



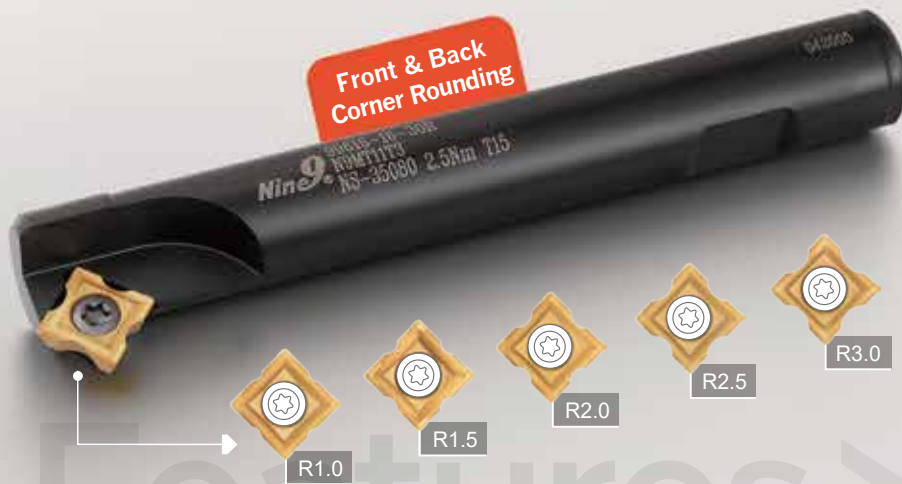
# Corner Rounding >>>

Type of R / Radius 1.0~3.0mm

Produces smooth and excellent surface finish on workpiece.



► For Front And Back Chamfering (By LA Insert),  
And Corner Rounding (By R Insert)



## Features >

► **Each Insert Has 4 Cutting Edges**

- Carbide insert can stand very long tool life.
- R1.0 ~ R3.0 inserts are interchangeable on same holder.
- For front and back chamfering.
- Tool offset can be set after measuring tool length by tool presetter or Z-Zero Setter.
- Inserts are CNC ground for precision radius and location.
- Optimizes the tool performance and reduces the cutting time.



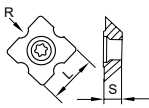


R1.0~R3.0

## ▶ Inserts >>

- For front and back corner rounding.
- Various corner radius inserts can fit on same holder.
- Coated carbide inserts for excellent tool life.
- Each insert has 4 cutting edges.

**NC2071:** • Universal grade for all unhardened steel and cast iron.  
 • Inserts are CNC ground for precision radius location.

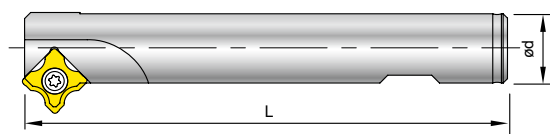
Corner radius(R)	Parts No.	Coating	Grade	No.	Dimensions	
					L	S
1.0	N9MT11T3R10-NC2071	TiN	P35		11.11 (0.433")	3.97 (0.156")
1.5	N9MT11T3R15-NC2071					
2.0	N9MT11T3R20-NC2071					
2.5	N9MT11T3R25-NC2071					
3.0	N9MT11T3R30-NC2071					

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Corner Rounding

## ▶ Holder >>

- Center of radius of each tool is dedicated.
- Tool offset can be set after measuring tool length by tool presetter or Z-Zero Setter.



Parts No.	Ød	L	⊕ Z	Screw	Key
99616-16-25R	16 (0.630")	100 (3.94")	1	NS-35080 2.5 Nm	NK-T15
99616-16-30R	16 (0.630")	120 (4.72")	1		
99616-25-40R	25 (0.984")	150 (5.91")	4		

## ▶ More >>

- Also can fit with N9MT11T308LA inserts for front and back chamfering. (Please see page 2-45)

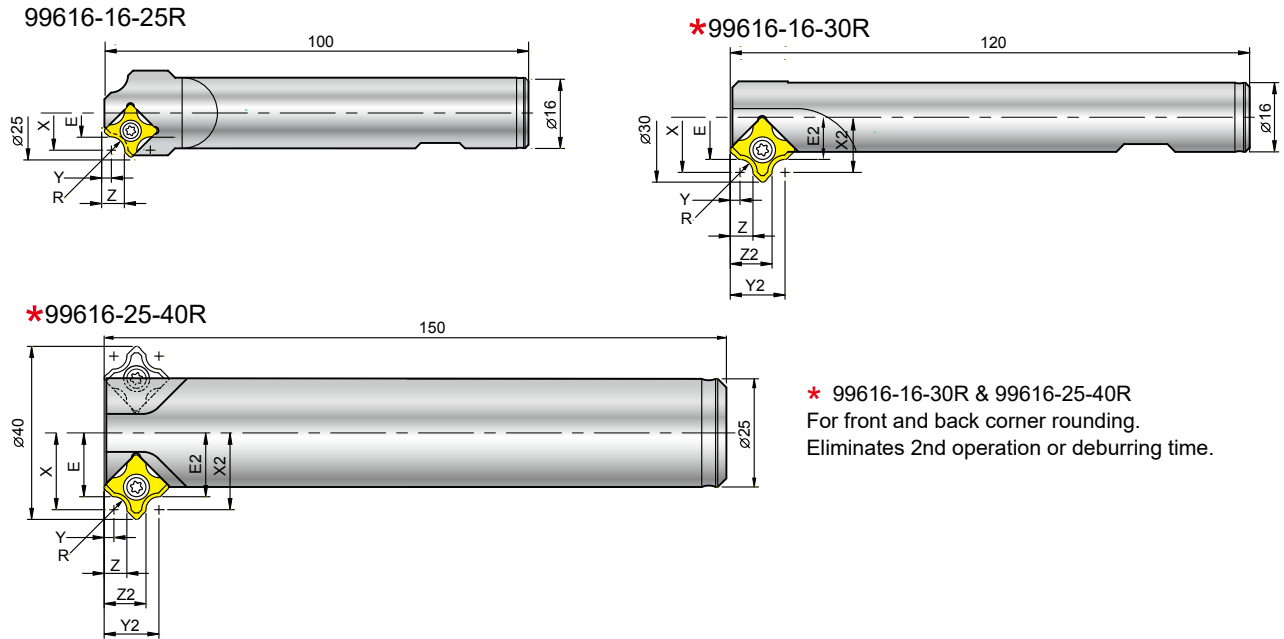
# R N9MT11T3R



## ► Cutting Position ►►

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Corner Rounding



\* 99616-16-30R & 99616-25-40R  
For front and back corner rounding.  
Eliminates 2nd operation or deburring time.

Corner Radius	Holder	Ød	Front Chamfering				Back Chamfering				⊗ Z
			E	X	Y	Z	E2	X2	Y2	Z2	
R1.0	99616-16-25R	16 (0.630")	8.25 (0.325")	9.25 (0.364")	3.25 (0.128")	4.25 (0.167")	—	—	—	—	1
	99616-16-30R		10.75 (0.423")	11.75 (0.463")			10.75 (0.423")	11.75 (0.463")	11.65 (0.459")	10.65 (0.419")	1
	99616-25-40R	25 (0.984")	15.75 (0.620")	16.75 (0.659")	15.75 (0.620")	16.75 (0.659")	—	—	—	—	4
R1.5	99616-16-25R	16 (0.630")	8 (0.315")	9.5 (0.374")	3 (0.118")	4.5 (0.177")	—	—	—	—	1
	99616-16-30R		10.5 (0.413")	12 (0.472")			10.5 (0.413")	12 (0.472")	11.9 (0.469")	10.4 (0.409")	1
	99616-25-40R	25 (0.984")	15.5 (0.610")	17 (0.670")	15.5 (0.610")	17 (0.670")	—	—	—	—	4
R2.0	99616-16-25R	16 (0.630")	7.75 (0.305")	9.75 (0.384")	2.75 (0.108")	4.75 (0.187")	—	—	—	—	1
	99616-16-30R		10.25 (0.404")	12.25 (0.482")			10.25 (0.404")	12.25 (0.482")	12.15 (0.478")	10.15 (0.400")	1
	99616-25-40R	25 (0.984")	15.25 (0.600")	17.25 (0.680")	15.25 (0.600")	17.25 (0.680")	—	—	—	—	4
R2.5	99616-16-25R	16 (0.630")	7.5 (0.295")	10 (0.394")	2.5 (0.098")	5 (0.197")	—	—	—	—	1
	99616-16-30R		10 (0.394")	12.5 (0.492")			10 (0.394")	12.5 (0.492")	12.4 (0.488")	9.9 (0.390")	1
	99616-25-40R	25 (0.984")	15 (0.590")	17.5 (0.689")	15 (0.590")	17.5 (0.689")	—	—	—	—	4
R3.0	99616-16-25R	16 (0.630")	7.25 (0.285")	10.25 (0.404")	2.25 (0.09")	5.25 (0.207")	—	—	—	—	1
	99616-16-30R		9.75 (0.384")	12.75 (0.502")			9.75 (0.384")	12.75 (0.502")	12.65 (0.498")	9.65 (0.380")	1
	99616-25-40R	25 (0.984")	14.75 (0.580")	17.75 (0.699")	14.75 (0.580")	17.75 (0.699")	—	—	—	—	4

\* Also can fit with N9MT11T308LA inserts for front and back chamfering. (Please see page 2-45)



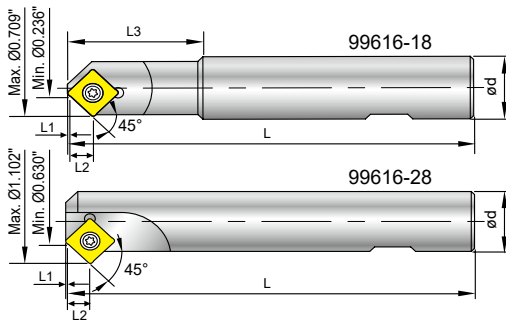
## ▶ Inserts >>

- NC40:**
  - General purpose, universal grade for all unhardened steel.
  - 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, cast iron and stainless steel.
  - Each insert has 4 cutting edges.
- NC60:**
  - Cermet insert, for hardened steel up to 56 HRC .
  - Each insert has 4 cutting edges.

Parts No.	Coating	Grade	Dimensions				
			L	S	Re		
N9MT11T308LA	NC40	TiN		11.11 (0.433")	3.97 (0.156")	0.8 (0.031")	
	NC10	TiAlN					K10F
	NC60	Cermet					

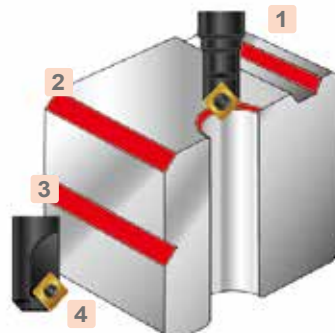
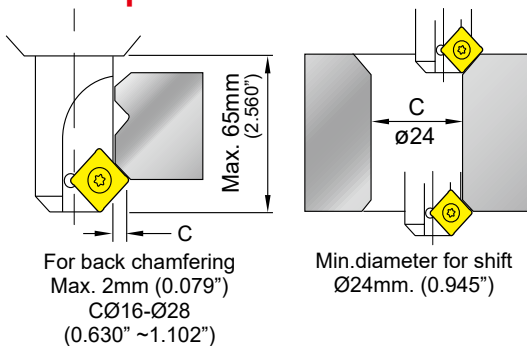
## ▶ Holder >>

- 99616-28 can be applied for machining back chamfering and side grooving.



Parts No.	Chamfering	Ød	L	L1	L2	L3	Z	Insert type	Screw / Key
99616-18	Ø6-Ø18 (Ø0.236" ~ Ø0.709")	20 (0.787")	120 (4.724")	1.15 (0.045")	7.55 (0.297")	40 (1.632")	1	N9MT11T308LA	NS-35080 2.5 Nm / NK-T15
99616-28	Ø16-Ø28 (Ø0.630" ~ Ø1.102")	20 (0.787")	120 (4.724")	1.15 (0.045")	7.55 (0.297")	--			

## ▶ Example >>



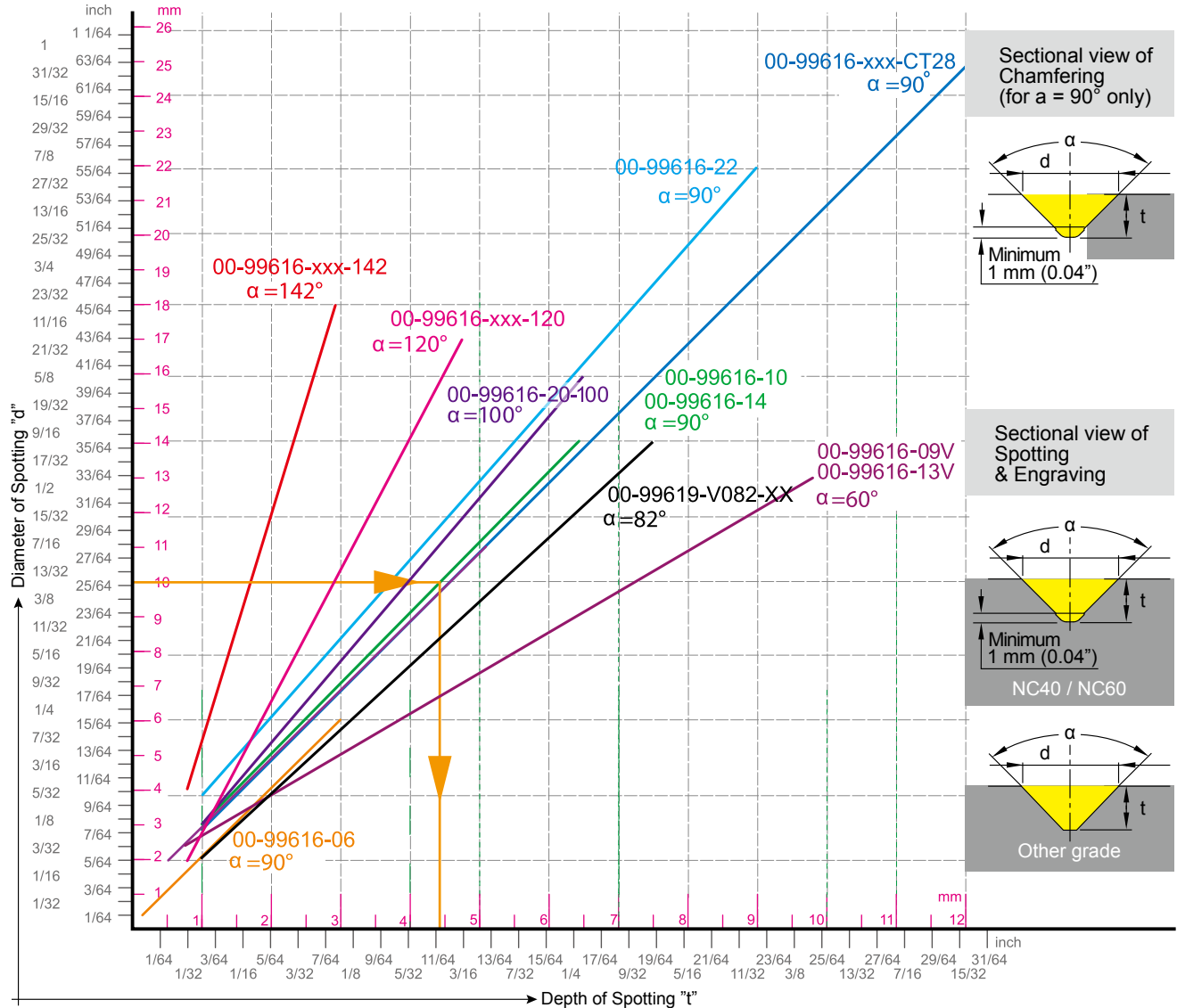
Action	
1	External and internal chamfering
2	Side chamfering
3	Side grooving
4	Back chamfering

## ▶ More >>

- Also can fit with 99616-XX-25R/30R/40R holders. (Please see page 2-44)

# Cutting Data

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



### ► Instruction >>

1. From Spot diameter "d" to get drill depth "t".
2. Point angle "α" is determined 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 grades of inserts 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.

Metric		Inch	
$S = \frac{Vc \times 1000}{\pi \times d}$	d = diameter -mm S = Spindle Speed -r.p.m. Vc = Cutting Speed -m/min.	$S = \frac{(3.82 \times SFM)}{d}$	d = diameter-inch S = Spindle Speed-r.p.m. SFM = Surface Speed-ft./min.
$F = S \times f$	f = mm/rev. F = mm/min.	$F = r.p.m. \times IPR$	f = IPR = inch/rev. F = inch/min.

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NC Spot Drill

# Cutting Data

Determine spindle speed and feed rate:

- Choose spotting depth to decide spotting diameter according to the Diameter/Depth chart on page 2-44.
- The spindle speed should be calculated by the maximum diameter of spotting, chamfering and grooving.




## ► For Insert V9MT0802CT / N9MT05T1CT / N9MT0602CT

Workpiece material	SFM	IPR (inch/rev.)			NC2071	NC5071	NC9076
		 					
		Spotting / Grooving	Chamfering				
<b>P</b> Carbon steel C<0.3%	500 ~ 1050	0.0012" ~ 0.0028"	0.0020" ~ 0.0059"	●			
Carbon steel C>0.3%	330 ~ 820	0.0008" ~ 0.0024"	0.0012" ~ 0.0047"		●		
Low alloy steel C<0.3%	330 ~ 820	0.0008" ~ 0.0024"	0.0016" ~ 0.0047"	●			
High alloy steel	195 ~ 590	0.0008" ~ 0.0020"	0.0012" ~ 0.0039"		●		
<b>M</b> Stainless steel	210 ~ 410	0.0008" ~ 0.0016"	0.0012" ~ 0.0031"	●	○	◎	
<b>K</b> Cast iron	500 ~ 820	0.0012" ~ 0.0028"	0.0020" ~ 0.0059"	◎	●		
<b>N</b> Non-ferrous metal	500 ~ 1050	0.0012" ~ 0.0028"	0.0020" ~ 0.0059"	◎		●	
<b>S</b> Ti, Ti-alloy	200 ~ 260	0.0008" ~ 0.0024"	0.0008" ~ 0.0024"	●		◎	
Heat resistant alloy	100 ~ 200	-	0.0012" ~ 0.0028"	○	◎		
<b>H</b> Hardened steel < HRC56	100 ~ 200	0.0008" ~ 0.0024"	0.0008" ~ 0.0024"		○		

\* For technical construction reasons, the insert is not located on the center of the holder.

● Best ◎ Suit ○ Possible

## ► For Insert N9MT0802 / N9MT11T3CT

Workpiece material	SFM	IPR (inch/rev.)			NC40	NC10	NC60	H-NC5071	H-NC40	H-NC9076
		 								
		Spotting / Grooving	Chamfering							
<b>P</b> Carbon steel C<0.3%	500 ~ 1050	0.0020" ~ 0.0039"	0.0039" ~ 0.0094"	●				●		
Carbon steel C>0.3%	330 ~ 820	0.0016" ~ 0.0031"	0.0031" ~ 0.0079"				●			
Low alloy steel C<0.3%	330 ~ 820	0.0016" ~ 0.0031"	0.0031" ~ 0.0079"	●		◎		●		
High alloy steel	195 ~ 590	0.0012" ~ 0.0028"	0.0020" ~ 0.0059"			◎	●			
<b>M</b> Stainless steel	210 ~ 410	0.0012" ~ 0.0024"	0.0031" ~ 0.0079"	○	●		○	●	◎	
<b>K</b> Cast iron	500 ~ 820	0.0020" ~ 0.0039"	0.0039" ~ 0.0098"	●	●		●	◎		
<b>N</b> Non-ferrous metal	500 ~ 1050	0.0020" ~ 0.0039"	0.0039" ~ 0.0098"		◎			◎	●	
<b>S</b> Ti, Ti-alloy	200 ~ 260	0.0012" ~ 0.0031"	0.0012" ~ 0.0031"					●	◎	
Heat resistant alloy	100 ~ 200	-	0.0020" ~ 0.0039"				◎	○		
<b>H</b> Hardened steel < HRC56	100 ~ 200	0.0012" ~ 0.0031"	0.0012" ~ 0.0031"			●	○			

\* For technical construction reasons, the insert is not located on the center of the holder.

● Best ◎ Suit ○ Possible




\* H-NC5071, H-NC40 and H-NC9076 inserts with supporting edges can increase feed rate 50%.



NC Spot Drill

# Cutting Data

► For Insert V9MT12T3CT / V082... / N9MT1704CT / N9MT2204CT / N9MT2506CT / V142...

Workpiece material	SFM	IPR (inch/rev.)			NC2071	NC5071	NC9076 (NC9036)	NC40	NC2033	XP9000
		 Spotting / Grooving	 Chamfering	 Chamfering						
<b>P</b> Carbon steel C<0.3%	500 ~ 1050	0.0020" ~ 0.0039"	0.0039" ~ 0.0094"	●			●			
Carbon steel C>0.3%	330 ~ 820	0.0016" ~ 0.0031"	0.0031" ~ 0.0079"		●			●		
Low alloy steel C<0.3%	330 ~ 820	0.0016" ~ 0.0031"	0.0031" ~ 0.0079"	●			●			
High alloy steel	195 ~ 590	0.0012" ~ 0.0028"	0.0020" ~ 0.0059"		●			●		
<b>M</b> Stainless steel	210 ~ 410	0.0012" ~ 0.0024"	0.0031" ~ 0.0079"	●	○	◎	○	○		
<b>K</b> Cast iron	500 ~ 820	0.0020" ~ 0.0039"	0.0039" ~ 0.0098"	◎	●		◎	●		
<b>N</b> Non-ferrous metal	500 ~ 1050	0.0020" ~ 0.0039"	0.0039" ~ 0.0098"	◎		●			●	
<b>S</b> Ti, Ti-alloy	200 ~ 260	0.0012" ~ 0.0031"	0.0012" ~ 0.0031"	●		◎				
Heat resistant alloy	100 ~ 200	-	0.0020" ~ 0.0039"	○	◎					
<b>H</b> Hardened steel < HRC56	100 ~ 200	0.0012" ~ 0.0031"	0.0012" ~ 0.0031"		○			◎		

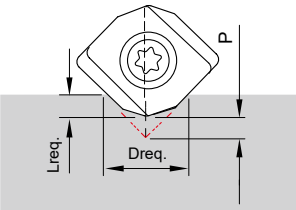
\* For technical construction reasons, the insert is not located on the center of the holder.

● Best ◎ Suit ○ Possible

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NC Spot Drill

► For Insert N9MT0802M.. / N9MT11T3M.. / N9MT11T3UNC.. N9MT1704M..

W spotting	Formula																						
	$P =$ distance of theoretical intersection point to tip of insert.																						
	$0.5 =$ fixed factor for calculation																						
	$L_{req.} =$ required drilling depth																						
	$D_{req.} =$ required diameter																						
	<table border="1"> <thead> <tr> <th>M4</th> <th>M5</th> <th>M6</th> <th>M8</th> <th>M10</th> <th>M12</th> <th>M14</th> <th>M16</th> <th>1/4-20 UNC</th> <th>5/16-18 UNC</th> <th>3/8-16 UNC</th> </tr> </thead> <tbody> <tr> <td>P = 0.046"</td> <td>0.058"</td> <td>0.069"</td> <td>0.094"</td> <td>0.117"</td> <td>0.141"</td> <td>0.165"</td> <td>0.192"</td> <td>0.071"</td> <td>0.091"</td> <td>0.109"</td> </tr> </tbody> </table>	M4	M5	M6	M8	M10	M12	M14	M16	1/4-20 UNC	5/16-18 UNC	3/8-16 UNC	P = 0.046"	0.058"	0.069"	0.094"	0.117"	0.141"	0.165"	0.192"	0.071"	0.091"	0.109"
M4	M5	M6	M8	M10	M12	M14	M16	1/4-20 UNC	5/16-18 UNC	3/8-16 UNC													
P = 0.046"	0.058"	0.069"	0.094"	0.117"	0.141"	0.165"	0.192"	0.071"	0.091"	0.109"													

WSP spotting	Workpiece material	SFM	IPR (inch/rev.)	Grade of Insert
<b>P</b>	Carbon steel	500 ~ 1050	0.0020" ~ 0.0060"	NC2033
	Alloy steel	410 ~ 820	0.0020" ~ 0.0040"	NC2033
<b>M</b>	Stainless steel	260 ~ 500	0.0015" ~ 0.0031"	NC2033
<b>K</b>	Cast iron	330 ~ 660	0.0020" ~ 0.0040"	NC2033
<b>H</b>	Hardened steel < HRC50	100 ~ 200	0.0012" ~ 0.0031"	NC2033

# Cutting Data

## ► For Insert N9MT05T1RC / N9MT11T3RC / N9MT1704RC / N9MT2506RC

Corner Rounding	Calculate spindle speed
	$d = 2 \times X$ inch $S = \frac{SFM \times 3.82}{d}$ r.p.m. $F = S \times f$ inch
	$d =$ diameter of the tool $X =$ tool radius offset (ref. page 2-18~20 for RC inserts) $Vc =$ Cutting speed ft./min. $S =$ Spindle Speed -r.p.m. $F =$ Feed rate inch $f =$ inch/rev.
	<b>Calculate tool length offset on machining center</b> $X =$ tool radius offset $Y =$ distance to the center of radius. $Z =$ distance of cut

RC Insert	Work Material	SFM	IPR (inch/rev.)	Grade of Insert
	<b>P</b> Carbon steel	500 ~ 1050	0.0020" ~ 0.0039"	NC40, NC2071, NC2033
	<b>P</b> Alloy steel	330 ~ 820	0.0020" ~ 0.0039"	NC40, NC2071, NC2033
	<b>M</b> High alloy steel	260 ~ 500	0.0016" ~ 0.0031"	NC40, NC2071, NC2033
	<b>M</b> Stainless steel	210 ~ 410	0.0020" ~ 0.0039"	NC9036
	<b>K</b> Cast iron	500 ~ 820	0.0020" ~ 0.0039"	NC40, NC2071, NC2033
	<b>N</b> Al, Al-alloys(Si<12%)	500 ~ 1050	0.0020" ~ 0.0039"	NC9036, XP9000
	<b>N</b> Casting Al-alloys(Si>12%)	330 ~ 1050	0.0020" ~ 0.0039"	NC9036, XP9000
	<b>S</b> Cu, Cu-alloy, casting cu-alloy	500 ~ 820	0.0020" ~ 0.0039"	NC9036, XP9000
	<b>S</b> Ti, Ti-alloy	130 ~ 260	0.0012" ~ 0.0031"	NC9036
	<b>H</b> Hardened steel < HRC50	100 ~ 200	0.0012" ~ 0.0031"	NC2033

## ► For N9MT-R Insert >> Corner Rounding (4 cutting edges)

R Insert	Work Material	SFM	IPR (inch/rev.)	Grade of Insert
	<b>P</b> Carbon steel	500 ~ 1050	0.0020" ~ 0.0040"	NC2071
	<b>P</b> Alloy steel	330 ~ 820	0.0016" ~ 0.0031"	NC2071
	<b>P</b> High alloy steel	200 ~ 260	0.0012" ~ 0.0023"	NC2071
	<b>K</b> Cast iron	500 ~ 820	0.0020" ~ 0.0040"	NC2071

## ► For LA Insert >> 45° Chamfering

45° Chamfering	Formula
	$\alpha =$ point angle 90° $d =$ effective diameter $SFM =$ Surface Speed-ft./min.. $Vc$ (m/min.) x 3.28 $S =$ Spindle Speed-r.p.m. $f =$ IPR= inch/rev.
	$S = \frac{(3.82 \times SFM)}{d}$ $F = f \times S$
	<b>45° Chamfering</b>

45° Chamfering	Work Material	SFM	IPR (inch/rev.)	Grade of Insert
	<b>P</b> Carbon steel	500 ~ 1050	0.0020" ~ 0.0040"	NC40
	<b>P</b> Alloy steel	330 ~ 820	0.0016" ~ 0.0031"	NC40
	<b>P</b> High alloy steel	200 ~ 260	0.0012" ~ 0.0023"	NC40
	<b>M</b> Stainless steel	210 ~ 410	0.0012" ~ 0.0023"	NC10
	<b>K</b> Cast iron	500 ~ 820	0.0020" ~ 0.0040"	NC10, NC40
	<b>N</b> Al, Al-alloys(Si<12%)	500 ~ 1050	0.0020" ~ 0.0040"	NC10
	<b>N</b> Casting Al-alloys(Si>12%)	330 ~ 1050	0.0020" ~ 0.0040"	NC10
	<b>S</b> Cu, Cu-alloy, casting cu-alloy	500 ~ 820	0.0020" ~ 0.0040"	NC10
	<b>H</b> Hardened steel < HRC56	200 ~ 260	0.0020" ~ 0.0040"	NC60

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Corner Rounding