X060 Series

0.0039" & 0.0079"

Spotting 90° / 120° / 142°

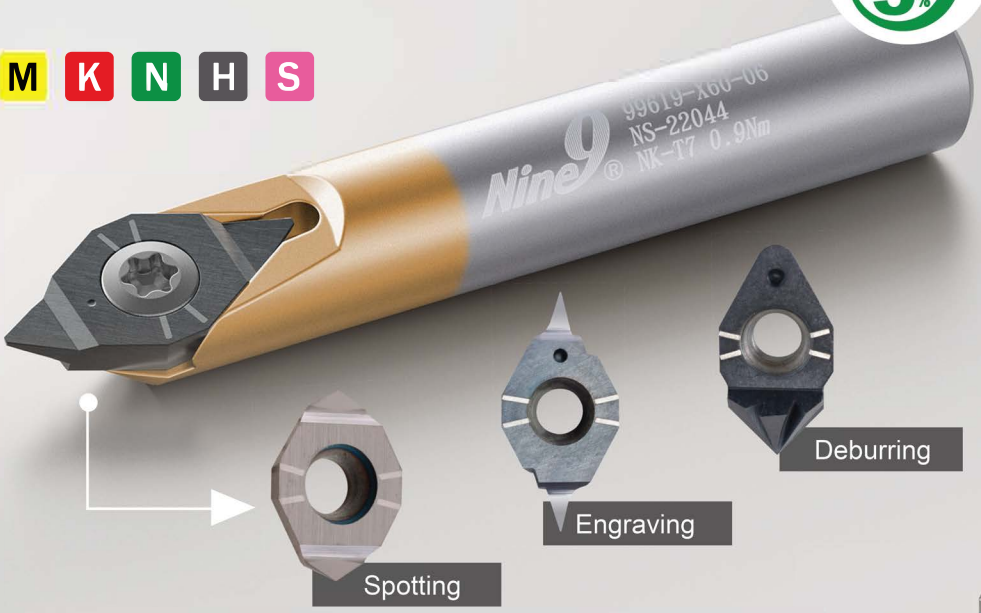
Engraving 30° / 45° / 60° / 90°

Deburring 60° / 90°

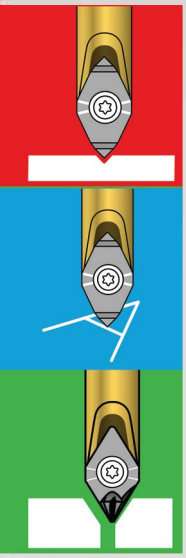
One holder supports the entire X060 series insert

MCC Minimum Consumable Cutting Indicator 5%

P M K N H S







No Need To Reset After Changing Insert Or Cutting Edge

- 2 Cutting edges.
- Excellent repeatability.

High Positive Rake Angle

- Very sharp edge.

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.
- Reduces cycle time!



Micro Spot Drill >>>

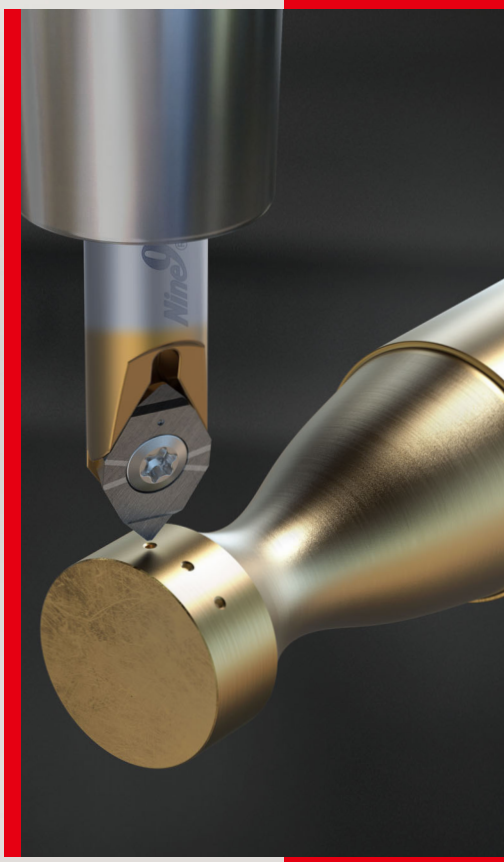
90° / 120° / 142°

0.0039" & 0.0079"

It produces a consistent surface for micro drill successfully to enter the workpiece.

P M K N H

MCC Minimum Consumable Cutting Indicator 5%



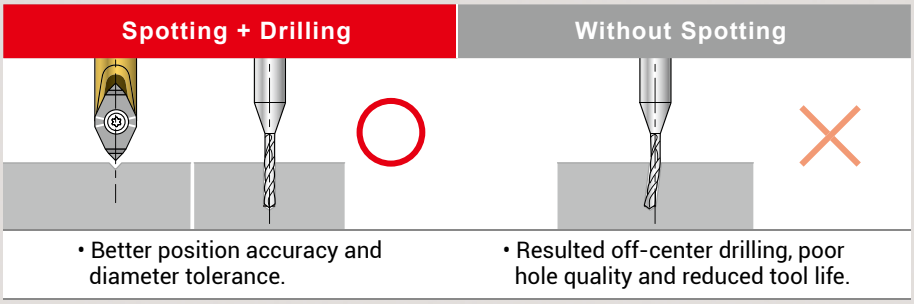
One Holder Supports The Entire X060 Series Insert.



Features >

Each Insert Has 2 Cutting Edges.

- Micro spot drill geometries are designed to optimize rigidity and accuracy with a point angle to guide micro drill towards the hole's center line.
- Carbide insert can stand very long tool life.
- It produces a consistent surface for micro drill to enter the workpiece especially for round, angled or curved surfaces.



0.0039” & 0.0079”
Micro Spot Drill 90°, 120° & 142°

90°
120°
142°

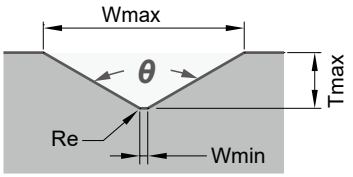


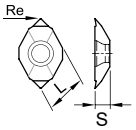
Inserts >>

NC2032: • For all kinds of steel from < 40 HRC, carbon steel, alloy steel,and cast iron.

NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to 56 HRC.

XP9001: • For non-ferrous metal, aluminum, brass, copper, plastic, acrylic.



Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax.	Tmax.
90°	X060A90W010R	NC2032	TiAlN	K20F		6 (0.236”)	2.05 (0.081”)	0.02 (0.0008”)	0.1 (0.004”)	1.1 (0.043”)	0.5 (0.020”)
		NC2035	ALDURA								
		XP9001	Uncoated								
90°	*X060A90W020R	NC2032	TiAlN	K20F				0.04 (0.0015”)	0.2 (0.008”)	2.2 (0.087”)	1.0 (0.040”)
		NC2035	ALDURA								
		XP9001	Uncoated								
120°	X060A120W010R	NC2032	TiAlN	K20F				0.02 (0.0008”)	0.1 (0.004”)	2.53 (0.100”)	0.7 (0.028”)
142°	X060A142W010R	NC2032	TiAlN	K20F				0.02 (0.0008”)	0.1 (0.004”)	2.42 (0.095”)	0.4 (0.016”)

* X060A90W020R is also good for engraving.

Holder >>

• One holder supports the entire X060 series of carbide inserts.





Parts No.	Shank	Ød	L	Screw	Key
99619-X060-06	Steel	6 (0.236”)	40 (1.575”)	NS-22044 0.9Nm	NK-T7
99619-X060-06L	Carbide		60 (2.362”)		
99619-X060-06LS	Steel				
99619-X060-06XL	Carbide		100 (3.937”)		
99619-X060-08	Steel	8 (0.315”)	60 (2.362”)		

Cutting Data >>

Workpiece Material	S (r.p.m)	IPR (inch/rev.) X060A90W010R	X060A90W020R	X060A120W010R X060A142W010R	Grade of Insert
P Carbon steel C<0.3%	8000 ~ 40000	0.00008 ~ 0.0005	0.00008 ~ 0.0006	0.00008 ~ 0.0006	NC2032
P Carbon steel C>0.3%		0.00008 ~ 0.0004	0.00008 ~ 0.0005	0.00008 ~ 0.0005	NC2032
P Alloy steel		0.00008 ~ 0.0004	0.00008 ~ 0.0004	0.00008 ~ 0.0004	NC2032, NC2035
M Stainless steel		0.00008 ~ 0.0003	0.00008 ~ 0.0004	0.00008 ~ 0.0004	NC2032
K Casting iron		0.00008 ~ 0.0004	0.00008 ~ 0.0004	0.00008 ~ 0.0004	NC2032
N Non-ferrous metal (Al, Cu)		0.00008 ~ 0.0006	0.00008 ~ 0.0008	-	XP9001
H Hardened steel up 56 HRC		0.00008 ~ 0.0002	0.00008 ~ 0.0002	-	NC2035

Engraving Tool >>>

30° / 45° / 60° / 90°

This is a revolutionary new concept of engraving tools with indexable carbide insert.
Provide HIGH QUALITY ENGRAVING in most kinds of material.
Higher speed and feed rate, dramatically reducing your cycle time.

P M K N H S



No Need To Reset After Changing Insert Or Cutting Edge

- 2 Cutting Edges.
- Excellent repeatability!



Features >

High Positive Rake Angle

- Very sharp edge for shallow engraving.
- Suitable for all types of materials, such as plastic, non-ferrous metal, aluminum, copper, carbon steel and stainless steel.

Multi-Side Grinding

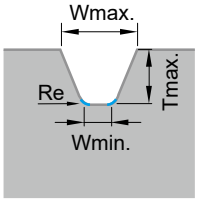
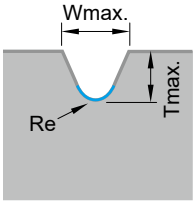
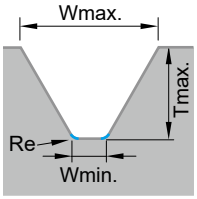
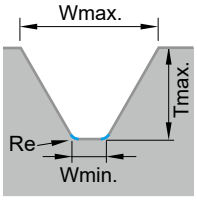
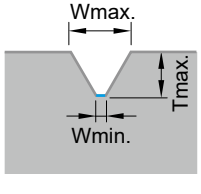
- Full peripherally ground insert to ensure efficient repeatability.
- It performs excellently without producing any burrs, especially in copper, aluminum and stainless steel.

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!

Special forms are available on request

Engraving Tool System

Type	Form	Angle	Insert	Wmin.	Wmax.	Tmax.	Holder
X060 Series	 Radius Angled	**30°**	 X060A30W...	0.2 (0.008")	0.52 (0.020")	0.6 (0.024")	 99619-X060... Ø6 (0.236") Ø8 (0.315")
		45°	 X060A45W...		0.86 (0.034")	0.8 (0.031")	
		60°	 X060A60W...		1.36 (0.054")	1.0 (0.039")	
		90°	 X060A90W...		2.2 (0.087")	1.0 (0.039")	
	 Radius	**30°**	 X060A30R...	Re: 0.2 (0.008")	0.63 (0.025")	0.6 (0.024")	
		45°	 X060A45R...		0.93 (0.037")	0.8 (0.031")	
		60°	 X060A60R...		1.39 (0.055")	1.0 (0.039")	
V045 V060 Series	 Radius Angled	**45°**	 V04506T1W	0.45 (0.018")	2.1 (0.083")	2.0 (0.079")	 V04506T1W Ø6 (0.236") Ø8 (0.315")
				0.65 (0.026")			
	 Radius Angled / Angled	**60°**	 V06006T1W	0.25 (0.01")	1.1 (0.043")	0.8 (0.031")	 V06006T1W Ø4 (0.157") Ø6 (0.236") Ø8 (0.315")
				0.45 (0.018")	2.7 (0.106")	2.0 (0.079")	
				0.65 (0.026")	2.7 (0.106")	2.0 (0.079")	
N9MT-W Series	 Angled	**60°**	 N9MT080201W -60-NC40	0.2 (0.008")	1.1 (0.043")	0.8 (0.031")	 99616-10...SW Ø10 (0.394") Ø3/8"
		90°	 N9MT080201W	0.2 (0.008")	2.0 (0.079")	0.9 (0.035")	

30° X060 Engraving Tool 30°



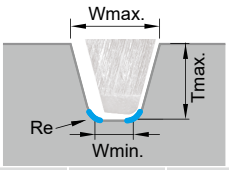
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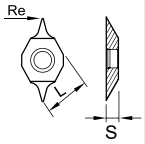
NC2032: • For all kinds of steel from < 40 HRC, carbon steel, alloy steel,and cast iron.

NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to 56 HRC.

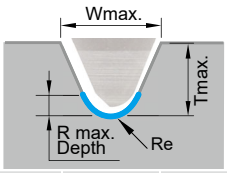
XP9001: • For non-ferrous metal, aluminum, brass, copper, plastic, acrylic.

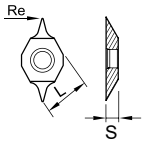
• Radius Angled Form



Angle	Parts No.		Coating	Grade		Dimensions			Wmin.	Wmax.	Tmax.
						L	S	Re			
30°	X060A30W020R	NC2032	TiAlN	K20F		6 (0.236")	2.05 (0.081")	0.04 (0.0015")	0.20 (0.008")	0.52 (0.020")	0.6 (0.024")
		NC2035	ALDURA								
		XP9001	Uncoated								

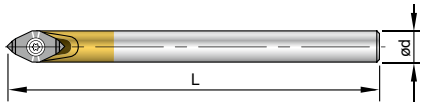
• Radius Form



Angle	Parts No.		Coating	Grade		Dimensions			R max. Depth	Wmax.	Tmax.
						L	S	Re			
30°	X060A30R020	NC2032	TiAlN	K20F		6 (0.236")	2.05 (0.081")	0.2 (0.008")	0.15 (0.006")	0.63 (0.025")	0.6 (0.024")
		NC2035	ALDURA								
		XP9001	Uncoated								

Holder >>

• One holder supports the entire X060 series of carbide inserts.





Parts No.	Shank	Ød	L	Screw	Key
99619-X060-06	Steel	6 (0.236")	40 (1.575")	NS-22044 0.9Nm	NK-T7
99619-X060-06L	Carbide		60 (2.362")		
99619-X060-06LS	Steel				
99619-X060-06XL	Carbide		100 (3.937")		
99619-X060-08	Steel	8 (0.315")	60 (2.362")		

X060 Engraving Tool 45°



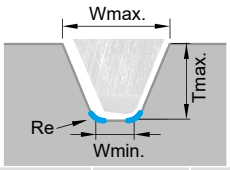
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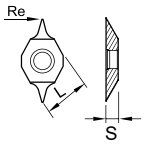
NC2032: • For all kinds of steel from < 40 HRC, carbon steel, alloy steel,and cast iron.

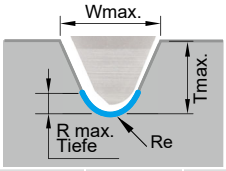
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to 56 HRC.

XP9001: • For non-ferrous metal, aluminum, brass, copper, plastic, acrylic.

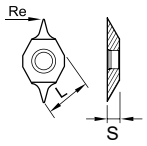
• Radius Angled Form



Angle	Parts No.		Coating	Grade		Dimensions			Wmin.	Wmax.	Tmax.
						L	S	Re			
45°	X060A45W020R	NC2032	TiAlN	K20F		6 (0.236”)	2.05 (0.081”)	0.04 (0.0015”)	0.20 (0.008”)	0.86 (0.034")	0.8 (0.031")
		NC2035	ALDURA								
		XP9001	Uncoated								

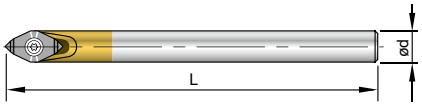


• Radius Form

Angle	Parts No.		Coating	Grade		Dimensions			R max. Depth	Wmax.	Tmax.
						L	S	Re			
45°	X060A45R020	NC2032	TiAlN	K20F		6 (0.236”)	2.05 (0.081”)	0.2 (0.008”)	0.12 (0.005")	0.93 (0.037")	0.8 (0.031")
		NC2035	ALDURA								
		XP9001	Uncoated								

Holder >>

• One holder supports the entire X060 series of carbide inserts.





Parts No.	Shank	Ød	L	Screw	Key
99619-X060-06	Steel	6 (0.236”)	40 (1.575”)	NS-22044 0.9Nm	NK-T7
99619-X060-06L	Carbide		60 (2.362”)		
99619-X060-06LS	Steel				
99619-X060-06XL	Carbide		100 (3.937”)		
99619-X060-08	Steel	8 (0.315”)	60 (2.362”)		

60° X060 Engraving Tool 60°

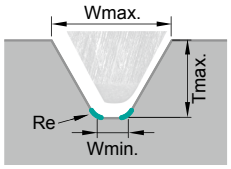


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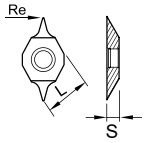
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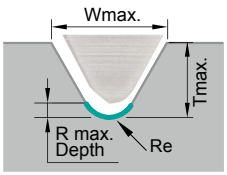
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to 56 HRC.

XP9001: • For non-ferrous metal, aluminum, brass, copper, plastic, acrylic.

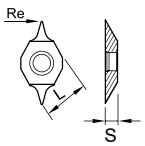


• Radius Angled Form

Angle	Parts No.		Coating	Grade		Dimensions			Wmin.	Wmax.	Tmax.
						L	S	Re			
60°	X060A60W020R	NC2032	TiAlN	K20F		6 (0.236”)	2.05 (0.081”)	0.04 (0.0015”)	0.2 (0.008”)	1.36 (0.054")	1.0 (0.039")
		NC2035	ALDURA								
		XP9001	Uncoated								

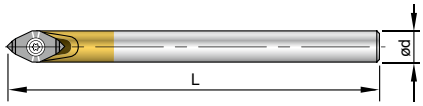


• Radius Form

Angle	Parts No.		Coating	Grade		Dimensions			R max. Depth	Wmax.	Tmax.
						L	S	Re			
60°	X060A60R020	NC2032	TiAlN	K20F		6 (0.236”)	2.05 (0.081”)	0.2 (0.008”)	0.1 (0.004")	1.39 (0.055")	1.0 (0.039")
		NC2035	ALDURA								
		XP9001	Uncoated								

Holder >>

• One holder supports the entire X060 series of carbide inserts.





Parts No.	Shank	Ød	L	Screw	Key
99619-X060-06	Steel	6 (0.236”)	40 (1.575”)	NS-22044 0.9Nm	NK-T7
99619-X060-06L	Carbide		60 (2.362”)		
99619-X060-06LS	Steel				
99619-X060-06XL	Carbide		100 (3.937”)		
99619-X060-08	Steel	8 (0.315”)	60 (2.362”)		

X060 Engraving Tool 90°

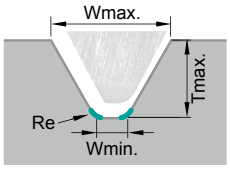


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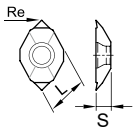
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NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to 56 HRC.

XP9001: • For non-ferrous metal, aluminum, brass, copper, plastic, acrylic.



• Radius Angled Form

Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax.	Tmax.
90°	X060A90W020R	NC2032	TiAlN	K20F		6 (0.236")	2.05 (0.081")	0.04 (0.0015")	0.2 (0.008")	2.2 (0.087")	1.0 (0.039")
		NC2035	ALDURA								
		XP9001	Uncoated								

Holder >>

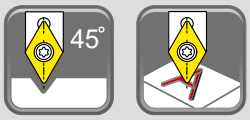
• One holder supports the entire X060 series of carbide inserts.





Parts No.	Shank	Ød	L	Screw	Key
99619-X060-06	Steel	6 (0.236")	40 (1.575")	NS-22044 0.9Nm	NK-T7
99619-X060-06L	Carbide		60 (2.362")		
99619-X060-06LS	Steel				
99619-X060-06XL	Carbide		100 (3.937")		
99619-X060-08	Steel	8 (0.315")	60 (2.362")		

45° V045 Engraving Tool 45°

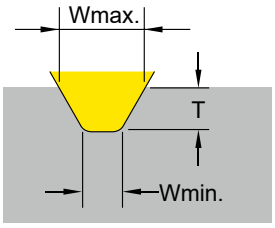


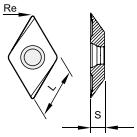
Inserts >>

NC2071: • Strong edge on chip-breaker, best suited for min. DOC 0.2mm.
• Universal grade for all kinds of steel <30 HRC, non-ferrous metal and stainless steel.

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

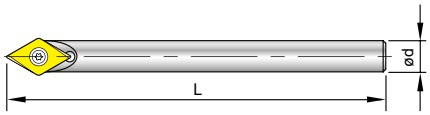
NC9031: • Fully positive ground rake angle, very sharp edge for shallow engraving.
• For non-ferrous metal such as aluminum, brass, copper, titanium, plastic and acrylic.



Angle	Parts No.		Coating	Grade		Dimensions			W		T	
						L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.
45°	V04506T1W06	NC2071	TiN	K20F		6.35 (0.250”)	2.0 (0.079”)	0.2 (0.008”)	0.65 (0.026”)	2.1 (0.083”)	0.2 (0.008”)	2.0 (0.079”)
		NC2032	TiAlN						0.65 (0.026”)		0.2 (0.008”)	
		NC9031	TiN						0.45 (0.018”)		0.05 (0.002”)	

Holder >>

• Carbide shank holders for high speed cutting.
• XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.





Angle	Parts No.	Shank	Ød	L	Screw	Key
45°	99619-V045-06	Steel	6 (0.236”)	40 (1.575”)	NS-22044 0.9Nm	NK-T7
	99619-V045-06L	Carbide		60 (2.362”)		
	99619-V045-06XL	Carbide		100 (3.937”)		
	99619-V045-08	Steel	8 (0.315”)	60 (2.362”)		

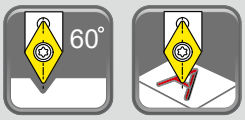
Starter Kit >> V045 & V060

Angle	Parts No.	Shank Ø	Insert included	Content
45°	99619-V045-03K-71	Ø6 (0.236”) 99619-V045-06	V04506T1W06-NC2071	1 x Holder 1 x T7 Key 3 x inserts
	99619-V045-03K-32		V04506T1W06-NC2032	
	99619-V045-03K-31		V04506T1W06-NC9031	
60°	99619-V060-03K-71	Ø6 (0.236”) 99619-V060-06	V06006T1W06-NC2071	
	99619-V060-03K-32		V06006T1W06-NC2032	
	99619-V060-03K-35		V06006T1W06-NC2035	
	99619-V060-03K-31		V06006T1W06-NC9031	



V060 Engraving Tool 60°

60°



Inserts >>

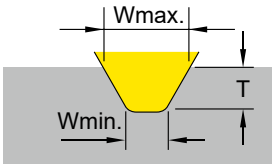
NC2071: • Strong edge on chip-breaker, best suited for min. DOC 0.2mm.
• Universal grade for all kinds of steel <30HRC, non-ferrous metal and stainless steel.

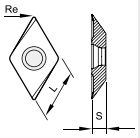
NC2032: • Long tool life.
• For all kinds of steel from 30~50 HRC, carbon steel, alloy steel,and cast iron.

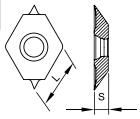
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to 56 HRC.

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.

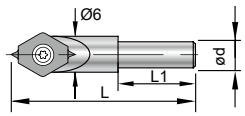


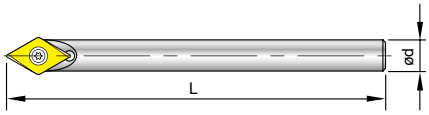
Angle	Parts No.		Coating	Grade		Dimensions			W		T	
						L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.
60°	V06006T1W06	NC2071	TiN	K20F		6.35 (0.250")	2.0 (0.079")	0.2 (0.008")	0.65 (0.026")	2.7 (0.106")	0.2 (0.008")	2.0 (0.079")
		NC2032	TiAlN						0.65 (0.026")		0.2 (0.008")	
		NC2035	ALDURA						0.65 (0.026")		0.2 (0.008")	
		NC9031	TiN						0.45 (0.018")		0.05 (0.002")	

Angle	Parts No.		Coating	Grade		Dimensions			W		T	
						L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.
60°	V06006T1W03	NC2032	TiAlN	K20F		6.35 (0.250")	2.0 (0.079")	---	0.25 (0.01")	1.1 (0.043")	0.05 (0.002")	0.8 (0.031")
		NC9036	DLC									

Holder >>

• Carbide shank holders for high speed cutting.
• XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.







Angle	Parts No.	Shank	Ød	L	L1	Screw	Key
60°	99619-V060-04	Steel	4 (0.157")	30 (1.181")	12 (0.472")	NS-22044 0.9Nm	NK-T7
	99619-V060-06	Steel	6 (0.236")	40 (1.575")	---		
	99619-V060-06L	Carbide		60 (2.462")	---		
	99619-V060-06XL	Carbide		100 (3.937")	---		
	99619-V060-08	Steel	8 (0.315")	60 (2.462")	---		

60°
90°

N9MT080201W Engraving Tool 60° / 90°



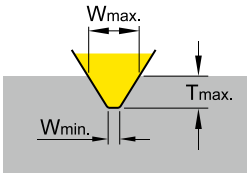
Inserts >>

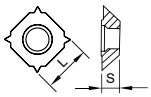
- No need to reset tool length after changing insert or cutting edge.
- The inserts can be used for small diameter spotting.
- Each insert has 4 cutting edges.

60-NC40: • Very positive angle for 60° engraving for all kind of unhardened steel and cast iron.

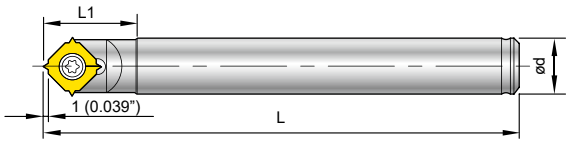
NC40: • Universal grade for all unhardened steel.

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

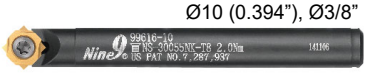


Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Wmin.	Wmax.	Tmax.
60°	N9MT080201W	60-NC40	TiN	K20F		8 (0.315")	2.38 (0.094")	0.2 (0.008")	1.1 (0.043")	0.8 (0.031")
90°		NC40	TiN	K20F		8 (0.315")	2.38 (0.094")	0.2 (0.008")	2.0 (0.079")	0.9 (0.035")
90°		NC10	TiAlN	K20F		8 (0.315")	2.38 (0.094")	0.2 (0.008")	2.0 (0.079")	0.9 (0.035")

Holder >>



Ø10 (0.394"), Ø3/8"



Parts No.	Ød	L	L1	Screw	Key
99616-10	10 (0.394")	90 (3.543")	18 (0.709")	NS-30055 2.0 Nm	NK-T8
99616-3/8	3/8"	90 (3.543")			

Cutting Data >>

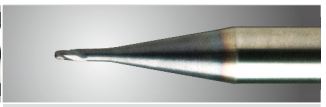
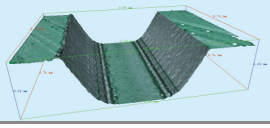
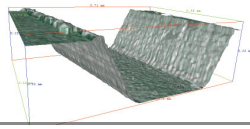
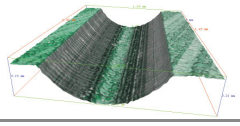
(Tmax.: 0.0315")



Workpiece Meterial	S (r.p.m)	IPR (inch/rev.)	Insert Grade	Depth of cut (inch) 1st	2nd	3rd	Finishing
P All unhardened steel	5000 ~ 20000	0.0003" ~ 0.0008"	60-NC40,NC40	0.012"	0.008"	0.008"	0.002"
K Cast iron			60-NC40, NC10				
N Non-Ferrous Metal			NC10				

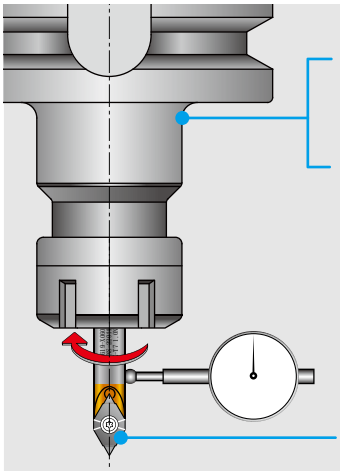
Performance

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	P SKD 51	M SS	H 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 >>



1 Recommended of tool holders
High precision spring collet chucks, shrink fit chucks, hydraulic chuck.

2 Pre-balance the tool holder
minimum **G6.3/10,000 r.p.m.** is necessary.

3 The downward feed rate of the Z-axis
should be **reduced to 50%** of the table feed rate.

4 Tool shank runout:
below 0.01 mm. (0.004")

5 Torque screwdriver is recommended

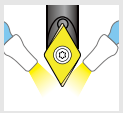
6 Cutting fluid and cooling condition

Emusion / Oil



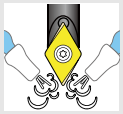
P Steel
M Stainless Steel
S Titanium
H Hardened Steel

Oil



N Non-Ferrous

Air



K Cast Iron

Clamping the engraving insert

• Place and hold the insert in the insert pocket against the positioning side.

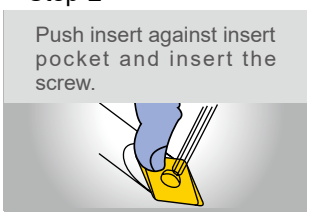
• Step-1

Place the insert in the insert pocket.



• Step-2

Push insert against insert pocket and insert the screw.



• Step-3

Tighten the insert screw.

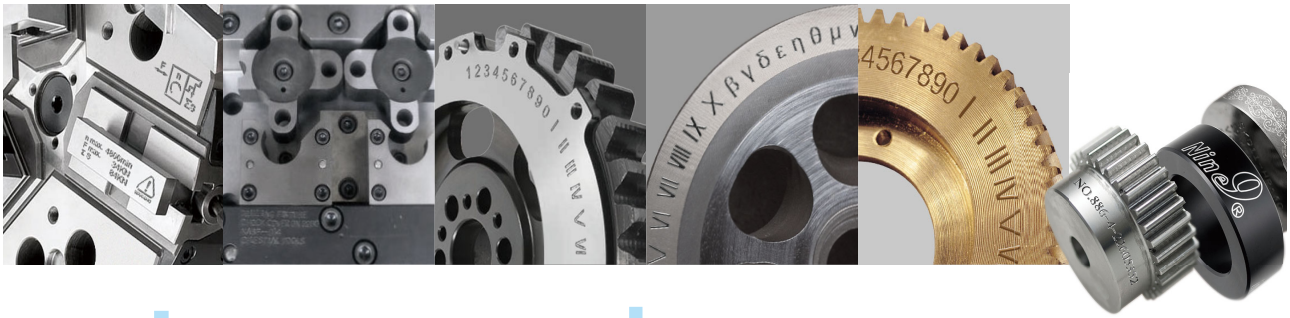


Engraving Applications

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



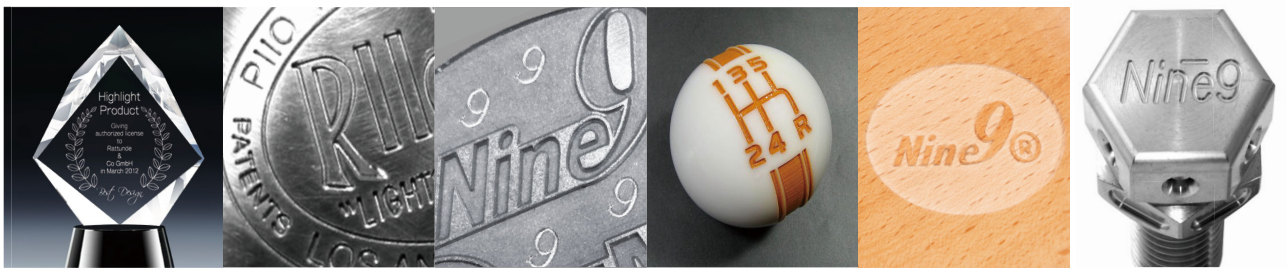
Luxury goods



Mold & Die



Product



Cutting Data >> X060 Engraving

X060A30W020R / X060A30R020

(Tmax. : 0.024")

	Workpiece Material	S (r.p.m)	IPR (inch/rev.) Radius Angled	IPR (inch/rev.) Radius	Grade of Insert	Depth of cut (inch) 1st	2nd	3rd	4th	5th ~	Finishing
P	Carbon steel C<0.3%	8000 ~ 40000	0.00004" ~ 0.00039"	0.00008" ~ 0.00059"	NC2032	0.008"	0.004"	0.002"	0.002"	0.002"	0.0008"
P	Carbon steel C>0.3%		0.00004" ~ 0.00031"	0.00008" ~ 0.00047"	NC2032	0.006"	0.004"	0.002"	0.002"	0.002"	0.0008"
P	Alloy steel		0.00004" ~ 0.00024"	0.00008" ~ 0.00039"	NC2032, NC2035	0.006"	0.004"	0.002"	0.002"	0.001"	0.0008"
M	Stainless Steel		0.00004" ~ 0.00024"	0.00008" ~ 0.00039"	NC2032	0.004"	0.002"	0.002"	0.001"	0.001"	0.0008"
K	Cast iron		0.00004" ~ 0.00024"	0.00008" ~ 0.00039"	NC2032	0.006"	0.004"	0.002"	0.002"	0.001"	0.0008"
N	Aluminum		0.00004" ~ 0.00047"	0.00008" ~ 0.00079"	XP9001	0.008"	0.004"	0.004"	0.002"	0.002"	0.0008"
N	Copper, Brass		0.00004" ~ 0.00047"	0.00008" ~ 0.00079"	XP9001	0.008"	0.004"	0.004"	0.002"	0.002"	0.0008"
H	Hardened Steel Up to 56 HRC		0.00004" ~ 0.00020"	0.00008" ~ 0.00024"	NC2035	0.004"	0.002"	0.001"	0.001"	0.0008"	0.0004"

X060A45W020R / X060A45R020

(Tmax. : 0.031")

	Workpiece Material	S (r.p.m)	IPR (inch/rev.) Radius Angled	IPR (inch/rev.) Radius	Grade of Insert	Depth of cut (inch) 1st	2nd	3rd	4th	5th ~	Finishing
P	Carbon steel C<0.3%	8000 ~ 40000	0.00008" ~ 0.00047"	0.00008" ~ 0.00059"	NC2032	0.012"	0.008"	0.004"	0.002"	0.002"	0.001"
P	Carbon steel C>0.3%		0.00008" ~ 0.00039"	0.00008" ~ 0.00047"	NC2032	0.010"	0.006"	0.004"	0.002"	0.002"	0.001"
P	Alloy steel		0.00008" ~ 0.00039"	0.00008" ~ 0.00039"	NC2032, NC2035	0.008"	0.004"	0.002"	0.002"	0.002"	0.001"
M	Stainless Steel		0.00008" ~ 0.00031"	0.00008" ~ 0.00039"	NC2032	0.008"	0.004"	0.002"	0.002"	0.002"	0.001"
K	Cast iron		0.00008" ~ 0.00039"	0.00008" ~ 0.00039"	NC2032	0.008"	0.004"	0.004"	0.002"	0.002"	0.001"
N	Aluminum		0.00008" ~ 0.00059"	0.00008" ~ 0.00079"	XP9001	0.012"	0.008"	0.004"	0.004"	0.002"	0.001"
N	Copper, Brass		0.00008" ~ 0.00059"	0.00008" ~ 0.00079"	XP9001	0.012"	0.008"	0.004"	0.004"	0.002"	0.001"
H	Hardened Steel Up to 56 HRC		0.00008" ~ 0.00024"	0.00008" ~ 0.00024"	NC2035	0.006"	0.004"	0.002"	0.002"	0.001"	0.0008"

X060A60W020R / X060A60R020

(Tmax. : 0.039")

	Workpiece Material	S (r.p.m)	IPR (inch/rev.) Radius Angled	IPR (inch/rev.) Radius	Grade of Insert	Depth of cut (inch) 1st	2nd	3rd	4th	5th ~	Finishing
P	Carbon steel C<0.3%	8000 ~ 40000	0.00008" ~ 0.00047"	0.00008" ~ 0.00059"	NC2032	0.012"	0.008"	0.004"	0.004"	0.002"	0.001"
P	Carbon steel C>0.3%		0.00008" ~ 0.00039"	0.00008" ~ 0.00047"	NC2032	0.012"	0.008"	0.004"	0.004"	0.002"	0.001"
P	Alloy steel		0.00008" ~ 0.00039"	0.00008" ~ 0.00039"	NC2032, NC2035	0.012"	0.004"	0.004"	0.002"	0.002"	0.001"
M	Stainless Steel		0.00008" ~ 0.00031"	0.00008" ~ 0.00039"	NC2032	0.008"	0.004"	0.004"	0.002"	0.002"	0.001"
K	Cast iron		0.00008" ~ 0.00039"	0.00008" ~ 0.00039"	NC2032	0.012"	0.004"	0.004"	0.002"	0.002"	0.001"
N	Aluminum		0.00008" ~ 0.00059"	0.00008" ~ 0.00079"	XP9001	0.012"	0.008"	0.004"	0.004"	0.002"	0.001"
N	Copper, Brass		0.00008" ~ 0.00059"	0.00008" ~ 0.00079"	XP9001	0.012"	0.008"	0.004"	0.004"	0.002"	0.001"
H	Hardened Steel Up to 56 HRC		0.00008" ~ 0.00024"	0.00008" ~ 0.00024"	NC2035	0.008"	0.004"	0.002"	0.002"	0.001"	0.0008"

X060A90W020R

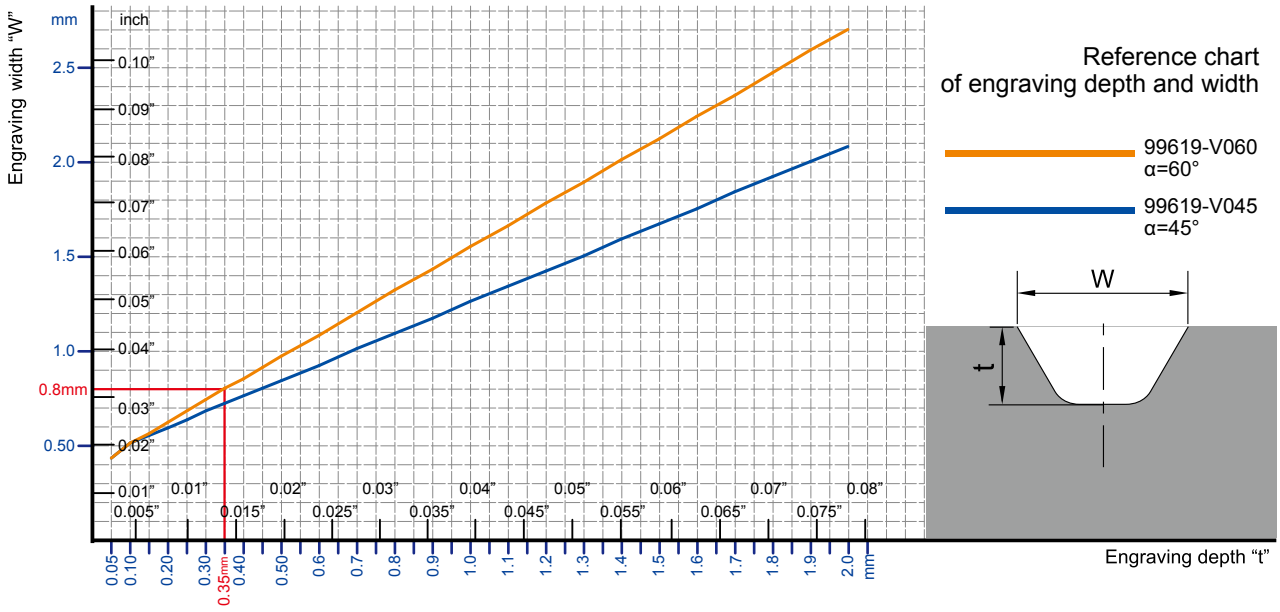
(Tmax. : 0.039")

	Workpiece Material	S (r.p.m)	IPR (inch/rev.)	Grade of Insert	Depth of cut (inch) 1st	2nd	3rd	4th	5th ~	Finishing
P	Carbon steel C<0.3%	8000 ~ 40000	0.00008" ~ 0.00059"	NC2032	0.014"	0.010"	0.006"	0.004"	0.002"	0.001"
P	Carbon steel C>0.3%		0.00008" ~ 0.00047"	NC2032	0.012"	0.008"	0.004"	0.004"	0.002"	0.001"
P	Alloy steel		0.00008" ~ 0.00039"	NC2032, NC2035	0.012"	0.004"	0.004"	0.002"	0.002"	0.001"
M	Stainless steel		0.00008" ~ 0.00039"	NC2032	0.008"	0.004"	0.004"	0.002"	0.002"	0.001"
K	Casting iron		0.00008" ~ 0.00039"	NC2032	0.012"	0.004"	0.004"	0.002"	0.002"	0.001"
N	Non-ferrous metal (Al, Cu)		0.00008" ~ 0.00079"	XP9001	0.016"	0.012"	0.008"	0.004"	0.002"	0.001"
N	Copper, Brass		0.00008" ~ 0.00079"	XP9001	0.016"	0.012"	0.008"	0.004"	0.002"	0.001"
H	Hardened steel up 56 HRC		0.00008" ~ 0.00024"	NC2035	0.008"	0.004"	0.002"	0.002"	0.001"	0.0008"

Cutting Data >> V045/V060 Engraving

- 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

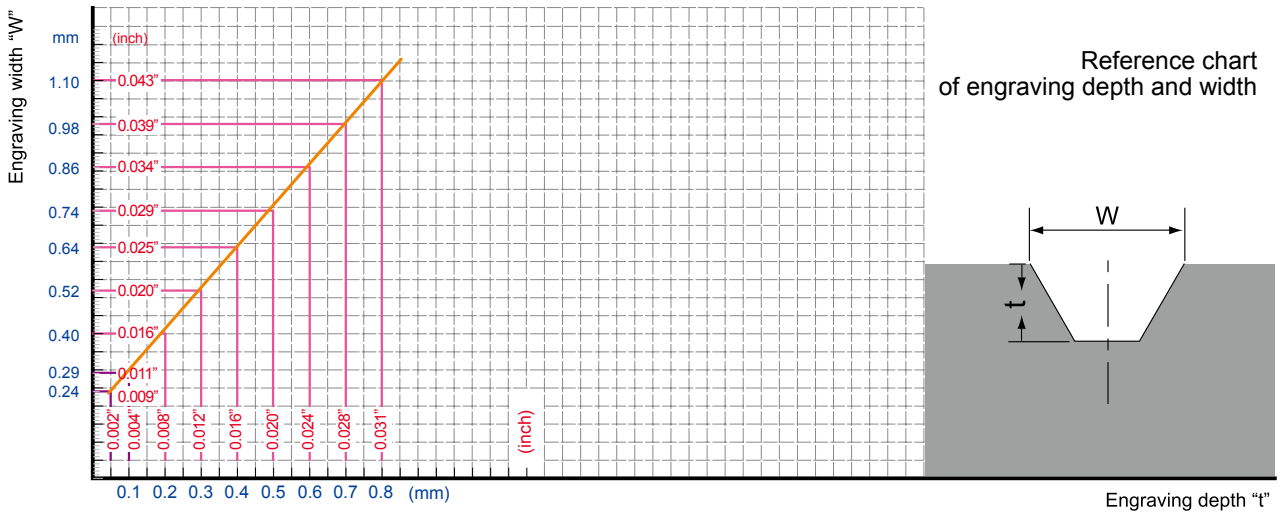


Work Material		S (r.p.m)	IPR (inch/rev.)	Grade of Insert
P	Carbon steel	5000~40000	0.0003~0.0020	NC2071,NC2032
P	Alloy steel	5000~40000	0.0003~0.0012	NC2032,NC2071
M	Stainless steel	5000~40000	0.0003~0.0020	NC2071,NC9031
K	Casting iron	5000~40000	0.0003~0.0012	NC2032
N	Aluminum≧Non-ferrous metal	5000~40000	0.0003~0.0031	NC2071,NC9031
H	Hardened steel up to 56 HRC	6000~35000	0.0001~0.0004	NC2035

(Tmax.:0.079")

Material \ Ap		1st	2nd	3rd	4th	5th	6th	~	Fine finishing
P	Carbon steel	0.031"	0.024"	0.012"	0.008"	0.004"	~	~	0.002"
P	Alloy steel	0.020"	0.016"	0.012"	0.012"	0.008"	0.008"	0.004"	0.002"
M	Stainless steel	0.020"	0.016"	0.012"	0.012"	0.008"	0.008"	0.004"	0.002"
K	Casting iron	0.031"	0.024"	0.012"	0.008"	0.004"	~	~	0.002"
N	Aluminum≧Non-ferrous metal	0.039"	0.031"	0.008"	~	~	~	~	0.002"
H	Hardened steel up to 56 HRC	0.008"	0.008"	0.006"	0.006"	0.004"	0.004"	0.004"	0.002"

V060 T1W03



Workpiece Meterial		S (r.p.m)	IPR (inch/rev.)	Grade of Insert
P	Carbon steel C<0.3%	8000 ~ 40000	0.0002 ~ 0.0004	NC2032
P	Carbon steel C>0.3%	8000 ~ 40000	0.0002 ~ 0.0006	NC2032
P	Alloy steel	6000 ~ 35000	0.0002 ~ 0.0004	NC2032
M	Stainless steel	8000 ~ 35000	0.0001 ~ 0.0004	NC9036
K	Casting iron	6000 ~ 35000	0.0002 ~ 0.0006	NC2032
N	Aluminum	8000 ~ 40000	0.0002 ~ 0.0006	NC9036
N	Copper, Brass	8000 ~ 40000	0.0002 ~ 0.0004	NC9036
S	Titanium	6000 ~ 15000	0.0001 ~ 0.0004	NC9036

(Tmax.:0.0315")

Material \ Ap		1st	2nd	3rd	4th	5th	~	Fine finishing
P	Carbon steel C<0.3%	0.0118"	0.0080"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
P	Carbon steel C>0.3%	0.0118"	0.0080"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
P	Alloy steel	0.0118"	0.0040"	0.0040"	0.0020"	0.0020"	0.0020"	0.0012
M	Stainless steel	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
K	Casting iron	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
N	Aluminum	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
N	Copper, Brass	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
S	Titanium	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012

NC Deburring >>>

60° & 90°

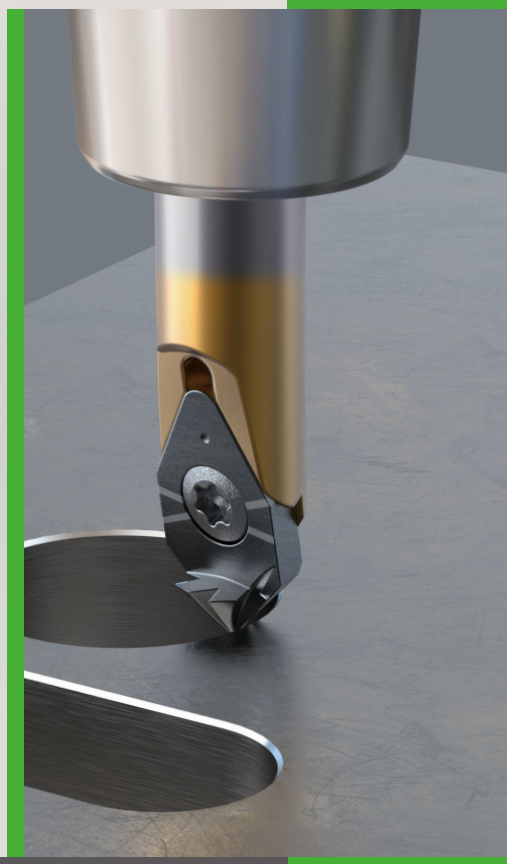
Ideal for fine hole deburring.

P M K N

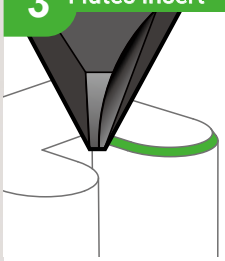
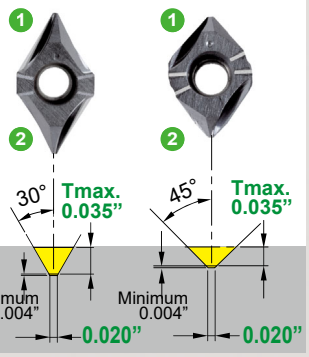
Indexable Type, High Precision Ground Carbide Insert.

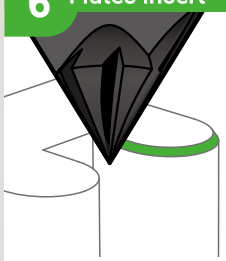
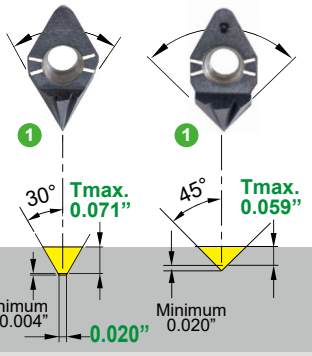
- Achieve high speed and high feed deburring and chamfering on CNC machine.
- Retain exceptional positional accuracy of the deburring depth and diameter.





Features >

X060A..T3		
3 Flutes insert	2 cutting edges	
	60°	90°
		
• Good for interior angles < 90°. • The chip removing space is bigger.		

X060A..T6		
6 Flutes insert	single cutting edge	
	60°	90°
		
• Good for simple contours. • Fast deburring, Time saving!		

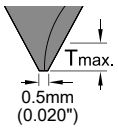
NC Deburring 60°& 90°

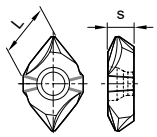
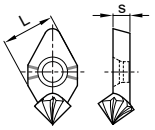


Inserts >>

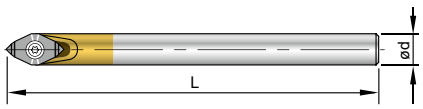
NC2032: • For all kinds of steel < 40 HRC, carbon steel, alloy steel, cast iron, aluminum and non-ferrous metal.

XP9001: • For non-ferrous metal, aluminum, brass, copper, plastic and acrylic.



Angle	Part No.	Coating	Grade	Flutes		Dimensions L	Dimensions S	Tmin.	Tmax.
60°	X060A60T3-NC2032	TiAlN	K20F	3		6 (0.236")	2.8 (0.110")	0.1 (0.004")	0.9 (0.035")
	X060A60T3-XP9001	Uncoated							
90°	X060A90T3-NC2032	TiAlN							
	X060A90T3-XP9001	Uncoated							
60°	X060A60T6-NC2032	TiAlN	K20F	6		6 (0.236")	2.0 (0.079")	0.1 (0.004")	1.8 (0.071")
90°	X060A90T6-NC2032							0.5 (0.020")	1.5 (0.059")

Holder >>





Parts No.	Shank	Ød	L	Screw	Key
99619-X060-06	Steel	6 (0.236")	40 (1.575")	NS-22044 0.9Nm	NK-T7
99619-X060-06L	Carbide		60 (2.362")		
99619-X060-06LS	Steel				
99619-X060-06XL	Carbide		100 (3.937")		
99619-X060-08	Steel	8 (0.315")	60 (2.362")		

Starter Kit >>

• Different content can be customized.

Parts No.	Carbide Shank Ø	Angle	Insert included	Content
99619-X060-DB60-02K-32	6 (0.236") (99619-X060-06L)	60°	X060A60T6-NC2032	1 x Holder 1 x T7 Key 2 x inserts
99619-X060-DB90-02K-32		90°	X060A90T6-NC2032	



Cutting Data >>

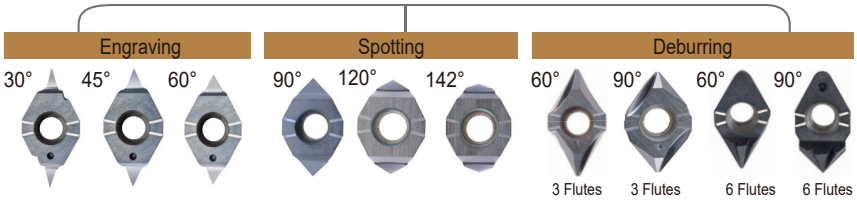
Workpiece Material		S (r.p.m.)	Feed Rate (inch / tooth)	Grade of Insert
P	Carbon Steel C<0.3%	8000~40000	0.00020 ~ 0.0020	NC2032
P	Alloy steel	6000~35000	0.00020 ~ 0.0016	
M	Stainless Steel	6000~25000	0.00020 ~ 0.0012	
K	Casting iron	6000~35000	0.00020 ~ 0.0012	
N	Aluminum, Non-Ferrous Metal	8000~40000	0.00020 ~ 0.0020	XP9001







Various insert can fit on same holder



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