



PCD & CBN TOOLS





**Rudrali** is established in 1992 for producing different types of Diamond tools for various Industries. We supply our tools in India & Export to 18 different countries around the world including Germany, Canada, USA, UK, Switzerland, Singapore, Italy, Belgium, etc. Our products are well accepted by all our customers.

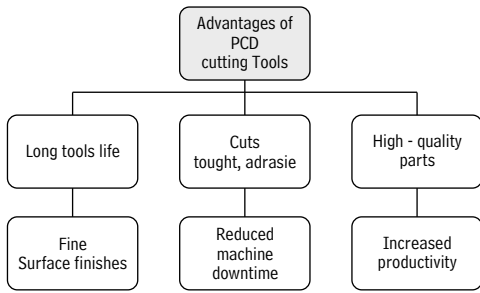
The company has made expansion & diversification to produce **(PCD) Polycrystalline Diamond & (CBN) Cubic Boron Nitride cutting Tools & Inserts** to cater the requirement of Engineering, Automobile & other high precision industries of India.

The Company has latest technology, imported machinery, team of expert technicians & skilled work force along with sophisticated Quality Control Equipments to adhere the strict international quality standards.

Our products are manufactured from superior quality raw material to meet the exact demands of our esteem customers.



## Advantages of PCD Cutting Tools



The advantages that PCD cutting tools offer industry more than offset their higher costs. PCD tools are capable of greatly improving efficiency, reducing scrap parts, and increasing the quality of the product when used to machine nonferrous and nonmetallic materials some of the main advantages of polycrystalline diamond cutting tools.

**Long Tool Life :** Because of their high uniform hardness and wear resistance, PCD cutting tools resist chipping or cracking, therefore, their tool life is generally predictable. The rate of wear at the cutting edge is far slower than of cemented tungsten carbide tools. Reduced tool wear result in holding closer tolerances on workpieces, requiring fewer tool adjustment.

**Cutting Tough, Abrasive Material :** PCD cutting tools are designed to machine tough, abrasive nonferrous and nonmetallic materials faster and at a lower cost than cemented tungsten carbide or single-crystal mined-diamond tools. The sharp cutting edge shears the chip cleanly and reduces the friction force of the chip sliding over the rake surface of the tool.

**High - Quality Parts :** The sharpness of PCD blank tools results in an efficient cutting action which consistently produces better part accuracy and geometry and results in less scrap being produced. The need for part inspection is greatly reduced.

**Fine Surface Finishes :** PCD cutting-tool blank are polished and ground to obtain a very keen cutting edge which produces a very effective cutting action. These tools produce consistently good surface finishes throughout a production run without cutting edge wear or chipping, which would affect the surface finish. PCD cutting tools do not produce the ultrafine surface finishes possible with single-point mined diamond tools; however, a finish as fine as 5 micron. has been obtained under special conditions.

**Reduced Machine Downtime :** Because PCD tools are very hard and maintain a keen cutting edge for long production runs, there is less time required to index, change, or recondition the cutting tool. This also eliminates the need to adjust tool positions and, in many cases, the need for compensation, devices. This results in less machine downtime, which reduces the machining time. for each part.

**Increased Productivity :** A combination of all the advantages that PCD tools offer, such as increased speeds and feeds, long tool life, longer production runs, improved size control, consistent part quality, and savings in labor costs, or all have an effect on overall production rates and the manufacturing cost per piece.

## PCD Cutting Tool Applications

Nonferrous Metals	Nonmetallic Materials	Composites
Aluminum Babbitt Brass Alloy Copper Alloy Lead Alloy Manganese Alloy Silicon - Aluminum Silver Platinum Tungsten Carbide Platinum Zinc Alloy	Alumina , Fired Bakelite Beryllia Ceramics Epoxy Glass Graphite Rubber, Hard Various Plstics	Asbestos Fiberglass Filled Carbons Filled Nylon Filled Phenolic Filled P. V. C. Filled Silica Filled Teflon

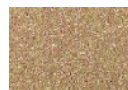
## PCD Application Grade



### Grade RHD 414

Fine surface finishes for

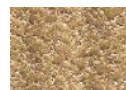
- Aluminum
- Copper
- Precious Metals
- Wood Composites
- Plastics
- Excellent edge quality and retention
- High abrasion resistance
- Moderate impact strength
- Excellent surface finish
- Easiest Compacts material to grind



### Grade RHD 13X

Highly abrasion resistant for machining of

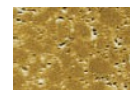
- < 14% Si/Al Alloys
- Copper Alloys
- Graphite and Graphite Composites
- Wood Composites
- Green Ceramics and Carbides
- Good edge quality
- Excellent abrasion resistance
- Moderate impact strength
- Good surface finish



### Grade RHD 15X

High strength for interrupted and roughing cuts of

- > 14% Si/Al Alloys
- Metal Matrix Composites
- Bi-Metals (aluminum/cast iron)
- Sintered Ceramics and Carbides
- Other highly abrasive materials
- Exceptionally long tool life
- Extremely high abrasion resistance
- High impact strength
- Fair to good surface finish, depending on application



### Grade RHD 18X

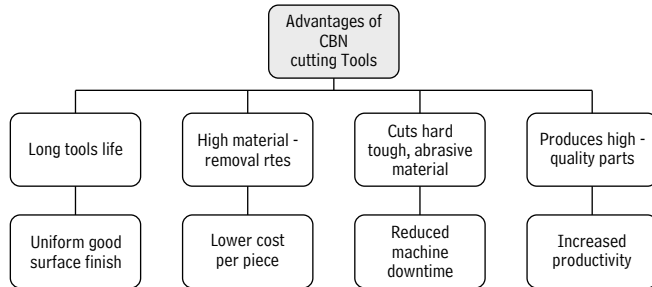
Bimodal grain structure for severe applications

- MMC (Duralcan\*\*)
- >14% Si/Al Alloys
- Fiberglass
- Fiberboard
- Wood Laminates
- Exceptionally high abrasion resistance
- Outstanding impact strength
- Very good surface finishes
- Record tool life

## Working Parameters for PCD Cutting Tools

Material Aluminum alloy	Cutting Speed		Feed Rate		D.O.C.
	ft / min	m / min	in / rev	mm / rev	in mm
( 4 - 8 % Si )	4200 ~ 6500	1280 ~ 1980	0.004 ~ 0.025	0.10 ~ 0.63	0.1~ 4.0
( 9 - 14 % Si )	3300 ~ 5200	1000 ~ 1580	0.004 ~ 0.020	0.10 ~ 0.50	0.1~ 4.0
( 15 - 18 % Si )	1000 ~ 2300	305 ~ 700	0.004 ~ 0.015	0.10 ~ 0.40	0.1~ 4.0
Copper alloys	900 ~ 3000	300 ~ 1000	0.002 ~ 0.006	0.05 ~ 0.15	0.05 ~ 2.0

## Advantages of CBN Cutting Tools



The advantages that CBN cutting tools offer the metalworking industry more than offset their higher initial costs. Primarily designed to machine very hard and difficult-to-grind (DTG) metals, CBN tools are capable of greatly improving productivity, reducing scrap parts, and increasing the quality of the product. Let us examine the advantages of CBN super-abrasive cutting tools which can be used for turning and milling operations above Fig. 1.

**Long Tool Life.** CBN cutting tools have properties which resist chipping and cracking and provide uniform hardness and abrasion resistance in all directions. They may outperform conventional cutting tools by as much as 50 times. Reduced tool wear results in closer tolerances on workpieces, and fewer tool adjustments keep machine down-time to a minimum. The increased reliability of CBN cutting tools make them a major factor in automating machining operations.

**High Material-Removal Rates :** Because CBN cutting tools are so hard and resist abrasion so well, cutting speeds in the range of 250 to 400 ft/min are possible on hardened steels and speeds of 5000 ft/min are possible in pearlitic cast iron. CBN cutting tools can withstand the high temperatures created by increased speeds and feeds. This results in higher material-removal rates with less tool wear, which reduces the total machining cost per piece.

**Cutting Hard, Tough Materials :** CBN cutting tools are so hard that they can efficiently machine steel with hardness of Rc 45 and above. CBN is also used for machining cobalt-base and nickel-base high-temperature alloys with hardness of Rc 35 and above. Many of these materials are so hard and tough that they must be machined at relatively low speeds. Conventional grinding is also used but is a relatively slow metal-removal process. CBN cutting tools have a high resistance to impact and therefore can machine parts with interrupted cuts and tough abrasive scale.

**High-Quality Products :** Because the cutting edges of CBN cutting tools wear very slowly, they produce high-quality parts faster and at lower cost per piece than do conventional cutting tools. The need for the inspection of parts is greatly reduced as is the adjustment of the machine tool to compensate for cutting-tool wear maintenance. This results in better control over workpiece shape and size, which produces consistent part quality far beyond that possible with other cutting tools.

**Uniform Surface Finish :** Surface finishes of less than 10 micron are possible, which often eliminate the need for relatively slow finishing operations such as conventional grinding.

**Lower Cost Per Piece :** CBN cutting tools stay sharp and cut efficiently through long production runs. This results in better control over workpiece shape and size and fewer cutting-tool changes. This lowers manufacturing costs per piece by reducing inspection time and increasing machine uptime.

## CBN Cutting Tool Application

Hard cast iron	Ni - Hard Alloy cast iron Chilled cast iron Nodular cast iron
Soft cast iron	Gray cast iron
Sintered iron	Powered cast iron Sintered iron
Hardened steels	Tool steels Die steels Case hardened steels A, D, M series steels Bearing steels
Superalloy	Inconel - 718, - 901, -600 Rane 77, 95 Hostalloy Waspalloy Colmonoy K - Monel

## CBN GRADES FOR SUITABLE APPLICATIONS

Grade	Work Material		Hardness (HB)	Graphite
	CAST IRON			
RHB 315/ RHB 316	AISI 35	AISI 40	180~250	Flake Graphite
	GRAY CAST IRON			
RHB 316	GG25	GG30	150~300	Spherical
	AISI 60	AISI 40		Graphite
	GGG40			
	AISI8	AISI 100		
	GGG40	GGG70		
	AISI03			
	GGG70			
	S.G.IRON			
RHB 314	EN-GJS	400-18/15	170 ~ 300	Spherical
		450-10		Nodules
		500-7		
		600-3		
		700-2		

Grade	Material	Hardness (HRC)
RHB 312	Hardened Steel	45~60
RHB 322	Hardened Steel	45~68

## Working Parameters for CBN Cutting Tools

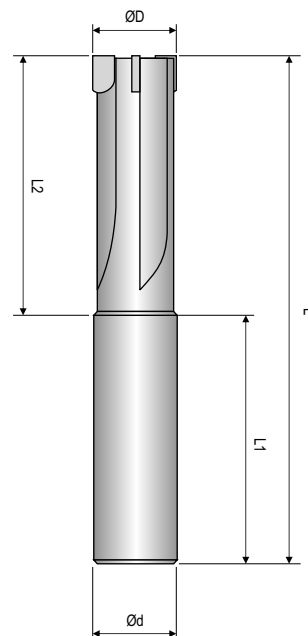
Material	Cast Iron	S.G.Iron	Hardend Steel
<b>Speed m/min</b>	250~550	200~400	120~180
<b>Feed Rate mm/rev</b>	0.10~0.20	0.10~0.20	0.10~0.20
<b>Depth of cut mm</b>	0.10~0.30	0.10~0.30	0.10~0.20
<b>Hardness HRC</b>	15~30	17~30	45~58

## PCD & CBN REAMERS

### 4 FLUTE PARALLEL SHANK

D	d	L	L1	L2
Cutting Diameter	Shank Diameter	Overall Length	Shank Length	Working Length
10	10	80	50	30
12	12	80	50	30
14	16	80	50	30
16	16	80	50	30
18	20	80	50	30
20	20	100	60	40
22	25	100	60	40
25	25	100	60	40
28	25	100	60	40
32	25	100	60	40

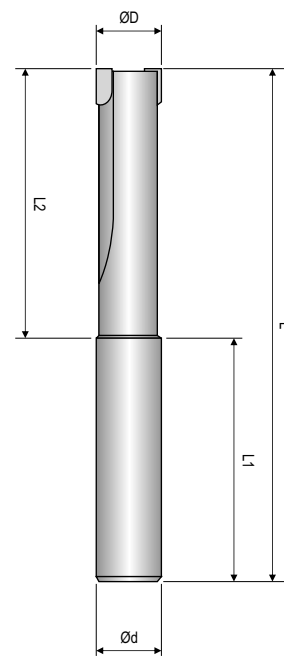
\*All Dimensions are in mm.



### 2 FLUTE PARALLEL SHANK

D	d	L	L1	L2
Cutting Diameter	Shank Diameter	Overall Length	Shank Length	Working Length
06	08	80	50	30
07	10	80	50	30
08	10	80	50	30
10	10	80	50	30
12	12	100	60	40
14	16	100	60	40
16	16	100	60	40
18	20	100	60	40
20	20	100	60	40

\*All Dimensions are in mm.

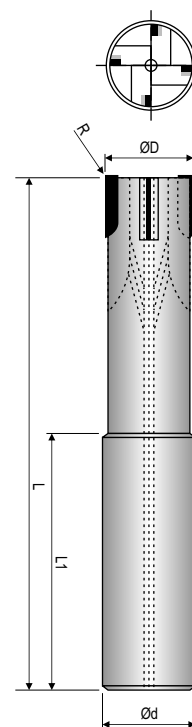


## PCD & CBN ENDMILL

### 4 FLUTE STEEL SHANK

ØD	Ød	L1	L	R
16.00	16.00	50.00	100	0.80
14.00	14.00	50.00	100	0.80
12.00	12.00	50.00 </td <td>100</td> <td>0.80</td>	100	0.80

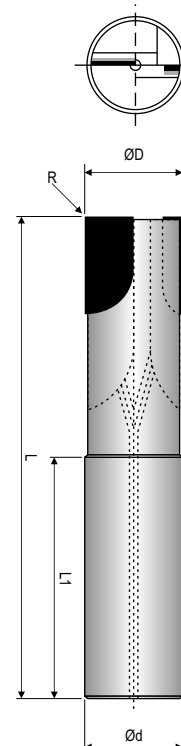
\*All Dimensions are in mm.



### 2 FLUTE STEEL SHANK

ØD	Ød	L1	L	R
20.00	20.00	50.00	100	0.10
18.00	18.00	50.00	100	0.40
16.00	16.00	50.00	100	0.20
21.00	20.00	50.00	120	0.40

\*All Dimensions are in mm.

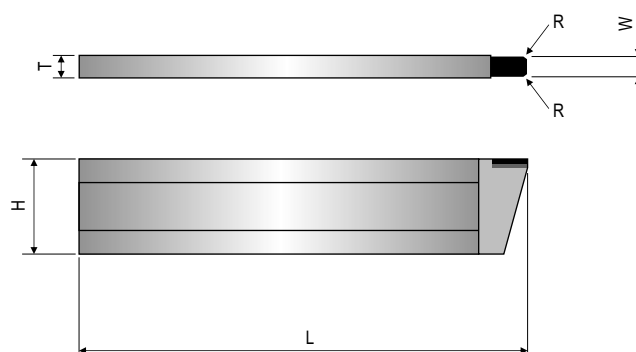


## PCD & CBN GROOVING TOOLS

### GROOVING TOOL CARBIDE SHANK

Sr. No.	W	T	H	L	R
1	1.25	1.25	15.00	75.00	0.50
2	2.16	2.16	16.00	75.00	0.25
3	3.64	3.64	16.00	75.00	1.00
4	4.04	4.04	16.00	75.00	0.25
5	5.00	5.00	16.00	7.00	2.00

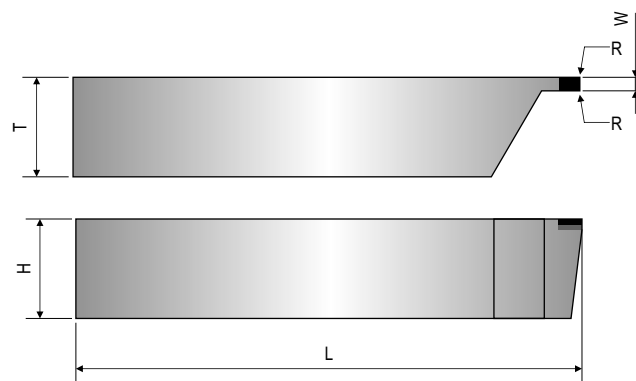
\*All Dimensions are in mm.



### GROOVING TOOL STEEL SHANK

Sr. No.	W	T	H	L	R
1	2.50	25.00	25.00	150.00	0.50
2	3.00	25.00	25.00	150.00	0.50
3	5.30	25.00	25.00	150.00	0.50

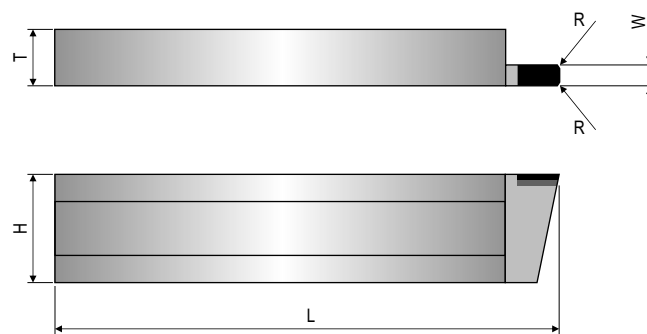
\*All Dimensions are in mm.



### GROOVING TOOL CARBIDE SHANK (LEFT HAND)

Sr. No.	W	T	H	L	R
1	0.82	2.92	18.50	80.00	0.25
2	1.67	5.06	16.00	75.00	0.25
3	2.02	2.02	15.50	80.00	0.25
4	3.263	7.24	16.00	55.00	0.30
5	4.56	4.56	16.00	75.00	0.30

\*All Dimensions are in mm.

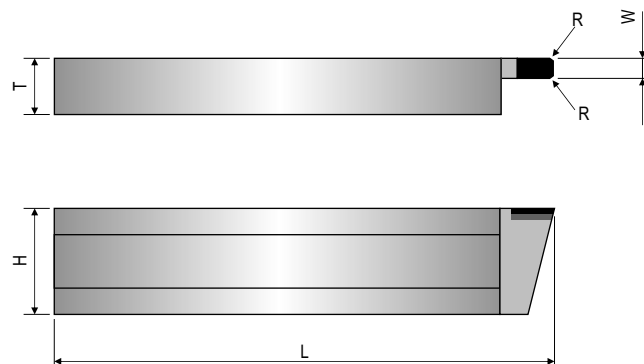


## PCD & CBN GROOVING TOOLS

### GROOVING TOOL CARBIDE SHANK (RIGHT HAND)

Sr. No.	W	T	H	L	R
1	0.82	9.50	3.02	75.00	0.20
2	1.02	9.50	3.02	75.00	0.075
3	2.445	16.00	6.44	75.00	0.25
4	4.057	16.00	6.00	75.00	0.95
5	5.10	16.00	8.00	72.00	1.00

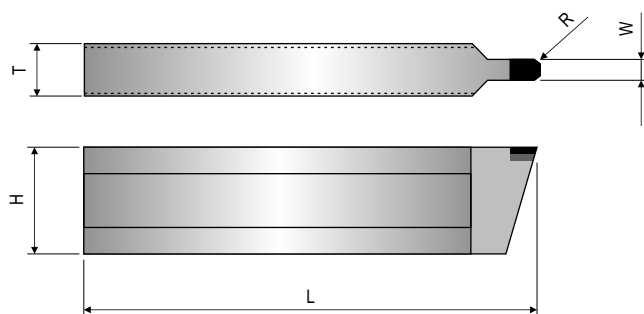
\*All Dimensions are in mm.



### GROOVING TOOL (SHOULDER TYPE)

Sr. No.	W	T	H	L	R
1	0.837	3.237	8.00	70.00	0.25
2	1.227	4.227	8.00	70.00	0.20
3	1.247	4.247	8.00	70.00	0.20
4	1.547	4.00	8.00	70.00	0.425
5	1.642	4.042	8.00	70.00	0.20

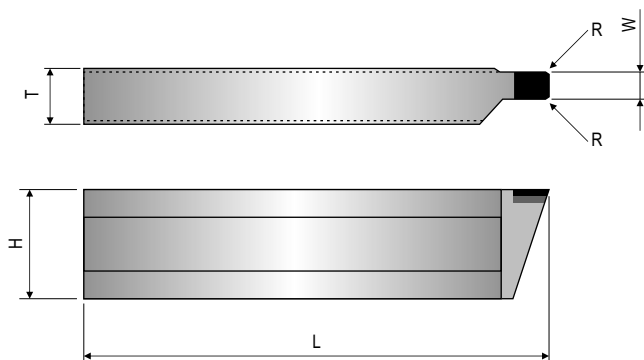
\*All Dimensions are in mm.



### GROOVING TOOL (ONE SIDE SHOULDER)

Sr. No.	W	T	H	L	R
1	1.527	3.180	8.00	70.00	0.30
2	2.032	2.235	8.00	70.00	0.40

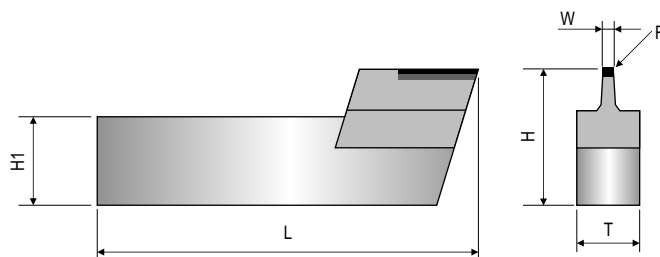
\*All Dimensions are in mm.





### TANGENTIAL TOOL

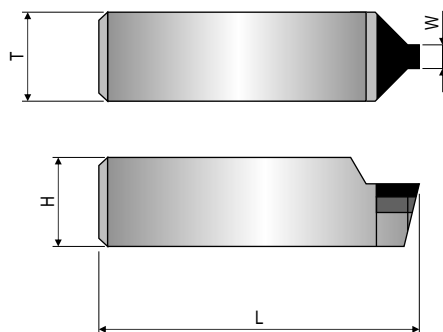
Sr. No.	W	T	H	H1	L	R
01	0.80	12.00	30.00	21.00	90.00	0.40
02	1.24	12.00	30.00	21.00	90.00	0.60
03	0.77	12.00	30.00	21.00	90.00	0.25
04	1.40	12.00	30.00	21.00	90.00	0.30



\*All Dimensions are in mm.

### CIRCLIP TOOL

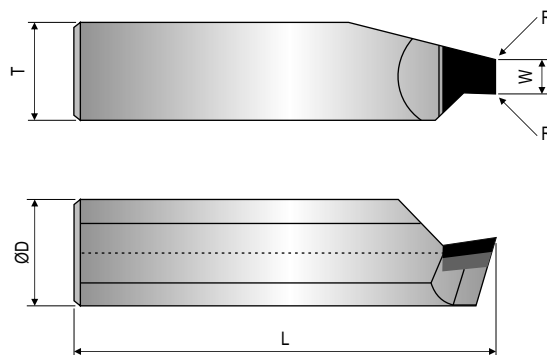
Sr. No.	W	T	H	L
01	1.35	5.00	5.00	18.00
02	1.35	5.00	5.00	24.00
03	1.82	5.00	5.00	25.00



\*All Dimensions are in mm.

### CIRCLIP TOOL

Sr. No.	W	ØD	T	L	R
01	2.39	6.00	5.50	24.00	0.20

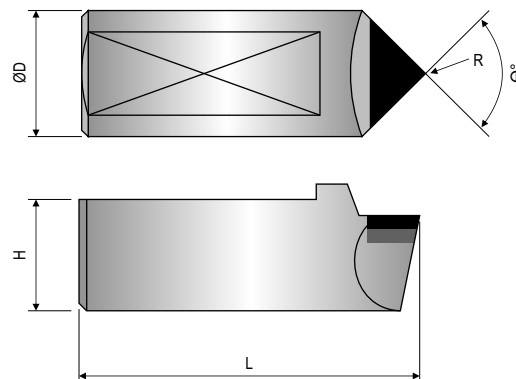


\*All Dimensions are in mm.

### O.D. TURNING TOOL

ØD	H	L	R	Θ
4.00	3.50	10.55	0.20	90°
8.00	7.00	21.20	0.40	85°
8.00	7.00	35.20	0.80	85°
8.00	7.00	21.00	1.00	90°
8.00	7.00	21.00	1.40	90°

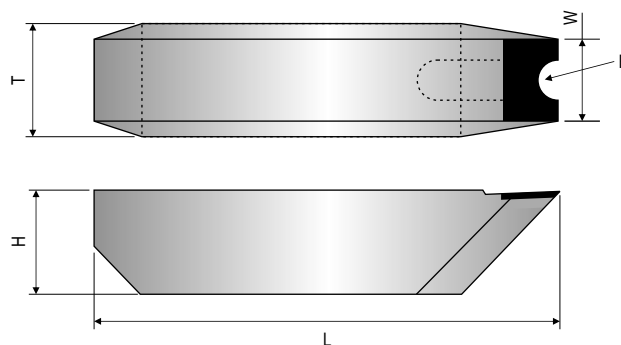
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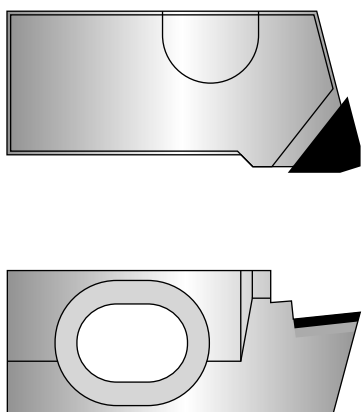
### TRIMMING TOOL

Sr. No.	W	T	H	L	R
01	7.46	10.40	9.40	42.00	1.8
02	7.46	10.40	9.40	42.00	2.34
03	7.46	10.40	9.40	42.00	2.6
04	7.46	10.40	9.40	42.00	3.0
05	7.46	10.40	9.40	42.00	6.2

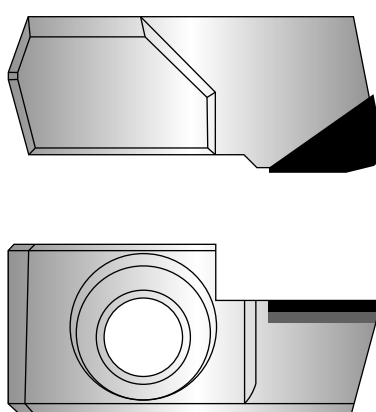
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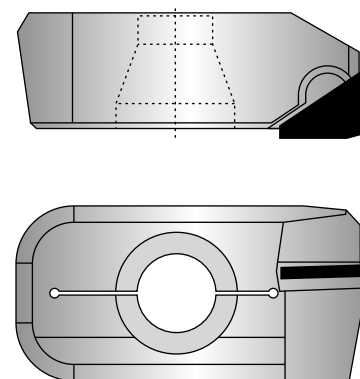
### MILLING CARTRIDGE - DMI



### MILLING CARTRIDGE - TGT



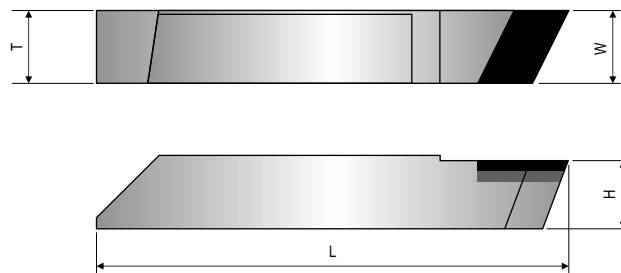
### MILLING CARTRIDGE - RCM



### VSR BITE

Sr. No.	W	T	H	L
1	6.00	6.00	5.50	38.00
2	6.00	6.00	5.50	41.50
3	6.00	6.00	5.50	40.00
4	6.20	6.00	5.50	39.00

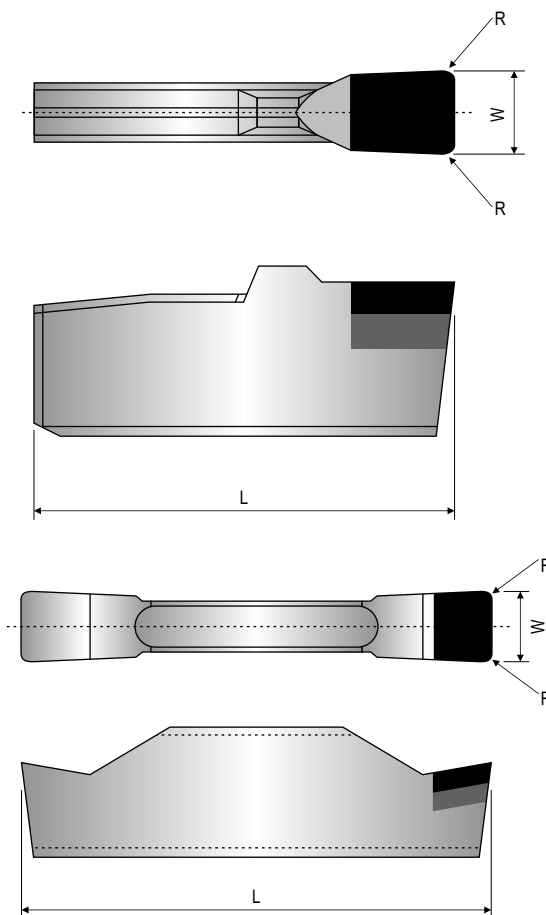
\*All Dimensions are in mm.



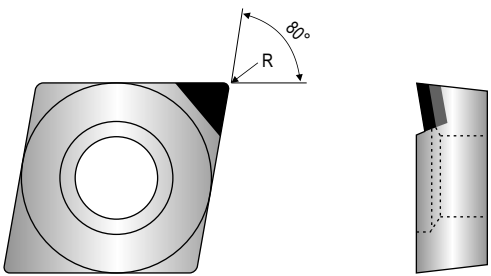
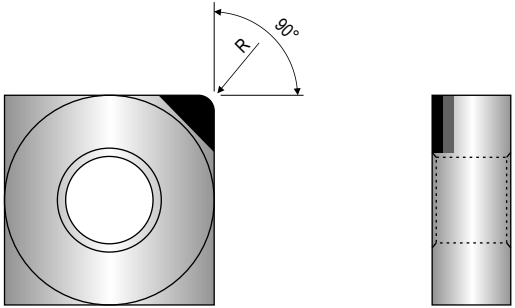
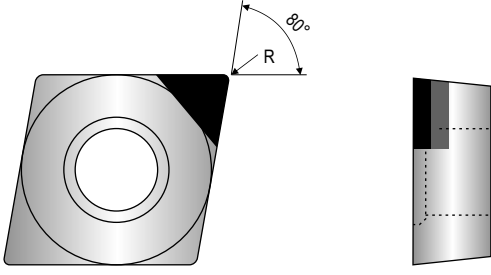
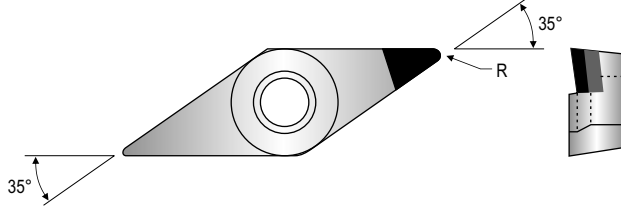
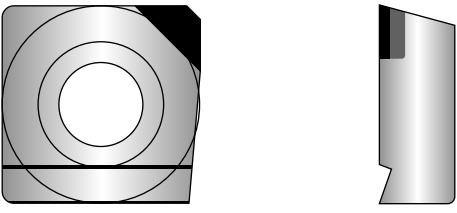
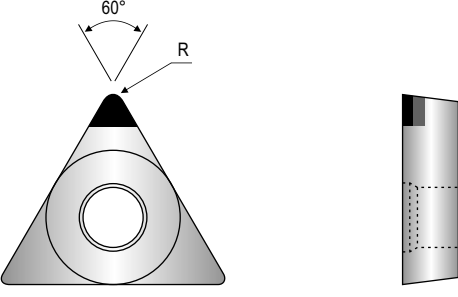
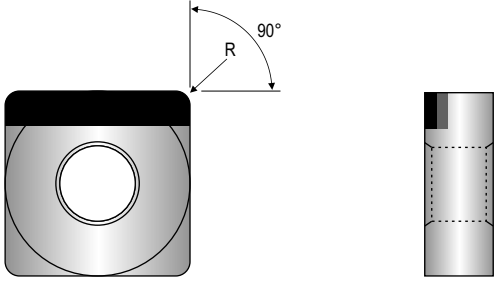
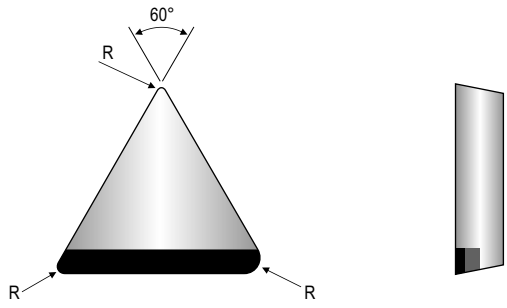
### SPECIAL INSERT - TDC

Sr. No.	W	L	R
1	2.46	10.35	0.30
2	3.00	10.30	0.30
3	2.00	8.36	1.00
4	2.00	8.25	0.20
5	3.00	20.00	0.80
6	4.00	20.00	0.40

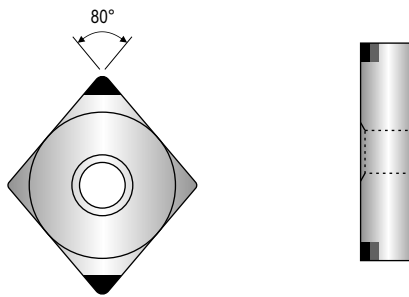
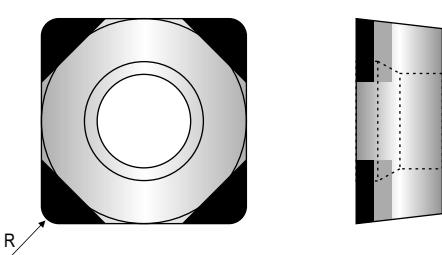
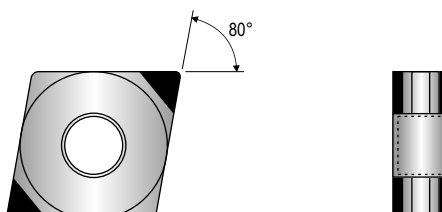
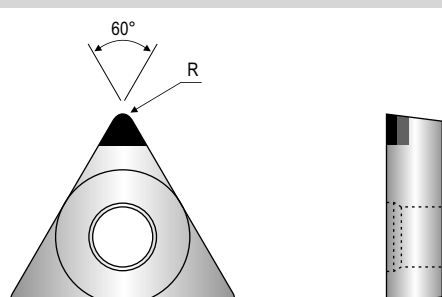
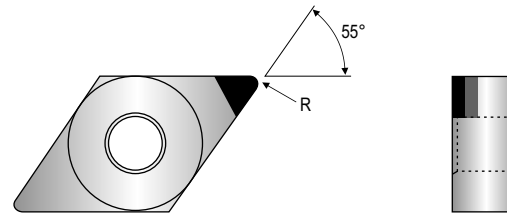
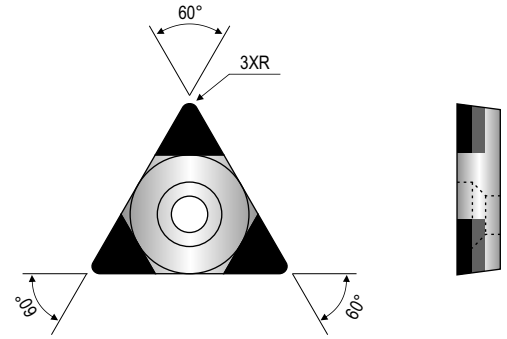
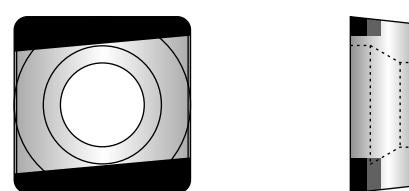
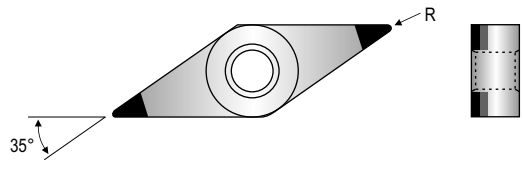
\*All Dimensions are in mm.



## PCD INSERTS

<p style="text-align: center;"><b>CCMT 120404</b></p> 	<p style="text-align: center;"><b>SNMA 120408</b></p> 
<p style="text-align: center;"><b>CCGT 09T304</b></p> 	<p style="text-align: center;"><b>VCGT 110304</b></p> 
<p style="text-align: center;"><b>SNEW 1204 ADFR</b></p> 	<p style="text-align: center;"><b>TCMW 16T308</b></p> 
<p style="text-align: center;"><b>SP-SNMA 120408 (Full Edge)</b></p> 	<p style="text-align: center;"><b>SP-TPGN 220408</b></p> 

## CBN INSERTS

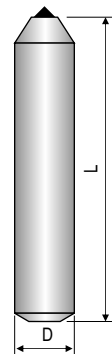
<p style="text-align: center;"><b>2NU CNMA 120404</b></p> 	<p style="text-align: center;"><b>4NU SCGW 09T308</b></p> 
<p style="text-align: center;"><b>4NU CNGA 120404</b></p> 	<p style="text-align: center;"><b>NU TCMW 16T308</b></p> 
<p style="text-align: center;"><b>NU DNMA 150608</b></p> 	<p style="text-align: center;"><b>3NU TPGW 110308</b></p> 
<p style="text-align: center;"><b>SP SCGW 09T304 (FULL EDGE)</b></p> 	<p style="text-align: center;"><b>2NU VNMA 160404</b></p> 

## DIAMOND TOOLS

### DIAMOND DRESSER - SINGLE POINT

Item Code	Dimensions	Item Code	Dimensions
RI 39	6 X 13	RI 44	10 X 80
RI 40	8 X 20	RI 45	10 X 100
RI 41	8 X 40	RI 46	12 X 30
RI 42	8 X 80	RI 47	12 X 60
RI 43	10 X 20	RI 48	12 X 120

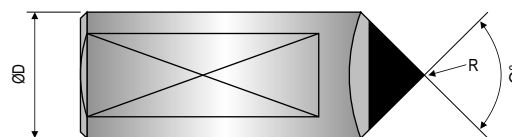
\*All Dimensions are in mm.



### NATURAL POINT O.D. TURNING TOOL

ØD	H	L	R	Θ
4.00	3.50	10.55	0.20	90°
8.00	7.00	21.20	0.40	85°
8.00	7.00	35.20	0.80	85°
8.00	7.00	21.00	1.00	90°
8.00	7.00	21.00	1.40	90°

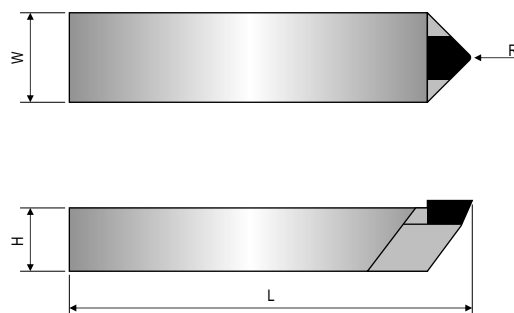
\*All Dimensions are in mm.



### NATURAL DIAMOND TIP TOOL

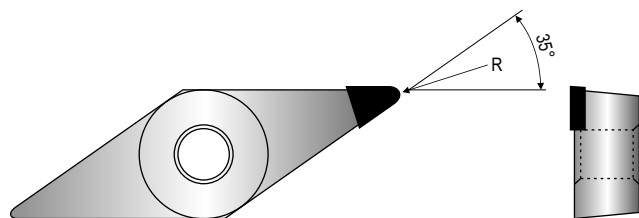
Sr. No.	W	H	L	R	Clearance Angle
1	6.35	6.10	57.00	0.25 / 0.30	15 Degree
2	4.70	4.50	47.00	0.50 / 0.75	

\* General Tolerance :  
 Linear Tolerances -  $\pm 0.10\text{MM}$   
 Angular Tolerances -  $\pm 0.5$

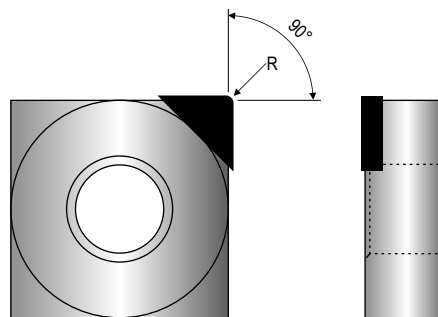


**NATURAL DIAMOND TIP INSERT**

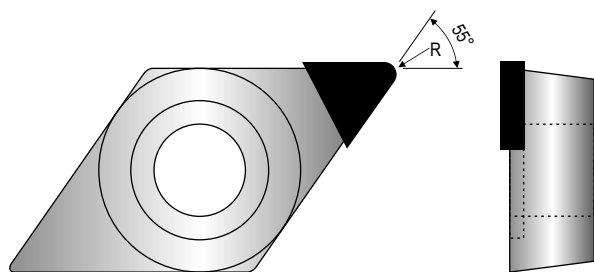
**VCMW 110304**



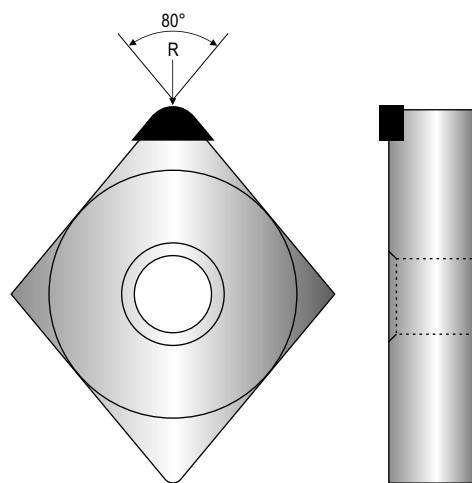
**SNMA 120408**



**DCMT 11T304**



**CNMA 120408**





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