setting a new industry standard **FOR PRODUCTIVITY**

From the most comprehensive stock offering to the industry's largest custom-manufactured availability, our Norton superabrasive product portfolio gives you the most options with uncompromising performance.

A Paradigm Shift in Manufacturing

Online truing and dressing capability results in lower cutting energies and highest quality part edges and finish. Choose Paradigm stock or custom products for your exact requirements.

99 More Reasons to Choose Norton

The Norton "B99" line includes 250+ USA-made, ISO-certified, diamond and cBN products for precision finishing applications without the wait … in stock and available now.

A Superhero CNC Standard Offering

Norton offers the broadest line of products to grind carbides, hardened steels and other hard-to-grind materials. Choose stock or custom-engineered made-to-order products.

NORTON PARADIGM NORTON B99

NORTON DIAMOND / CBN STOCK WHEELS

The "99" line of quality stock Diamond and cBN (cubic Boron Nitride) grinding products includes resin, vitrified, metal and MSL (metal single layer) bond offerings. Premium, high performance resin bond diamond and cBN wheels are also available.

Applications:

Norton B99 Diamond Wheels

- Sharpening cemented carbide cutting tools
- Cutting off carbide rod
- Grinding or cutting off non-ferrous materials such as ceramics or glass
- Surface grinding dies
- O.D. grinding spray coatings

Norton B99 cBN Wheels

- Sharpening high-speed (M2, D2, T15, etc.) steel cutting tools
- Surface and ID grinding hardened steel die components
- Precision grinding steel parts Rc 50 or harder

Stock Shapes: DW Mounted Points, HH1 and HH2 Hand Hones, and 1A1, 1A1R, 1V1P, 4A2P, 6A2C, 6A2H, 11V9, 12A2, 12V9, and 15V9 Wheels

Abrasive Grain: Diamond and cBN (cubic Boron Nitride)

Abrasive Bonds: Resin, Metal, Metal Single Layer, and Vitrified

STOCK DIAMOND WHEELS

FEATURES	BENEFITS
• High quality synthetic diamond	• High material removal rates; longer wheel life vs. conventional green silicon carbide wheels
• Pre-engineered resin bond – B99	• Free cutting; superior form holding; efficient wet or dry
• Premium, heavy-duty resin bond – B105	• Ideal for dry toolroom reconditioning applications
• Metal bond – M99	• Ideal for 1A1R cut-off applications and grinding glass or ceramic materials
• MSL (metal single layer) diamond tools; no wheel dressing required	• Fast stock removal, cool cutting; excellent for dry offhand finishing of carbide
• Vitrified bond – V99	• Most durable under high grinding forces; excellent for wet, offhand finishing of carbide tools

STOCK CBN WHEELS

FEATURES	BENEFITS
• cBN (cubic Boron Nitride) abrasive material is second in hardness to diamond	• Easily cuts difficult-to-grind steel parts Rc 50 or harder
	• Highly wear resistant and thermally stable
• Pre-engineered resin bond – B99	• Free cutting, superior form holding
• Premium Aztec III resin bond	• Most efficient for dry tool resharpening
• Premium Aztec .007 resin bond	• Most efficient for dry tool resharpening where heavy stock removal is desired

TECH TIP

- Truing makes the wheel concentric with the spindle
- Dressing opens the wheel's cutting face
- Always true and dress diamond and cBN wheels prior to use
- Diamond and cBN wheels with grit sizes 100 – 180 can be trued with a Brake Controlled Truing Device
- Refer to the "Mounting, Truing and Dressing Guide" for more information

⚠ It is the user's responsibility to refer to and comply with ANSI B7.1

NORTON DIAMOND / CBN STOCK WHEELS

NORTON DIAMOND PRODUCT IDENTIFICATION SYSTEM / USAGE INFORMATION

ASD 120 – R 75 B99 1/8

Abrasive Type

ASD
- Used with B99 and B105 bonds
- Armored
- Durable
- Versatile
- Use wet or dry
- Carbide/steel operations

CD
- Used with B99 bond

D
- Used with B99 bond
- Micron-sized diamond; finishing

M3D
- Used with M99 bond

M4D
- Used with M99 bond
- Armored
- Durable; for non-metallics

RMD
- Used with V99 bond

SD
- Used with B99 and V99 bonds
- Norton standard
- Use wet or dry
- Free cutting
- Low horsepower (3/4 hp or less)

Grit Size

- 100S – Roughing
- 120 – Roughing/cutting-off
- 150 – Combined roughing and finishing
- 180 – Improving finish
- 220, 320 & 400 – Finishing only
- 10/20 mic
- 6/12 mic

Grade

Resin Bond

R – Norton standard

N – Free cutting

Metal Bond

N – Norton standard

Vitrified Bond

P – Norton standard

R – Most durable

Concentration

50
- Most economical
- For broad area of contact

75
- Norton standard
- Freer cutting than 100
- Dry grinding with ASD

100
- Very durable
- For flood coolants
- Use with 220 grit or finer
- Use for cutting-off

115
- For CNC grinding machines

125
- Form holding
- For high volume, high pressure coolant, precision applications on high-speed tool steels

Bond

B99
- Resin bond
- Use wet or dry
- Tool making; resharpening

B105
- Premium resin bond
- Advanced heat-reducing bond
- Use dry; reconditioning

B610 and B80
- For CNC grinding machines

M99
- Metal bond
- 1A1R cut-off
- Glass and ceramics

MSL
- Metal single layer
- Type 6A2C only
- Use dry
- Offhand reconditioning/ finishing carbide

V99
- Vitrified bond
- Offhand finishing of carbide tools
- Plunge grinding

Abrasive Depth

1/16"
1/8"
1/4"
9/32"
3/8"
1/2"
3/4"
Solid

NORTON CBN PRODUCT IDENTIFICATION SYSTEM / USAGE INFORMATION

CB 120 – T B99 1/8

Abrasive Type

CB – cubic Boron Nitride
- Used with B99 bond
- Armored
- Use wet or dry

Grit Size

- 100 – Roughing
- 120 – Roughing/cutting-off
- 150 – Combined roughing and finishing
- 180 – Improving finish
- 220, 320, 400 – For finishing only

Grade

Q
- Approx. 50 concentration
- Type 6A2
- Broad area of contact

T
- Approx. 75 concentration
- Norton standard
- First choice
- Lower horsepower
- Broad area of contact
- Dry grinding
- Resharpening applications

W
- Approx. 100 concentration
- Most durable
- High volume coolant
- Flute polishing
- Surface grinding
- Cylindrical grinding

Bond

B99
- Resin bond
- Use wet or dry

Aztec III
- Premium resin bond
- Use dry
- Tool resharpening

Aztec .007
- Premium resin bond
- Use dry
- Increased feed rates
- Heavy stock removal
- Heavier cuts

Abrasive Depth

1/16"
1/8"
1/4"
1/2"
Solid

NORTON DIAMOND / CBN STOCK WHEELS

HOW TO SELECT NORTON STOCK DIAMOND WHEELS

Select:

WHEEL SHAPE			Select desired wheel shape
WHEEL DIMENSIONS	D x T x H	Select Diameter x Thickness x Hole from the availability tables. Use blueprint numbers where available.	
ABRASIVE	Resin Bond Wheels:		Select the abrasive based on horsepower, grinding wet or dry, and contact with steel.
	ASD	Armored diamond, durable. Versatile: can be used wet or dry. Also should be used when carbide and steel are ground in the same operation.	
	D	Micron-sized diamond. Used for finishing and polishing operations.	
	SD	Free cutting standard. Used wet or dry; should be used on low horsepower (3/4 hp or less) machines.	
	Metal Bond Wheels:		
	M4D	Armored, durable standard. A strong, blocky crystal designed for high performance on glass, ceramics, refractories and other non-metallics.	
	Vitrified Bond Wheels:		
	RMD	Medium strength. Specifically designed for use with vitrified bonds.	
	SD	Free cutting standard.	
GRIT SIZE	100	Roughing. The most common grit size for roughing operations.	Select the abrasive grit size based on finish and material removal rate required.
	120	For roughing where 100 is too coarse. Also for cut-off applications.	
	150	Medium stock removal plus good finish. For combined roughing and finishing applications.	
	180	Medium stock removal plus good finish. To improve finish.	
	220	Finishing	
	320	Finishing	
	400	Fine Finishing	
	10/20 Mic	Super Fine Finishing	
	6/12Mic	Super Fine Finishing	
GRADE	Resin Bond Wheels:		The hardness of the wheel
	R	Norton standard	
	N	Free cutting	
	Metal Bond Wheels:		
	N	Norton standard	
	Vitrified Bond Wheels:		
	P	Norton standard	
	R	Most durable	
CONCENTRATION	50	Most economical. For broad area of contact grinding.	Select the abrasive concentration based on grinding wet or dry, material removal rates and form-holding requirements.
	75	Norton standard. Freer cutting than 100 and the most economical for dry grinding with ASD diamond.	
	100	Very durable. Recommended under flood coolant conditions; for use with 220 grit or finer, when durability is required, and for cut-off applications.	
	125	Form holding. Used in high volume, high pressure coolant, precision applications on high-speed tool steels.	
BOND	Resin Bond:		Select the bond based on the material being ground and grinding application.
	B99	Norton standard. Versatile enough to be used wet or dry on most tool making or resharpening applications.	
	B105	Premium, heat-reducing bond. For dry toolroom reconditioning applications.	
	Metal Bond:		
	M99	Best suited for 1A1R cut-off applications as well as grinding glass or ceramic materials.	
	MSL	Metal Single Layer. Available in shape 6A2C for dry, offhand reconditioning of carbide tools.	
	Vitrified Bond:		
	V99	Best for wet offhand finishing of carbide tools as well as plunge grinding of carbide tools.	
ABRASIVE DEPTH	1/16		Usable abrasive
	1/8		
	1/4		
	9/32		
	Solid		

NORTON DIAMOND / CBN STOCK WHEELS

HOW TO SELECT NORTON STOCK CBN WHEELS

Select

WHEEL SHAPE			Select desired wheel shape
WHEEL DIMENSIONS	D x T x H	Select Diameter x Thickness x Hole from the availability tables. Use blueprint numbers where available.	
ABRASIVE	Resin Bond Wheels:		Select Norton cBN abrasive to grind hard tool steels such as A2, D2, T15, etc., and tough alloy steels.
	CB	Norton standard coated cBN (cubic Boron Nitride). Optimized for high performance in resin bond systems.	
GRIT SIZE	100	Roughing. The most common grit size for roughing operations.	Select the grit size based on finish and material removal rate required.
	120	For roughing where 100 is too coarse. Also for cut-off applications.	
	150	Medium stock removal plus good finish. For combined roughing and finishing applications.	
GRADE	Q	Approximately 50 concentration. Used on wide area of contact applications.	The hardness of the wheel
	T	Norton standard. Approximately 75 concentration. T is the first choice for lower horsepower equipment or large area of contact between the wheel and the work piece. Ideal for resharpening applications with 11V9, 12A2, 4A2P, and 15V9 wheel shapes when dry grinding.	
	W	Most durable. Approximately 100 concentration, W is recommended for high volume coolant operations: flute grinding from solid, flute polishing, surface, and cylindrical grinding.	
BOND	B99	Norton standard. Pre-engineered for optimal performance with cBN abrasive. Available in all shapes.	Select the bond depending on the type of grinding application.
	Aztec III	The Norton advanced heat-reducing, lubricating resin bond. Used for dry grinding tool steels.	
	Aztec .007	The Norton premium resin bond for increased feed rates, high stock removal and heavier cuts – when dry grinding tool steels.	
ABRASIVE DEPTH	1/16		Usable abrasive
	1/8		
	1/4		
	Solid		

Our Norton line offers a comprehensive stock product selection to service most of your needs – with the fastest delivery and lowest total costs.

Review this stock section first. If you can not find the specification you need:

- Then refer to the brief descriptions of our B99 Express and CNC lines (following this section)
- See the more in-depth B99 Express product availability in our "Diamond and cBN Superabrasives Standard Catalog" #8068 on www.nortonabrasives.com or contact your Norton representative for a complete listing of Norton made-to-order superabrasive products.

TECH TIP

Diamond Grinds:

In general, diamond is used to grind non-ferrous materials, because of an adverse reaction between diamond and iron.

- Cemented carbide
- Glass
- Ceramics
- Fiberglass
- Plastics
- Stone
- Abrasives
- Electronic components and materials

cBN GRINDS:

cBN is used to grind ferrous materials.

- High-speed tool steels
- Die steels
- Hardened carbon steels
- Alloy steels
- Aerospace alloys
- Hardened stainless steel
- Abrasion-resistant ferrous materials

It is the user's responsibility to refer to and comply with ANSI B7.1

NORTON DIAMOND / CBN STOCK WHEELS

APPLICATION-TO-PRODUCT RECOMMENDATION GUIDE – DIAMOND WHEELS

Application or Common Machine Type		Common Wheel Size, Type & Blueprint	Application Variables		Recommended Specification
Carbide Grinding – Toolroom Production					
Blanchard Grinding Vertical Spindle Surface Grinding		10", 11", 16" & 18" diameters Type 2A2T	Wet – solid carbide	1" or larger pieces – roughing	SD100-R75B99E*
				Small pieces	ASD100-R75B99E*
			Carbide & steel (combination)		ASD100-R75B99E*
Hand Burr Grinding		6" x 3/32" x 1-1/4" Type 1V1P V – 20° ME89562	Dry		ASDC320B-R125B99
Centerless (wet)	Throughfeed Grinding	12", 14", 16", 18" & 20" diameters Type 1A1	Roughing		ASD100-R75B99E*
	Unison Dedtru Grinder	7" x 1" x 1-1/4" Type 1A1			ASD150-R75B99E*
Cutting Off (wet)		6" x .035" x 1-1/4" Type 1A1R ME43572	Most durable		ASD100S-R100B99
			Free cutting		SD100-R75B99
		10" x .050" x 1-1/4" Type 1A1R ME43565			SD120-R100B99
Cylindrical Grinding (wet)		10", 12", 14", 16" & 20" diameters Type 1A1	Wet, rough grinding of cemented carbides, hard (55 Rc+) plasma and ceramic spray coatings		ASD180-R100B99
					ASD180-R75B99E*
					ASD150-R75B99
					ASD120-R75B99
			Wet, finish grinding of all carbides, plasma and ceramic spray coatings		SD220-R100B99E*
Tool Sharpener Bench Grinder (wet)		5" x 1" x 1-1/4" Type 6A2H ME27084 Rim Width (W) = 1-1/16	Tool sharpening		SD320-R50B99
Hand Honing (dry)		Various sizes Type HH1 or HH2			ASD100-R100B99
					SD320-100V99
Lamination Dies (wet)		Various sizes Type 1A1	Surface grinding of carbide		ASD120-R75B99
Surface Grinding (wet) Straight Wheels		Various sizes Type 1A1	Roughing	Durable	ASD100S-R100B99E*
				Free cutting	SD100S-R100B99
			Finishing only		SD220-R100B99
			General purpose		ASD150-R75B99
Tool & Cutter Grinding		Various sizes Type 11V9, 12V9 or 15V9	Wet or dry		ASD120-R7599
Carbide Grinding – Offhand					
Single-Point Carbide Tools		6" x 3/4" x 1-1/4" Type 6A2C ME27853	Wet roughing	Durable	RMD150-P50V99*
				Free cutting	SD150-P50V99
			Wet finishing	Durable	RMD220-P50V99*
				Free cutting	SD220-P50V99
			Wet or dry grinding where free-cutting and self-dressing wheels are required	Roughing	ASD120-R75B99
				Finishing	SD220-R50B99E*

Note: Diamond depths are not indicated in above listings. When ordering, be sure to include Diamond depth (1/16, 1/8, etc.).

**Express Made-To-Order; Refer to the B99E Express Made-to-Order Wheel section.*

NORTON DIAMOND / CBN STOCK WHEELS

APPLICATION-TO-PRODUCT RECOMMENDATION GUIDE – CBN WHEELS

Application or Common Machine Type	Common Wheel Size, Type & Blueprint	Application Variables	Recommended Specification
Toolroom Grinding			
Cutter Sharpening Milling Cutters, Broaches, Reamers, etc.	3-3/4" x 1-1/2" x 1-1/4" Type 11V9 ME92192	Dry	Aztec III 120T
		Wet	CB120-TB99
	6" x 1" x 1-1/4" Type 12A2 ME27758	Wet or dry	CB120-TB99
	6" x 3/4" x 1-1/4" Type 12V9 ME48666	Wet or dry	CB120-TB99
	6" x 3/4" x 1-1/4" Type 15V9 ME40633	Wet or dry	CB100-WB99E*
Surface Grinding	10" x 1/2" x 3" Type 1A1	Wet or dry	CB100-TB99E*
Cylindrical Grinding	12" x 1/2" x 3" Type 1A1	Wet or dry	CB150-WB99E*
Internal Grinding Tools	Thinner than 1/2" Type DW	Wet or dry	CB100-WB99
	1/2" or thicker Type 1A1	Wet or dry	CB120-TB99E*
Slotting	7" x .040" x 1-1/4" Type 1A1R	Water-base coolant	CB120-WB99E*

Note: cBN depths are not indicated in above listings. When ordering, be sure to include cBN depth (1/16, 1/8, etc.)

**Express Made-To-Order; Refer to the B99E Express Made-to-Order Wheel section.*

CROSS REFERENCE GUIDE

	Abrasives				Bonds						
	Resin Diamond	Resin Diamond	Metal Diamond	Resin/ Vitrified cBN	Resin Diamond	Resin Diamond	Metal Diamond	Vitrified Diamond	Resin cBN	Resin cBN	Resin cBN
NORTON	ASD	SD	M4D	CB	B99/B99E	B105	M99	V99	B99/B99E	B99EF	AZTEC
3M /	CGD,	GD,		CB	PS			V		BC	
General Industrial Diamond / Diamond Productions, Inc	ND	D, MD									
Abrasive Technology	SN	S		cBN	B		M		B		
Accurate Diamond Tool	NCD	D, MD		BN	B		M				
Citco	5SD, 6SD	SD	MD	CB	B43, B52		M		B26	C3	
Engis	NMD	D, MD		cBN, CB							
Noritake				CBC		BX4			BD/B38		BX4
Radiac / US Diamond	NCD, WD, 1WD, MDC	D, MD	MD4C	B, CB, BZ	B7Z, BB, B5, B56,BN		M, MF	V	BZ, BN		
Regal Diamond				B, BB	BJ						
Superabrasives, Inc.	MDN	D, MD		B					B82	B5	
Tyrolit / Wickman / Bay State / Cincinnati	SDM, XDL, XDN, D, 7D, CMD	SD, D, 6D, MD	1D	5B,1BN, BN, BM	BD, BC, BX33, B52, B6	Amigo	MI, MSS, MB		B72, B56, BG, B7	BXU8	Amigo
Wendt / Slip Naxos / Winterthur	SDK			B, BXW					RN	RR	

	ABRASIVES		BONDS	
NORTON POLYIMIDE	Univel/G-Force		Diamond and cBN	
	Diamond AD	cBN BX	Univel	G-Force
3M / General Industrial Diamond / Diamond Productions, Inc	D	CB	BP	BPP
Citco	SD	CB	P	C5

TROUBLESHOOTING GUIDE – DRY GRINDING

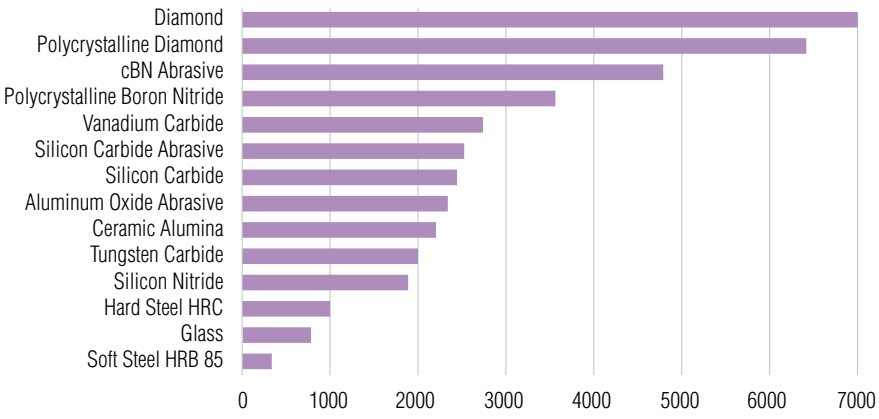
Problem	Possible Causes	Suggested Correction
Burning (excessive heat)	Wheel loaded or glazed	Dress wheel with a dressing stick
	Excessive feed rate	Reduce infeed of wheel or workpiece
	Wheel too durable	Use freer cutting specification or slow down wheel speed
Poor finish	Grit size too coarse	Select a finer grit size
	Excessive feed rate	Reduce infeed of wheel or workpiece
Chatter	Wheel out of truth	True wheel; ensure it is not slipping on mount (See “Mounting, Truing and Dressing Guide”)

TROUBLESHOOTING GUIDE – WET GRINDING

Problem	Possible Causes	Suggested Correction
Burning (excessive heat)	Wheel glazed or loaded	Re-dress wheel
	Poor coolant placement	Apply coolant directly to wheel/workpiece interface
	Excessive material removal rate	Reduce downfeed and/or crossfeed
Poor finish	Excessive dressing	Use lighter dressing pressure
		Stop dressing as soon as wheel starts to consume stick rapidly
	Grit size too coarse	Select a finer grit size
	Poor coolant flow or location	Apply heavy flood so it reaches wheel/work interface
Chatter	Wheel out of truth	True wheel; ensure it is not slipping on mount
Wheel will not cut	Glazed by truing	Dress lightly until wheel opens up
	Wheel loaded	Dress lightly until wheel opens up
		Increase coolant flow to keep wheel surface clean
		Never run wheel with coolant turned off
Slow cutting	Low feeds and speeds	Increase feed rate; increase wheel speed (Do not exceed wheel MOS)
Short wheel life	Incorrect coolant flow	Apply coolant to flood wheel/work surface
	Low wheel speed	Increase wheel speed (observe maximum operating speed)
	Excessive dressing	Use lighter dressing pressure
	Wheel too soft or too hard	Change grit or grade; use higher concentration

MATERIAL HARDNESS SCALE

Superabrasives is a term used to describe those abrasives of extreme hardness which produce outstanding results when properly used on specific applications. This graph provides a hardness comparison (Knoop Hardness Scale) between diamond and cBN superabrasives, aluminum oxide and silicon carbide standard abrasives, and some common materials these abrasives are used to grind.



TECH TIP

Avoid Grinding Steel

- Avoid steel when grinding with diamond wheels. Keep the amount of steel ground to an absolute minimum.
- On brazed tools, use aluminum oxide wheel to back off the steel shank.
- A high lubricity grinding fluid should be used.
- For some steels, an armored (AMD) diamond wheel might prove most economical.

Use Rigid Work Support

- All workpieces should be supported firmly during the grinding process. Any amount of vibration will cause wheel wear and produce chatter or wave marks on the ground surface.
- On work ground between centers, centerholds should be properly prepared.
- Minimize work overhang.
- If the ground work is supported by a work finger, ensure the finger is strong enough to provide vibration-free support.

Coolant – Grind Wet

- Diamond wheels should be used with a full flood coolant properly directed toward the grinding zone. Water with a rust inhibitor is recommended.
- Vitrified diamond wheels should be used only with a coolant.
- When flood application can't be used, try mist or spray application.
  - » Use compressed air to “atomize” water or soluble oil.
  - » Direct the spray at the grinding zone to help dissipate heat and prevent heat damage to the work.

Avoid Excessive Feeds

- Excessive feeds will result in premature wheel wear. Excessive feed rates are characterized by:
  - » A hard grinding sound
  - » Chatter
  - » Burn
  - » High wheel wear rate
  - » Vibration

NORTON DIAMOND / CBN STOCK WHEELS

Decimal and Metric Equivalents of Common Fractions

FRACTIONS OF AN INCH	DECIMALS OF AN INCH	MILLIMETERS
1/64	.0156	0.397
1/32	.0313	0.794
3/64	.0469	1.191
1/16	.0625	1.588
5/64	.0781	1.985
3/32	.0938	2.381
7/64	.1094	2.778
1/8	.1250	3.175
9/64	.1406	3.572
5/32	.1563	3.969
11/64	.1719	4.366
3/16	.1875	4.762
13/64	.2031	5.159
7/32	.2188	5.556
15/64	.2344	5.953
1/4	.2500	6.350
17/64	.2656	6.747
9/32	.2813	7.144
19/64	.2969	7.541
5/16	.3135	7.937
21/64	.3281	8.334
11/32	.3438	8.731
23/64	.3594	9.128
3/8	.3750	9.525
25/64	.3906	9.922
13/32	.4063	10.319
27/64	.4219	10.716
7/16	.4375	11.112
29/64	.4531	11.509
15/32	.4688	11.906
31/64	.4844	12.303
1/2	.5000	12.700
33/64	.5156	13.097
17/32	.5313	13.494
35/64	.5469	13.891
9/16	.5625	14.287
37/64	.5781	14.684
19/32	.5938	15.081
39/64	.6094	15.478
5/8	.6250	15.875
41/64	.6406	16.272
21/32	.6563	16.688
43/64	.6719	17.085
11/16	.6875	17.462
45/64	.7031	17.859
23/32	.7188	18.256
47/64	.7344	18.653
3/4	.7500	19.050
49/64	.7645	19.447
25/32	.7813	19.843
51/64	.7969	20.240
13/16	.8125	20.637
53/64	.8281	21.034
27/32	.8438	21.430
55/64	.8594	21.827
7/8	.8750	22.224
57/64	.8906	22.621
29/32	.9063	23.018
59/64	.9219	23.415
15/16	.9375	23.812
61/64	.9531	24.209
31/32	.9688	24.606
63/64	.9844	25.003
1	1.0000	25.400

Expected Surface Finish by Grit Size

Use these charts as guides only. Surface finish is affected by several variables: machine type and condition, type of material ground, coolant, wheel speed, bond system, etc.

DIAMOND

Grit Size	Expected Finish Micro Inch AA	Maximum Depth of Cut per Pass for Grit Size
100	24 to 32	0.001" to 0.002"
120	16 to 18	0.001" to 0.002"
150	14 to 16	0.001" to 0.002"
180	12 to 14	0.0007" to 0.001"
220	10 to 12	0.0007" to 0.001"
320	8	0.0004" to 0.0006"
400	7 to 8	0.0003" to 0.0005"

CBN

Grit Size	Expected Finish With Oscillation	Expected Finish Plunge
100	35 – 40	40 – 45
120	30 – 35	35 – 40
150	25 – 30	30 – 35
180	20 – 25	25 – 30
220	15 – 20	20 – 25
320	10 – 15	15 – 20
400	4 – 8	5 – 10

Recommended Wheel Speeds for Diamond and cBN Wheels

WET GRINDING	Cup Wheels 11V9, 12V9, 15V9, etc.	Peripheral Wheels 1A1, 1V1, 1A1R, etc.
Diamond Grinding Wheels		
Resin Bond Wheels	4921 to 7874 SFPM	4921 to 7874 SFPM
	25 to 40 m/s	25 to 40 m/s
Metal Bond Wheels		3937 to 5906 SFPM
		20 to 30 m/s
Vitrified Bond Wheels	2953 to 5906 SFPM	2953 to 5906 SFPM
	15 to 30 m/s	15 to 30 m/s
cBN Grinding Wheels		
Resin Bond Wheels	5906 to 9843 SFPM	5906 to 9843 SFPM
	30 to 50 m/s	30 to 50 m/s

DRY GRINDING	Cup Wheels 11V9, 12V9, 15V9, etc.	Peripheral Wheels 1A1, 1V1, 1A1R, etc.
Diamond Grinding Wheels		
Resin Bond Wheels	2756 to 3543 SFPM	2756 to 3543 SFPM
	14 to 18 m/s	14 to 18 m/s
cBN Grinding Wheels		
Resin Bond Wheels	2953 to 5906 SFPM	2953 to 5906 SFPM
	15 to 30 m/s	15 to 30 m/s

Note: These are not the maximum operating speeds (MOS).
Consult ANSI B7.1 or contact your Norton representative for MOS.

Wheel Speed Calculation

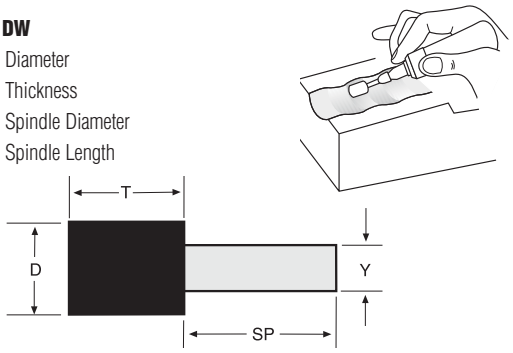
To convert m/s to SFPM:	Multiply M/S x 196.85 = SFPM
To convert SFPM to M/S:	Divide SFPM by 196.85 = M/S
To convert RPM to SFPM:	Multiply wheel diameter in inches x RPM x 0.262

M/S = meters/second RPM = Revolutions Per Minute SFPM = Surface Feet Per Minute

NORTON DIAMOND / CBN STOCK WHEELS

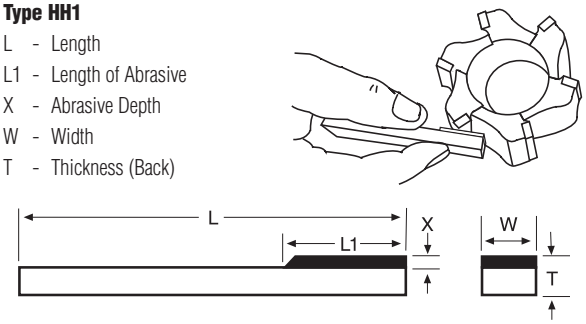
Type DW

D - Diameter
T - Thickness
Y - Spindle Diameter
SP - Spindle Length



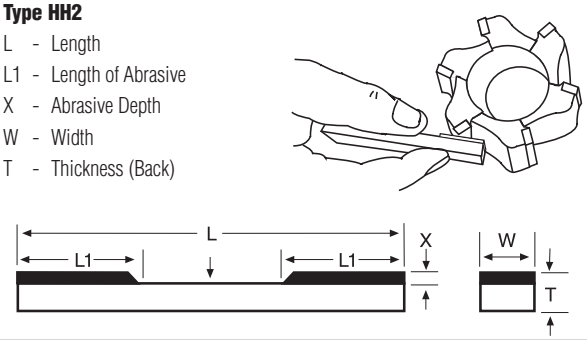
Type HH1

L - Length
L1 - Length of Abrasive
X - Abrasive Depth
W - Width
T - Thickness (Back)



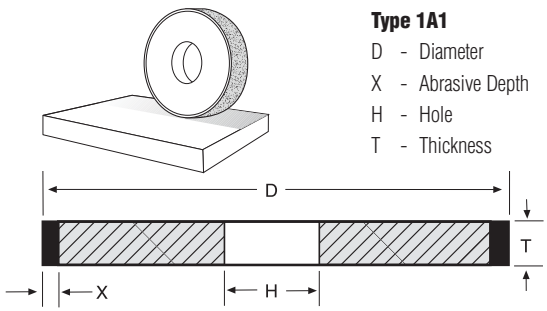
Type HH2

L - Length
L1 - Length of Abrasive
X - Abrasive Depth
W - Width
T - Thickness (Back)



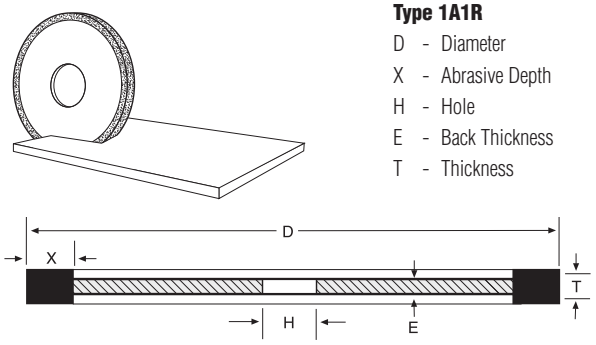
Type 1A1

D - Diameter
X - Abrasive Depth
H - Hole
T - Thickness



Type 1A1R

D - Diameter
X - Abrasive Depth
H - Hole
E - Back Thickness
T - Thickness



SIZE (D x T)	SPECIFICATION	PART #
Type DW Mounted Points – Diamond		
3/16 x 1/4 Steel Spindle 1/8 x 1-1/2	SD100-R100B99-SOLID	69014192238
1/2 x 1/2 Steel Spindle 1/4 x 1-1/2	SD220-R100B99-SOLID	69014192249
3/4 x 3/8 Steel Spindle 1/4 x 1-1/2	SD150-R100B99-SOLID	69014192251
1 x 1/2 Steel Spindle 1/4 x 1-1/2	SD100-R100B99-SOLID	69014192428
Type DW Mounted Points – cBN		
3/16 x 1/4 Carbide Spindle .125 x 1-3/4	CB150-WB99-SOLID	69014192258

SIZE (T x W x L)	SPECIFICATION	PART #
Type HH1 Hand Hones – Diamond		
1/4 x 1/4 x 6 One 1/16 deep 1" long insert in one 1/4 surface	ASD220-R100B99-1/16	69014192139
1/4 x 3/8 x 4 One 1/16 deep 1" long insert in one 3/8 surface	ASD100-R100B99-1/16	69014192141
	ASD180-R100B99-1/16	69014192142
	ASD220-R100B99-1/16	69014191670
	ASD320-R100B99-1/16	69014191672
	ASD400-R100B99-1/16	69014192143
	D10/20MIC-R100B99-1/16	69014192144
	SD320-100V99-1/16	69014192140
Type HH2 Hand Hones – Diamond		
1/4 x 3/8 x 4 Two 1/16 deep 1" long inserts in one 3/8 surface	ASD120/220-R100B99-1/16	69014192150
	ASD220/320-R100B99-1/16	69014192178
	ASD220/400-R100B99-1/16	69014192179
	ASD320/400-R100B99-1/16	69014192180
	SD220/320-100V99-1/16	69014192149

SIZE (D x T x H)	SPECIFICATION	PART #
Type 1A1 Straight – Diamond		
1 x 1/4 x 1/4	SD100-R100B99-1/8	69014192175
1-1/2 x 1/2 x 1/2	D6/12MIC-N100B99-1/8	69014192176
2 x 1/8 x 1/4	SD100-R100B99-1/8	69014192184
3 x 1/4 x 3/4	SD180-N100B99-1/8	69014192187
4 x .020 x 1-1/4	SD320-R100B99-1/8	69014192188
4 x 1/32 x 1-1/4	SD100S-R100B99-1/4	69014192192
4 x 1/16 x 1-1/4	SD100S-R100B99-1/4	66260273583
	SD150-R100B99-1/4	66260273584
	SD220-R100B99-1/4	66260273586
4 x 1/8 x 3/4	SD150-R100B99-1/4	69014192024
4 x 1/8 x 1-1/4	SD150-R100B99-1/4	69014191677
4 x 1/4 x 1/2	SD150-R100B99-1/4	66260273590
4 x 1/4 x 3/4	SD150-R100B99-1/4	66260273592
4 x 1/4 x 1-1/4	SD100S-R100B99-1/4	66260273587
	SD120-R100B99-1/4	66260273588
	SD150-R100B99-1/4	66260273589
4 x 1/2 x 1-1/4	SD150-R100B99-1/4	66260273594
6 x 1/32 x 1-1/4	SD220-R100B99-1/8	69014192197
6 x 1/16 x 1-1/4	SD100-R100B99-1/4	66260273596
	SD150-R100B99-1/4	66260273597
	SD180-R100B99-1/4	66260273598
	SD220-R100B99-1/4	66260273599
6 x 1/8 x 1-1/4	ASD150-R75B99-1/4	66260273617
	SD100-R100B99-1/4	66260273611
	SD150-R100B99-1/4	66260273613
	SD180-R100B99-1/4	66260273614
	SD220-R100B99-1/4	66260273615
6 x 1/4 x 1-1/4	ASD100S-R75B99-1/4	69014192205
	ASD120-R75B99-1/4	69014192769
	ASD150-R75B99-1/4	66260273609
	ASD180-R75B99-1/4	69014192770
	ASD220-R75B99-1/4	69014192771
	ASD320-R75B99-1/4	69014192772
	RMD180-P100V99-1/8	69014192203
	SD120-R100B99-1/4	69014191691
	SD150-R100B99-1/4	69014191692
	SD180-R100B99-1/4	69014191693
	SD220-R100B99-1/4	69014192764

Standard Package = 1 mounted point, hand hone, or wheel

Continued

See our new Norton Thriftline Diamond and cBN offering for low-volume, price-sensitive applications on page 305.

NORTON DIAMOND / CBN STOCK WHEELS

SIZE (D x T x H)	SPECIFICATION	PART #
Type 1A1 Straight – Diamond (cont'd)		
6 x 3/8 x 1-1/4	ASD120-R75B99-1/4	69014192773
	ASD150-R75B99-1/4	69014191695
	SD150-R100B99-1/4	69014191696
6 x 1/2 x 1-1/4	ASD120-R75B99-1/4	69014192777
	ASD150-R75B99-1/4	69014191698
	ASD220-R75B99-1/4	69014192779
	ASD320-R75B99-1/4	69014192780
	SD120-R100B99-1/4	66260273557
	SD150-R100B99-1/4	66260273561
	SD180-R100B99-1/4	69014191700
7 x 1/4 x 1-1/4	ASD150-R75B99-1/4	69014191701
	SD100S-R100B99-1/4	69014192210
	SD120-R100B99-1/4	66260273566
	SD150-R100B99-1/4	69014191703
	SD180-R100B99-1/4	69014191704
	SD220-R100B99-1/4	69014191705
7 x 3/8 x 1-1/4	SD120-R100B99-1/4	69014191849
	SD220-R100B99-1/4	69014191852
7 x 1/2 x 1-1/4	ASD100-R75B99-1/4	69014192211
	ASD150-R75B99-1/4	69014191853
	ASD180-R75B99-1/4	69014192212
	SD120-R100B99-1/4	69014191854
	SD150-R100B99-1/4	69014191855
	SD180-R100B99-1/4	69014191856
	SD220-R100B99-1/4	69014191857
8 x 1/2 x 1-1/4	SD150-R100B99-1/4	66260273574
10 x 1/2 x 3	ASD120-R75B99-1/4	69014192305
	ASD180-R100B99-1/4	69014192306
12 x 1/2 x 3	ASD150-R75B99-1/4	69014192310
12 x 1/2 x 5	ASD150-R75B99-1/4	69014192311
12 x 1 x 3	ASD120-R75B99-1/4	69014192312
12 x 1 x 5	ASD120-R75B99-1/4	69014192313
14 x 1/2 x 5	ASD150-R75B99-1/4	69014192314
14 x 1 x 5	ASD120-R75B99-1/4	69014192316
20 x 1 x 12	ASD120-R75B99-1/4	69014192325

Standard Package = 1 wheel

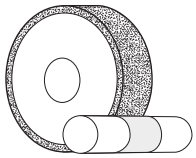
SIZE (D x T x H)	SPECIFICATION	PART #
Type 1A1 Straight – cBN		
6 x 1/8 x 1-1/4	CB120-TB99-1/4	66260273601
6 x 1/4 x 1-1/4	CB120-TB99-1/4	66260273605
6 x 1/2 x 1-1/4	CB120-TB99-1/4	66260273607
7 x 1/4 x 1-1/4	CB120-TB99-1/4	69014192021
7 x 1/2 x 1-1/4	CB120-TB99-1/4	66260273567
12 x 1/2 x 5	CB150-TB99-1/4	66260273560
12 x 1 x 5	CB150-TB99-1/4	66260273562
Type 1A1R Cut-Off – Diamond		
3 x .020 x 1/2 (ME104177)	M4D150-N50M99-1/8	69014192060
4 x .012 x 1/2 (ME104180)	M4D180-N75M99-1/8	69014192063
	M4D220-N75M99-1/8	69014192064
4 x .020 x 1/2 (ME104180)	M4D220-N100M99-1/8	69014192067
4 x .030 x 1/2 (ME104180)	M4D150-N75M99-1/8	69014192068
4 x 1/32 x 3/4 (ME43570)	SD100S-R100B99-1/4	69014192151
	SD120-R100B99-1/4	69014191706
4 x 1/32 x 1-1/4 (ME43570)	SD100S-R100B99-1/4	69014192152
5 x .015 x 1/2 (ME104180)	M4D220-N100M99-1/8	69014192070
6 x .017 x 1-1/4 (ME104180)	M4D150-N100M99-1/8	69014192082
	M4D220-N100M99-1/8	69014192083
6 x .025 x 1-1/4 (ME104180)	M4D150-N100M99-1/8	69014192086
6 x .035 x 5/8 (ME104177)	M4D100-N75M99-1/8	69014192088
6 x .035 x 1-1/4 (ME43572)	SD100-R75B99-1/4	69014192155
	ASD100S-R100B99-1/4	69014192158
	ASD120-R100B99-1/4	69014192159
	SD100-R100B99-1/4	69014191858
	SD100S-R100B99-1/4	69014192156
	SD220-R100B99-1/4	69014192157

Continued

NEW! See page 305 for Norton Thriftline stock wheels, engineered at low initial cost, for small volume operations.

TECH TIP

Cylindrical grinding applications – 1A1 wheels:

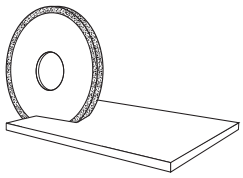


- Includes all outside grinding of round parts, even though the finished product is not always a true cylinder.
- Infeed at both ends of the traverse to keep wheel face flat.
- Use work supports to prevent deflection.
- Rough grinding traverse speed should be 1/2 to 2/3 of the thickness of the wheel per work revolution.
- Finishing grinding traverse speed should be 1/2" or less per work revolution.

It is the user's responsibility to refer to and comply with ANSI B7.1

TECH TIP

Cut-off applications – 1A1R wheels:



- Use the largest diameter flanges possible
- Use flanges of equal diameter
- Use the thickest wheel possible for increased stiffness and straightness of cut

cBN wheels are used on hardened steels.

Diamond wheels are used to cut or slot carbide, glass or ceramic parts.

It is the user's responsibility to refer to and comply with ANSI B7.1

TECH TIP

Diamond Grinds:

- Cemented carbide
- Glass
- Ceramics
- Fiberglass
- Plastics
- Stone
- Abrasives
- Electronic components and materials

cBN Grinds:

- High-speed tool steels
- Die steels
- Hardened carbon steels
- Alloy steels
- Aerospace alloys
- Hard stainless steel
- Abrasion-resistant ferrous materials

Can't Find Your Specification Here?

Review this stock section first. If you can not find the specification you need:

- Then refer to the brief descriptions of our B99 Express and CNC lines (following this section)
- See the more in-depth B99 Express product availability in our "Diamond and cBN Superabrasives Standard Catalog" #8068 on www.nortonabrasives.com or contact your Norton representative for a complete listing of Norton made-to-order superabrasive products.

NORTON DIAMOND / CBN STOCK WHEELS

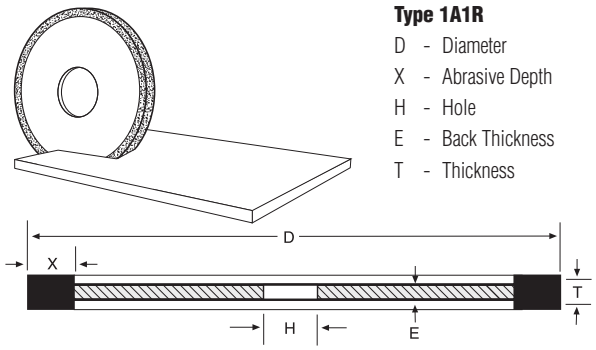
SIZE (D x T x H)	SPECIFICATION	PART #
Type 1A1R Cut-Off – Diamond		
6 x .035 x 1-1/4 (ME73316)	ASD100S-R100B99-9/32	69014192164
	ASD120-R100B99-9/32	69014192165
	SD100-R100B99-9/32	69014192161
	SD120-R100B99-9/32	69014192162
	SD150-R100B99-9/32	69014192163
6 x .045 x 1-1/4 (ME83991)	SD100-R50B99-1/8	69014192166
6 x .055 x 1-1/4 (ME104177)	M4D100-N75M99-1/8	69014192099
7 x .035 x 1-1/4 (ME82347)	ASD100-R100B99-1/4	66260238686
7 x .055 x 1-1/4 (ME104177)	M4D120-N100M99-1/8	69014192108
8 x .030 x 1-1/4 (ME104180)	M4D180-N75M99-1/8	69014192110
8 x .045 x 5/8 (ME43569)	SD120-R100B99-1/4	69014192167
8 x .045 x 1-1/4 (ME43569)	SD120-R100B99-1/4	69014192169
8 x .050 x 1-1/4 (ME104180)	M4D180-N75M99-1/8	69014192114
10 x .050 x 1-1/4 (ME 43565)	ASD120-R100B99-1/4	66260230236
	CD100-R100B99-1/4	69014192815
	SD120-R100B99-1/4	69014192170
12 x .070 x 3/4 (ME 43567)	SD150-R100B99-1/4	69014192173
14 x .070 x 3/4 (ME 106589)	SD120-R100B99-1/4	66260259011
Type 1A1R Cut-off – cBN		
6 x .035 x 1-1/4 (ME43572)	CB100-WB99-1/4	69014192160
Type 1V1P Fluting – Diamond		
6 x 3/32 x 1-1/4 Face Bevel 1 Side 20 Deg Copper Core (ME89562)	ASDC320C-R100B99-1/4	69014192761
	ASD320B-R125B99-1/4	69014192302
Type 4A2P Dish – Diamond		
6 x 3/8 x 1-1/4 Rim Width 1/4" (ME88369)	ASD120-R75B99-1/16	69014192280

Standard Package = 1 wheel

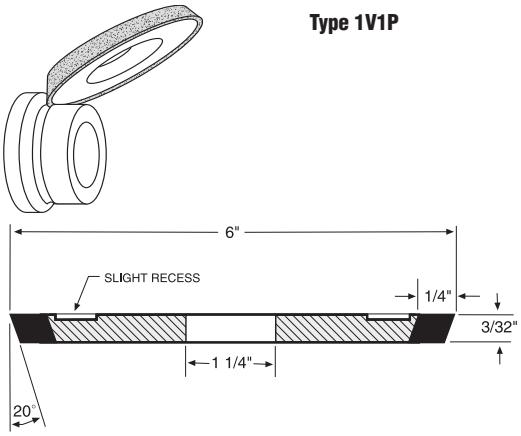
Refer to “Brake Controlled Truing Devices” and “Dressing Sticks” sections for truing and dressing products.

Type 1A1R

D - Diameter
X - Abrasive Depth
H - Hole
E - Back Thickness
T - Thickness

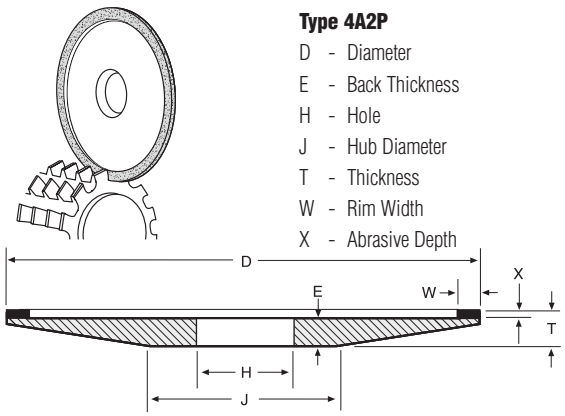


Type 1V1P



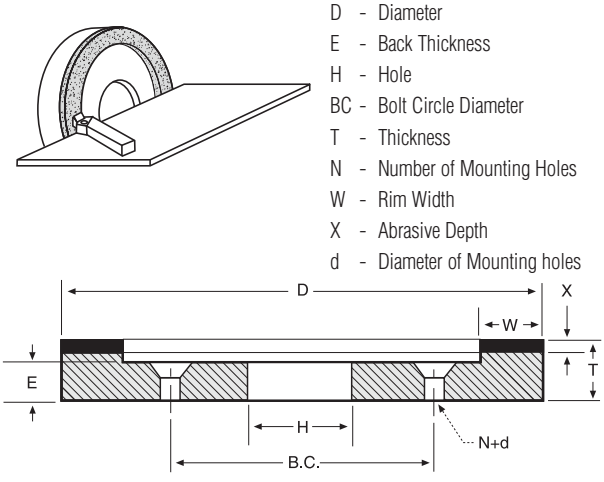
Type 4A2P

D - Diameter
E - Back Thickness
H - Hole
J - Hub Diameter
T - Thickness
W - Rim Width
X - Abrasive Depth

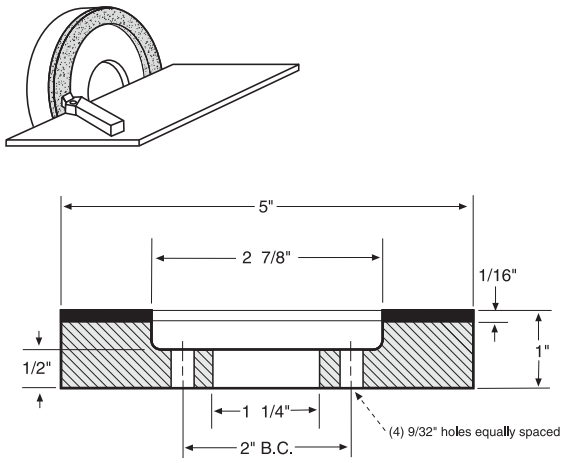


Type 6A2C

D - Diameter
E - Back Thickness
H - Hole
BC - Bolt Circle Diameter
T - Thickness
N - Number of Mounting Holes
W - Rim Width
X - Abrasive Depth
d - Diameter of Mounting holes



Type 6A2H



NORTON DIAMOND / CBN STOCK WHEELS

SIZE (D x T x H)	SPECIFICATION	PART #
Type 6A2C Straight cup – Diamond		
6 x 7/16 x 1-1/4 Rim Width 1" (0640185M)	D120/140-H-MSL	66260269172
6 x 3/4 x 1-1/4 Rim Width 3/4" (ME27853)	SD220-R50B99-1/16	69014191665
	ASD120-R75B99-1/16	69014191860
	ASD120-R75B99-1/8	69014192786
	SD150-P50V99-1/16	69014192217
	SD220-P50V99-1/16	69014191623
6 x 3/4 x 1-1/4 Rim Width 1/2" (ME30621)	ASD120-R75B99-1/8	66260273565

Standard Package = 1 wheel

SIZE (D x T x H)	SPECIFICATION	PART #
Type 6A2H Straight Cup – Diamond		
5 x 1 x 1-1/4 Rim Width 1-1/16" (ME27084)	SD320-R50B99-1/16	69014192221

Standard Package = 1 wheel

NEW! See page 305 for Norton Thriftline stock wheels, engineered at low initial cost, for small volume operations.

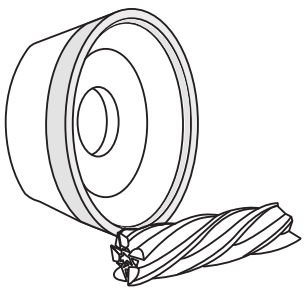
ASD DIAMOND / B105 RESIN BOND WHEELS

BEST CHOICE FOR DRY GRINDING CARBIDE TOOLS

FEATURES	BENEFITS
• Premium quality diamond	• Produces keen cutting tools that hold their shape, are easier to sharpen, and require fewer reconditionings
• Advanced, heat-reducing bond	• Minimizes heat generation and thermal damage to tool • Increases tool life and productivity • Lasts more than 2X as long as standard diamond wheels • Lowest total wheel costs; highest productivity
• Self-lubricating bond	• No steel or braze loading • Uses less power
• Unique self-dressing core	• Eliminates wheel core damage • Eliminates downtime to dress core

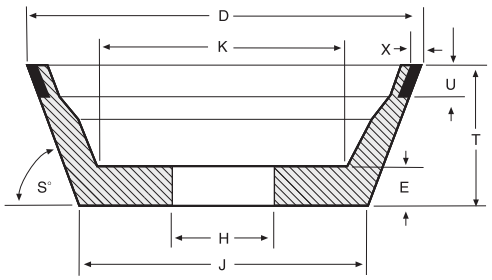
SIZE (D x T x H)	SPECIFICATION	PART #
Type 11V9 Flaring Cup – Diamond		
3-3/4 x 1-1/2 x 1-1/4 Insert Length 3/8" (ME92192)	ASD120-R75B105-1/16	69014191905
	ASD150-R75B105-1/16	69014191906
	ASD100S-R75B105-1/8	69014191908
	ASD120-R75B105-1/8	69014191909
	ASD150-R75B105-1/8	69014191910
5 x 1-3/4 x 1-1/4 Insert Length 7/16" (ME98298)	ASD120-R75B105-1/16	69014191913
	ASD150-R75B105-1/16	69014191914
	ASD100S-R75B105-1/8	69014191916
	ASD150-R75B105-1/8	69014191918

Standard Package = 1 Wheel



Type 11V9

D - Diameter
K - Inside Diameter of Flat
H - Hole
E - Back Thickness
T - Thickness
J - Hub Diameter
U - Insert Length
X - Abrasive Depth
S - Face Angle



SIZE (D x T x H)	SPECIFICATION	PART #
Type 11V9 Flaring Cup – Diamond		
3 x 1-1/4 x 3/4 Insert Length 3/8" (ME93912)	ASD120-R75B99-1/16	69014192291
	ASD150-R75B99-1/16	69014192292
	SD150-R100B99-1/16	69014192293
3-3/4 x 1-1/2 x 3/4 Insert Length 3/8" (M92192)	ASD120-R75B99-1/16	69014192022
3-3/4 x 1-1/2 x 1-1/4 Insert Length 3/8" (ME92192)	ASD150C-R50B99-1/8	69014190751
	ASD120-R75B99-1/16	69014191660
	ASD150-R75B99-1/16	69014191725
	ASD100S-R75B99-1/8	69014191653
	ASD120-R75B99-1/8	69014191652
	ASD150-R75B99-1/8	69014191651
	ASD180-R75B99-1/8	69014191650
	SD120-R100B99-1/16	69014191657
	SD150-R100B99-1/16	69014191656
	SD220-R100B99-1/16	69014191654
	SD320-R100B99-1/16	69014192814
	SD100S-R100B99-1/8	69014192427
	SD120-R100B99-1/8	69014191649
	SD150-R100B99-1/8	69014191648
	SD180-R100B99-1/8	69014191647
	SD220-R100B99-1/8	69014191646
5 x 1-3/4 x 1-1/4 Insert Length 7/16" (ME98298)	ASD100S-R75B99-1/16	69014191645
	ASD120-R75B99-1/16	69014191644
	ASD150-R75B99-1/16	69014191643
	ASD100S-R75B99-1/8	69014191637
	ASD120-R75B99-1/8	69014191636
	ASD150-R75B99-1/8	69014191635
	ASD180-R75B99-1/8	69014191634
	SD120-R100B99-1/16	69014191641
	SD150-R100B99-1/16	69014191640
	SD220-R100B99-1/16	69014191638
	SD150-R100B99-1/8	69014191632
	SD180-R100B99-1/8	69014191631

Standard Package = 1 Wheel

NORTON DIAMOND / CBN STOCK WHEELS

NORTON AZTEC CBN WHEELS

BEST CHOICE FOR DRY TOOL RESHARPENING

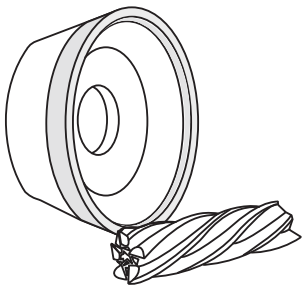
FEATURES	BENEFITS
• Consistent, high quality cBN (cubic Boron Nitride) abrasive	• 85% longer life than standard cBN wheels
• Advanced heat-reducing bond conducts heat away from the workpiece	• Eliminates heat build-up and damage • Extends wheel life • Freer cutting action • Maintains cutting tool steel integrity • Extends cutting tool life
AZTEC III	
• Lubricating bond	• Eliminates steel and braze loading • Reduces drag • Allows greater infeeds
AZTEC .007	
• Allows increased infeed (start at .007)	• High stock removal rate • Heaviest cuts with less wheel wear • Lower grinding forces • Elimination of chatter

SIZE (D x T x H)	SPECIFICATION	PART #
Type 11V9 Flaring Cup – cBN		
3-3/4 x 1-1/2 x 1-1/4 Insert Length 3/8" (ME92192)	AZTEC .007-100-1/16	69014195683
	AZTEC .007-150-1/16	69014195679
	AZTEC III 100T-1/16	69014191832
	AZTEC III 120T-1/16	69014191833
	AZTEC III 150T-1/16	69014191834
	AZTEC .007-150-1/8	69014195680
	AZTEC III 100T-1/8	69014191838
	AZTEC III 120T-1/8	69014191839
	AZTEC III 150T-1/8	69014191840
5 x 1-3/4 x 1-1/4 Insert Length 7/16" (ME98298)	AZTEC .007-100-1/16	69014195685
	AZTEC III 100T-1/16	69014191841
	AZTEC III 120T-1/16	69014191842
	AZTEC III 150T-1/16	69014191843
	AZTEC .007-100-1/8	69014195686
	AZTEC .007-150-1/8	69014195682
	AZTEC III 100T-1/8	69014191844

Standard Package = 1 Wheel

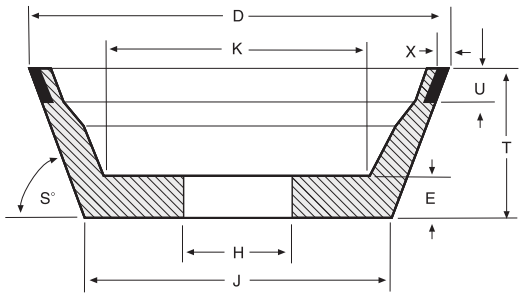
SIZE (D x T x H)	SPECIFICATION	PART #
Type 11V9 Flaring Cup – cBN		
3-3/4 x 1-1/2 x 1-1/4 Insert Length 3/8" (ME92192)	CB100-TB99-1/16	69014191719
	CB100-TB99-1/8	69014191722
	CB120-TB99-1/8	69014191723
	CB150-TB99-1/8	69014191724
	CB120-WB99-1/16	69014191720
5 x 1-3/4 x 1-1/4 Insert Length 7/16" (ME98298)	CB120-TB99-1/8	69014191715
	CB150-TB99-1/8	69014191716

Standard Package – 1 Wheel



Type 11V9

D - Diameter
K - Inside Diameter of Flat
H - Hole
E - Back Thickness
T - Thickness
J - Hub Diameter
U - Insert Length
X - Abrasive Depth
S - Face Angle



Refer to “Brake Controlled Truing Devices” and “Dressing Sticks” sections for truing and dressing products.

NEW! See page 305 for Norton Thriftline stock wheels, engineered at low initial cost, for small volume operations.

NORTON DIAMOND / CBN STOCK WHEELS

SIZE (D x T x H)	SPECIFICATION	PART #
Type 12A2 Dish – Diamond		
4 x 1/2 x 1-1/4 Rim Width 1/4" (ME40745)	SD180-R75B99-1/8	69014192223
6 x 1 x 1-1/4	ASD120-R75B99-1/8	69014191630
Rim Width 3/16" (ME27758)	ASD180-R75B99-1/8	69014192226
Type 12A2 Dish – cBN		
6 x 1 x 1-1/4 Rim Width 3/16" (ME27758)	CB120-TB99-1/16	69014192227
Type 12V9 Dish – Diamond		
3 x 7/16 x 3/4 Insert Length 7/16" (ME41755)	SD150-R100B99-1/16	69014192228
4 x 1/2 x 1-1/4 Insert Length 1/4" (ME58734)	SD180-R100B99-1/8	69014191629
6 x 3/4 x 1-1/4 Insert Length 3/8" (ME48666)	ASD150-R75B99-1/16	69014191628
Type 12V9 Dish – cBN		
4 x 1/2 x 1-1/4 Insert Length 1/4" (ME58734)	CB120-TB99-1/8	69014192229
6 x 3/4 x 1-1/4 Insert Length 3/8" (ME48666)	CB120-TB99-1/8 CB150-TB99-1/8	69014192020 69014192784
Type 15V9 Dish – Diamond		
6 x 3/4 x 1-1/4 Insert Length 3/8"	SD150-R100B99-1/16	69014192230

Standard Package = 1 wheel

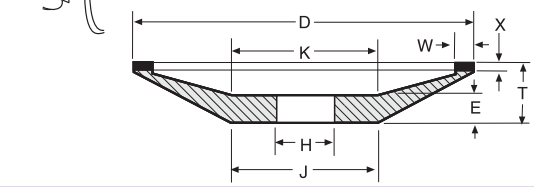
Norton offers a comprehensive stock product selection to service most of your needs – with the fastest delivery and lowest total cost.

Review this stock section first. If you can not find the specification you need:

- Then refer to the brief descriptions of our B99 Express and CNC lines (following this section)
- See the more in-depth B99 Express product availability in our "Diamond and cBN Superabrasives Standard Catalog" #8068 on www.nortonabrasives.com or contact your Norton representative for a complete listing of Norton made-to-order superabrasive products.

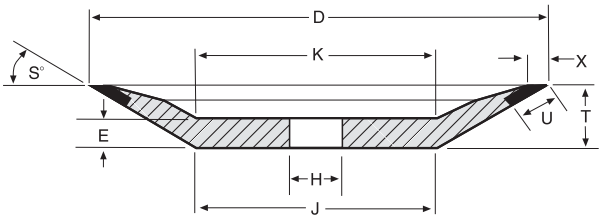
Type 12A2

D - Diameter
K - Inside Diameter
H - Hole
E - Back Thickness
J - Hub Diameter
T - Thickness
W - Rim Width
X - Abrasive Depth



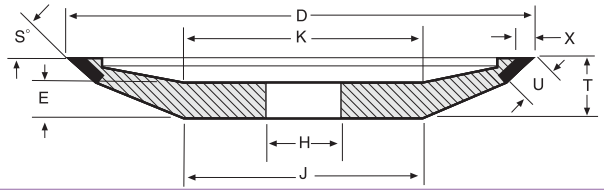
Type 12V9

D - Diameter
K - Inside Diameter
H - Hole
E - Back Thickness
J - Hub Diameter
S - Face Angle
T - Thickness
U - Insert Length
X - Abrasive Depth



Type 15V9

D - Diameter
K - Inside Diameter of Flat
H - Hole
E - Back Thickness
J - Hub Diameter
S - Face Angle
T - Thickness
U - Insert Length
X - Abrasive Depth



Norton B99 Express Service

The Norton B99 Express service is designed to offer you up to 65,000 made-to-order choices of resin bond Diamond and cBN wheels. Almost all popular sizes are offered.

12" and less diameter B99 Express wheels will ship in two weeks or less from the date the order is received by Norton. 14" and larger wheels are available at standard lead-times.

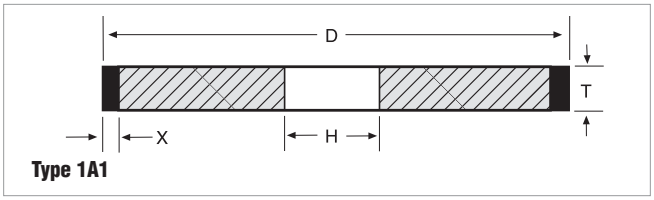
See the more in-depth B99 Express product availability in our "Diamond and cBN Superabrasives Standard Catalog" #8068 on www.nortonabrasives.com or contact your Norton representative for a complete listing of Norton made-to-order superabrasive products.

NORTON DIAMOND / CBN STOCK WHEELS

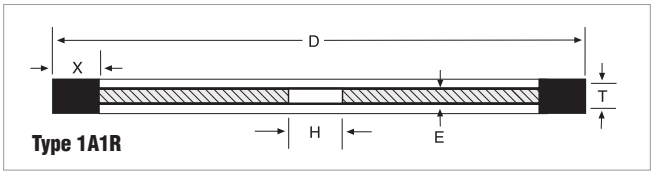
NEW! NORTON THRIFTLINE STOCK DIAMOND AND CBN WHEELS

FEATURES & BENEFITS

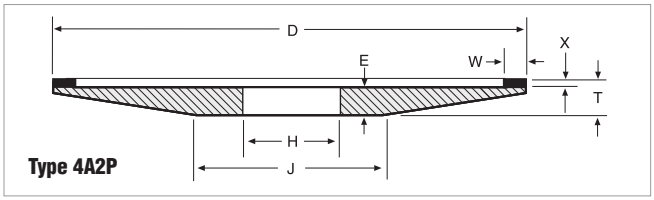
- Produced in large volume to lower cost and maintain consistency; ideal for low-volume applications where low initial price is a primary purchasing consideration
- Lower diamond concentrations make these wheels easy to use
- Ideal for economical and efficient grinding, while keeping wheel investment to a minimum
- Available from stock in three grit sizes: 100 &120 for roughing, and 220 for finishing



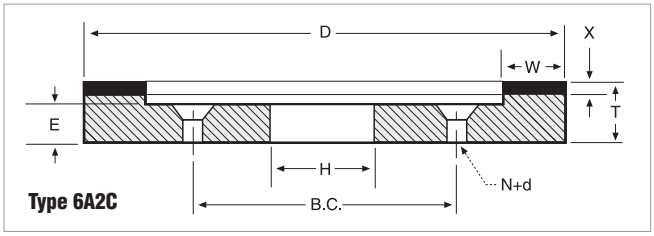
Type 1A1



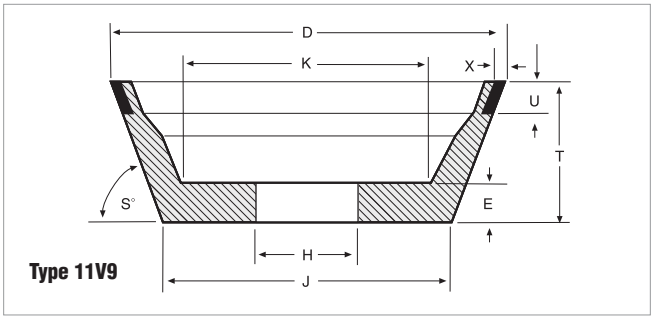
Type 1A1R



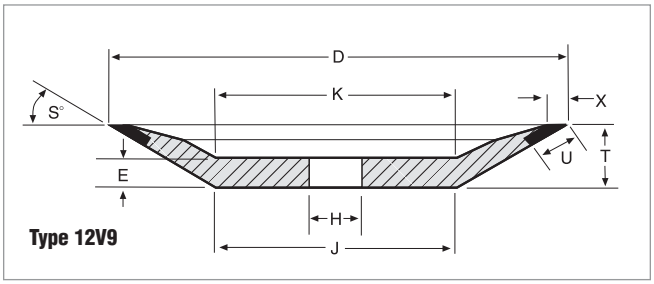
Type 4A2P



Type 6A2C



Type 11V9



Type 12V9

SIZE (D x T x H)	SPECIFICATION	PART #
Type 1A1 Straight – Diamond		
6 x 1/4 x 1-1/4	D100-75B-1/4	66260164227
6 x 1/4 x 1-1/4	D100-100B-1/4	66260164228
6 x 1/4 x 1-1/4	D220-75B-1/4	66260164229
6 x 1/4 x 1-1/4	D220-100B-1/4	66260164230
6 x 1/2 x 1-1/4	D100-75B-1/4	66260164218
6 x 1/2 x 1-1/4	D100-100B-1/4	66260164220
6 x 1/2 x 1-1/4	D220-75B-1/4	66260164221
6 x 1/2 x 1-1/4	D220-100B-1/4	66260164225
Type 1A1R Cut-off – Diamond		
6 x 0.035 x 1-1/4 (ME43572)	D100 100B 1/4	66260164213
Type 4A2P Dish Saw Sharpening – Diamond		
6 x 3/8 x 1-1/4 (ME88369) Insert Width 1/4"	D150-100B-1/16	66260164209
6 x 7/16 x 1-1/4 (ME88369) Insert Width 1/4"	D200-100B-1/8	66260164212
Type 6A2C Straight Cup with Holes – Diamond		
6 x 3/4 x 1-1/4 (ME27853) Insert Width 3/4"	D120-75B-1/4	66260164231
6 x 3/4 x 1-1/4 (ME27853) Insert Width 3/4"	D220-75B-1/4	66260164232
Type 11V9 Flaring Cup – Diamond		
3-3/4 x 1-1/2 x 1-1/4 (ME92192) Insert Length 3/8"	D120-75B-1/8	66260164098
	D120-100B-1/8	66260164097
	D220-75B-1/8	66260163896
	D220-100B-1/8	66260163895
5 x 1-3/4 x 1-1/4 (ME98298) Insert Length 7/16"	D120-75B-1/8	66260164126
	D120-100B-1/8	66260164128
	D220-75B-1/8	66260164129
	D220-100B-1/8	66260164130
Type 11V9 Flaring Cup – cBN		
3-3/4 x 1-1/2 x 1-1/4 (ME92192) Insert Length 3/8"	B120-75B-1/8	66260164148
	B120-100B-1/8	66260164146
	B220-75B-1/8	66260164154
	B220-100B-1/8	66260164151
5 x 1-3/4 x 1-1/4 (ME98298) Insert Length 7/16"	B120-75B-1/8	66260164179
	B120-100B-1/8	66260164180
	B220-75B-1/8	66260164181
	B220-100B-1/8	66260164182
Type 12V9 Dish – Diamond		
6 x 3/4 x 1-1/4 (ME48666) Insert Length 1/4" Insert Angle 30°	D220-100-1/8	66260164189

Standard Package = 1 wheel

Blueprint Dimension Key

Common:

D - Diameter
T - Thickness
H - Hole
X - Abrasive Depth

BC - Bolt Circle Diameter
d - Diameter of Mounting holes
E - Back Thickness
J - Hub Diameter
K - Inside Diameter
N - Number of Mounting Holes
S - Face Angle
U - Insert Length
W - Rim Width

NORTON B99 EXPRESS WHEELS

65,000+ made-to-order resin products; 25 wheel shapes, with one- and two-week lead-times for 12" and less diameter wheels. 14" and larger wheels and 80 grit and coarser wheels are available with standard made-to-order lead-times. If you do not find the resin specification and/or shape you need in our stock offering, you will most likely find it in our B99 Express made-to-order offering.

Applications:

Norton B99E Diamond Wheels

- Sharpening cemented carbide cutting tools
- Cutting-off carbide rod
- Grinding or cutting-off non-metallic materials such as ceramics or glass
- Surface grinding dies
- O.D. grinding spray coatings

Norton B99E cBN Wheels

- Sharpening high-speed (M2, D2, T15, etc.) steel cutting tools
- Surface and ID grinding hardened steel die components
- Precision grinding steel parts Rc 50 or harder

B99 EXPRESS MADE-TO-ORDER DIAMOND AND CBN RESIN BOND WHEELS

FEATURES	BENEFITS
• Superior diamond and cBN abrasives in durable resin bond systems	• These quality wheels will get your job done
• Thousands of abrasive, grit, grade, concentration, and bond combinations	• There is a B99 Express wheel for almost every resin bond application
• Made in our state-of the art, USA, ISO-certified facilities	• Exceptional quality and performance
• Priced as stock products	• Excellent performance/price ratio
• Two-week (and less) lead-times	• Minimal time from order to production floor

HOW TO SELECT B99 EXPRESS MADE-TO-ORDER DIAMOND WHEELS

Select			
WHEEL SHAPE			Select desired wheel shape
WHEEL DIMENSIONS	D x T x H	Select Diameter x Thickness x Hole from the availability tables. Use blueprint numbers where available.	
ABRASIVE	ASD	Armored diamond; most durable. Versatile: can be used wet or dry. ASD should be used when carbide and steel are ground in the same operation.	Select the abrasive based on horsepower, grinding wet or dry, and contact with steel.
	SD	Free cutting standard. Can be used wet or dry; should be used on low horsepower (3/4 hp or less) machines.	
GRIT SIZE	80	Roughing	Select the grit size based on finish and material removal rate required. Note: Standard made-to-order lead-times apply to 80 grit and coarser wheels.
	100	Roughing. The most common grit size for roughing operations.	
	120	For roughing where 100 is too coarse. Also for cut-off applications.	
	150	Medium stock removal plus good finish. For combined roughing and finishing applications.	
	180	Medium stock removal plus good finish. To improve finish.	
	220	Finishing	
	320	Finishing	
	400	Fine finishing	
GRADE	R	Resin bond standard	The hardness of the wheel
CONCENTRATION	50	Shape 2A2T only. For broad area of contact grinding.	Select the concentration based on grinding wet or dry, material removal rates, and form holding requirements.
	75	Norton standard. Freer cutting than 100 grit and the most economical for dry grinding with ASD diamond.	
	100	Very durable. Recommended under flood coolant conditions. For use with 220 grit or finer, when durability is required. Also for cut-off applications.	
	125	Improved form holding. Used with B99EF bond only for form holding in high-volume, high-pressure coolant applications. Used with ASD abrasive.	
BOND	B99E	Norton standard pre-engineered resin bond. Versatile enough to be used wet or dry on most tool making or resharpening applications as well as for grinding non-metallic materials such as ceramics or glass. Available in all shapes.	Select the bond based on the material being ground and grinding application.
	B99EF	Improved form holding. More durable than B99E. Improved heat dissipation in wet or dry applications. Available in wheel shapes 1V1, 1B1, 1E1, 1EE1, 1F1 and 1FF1.	
ABRASIVE DEPTH	1/16		Usable abrasive
	1/8		
	1/4		
	1/2		

HOW TO SELECT B99 EXPRESS MADE-TO-ORDER CBN WHEELS

Select			
WHEEL SHAPE			Select desired wheel shape
WHEEL DIMENSIONS	D x T x H	Select Diameter x Thickness x Hole from the availability tables. Use blueprint numbers where available.	Note: Standard made-to-order lead-times apply to 14" and larger wheels.
ABRASIVE	CB	Norton standard coated cBN (cubic Boron Nitride). Optimized for high performance in resin bond systems.	Select Norton cBN abrasive to grind hard tool steels such as A2, D2, T15, etc., and tough alloy steels.
GRIT SIZE	100	Roughing. The most common grit size for roughing operations.	Select the grit size based on finish and material removal rate required. Note: Standard made-to-order lead-times apply to 80 grit and coarser wheels.
	120	For roughing where 100 is too coarse. Also for cut-off applications.	
	150	Medium stock removal plus good finish. For combined roughing and finishing applications.	
	180	Medium stock removal plus good finish. To improve finish.	
	220	Finishing	
	320	Finishing	
	400	Fine finishing	
GRADE	T	Norton standard. Approximately 75 concentration, T is the first choice for lower horsepower equipment or wide area of contact between the wheel and the workpiece. Ideal for resharpening applications with 11V9, 12A2, 4A2P, and 15V9 wheel shapes when dry grinding.	The hardness of the wheel
	W	Very durable. Approximately 100 concentration, W is recommended for high volume coolant operations: flute grinding from solid, flute polishing, surface, and cylindrical grinding.	
	Z	Form holding. Approximately 125 concentration, Z grade is extremely durable and is recommended where long life or form holding is required in high-volume, high-pressure coolant applications. Used with B99EF bond only.	
BOND	B99E	Norton standard resin bond. Pre-engineered for optimal performance with cBN abrasive. Available in all shapes.	Select the bond depending on the type of grinding application.
	B99EF	Improved form holding. More durable than B99E. Improved heat dissipation in wet or dry applications. Available in wheel shapes 1V1, 1B1, 1E1, 1EE1, 1F1 and 1FF1.	
ABRASIVE DEPTH	1/16		Usable abrasive
	1/8		
	1/4		
	1/2		

See the more in-depth B99 Express product availability in our "Diamond and cBN Superabrasives Standard Catalog" #8068 on www.nortonabrasives.com or contact your Norton representative for a complete listing of Norton made-to-order superabrasive products.

TECH TIP

Diamond Grinds:

In general, diamond is used to grind non-ferrous materials, because of an adverse reaction between diamond and iron.

- Cemented carbide
- Glass
- Ceramics
- Fiberglass
- Plastics
- Stone
- Abrasives
- Electronic components and materials

cBN Grinds:

cBN is used to grind ferrous materials.

- High-speed tool steels
- Die steels
- Hardened carbon steels
- Alloy steels
- Aerospace alloys
- Hardened stainless steel
- Abrasion-resistant ferrous materials


It is the user's responsibility to refer to and comply with ANSI B7.1

CNC DIAMOND / CBN WHEELS

These superior, pre-engineered wheels have been specifically developed to meet the demanding needs of precision cutting tool manufactures as well as re-sharpeners. The use of the highest quality diamond and cBN abrasives matched to superior high temperature bond systems, guarantees high performing wheels. These wheels are manufactured under the strictest quality control protocols ensuring the same, consistent, high-performing product. Cutting tool manufactures who use these wheels report much improved dimensional accuracy and superior cutting edges.

This product offering provides wheel sizes for most CNC machines and wheels shapes to produce the required cutting tool geometries. If you do not find a wheel in this offering to suit your specific needs, a custom-made wheel can be provided.

Applications: CNC cutting tool manufacturing and resharpening: fluting, end fluting, gashing, and OD relief

NORTON PARADIGM DIAMOND WHEELS

FOR CNC WC ROUND TOOL MANUFACTURING

NORTON G-FORCE CBN WHEELS

FOR CNC HSS ROUND TOOL MANUFACTURING

FEATURES & BENEFITS

- Truable: online and offline truable, lights-out mfg. for maximum productivity
- Wear and load resistant: better control over core growth, and superior grinding on 6% to 12% cobalt
- High grain retention; uniform structure and high G-ratio; up to 2.5 times longer life and 30% higher MRR than existing superabrasive wheels
- Low specific cutting energy for faster grinding with lower power draw and less burn

NORTON G-FORCE AND UNIVEL POLYIMIDE DIAMOND WHEELS

BETTER CHOICE FOR CNC WC ROUND TOOL MANUFACTURING

FEATURES & BENEFITS

UNIVEL AND G-FORCE PREMIUM PRODUCTS

- Polyimide bond systems provide superior form-holding and lower-power requirements compared to premium competitive wheels, reducing frequency of dresses, and decreasing chances of burn and heat damage to the part

G-FORCE

- Unique bond technology excels on round, carbide and steel tools; abrasive is strongly held – and wear-resistant
- Self-dressing; maintains a consistently sharp grinding edge which allows for lights-out manufacturing
- Excellent depth of cut, traverse rates, and form holding; reduces total grinding costs by 30% or more

WINTER AND NORTON CNC WHEELS

GOOD CHOICE FOR SHORT RUNS AND FREQUENT GEOMETRY CHANGES

FEATURES & BENEFITS

NORTON/WINTER

- A price competitive alternative to Paradigm, Univel, and G-Force wheels; ideal for short-run manufacturing jobs where frequent wheel profile changes are required, and premium wheels can not be cost-justified
- Can be reshaped for numerous short runs; great performance/price ratio

NORTON

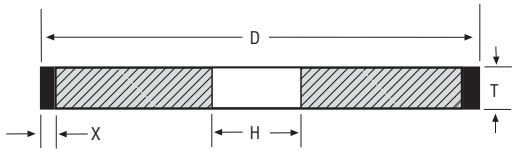
- Ideal for resharpening and short-run manufacturing operations; competitively-priced while providing premium performance
- Free cutting phenolic specifications formulated for oil coolants grind with less heat and pressure – eliminating burning
- Consistent wheel-to-wheel performance for reduced cycle times, less dressing = longer wheel life
- Precision tolerances; repeatable part geometry

Diamond CNC Wheels

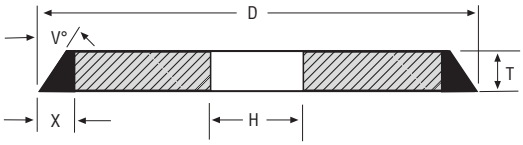
TIER:	**BEST**				**BETTER**			**GOOD**		
TRADENAME:	**NORTON PARADIGM**				**NORTON G-FORCE/UNIVEL**			**WINTER AND NORTON**		
SIZE (D x T x H) U, W	**ANGLE V**	**SPECIFICATION**	**ABR. DEPTH X**	**PART #**	**SPECIFICATION**	**ABR. DEPTH X**	**PART #**	**SPECIFICATION**	**ABR. DEPTH X**	**PART #**
TYPE 1A1 – Diamond Flute										
4 x 1/2 x 1-1/4		SD320-D168-P100C	3/8	07958783055*	AD320-UP061 G-Force	1/4	60157663909	A4D180-R115B610	1/4	69014118200
								D220-C100-K+925	6mm	60157623605
5 x 3/8 x 1-1/4		SD320-D168-P100C	1/2	07958783058*	AD320-UP061 G-Force	1/2	60157668409	A4D220-R115B610	1/2	69014118255
								D220-C100-K+925	6mm	60157625123*
5 x 1/2 x 1-1/4		SD320-C176-P100C	1/2	07958783061	AD320-UP061 G-Force	1/2	60157662240	A4D180-R115B610	1/2	69014118202
								D220-C100-K+925	6mm	60157613099
5 x 5/8 x 1-1/4		SD320-C176-P100C	1/2	07958783063*	AD320-UP061 G-Force	1/2	60157663486*	A4D180-R115B610	1/2	69014118203*
6 x 1/2 x 1-1/4		SD320-C176-P100C	1/2	07958783064	AD320-UP061 G-Force	1/4	60157682133*	A4D180-R115B610	1/4	69014118216*
								D280-N100K+1421	6mm	60157624551*
TYPE 1A1 – Diamond Polish										
5 x 1/2 x 1-1/4					80D1000-100UP731 Univel	1/2	07958784316*			
TYPE 1A1 – Diamond Relief										
6 x 1/2 x 1-1/4		SD320-E168-P100C	1/2	07958783073*	AD320-UP892 G-Force	1/2	69014117684*	A4D180-R115B610	1/2	69014118217*
								D280-N100-K+1421	6mm	60157624551
TYPE 1A1RN – Diamond Flute										
5 x 3/8 x 1-1/4		SD320-D168-P100C	1/2	07958783067*	AD320-UP061 G-Force	1/2	60157663501	A4D180-R115B610	1/2	69014118201
								D220-C100-K+925	6mm	60157625123
5 x 1/2 x 1-1/4					AD220-UP061 G-Force	1/2	66260322280			
5 x 5/8 x 1-1/4					AD220-UP061 G-Force	1/2	60157664141			
TYPE 1B1 – Diamond Flute										
4 x 3/8 x 1-1/4	V=20°	SD320-D168-P100C	3/8	07958783054						
TYPE 1B1 – Diamond Flute/Gash										
5 x 3/8 x 1-1/4	V=45°	SD320-E168-P100C	1/2	07958783065						
TYPE 1B1 – Diamond Gash										
5 x 1/2 x 1-1/4	V= 45°	SD320-E168-P100C	1/4	07958783062*						
5 x 1/2 x 1-1/4	V=60°	SD320-E168-P100C	1/4	07958783060*						
5 x 1/2 x 1-1/4	V=30°	SD320-E168-P100C	3/4	07958783070*				A4D320-R115B610	3/4	69014118207
								D220-C100-K+925	6mm	60157613112
5 x 1/2 x 1-1/4	V=45°	SD320-E168-P100C	3/4	07958783068*	AD320-UP531 G-Force	3/4	66260329603	A4D320-R115B610	3/4	69014118208
								D220-C100-K+925	6mm	60157623673
TYPE 1V1 – Diamond Flute										
4 x 3/8 x 1-1/4	V=20°				AD320-UP061 G-Force	1/4	66260316591	A4D180-R115B610	1/4	69014118263
5 x 1/2 x 1-1/4	V=10°	SD320-C176-P100C	1/2	07958783071*	AD320-UP061 G-Force	1/2	66260116723	A4D180-R115B610	1/2	69014118204
5 x 1/2 x 1-1/4	V=20°	SD320-C176-P100C	1/2	07958783074	AD320-UP061 G-Force	1/2	60157693843	A4D180-R115B610	1/2	69014118205
								D220-C100-K+925	6mm	60157623953
5 x 1/2 x 1-1/4	V=30°	SD320-C176-P100C	1/2	07958783085*	AD320-UP671 G-Force	1/2	60157693841	A4D180-R115B610	1/2	69014118206

** Non-Stock: Please contact your Norton representative for current lead-times.*
All holes (bores) are machined to (H7) class fit.

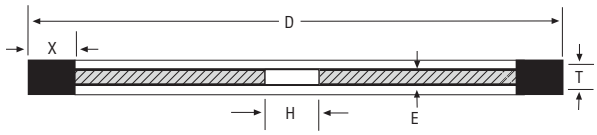
Type 1A1



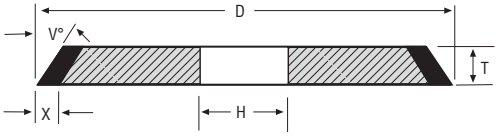
Type 1B1



Type 1A1R



Type 1V1

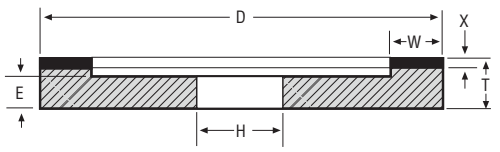


Diamond CNC Wheels

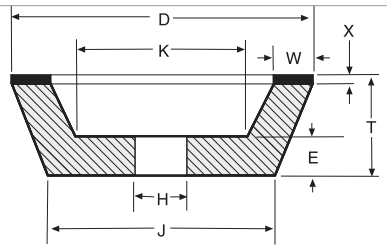
	TIER:	BEST			BETTER			GOOD		
	TRADENAME:	NORTON PARADIGM			NORTON G-FORCE/UNIVEL			WINTER AND NORTON		
SIZE (D x T x H) U, W	ANGLE V	SPECIFICATION	ABR. DEPTH X	PART #	SPECIFICATION	ABR. DEPTH X	PART #	SPECIFICATION	ABR. DEPTH X	PART #
TYPE 1V1 – Diamond Flute/Gash										
5 x 3/8 x 1-1/4	V=45°				AD320-UP531 G-Force	1/2	60157696562	A4D320-R115B610	1/2	69014118257
TYPE 1V1 – Diamond Gash										
5 x 1/2 x 1-1/4	V= 45°				AD320-UP531 G-Force	1/4	66260329604	A4D320-R115B610	1/4	69014118209
5 x 1/2 x 1-1/4	V=60°				AD320-UR331 Univel	1/4	66260329469	A4D320-R115B610	1/4	69014118210
TYPE 6A2 – Diamond Point										
4 x 1-1/4 x 1-1/4 W=1/4		SD320-E168-P100C	1/4	07958783057*	AD320-UP251 G-Force	1/4	69014118644*	ASD320C-R100B56	1/4	69014118219*
TYPE 11A2 – Diamond Relief										
3 x 1-1/4 x 1-1/4 W=1/4					10D320-NB100U Univel	1/4	60157692199			
4 x 1-1/4 x 1-1/4 W=1/4		SD320-E168-P100C	1/4	07958783059*	AD320-UP701 G-Force	1/4	60157696315	ASDC320-R100B80	1/4	69014118213
4 x 1-1/4 x 1-1/4 W=1/4					AD320-UP561 G-Force	1/4	69014118479*	ASDC320-R100B80	1/4	69014118265*
TYPE 11V5 – Diamond Relief										
4 x 1-1/4 x 1-1/4 W=1/4	V=30°				AD320-UP561 G-Force	1/4	69014117838	ASDC320-R100B80	1/4	69014118211
4 x 1-1/4 x 1-1/4 W=3/8	V=10°				AD320-UP561 G-Force	1/4	69014117812	ASDC320-R100B80	1/4	69014118212
TYPE 11V9 – Diamond Relief										
3-3/4 x 1-1/2 x 1-1/4 U=3/8					10D240-PB125-U Univel	1/8	66260322134	ASDC320-R100B80	1/8	69014118259
5 x 1-3/4 x 1-1/4 U=5/8					10D240-PB125-U Univel	1/8	66260118300	ASDC320-R100B80	1/8	69014118215
								D280-R100-K+4821	3mm	60157612443
TYPE 12V9 – Diamond Relief										
4 x 3/4 x 1-1/4 U=3/8					AD320-UP531 G-Force	1/8	66260127950*	ASDC320-R100B80	1/8	69014118221*
								D280-R100K+4821	3mm	60157612442*
5 x 3/4 x 1-1/4 U=1/2					AD320-UP531 G-Force	1/8	66260127911*	ASDC320-R100B80	1/8	69014118222*

** Non-Stock: Please contact your Norton representative for current lead-times.*
All holes (bores) are machined to (H7) class fit.

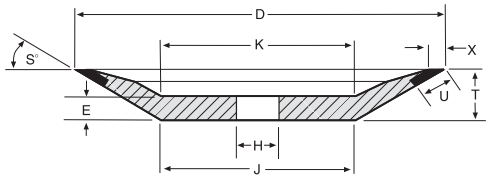
Type 6A2



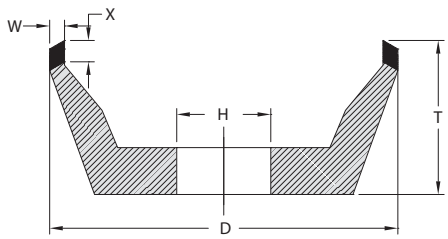
Type 11A2



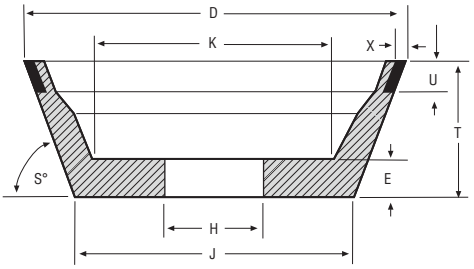
Type 12V9



Type 11V5



Type 11V9



cBN CNC Wheels

TIER:	BEST				GOOD		
TRADENAME:	NORTON G-FORCE/UNIVEL				WINTER AND NORTON		
SIZE (D x T x H) U, W	ANGLE V	SPECIFICATION	ABR. DEPTH X	PART #	SPECIFICATION	ABR. DEPTH X	PART #
TYPE 1A1 – cBN Flute							
4 x 1/2 x 1-1/4		BX220-UP241 G-Force	1/4	60157669935*	BAM180-WBXD3037	1/4	69014118223*
					B220-V240-KSS920	6mm	60157623498
5 x 3/8 x 1-1/4		BX220-UP241 G-Force	1/2	69014118436*	BAM320C-WBXD3037	1/2	69014118256*
5 x 1/2 x 1-1/4		BX220-UP241 G-Force	1/2	60157670869*	BAM180-WBXD3037	1/2	69014118224*
					B220-V240-KSS920	6mm	60157602944
5 x 5/8 x 1-1/4		BX220-UP241 G-Force	1/2	66260329385*	BAM180-WBXD3037	1/2	69014118225*
6 x 1/4 x 1-1/4		BX240-UP241 G-Force	1/4	69014118435*	BAM180-WBXD3037	1/4	69014118240*
TYPE 1A1 – cBN Relief							
6 x 1/2 x 1-1/4		BX320-UP892 G-Force	1/2	69014117679*	BAM180-WBXD3037	1/2	69014118237*
TYPE 1A1RN – cBN Flute							
5 x 1/4 x 1-1/4		BX150-UP241 G-Force	1/2	07958773216*			
5 x 3/8 x 1-1/4		BX150-UP241 G-Force	1/2	07958773217*			
5 x 1/2 x 1-1/4		BX150-UP241 G-Force	1/2	69014141373*			
TYPE 1B1 – cBN Gash							
5 x 1/2 x 1-1/4	V=30°	BX320-UP701 G-Force	3/4	66260329388*	BAM320C-WBXD3037	3/4	69014118229*
5 x 1/2 x 1-1/4	V=45°	BX320-UP531 G-Force	3/4	66260329391*	BAM320C-WBXD3037	3/4	69014118230*
					B220-V240-KSS920	6mm	60157623542
TYPE 1V1 – cBN Flute							
4 x 3/8 x 1-1/4	V=20°	BX220-UP241 G-Force	1/4	69014118342*	BAM180C-WBXD3037	1/4	69014118264*
5 x 1/2 x 1-1/4	V=20°	BX220-UP241 G-Force	1/2	60157680042*	BAM180-WBXD3037	1/2	69014118227*
					B220-V240-KSS920	6mm	60157623944*
5 x 1/2 x 1-1/4	V=30°	BX220-UP241 G-Force	1/2	60157691380*	BAM180-WBXD3037	1/2	69014118228*
5 x 1/2 x 1-1/4	V=10°	BX220-UP241 G-Force	1/2	66260119876*	BAM180-WBXD3037	1/2	69014118226*
TYPE 1V1 – cBN Flute/Gash							
5 x 3/8 x 1-1/4	V=45°	BX220-UP531 G-Force	1/2	60157697699*	BAM320C-WBXD3037	1/4	69014118262*
					B220-V240-KSS920	6mm	60157623524
TYPE 1V1 – cBN Gash							
5 x 1/2 x 1-1/4	V=60°	BX320-UR331 Univel	1/4	66260329461*	BAM320C-WBXD3037	1/4	69014118232*
5 x 1/2 x 1-1/4	V=45°	BX320-UP531 G-Force	1/4	66260329275*	BAM320C-WBXD3037	1/4	69014118231*
					B220-V240-KSS920	6mm	60157623776
TYPE 6A2 – cBN Point							
4 x 1-1/4 x 1-1/4 W=1/4		BX320-UP241 G-Force	1/4	69014118543*	CB320C-WBB	1/4	69014118239*
5 x 1-1/4 x 1-1/4 W=1/2		BX320-UP241 G-Force	1/4	69014118447*	CB320C-WBB	1/4	69014118238*

** Non-Stock: Please contact your Norton representative for current lead-times.*
All holes (bores) are machined to (H7) class fit.

TECH TIP

Diamond Grinds:

In general, diamond is used to grind non-ferrous materials, because it reacts with iron.

- Cemented carbide
- Glass
- Ceramics
- Fiberglass
- Plastics
- Stone
- Abrasives
- Electronic components and materials

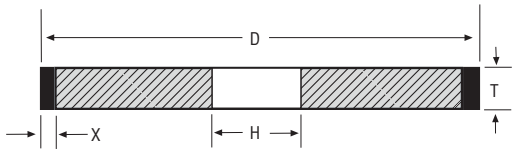
cBN Grinds:

cBN is used to grind ferrous materials.

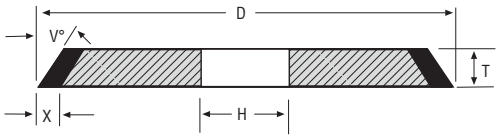
- High-speed tool steels
- Die steels
- Hardened carbon steels
- Alloy steels
- Aerospace alloys
- Hardened stainless steel
- Abrasion-resistant ferrous materials

It is the user's responsibility to refer to and comply with ANSI B7.1

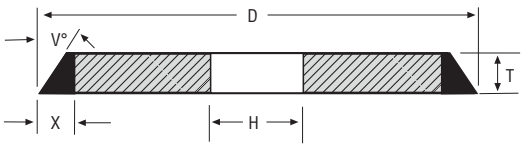
Type 1A1



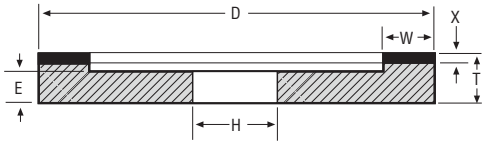
Type 1V1



Type 1B1



Type 6A2

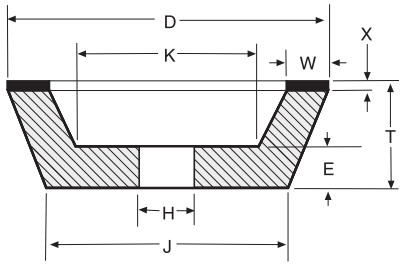


cBN CNC Wheels

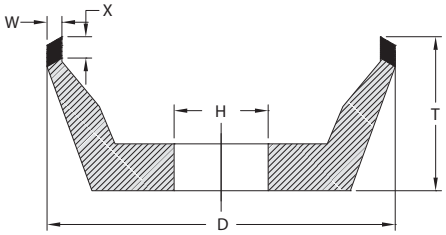
TIER:	BEST				GOOD		
TRADENAME:	NORTON G-FORCE/UNIVEL				WINTER AND NORTON		
SIZE (D x T x H) U, W ANGLE V	SPECIFICATION	ABR. DEPTH X	PART #		SPECIFICATION	ABR. DEPTH X	PART #
TYPE 11A2 – cBN Relief							
5 x 1-1/2 x 2 W=1/4	BX320-UP531 G-Force	1/4	69014118406*		BAM220-WBE	1/4	69014118254*
TYPE 11A2 – cBN Relief							
4 x 1-1/4 x 1-1/4 W=1/4	BX320-UP531 G-Force	1/4	69014118445*		BAM220-WBE	1/4	69014118266*
TYPE 11V5 – cBN Relief							
4 x 1-1/4 x 1-1/4 V=30° W=1/4	BX320-UP701 G-Force	1/4	69014117833*		BAM220-WBE	1/4	69014118233*
					B220-J240-KSS63Y	6mm	60157623563
4 x 1-1/4 x 1-1/4 V=10° W=3/8	BX320-UP701 G-Force	1/4	69014117820*		BAM220-WBE	1/4	69014118234*
TYPE 11V9 – cBN Relief							
3-3/4 x 1-1/2 x 1-1/4 U=3/8	90B240-PB125-U Univel	1/8	69014118345*		BAM220-WBE	1/8	69014118260*
TYPE 11V9 – cBN Relief							
3-3/4 x 1-1/2 x 1-1/4 U=3/8	90B240-PB125-U Univel	1/8	69014118029*		BAM220-WBE	1/8	69014118235*
5 x 1-3/4 x 2 U=3/8	90B240-PB125-U Univel	1/8	69014118043*		BAM220-WBE	1/8	69014118248*
TYPE 12V9 – cBN Relief							
4 x 3/4 x 1-1/4 U=3/8	BX320-UP531 G-Force	1/8	69014118470*		BAM220-WBE	1/8	69014118241*
5 x 3/4 x 1-1/4 U=1/2	BX320-UP531 G-Force	1/8	69014118441*		BAM220-WBE	1/8	69014118242*

** Non-Stock: Please contact your Norton representative for current lead-times.*
All holes (bores) are machined to (H7) class fit.

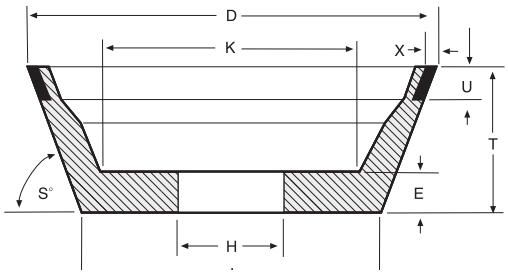
Type 11A2



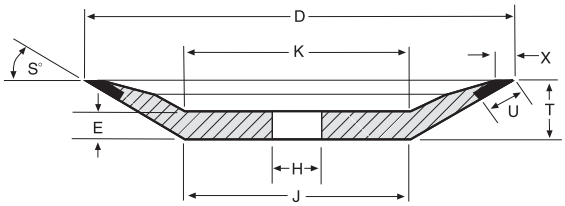
Type 11V5



Type 11V9

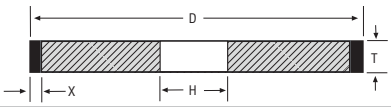
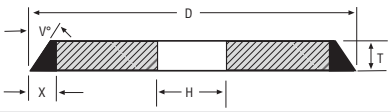
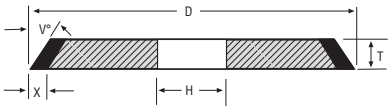
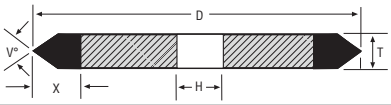
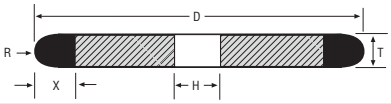
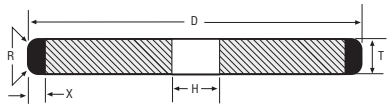
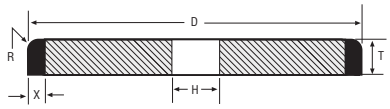


Type 12V9



Norton CNC Express Blank Stock for Made-To-Order Wheels

Blank Stock Inventory to be altered to your specifications within 5-10 days

Wheel Shape	Tool Material	Application	G-Force Specification AD = Diamond BX = cBN	Diameter D	THK. T	Hole H	Abr. Depth X	Angle (V) or Radius (R)
1A1 	WC	Fluting	AD320-UP061E	5	7/16" min. to 1/2" max.	1/2" min. to 2" max.	1/2"	–
	HSS	Fluting	BX320-UP241E	5				
	WC	Fluting	AD320-UP061E	6				
1B1 	WC	Fluting	AD320-UP061E	5				1 deg. - 30 deg.
	WC	Fluting	AD320-UP061E	6				
	HSS	Fluting	BX320-UP241E	5				
1V1 	WC	Gashing	AD320-UP531E	5				1 deg. - 55 deg.
	HSS	Gashing	BX320-UP531E	5				
1E1 	WC	Fluting	AD320-UP061E	5				90 deg. to 178 deg.
	HSS	Fluting	BX320-UP241E	5				
	WC	Fluting	AD320-UP061E	6				
1F1 	WC	Fluting	AD320-UP061E	5				T/2 or greater
	HSS	Fluting	BX320-UP241E	5				
	WC	Fluting	AD320-UP061E	6				
1L1 	WC	Fluting	AD320-UP061E	5				Less than T/2
	HSS	Fluting	BX320-UP241E	5				
	WC	Fluting	AD320-UP061E	6				
1Q1 	WC	Fluting	AD320-UP061E	5				Less than T/2
	HSS	Fluting	BX320-UP241E	5				
	WC	Fluting	AD320-UP061E	6				

Note: all of the wheel shapes listed can also be designated to have .010 relief(s) 1 side, or 2 sides on 1A1P and 1A1RN wheels.

CNC Express Wheel Service for WC and HSS Tools

- G-Force Diamond and cBN wheels altered from blank stock
- Available for a large range of special geometries
- 2-week standard lead time for first-time orders (new part numbers)
- 1-week lead-time for repeat orders (existing part numbers)

How To Request An Express Wheel Quote And Order

Refer to this chart and choose:

- Wheel shape by application
- Diameter "D"
- Thickness "T" from the range of 7/16" to 1/2"
- Hole "H" from the range of 1/2" to 2"
- Angle ("V"), Radius ("R") dimensions from the range provided
- Abrasive depth "X" will always be 1/2" for these CNC wheels
- Specifications required for material and application
- NOTE: Please remember to include the "E" at the end of the specification to indicate Express lead-time is required

Brake Controlled Truing Devices

Designed for truing diamond and cBN wheels rapidly, effectively, and with a minimum of superabrasive loss. Recommended for wheels up to 12" in diameter.

Applications: Truing straight, cup and cylinder wheels:

- Straight wheels, used on chip breaker, tool and cutter, surface, and cylindrical grinding machines
- Cup wheels, used on vertical spindle surface grinders
- Internal grinding wheels
- Cut-off wheels

Non-Stock 4597 Brake Controlled Truing Device

The 4597 is engineered for heavier and more frequent truing applications. The adjustable speeds allow for varying conditions (between 1050 and 1500 SFPM). It comes complete with a reusable case, "True to Form, Dress to Cut" training video, two 3" 38A60-M8VBE* vitrified wheels, Truing Device Tips book and a dressing stick. It can be rebuilt using the 4597RK Rebuild Kit.

Worn #4597 Brake Controlled Truing Devices (UPC 66260195350) in need of reconditioning (beyond new shoes and springs) may be returned to be rebuilt. Contact Customer Service for return instructions and quote.

Stock 3597 Pacesetter Brake Controlled Truing Device

The Pacesetter model is ideal for light-duty use. The pre-set brake speed requires no adjusting. This model includes one 3" 38A60-M8VBE* vitrified wheel and can be rebuilt using the 3597RK Rebuild Kit.

Stock 4597RK and 3597RK Rebuild Kits

The truing devices can be rebuilt with these kits, consisting of 3 brake shoes, 3 springs, and 3 screws.

TIER:	BETTER		GOOD	
ITEM	**PRODUCT NO.**	**PART #**	**PRODUCT NO.**	**PART #**
Truing Devices				
4597 Brake Controlled Truing Device	4597	66260195350*		
3597 Pacesetter Brake-Controlled Truing Device	3597	66260135578		
Truing Device Rebuild Kits				
4597 Rebuild Kit	4597RK	66260195351		
3597 Pacesetter Rebuild Kit	3597RK	66260135595		
Replacement Wheels				
3 x 1 x 1/2			38A60-MVBE	66243529145
			38A80-MVBE	66243529146
			37C60-MVK	66243529166
			37C80-HVK	66243529170
			37C80-MVK	66243529171
			37C100-HVK	66243529172
			37C100-MVK	66243529070

**Non-Stock: Please contact your Norton representative for current lead-times.*

SPEC CHECK

Truing Diamond and cBN Wheels

SUPERABRASIVE WHEEL	TRUING WHEEL SPECIFICATION
Resin and Vitrified Bond	
80, 100, and 120 grits	38A60-MVBE, 37C60-MVK
150, 180, and 220 grits	38A80-MVBE, 37C80-MVK
320 and finer grits	37C100-HVK
Metal Bond	
80, 100, and 120 grits	38A60-MVBE
150, 180, and 220 grits	38A80-MVBE
240 and finer grits	37C80-HVK

TECH TIP

- Prior to truing the wheel, run a wax crayon over the wheel face. Important: do NOT use any liquid-based ink on superabrasive wheels.
- Any crayon left on the wheel face after truing will reveal untrued areas.
- Indicate the superabrasive wheel runout before starting... usually within .001" to .002", to minimize wheel loss.
- Mount the device spindle parallel to the wheel spindle to ensure proper straight face truing.
- For cup-shaped wheels, the device spindle will be mounted perpendicular to the wheel spindle.
- Always use the brake-controlled truing device dry.
- Bring the diamond/cBN wheel and the truing wheel together until they almost touch.
- Start the diamond/cBN wheel to normal speed; spin the truing wheel in the same direction at point of contact.
- Bring the two wheels together until they touch.
- Make sure the truing wheel is spinning at time of contact.
- Traverse the wheel back and forth at 30 to 60 inches/minute.
- Downfeed .0005" to .001" at the end of each traverse.
- At the end of truing, the diamond/cBN wheel should be smooth and in truth.
- Apply a dressing stick to sharpen the wheel.

⚠ It is the user's responsibility to refer to and comply with ANSI B7.1

Diamond and cBN Wheel Mounting, Truing and Dressing Guide

To achieve the best results using Norton diamond and cBN products, the following steps for mounting, truing and dressing should be practiced:

MOUNTING – Putting Wheel on Machine Spindle

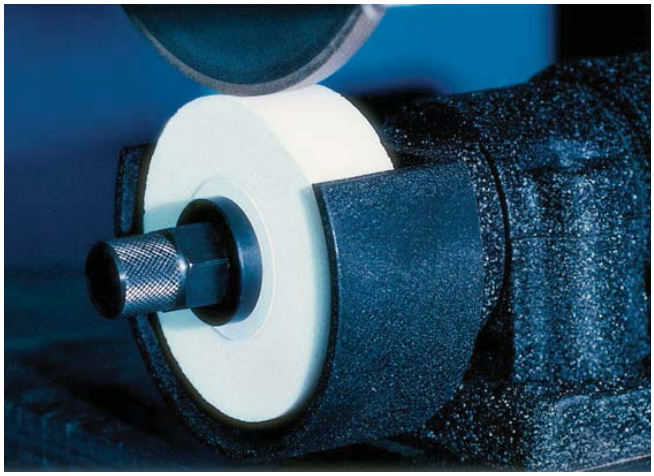
- Examine wheel flanges and spindle carefully.
- Be sure flanges' surfaces are clean and free of damage.
- Ensure that the mounting flanges are flat and of equal diameter, especially on wheels with rigid centers, such as vitrified bond wheels.
- Paper or plastic blotters should only be used when mounting superabrasive wheels with vitrified cores. Using paper or plastic blotters on any other core material might result in the wheel loosening during grinding.
- Inspect machine spindle for excessive runout.
  - » TIR (Total Indicated Runout) should be no greater than 0.0002".
- Mount wheel between hand-tightened flanges.
- Using a dial indicator, tap the wheel lightly with a rubber or wooden block to minimize runout to less than .0010".
- Tighten flange securely and recheck with indicator.
- Allow a newly mounted wheel to operate for one full minute before grinding.
- The use of one permanent mounting for the life of the wheel is recommended whenever possible:
  - » If the grinding machine has a tapered spindle, mount each straight, flaring cup or dish wheel on a separate collet or adapter.
  - » When changing wheels the entire unit is removed, keeping the wheel in running truth.
  - » When needed again, the entire unit can be placed directly on the spindle or arbor, thereby eliminating the time and abrasive lost in retruing.

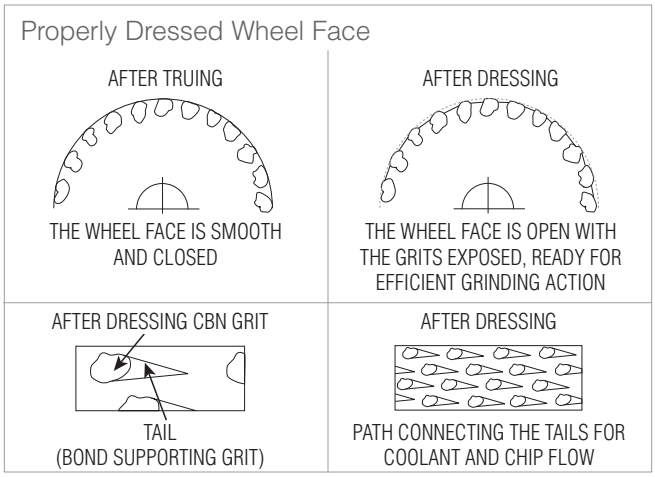
TRUING – Making Wheel Round and Concentric with the Spindle Axis

- Prior to truing the wheel, run a wax crayon over the wheel face. Important: do not use any liquid-based ink on superabrasive wheels.
- Any crayon left on the wheel face after truing will reveal untrued areas.
- Indicate the superabrasive wheel runout before starting... usually within .001" to .002", to minimize wheel loss.
- Norton brake controlled truing devices are most commonly used to true Diamond and cBN straight, cup and cylinder wheels.
  - » Mount the device spindle parallel to the wheel spindle to ensure proper straight face truing.
  - » For cup wheels, the device spindle will be mounted perpendicular to the wheel spindle.
  - » Always use brake controlled truing device dry.
  - » Bring the diamond/cBN wheel and the truing wheel together until they almost touch.
  - » Start the diamond/cBN wheel to normal speed; start the truing wheel in the same direction.
  - » Bring the two wheels together until they touch.
  - » Make sure the truing wheel is spinning at time of contact.
  - » Traverse the wheel back and forth at 30 to 60 inches per minute.
  - » Downfeed .0005" to .001" at the end of each traverse.
  - » At the end of truing, the diamond/cBN wheel should be smooth and in truth.
  - » Apply a dressing stick to sharpen the truing wheel.

DRESSING – Opening the Face of a Trued Wheel

- Dressing the abrasive – a cleaning/sharpening process to expose sharp, free-cutting grit:
  - » For resinoid and vitrified bond wheels, the dressing stick should be one or two grit sizes finer than the abrasive in the diamond/cBN wheel – in a soft grade such as H or I.
  - » For metal bond wheels, choose a stick with the same grit or one grit coarser than the wheel abrasive – in a medium grade (K – N).
  - » See the "Dressing Stick" section for recommendations.
- Dressing the core – The core material (the part of the wheel that holds and supports the abrasive-bearing section) should never contact the work piece during grinding; rubbing will generate excessive heat. As the abrasive section of a cup wheel wears, the core material might become exposed, necessitating dressing.
  - » Use a single-point carbide or steel tool to dress an exposed resaloy core.
  - » Clamp the tool in a vise.
  - » Direct the cutting edge accurately to leave a 1/16" of abrasive section exposed.





DRESSING STICKS

Regular use of properly selected dressing sticks will help you achieve maximum performance from your grinding wheels.

Applications:	Truing, cleaning, and dressing diamond, cBN, and conventional abrasive grinding wheels
Grit range:	16 – 1200
Abrasive grain:	Aluminum Oxide, Boron Nitride, Silicon Carbide
Shape:	Square, rectangular, and round
Machine Used:	

GRINDING WHEEL-TO-PRODUCT RECOMMENDATION GUIDE

Selecting the appropriate dressing stick for each application depends on the wheel size, type, speed, specification, and grit size, as well as the workpiece material. Initial starting specifications are listed below. We recommend testing several sticks to find the best one for your application.

VITRIFIED DRESSING STICKS

	Product	Specification
Superabrasive Wheels - Resin and Vitrified Bond		
- 80, 100, and 120 grits	Dressing Stick	38A150-HVBE
- 150, 180, and 220 grits	Dressing Stick	38A220-HVBE
- 320 and finer grits	Superfine Stick	NMVC400-J5VCA
Superabrasive Wheels - Metal Bond		
- 80, 100, and 120 grits	Dressing Stick	37C80-NV
- 150, 180, and 220 grits	Dressing Stick	37C150-KV
- 240 and finer grits	Dressing Stick	37C220-KV
Conventional Vitrified Wheels - Vitrified Bond		
- 46 grit and finer and M grade and softer	High Performance Dressing Stick	Norbide
	Conventional Dressing Stick	37C24-SVK

Norbide High Performance Sticks

For offhand truing and dressing of medium grit, soft- and medium-grade vitrified grinding wheels. Norton Norbide sticks are the hardest sticks you can buy. Made from boron nitride, they are well suited for dressing tool and cutter wheels 10" and smaller, especially cup and saucer shapes.

TIER: **BETTER**
BRAND: Norton

SIZE (T x W x L*)	STD. PKG.	SPEC.	PART #
High Performance Long Life Stick			
1/4 x 1/2 x 3	5	Norbide	61463610148

** Thickness x Width x Length*

TECH TIP

Dressing Diamond and cBN Wheels

- Resin and Vitrified Bond Diamond, and cBN Wheels
  - » Choose a dressing stick one or two grit sizes finer than the abrasive in the wheel – in a soft grade (H or I).
- Metal Bond Diamond, and cBN Wheels
  - » Choose a stick the same grit size or one grit size coarser than the abrasive in the wheel – in a medium grade (K–M).

⚠ It is the user's responsibility to refer to and comply with ANSI B7.1

Vitrified Dressing Sticks

Aluminum Oxide (White)

For dressing and cleaning cBN wheels; these sticks also work well for diamond wheels.

Silicon Carbide (Black)

Coarse grit (16 - 46) and hard-grade (R and harder) sticks are used for dressing conventional vitrified wheels. Finer grit and softer grades are used for dressing diamond wheels.

TIER: BETTER
BRAND: Norton

SIZE (T x W x L)	STD. PKG.	SPEC.	PART #
Vitrified Dressing Sticks – Aluminum Oxide			
3/8 x 3/4 x 4	5	38A150-IVBE	61463639635
1/2 x 1/2 x 4	5	38A220-HVBE	61463610555
1/2 x 1/2 x 6	5	38A150-IVBE	61463610303
	5	38A220-HVBE	61463610103
1/2 x 3/4 x 4	5	38A60-LVBE	61463610415
1/2 x 1 x 4	5	38A180-IVBE	61463699705
3/4 x 3/4 x 4	5	38A60-LVBE	61463610440
	5	38A80-MVBE	61463610362
	5	38A90-LV	61463639632
	5	38A150-HVBE	61463610291
	5	38A150-IVBE	61463610368
	5	38A220-HVBE	61463610290
3/4 x 3/4 x 8	5	38A220-HVBE	61463610280
1 x 1 x 6	5	38A150-HVBE	61463610405
	5	38A150-IVBE	61463610453
	5	38A220-HVBE	61463610406
1 x 1 x 8	5	38A120-IVBE	61463610390
	5	38A150-IVBE	61463610455

TIER: BETTER
BRAND: Norton

SIZE (T x W x L)	STD. PKG.	SPEC.	PART #
Vitrified Dressing Sticks – Silicon Carbide			
1/2 x 1/2 x 6	5	37C24-SVK	61463610285
	5	37C100-LV	61463610201
	5	37C150-KV	61463610205
	5	37C150-LV	61463610206
	5	37C150-MV	61463610207
	5	37C220-KV	61463610214
3/4 x 3/4 x 6	5	37C150-LV	61463610375
1 x 1 x 6	5	37C20-SVK	61463610459
	5	37C24-SVK	61463610462
	5	37C24-TVK	61463610354
	5	37C46-RVK	61463610466
	5	37C80-NV	61463610393
	5	37C150-KV	61463610438
	5	37C220-KV	61463610398
1 x 1 x 8	5	37C20-SVK	61463610469
	5	37C24-SVK	61463610471
1 x 2 x 8	5	37C16-TVK	61463610482
	5	37C24-TVK	61463610485
2 x 2 x 8	5	37C24-SVK	61463610490
Vitrified Round Dressing Sticks – Silicon Carbide			
1/2 x 6	5	37C24-SVK	61463610371
1 x 6	5	S/C Ex-C (JT276)	61463687905

Vitrified Superfine Sticks

For dressing superabrasive wheels.

TIER: BETTER
BRAND: Norton

SIZE (T x W x L)	STD. PKG.	SPEC.	PART #
Vitrified Superfine Sticks – Aluminum Oxide			
1 x 1 x 6	5	PCD Coarse - 400 grit	61463647865
	5	PCD Fine - 800 grit	61463647867
1 x 1 x 8	5	NSA320-H8V	61463610597
Vitrified Superfine Sticks – Silicon Carbide			
1/2 x 1/2 x 6	5	NMVC320-J5VCA	61463610599
	5	NMVC400-J5VCA	61463650324
1 x 1 x 6	5	NMVC320-J5VCA	61463610605
	5	NMVC400-J5VCA	61463650450

Offhand Grinding Wheel Dressing Stick and Holder

This convenient metal holder is widely used by mechanics and foundry-men for truing, dressing and changing the face of the wheel. The JT246 dressing stick – an extra coarse grit silicon carbide for dressing conventional vitrified wheels – is firmly held and adjusted by the knurled control.

TIER: BETTER
BRAND: Norton

SIZE (D x L)	SPEC.	STD. PKG.	PRODUCT #	PART #
Offhand Grinding Wheel Dressing Stick and Holder				
1/2 x 6 Round	Silicon Carbide Extra Coarse Grit Round Dressing Stick	5	JT246	61463687900
10 Overall	Dressing Stick Holder	5	H6	61463687895

Rubber Finishing Sticks

These sticks are used for manual or mechanical honing on machines where they are mounted in holders or fixtures. Intended for use where precision dimensional limits and grade controls are required, such as die polishing.

TIER: **BETTER**
BRAND: Norton

SIZE (T x W x L)	MIN./STD. PKG.	SPEC.	PART #
Rubber Finishing Sticks			
1/2 x 1/2 x 6	5/20	57A120-B2RR	61463610608
1/2 x 1 x 6	5/20	57A120-B2RR	61463610609

Blank Stock FastTrack Made-to-Order Microabrasive Superfinishing Sticks

Superfinishing blank stock encompasses a wide range of different specifications. These blanks can be finished to your dimensional requirements within two weeks from the date that the order is received at Norton Customer Service. Small lots, for test purposes, can be express shipped.

APPLICATIONS	ABRASIVE TYPE – BOND	GRIT RANGE	TREATMENT TYPE
Superfinishing / Finishing and Dressing	NLA – V	240 – 1200	Sulfur, Wax
	NMVC – VCA		
	NSA – V		
Honing	SG – VS	54 – 220	
	SGG – VS1		

ELECTROPLATED PRODUCTS

Our extensive offering of stock diamond and cBN electroplated products has been engineered to meet the diverse demands of traditional and emerging tool and die, ceramic, and composite applications.

Applications:	Small hole/ID grinding, deburring, cleaning, honing, precision drilling, forming dies and molds, routing, reaming, blending radii, notching and cutting-off with saw blades in ceramic, tool and die, and composite applications
Products:	Mounted points, mandrels, drills, routers, contour tools, wheels, files, and saw blades
Abrasive Grain:	Diamond and cBN (cubic Boron Nitride)

Abrasive Applications

Although diamond and cBN (cubic Boron Nitride) are both superabrasives, the use of diamond and cBN varies, depending upon the materials to be ground.

Diamond Grinds:

- Cemented carbide
- Glass
- Ceramics
- Fiberglass
- Plastics
- Composites
- Abrasives
- Stone
- Electronic components and materials

cBN Grinds:

- High-speed tool steels
- Die steel
- Hardened carbon steels
- Hardened stainless steels
- Alloy steels
- Aerospace alloys
- Abrasion-resistant ferrous materials

In general, cBN is used to grind ferrous materials. Diamond is used to grind non-ferrous materials, because of an adverse reaction between diamond and iron.

TECH TIP

Coolants

Although coolants may not be necessary, using a coolant produces superior surface finishes, a longer tool life, higher performance, and reduces tool loading.

Feeds

Suggested feeds for jig or internal grinding are from .0002" – .0004" per pass.

Speeds

Maximum Operating Speeds (MOS)

Never exceed the maximum operating speed marked on the superabrasive product being used.

Electroplated Products: 25,000 SFPM

Maximum speeds of mounted points are a function of the length of overhang and size of the product. Refer to “Safe Operating Speeds” in form #2872, provided with your product.

Recommended Operating Speeds

The preceding speed is the maximum safe speed and not necessarily the most efficient. Superabrasive products operate most effectively at speeds lower than the maximum. The following are general recommendations. cBN products, in many cases, are used effectively at higher speeds.

Electroplated Diamond Products: 5,000 to 10,000 SFPM

Electroplated cBN Products: 8,000 to 10,000 SFPM

Calculating Operating Speed

The following formula may be used to quickly calculate wheel speed:

- RPM = Revolutions Per Minute
- SFPM = Surface Feet Per Minute

To convert SFPM to RPM: (Multiply SFPM x 3.82) divided by wheel diameter in inches

Made-to-Order Electroplated Product Guide

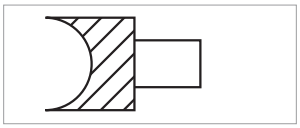
The stock electroplated products offered on the following pages have been engineered to meet the diversity of demands typical in today's manufacturing environment.

When special forms, shapes, and configurations are required, Norton electroplated diamond and cBN products can be fabricated in almost any geometry.

Customer-Supplied Preforms and Blanks

Customers may prefer to manufacture their own preforms/blanks for custom products and in many cases this can reduce cost and lead-times.

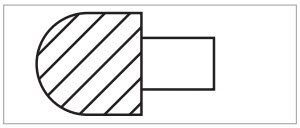
The instructions below detail the necessary allowances for each grit size. Please refer to these whenever manufacturing blanks.



Area to be plated (female radius)

Female radius must be larger than the finished size required.

Example – If a .500 female radius is required with 60/80 grit, then the blank should be manufactured .011 larger = .511



Area to be plated (male radius)

A male radius must be smaller than the finished size required.

Example – If a .500 male radius is required with 60/80 grit, then the blank should be manufactured .011 smaller = .489

Grit Size Allowance for Plated Products

ALLOWANCE/GRIT SIZE	PARTICLE SIZE
20/30	.035
30/40	.025
40/50	.018
60/80	.011
80/100	.008
100/120	.007
120/140	.006
140/170	.005
170/200	.004
200/230	.0035
270/325	.003
4.5 Micron – 400	.0025
30 Micron – 600	.0016
15 Micron – 1200	.001

This should be used as a guide when manufacturing blanks to be plated with diamond or cBN.

Surface Finish

Use this chart only as a guide. Surface finish is affected by a number of variables: machine type and condition, type of material, coolant, wheel speed, bond system, etc.

Expected RMS Finish

GRIT SIZE	ELECTROPLATED
80	90-125
100	64-90
120	48-64
150	32-48
180	24-32
220	20-24
240	16-20
320	16-20
400	14-20
500	12-13
600	12

Strip and Replate Services

Ask Customer Service for information and quotations on our complete strip and replate services on many electroplated products.

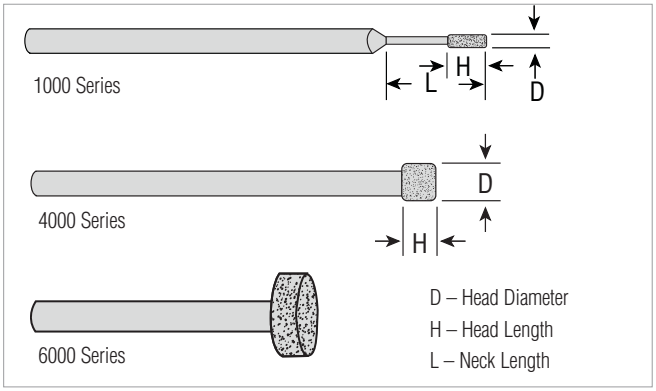
Electroplated Mounted Points

Diamond and cBN Mounted Points ● ▲

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action
• Variety of tools and grit sizes available as stock	• Satisfy most tool and die and deburring requirements
• Mandrels are made of high-speed tool steel	• Withstand operating pressure

Use Norton diamond mounted points for precise, small hole, jig and internal grinding of carbide, ceramics, sapphire, glass, and a variety of tough, super alloys.

For grinding tough, high carbon, high chrome steel, use cBN mounted points.



PART #	PRODUCT #	HEAD DIAMETER INCHES	HEAD LENGTH	NECK LENGTH	GRIT SIZE
1000 Series – Diamond					
1/8" Shank x 2-1/4" Overall Length					
66260392429	1016FD	.016	.079	1/8	200
66260392432	1020MD	.020	.079	1/8	150
66260392431	1020FD	.020	.079	1/8	200
66260392436	1025MD	.025	.079	1/8	150
66260392435	1025FD	.025	.079	1/8	200
66260392440	1030MD	.030	.079	1/4	150
66260392439	1030FD	.030	.079	1/4	200
66260392445	1035CD	.035	.118	1/4	100
66260392444	1035MD	.035	.118	1/4	150
66260392443	1035FD	.035	.118	1/4	200
66260392451	1040CD	.040	.118	1/4	100
66260392450	1040MD	.040	.118	1/4	150
66260392449	1040FD	.040	.118	1/4	200
66260392457	1045CD	.045	.118	1/4	100
66260392456	1045MD	.045	.118	1/4	150
66260392455	1045FD	.045	.118	1/4	200
66260392463	1050CD	.050	.118	1/2	100
66260392462	1050MD	.050	.118	1/2	150
66260392461	1050FD	.050	.118	1/2	200
66260392469	1050LCD	.050	.118	1	100
66260392468	1050LMD	.050	.118	1	150
66260392467	1050LFD	.050	.118	1	200
66260392475	1055CD	.055	.118	1/2	100
66260392474	1055MD	.055	.118	1/2	150
66260392473	1055FD	.055	.118	1/2	200
66260392481	1060CD	.060	.157	1/2	100
66260392480	1060MD	.060	.157	1/2	150
66260392479	1060FD	.060	.157	1/2	200
66260392487	1060LCD	.060	.157	1	100

Continued

PART #	PRODUCT #	HEAD DIAMETER INCHES	HEAD LENGTH	NECK LENGTH	GRIT SIZE
1000 Series – Diamond (continued)					
1/8" Shank x 2-1/4" Overall Length					
66260392492	1065MD	.065	.157	1/2	150
66260392491	1065FD	.065	.157	1/2	200
66260392499	1070CD	.070	.157	1/2	100
66260392498	1070MD	.070	.157	1/2	150
66260392497	1070FD	.070	.157	1/2	200
66260392511	1075CD	.075	.157	1/2	100
66260392510	1075MD	.075	.157	1/2	150
66260392509	1075FD	.075	.157	1/2	200
66260392517	1080CD	.080	.157	1/2	100
66260392516	1080MD	.080	.157	1/2	150
66260392515	1080FD	.080	.157	1/2	200
66260392523	1080LCD	.080	.157	1	100
66260392521	1080LFD	.080	.157	1	200
66260392529	1085CD	.085	.157	1/2	100
66260392528	1085MD	.085	.157	1/2	150
66260392535	1090CD	.090	.157	1/2	100
66260392534	1090MD	.090	.157	1/2	150
66260392533	1090FD	.090	.157	1/2	200
66260392541	1090LCD	.090	.157	1	100
66260392540	1090LMD	.090	.157	1	150
66260392547	1095CD	.095	.157	1/2	100
66260392546	1095MD	.095	.157	1/2	150
66260392553	1100CD	.100	.157	1/2	100
66260392552	1100MD	.100	.157	1/2	150
66260392551	1100FD	.100	.157	1/2	200
66260392565	1105CD	.105	.157	1/2	100
66260392563	1105FD	.105	.157	1/2	200
66260392577	1110CD	.110	.157	1/2	100
66260392576	1110MD	.110	.157	1/2	150
66260392583	1110LCD	.110	.157	1	100
66260392589	1115CD	.115	.157	1/2	100
66260392588	1115MD	.115	.157	1/2	150
66260392595	1120CD	.120	.157	1/2	100
66260392594	1120MD	.120	.157	1/2	150
66260392593	1120FD	.120	.157	1/2	200
66260392601	1125CD	.125	.157	1/2	100
66260392600	1125MD	.125	.157	1/2	150
66260392599	1125FD	.125	.157	1/2	200
66260392607	1130CD	.130	.197	1	100
66260392606	1130MD	.130	.197	1	150
66260392613	1135CD	.135	.236	N/A	100
66260392612	1135MD	.135	.236	N/A	150
66260392611	1135FD	.135	.236	N/A	200
66260392619	1140CD	.140	.236	N/A	100
66260392625	1156CD	.156	.236	N/A	100
66260392624	1156MD	.156	.236	N/A	150
66260392623	1156FD	.156	.236	N/A	200
66260392730	1171MD	.171	.236	N/A	150

Continued

TARGET MARKET SYMBOLS

● = Ceramics ▲ = Tool & Die ■ = Composites

Electroplated Mounted Points

Diamond and cBN Mounted Points ● ▲

PART #	PRODUCT #	HEAD DIAMETER INCHES	HEAD LENGTH	NECK LENGTH	GRIT SIZE
1000 Series – Diamond (continued)					
1/8" Shank x 2-1/4" Overall Length					
66260392730	1171MD	.171	.236	N/A	150
66260392737	1187CD	.187	.312	N/A	100
66260392735	1187FD	.187	.312	N/A	200
66260392742	1203MD	.203	.312	N/A	150
66260392741	1203FD	.203	.312	N/A	200
66260392748	1218MD	.218	.312	N/A	150
66260392747	1218FD	.218	.312	N/A	200
66260392755	1250CD	.250	.312	N/A	100
66260392754	1250MD	.250	.312	N/A	150
66260392753	1250FD	.250	.312	N/A	200
66260363450	1750MD	.750	.035	N/A	150
1000 Series – cBN					
1/8" Shank x 2-1/4" Overall Length					
66260392434	1020MC	.020	.079	1/8	150
66260392442	1030MC	.030	.079	1/4	150
66260392453	1040MC	.040	.118	1/4	150
66260392460	1045CC	.045	.118	1/4	100
66260392466	1050CC	.050	.118	1/2	100
66260392465	1050MC	.050	.118	1/2	150
66260392464	1050FC	.050	.118	1/2	200
66260392484	1060CC	.060	.157	1/2	100
66260392483	1060MC	.060	.157	1/2	150
66260392482	1060FC	.060	.157	1/2	200
66260392496	1065CC	.065	.157	1/2	100
66260392502	1070CC	.070	.157	1/2	100
66260392501	1070MC	.070	.157	1/2	150
66260392500	1070FC	.070	.157	1/2	200
66260392514	1075CC	.075	.157	1/2	100
66260392512	1075FC	.075	.157	1/2	200
66260392520	1080CC	.080	.157	1/2	100
66260392532	1085CC	.085	.157	1/2	100
66260392531	1085MC	.085	.157	1/2	150
66260392538	1090CC	.090	.157	1/2	100
66260392537	1090MC	.090	.157	1/2	150
66260392536	1090FC	.090	.157	1/2	200
66260392544	1090LCC	.090	.157	1	100
66260392543	1090LMC	.090	.157	1	150
66260392556	1100CC	.100	.157	1/2	100
66260392554	1100FC	.100	.157	1/2	200
66260392561	1100LMC	.100	.157	1	150
66260392568	1105CC	.105	.157	1/2	100
66260392567	1105MC	.105	.157	1/2	150
66260392580	1110CC	.110	.157	1/2	100
66260392578	1110FC	.110	.157	1/2	200
66260392598	1120CC	.120	.157	1/2	100
66260392604	1125CC	.125	.157	1/2	100
66260392603	1125MC	.125	.157	1/2	150
66260392602	1125FC	.125	.157	1/2	200
66260392610	1130CC	.130	.197	1	100
66260392608	1130FC	.130	.197	1	200
66260392616	1135CC	.135	.236	N/A	100
66260392615	1135MC	.135	.236	N/A	150
66260392622	1140CC	.140	.236	N/A	100
66260392628	1156CC	.156	.236	N/A	100
66260392627	1156MC	.156	.236	N/A	150
66260392626	1156FC	.156	.236	N/A	200
66260392734	1171CC	.171	.236	N/A	100
66260392733	1171MC	.171	.236	N/A	150
66260392740	1187CC	.187	.312	N/A	100
66260392739	1187MC	.187	.312	N/A	150
66260392738	1187FC	.187	.312	N/A	200
66260392745	1203MC	.203	.312	N/A	150
66260392752	1218CC	.218	.312	N/A	100
66260392751	1218MC	.218	.312	N/A	150
66260392758	1250CC	.250	.312	N/A	100
66260392757	1250MC	.250	.312	N/A	150

PART #	PRODUCT #	HEAD DIAMETER INCHES	HEAD LENGTH	NECK LENGTH	GRIT SIZE
4000 Series – Diamond					
1/4" Shank x 3" Overall Length					
66260392630	4156CD	.156	.250	1	100
66260392629	4156FD	.156	.250	1	200
66260392634	4187CD	.187	.250	1	100
66260392633	4187FD	.187	.250	1	200
66260392638	4203CD	.203	.250	1	100
66260392642	4218CD	.218	.250	1	100
66260392641	4218FD	.218	.250	1	200
66260392646	4236CD	.236	.250	1	100
66260392645	4236FD	.236	.250	1	200
66260392650	4250CD	.250	.250	1	100
66260392649	4250FD	.250	.250	1	200
66260392654	4282CD	.282	.250	N/A	100
66260392653	4282FD	.282	.250	N/A	200
66260392658	4312CD	.312	.375	N/A	100
66260392657	4312FD	.312	.375	N/A	200
66260392662	4375CD	.375	.375	N/A	100
66260392661	4375FD	.375	.375	N/A	200
66260392666	4390CD	.390	.375	N/A	100
66260392670	4406CD	.406	.375	N/A	100
66260392674	4437CD	.437	.375	N/A	100
66260392678	4500CD	.500	.375	N/A	100
66260392677	4500FD	.500	.375	N/A	200
66260392682	4730CD	.730	.375	N/A	100
66260392690	41000CD	1.000	.375	N/A	100
66260392689	41000FD	1.000	.375	N/A	200
4000 Series – cBN					
1/4" Shank x 3" Overall Length					
66260392632	4156CC	.156	.250	1	100
66260392631	4156FC	.156	.250	1	200
66260392636	4187CC	.187	.250	1	100
66260392635	4187FC	.187	.250	1	200
66260392640	4203CC	.203	.250	1	100
66260392639	4203FC	.203	.250	1	200
66260392644	4218CC	.218	.250	1	100
66260392643	4218FC	.218	.250	1	200
66260392648	4236CC	.236	.250	1	100
66260392647	4236FC	.236	.250	1	200
66260392652	4250CC	.250	.250	1	100
66260392651	4250FC	.250	.250	1	200
66260392656	4282CC	.282	.250	N/A	100
66260392655	4282FC	.282	.250	N/A	200
66260392660	4312CC	.312	.375	N/A	100
66260392659	4312FC	.312	.375	N/A	200
66260392664	4375CC	.375	.375	N/A	100
66260392663	4375FC	.375	.375	N/A	200
66260392668	4390CC	.390	.375	N/A	100
66260392672	4406CC	.406	.375	N/A	100
66260392676	4437CC	.437	.375	N/A	100
66260392675	4437FC	.437	.375	N/A	200
66260392680	4500CC	.500	.375	N/A	100
66260392679	4500FC	.500	.375	N/A	200
66260392684	4730CC	.730	.375	N/A	100
66260392683	4730FC	.730	.375	N/A	200
66260392692	41000CC	1.000	.375	N/A	100

TARGET MARKET SYMBOLS

● = Ceramics ▲ = Tool & Die ■ = Composites

Electroplated Mounted Points, Mandrels and Tapered Hones

Diamond and cBN Mounted Points ● ▲

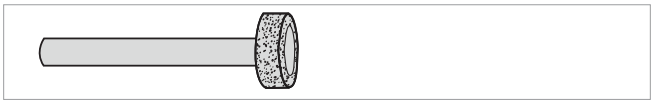
PART #	PRODUCT #	HEAD DIAMETER INCHES	HEAD LENGTH	GRIT SIZE
6000 Series – Diamond				
3/8" Shank x 3-3/4" Overall Length				
66260392694	6406CD	.406	.375	80
66260392693	6406MD	.406	.375	150
66260392698	6437CD	.437	.375	80
66260392697	6437MD	.437	.375	150
66260392702	6500CD	.500	.375	80
66260392701	6500MD	.500	.375	150
66260392706	6562CD	.562	.375	80
66260392710	6625CD	.625	.375	80
66260392709	6625MD	.625	.375	150
66260392718	6750CD	.750	.375	80
66260392717	6750MD	.750	.375	150
66260392721	6875MD	.875	.400	150
66260392726	61000CD	1.000	.500	80
66260392725	61000MD	1.000	.500	150

PART #	PRODUCT #	HEAD DIAMETER INCHES	HEAD LENGTH	GRIT SIZE
6000 Series – cBN				
3/8" Shank x 3-3/4" Overall Length				
66260392696	6406CC	.406	.375	80
66260392695	6406MC	.406	.375	150
66260392700	6437CC	.437	.375	80
66260392699	6437MC	.437	.375	150
66260392704	6500CC	.500	.375	80
66260392703	6500MC	.500	.375	150
66260392708	6562CC	.562	.375	80
66260392712	6625CC	.625	.375	80
66260392711	6625MC	.625	.375	150
66260392716	6687CC	.687	.375	80
66260392715	6687MC	.687	.375	150
66260392720	6750CC	.750	.375	80
66260392719	6750MC	.750	.375	150
66260392724	6875CC	.875	.400	80
66260392728	61000CC	1.000	.500	80
66260392727	61000MC	1.000	.500	150
9000 Series – Diamond				
3/4" Shank x 3-3/4" Overall Length				
66260308354	91000CD	1.000	.500	80

cBN Heavy Stock Removal Mandrels ▲

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action
• Super coarse abrasive grit	• Long tool life

For heavy stock removal on jig, internal, and offhand operations on tool steels and hardened aerospace alloys.

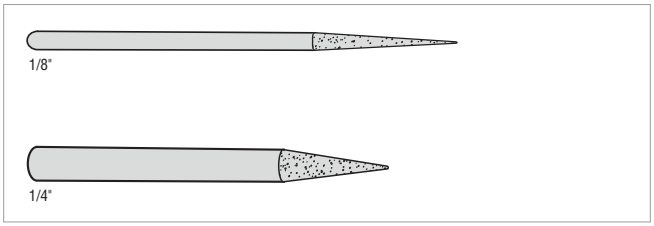


PART #	PRODUCT #	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER	OVERALL LENGTH	GRIT SIZE
HSR Series – cBN						
66260395426	HSR-1/4	1/4	1/4	3/8	3	60
66260395428	HSR-3/8	3/8	3/8	3/8	3	60
66260395429	HSR-1/2	1/2	3/8	3/8	3-1/2	60
66260395431	HSR-3/4	3/4	3/8	3/8	3-1/2	60
66260395432	HSR-1	1	3/8	3/8	3-1/2	60

Diamond Tapered Hones for Drawing Dies ● ▲ ■

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action

Used primarily for forming carbide drawing dies, but also can be used for small hole honing in ceramics, fiberglass, plastics, and composite materials.



PART #	PRODUCT #	INCLUDED ANGLE	SHANK DIAMETER	GRIT SIZE
Tapered Hones for Drawing Dies – Diamond				
3" Overall Length				
66260395540	TH12-6MD	6°	1/8	150
66260395541	TH12-8MD	8°	1/8	150
66260363371	TH25-12CD	12°	1/4	100
66260395542	TH12-12MD	12°	1/8	150
66260395543	TH25-12MD	12°	1/4	150
66260395544	TH25-14MD	14°	1/4	150
66260395545	TH25-16MD	16°	1/4	150

TARGET MARKET SYMBOLS

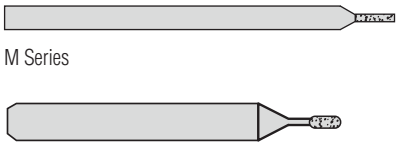
● = Ceramics ▲ = Tool & Die ■ = Composites

Electroplated Micro Drills and Routers

Diamond Micro Drills ● ▲ ■

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action
• M-Series	• Carefully-sized, uniformly-shaped diamond particles are used on all M-Series drills
• S-Series	• Recommended for adapting to ultrasonic drill heads

A modification of Norton mounted points, these tools are specifically designed for drilling holes in the .007" to .065" diameter range. Perfect for drilling sapphire and high density alumina ceramics for hybrid micro-circuit substrates.



M Series

S Series

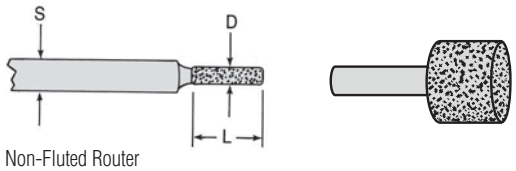
PART #	PRODUCT #	DIAMETER INCHES	HEAD LENGTH	OVERALL LENGTH	GRIT SIZE
M-Series Micro Drills – Diamond					
Shank Diameter .040" (1mm)					
66260395516	M7	.007	.028	11/16	600
66260395517	M10	.010	.049	11/16	400
66260395518	M12	.012	.056	13/16	325
66260395519	M15	.015	.077	13/16	325

PART #	PRODUCT #	DIAMETER INCHES	HEAD LENGTH	OVERALL LENGTH	GRIT SIZE
S-Series Micro Drills – Diamond					
1/8" Shank x 1" Overall Length					
66260395520	S16FD	.016	.062	.093	200
66260392841	S18FD	.018	.062	.125	200
66260395521	S20FD	.020	.062	.125	200
66260395522	S25FD	.025	.093	.156	200
66260395523	S30MD	.030	.093	.156	150
66260395524	S35MD	.035	.093	.187	150
66260395525	S40MD	.040	.125	.218	150
66260395526	S45CD	.045	.125	.218	100
66260395527	S50CD	.050	.125	.250	100
66260395528	S60CD	.060	.125	.312	100
66260395529	S65CD	.065	.125	.312	100

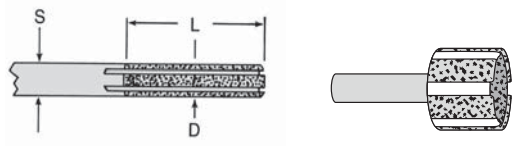
Diamond Routers ● ■

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action

Used with hand operated tools, drill presses, and milling machines. Ideal for routing and reaming the highly-abrasive materials of alumina, fiberglass, plastics, and other nonmetallic composite materials.



Non-Fluted Router



Fluted Router

D – Head Diameter
L – Length of Diamond
S – Shank Diameter

PART #	PRODUCT #	HEAD DIAMETER	LENGTH OF DIAMOND	SHANK DIAMETER	OVERALL LENGTH	GRIT SIZE
Non-Fluted Routers – Diamond						
66260364302	RNF1410CD	1/4	1	1/4	2-1/2	40
Fluted Routers – Diamond						
66260364310	RSF1812CD	1/8	1/2	1/4	2-1/2	60
66260364309	RSF1810CD	1/8	1	1/4	2-1/2	60
66260364308	RSF1412CD	1/4	1/2	1/4	2-1/2	40
66260364307	RSF1410CD	1/4	1	1/4	2-1/2	40
66260302715	RSF3412CD	3/4	1/2	1/2	2-1/2	40

TARGET MARKET SYMBOLS

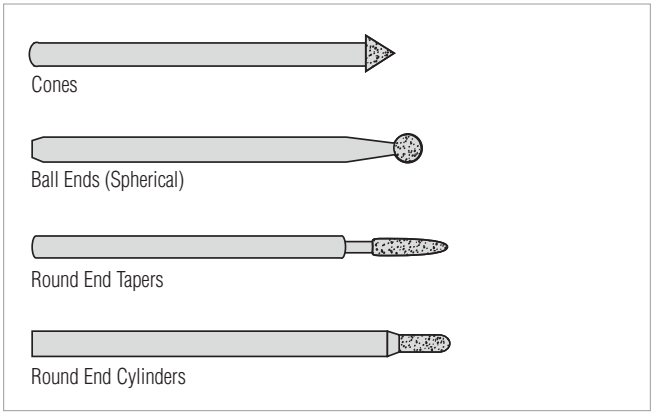
● = Ceramics ▲ = Tool & Die ■ = Composites

Electroplated Mounted Contour Tools

Diamond and cBN Mounted Contour Tools ● ▲ ■

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action
• Variety of tool shapes available as stock	• Satisfy most tool and die and deburring requirements

For contour grinding applications on carbide, ceramics, glass, ferrites, and many tough alloys and cements. Best suited for blending radii and deburring operations. Operating speeds: 15,000-20,000 RPM range.



PART #	PRODUCT #	BALL DIAMETER	GRIT SIZE
Ball Ends (Spherical) – Diamond			
1/8" Shank x 2" Overall Length			
66260395434	BE1CD	3/64	100
66260395436	BE2CD	1/16	100
66260395438	BE3CD	5/64	100
66260395440	BE4CD	3/32	100
66260395442	BE5CD	1/8	100
66260395444	BE6CD	3/16	100
66260395448	BE8CD	3/8	100
66260395450	BE9CD	1/2	100
Ball Ends (Spherical) – cBN			
1/8" Shank x 2" Overall Length			
66260395437	BE3CC	5/64	100
66260395439	BE4CC	3/32	100
66260395441	BE5CC	1/8	100
66260395443	BE6CC	3/16	100
66260395445	BE7CC	1/4	100

PART #	PRODUCT #	SMALL HEAD DIAMETER	LARGE HEAD DIAMETER	HEAD LENGTH	INC. ANGLE	GRIT SIZE
Round End Tapers – Diamond						
1/8" Shank x 2" Overall Length						
66260395506	RT44CD	.044	.066	5/16	4°	100
66260395510	RT78CD	.078	.110	5/16	6°	100
Round End Tapers – cBN						
1/8" Shank x 2" Overall Length						
66260395509	RT78CC	.078	.110	5/16	6°	100

PART #	PRODUCT #	CONE BASE DIAMETER	INCLUDED ANGLE	CONE LENGTH	GRIT SIZE
Cones – Diamond					
1/8" Shank x 2" Overall Length					
66260395484	C14CD	1/8	14°	1/2	100
66260395488	C35CD	5/32	35°	1/4	100
66260395490	C60CD	11/64	60°	5/32	100
66260395492	C90CD	3/16	90°	3/32	100
Cones – cBN					
1/8" Shank x 2" Overall Length					
66260395483	C14CC	1/8	14°	1/2	100
66260395485	C26CC	3/16	26°	13/32	100
66260395487	C35CC	5/32	35°	1/4	100
66260395489	C60CC	11/64	60°	5/32	100
66260395491	C90CC	3/16	90°	3/32	100

PART #	PRODUCT #	HEAD DIAMETER	HEAD LENGTH	GRIT SIZE
Round End Cylinders – Diamond				
1/8" Shank x 2" Overall Length				
66260395494	RE1CD	1/16	1/4	100
66260395496	RE2CD	5/64	1/4	100
66260395498	RE3CD	3/32	1/4	100
66260395500	RE4CD	1/8	1/4	100
66260395502	RE5CD	3/16	5/16	100
66260395504	RE6CD	1/4	5/16	100
Round End Cylinders – cBN				
1/8" Shank x 2" Overall Length				
66260395495	RE2CC	5/64	1/4	100

Type 6A2C cup and Type 01 straight bench and pedestal electroplated wheels are available as made-to order products. Contact your Norton representative for availability and quotation.

Electroplated Files

Diamond Machine Files ● ▲

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action

For use in reciprocating hand profiling machines. Ideal for reworking and finishing carbide dies and molds, blending radii, and deburring and cleaning slots and grooves.

PART #	PRODUCT #	DIMENSIONS	ABRASIVE LOCATION	GRIT SIZE
Machine Files – Diamond				
5/8" Diamond Length, 1/8" Shank, 2" Overall Length				
66260395585	1ECD	.020 x .125		100
66260395586	2ECD	.030 x .125		100
66260395587	3ECD	.040 x .125		100
66260395589	3FCD	.120 x .040		100
66260395590	4FCD	.157 x .040		100
66260395591	5FCD	.203 x .078		100
66260395592	6FCD	.120 x .040		100
66260395593	1CCD	.098 x .196		100
66260395594	2CCD	.120 x .250		100
66260395596	3TCD	.127 side		100
66260395598	1RCD	.042 diam.		100
66260395599	2RCD	.080 diam.		100
66260395600	3RCD	.127 diam.		100

Diamond Hand Files ● ▲

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action

Indispensable aid for the toolroom. All purpose hand-held tool useful for deburring, notching, dressing, and honing hard, brittle materials.

PART #	PRODUCT #	DIMENSIONS	ABRASIVE LOCATION	GRIT SIZE
Hand Files – Diamond				
6" Overall Length, 1-1/2" Diamond Length				
66260395605	DF1CD	1/8 x 1/8		100
66260395606	DF2CD	1/8 x 1/4		100
66260392843	DF2FD	1/8 x 1/4		200
66260395607	DF2WCD	1/8 x 1/4		100
66260395608	DF3CD	1/8 x 3/8		100
66260392844	DF3FD	1/8 x 3/8		200
66260395609	DF3WCD	1/8 x 3/8		100
66260364241	DF3SCD	1/8 x 1/2		100
66260395611	DF4CD	1/8		100
66260300134	DF4WCD	1/4		100
66260395613	DF5CD	1/8		100
66260392846	DF5FD	1/8		200
66260395614	DF5WCD	1/4		100
66260395615	DF6CD	1/8		100

TARGET MARKET SYMBOLS

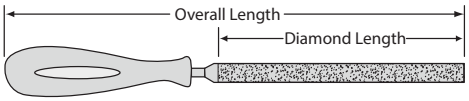
● = Ceramics ▲ = Tool & Die ■ = Composites

Electroplated Files

Diamond Needle Files ● ▲

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action

Indispensable aid for the toolroom. An all-purpose hand-held tool, useful for deburring, notching, dressing, and honing hard, brittle materials.



PART #	PRODUCT #	GRIT SIZE
NFK-6 Needle File Kit – Diamond		
66260364008	NFK-6	
Contains one each of the following:		
	NF1FD	200
	NF2FD	200
	NF3FD	200
	NF4FD	200
	NF5FD	200
	NF6FD	200
DFS-6 Die File Kit – Diamond		
66260391830	DFS-6	
Contains one each of the following:		
	1571	100
	1572	100
	1573	100
	1574	100
	1575	100
	1576	100

TARGET MARKET SYMBOLS		
● = Ceramics	▲ = Tool & Die	■ = Composites

PART #	PRODUCT #	DIMENSIONS	ABRASIVE LOCATION	SHAPE	GRIT SIZE
Needle Files – Diamond					
4-1/4" Diamond Length, 8-1/2" Overall Length					
66260302432	LNF2CD	.400 x .100		Equaling	100
66260305611	LNF2FD	.400 x .100		Equaling	200
66260302898	LNF3CD	.450 x .150		Half Round	100
66260305612	LNF3FD	.485 x .150		Half Round	200
2-3/4" Diamond Length, 5-3/4" Overall Length, With Handle					
66260391729	1571	.055 x .190		Flat	100
66260391730	1572	.075 x .210		Half Round	100
66260391731	1573	.145 x .145		Triangle	100
66260391732	1574	.100 x .100		Square	100
66260391733	1575	.120		Round	100
66260391734	1576	.055 x .190		Pointed Flat	100
3" Diamond Length, 5-1/2" Overall Length, With Handle					
66260395575	NF1FD	.150 x .105		Oval	200
66260395576	NF2FD	.218 x .072		Half Round	200
66260395577	NF3FD	.205 x .058		Equaling	200
66260395578	NF4FD	.096 x .096		Square	200
66260395579	NF5FD	.138 x .138		Triangle	200
66260395580	NF6FD	.118		Round	200

Needle File Shape and Application Key:

Barrette:	A triangle with diamond on the bottom side only
Crossing:	Elongated oval, with more pointed ends than an oval file; has diamonds all around
Equaling:	A rectangle with diamond on all four sides; ideal for filing both sides of an ID simultaneously
Pointed Flat:	A cone with a flat top with diamond on the sides of the cone

Electroplated Drills

Diamond Core Drills ● ■

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action

High performance on glass and ceramic applications while providing fast, reliable cutting. Submersed drilling is highly recommended for optimum operating performance.

PART #	PRODUCT #	OUTER DIAMETER	INNER DIAMETER	GRIT SIZE
Core Drills – Diamond				
Straight Tube Type, 2" Overall Length				
66260395530	A1MD	1/16	.023	150
66260395531	A2MD	3/32	.048	150
66260395532	A3MD	1/8	.075	150
66260395533	A4MD	5/32	.110	150
66260395534	A5CD	3/16	.140	100
66260395535	A6CD	1/4	.195	100
66260395536	A7CD	5/16	.255	100
66260395537	A8CD	3/8	.325	100

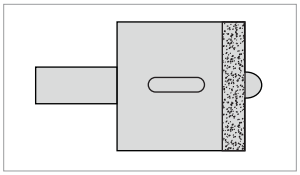
Diamond Mounted Core Drills ● ■

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action
• Removable pilot (bulb-like extension)	• Provides added stability
	• Ensures smooth drilling with less wobbling
• 1/8" wrap: additional 1/8" of electroplated diamond on the blade core	• Increases life of blade on deep cuts, reduces binding and grinding on the core

High performance results on glass and ceramic applications.

PART #	PRODUCT #	OUTER DIAMETER	INNER DIAMETER	GRIT SIZE
Mounted Core Drills – Diamond				
1/8" Wrap, 3/8" Shank Diameter, 3.45" Overall Length				
66260392850	CD.750	3/4	1/4	40

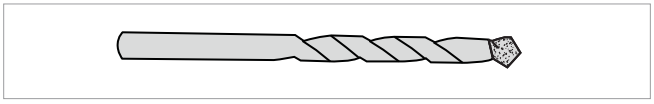
Pilots are removable.



Diamond Twist Drills ● ■

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action

Recommended for precision drilling on circuit boards containing fiberglass, nylon, and similar tough, abrasive materials. Diamond twist drills are also useful for drilling plastics and resin composites and have been successful in drilling soft ductile materials as well as “green” carbide. Operating procedures are similar to those of standard twist drills.



PART #	PRODUCT #	DRILL DIAMETER	DRILL LENGTH	GRIT SIZE
Twist Drills – Diamond				
66260395549	TW-1/16	1/16	1-3/4	100
66260395550	TW-1/8	1/8	2-3/4	100
66260395551	TW-1/4	1/4	4	100
66260395552	TW-3/8	3/8	5	100

Diameter tolerance equals + or – 1/64.

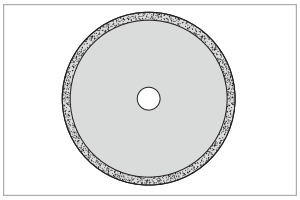
TARGET MARKET SYMBOLS		
● = Ceramics	▲ = Tool & Die	■ = Composites

Electroplated Saw Blades

Diamond Continuous Rim Cut-off Saw Blades ■

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action

Ideal for cutting-off highly-abrasive materials such as alumina, fiberglass, plastics, and other nonmetallic composite materials.



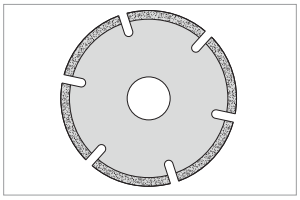
Additional diamond continuous rim and slotted cut-off saw blades, with extended wraps to avoid binding, are available as made-to-order products. Please contact your Norton representative.

PART #	PRODUCT #	DIAM.	OVERALL THICKNESS	HOLE SIZE	GRIT SIZE
Continuous Rim Cut-off Saw Blades – Diamond					
66260301990	DS2062-250	2	1/16	1/4	40
66260391474	DS2094-250	2	3/32	1/4	40
66260391473	DS3094-250	3	3/32	1/4	40
66260363036	DS3094-375	3	3/32	3/8	40
66260395554	DS4094-500	4	3/32	1/2	40
66260300197	DS4094-750	4	3/32	3/4	40
66260395557	DS8094-625	8	3/32	5/8	40

Diamond Slotted Cut-off Saw Blades ■

FEATURES	BENEFITS
• Nickel alloy matrix	• Tough, durable bond
• Single layer of abrasive	• Economical
• Exposed particles	• Aggressive cutting action
• 3/4" wrap: additional 3/4" of electroplated diamond on the blade core	• Increases life of blade on deep cuts, reduces binding and grinding on the core

Ideal for cutting-off highly-abrasive materials such as alumina, fiberglass, plastics, and other nonmetallic composite materials.



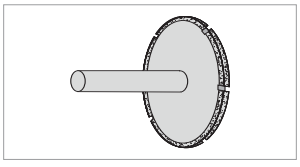
Additional diamond continuous rim and slotted cut-off saw blades, with extended wraps to avoid binding, are available as made-to-order products. Please contact your Norton representative.

PART #	PRODUCT #	DIAM.	OVERALL THICKNESS	HOLE SIZE	GRIT SIZE
Slotted Cut-off Saw Blades – Diamond					
66260301989	DSS2062-250	2	1/16	1/4	40
66260364258	DSS3094-250	3	3/32	1/4	40
66260363015	DSS4094-375	4	3/32	3/8	40
66260395559	DSS4094-500	4	3/32	1/2	40
66260395560	DSS6094-500	6	3/32	1/2	40
66260362981	DSS10125-625	10	1/8	5/8	40
66260395563	DSS12125-500	12	1/8	1/2	40
66260364253	DSS14156-500	14	5/32	1/2	40
66260362989	DSS14156-1	14	5/32	1	40
66260395565	DSS16156-1	16	5/32	1	40
66260395566	DSS18156-1	18	5/32	1	40
Slotted Cut-off Saw Blades with 3/4" Wrap – Diamond					
66260313423	DSSW4094-750	4	3/32	3/4	40

Diamond Mounted Saw Blades ■

FEATURES	BENEFITS
▮ Nickel alloy matrix	▮ Tough, durable bond
▮ Single layer of abrasive	▮ Economical
▮ Exposed particles	▮ Aggressive cutting action

Ideal for cutting-off highly-abrasive materials such as alumina, fiberglass, plastics, and other nonmetallic composite materials.



PART #	PRODUCT #	DIAM.	OVERALL THICKNESS	HOLE SIZE	GRIT SIZE
Mounted Saw Blades – Diamond					
2" Overall Length					
66260395422	MDS1CD	1	3/32	1/4	40
66260395423	MDS1-1/2CD	1-1/2	3/32	1/4	40
66260395424	MDS2CD	2	3/32	3/8	40

TARGET MARKET SYMBOLS

● = Ceramics ▲ = Tool & Die ■ = Composites