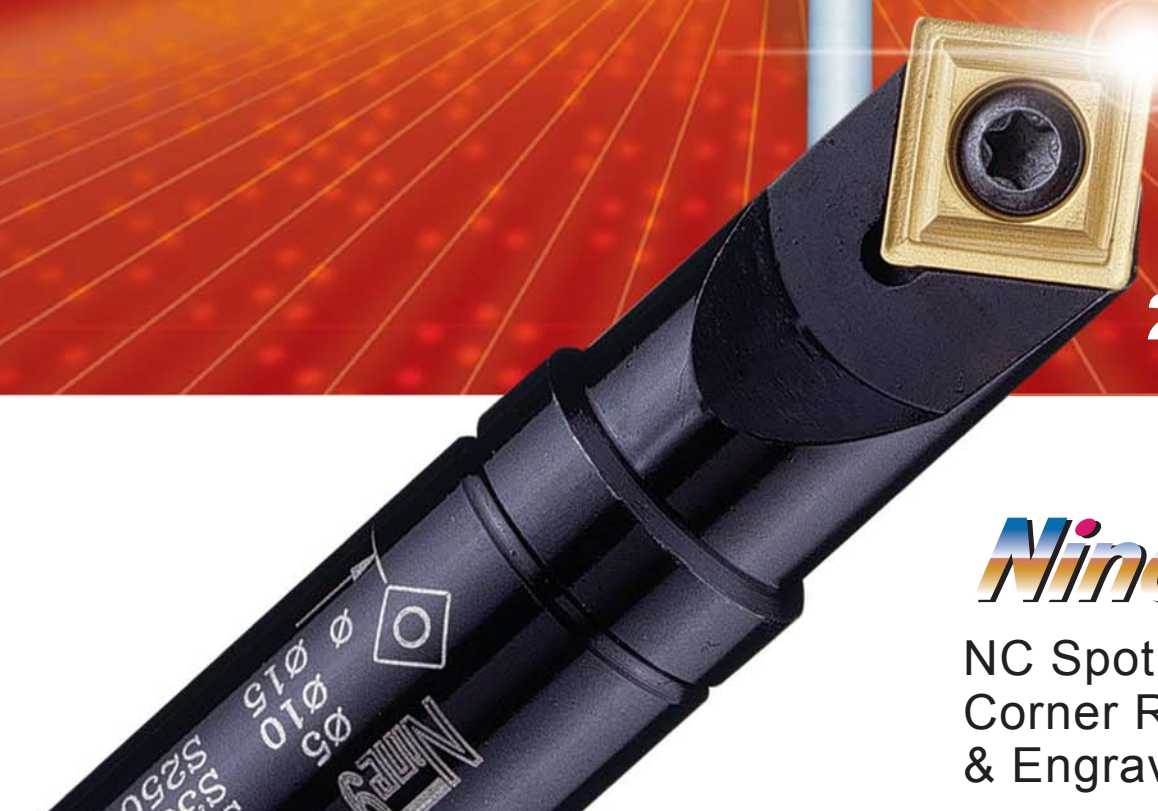
NO NEED TO CHOOSE
NINE9 DOES IT ALL!



2010-2011

Nine9®

NC Spot Drills
Corner Rounding Cutters
& Engraving Tools

Our Focus:

- Higher efficiency
- Long tool life
- Position accuracy
- Total cycle time

Multifunctional Cutting Tool

- Universal easy handling and material saving!
- One holder to cover so many different applications!

21st Century

Ancient History

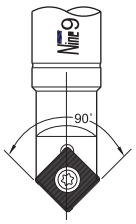
A New Drilling Concept

0.5xD of spotting.

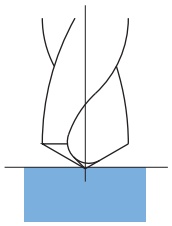
Many drill manufacturers and suppliers state that they are drilling from solid.
You can look forward to the following benefits when using the NC Spot Drill to drill a spot that is half of the drilling diameter.

Drill Benefits:

- Higher feed rate.
  Why? Because the drill is guided at the strongest part of cutting edge.
- Better center position.
  Why? Because the spotting is done by single cutting edge which is out of center, and similar to boring operation.
- Increased tool life.

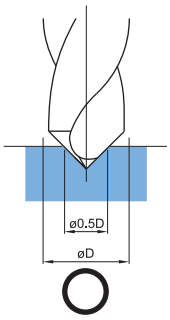


Without Spotting



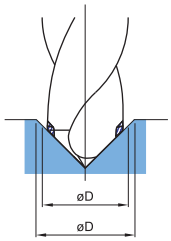
Drill has less position accuracy and diameter tolerance.

0.5xD Spotting



Best result!
Higher speed and feed rate.
More accuracy of positioning and diameter tolerance.

Larger Spotting



Longer spotting time!
Guided at the weakest corner of drill.
Shorter tool life.

Mini Spotting

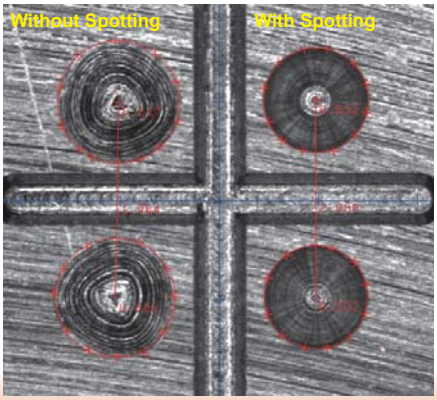
The application of the engraving insert as a spotting drill for the minor size of drill.

Benefits:

- Best positioning accuracy.
- Better surface with spotting by NC Spot drill in advance.

Working example of spotting:

Spindle speed: 3000-25000 r.p.m.
Feed rate: 0.0004~0.0008 inch/rev.
Tool : 99616-3/8.08W NC40



NC Spot Drill with Patented Indexable Carbide Insert

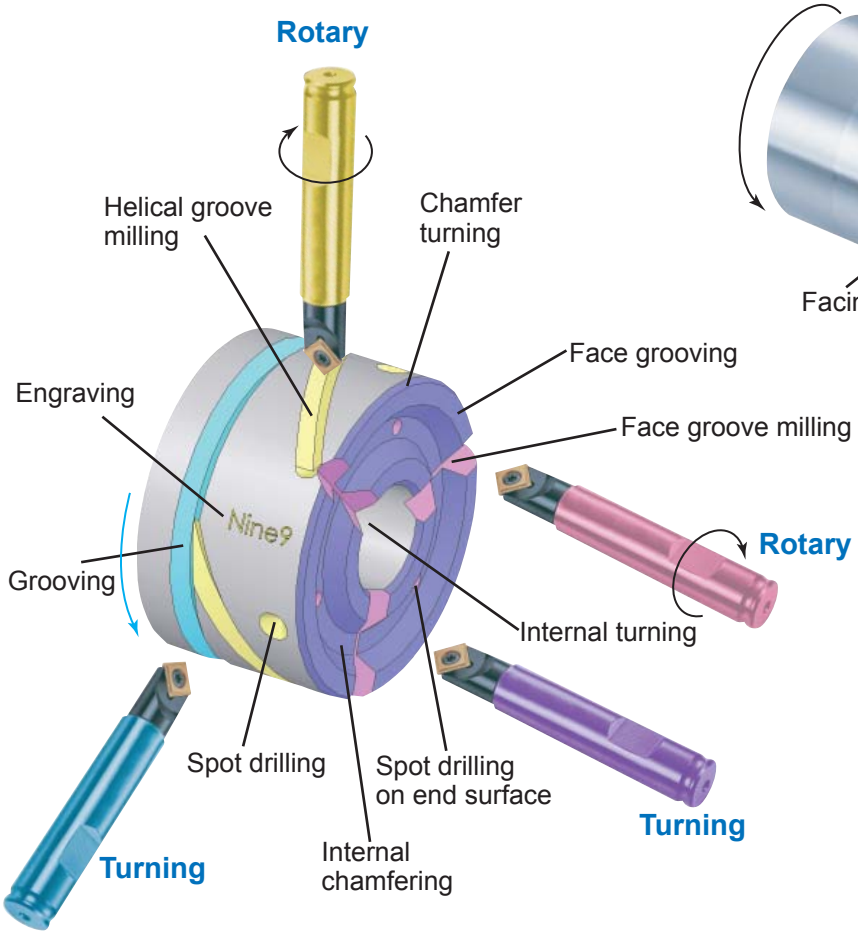
High Efficiency! Low Cost!
CNC Lathes, CNC Turning Centers and Machining Centers.

One tool will perform multiple applications.

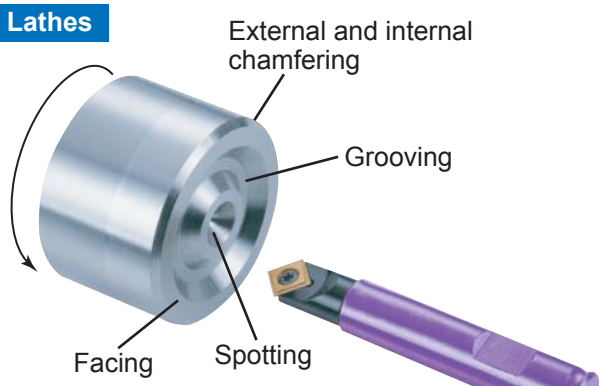
- **Long tool life.**
- **Each insert has two or four cutting edges.**
- **Suitable for spotting, chamfering, grooving and engraving.**
- ***45°* / 60° / 82° / 90° / 100° / 120° / *142°* angle for different applications.**
- **Increase cutting speed with coated carbide inserts.**

ALL IN ONE !!

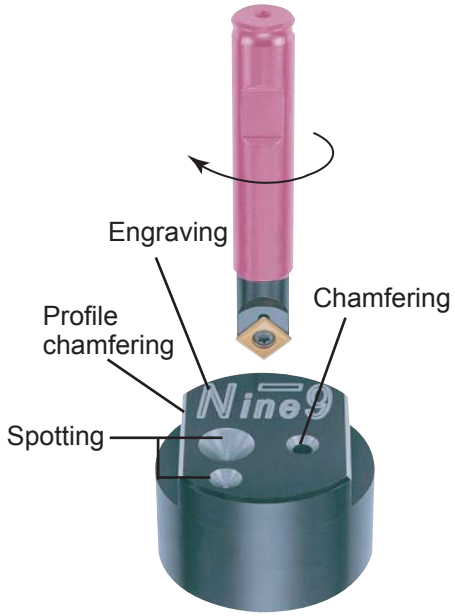
Turning Center



CNC Lathes



Machining Center

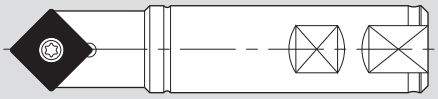


Engraving Tools

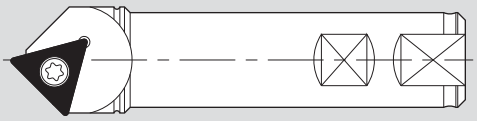
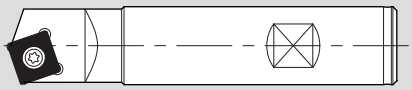
Angle	Holder	Inserts	D min.	D max.	Spotting	Chamfering	Grooving	Engraving	Drilling	Page
New 45°	 99619-V045	 V04506T1W	0.45 (0.018”)	2.1 (0.083”)	○			●		P9
New 60°	 99619-V060	 V06006T1W	0.45 (0.018”)	2.7 (0.106”)	○			●		P9
	 99616-10...SW	 N9MT080201W-60	0.25 (0.010”)	1.1 (0.043”)	○			●		P12
90°	 99616-10...SW	 N9MT080201W	0.25 (0.010”)	2.0 (0.079”)	○			●		P12
	 99616-06-6	 N9MT05T1	1 (0.039”)	6 (0.236”)	●			●		P16

*Open circle = suitable application, Filled circle = preferred application.

NC Spot Drill

Angle	Holder	Inserts	D min.	D max.	Spotting	Chamfering	Grooving	Engraving	Drilling	Page
60°	 99616-14...P60	 N9MT11T3P60	2 (0.079”)	6.2 (0.244”)	●	●		●		P13
	 99616-13V	 V9MT12T3	2 (0.079”)	13 (0.512”)	●	●	●	●		P14
82°	 99619-V082-3/8	 V0820802	2 (0.079”)	9 (0.354”)	●	●	●	●		P15
	 99619-V082-5/8	 V08212T3	2 (0.079”)	14 (0.551”)	●	●	●	●		P15
90°	 99616-06-6	 N9MT05T1	1 (0.039”)	6 (0.236”)	●	●		●		P16
	 99616-10...	 N9MT0802	2 (0.079”)	10 (0.394”)	●	●	●	●		P17
	 99616-14...	 N9MT11T3	3 (0.118”)	14 (0.551”)	●	●	●	●		P19
	 99616-22	 N9MT1704	3 (0.118”)	22 (0.866”)	●	●	●			P21

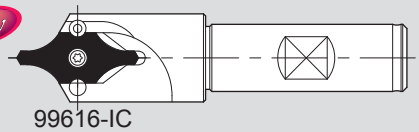
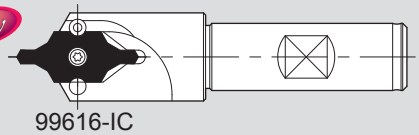
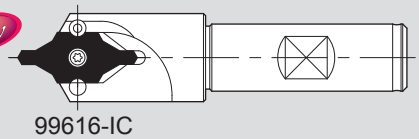
NC Spot Drill

Angle	Holder	Inserts	D min.	D max.	Spotting	Chamfering	Grooving	Engraving	Drilling	Page
90°	 99616-1	 TCMT220408	4 (0.157")	25 (0.984")	●	●				P22
100°	 99616-3/4	 N9MT11T3CT2T-H	4 (0.157")	16 (0.630")	●	●				P23
120°	 99616-3/4	 N9MT11T3CT2T-H	4 (0.157")	17 (0.669")	●	●				P23
142°	 99616-3/4	 N9MT11T3CT2T-H	4 (0.157")	18.5 (0.728")	●	●				P23
New 142°	 99619-V142	 V1421604	2 (0.079")	32 (1.260")	●	●				P25

Corner Rounding

		D min.	D max.	Spotting	Chamfering	Grooving	Engraving	Drilling	Page
 99616-14...RC	 N9MT11T3RC (2 cutting edges)	R 1/64"	R 1/8"		●				P27
New  99616-22...RC	 N9MT1704RC (2 cutting edges)	R 1/4"	R 3/16"		●				P28

Center Drilling

		D min.	D max.	Spotting	Chamfering	Grooving	Engraving	Drilling	Page
New  99616-IC	 DIN332 Form R	2	10					●	P5
New  99616-IC	 DIN332 Form A+B	2	10					●	P5
New  99616-IC	 ANSI 60°	5/64"	3/8"					●	P5

Special Application

P36

Special requests are welcomed.

Nine9®

indexable Center Drill

- ***Highly Efficient Tools***
- ***No Re-setting, No Resharpening***
- ***Time Saving***
- ***Long Tool Life***
- ***Improves Process Performance***

i-Center®

i-Center indexable center drill ***(patent pending)***
The world's first indexable center drill.
Shortens set up time and center drilling time.
Increases tool life which reduces tooling costs.
Special forms are possible.

New

The "i-Center" is a trademark of Nine9, the developer of the first indexable center drill. For the first time, Nine9's "i-Center" patent-pending design provides the benefit of solid carbide cutting parameters while delivering -

● Application on turning machine.

■ High Speed, High Feed Rate

High performance speed and feed can be reached thanks to the special ground insert and ridged holder design. For example, drilling alloy steel at 6000 rpm and feed rate of 24"/min. (.004"/rev.)

■ Easy Tool Length Setting

The axial position accuracy of the insert is 0.05 mm (.002"). It is not necessary to reset the tool length when changing the insert or cutting edge.

■ Excellent Repeatability

The insert is positioned by two fixed pins and clamped by one insert screw at the center. The positioning repeatability of the insert is within 0.02 mm (.0008") in radial direction, thus ensuring conformity to any National Standard.

■ Extended Tool Life

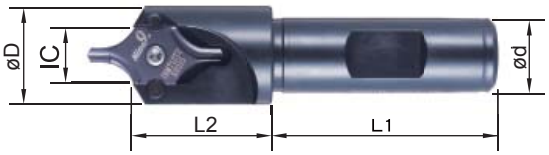
Coolant can be supplied through the center of the holder to increase performance and extend tool life. Insert geometry, grades and coating process are specifically engineered for centering applications.

● High pressure coolant can be supplied through center directly to tip of center drill insert.

i-Center Tool holder

Features:

- ⊙ Made of high alloy steel and hardened.
- ⊙ Shank is ground to h6 tolerance.
- ⊙ Special holders are available on request.



Order No.	Part No.	IC	ød	L1	L2	øD±0.02	Screw	Key
99616-IC12-16	SB16-IC12	12	16	48	36	21	NS-30072 2.0 Nm	NK-T9
99616-IC16-16	SB16-IC16	16	16	48	43	27	NS-35080 2.5 Nm	NK-T15
99616-IC20-20	SB20-IC20	20	20	50	60	32	NS-50120 5.5 Nm	NK-T20
99616-IC25-25	SB25-IC25	25	25	56	65	43	NS-50120 5.5 Nm	NK-T20

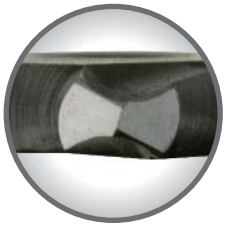
Order No.	Part No.	IC	ød	L1	L2	øD±0.02	Screw	Key
99616-IC12-5/8	SB5/8"-IC12	12	5/8"	48	36	21	NS-30072 2.0 Nm	NK-T9
99616-IC16-5/8	SB5/8"-IC16	16	5/8"	48	43	27	NS-35080 2.5 Nm	NK-T15
99616-IC20-3/4	SB3/4"-IC20	20	3/4"	50	60	32	NS-50120 5.5 Nm	NK-T20
99616-IC25-1	SB1"-IC25	25	1"	56	65	43	NS-50120 5.5 Nm	NK-T20

New

i-Center Indexable center insert

Features:

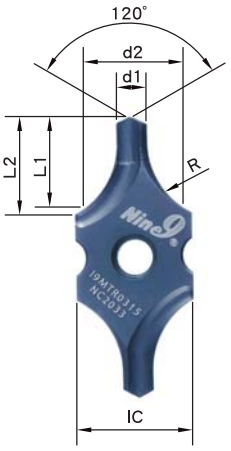
- NC 2033: K20F grade carbide insert and TiAlN coated for carbon steel, alloy steel, high alloy steel, cast iron and Al, Al-alloy, Cu, Cu-alloy.
- 2 cutting edges, high performance for center drilling.
- Metric sizes: DIN 332 A+B, DIN 332 R, 2~10 mm
- Inch sizes: ANSI (BS) #2 ~10



2 cutting edges

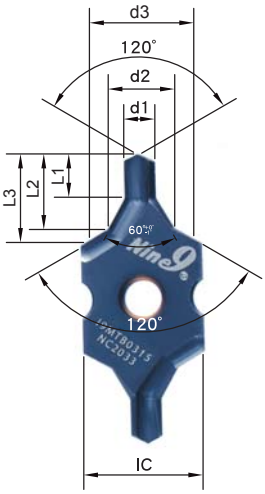
• *DIN332 Form R*

Parts No.	d1		d2	L1	L2	R		IC
						min.	max.	
I9MT12T2R0200-NC2033	2.00	+0.14 0	5.0	5.3	6.72	5.0	6.3	12
I9MT12T2R0250-NC2033	2.50		6.3	6.7	8.29	6.3	8.0	
I9MT12T2R0315-NC2033	3.15	+0.18 0	8.0	8.5	9.94	8.0	10.0	
I9MT1603R0400-NC2033	4.00		10.0	10.6	12.84	10.0	12.5	16
I9MT1603R0500-NC2033	5.00		12.5	13.2	14.78	12.5	16.0	
I9MT2004R0630-NC2033	6.30	+0.22 0	16.0	17.0	18.83	16.0	20.0	20
I9MT2004R0800-NC2033	8.00		20.0	21.2	21.2	20.0	25.0	
I9MT2506R1000-NC2033	10.00		25.0	26.5	26.5	25.0	31.5	25



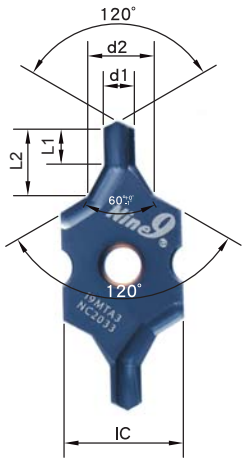
• *DIN332 Form A+B*

Parts No.	d1		d2	d3	L1		L2	L3	IC
I9MT12T2B0200-NC2033	2.00	+0.14 0	4.25	6.3	2.5	+0.8 0	4.3	4.9	12
I9MT12T2B0250-NC2033	2.50		5.3	8	3.1	+1.0 0	5.5	6.8	
I9MT12T2B0315-NC2033	3.15	+0.18 0	6.7	10	3.9		7.4	9.0	
I9MT1603B0400-NC2033	4.00		8.5	12.5	5.0	+1.2 0	9.5	10.6	16
I9MT1603B0500-NC2033	5.00		10.6	16	6.3		11.7	13.3	
I9MT2004B0630-NC2033	6.30	+0.22 0	13.2	18	8.0		14.6	15.9	20
I9MT2004B0800-NC2033	8.00		17.0	20	10.1	+1.4 0	18.6	19.4	
I9MT2506B1000-NC2033	10.00		21.2	25	12.8		23.2	24.3	25



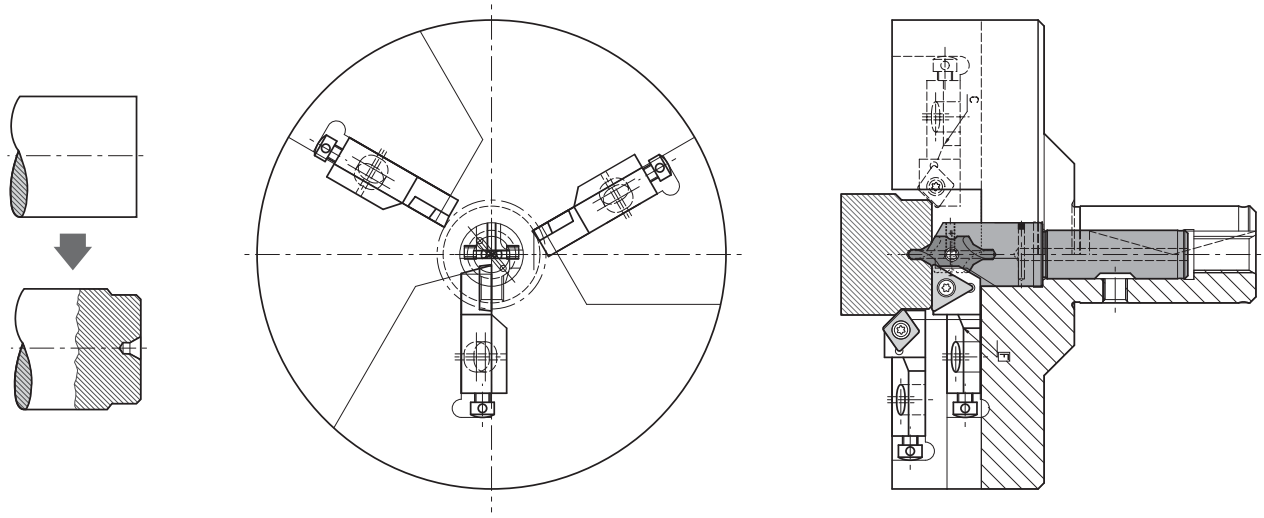
• *ANSI 60°*

Parts No.	Size	d1			d2		L1			L2	IC
			mm			mm		mm			
I9MT12T2A2-NC2033	#2	5/64	1.98	+0.14 0	3/16	4.76	5/64	1.98	+0.8 0	4.4	12
I9MT12T2A3-NC2033	#3	7/64	2.78		1/4	6.35	7/64	2.78	+1.0 0	5.9	
I9MT12T2A4-NC2033	#4	1/8	3.18	+0.18 0	5/16	7.94	1/8	3.18		7.3	
I9MT1603A5-NC2033	#5	3/16	4.76		7/16	11.11	3/16	4.76	+1.2 0	10.3	16
I9MT2004A6-NC2033	#6	7/32	5.56		1/2	12.7	7/32	5.56		11.8	20
I9MT2004A7-NC2033	#7	1/4	6.35	+0.22 0	5/8	15.88	1/4	6.35		14.6	
I9MT2004A8-NC2033	#8	5/16	7.94		3/4	19.05	5/16	7.94	+1.4 0	17.6	
I9MT2506A10-NC2033	#10	3/8	9.53		0.98”	25.0	3/8	9.53		22.9	25

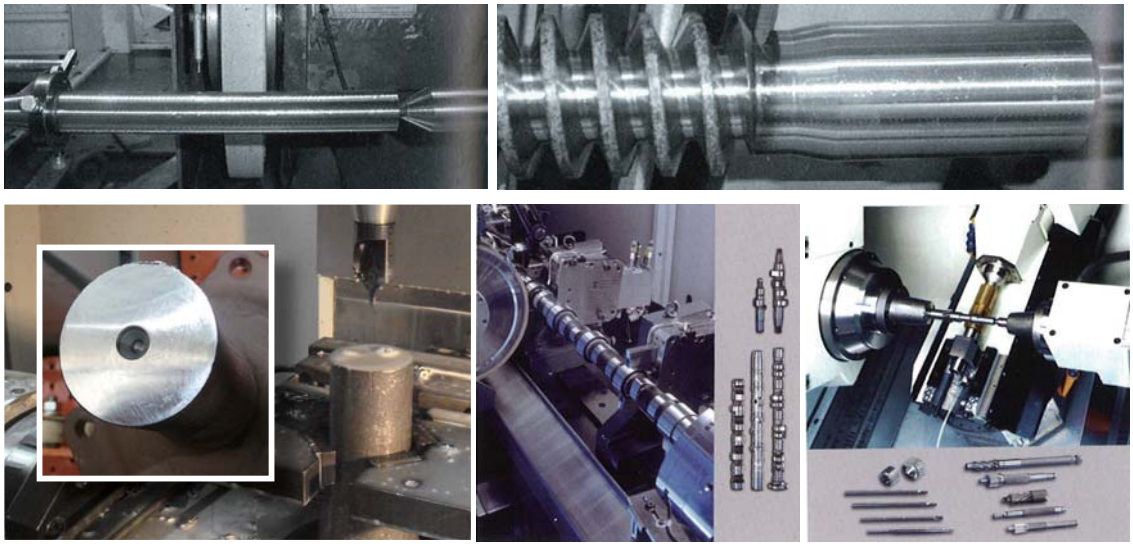


Application of i-Center

⊙ For shaft end machining special tools.



⊙ For centering shafts of engine, transmision gear shafts of automobiles and trucks, etc.



Nine9® Engraving Tool V045 / V060

New

Our Claim:

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 speeds and feed rates, dramatically reducing your cycle times.

Main Features

Patent Pending!

High Positive Rake Angle

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

High Speeds, High Feed Rates

Designed to run at high speed, up to 20000 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!

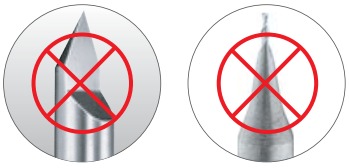
Applications

Universal for marking number and almost any character.
45°, 60° engraving inserts which can be used for marking serial numbers; product codes; dial scales; signs; logo outlines and almost any character which can be created by the NC programming system.

21st Century

Engraving
45°/60°

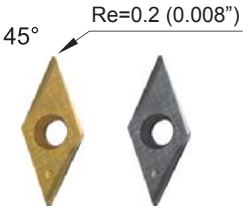
Ancient History

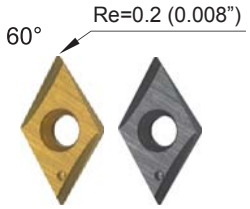


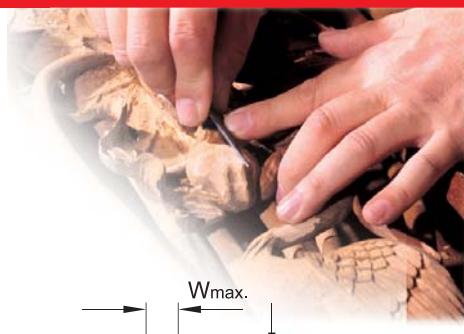
Low feedrate!

Indexable Engraving Tool

45°, 60°





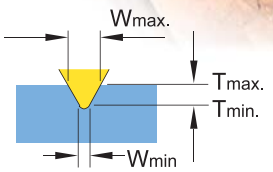


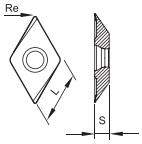
Inserts

Feature:
- For 45, 60 degree engraving tools.
- K20F submicron grain carbide insert, high positive rake angle and ground relief angle for universal applications.
- Each insert has 2 cutting edges.

NC2071:
- TiN coated. Good for low carbon steel, stainless steel, non-ferrous metal and aluminum.

NC2032:
- TiAlN coated. Good for all kinds of steel 30°-50° HRC, alloy steel and cast iron.



Parts No.	Angle	Grade	Coating		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax..	Tmax.
V04506T1W06-NC2071	45°	K20F	TiN		6.35 (0.250")	2.0 (0.079")	0.2 (0.008")	0.45 (0.018")	2.1 (0.083")	2.0 (0.079")
V04506T1W06-NC2032			TiAlN							
V06006T1W06-NC2071	60°	K20F	TiN		6.35 (0.250")	2.0 (0.079")	0.2 (0.008")	0.45 (0.018")	2.7 (0.106")	2.0 (0.079")
V06006T1W06-NC2032			TiAlN							

- Other sizes also available upon request.

Holders

- Tool steel shank holders.

Parts No.	Ød	L	Screw	Key
99619-V045-06	6 (0.236")	40 (1.575")	NS-22044 0.8Nm	NK-T7
99619-V060-06				

Ø6(0.236")

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

Parts No.	Ød	L	Screw	Key
New ! 99619-V045-06L	6 (0.236")	60 (2.362")	NS-22044 0.8Nm	NK-T7
New ! 99619-V045-06XL		100 (3.937")		
New ! 99619-V060-06L	6 (0.236")	60 (2.362")	NS-22044 0.8Nm	NK-T7
New ! 99619-V060-06XL		100 (3.937")		

Ø6(0.236")

- Other sizes also available upon request.

Starter Kit

Parts No.	Angle	Insert included	Content
99619-V045-03K-71	45°	V04506T1W06-2071	1 x holder + 3 inserts + 1 key
99619-V045-03K-32		V04506T1W06-2032	
99619-V060-03K-71	60°	V06006T1W06-2071	
99619-V060-03K-32		V06006T1W06-2032	

Application Examples

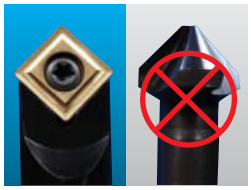
- **Available shank diameter-Ø5, Ø6, Ø10, Ø12, Ø16, Ø20mm, Ø25mm, Ø1/4”, Ø3/8”, Ø1/2”, Ø5/8”, Ø3/4”**
- **Inserts are interchangeable.**

90° Spotting

142° Spotting

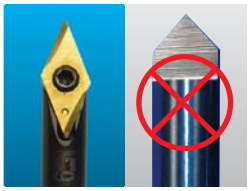
Engraving 60°/ 90°

For Centering
Replace HSS center drill with Carbide Insert
Increase cutting speed



Spotting, Chamfering
Grooving

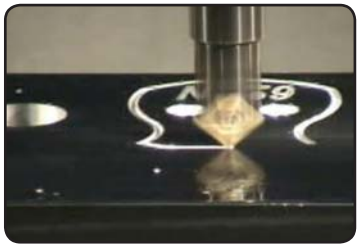
Chamfering
Corner Rounding



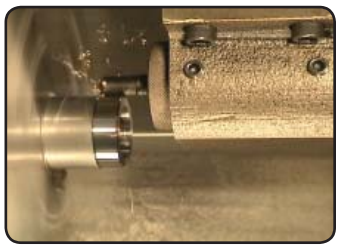
Engraving 45°/ 60°

Application Example:

- 45°, 60° Engraving Tools.

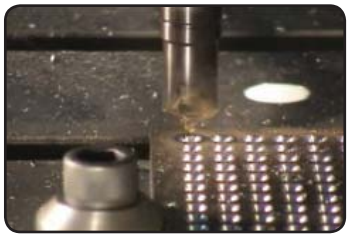


- Spotting, Grooving, Engraving on Machining Center.



- Turning, Chamfering, Facing on CNC Lathes.

- Cut a Serrated Workpiece.
- Single Pass Each Direction.



- Center Drilling on Machining Center.

- Contour Chamfering on Machining Center.

Engraving Tool

60° | 90° | Shank Ø10 | Shank Ø3/8"

Inserts

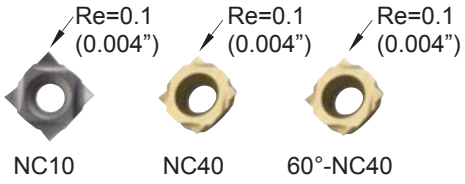
Features:

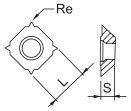
- 90° Indexable engraving insert with 4 cutting edges.
- No resharpening required.
- For marking all types of work pieces.

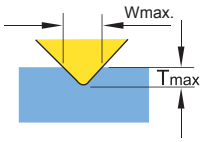
N9MT080201W-NC10: • Submicron carbide insert, TiAlN coated, for Al, Al-alloy, hardened steel 40-50°, stainless steel.

N9MT080201W-NC40: • Submicron carbide insert, TiN coated, for all unhardened steel and cast iron, general purpose.

N9MT080201W-60-NC40: • Submicron carbide insert, TiN coated, very positive angle for 60° engraving for all kind of steel and cast iron.

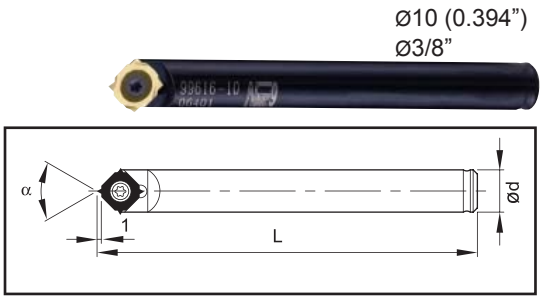


Parts No.	α	Grade	Coating		Dimensions L	Dimensions S	Dimensions Re	Wmax.	Tmax.
N9MT080201W-60-NC40	60°	K20F	TiN		8 (0.315")	2.38 (0.094")	0.1 (0.004")	1.1 (0.043")	0.8 (0.031")
N9MT080201W-NC40	90°	K20F	TiN					2.0 (0.079")	0.9 (0.035")
N9MT080201W-NC10	90°	K20F	TiAlN					2.0 (0.079")	0.9 (0.035")



Holders

Parts No.	ød	L	Screw	key
99616-10	10 (0.394")	90 (3.543")	NS-30055 2.0 Nm	NK-T8
99616-3/8	3/8"	3.5"		



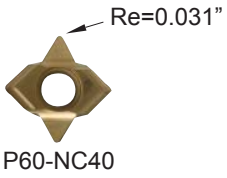
Starter Kit

- Total 2 inserts are equal to 8 engraving tools.

Parts No.	Insert	Content
99616-10.08W NC10 KIT	N9MT080201W-NC10	1 x 10mm holder + 2 inserts + 1 key
99616-10.08W NC40 KIT	N9MT080201W-NC40	
99616-10.08W-60 NC40 KIT	N9MT080201W60-NC40	
99616-3/8.08W NC10 KIT	N9MT080201W-NC10	1 x 3/8" holder + 2 inserts + 1 key
99616-3/8.08W NC40 KIT	N9MT080201W-NC40	
99616-3/8.08W-60 NC40 KIT	N9MT080201W60-NC40	

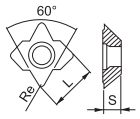
60° NC Spot Drill-N9MT11T3P60

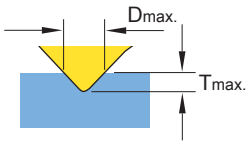
Inserts



Features:
- Fully ground spotting insert, for 60 degree spotting and engraving.

NC40:
- P35 grade, TiN coated.
- Each insert has 2 cutting edges.

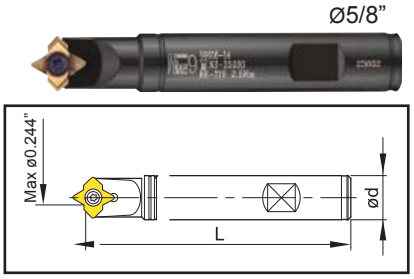
Parts No.	Grade	Coating		Dimensions			Dmax.	Tmax.
				L	S	Re		
N9MT11T3P60-NC40	P35	TiN		11 (0.433”)	3.97 (0.156”)	0.8 (0.031”)	6.2 (0.244”)	4 (0.157”)



Holders

Features:
- 60 degree spotting drill with indexable insert.
- ***Using standard NC Spot Drill shank.***
- A single cutting edge design creates higher precision and position when spotting.

Applications:
- For spotting, engraving, small grooving on milling machines, machining centers.
- For carbon steel, alloy steel and cast iron, general purpose.



Parts No.	ød	L	Screw	key
99616-14-1/2	1/2”	4“	NS-35080 2.5 Nm	NK-T15
99616-14-5/8	5/8”	4”		

NC Spot Drill-V9MT12T3

60°

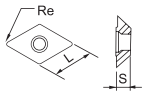
Shank Ø5/8”

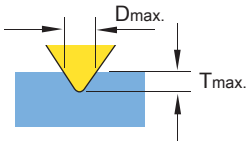
Inserts

Features:
- 60 degree indexable spotting insert, Dmax 0.512”.
- Special geometry with supporting edges for use in high speed machining.
- Excellent tool for grooving, save machining time!

NC2071:
- K20F grade, TiN coated, high positive ground cutting edge and relief angle.
- Universal grade for carbon steel, alloy steel and cast iron.
- Each insert has 2 cutting edges.

NC9076:
- High positive geometry and sharpen edge.
- DLC coated, super good for Al, Al-alloy, copper, brass and bronze.
- Excellent surface performance on non-ferrous metal.
- Each insert has 2 cutting edges.

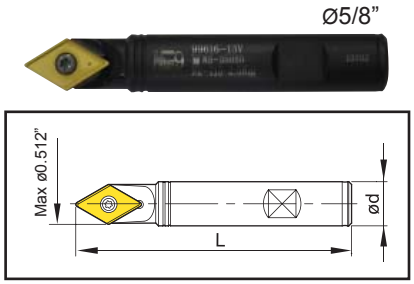
Parts No.	Grade	Coating		Dimensions			Dmax.	Tmax.
				L	S	Re		
V9MT12T3CT-NC2071	K20F	TiN		12.7 (0.5”)	3.97 (0.156”)	0.8 (0.031”)	13 (0.512”)	11.7 (0.461”)
V9MT12T3CT-NC9076	K20F	DLC						



Holders

Features:
- 60 degree spotting drill with indexable insert.
- A single cutting edge creates higher precision and position when spotting.

Applications:
- Spotting, engraving, grooving and chamfering on milling machines, machining centers.
- Spotting, facing on CNC Lathes.



Parts No.	ød	L	Screw	Key
99616-13V-5/8	5/8”	4“	NS-35080 2.5 Nm	NK-T15

Starter Kit

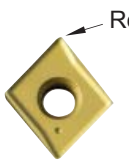
Parts No.	Insert	Content
99616-13V-5/8.12 2071 KIT (99616-13V-IN3)	V9MT12T3CT-NC2071	1 x holder + 3 inserts + 1 key

82° NC Spot Drill-V0820802 / V08212T3


Shank Ø3/8"
Shank Ø5/8"

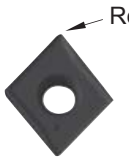
Inserts

Features:
- 82 degree indexable spotting insert.
- Match the geometry of Amercian standard screw hole.
- Special geometry with supporting edges for use in high speed machining.



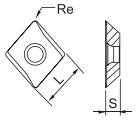
NC2071

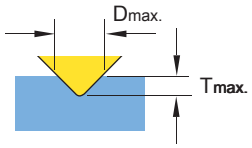
NC2071:
- K20F grade, TiN coated, high positive ground cutting edge and relief angle.
- Universal grade for carbon steel, alloy steel and cast iron.
- Each insert has 2 cutting edges.



NC9076

NC9076:
- High positive geometry and sharp edge.
- DLC coated, super good for Al, Al-alloy, copper, brass and bronze.
- Produces excellent surface finish on non-ferrous metals.
- Each insert has 2 cutting edges.

Parts No.	Grade	Coating		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
V0820802-NC2071	K20F	TiN		8 (0.315”)	2.38 (0.094”)	0.4 (0.016”)	9 (0.354”)	4.8 (0.189”)
V0820802-NC9076	K20F	DLC						
V08212T3-NC2071	K20F	TiN		12.7 (0.5”)	3.97 (0.156”)	0.8 (0.031”)	14 (0.551”)	7.5 (0.295”)
V08212T3-NC9076	K20F	DLC						

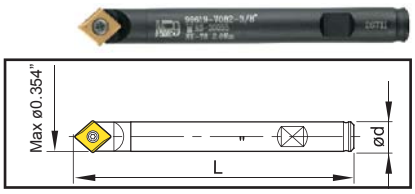


Holders

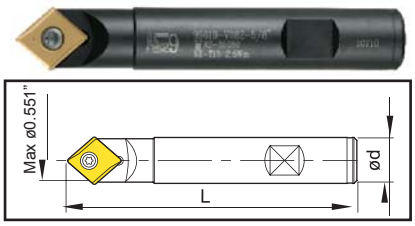
Features:
- 82 degree spotting drill with indexable insert.
- Special cutting edge design gives higher precision and position when spotting.

Applications:
- Spotting, engraving, grooving and chamfering on milling machines, machining centers.
- Spotting, facing on CNC Lathes.

Ø3/8”



Ø5/8”



Parts No.	Insert type	ød	L	Screw	Key
99619-V082-3/8	V0820802	3/8”	3.5”	NS-30055 2.0 Nm	NK-T8
99619-V082-5/8	V08212T3	5/8”	4”	NS-35080 2.5 Nm	NK-T15

HOT

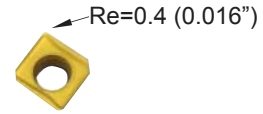
Starter Kit

Parts No.	Insert	Content
99619-V82-5/8.12 2071 KIT (99619-V082-IN3)	V08212T3-NC2071	1 x 5/8” holder + 3 inserts + 1 key

NC Spot Drill-N9MT05T1

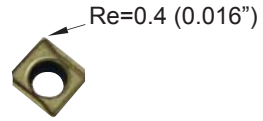
Inserts

Features: Mini spotting drill with indexable insert, low cutting power required. Especially good for Swiss type automatic lathes and CNC lathes.



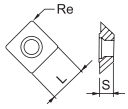
NC2071

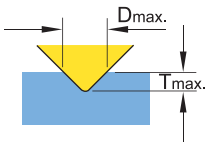
NC2071:
- K20F grade, TiN coated, fully ground cutting edge and relief angle.
- Geometry with supporting edges to stable the cutting condition on low power machine.
- Each insert has 2 cutting edges, for carbon steel, alloy steel and cast iron.



NC9076

NC9076:
- High positive geometry and sharp edge.
- DLC coated, super good for Al, Al-alloy, copper, brass and bronze.
- Produces an excellent surface finish on non-ferrous metal.
- Each insert has 2 cutting edges.

Parts No.	Grade	Coating		Dimensions			Dmax.	Tmax.
				L	S	Re		
N9MT05T1CT-NC2071	K20F	TiN		5 (0.197”)	1.8 (0.071”)	0.4 (0.016”)	6 (0.236”)	3.5 (0.138”)
N9MT05T1CT-NC9076	K20F	DLC						

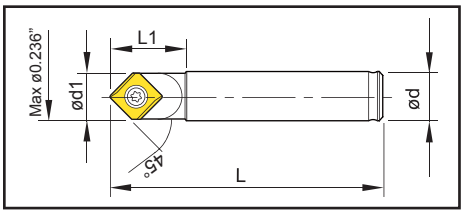


Holders

Features:
- Smallest indexable spotting drill holder.
- A single cutting edge creates higher precision and position when spotting.

Applications:
- Spotting, engraving, and chamfering on milling machines, machining centers.
- Spotting, facing on CNC Lathes.

Ø6 (0.236”)
Ø5 (0.197”)
Ø1/4”



Parts No.	ød	ød1	L	L1	Screw	Key
99616-06-6	6 (0.236”)	6 (0.236”)	35 (1.378”)	10 (0.394”)	NS-20036 0.8 Nm	NK-T6
99616-06-5	5 (0.197”)					
99616-06-1/4	1/4”					

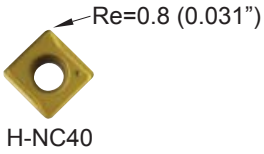
Starter Kit

Parts No.	Insert	Content
99616-06-1/4.05 2071 KIT	N9MT05T1CT-NC2071	1 x 1/4” holder + 6 inserts + 1 key

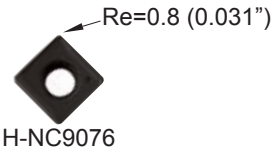
90° NC Spot Drill-N9MT0802

Inserts

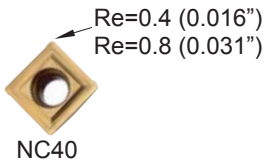
H-NC40:
- Best choice for spotting application.
- Special geometry with supporting edges for use in high speed machining.
- Sharp edge good for long cutting chip metals, such as low carbon steel, stainless steel and Ti, Ti-alloy.
- Each insert has 2 cutting edges.



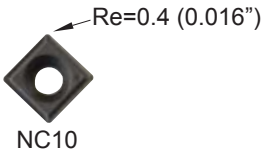
H-NC9076:
- High positive geometry and sharp edge. DLC coated, super good for Al, Al-alloy, copper, brass and bronze.
- Produces excellent surface finish when chamfering non-ferrous metals.
- Each insert has 2 cutting edges.

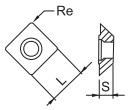


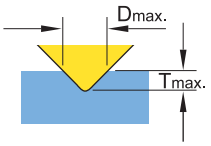
NC40:
- General purpose, universal grade for all unhardened steel and cast iron.
- Each insert has 4 cutting edges.



NC10:
- High positive angle and fully ground cutting edge and relief angle.
- Universal grade for Al, Al-alloy, non-ferrous metal and stainless steel.
- Each insert has 4 cutting edges.



Parts No.	Grade	Coating		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
N9MT0802CT2T-H-NC40	K20F	TiN		8 (0.315")	2.38 (0.094")	0.8 (0.031")	10 (0.394")	4 (0.157")
N9MT0802CT2T-H-NC9076	K20F	DLC						
N9MT080208CT-NC40	K20F	TiN						
N9MT080204CT-NC40	K20F	TiN		8 (0.315")	2.38 (0.094")	0.4 (0.016")		
N9MT080204CT-NC10	K20F	TiAlN						

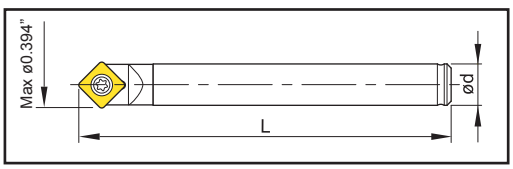


Holders

Features:
- Indexable spotting drill holders.
- Single cutting edge design gives higher precision when spotting.

Applications:
- Spotting, engraving, grooving and chamfering on milling machines, machining centers.
- Spotting, facing on CNC Lathes.

Ø10 (0.394")
Ø3/8"



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

NC Spot Drill-N9MT0802

Starter Kit

- Selected package for starter who wants to try NC Spot Drill.
- Includes one tool holder and 6 inserts in the pocket.
- Total of 6 inserts equals 24 spot drills.

Parts No.	Insert included	Content
99616-3/8.08 NC40 KIT	 N9MT080208CT-NC40	1 x 3/8" holder + 6 inserts + 1 key
99616-3/8.08 NC10 KIT	 N9MT080204CT-NC10	

5 Pcs-Pack

- Economy pack for larger end users.
- *Do not miss it!*

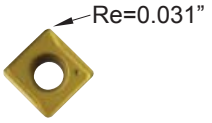
Shank	Parts No.	Contents
3/8"	99616-3/8 PACK	5 x 3/8" holders + 1 key

~ Special Offer ~

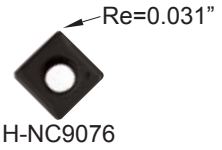
90° NC Spot Drill-N9MT11T3

Inserts

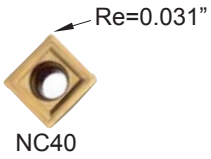
H-NC40:
- Best choice for spotting application.
- Special geometry with supporting edges for use in high speed machining.
- Sharp edge good for long cutting chip metals, such as low carbon steel, stainless steel and Ti, Ti-alloy.
- Each insert has 2 cutting edges.



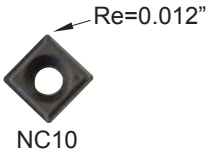
H-NC9076:
- High positive geometry and sharp edge same as grade H-NC40. DLC coated, super good for Al, Al-alloy, copper, brass and bronze.
- Produces excellent surface finish when chamfering non-ferrous metals.
- Each insert has 2 cutting edges.



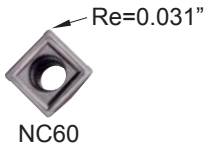
NC40:
- General purpose, universal grade for all unhardened steel and cast iron.
- Each insert has 4 cutting edges.

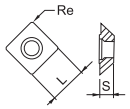


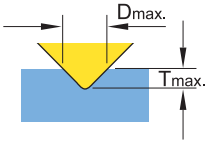
NC10:
- High positive angle and fully ground cutting edge and relief angle.
- Universal grade for Al, Al-alloy, non-ferrous metal and stainless steel.
- Each insert has 4 cutting edges.



NC60:
- Cermet insert, fully ground cutting and relief angle, for hardened steel up to HRC55.
- Each insert has 4 cutting edges.



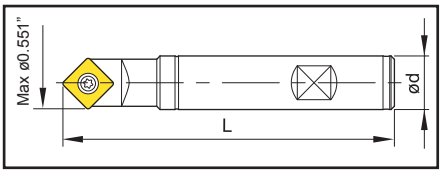
Parts No.	Grade	Coating		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
N9MT11T3CT2T-H-NC40	K20F	TiN		11 (0.433”)	3.97 (0.156”)	0.8 (0.031”)	14 (0.551”)	7 (0.276”)
N9MT11T3CT2T-H-NC9076	K20F	DLC						
N9MT11T3CT-NC40	P35	TiN						
N9MT11T3CT-NC10	K10F	TiAlN				0.3 (0.012”)		
N9MT11T3CT-NC60	CERMET					0.8 (0.031”)		



Holders-90°

Features:
- Indexable insert spotting drill holders.
- The most wide range application of spotting drills for milling and turning operation.
- Holders and inserts are interchangeable.

Applications:
- Spotting, engraving, grooving and chamfering on milling machines, machining centers.
- Spotting, facing, turning on CNC Lathes.



Parts No.	ød	L	Screw	Key
99616-14-1/2	1/2”	4“	NS-35080 2.5 Nm	NK-T15
99616-14-5/8	5/8”	4”		

Starter Kit

Parts No.	Insert included	Content
99616-14-1/2.11 NC40 KIT	 N9MT11T3CT-NC40	1 x 1/2" holder + 6 inserts + 1 key
99616-14-1/2.11 NC10 KIT	 N9MT11T3CT-NC10	
99616-14-1/2.11 NC60 KIT	 N9MT11T3CT-NC60	
99616-14-5/8.11 NC40 KIT	 N9MT11T3CT-NC40	1 x 5/8" holder + 6 inserts + 1 key
99616-14-5/8.11 NC10 KIT	 N9MT11T3CT-NC10	
99616-14-5/8.11 NC60 KIT	 N9MT11T3CT-NC60	

5 Pcs-Pack

- Economy pack for larger end users.
- *Do not miss it!*

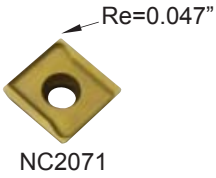
Shank	Parts No.	Contents
5/8"	99616-14-5/8 PACK	5 x 5/8" holders + 1 key

~ Special Offer ~

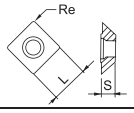
90° NC Spot Drill-N9MT1704

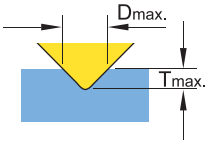
Inserts

Features:
- 90 degree indexable spot drill insert, Dmax 0.87 inch.



NC2071:
- K20F grade, TiN coated, high positive geometry, fully ground cutting edge and relief angle.
- Each insert has 2 cutting edges.
- Universal grade for all unhardened steel and cast iron.

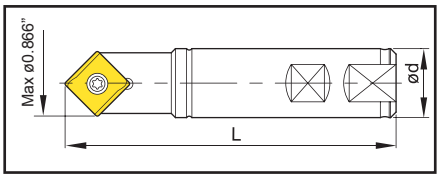
Parts No.	Grade	Coating		Dimensions			Dmax.	Tmax.
				L	S	Re		
N9MT1704CT-NC2071	K20F	TiN		17 (0.669”)	4.76 (0.187”)	1.2 (0.047”)	22 (0.866”)	10 (0.394”)



Holders

Features:
- 90 degree spotting drill with indexable insert.
- A single cutting edge creates higher precision and position when spotting.

Applications:
- Spotting, engraving, grooving and chamfering on milling machines, machining centers.
- Spotting, facing on CNC Lathes.



Parts No.	ød	L	Screw	Key
99616-22-3/4	3/4”	4”	NS-50125 5.5 Nm	NK-T20
99616-22-1	1”	6”		

Starter Kit

Parts No.	Insert fitted	Content
99616-22-3/4.17 2071 KIT (99616-22-IN3)	N9MT1704CT-NC2071	1 x 3/4” holder + 3 inserts + 1 key

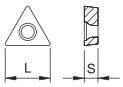
NC Spot Drill-TCMT220408

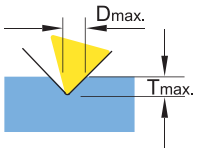
Inserts

NC40

Features:
- For spotting diameter up to 1 inch.
- Fully ground cutting edge and relief angle.

NC40:
- P35, TiN coated.
- Universal grade for carbon steel, alloy steel and cast iron.
- Each insert has 3 cutting edges.

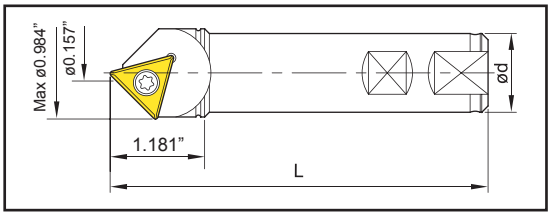
Parts No.	Grade	Coating		Dimensions		Dmax.	Tmax.
				L	S		
TCMT220408CT-NC40	P35	TiN		20.83 (0.820”)	4.76 (0.187”)	25 (0.984”)	12.2 (0.480”)



Holders

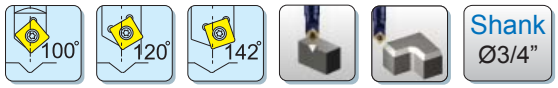
Features:
- Large spotting diameter with indexable insert.
- Single cutting edge design gives high precision when spotting.

Applications:
- Spotting, and chamfering on milling machines, machining centers.

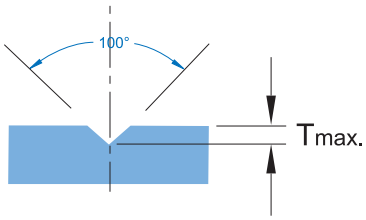


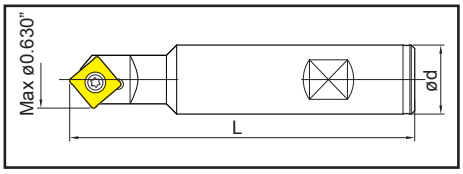
Parts No.	ød	L	Screw	Key
99616-1-CT28	1”	4.72”	NS-40100 3.8 Nm	NK-T15

100°/120°/142° NC Spot Drill-N9MT11T3



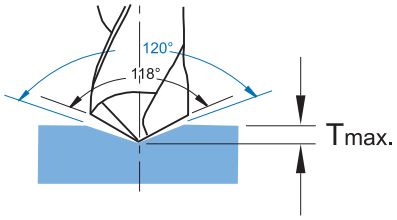
- **100 degree**

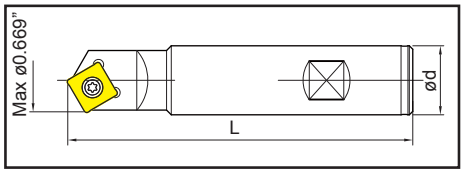




- For aircraft 100° normal rivet hole and screw hole.

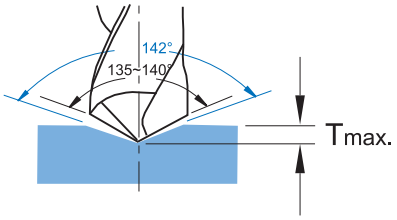
- **120 degree**

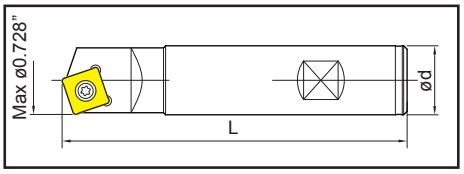




- For spotting before drilling by 118° point angle drill.
- 60° chamfering.

- **142 degree**



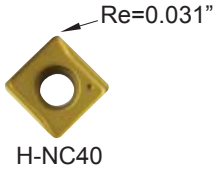


- For spotting before drilling by 135~140° point angle high performance drilling.

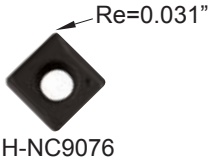
Inserts

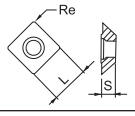
Feature:
- Special geometry with supporting edges to reduce the vibration in high speed machining.

H-NC40:
- K20F grade, TiN coated.
- General purpose for all kinds of steel and cast iron.
- Each insert has 2 cutting edges.



H-NC9076:
- High positive geometry and sharp edge.
- DLC coated, specially developed for Al, Al-alloy, copper, brass and bronze.
- Produces excellent surface finish when chamfering non-ferrous metals.
- Each insert has 2 cutting edges.



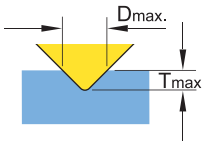
Parts No.	Grade	Coating		Dimensions		
				L	S	Re
N9MT11T3CT2T-H-NC40	K20F	TiN		11 (0.433”)	3.97 (0.156”)	0.8 (0.031”)
N9MT11T3CT2T-H-NC9076	K20F	DLC				

NC Spot Drill-N9MT11T3

Holders-100°/120°/142°

Features:
- Indexable insert spotting drill holders for 100°/120°/142° spotting.
- Reduces spotting time, increases tool life and position accuracy of the next drilling operation.

Parts No.	Angle	ød	L	Screw	Key	Dmax.	Tmax.
99616-3/4-100	100°	3/4”	4”	NS-35080 2.5 Nm	NK-T15	16 (0.630”)	6 (0.236”)
99616-3/4-120	120°					17 (0.669”)	5 (0.197”)
99616-3/4-142	142°					18.5 (0.728”)	3 (0.118”)



Starter Kit-100°/120°/142°

Parts No.	Insert included	Content
99616-3/4-100.11 NC40 KIT	N9MT11T3CT2T-H-NC40	1 holder + 6 inserts + 1 key
99616-3/4-120.11 NC40 KIT		
99616-3/4-142.11 NC40 KIT		

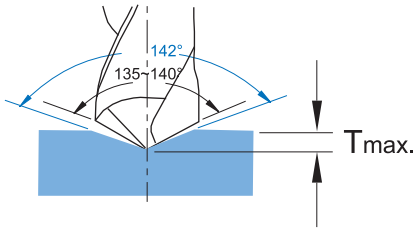
Higher feed rate!
Better center position!
Longer tool life!

142° NC Spot Drill-V14208 / V14216

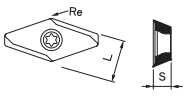
Inserts

Features:

- For spotting before drilling by 135° - 140° point angle high performance drill.
- 142 degree indexable spotting drills. Maximum diameter up to 32mm.



NC2071:
- K20F grade, TiN coated, high positive geometry, fully ground cutting edge and relief angle.
- Each insert has 2 cutting edges.
- Universal grade for all unhardened steel and cast iron.

Parts No.	Grade	Coating		Dimensions			Dmax.	Tmax.
				L	S	Re		
V1420803-NC2071	K20F	TiN		8 (0.315”)	2.38 (0.094”)	0.8 (0.031”)	16 (0.630”)	2.8 (0.110”)
V1421604-NC2071	K20F	TiN		14 (0.551”)	4.76 (0.187”)	1.2 (0.047”)	32 (1.260”)	5.5 (0.217”)


V1420803-NC2071

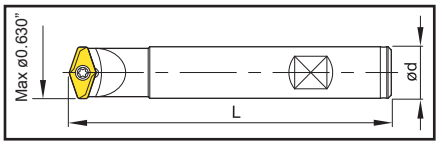

V1421604-NC2071

Holders

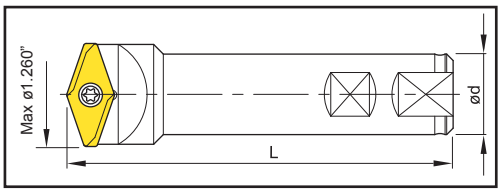
Feature:

- Using spotting first may increase higher speed and feed rate of the after drills.
- Save total machining time!
- Longer tool life of the after drills. Money saving!
- Higher accuracy of positioning and diameter tolerance!

Ø5/8”



Ø1”



Parts No.	Insert Type	ød	L	Screw	Key
99619-V142-5/8	V1420803-NC2071	5/8”	4”	NS-30072	NK-T9
99619-V142-1.000	V1421604-NC2071	1”	4.75”	NS-50125	NK-T20

New

Single Set

Parts No.	Total Length	Insert fitted	Dmax.	Tmax.
99619-V142-1-02S	4.75”	V1421604-NC2071	1.260”	0.217”

Ø1”

Starter Kit

Parts No.	Insert	Content
99619-142-5/8.08 2071 KIT (99619-V142-IN3)	V1420803-NC2071	1 x 5/8” holder 3 x inserts 1 x Key

Now a High Performance *SPOT DRILL*

for HIGH PERFORMANCE DRILLS

NC SPOT DRILL 142°

Save cutting and changing time!

- **Designed for all high performance drills: solid carbide, replaceable tip, and spade drills**
- **Excellent tool life**
- **“Half spot” to save time and increase drill life**
- **Get the most from high performance drills**


Shank Ø1/2” Shank Ø5/8”

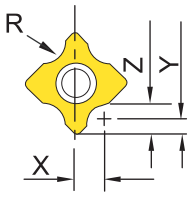
Inserts

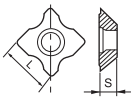
Features:

- Higher cutting speed and feed rate.
- Various corner radius inserts can fit on same holder.
- Combination corner rounding and 45° chamfering application on same insert.
- Carbide insert can stand very long tool life.

N9MT11T3RCXX-NC40:

- Submicron carbide insert, K20F, TiN coated, universal design for all kinds of materials.
- Inserts are CNC ground for precision radius location.
- Each insert has two cutting edges.



Parts No.	Grade	Coating	Corner radius(R)	offset				Dimensions	
				X	Y	Z		L	S
N9MT11T3RC10-NC40	K20F	TiN	1.0	2.75 (0.108”)	1.5 (0.059”)	2.5 (0.098”)		11 (0.433”)	3.97 (0.156”)
N9MT11T3RC15-NC40	K20F	TiN	1.5	3.25 (0.128”)	1.5 (0.059”)	3 (0.118”)		11 (0.433”)	3.97 (0.156”)
N9MT11T3RC20-NC40	K20F	TiN	2.0	3.75 (0.148”)	1.5 (0.059”)	3.5 (0.138”)		11 (0.433”)	3.97 (0.156”)
N9MT11T3RC25-NC40	K20F	TiN	2.5	4.25 (0.167”)	1.5 (0.059”)	4 (0.157”)		11 (0.433”)	3.97 (0.156”)
N9MT11T3RC30-NC40	K20F	TiN	3.0	4.75 (0.187”)	1.4 (0.055”)	4.4 (0.173”)		11 (0.433”)	3.97 (0.156”)
N9MT11T3RC1/64-NC40	K20F	TiN	1/64	0.086”	0.059”	0.0747”		0.433”	0.156”
N9MT11T3RC1/32-NC40	K20F	TiN	1/32	0.101”	0.059”	0.090”		0.433”	0.156”
N9MT11T3RC1/16-NC40	K20F	TiN	1/16	0.133”	0.059”	0.122”		0.433”	0.156”
N9MT11T3RC3/32-NC40	K20F	TiN	3/32	0.164”	0.059”	0.153”		0.433”	0.156”
N9MT11T3RC 1/8-NC40	K20F	TiN	1/8	0.199”	0.055”	0.180”		0.433”	0.156”

- Other sizes also available upon request.

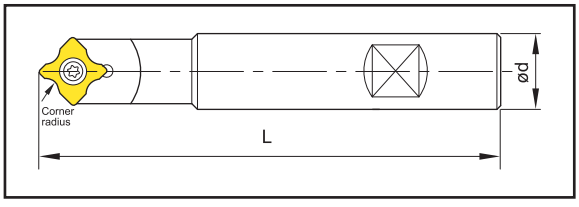
Holders

Features:

- For corner rounding using NC Spot Drill shank.
- Good for small work pieces.
- Same insert can also be used to produce a 45 degree edge chamfer.

Parts No.	ød	L	Screw	Key
99616-14-1/2	1/2”	4”	NS-35080 2.5 Nm	NK-T15
99616-14-5/8	5/8”	4”		

Ø1/2”, Ø5/8”




Shank Ø3/4”
Shank Ø1”

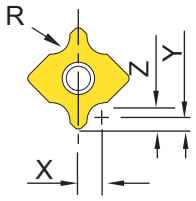
Inserts

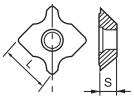
Features:

- Higher cutting speed and feed rate.
- Various corner radius inserts can fit on same holder.
- Combination corner rounding and 45° chamfering application on same insert.
- Carbide insert can stand very long tool life.

N9MT1704RCXX-NC2071:

- Submicron carbide insert, K20F, TiN coated, universal design for all kind of materials.
- Inserts are CNC ground for precision radius location.
- Each insert has two cutting edges.



Parts No.	Grade	Coating	Corner radius(R)	offset				Dimensions	
				X	Y	Z		L	S
New! N9MT1704RC40-NC2071	K20F	TiN	4.0	6.15	2	6		17	4.76
New! N9MT1704RC50-NC2071	K20F	TiN	5.0	7.10	2	7		17	4.76
New! N9MT1704RC60-NC2071	K20F	TiN	6.0	8.10	2	8		17	4.76
New! N9MT1704RC3/16-NC2071	K20F	TiN	3/16	0.270”	0.078”	0.268”		0.669”	0.187”
New! N9MT1704RC1/4-NC2071	K20F	TiN	1/4	0.333”	0.078”	0.330”		0.669”	0.187”

Holders

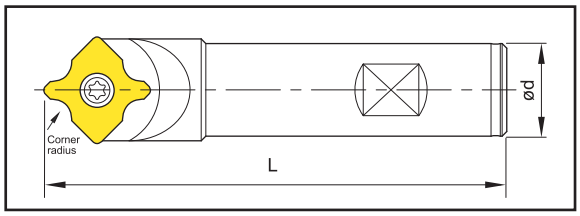
Features:

- For corner rounding using NC Spot Drill shank.
- Good for small work pieces, which need large corner rounding.
- 45 degree chamfering is available by using straight position of cutting edge.

Parts No.	ød	L	Screw	Key
99616-22-3/4	3/4”	4”	NS-50125 5.5 Nm	NK-T20
99616-22-1	1”	6”		

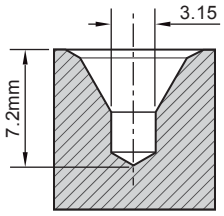
- Other sizes also available upon request.

Ø3/4”, Ø1”

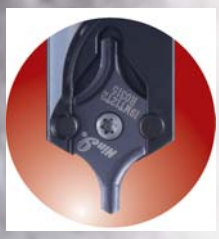


Undeniable benefits of i-Center

i-Center is the world's unique solution, first to upgrade the center drill process into the indexable generation leaving HSS and solid carbide centering behind as ancient history.



Comparison:
Work piece: Low carbon alloy steel, 850 N/mm²
Diameter of tool: Ø3.15 mm Depth of drilling: 7.2 mm
Machine: Vertical Machining Center, BT40 with internal coolant


i-Center


HSS
Center Drill
(TiN Coating)


Solid Carbide
Center Drill

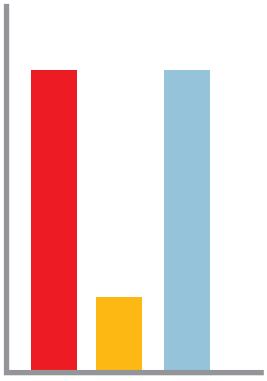
	i-Center	HSS Center Drill (TiN Coating)	Solid Carbide Center Drill
Cutting speed m/min.	65	17	65
Spindle speed r.p.m.	6570	1718	6570
Feed rate f = mm/rev.	0.12	0.02	0.1
Feed rate F= mm/min.	788.4	34.4	657
Coolant Emulsion	External / Internal	External	External
Drilling time sec.	0.55	12.5	0.65
Holes of drilling per edge	7000	700	5000

Profit by making the right choice

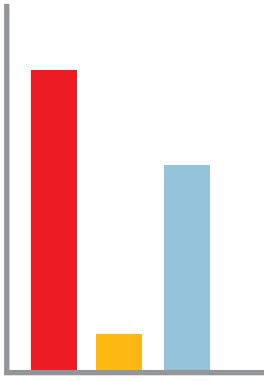
- High speed and feed rates of the i-Center reduce cutting time.
- The i-Center's unique design increases tool life and reduces changeover time.
- Together these attributes lower cost and increase your profits!

Nine9 i-Center
HSS center drill
Solid carbide center drill

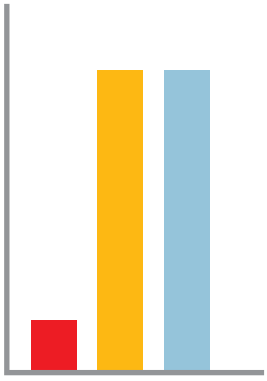
Feed rate



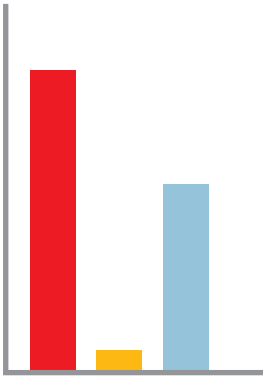
Tool life per edge



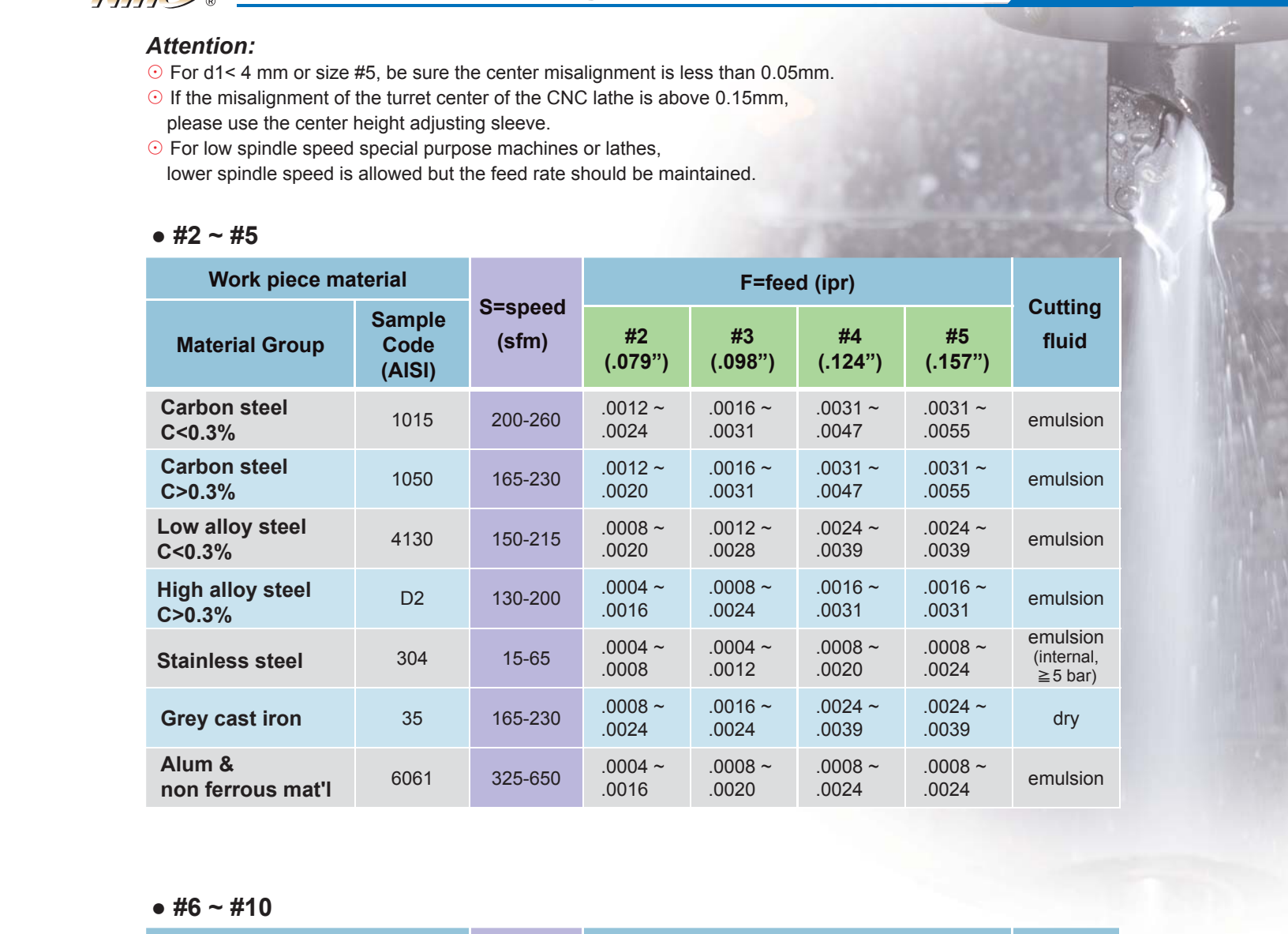
Tool setting time



Cost saving



i-Center Cutting Data



Attention:

- For d1< 4 mm or size #5, be sure the center misalignment is less than 0.05mm.
- If the misalignment of the turret center of the CNC lathe is above 0.15mm, please use the center height adjusting sleeve.
- For low spindle speed special purpose machines or lathes, lower spindle speed is allowed but the feed rate should be maintained.

● #2 ~ #5

Work piece material		S=speed (sfm)	F=feed (ipr)				Cutting fluid
Material Group	Sample Code (AISI)		#2 (.079")	#3 (.098")	#4 (.124")	#5 (.157")	
Carbon steel C<0.3%	1015	200-260	.0012 ~ .0024	.0016 ~ .0031	.0031 ~ .0047	.0031 ~ .0055	emulsion
Carbon steel C>0.3%	1050	165-230	.0012 ~ .0020	.0016 ~ .0031	.0031 ~ .0047	.0031 ~ .0055	emulsion
Low alloy steel C<0.3%	4130	150-215	.0008 ~ .0020	.0012 ~ .0028	.0024 ~ .0039	.0024 ~ .0039	emulsion
High alloy steel C>0.3%	D2	130-200	.0004 ~ .0016	.0008 ~ .0024	.0016 ~ .0031	.0016 ~ .0031	emulsion
Stainless steel	304	15-65	.0004 ~ .0008	.0004 ~ .0012	.0008 ~ .0020	.0008 ~ .0024	emulsion (internal, ≧5 bar)
Grey cast iron	35	165-230	.0008 ~ .0024	.0016 ~ .0024	.0024 ~ .0039	.0024 ~ .0039	dry
Alum & non ferrous mat'l	6061	325-650	.0004 ~ .0016	.0008 ~ .0020	.0008 ~ .0024	.0008 ~ .0024	emulsion

● #6 ~ #10

Work piece material		S=speed (sfm)	F=feed (ipr)				Cutting fluid
Material Group	Sample Code (AISI)		#6 (.197")	#7 (.248")	#8 (.315")	#10 (.394")	
Carbon steel C<0.3%	1015	200-260	.0039 ~ .0063	.0039 ~ .0063	.0047 ~ .0071	.0055 ~ .0079	emulsion
Carbon steel C>0.3%	1050	165-230	.0039 ~ .0063	.0039 ~ .0063	.0031 ~ .0047	.0055 ~ .0079	emulsion
Low alloy steel C<0.3%	4130	150-215	.0031 ~ .0047	.0031 ~ .0055	.0024 ~ .0039	.0047 ~ .0079	emulsion
High alloy steel C>0.3%	D2	130-200	.0024 ~ .0039	.0031 ~ .0047	.0016 ~ .0031	.0039 ~ .0063	emulsion
Stainless steel	304	15-65	.0008 ~ .0024	.0016 ~ .0031	.0008 ~ .0020	.0020 ~ .0039	emulsion (internal, ≧5 bar)
Grey cast iron	35	165-230	.0031 ~ .0047	.0031 ~ .0055	.0024 ~ .0039	.0047 ~ .0071	dry
Alum & non ferrous mat'l	6061	325-650	.0016~ .0031	.0016 ~ .0031	.0008 ~ .0024	.0024 ~ .0039	emulsion

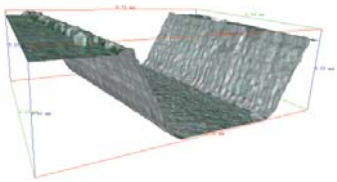
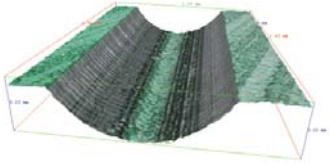
Engraving Tool

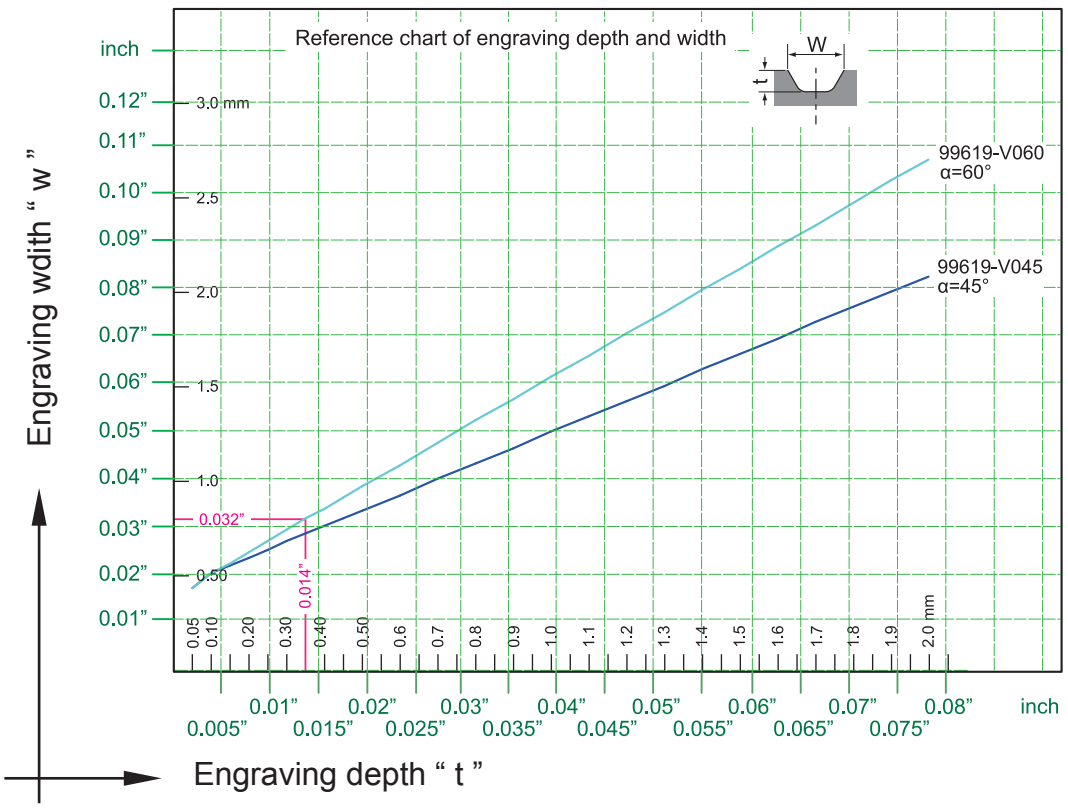
Nine9 indexable engraving tool optimizes engraving characters on CNC machines!

The tools to engrave character on work piece by NC program can be done by Nine9 engraving tool 99616-V060 **(Fig 1)**, *engraving tool* **(Fig. 2)** *and the ball nose end mill* **(Fig. 3).** *The engraving result was measured by Alicona Infinite Focus System, the form and roughness can be measured on the same machine and same operation.*

Test result:

Work piece material: Tool steel SKD 61(JIS G 4404)
Hardness: HRB92~93(≒ HB 200)
Engraving depth: 0.2 mm

Tool / Cutting data	 **99616-V060** (Fig. 1)	 **Engraving tool** (Fig. 2)	 **Ball nose end mill Radius 0.4 mm** (Fig. 3)
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			



- The bottom of the engraving is flat, minimum engraving depth (t) of 0.05 mm (0.002”) is recommended.
- 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.

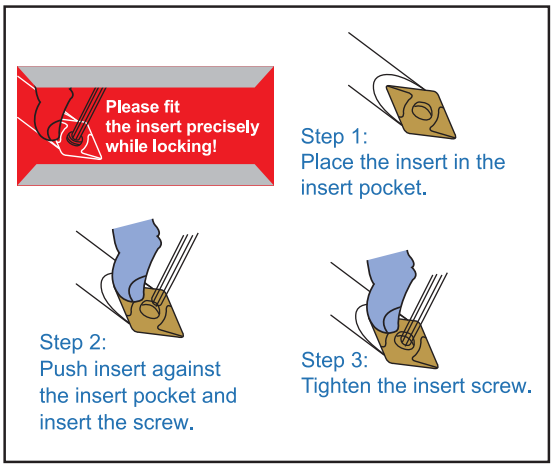
Attention!

1. Setting-up the tool holder:
- The engraving tool shank runout should be below 0.02 mm (0.0008”). Shrink fit chucks, hydraulic chuck and high precision spring collet chucks are recommended.
- Pre-balance the tool holder: G6.3/10,000 R.P.M. is recommended.

2. Clamping the engraving insert:
Place and hold the insert in the insert pocket against the positioning side. See illustration right.

3. 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 50-70% of the table feed rate.

4. 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.



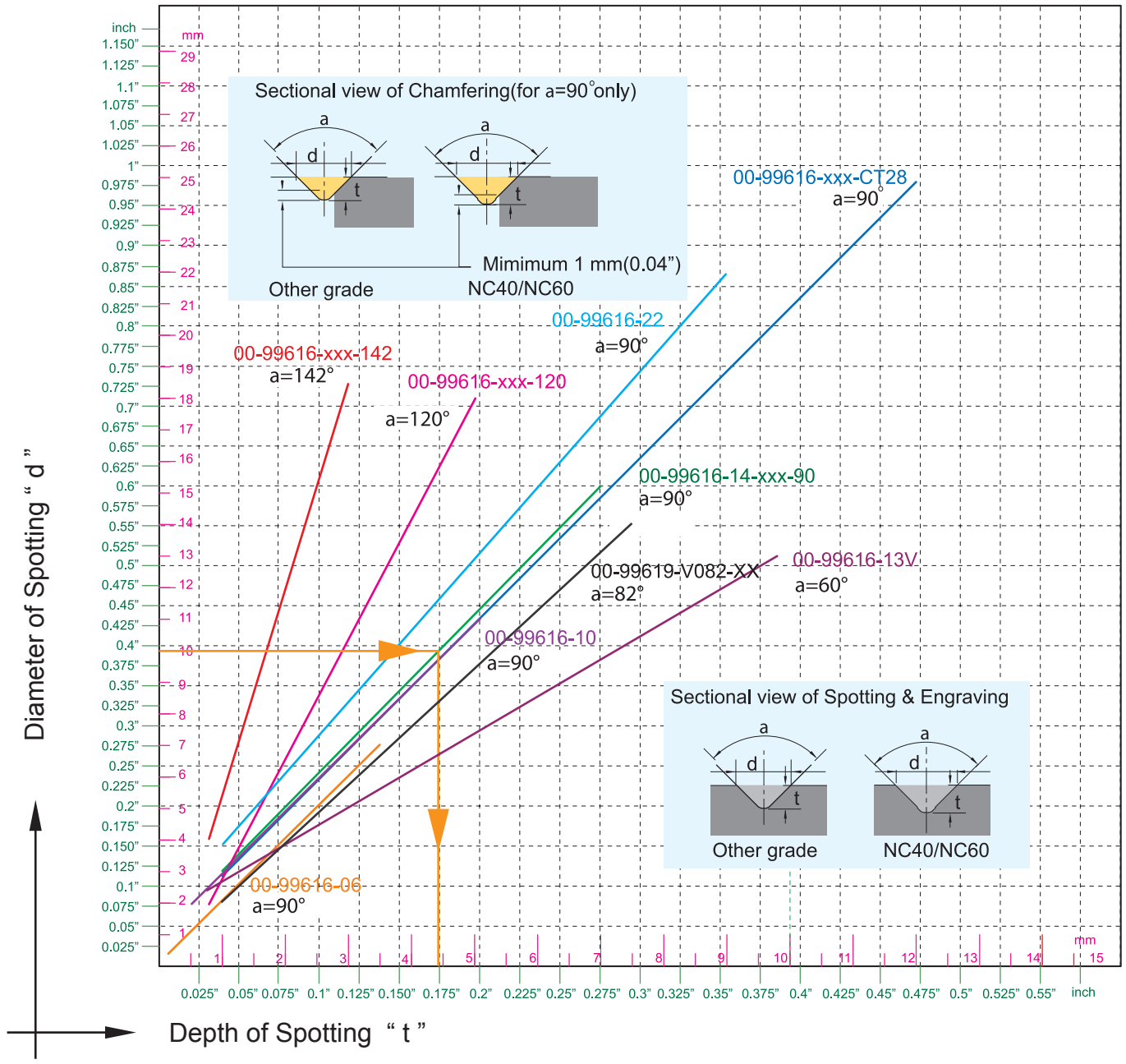
Cutting Data

Work Material		S RPM	f (in/rev.)	Grade of Insert
Stainless Steel		5000~20000	0.0008~0.0020	NC2071
Steel	< 30˚HRC	5000~20000	0.0008~0.0020	NC2071
	30˚-50˚HRC	5000~20000	0.0004~0.0008	NC2032
Cast iron		5000~20000	0.0004~0.0008	NC2032
Aluminum, Non-Ferrous Metal		5000~20000	0.0008~0.0030	NC2071
PMMA, POM (Plastic)		5000~20000	0.0008~0.0030	NC2071

Depth per pass

Material \ Ap	1st	2nd	3rd	4th	5th	6th	~	Fine finishing
Carbon steel C<0.3%	0.024"	0.016"	0.012"	0.008"	0.008"	0.004"	0.004"	0.004"
Carbon steel C>0.3%	0.031"	0.024"	0.012"	0.008"	0.004"	~		0.004"
Low alloy steel C<0.3%	0.020"	0.016"	0.012"	0.012"	0.008"	0.008"	0.004"	0.004"
High alloy steel C>0.3%	0.012"	0.012"	0.008"	0.008"	0.006"	0.006"	0.004"	0.020"
Alloy steel ≧HRC40°	0.008"	0.008"	0.006"	0.006"	0.004"	0.004"	0.004"	0.002"
Stainless steel	0.020"	0.016"	0.012"	0.012"	0.008"	0.008"	0.004"	0.002"
Casting iron	0.040"	0.031"	0.008"	~				0.004"
non-ferrous metal	0.079"	~						0.004"

Diameter/Depth Chart and Speed/Feed Rate Calculation of NC Spot Drill



Use Instructions

1. From Spot diameter "d" to get drill depth " t ".
2. Point angle "α" is decided by which tool holder you use.
3. From "d" draw a horizontal line to get intersection of the line by point angle "α".
4. From the intersection draw a vertical line to the bottom to have depth of spotting " t ". " t " is the drill depth of the NC program.
5. The sectional view of spotting will depend on the shape of insert. NC40 and other insert grades have different sectional view.
6. For chamfering, do not use tip of insert, 1mm(0.04") minimum clearance is required for a smooth surface finish.

Calculate Spindle Speed

1. Using your "d" value and cutting speed SFM from the data sheet (reference page 34), calculate spindle speed "S"(RPM).
2. Feed rate per minute F=f x S=RPMxIPR

inch

$$S = \frac{SFM \times 3.82}{D}$$

$$F = fxS$$

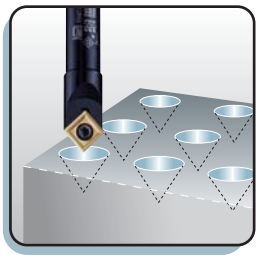
D= Diameter -inch
S= Spindle speed -r.p.m.
SFM= Cutting Speed -ft./min.
f = inch/rev. =IPR
F= inch/min.

N9MT-CT Insert **Multi-function Insert**

Determine spindle speed and feed rate:

- Choose spotting depth to decide spotting diameter according to the Diameter/Depth chart of page 33.
- The spindle speed should be calculated by the maximum diameter of spotting, chamfering and grooving.

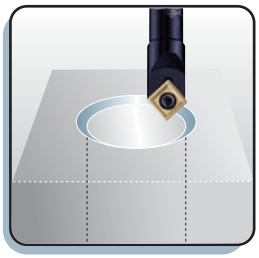
Centering



Work Material	SFM	IPR (inch/rev.)	Grade of Insert
Carbon Steel	500~820	0.0020~0.0040	NC40, H-NC40, NC2071
Alloy Steel	330~660	0.0016~0.0024	NC40, H-NC40, NC2071
Stainless Steel	210~410	0.0010~0.0024	NC10, NC60, H-NC40, NC2071
Non-Ferrous Metal (Al, copper)	500~1050	0.0020~0.0040	NC10, H-NC9076
Cast iron	260~500	0.0020~0.0040	NC10, NC40, NC2071
Ti, Ti-alloy	200~260	0.0012~0.0024	NC9076

* For technical construction reasons, the insert is not located on the center of the holder.
* Inserts with supporting edges can increase feed rate 50%. (ex:NC2071, NC9076, H-NC40 type)

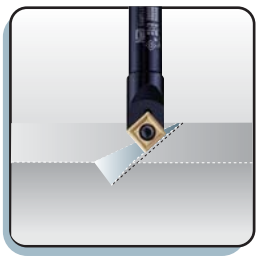
Chamfering



Work Material	SFM	IPR (inch/rev.)	Grade of Insert
Carbon Steel	500~1050	0.0020~0.0040	NC40, H-NC40, NC2071
Alloy Steel	330~820	0.0016~0.0024	NC40, H-NC40, NC2071
Stainless Steel	210~410	0.0010~0.0024	NC10, NC60, H-NC40, NC2071
Non-Ferrous Metal (Al, copper)	500~1050	0.0020~0.0040	NC10, H-NC9076
Cast iron	500~820	0.0020~0.0040	NC10, NC40, NC2071
Ti, Ti-alloy	200~260	0.0012~0.0024	NC9076

* NC2071, NC9076, H-NC40 type can increase feed rate 20%.

Grooving

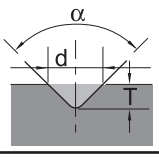


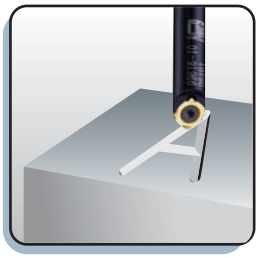
Work Material	SFM	IPR (inch/rev.)	Grade of Insert
Carbon Steel	500~820	0.0020~0.0040	NC40, H-NC40, NC2071
Alloy Steel	330~660	0.0016~0.0024	NC40, H-NC40, NC2071
Stainless Steel	210~410	0.0010~0.0024	NC10, NC60, H-NC40, NC2071
Non-Ferrous Metal (Al, copper)	500~1050	0.0020~0.0040	NC10, H-NC9076
Cast iron	260~500	0.0020~0.0040	NC10, NC40, NC2071
Ti, Ti-alloy	200~260	0.0012~0.0024	NC9076

N9MT-W Insert **Engraving Insert**

Engraving: Width of engraving=diameter of cutting=”d”
Depth of engraving=depth of cutting=”T”

■For α = 90° insert, d=2xT
■For α = 60° insert, d=1.73xT





Work Material	SFM	IPR (inch/rev.)	Grade of Insert
All Kind of Steel, unhardened, Cast iron	66~260	0.0004~0.0008	NC40
Non-Ferrous Metal	66~310	0.0004~0.0008	NC10
Hardened Steel HRC 40-50°	66~260	0.0004~0.0008	NC10

Attention:The calculated result “d” is only for calculation of spindle speed.

N9MT-RC Insert **Corner Rounding Tool**

Determine spindle speed and feed:

To decide running speed of the tools and feed rate, please calculate spindle speed and feed rate according to the following formula and cutting data:

Calculate spindle speed

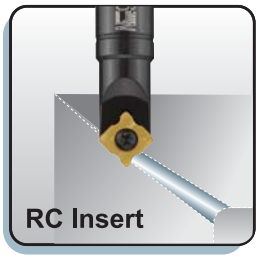
$d = 2 \times X$ inch

$d = 2 \times r$ inch

$S = \frac{SFM \times 3.82}{d}$ r.p.m.

$F = f \times S$ inch

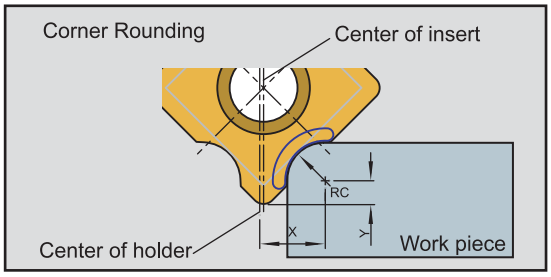
d = diameter of the tool for calculation purpose
X = tool radius offset (ref. page 27~28 for RC inserts)
r = tool radius offset
SFM = cutting speed ft./min.
S = Spindle speed
F = Feed rate
f = inch/rev.



Calculate tool length offest on machining center

TL=TL'-Y,
H = X or r

X = tool radius offset (ref. page 27~28 for RC inserts)
r = tool radius offset
Y = distance to the center of radius. (page 27~28 for RC inserts)
TL' = tool length
TL = tool length offset
H = tool radius offset



Recommended cutting speed for different materials:

Corner Rounding RC Insert

Workpiece material	SFM	IPR (inch/rev.)	Grade of insert
Carbon Steel	500~1050	0.0020~0.0040	NC40, NC2071
Alloy steel	330~820	0.0020~0.0040	NC40, NC2071
High alloy steel	260~500	0.0016~0.0040	NC40, NC2071
Hardened steel <HRC40°	200~260	0.0016~0.0040	NC40, NC2071
Stainless steel	210~410	0.0020~0.0040	NC40, NC2071
Gray cast iron	500~820	0.0020~0.0040	NC40, NC2071
Aluminum, Al-alloy Si < 12%	500~1050	0.0020~0.0040	NC40, NC2071
Al-alloy Si >12%	330~1050	0.0020~0.0040	NC40, NC2071
Copper	600~820	0.0020~0.0040	NC40, NC2071
Brass and Bronze	500~820	0.0020~0.0040	NC40, NC2071

Special Request Form for NC Spot Drills

Job: ☐Spotting ☐Chamfering ☐Engraving ☐Facing ☐Drilling

☐Milling ☐Turning ☐Others:

Holder: Dia: Length: Shank:

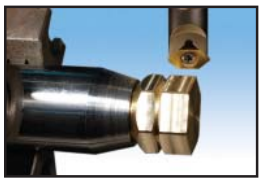
Working Material : ISO code or DIN code:

Sketch of working pieces:

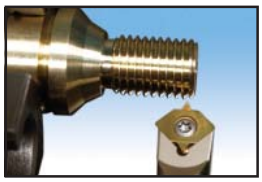
Special

Ordering Code	Various Applications
N9MT11T3FH-NC2031	8 mm end milling, face milling (High postive)
N9MT11T3T-NC2031	Pitch 0.5-3 mm thread turning external
N9MT11T3G-NC2031	2 mm grooving, depth 4 mm
N9MT11T3E-NC2031	Drilling and milling a groove

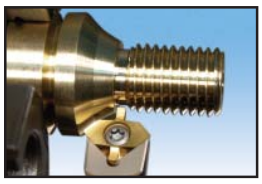
*Special insert and holder are available on request.



8 mm end milling, face milling (High postive)



Pitch 0.5-3 mm thread turning external



2 mm grooving, depth 4 mm

Drilling and milling a groove

Quick Change High Speed Boring Tools

Ø5mm~Ø50mm boring bars are interchangeable. Change the boring bar in just one minute. G6.3 10000 r.p.m. pre-balanced.

High Speed

- Boring bar design ensures accurate high speed boring. Grade balance is G6.3 10000 r.p.m.
- Carbide inserts' surface speeds up to 700 m/min.

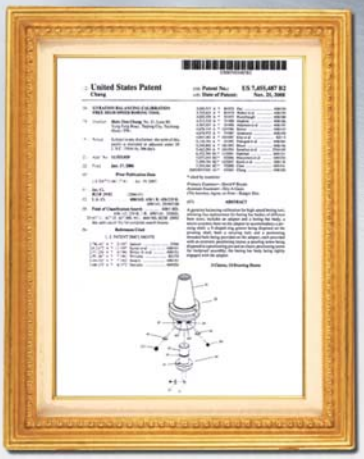
Low Cost

- The cost of this product is low compared to other micro adjustable boring heads.

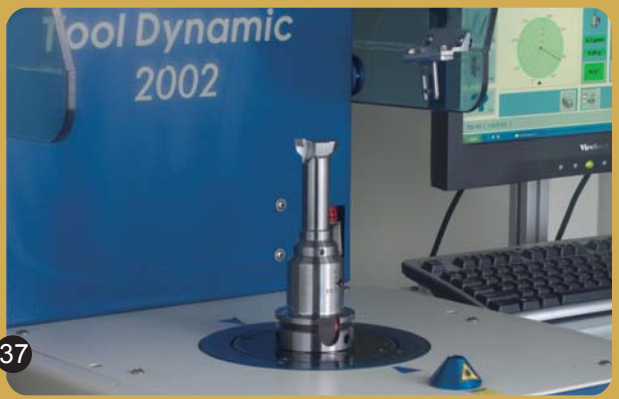
Simplistic Yet Accurate

- Dimensions are easy to read. They are indicated on the tools and are easily adjustable on a tool presetter or in machining center.
- No backlash.
- Change the boring bar and set the boring dimension on the tool presetter in just one minute.
- This simple boring tool has minimal components.

USA Patent

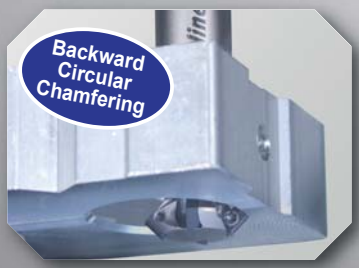


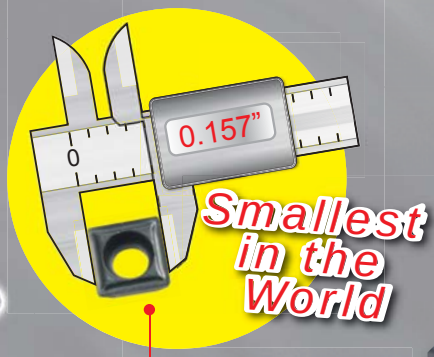
For detailed information, please contact us.

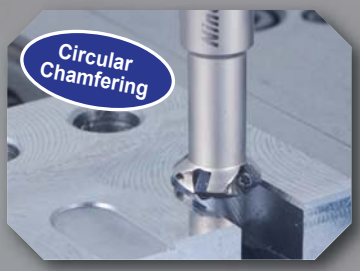


45° indexable chamfer mill

Smallest indexable countersink, Diameter 0.276".







For detailed information, please contact us.

Features

2, 4 cutter teeth

	Other Makers with Large Insert	Nine 9 Chamfer Mills
Chamfering	0.039"	0.039"
Feed rate inch/rev.	0.004"	0.004"
Cutter dia.	1.26"	0.433"
Cutter teeth	2	4 UP
Cutting speed (SFM)	660	990 UP
Spindle speed (R.P.M)	1990	8685 UP
Feed (IPM)	15.669"	136.772" UP

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Distributor:

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