-329090-212	ST12-DC6-120	2~6	120	40	12	14	--	DC6	M5 * L95	--	0-301940~642	TP-M12
-222	ST16-DC6-150	2~6	150	38	16	14	3°		M5 * L100	OP-M10		--
-232	ST20-DC6-200	2~6	200	70	20	14	3°		M5 * L100	OP-M10		--
-242	ST25-DC6-250	2~6	250	115	25	14	3°		M5 * L100	OP-M10		--
0-329090-322	ST20-DC8-200	3~8	200	28	20	19	2°	DC8	M6 * L120	OP-M12	0-301940~652	--
0-329090-432	ST25-DC10-250	4~10	250	28	25	24	2°	DC10	M8 * L150	OP-M16	0-301940~662	--

* Stop nut is applied when clamping and unclamping tools.

► DC-E Collet >>

- The design of DC-E collets is emphasized on increasing the clamping force of end mills.



Type	DC-4E		DC-6E		DC-8E		DC-10E	
D	7		9.6		15		19.1	
L	31		36		45		52	
DC4-E		DC6-E		DC8-E		DC10-E		
Parts No.	Size(mm)	Parts No.	Size(mm)	Parts No.	Size(mm)	Parts No.	Size(mm)	
0-300090-102	2.0	0-300090-203	3.0	0-300090-303	3.0	-	-	
0-300090-103	3.0	0-300090-204	4.0	0-300090-304	4.0	0-300090-404	4.0	
0-300090-104	4.0	0-300090-206	6.0	0-300090-306	6.0	0-300090-406	6.0	
				0-300090-308	8.0	0-300090-408	8.0	
						0-300090-410	10.0	

Extension Bar For NC Spot Drill

► Solid Carbide Extension Bar >>

- TiN coated to identify the efficient length.



- NC Spot Drill

99616-10-M6 (P.15)
99616-14-M8 (P.17)

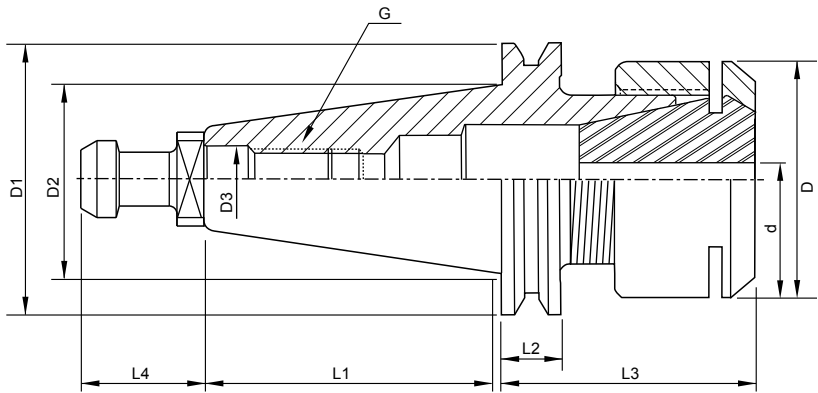


Order No.	Parts No.	ØD	T	L	M
00-99801-12W	BC12-100M06W	12	60	100	M6xP1.0
00-99801-14W	BC14-120M08W	14	70	120	M8xP1.25
00-99801-16W	BC16-150M08W	16	80	150	M8xP1.25

ISO 20/25 Tool Holder for Engraving Machine

► Tool Holder >>

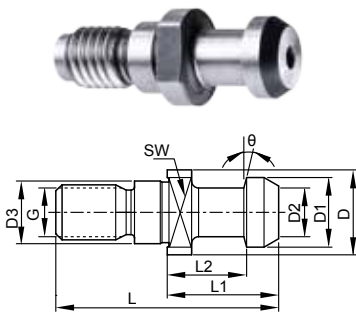
- Runout: 0.01mm (4xD).
- Max. speed: 50,000 r.p.m.
- Applied with pull stud and nut.



Taper Shank	Parts No.	Type	D1	D2	D3	D	L1	L2	L3	L4	G	Collet	Pull Stud	Clamping Nut
ISO20	0-225100-325	ISO20 ER16-R	33	22.2	8.5	22	33	8	30	12	M8	ER16	ISO20-D	CN-ER16R
ISO25	0-235100-425	ISO25 ER20-R	37	25.4	9	30	39.7	8	33	16	M8	ER20	ISO25-L	CN-ER20R

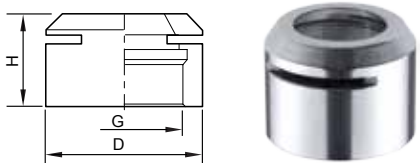
► Pull Stud >>

Parts No.	Type	L	L1	L2	D	D1	D2	D3	θ	G	SW
0-220000-150	ISO20-D	26	12	9	12	9	6	8.5	15°	M8	10
0-220000-250	ISO20-L	28	14	10	11	8.5	6	8.5	15°	M8	9
0-230000-150	ISO25-D	28	12	9	13	11	7	9	15°	M8	11
0-230000-250	ISO25-L	32	16	11.5	12	10	7	9	15°	M8	10



► Clamping Nut >>

Parts No.	Type	D	H	G
0-205100-302	CN-ER16R	22	19	M19X1.0P
0-205200-402	CN-ER20R	30	25	M25X1.5P



► Spring Collet >>

- Concentricity (0.01mm)

Parts No: 300100-3XX		Parts No: 300100-4XX	
Size	Range	Size	Range
ER16-3*	3-2	ER20-3	3-2
ER16-4	4-3	ER20-4	4-3
ER16-5	5-4	ER20-5	5-4
ER16-6	6-5	ER20-6	6-5
ER16-7	7-6	ER20-7	7-6
ER16-8	8-7	ER20-8	8-7
ER16-9	9-8	ER20-9	9-8
ER16-10	10-9	ER20-10*	10-9
* Ordering example ER16-3:300100-303-AA		ER20-11	11-10
		ER20-12	12-11
		ER20-13	13-12

* Ordering example
ER20-10:300100-410-AA