



Superabrasive Tooling

- Makes the Difference -

CDP Diamond Products, Inc.

CDP Diamond Products, Inc.

11919 Globe St. Livonia, MI 48150

Thank you for your interest in our products. We at CDP Diamond Products, Inc have over 40 years of experience in manufacturing of Diamond, PCD and PCBN tipped tools. CDP is a small enough company to offer the flexibility you need in a supplier, yet large enough to handle larger tooling programs efficiently. We have the capability and capacity to accommodate all of your tip tool requests.

As an ISO9001:2008 certified supplier (Certificate available) we are constantly working to improve for our customers. We currently maintain many insert re-tip programs for milling inserts (see figure A) that are tipped with PCD or PCBN for use primarily in machining composite or cast metal components. We offer inventory solutions in re-tipping that save as much as 30% yearly on a program.

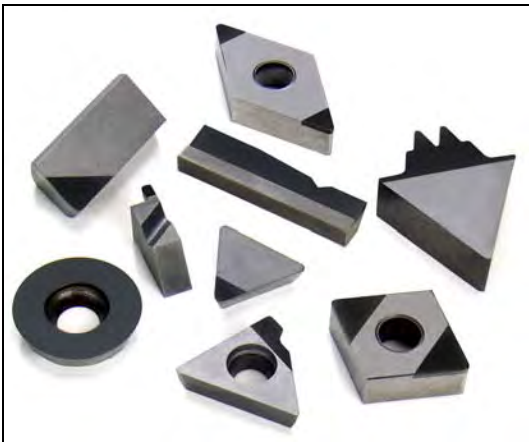


Figure A



Figure B

PCD inserts and cartridges are removed from milling heads and boring and grooving bars and sent to CDP for re-tip and re-use many times each. CBN inserts, like grooving tools with a full radius or groove width can be re tipped as well. We also offer resizing full top or solid CBN inserts to be used again in other operations. Example: RNG 43 CBN rounds reground to RNG 33 or 32, for less than 50% of the cost of new inserts.

We look forward to discussing with you any of these opportunities in PCD or PCBN tipped tools.

Best regards,

CDP Diamond Sales Team

CDP DIAMOND PRODUCTS, INC.

11919 GLOBE / PO BOX 51727

Livonia, MI 48151-5727

734-591-1041 / fx 734-591-6906

Insert/Tool Data Sheet

Company Name _____

Address _____

Phone _____

Contact _____

Tool Information

Job Information

Part# _____

Material _____

Tips (single, dbl., etc.) _____

Part name, no. _____

Coolant (YES or NO) _____

Parts yearly _____

Oper. (Turn, Mill, etc.) _____

Job start/end date _____

Target Price _____

Mat'l Hardness (Rc, or Bn) _____

Speeds, Feeds, DOC _____

Interrupted Cut ? (YES or NO) _____

If yes, to what degree? _____

Would you like a representative from CDP to visit your plant? _____

Machine Information

Manufacturer, Year Built _____ Coolant Type _____

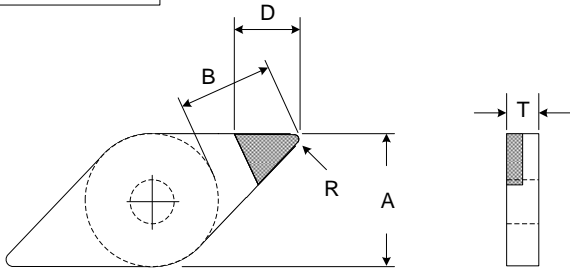
HP _____ RPM Max _____

CNC: (YES or NO) SFPM Constant: (YES or NO)

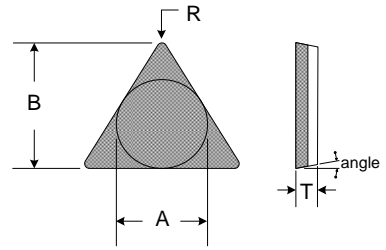
Machine Condition: New = 1, Good = 3, Poor = 5 _____

PCD CBN Inserts

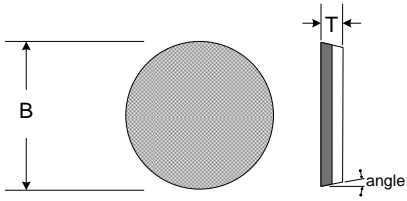
V Style Insert



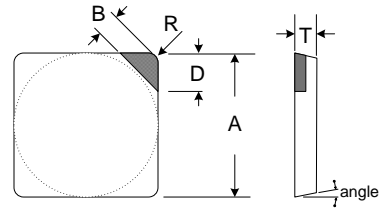
TPG Full Top



CBN PCD



SPG



Case Study No. 31 - OEM Automotive

Manufacturer: OEM
Part: Slip Yolk

Tool Information:

Part Number:	TNMA 334 CBN 220
Tips (<i>single, double. etc...</i>)	Single Tipped
Coolant (<i>yes / no</i>)	No coolant
Operation (<i>turn, mill, etc..</i>)	Turn

Job Information:

Material	Hard Steel Alloy Rc 60-62
Part name, No.	Slip Yolk
Parts yearly	1.2 Million
Job start/end date	Active as of November 2008
Target	<ul style="list-style-type: none"> • Brand X was current vendor at \$35.00 with 150-180 hits per insert. Bench mark was set by current vendor. • Material removed was .020" to .025" per side. CDP supplied inserts for test in grade CB220 with edge prep for hard turning. • All machine parameters remained the same. • Insert maintained part quality on Slip Yolk for between 220 and 240 parts per insert. • Upon approval, further results posted consistently over 220 hits per insert.

Results:

<i>Insert Type</i>	<i>Inserts per Year</i>	<i>Annual Cost</i>
Brand X	4,500 ¹ x \$35	\$157,000
CDP Inserts	3,600 ¹ x \$28	\$104,000

1 – Estimated per year

Case Study No. 32 - Tier 1 Automotive

Manufacturer: Tier 1 Automotive - Ohio & Michigan

Part: Transmission Valve Body

Tool Information:

Part Number:	SDR-100-031-E1
Tips (<i>single, double. etc...</i>)	Single Tipped PCD
Coolant (<i>yes / no</i>)	No coolant
Operation (turn, mill, etc..)	Face Milling

Job Information:

Material	380 Aluminum Casting
Part name, No.	Trans Valve Body
Parts yearly	Originally 680,000 (as of Jan 09 – 1.1million)
Job start/end date	Active 6 years, as of Jan 2009
Target	<ul style="list-style-type: none"> • OEM Brand X was current vendor of milling insert. Benchmark was given as 2000 - 2200 hits per milling head change of 22 inserts. • OEM Brand X cost per insert was \$72.00 each. • CDP grade CD400 PCD was supplied with edge prep for milling aluminum. • Cost from CDP was \$48.00 per insert. • Milling head with CDP inserts had 2800 + hits in first run. • Currently CDP inserts run 2750 hits consistently per change. • Additional savings are being realized for a re-tip program to re-use good carbides.

Results:

<i>Insert Manufacturer</i>	<i>Inserts per Year</i>	<i>Annual Cost</i>
Brand X	6,800 ¹ x \$72	\$489,600
CDP	1,280 ¹ x \$48	\$ 61,440
	4,000 ¹ x \$38 (<i>retip</i>)	<u>\$152,000</u>
		<u>\$223,440</u>

1 – Estimated per year

Case Study No. 37

Manufacturer: Independent Engine Builder

Part: Cast Iron Big Block Engines

Tool Information:

Part Number:	SNG432 CB130
Tips (<i>single, double. etc...</i>)	Solid
Coolant (<i>yes / no</i>)	No coolant
Operation (<i>turn, mill, etc..</i>)	Face Milling

Job Information:

Material	Gray Cast Iron
Part name, No.	Big / Small Block 6 – 8 Cylinder
Parts yearly	16,000
Job start/end date	Active as of November 2008
Target	<ul style="list-style-type: none"> Brand X was current vendor of milling insert. Solid Carbide and Ceramic Inserts were used depending on casting and engine block size. Current cost with these inserts related to 190 minutes of cut time per edge (8 edges) on 4" milling cutter with 6 negative inserts. Feed rates were about doubled, currently running 3500 sfm with .008" chip load and 2 passes to remove up to .150" depth. Cut time maintained at 220 minutes / edge. Cost savings were realized by increasing throughput (35%) and reducing downtime and bottleneck in shop (20%). Finish was much easier to maintain as well. Insert cost shown below.

Results:

<i>Insert Manufacturer</i>	<i>Inserts per Year</i>	<i>Annual Cost</i>
Brand X	3,300 ¹ x \$12	\$39,600
CDP Inserts	360 ¹ x \$105	\$37,800

1 – Estimated per year

CDP Diamond Products, Inc.

Recommended Speeds and Feeds of CBN

CBN Material	Speed (SFM)	Feed Rate (IPR)	Depth of Cut (Inch)
Carbon Steel	200 - 500	.008 Max	.020 Max
Bearing Steels	200 - 500	.008 Max	.020 Max
Alloy Steels 50 - 60 RC	200 - 500	.008 Max	.020 Max
Die Steels & Tool Steels 55 - 68 RC	160 - 350	.008 Max	.020 Max
High Tensile Cast Iron	200 - 500	.060 Max	.100 Max
Grey Cast Iron	1000 - 3000	.020 Max	.040 Max
Powdered Metal	500 - 650	.016 Max	.120 Max
Other (Hard Steel)	350 - 900	.005 Max	Call

Recommended Speeds and Feeds of PCD

PCD Material	Speed (SFM)	Feed Rate (IPR)	Depth of Cut (Inch)
Aluminum 6061 or Similar	3000 - 5000	.005 - .008	.005 - .020
Aluminum Castings	2000 - 10,000	.005 - .020	.005 - .125
Copper	750 - 1500	.003 - .008	.005 - .020
Bronze	1000 - 1250	.003 - .008	.005 - .020
Brass	2000 - 4000	.003 - .010	.005 - .020
Carbon	500 - 1000	.005 - .015	.005 - .030
Glass Fiber	750 - 1000	.001 - .010	.001 - .002
Carbon Composites	500 - 2000	.005 - .015	.010 - .100
Sintered Carbide	50 - 400	.003 - .006	.0005 - .005
High Alumina-Silica Ceramics	1200 - 2400	.001 - .004	.0005 - .005
Plastics / Phenolics	8000 - 13,000	.010 - .080	.010 - .100

These numbers are general guidelines . Some items may vary, and may be above or below listed range for a given material for a variety of reasons.

19119 Globe ♦ Livonia, MI ♦ 48150
 Phone: 734-591-1041 ♦ FAX: 734-591-6906

CDP Diamond Products, Inc.

PCD Tipped Drills

Type 01

Drill Size	OAL
Range .118" to .127"	2.2"
Range .128" to .157"	2.5"
Range .158" to .189"	2.7"
Range .190" to .219"	3.0"
Range .220" to .251"	3.2"
Range .252" to .282"	3.5"
Range .283" to .313"	3.7"
Range .314" to .360"	4.0"
Range .361" to .376"	4.2"
Range .377" to .438"	4.5"
Range .439" to .502"	4.7"

Example Part No.

PCD01 .1250-2.2

- 1/8" PCD Tipped
- Standard Point
- Solid Carbide Body
- Jobber Length

Type 01A

Drill Size	OAL
Range .474" to .501"	5.0"
Range .502" to .512"	5.0"
Range .513" to .552"	5.0"
Range .553" to .630"	5.6"
Range .631" to .650"	6.3"
Range .651" to .709"	6.3"
Range .710" to .730"	7.0"
Range .731" to .790"	7.0"

Example Part No.

PCD01A .6875-6.3

- 11/16" PCD
- Standard Point
- Solid Carbide Body

Type 02

Add secondary pt angle (4 facet) 90° incl. recommended for thru hole composites and graphite



Example Part No.

PCD02 .3750-4.2

- 3/8" 4-Facet PCD
- Type 2 Tipped Point
- Solid Carbide Body
- Jobber Length

Available Upon Request

Special Lengths, Straight Flute, Coolant thru, Pilot Drills, etc....



Re-Lap and Re-Tip Programs available for all PCD Tip Drills and End Mills



CDP DIAMOND PRODUCTS, INC.
11919 GLOBE / PO BOX 51727
Livonia, MI 48151-5727
734-591-1041 / fx 734-591-6906

Grinding Data Sheet

Company Name _____

Address _____

Phone _____

Contact _____

Wheel Information

Current Mfr. And part # _____

Current Wheel Spec. _____

Coolant (YES or NO) _____

Wheel Type (1A1, 6A2, 14A1, 2A2, etc.) _____

Wheel / Segment size _____

Job Information

Material _____

Part name, no. _____

Parts yearly _____

Job start/end date _____

Mat'l Hardness (Rc, or Bn) _____

Type of Grind (O.D., I.D., Surface{reciprocating/Rotary}, etc.) _____

Is the Wheel Plated or bonded? _____

Is this a roughing, semi-finishing, or finishing operation? _____

What is more important, wheel life or rate of removal? _____

Machine Information

Manufacturer, Year Built _____ Coolant Type _____

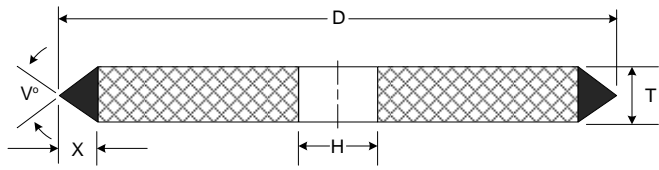
HP _____ RPM Max _____

CNC: (YES or NO) SFPM Constant: (YES or NO)

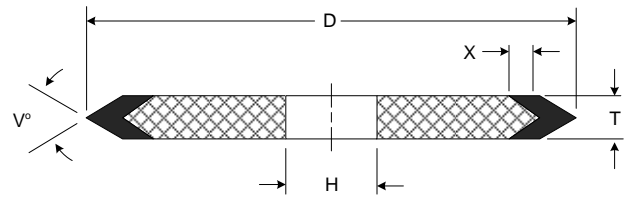
Machine Condition: New = 1, Good = 3, Poor = 5 _____

RESIN/METAL BOND WHEEL STYLE CHART

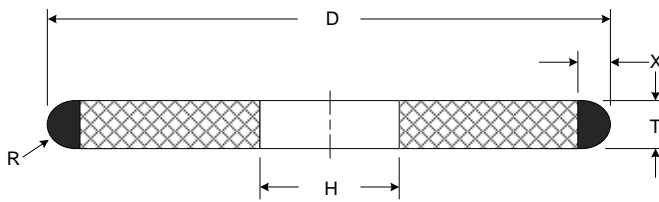
1E1



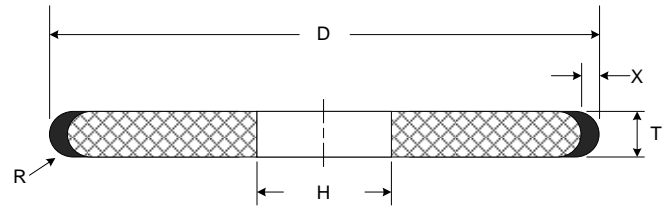
1EE1



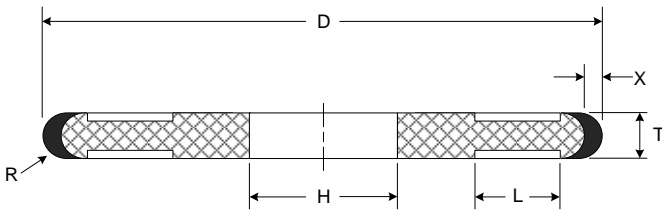
1F1



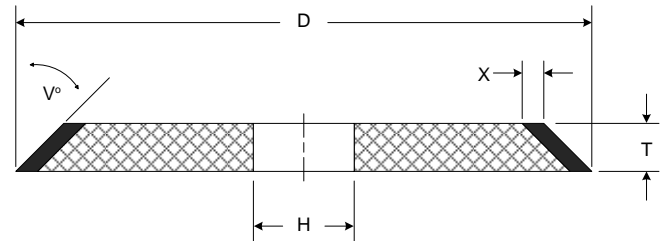
1FF1



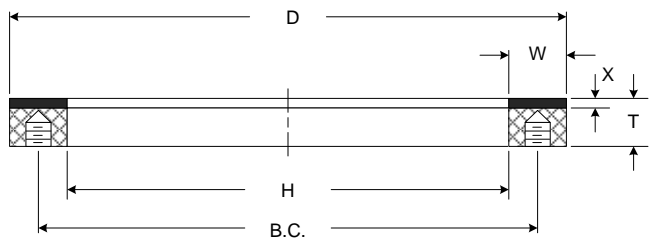
1FF1 R-Tool



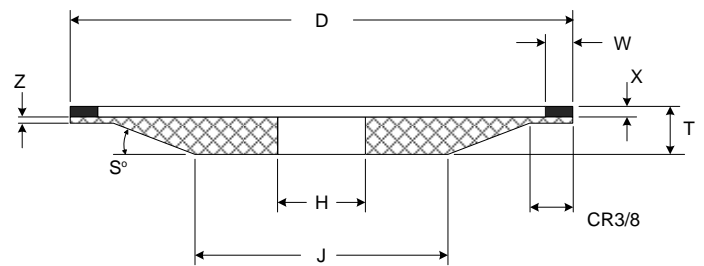
1V1



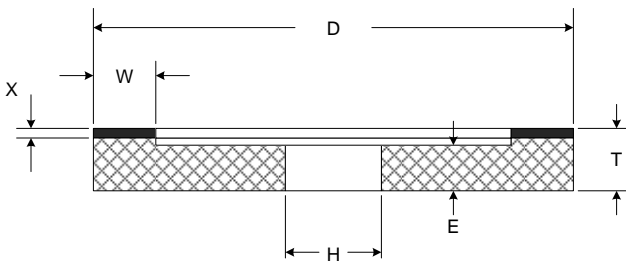
2A2T



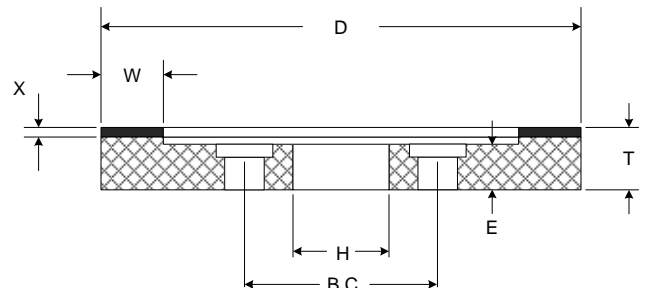
4A2P



6A2

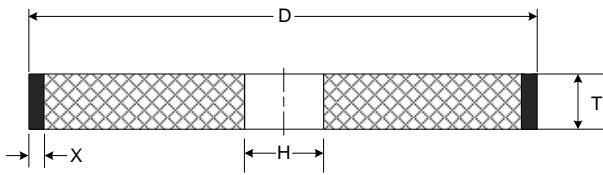


6A2B

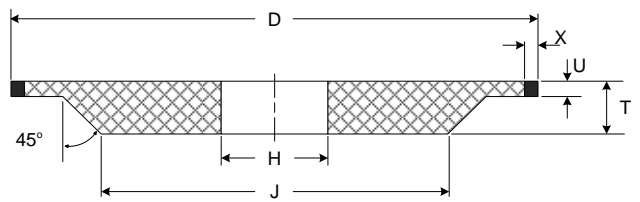


RESIN/METAL BOND WHEEL STYLE CHART

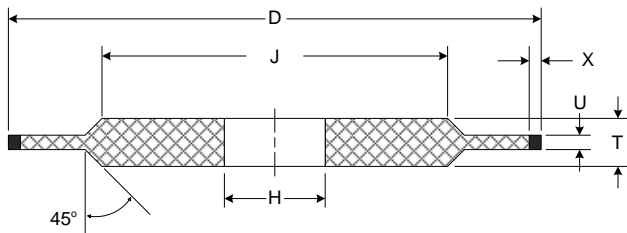
1A1



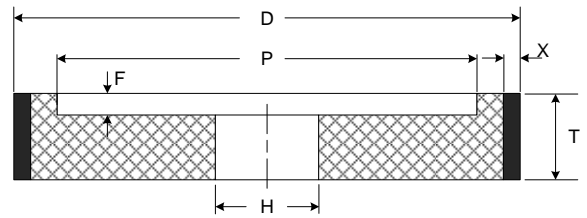
3A1



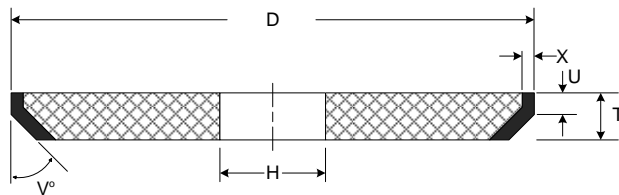
14A1



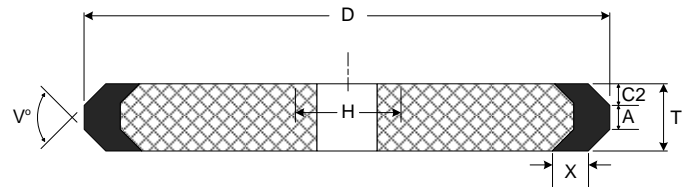
6A1



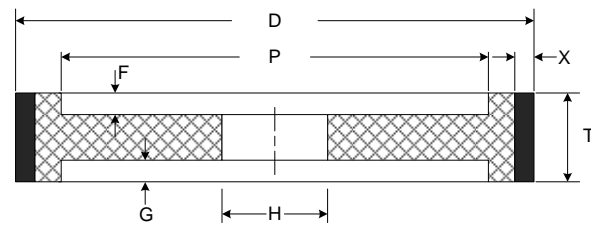
1Y1



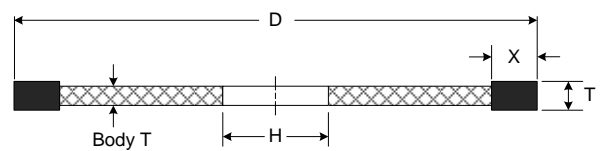
1DD1



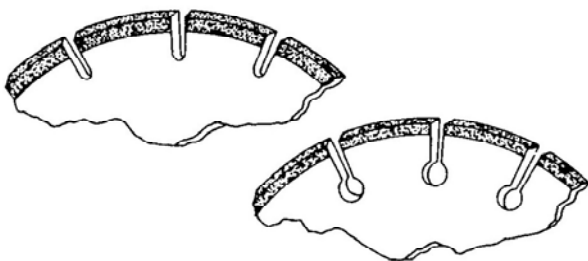
9A1



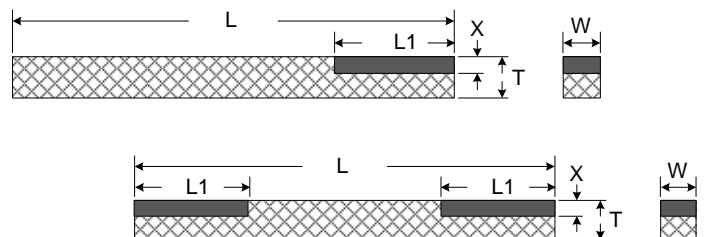
1A1R



Type 1FF 1RS



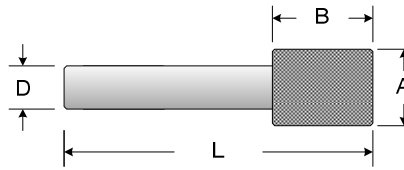
HH1 & HH2



CDP Diamond Products

Type DW8 Straight Wheel

Carbide Mandrel - Diamond Throughout



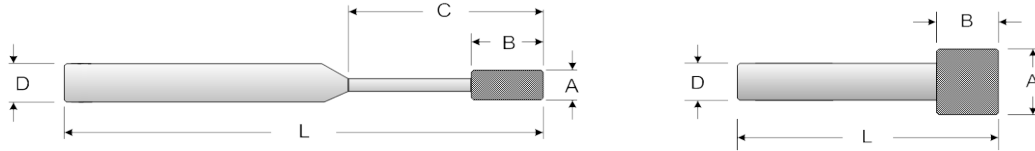
D = Diamond, B = CBN

Example Part # - D15-180

Wheel Number	A	B	D	L	Grit Size
15	0.115	3/16	3/32	2	180
16	1/8	3/16	3/32	2	180
17	1/8	1/4	3/32	2	180
19	5/32	3/16	3/32	2	180
20	5/32	1/4	1/8	2	180
21	3/16	1/8	1/8	2	180
22	3/16	3/16	1/8	2	180
23	3/16	1/4	1/8	2	180
25-X	7/32	1/4	1/8	2	150
25-XX	7/32	1/4	3/16	2 1/2	150
25	1/4	1/8	1/8	2	150
26	1/4	1/4	1/8	2	150
27	1/4	1/4	3/16	2 1/2	150
29	9/32	1/4	1/8	2	150
30	9/32	1/4	3/16	2 1/2	150
31	5/16	1/4	3/16	2 1/2	150
32	5/16	5/16	3/16	2 1/2	150
33-X	11/32	5/16	3/16	2 1/2	150
33	3/8	1/8	3/16	2 1/2	150
34	3/8	1/4	3/16	2 1/2	100
35	3/8	3/8	3/16	2 1/2	100
36	3/8	3/8	1/4	2 1/2	100
37-X	7/16	3/8	1/4	2 1/2	100
37	1/2	1/8	3/16	2 1/2	100
38	1/2	1/4	3/16	2 1/2	100
39	1/2	3/8	1/4	2 1/2	100
40	1/2	1/2	1/4	2 1/2	100
41-X	9/16	3/8	1/4	2 1/2	100
41	5/8	1/4	1/4	2 1/2	100
42	5/8	3/8	1/4	2 1/2	100
43	3/4	1/4	1/4	2 1/2	100
44	3/5	3/8	1/4	2 1/2	100
45	1	1/4	1/4	2 1/2	100
46	1	3/8	1/4	2 1/2	100
47	1	3/8	3/8	3	100

CDP Diamond Products

Standard Plated Grinding Mandrels - Steel Shank



Example Part # - D256-100

D = Diamond B = CBN	A	B	C	D	L	Available Grit Sizes		RPM
020	0.02	0.08	0.187	0.125	2.15	220	-	60000
025	0.025	0.08	0.187	0.125	2.15	220	-	-
030	0.03	0.08	0.25	0.125	2.15	220	-	-
030L	0.03	0.12	0.35	0.125	2.15	220	-	-
039	0.039	0.08	0.25	0.125	2.15	220	-	-
039L	0.039	0.12	0.375	0.125	2.15	220	-	-
049	0.049	0.08	0.25	0.125	2.15	220	-	-
049L	0.049	0.12	0.375	0.125	2.15	220	-	-
059	0.059	0.12	0.5	0.125	2.15	220	100	60000
069	0.069	0.12	0.5	0.125	2.15	220	100	-
079	0.079	0.16	0.5	0.125	2.15	220	100	-
089	0.089	0.16	0.5	0.125	2.15	220	100	-
099	0.099	0.16	0.5	0.125	2.15	220	100	-
109	0.109	0.16	0.5	0.125	2.15	220	100	-
118	0.118	0.16	0.5	0.125	2.15	220	100	-
130	0.13	0.2	0.625	0.125	2.15	220	100	-
140	0.14	0.2	0.625	0.125	2.15	220	100	-
157	0.157	0.2	N/A	0.125	2.15	220	100	-
157XL	0.157	0.2	1	0.25	3	-	100	-
177	0.177	0.235	N/A	0.125	2.15	220	100	-
177XL	0.177	0.235	1	0.25	3	-	100	-
197	0.197	0.235	N/A	0.125	2.15	220	100	-
197x187	0.197	0.25	1	0.187	3	220	100	60000
200	0.2	0.315	0.875	0.25	3	-	100	-
215	0.215	0.25	1	0.25	3	220	100	60000
215x187	0.215	0.25	N/A	0.187	3	220	100	60000
236	0.236	0.275	N/A	0.125	2.15	220	100	-
236x187	0.236	0.275	N/A	0.187	3	220	100	60000
236XL	0.236	0.275	1	0.25	3	220	100	-
256	0.256	0.275	1	0.25	3	220	100	50000
275	0.275	0.315	N/A	0.25	3	220	100	-
315	0.315	0.315	N/A	0.25	3	220	100	-
335	0.335	0.315	N/A	0.25	3	220	100	-
375	0.375	0.315	N/A	0.25	3	-	100	-
394	0.394	0.2	N/A	0.25	3	220	100	40000
394XA	0.394	0.375	N/A	0.25	3	-	100	-
394XB	0.394	0.375	N/A	0.375	3.5	220	100	-
473	0.473	0.394	N/A	0.25	3	220	100	-
473XL	0.473	0.394	N/A	0.375	3.5	220	100	-
500	0.5	0.394	N/A	0.25	3	-	100	-
500L	0.5	0.394	N/A	0.375	3.5	220	100	-
591	0.591	0.2	N/A	0.25	3	220	100	30000
591XB	0.591	0.394	N/A	0.375	3.5	220	100	-
730	0.73	0.394	N/A	0.25	3.5	-	100	-
730XL	0.73	0.394	N/A	0.375	3.5	220	100	-
750	0.75	0.394	N/A	0.25	3.5	-	100	-
750D	0.75	0.394	N/A	0.375	3.5	-	100	-
1000D	1	0.394	N/A	0.375	3.5	220	100	-
1000DX	1	0.5	N/A	0.375	3.5	-	100	-