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.

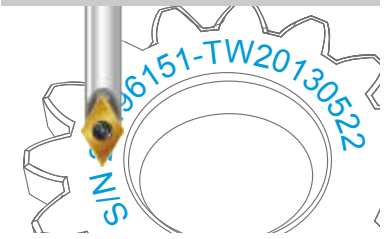
High Speed, High Feed Rate

- 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

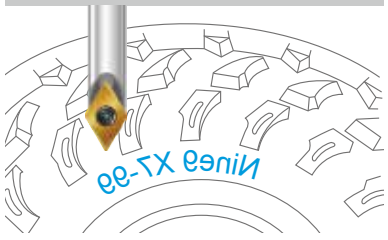
- Each indexable insert has 2 cutting edges.
- No resharpening required. Tool length is unchanged.
- No need to reset after changing insert or cutting edge.
- Excellent repeatability!

Serial number

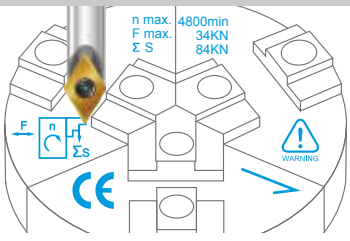


Logo outlines

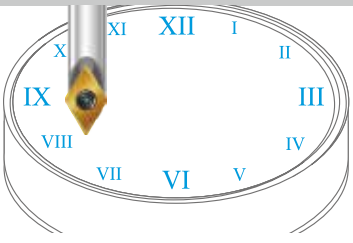
Mold & Die



Product info



Dial scales

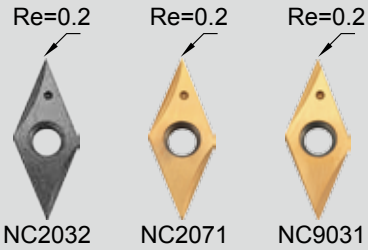


Applications

- 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°

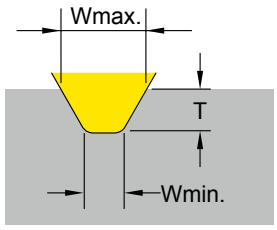


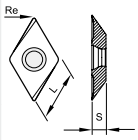
Inserts >>

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.

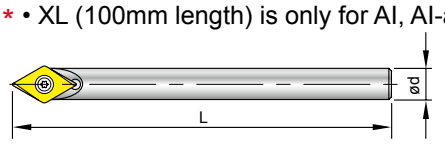
NC9031: • Fully positive ground rake angle, very sharp edge for shallow engraving.
• For non-ferrous metal such as aluminum, brass, copper, titanium, plastic and acrylic.

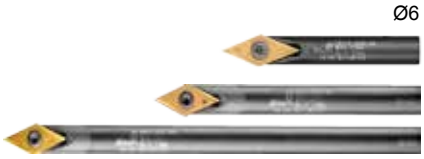


Code	Parts No.		Coating	Grade		Dimensions			W		T	
						L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.
0104501	V04506T1W06	NC2071	TiN	K20F		6.35	2.0	0.2	0.65	2.1	0.20	2.0
0104502		NC2032	TiAlN						0.65		0.20	
0104504		NC9031	TiN						0.45		0.05	

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.





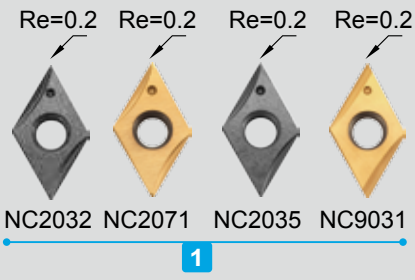
Code	Parts No.	Angle	Ød	L	L1	Screw / Key
691001	00-99619-V045-06	45°	6	40	---	NS-22044 0.9Nm
* 691002	00-99619-V045-06L			60	---	NK-T7
* 691003	00-99619-V045-06XL			100	---	

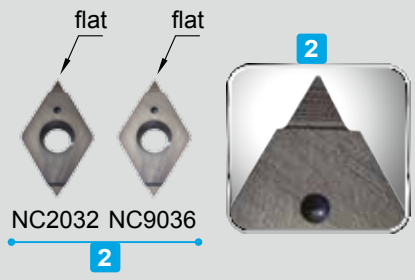
Note: • DC Slim chuck, see page 69.

Starter Kit >>

Code	Parts No.	Shank Ø	Angle	Insert included	Content
691201-4501	00-99619-V045-03K-71	Ø6 00-99619-V045-06	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 00-99619-V060-06	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 >>

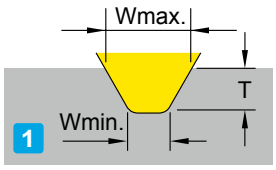
NC2032: • Long tool life
• For all kinds of steel from 30~50 HRC, carbon steel, alloy steel,and cast iron.

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 engraing.
• 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.



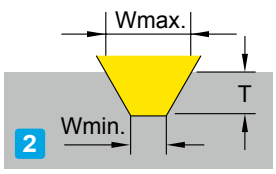
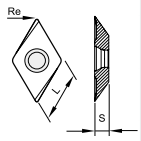
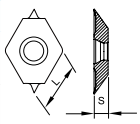
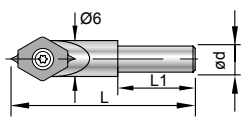
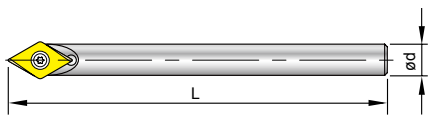


Fig	Code	Parts No.		Coating	Grade		Dimensions			W		T	
							L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.
1	0106001	V06006T1W06	NC2071	TiN	K20F		6.35	2.0	0.2	0.65	2.7	0.20	2.0
	0106002		NC2032	TiAlN						0.65		0.20	
	0106003		NC2035	ALDURA						0.65		0.20	
	0106004		NC9031	TiN						0.45		0.05	
Fig	Code	Parts No.		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.

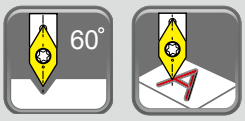


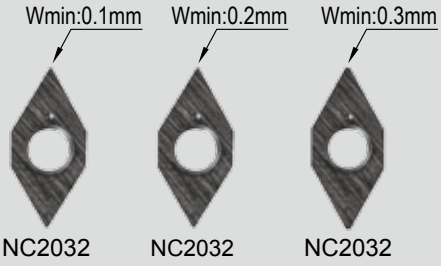


Code	Parts No.	Angle	Ød	L	L1	Screw / Key
692004	00-99619-V060-04	60°	4	30	12	 NS-22044 0.9Nm
692001	00-99619-V060-06		6	40	---	
* 692002	00-99619-V060-06L			60	---	 NK-T7
* 692003	00-99619-V060-06XL			100	---	

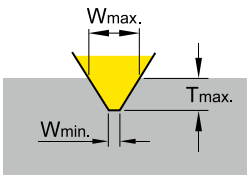
NEW

W060 Engraving Tools



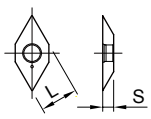


Inserts >>

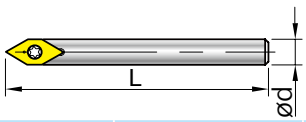


- Limited design, simply for thin or light engraving, used on engraving machine .
- Shank diameter 4mm is same as insert's size. Slim fits!
- Each insert has 2 cutting edges.

NC2032: • Universal grade for all unhardened steel.

New	Code	Parts No.	Angle	Coating		Dimensions L	Dimensions S	Wmin.	Wmax.	Tmax.
	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

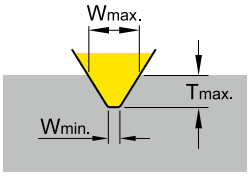
Holder >>



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

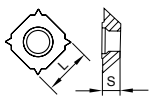
N9MT080201W

Inserts >>

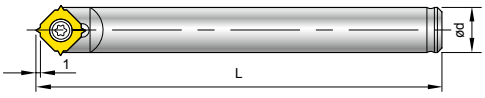


- No need to reset tool length after changing insert or cutting edge.
- Each insert has 4 cutting edges.

NC40: • Universal grade for all unhardened steel.
NC10: • Universal grade for non-ferrous metal and cast iron.

Code	Parts No.		Angle	Coating	Grade		Dimensions L	Dimensions S	Wmin.	Wmax.	Tmax.
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 Ap	0.2 mm	0.2 mm	0.05 mm, 4 times to cut to 0.2 mm
Roughness of bottom Ra	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			

Cutting data / Tool	00-99619-V060-06 V06006T1W06-NC2071	00-99619-V060-06 V06006T1W06-NC2071	00-99619-V060-06 V06006T1W06-NC2035
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 Ap	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

- Elmulsion 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:

• Step-1

Place the insert in the insert pocket.

• Step-2

Push insert against insert pocket and insert the screw.

• Step-3

Tighten the insert screw.

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

Mold & Die

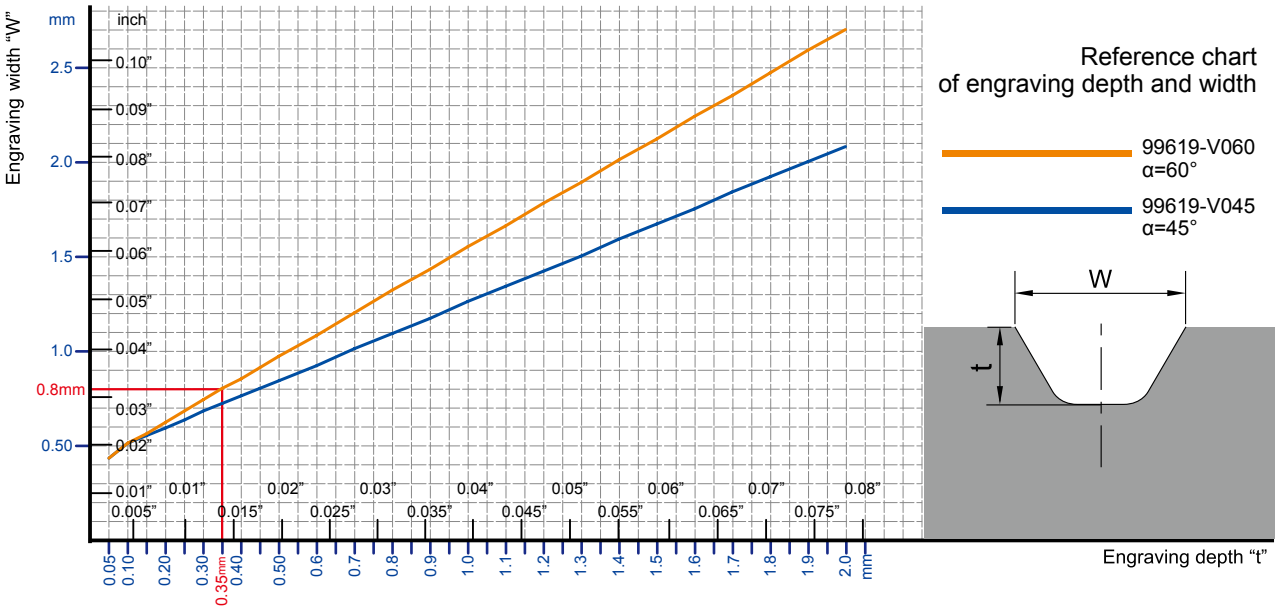
Product

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 >>



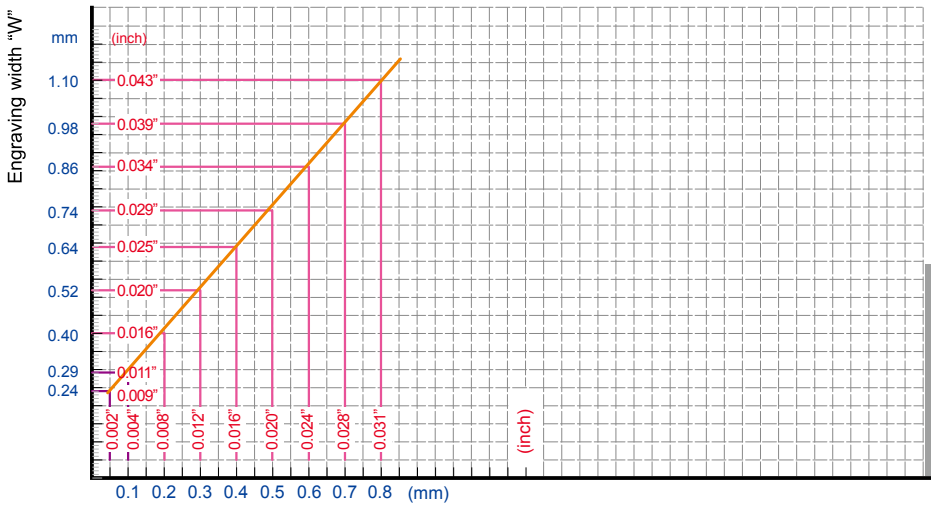
Work Material	S RPM	f (mm/rev.)	Grade of Insert
Carbon steel	5000~40000	0.008~0.05	NC2071,NC2032
Alloy steel	5000~40000	0.008~0.03	NC2032,NC2071
Stainless Steel	5000~40000	0.008~0.05	NC2071,NC9031
Cast iron	5000~40000	0.008~0.03	NC2032
Aluminum≧Non-Ferrous Metal	5000~40000	0.008~0.08	NC2071,NC9031
Hardened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

Tmax.:2mm

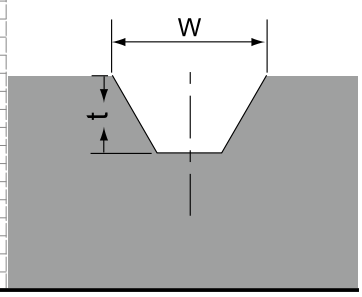
Material \ Ap	1st	2nd	3rd	4th	5th	6th	~	Fine finishing
Carbon steel	0.8	0.6	0.3	0.2	0.1	~	~	0.1
Alloy steel	0.5	0.4	0.3	0.3	0.2	0.2	0.1	0.1
Stainless Steel	0.5	0.4	0.3	0.3	0.2	0.2	0.1	0.05
Cast iron	0.8	0.6	0.3	0.2	0.1	~	~	0.1
Aluminum≧Non-Ferrous Metal	1.0	0.8	0.2	~	~	~	~	0.1
Hardened steel up to 56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

Cutting Data

V060 T1W03 >>



Reference chart
of engraving depth and width



Engraving depth "t"

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

You will be interested to know the whole range of Nine9 tools.