



Corner Rounding >> Type of RC

Various corner radius inserts can fit on same holder

Carbide insert can stand very long tool life

Produces smooth and excellent surface finish on workpiece.

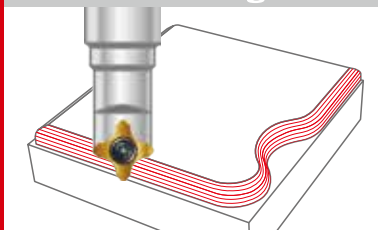
1

Features

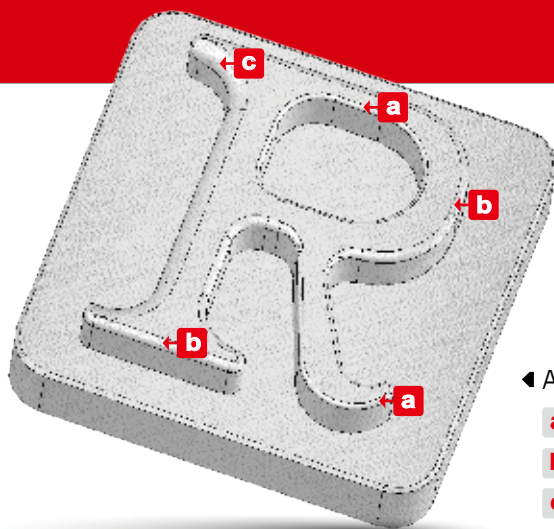
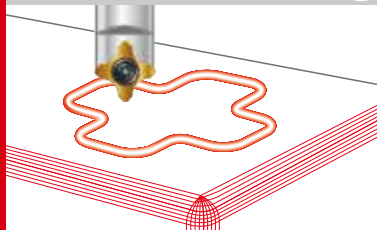
Corner Rounding

- Each insert has 2 cutting edges.
- Combination corner rounding and 45° chamfering application on same insert.
- Higher cutting speed and feed rate.
- Very small X offset, good for contour chamfering.
- Utilizes standard NC Spot Drill holders 99616-06, 99616-14 & 99616-22.

Corner Rounding



Circular Corner Rounding



Applications

- a** Radius 0.5
- b** Radius 1.0
- c** Radius 2.0



N9MT05T1RC

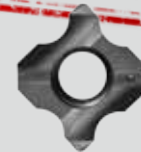
RC



RC0.5~RC1.0
All are interchangeable
on same holder



NC2071



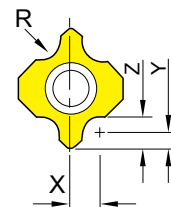
NC9036

► Inserts >>

- Various corner radius inserts can fit on same holder.
- Very small X offset 1.25mm for radius 0.5, the small x offset allows for profiling in small corners.

NC2071: • Universal grade for all unhardened steel and cast iron.
• Inserts are CNC ground for precision radius location.
• Each insert has 2 cutting edges.

NC9036: • For non-ferrous material such as aluminum, acrylic, titanium, brass, copper and stainless steel.
• High positive geometry and sharp edge produces excellent surface finish.
• Each insert has 2 cutting edges.



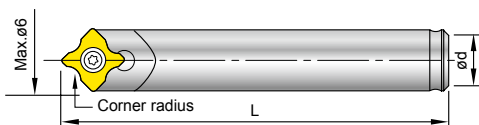
1

Corner Rounding

Insert Radius	Code	Parts No.		Coating	Grade	offset				Dimensions	
						X	Y	Z		L	S
0.5	011203	N9MT05T1RC05	NC2071	TiN	K20F	1.25	0.75	1.25		5	1.8
	011206		NC9036	DLC							
0.75	011204	N9MT05T1RC075	NC2071	TiN	K20F	1.50	0.75	1.50			
	011207		NC9036	DLC							
1.0	011205	N9MT05T1RC10	NC2071	TiN	K20F	1.75	0.75	1.75			
	011208		NC9036	DLC							

► Holder >>

- For corner rounding using **NC Spot Drill** shank.



Code	Parts No.	Ød	L	Screw	Key
601001	00-99616-06-6	6	35	*NS-20036 0.6 Nm	NK-T6
601002	00-99616-06-5	5	35		
601003	00-99616-06-6L	6	60		

Note: 601003 is carbide shank holder.

*Torque screwdriver is recommended, see page 6-4.

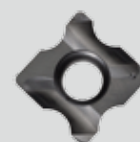
RC N9MT11T3RC



RC1.0~RC3.0
All are interchangeable
on same holder



NC40



NC9036

► Inserts >>

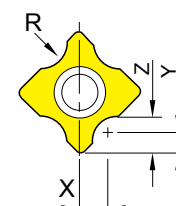
- Higher cutting speed and feed rate.
- Combination corner rounding and 45° chamfering application on same insert.
- Various corner radius inserts can fit on same holder.

NC40:

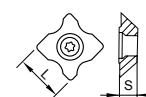
- Universal grade for all unhardened steel and cast iron.
- Inserts are CNC ground for precision radius location.
- Each insert has 2 cutting edges.

NC9036:

- For non-ferrous material such as aluminum, acrylic, titanium, brass, copper and stainless steel.
- High positive geometry and sharp edge produces excellent surface finish.
- Each insert has 2 cutting edges.



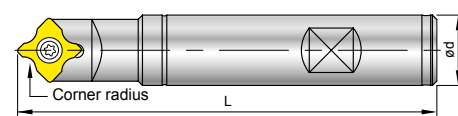
Insert Radius	Code	Parts No.		Coating	Grade	offset				Dimensions	
						X	Y	Z		L	S
1.0	014209	N9MT11T3RC10	NC40	TiN	K20F	2.75	1.5	2.5			
	014224		NC9036	DLC							
1.5	014210	N9MT11T3RC15	NC40	TiN	K20F	3.25	1.5	3			
	014225		NC9036	DLC							
2.0	014211	N9MT11T3RC20	NC40	TiN	K20F	3.75	1.5	3.5		11.11	3.97
	014226		NC9036	DLC							
2.5	014212	N9MT11T3RC25	NC40	TiN	K20F	4.25	1.5	4			
	014227		NC9036	DLC							
3.0	014213	N9MT11T3RC30	NC40	TiN	K20F	4.75	1.4	4.4			
	014228		NC9036	DLC							
1/64	014214	N9MT11T3RC1/64	NC40	TiN	K20F	0.086"	0.059"	0.0747"			
	014229		NC9036	DLC							
1/32	014215	N9MT11T3RC1/32	NC40	TiN	K20F	0.101"	0.059"	0.090"			
	014230		NC9036	DLC							
1/16	014216	N9MT11T3RC1/16	NC40	TiN	K20F	0.133"	0.059"	0.122"		0.437"	0.156"
	014231		NC9036	DLC							
3/32	014217	N9MT11T3RC3/32	NC40	TiN	K20F	0.164"	0.059"	0.153"			
	014232		NC9036	DLC							
1/8	014218	N9MT11T3RC 1/8	NC40	TiN	K20F	0.199"	0.055"	0.180"			
	014233		NC9036	DLC							



► Holder >>

- For corner rounding using **NC Spot Drill** shank.

Code	Parts No.	Ød	L	Screw/ Key
604002	00-99616-14-12	12	100	NS-35080 2.5 Nm
604004	00-99616-14	16		
614001	00-99616-14-1/2	1/2"	100	NK-T15
614002	00-99616-14-5/8	5/8"		



Ø12, Ø16



N9MT1704RC

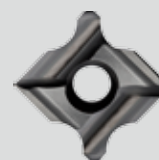
RC



RC4.0~RC6.0
All are interchangeable
on same holder



NC2071



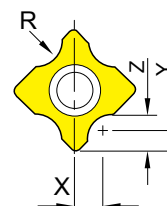
NC9036

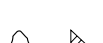
► Inserts >>

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

NC2071: • Universal grade for all unhardened steel and cast iron.
• Inserts are CNC ground for precision radius location.
• Each insert has 2 cutting edges.

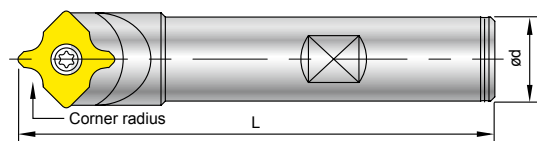
NC9036: • For non-ferrous material such as aluminum, acrylic, titanium, brass, copper and stainless steel.
• High positive geometry and sharp edge produces excellent surface finish.
• Each insert has 2 cutting edges.



Corner radius(R)	Code	Parts No.		Coating	Grade	offset				Dimensions	
						X	Y	Z		L	S
4.0	016202	N9MT1704RC40	NC2071	TiN	K20F	6.15	2	6		17	4.76
	016208		NC9036	DLC							
5.0	016203	N9MT1704RC50	NC2071	TiN	K20F	7.1	2	7			
	016209		NC9036	DLC							
6.0	016204	N9MT1704RC60	NC2071	TiN	K20F	8.1	2	8			
	016210		NC9036	DLC							

► Holder >>

- For corner rounding using **NC Spot Drill** shank.
- Good for small work pieces, which need large corner rounding.



Code	Parts No.	Ød	L	Screw	Key
606001	00-99616-22	20	100	NS-50125 5.5 Nm	NK-T20
606002	00-99616-22-25	25	150		



Corner Rounding >> Type of R

Various corner radius inserts can fit on same holder

Carbide insert can stand very long tool life

Produces smooth and excellent surface finish on workpiece.

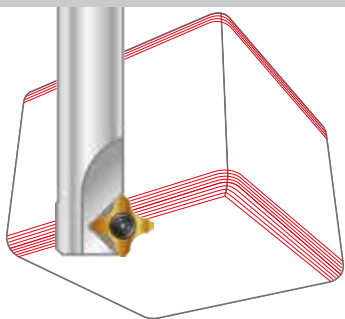
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Features

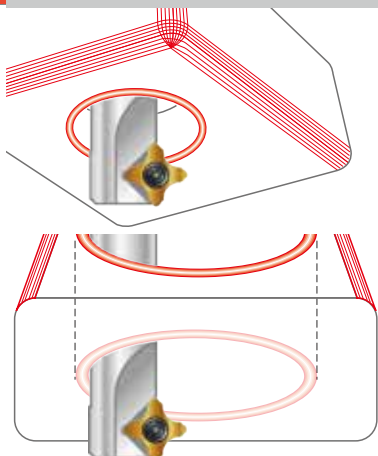
Corner Rounding

- Each insert has 4 cutting edges.
- 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.

Front & Back
Corner Rounding



Back
Circular Corner Rounding



N9MT11T3R

R

**R1.0~R3.0**

All are interchangeable
on same holder



► Inserts >>

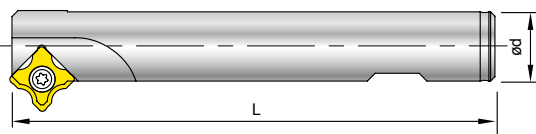
- For front and back corner rounding.
- Various corner radius inserts can fit on same holder.
- Coated carbide inserts for excellent tool life.
- Each insert has 4 cutting edges.

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

Corner radius(R)	Code	Parts No.	Coating	Grade		Dimensions	
						L	S
1.0	014404	N9MT11T3R10-NC2071	TiN	P35		11.11	3.97
1.5	014405	N9MT11T3R15-NC2071	TiN	P35			
2.0	014406	N9MT11T3R20-NC2071	TiN	P35			
2.5	014407	N9MT11T3R25-NC2071	TiN	P35			
3.0	014408	N9MT11T3R30-NC2071	TiN	P35			

► 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.



Code	Parts No.	Ød	L	⊕ Z	Screw	Key
604015	00-99616-16-25R	16	100	1	NS-35080 2.5 Nm	NK-T15
604019	00-99616-16-30R	16	120	1		
604020	00-99616-25-40R	25	150	4		

► More >>

- Also can fit with N9MT11T308LA inserts for front and back chamfering. (Please see page 1-24)

1

Corner Rounding

R N9MT11T3R

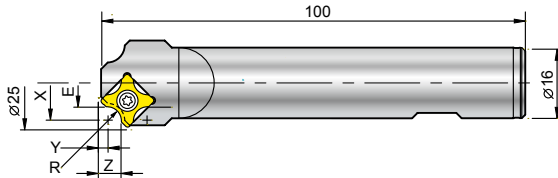


► Cutting Position ►►

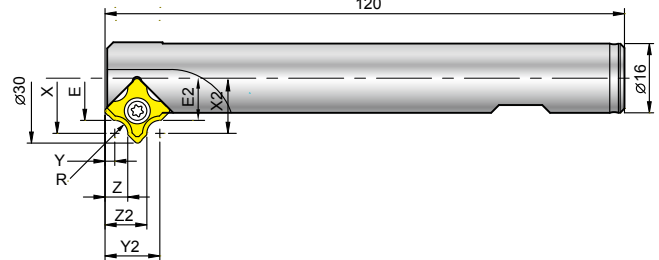
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Corner Rounding

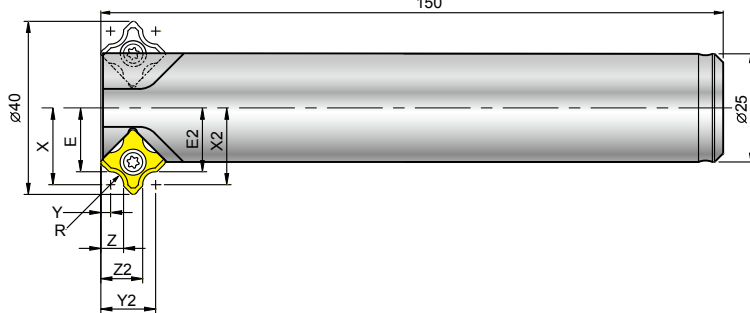
99616-16-25R



*99616-16-30R



*99616-25-40R



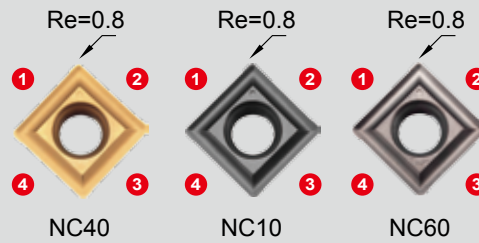
99616-16-30R & 99616-25-40R

*For front and back corner rounding.

*Eliminates 2nd operation or deburring time.

Insert Radius	Holder	Front Chamfering				Back Chamfering				Z
		E	X	Y	Z	E2	X2	Y2	Z2	
R1.0	00-99616-16-25R	8.25	9.25	3.25	4.25	—	—	—	—	1
	00-99616-16-30R	10.75	11.75	3.25	4.25	10.75	11.75	11.65	10.65	1
	00-99616-25-40R	15.75	16.75	3.25	4.25	15.75	16.75	11.65	10.65	4
R1.5	00-99616-16-25R	8	9.5	3	4.5	—	—	—	—	1
	00-99616-16-30R	10.5	12	3	4.5	10.5	12	11.9	10.4	1
	00-99616-25-40R	15.5	17	3	4.5	15.5	17	11.9	10.4	4
R2.0	00-99616-16-25R	7.75	9.75	2.75	4.75	—	—	—	—	1
	00-99616-16-30R	10.25	12.25	2.75	4.75	10.25	12.25	12.15	10.15	1
	00-99616-25-40R	15.25	17.25	2.75	4.75	15.25	17.25	12.15	10.15	4
R2.5	00-99616-16-25R	7.5	10	2.5	5	—	—	—	—	1
	00-99616-16-30R	10	12.5	2.5	5	10	12.5	12.4	9.9	1
	00-99616-25-40R	15	17.5	2.5	5	15	17.5	12.4	9.9	4
R3.0	00-99616-16-25R	7.25	10.25	2.25	5.25	—	—	—	—	1
	00-99616-16-30R	9.75	12.75	2.25	5.25	9.75	12.75	12.65	9.65	1
	00-99616-25-40R	14.75	17.75	2.25	5.25	14.75	17.75	12.65	9.65	4

N9MT11T308LA 45° Chamfering Tool



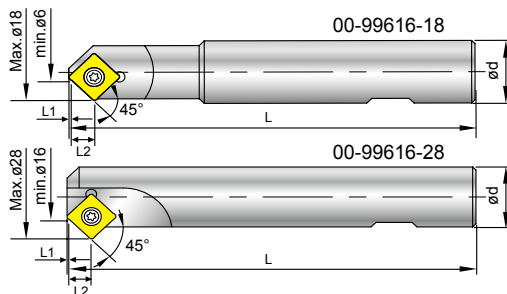
► Inserts >>

- 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.

Code	Parts No.		Coating	Grade		Dimensions		
						L	S	Re
014409	N9MT11T308LA	NC40	TiN	P35		11.11	3.97	0.8
014410		NC10	TiAN	K10F				
014411		NC60	Cermet					

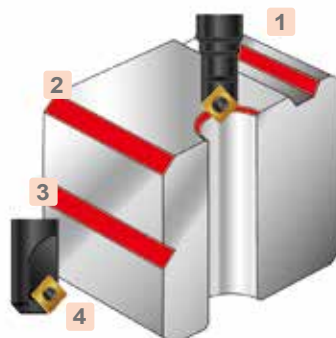
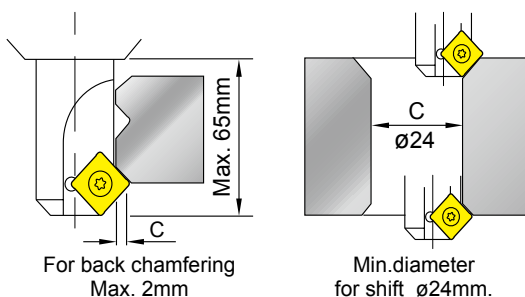
► Holder >>

- 00-99616-28 can be applied for machining back chamfering and side grooving.



Code	Parts No.	Chamfering	Ød	L	L1	L2	Z	Insert type	Screw / Key
604017	00-99616-18	Ø6-Ø18	20	120	1.15	7.55	1	N9MT11T308LA	NS-35080 2.5 Nm
604018	00-99616-28	Ø16-Ø28	20	120	1.15	7.55	1		NK-T15

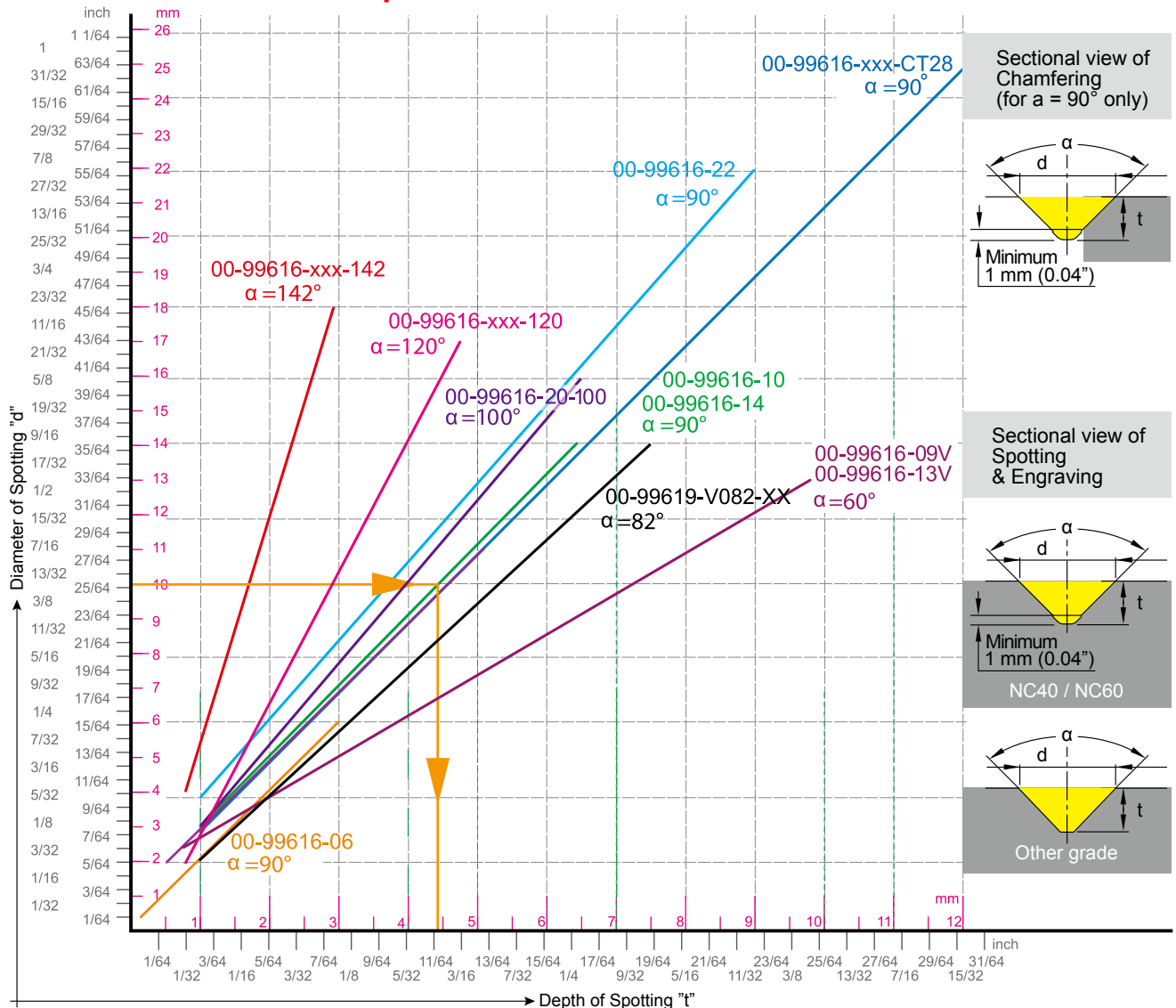
► Example >>



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

Cutting Data

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



► Instruction of Use >>

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.

► Calculate spindle speed and feed rate >>

1. Using your "d" value and cutting speed Vc from the data sheet, calculate spindle speed "S"(RPM).
2. "F" feed rate per minute $F = f \times S = \text{RPM} \times \text{IPR}$

Metric		Inch	
	d = diameter -mm		d = diameter-inch
$S = \frac{Vc \times 1000}{\pi \times d}$	S = Spindle Speed -r.p.m.	$S = \frac{(3.82 \times \text{SFM})}{d}$	S = Spindle Speed-r.p.m.
	Vc = Cutting Speed -m/min.		SFM = Surface Speed-ft./min. $Vc \text{ (m/min.)} \times 3.28$
$F = S \times f$	f = mm/rev.	$F = f \times S$	f = IPR = inch/rev.
	F = mm/min.		F = inch/min.

Cutting Data

► N9MT-CT >> Insert Multi-function

Determine spindle speed and feed rate:

- Choose spotting depth to decide spotting diameter according to the Diameter/Depth chart on page 1-25.
- The spindle speed should be calculated by the maximum diameter of spotting, chamfering and grooving.

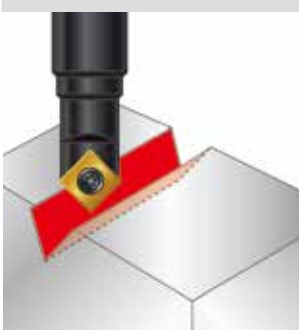
Spotting	Work Material	Vc (m/min)	f (mm/rev.)	Grade of Insert
	Carbon steel	150~250	0.05~0.10	NC40, NC2071
	Alloy steel	100~200	0.04~0.08	NC40, NC2071
	Stainless steel	65~125	0.03~0.06	NC10, NC60, H-NC40, NC2071
	Casting iron	80~150	0.05~0.10	H-NC40, NC10, NC2071
	Non-ferrous metal (Al, Cu)	150~300	0.05~0.10	NC10, NC9076, NC2071
	Ti, Ti-alloy	40~80	0.03~0.08	NC9076
	Hardened steel 40~56 HRC	30~60	0.03~0.08	NC60

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

* Inserts with supporting edges can increase feed rate 50%.

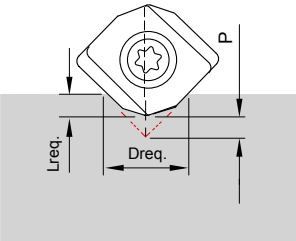
1
NC Spot Drill

Chamfering	Work Material	Vc (m/min)	f (mm/rev.)	Grade of Insert
	Carbon steel	150~320	0.15~0.24	NC40, NC2071
	Alloy steel	100~250	0.12~0.20	NC40, NC2071
	Stainless steel	65~125	0.1~0.20	NC10, NC60, H-NC40, NC2071
	Casting iron	150~250	0.15~0.25	H-NC40, NC10, NC2071
	Non-ferrous metal (Al, Cu)	150~320	0.15~0.25	NC10, NC9076, NC2071
	Ti, Ti-alloy	40~80	0.03~0.08	NC9076
	Hardened steel 40~56 HRC	30~60	0.03~0.08	NC60

Grooving	Work Material	Vc (m/min)	f (mm/rev.)	Grade of Insert
	Carbon steel	150~250	0.05~0.10	NC40, NC2071
	Alloy steel	100~200	0.04~0.08	NC40, NC2071
	Stainless steel	65~125	0.03~0.06	NC10, NC60, H-NC40, NC2071
	Casting iron	80~150	0.05~0.08	H-NC40, NC10, NC2071
	Non-ferrous metal (Al, Cu)	150~320	0.05~0.08	NC10, NC9076, NC2071
	Ti, Ti-alloy	40~80	0.03~0.08	NC9076
	Hardened steel 40~56 HRC	30~60	0.03~0.08	NC60

Cutting Data

► WSP Spotting >> 145°+90° W Spotting

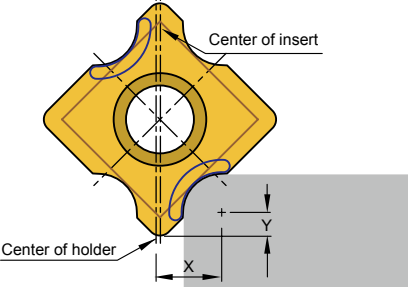
WSP spotting	Formula										
	P = distance of theoretical intersection point to tip of insert.										
	0.5 = fixed factor for calculation										
	Lreq. = required drilling depth										
	Dreq. = required diameter										
	M4	M5	M6	M8	M10	M12	M14	M16	1/4-20 UNC	5/16-18 UNC	3/8-16 UNC
P =	1.17	1.48	1.76	2.39	2.97	3.59	4.19	4.88	1.80	2.30	2.78

WSP spotting	Work Material	Vc (m/min)	f (mm/rev.)
	Carbon steel	150 ~ 300	0.05 ~ 0.15
	Alloy steel	120 ~ 250	0.05 ~ 0.10
	Stainless steel	80 ~ 150	0.04 ~ 0.08
	Casting iron	100 ~ 200	0.05 ~ 0.10

► N9MT-RC Insert >> Corner Rounding

Determine spindle speed and feed:

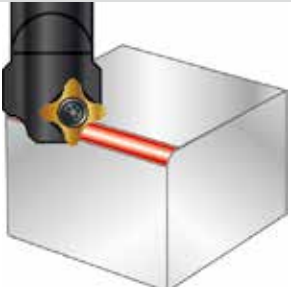
To decide running speed of the tools and feed rate, please calculate spindle speed and feed rate according to the following formula and cutting data:

Corner Rounding	Calculate spindle speed	
	d = 2 x X mm	d = diameter of the tool for calculation purpose
	S = $\frac{Vc \times 1000}{d \times \pi}$ r.p.m.	X = tool radius offset (ref. page 1-18~20 for RC inserts)
	F = S x f mm/min.	Vc = Cutting Speed -m/min.
		S = Spindle Speed -r.p.m.
		F = mm/min.
		f = mm/rev.
Calculate tool length offset on machining center		
	TL = TL' - Y,	X = tool radius offset (ref. page 1-18~20 for RC inserts)
	H = X	Y = distance to the center of radius. (ref. page 1-18~20 for RC inserts)
		TL' = tool length
		TL = tool length offset.
		H = tool radius offset

RC Insert	Work Material	Vc (m/min)	f (mm/rev.)	Grade of Insert
	Carbon steel	150~320	0.05~0.10	NC40, NC2071
	Alloy steel	100~250	0.05~0.10	NC40, NC2071
	High alloy steel	80~150	0.04~0.08	NC40, NC2071
	Stainless steel	65~125	0.05~0.10	NC9036
	Casting iron	150~250	0.05~0.10	NC40, NC2071
	Aluminum, Al-alloy Si < 12%	150~320	0.05~0.10	NC9036
	Al-alloy Si > 12%	100~300	0.05~0.10	NC9036
	Cu	200~250	0.05~0.10	NC9036
	Brass and Bronze	150~250	0.05~0.10	NC9036
	Ti, Ti-alloy	40~80	0.03~0.08	NC9036

Cutting Data

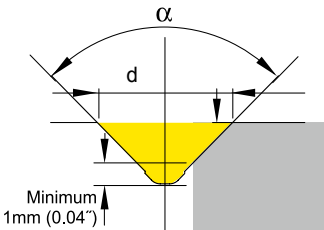
► N9MT-R Insert >> Corner Rounding (4 cutting edges)

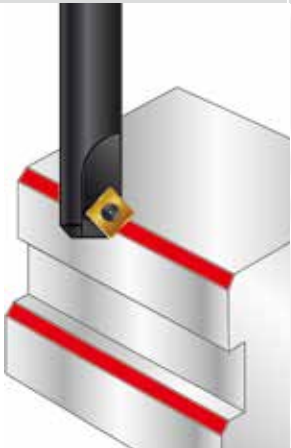
R Insert	Work Material	Vc (m/min)	f (mm/rev.)	Grade of Insert
	Carbon steel	150~320	0.05~0.10	NC2071
	Alloy steel	100~250	0.04~0.08	NC2071
	High alloy steel	60~80	0.03~0.06	NC2071
	Casting iron	150~250	0.05~0.10	NC2071

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Corner Rounding

► LA Insert >> 45° Chamfering

45° Chamfering	Formula
	α = point angle 90°
	$S = \frac{V_c \times 1000}{d \times \pi}$ r.p.m.
	d = effective diameter
	V_c = cutting speed-m/min.or ft/min.
	$F = S \times f$ mm/min.
	S = Spindle speed
	f = feed per rev.-mm/rev.

45° Chamfering	Work Material	Vc (m/min)	f (mm/rev.)	Grade of Insert
	Carbon steel	150-320	0.05~0.10	NC40
	Alloy steel	100-250	0.04~0.08	NC40
	High alloy steel	60-80	0.03~0.06	NC40
	Stainless steel	65-125	0.03~0.06	NC10
	Casting iron	150-250	0.05~0.10	NC10, NC40
	Aluminum, Al-alloy Si < 12%	150-320	0.05~0.10	NC10
	Al-alloy Si >12%	100-300	0.05~0.10	NC10
	Cu	200-250	0.05~0.10	NC10
	Brass and Bronze	150-250	0.05~0.10	NC10
	Hardened steel 40~56 HRC	60-80	0.05~0.10	NC60