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The background of the advertisement features a close-up photograph of industrial machinery. A large, multi-colored grinding wheel (with green, blue, and red segments) is shown in the process of grinding a metal shaft. The shaft has a polished, reflective surface. In the lower right foreground, a metal drill bit is held by a power drill with an orange handle. The bottom portion of the image is overlaid with a large, diagonal graphic element consisting of a red and purple gradient triangle.

# 3M™ Superabrasive Wheels for Cutting Tools

Tough tools for your toughest jobs.

January 2021 Edition



Stock products are available for fast, 2–4 day U.S. shipping in the 48 contiguous states. Delivery time will vary based on carrier method. Qualifying Catalog IDs are noted in **◆ bold**.

### 3M™ Superabrasive Products for Manufacturing Cutting Tools

The products featured in this catalog are 3M’s best “go-to” wheels for cutting tool applications ranging from short runs and re-sharpening to “lights-out” and long production runs. These round tool items are available for fast 2–4 day U.S. shipping within the 48 contiguous states (**Quick Ship products are noted in ◆ bold**). If you require an item that is not listed, please contact your 3M Customer Service Representative at 1-855-809-1710.

# 3M™ Superabrasive Wheels for Cutting Tools

## Table of Contents

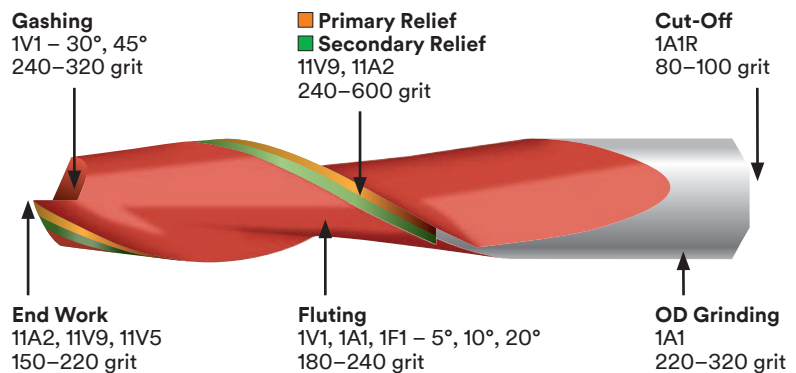
- Tips for Optimizing Your Grinding Process .....3
- Fluting Wheels ..... 4–5
- Gashing Wheels .....6
- Primary & Secondary Relief Wheels .....7
- Wheels for End Work.....8
- 3M™ Trizact™ Diamond Polishing Wheel 685DC .....9
- Cut-Off Wheels .....10
- OD Step Grinding.....10
- Truing & Dressing.....10
- Custom Wheel Request ..... 11

## Glossary

The following is a brief description of terms for the most common round tool grinding applications:

<b>Cut-Off</b>	Using a thin wheel to trim blanks to length. Typically used on the cutting end of the tool when re-grinding and on the shank end when forming a blank.
<b>End Work</b>	Grinding a small clearance, or relief angle on the face (tip) of the tool.
<b>Fluting</b>	Flutes are the helical or straight grooves in the body of the tool. This provides a pathway to permit the removal of chips, and to allow coolants to reach the cutting surface.
<b>Gashing</b>	Grinding a slot or notch along the cutting face to allow for chip flow.
<b>OD Grinding</b>	Grinding to final diameter.
<b>Primary Relief</b>	Removing material directly behind the cutting edge to provide clearance.
<b>Secondary Relief</b>	A slight bevel next to the primary relief.

## Typical Abrasive Wheels Used for Round Tool Grinding



## When to use Diamond vs. CBN

Diamond	CBN
Carbide	Tool steel
Non-ferrous metals	High speed steel
PCD	
Cermets	
Polycrystalline CBN/Diamond (PCBN)	

Round tools can be made out of any of these materials. For optimal grinding results, make sure you know what material the tools are made of.

# Tips for Optimizing Your Grinding Process

## 1. Match the Wheels to Your Production/Process

Consider using dedicated wheels vs. one wheel for all applications.

	Length of Production Run		
	Long (Untended)	Medium	Short Runs & Specials
Optimal Wheel Properties	Form holding	Form holding/ Fast cutting	Fast cutting

## 2. Match Wheel Size (OD) to the Equipment Capabilities

### Diamond Wheels

Smaller diameter wheels can be run at higher RPM to achieve the recommended surface speed (sfpm or mps). This helps utilize more of the available horsepower. With enough HP, you can process faster, without stalling the machine.

### CBN Wheels

- The higher the sfpm, the better the grinding performance
- Larger diameters help achieve higher sfpm
- CBN wheel should be run over 8,500 sfpm
- CBN wheels provide higher stock removal at higher surface speeds

## 3. Diamond Wheels

### Slower diamond grinding wheel speeds (sfpm) = faster feeds

The slower surface speed of the grinding wheel means you can increase the feed rate. The wheel acts softer, which produces higher cutting action. This is only true for diamond on carbide.

### Diamond Wheel Operating Speeds

Fluting (Hybrid, Resin and Poly Bonds)	Gashing* (Poly or Resin Bonds)	OD & End Work (Poly or Resin Bonds)
2,200 to 3,400 sfpm (11 to 17 mps)	4,500 to 6,500 sfpm (22 to 32 mps)	4,500 to 5,500 sfpm (22 to 28 mps)

\*Gashing wheels provide better form retention but less stock removal. Should be run at higher rpm so the wheel will act harder.

## 4. CBN Wheels

### With CBN wheels, faster is better

- For improved performance, operating speed should be 8,500 sfpm (44 mps) or more
- Maximum sfpm to be determined (dependent on machine capability)
- Special speed testing to guard against rotational failure is required over 10,000 sfpm

## 5. Grinder Considerations

### Does it have enough power?

Grinder must be powerful enough to maintain spindle speed at the highest required grinding load.

### Is it sufficiently rigid?

- Machine must be rigid; less than .0002" deflection under side load
- Machine must be able to handle the expected tolerance of the tool
- Bearings must be in good condition

## 6. Coolant Delivery System

- Coolant speed and pressure are just as important as coolant flow (100 psi is a good place to start)
- Position coolant nozzle to flow between the grinding wheel and the part being ground right at the point of contact
- Clean coolant is critical — contamination causes coolant to break down and affects part finish
- Maintain constant and consistent coolant temperature; Variation of more than ± 5°F causes excessive variation in the tolerance of the tools
- Over-design the system where possible to optimize the flow, volume and speed of clean coolant to the grinding zone
- Dry grinding is not recommended

## 7. Troubleshooting

Problems	Potential Causes	Remedies
<b>Loading of superabrasive wheel (frequent dressing cycles)</b>	Poor dressing	Re-dress and follow dressing recommendations.
	Poor filtration, insufficient coolant	Follow coolant recommendations.
	High speed on superabrasive grinding wheel	Slow down wheel speed.
	Feeds too light	Increase removal rate.
<b>Excessive wear of superabrasive wheel</b>	Grinding wheel is too hard	Change to a softer wheel.
	Insufficient coolant at the grinding interface	Improve volume, pressure, nozzle design and placement.
	Low wheel speed	Increase wheel speed so it will act harder.
	Excessive feed rate	Reduce depth of cut.
<b>Excessive heat or burned workpiece</b>	Grinding wheel is too soft	Change to a harder or thicker wheel. Increase wheel speed so it will act harder.
	Insufficient coolant at the grinding interface	Improve volume, pressure, nozzle design and placement.
	Grinding wheel speed too fast	Decrease wheel speed.
	Excessive feed rate	Reduce depth of cut.
<b>Poor workpiece surface finish</b>	Grinding wheel is too hard	Change to a softer wheel.
	Insufficient or misdirected coolant	Follow coolant recommendations.
	Balance, run-out, vibration	Check spindle bearings or other machine components. Check balance and trueness of wheel.
	Grinding wheel is too coarse	Change to a finer grit wheel.
	Wheel face is loaded or glazed	Condition wheel with dressing stick.
<b>Poor workpiece surface finish</b>	Poor filtration, insufficient coolant	Follow coolant recommendations.
	Grinding wheel is too soft	Change to a harder or thicker wheel. Increase wheel speed so it will act harder.



Stock Catalog IDs are noted in **◆ BOLD**.

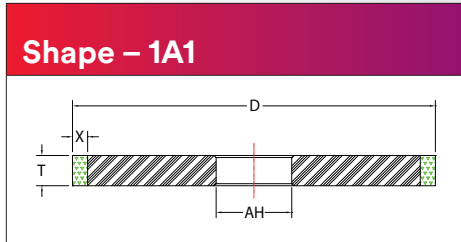
3M™ Superabrasive Products for Manufacturing Cutting Tools

# 3M™ Fluting Wheels

Flutes are the helical or straight grooves in the body of the tool. This provides a pathway to permit the removal of chips, and to allow coolants to reach the cutting surface.

The wheels listed in this catalog are intended as a general starting point for the application indicated. **These wheels are recommended for wet applications.** For dry applications or wheel configurations/grades not listed here, please contact your 3M Customer Service Representative at 1-855-809-1710.

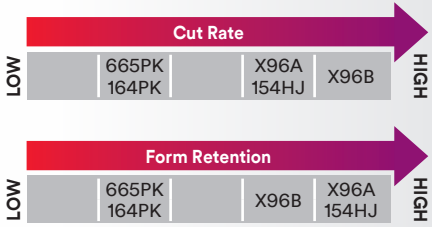
<b>AH Key</b>	1 = 20mm 2 = 32mm 3 = 1-1/4" 4 = 2"
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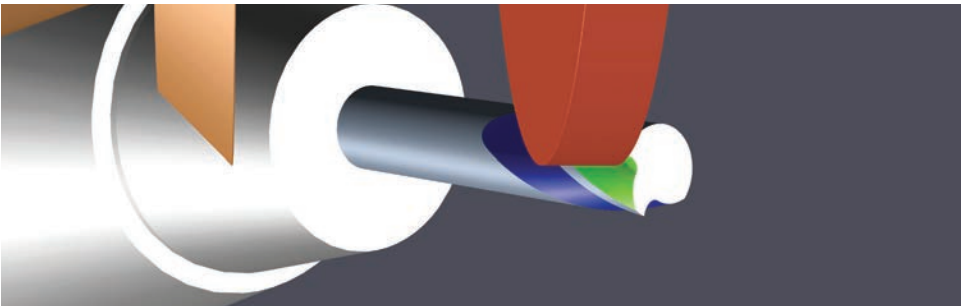
## Shape – 1A1

Dimensions D × T × AH (inches)	Abrasive	Grade	Bond	Product ID	Catalog ID (see AH Key)
<b>4 × 1/4 × AH</b> X = 3/8	Diamond	D280	Hybrid	X96A	◆ <b>6004100-AH</b>
			Hybrid	X96B	◆ <b>6004101-AH</b>
<b>4 × 3/8 × AH</b> X = 3/8	Diamond	D280	Hybrid	X96A	◆ <b>6004103-AH</b>
			Hybrid	X96B	◆ <b>6004104-AH</b>
<b>4 × 1/2 × AH</b> X = 3/8	Diamond	D280	Hybrid	X96A	◆ <b>6004106-AH</b>
			Hybrid	X96B	◆ <b>6004107-AH</b>
<b>4 × 1/2 × AH</b> X = 3/8	CBN	B180	Hybrid	154HJ	◆ <b>6004109-AH</b>
			Polyimide	164PK	◆ <b>6004110-AH</b>
<b>5 × 1/4 × AH</b> X = 3/8	Diamond	D280	Hybrid	X96A	◆ <b>6004111-AH</b>
			Hybrid	X96B	◆ <b>6004112-AH</b>
<b>5 × 3/8 × AH</b> X = 3/8	Diamond	D280	Hybrid	X96A	◆ <b>6004114-AH</b>
			Hybrid	X96B	◆ <b>6004115-AH</b>
<b>5 × 1/2 × AH</b> X = 3/8	Diamond	D280	Hybrid	X96A	◆ <b>6004117-AH</b>
			Hybrid	X96B	◆ <b>6004118-AH</b>
<b>5 × 1/2 × AH</b> X = 3/8	CBN	B180	Polyimide	154HJ	◆ <b>6004120-AH</b>
			Polyimide	164PK	◆ <b>6004121-AH</b>
<b>5 × 3/4 × AH</b> X = 3/8	Diamond	D280	Hybrid	X96A	◆ <b>6004122-AH</b>
			Hybrid	X96B	◆ <b>6004123-AH</b>
<b>6 × 1/2 × AH</b> X = 3/8	Diamond	D280	Polyimide	665PK	◆ <b>6004124-AH</b>
			Hybrid	X96A	◆ <b>6004125-AH</b>
<b>6 × 1/2 × AH</b> X = 3/8	Diamond	D280	Hybrid	X96B	◆ <b>6004126-AH</b>
			Polyimide	665PK	◆ <b>6004127-AH</b>
<b>6 × 1/2 × AH</b> X = 3/8	CBN	B180	Hybrid	154HJ	◆ <b>6004128-AH</b>
			Polyimide	164PK	◆ <b>6004129-AH</b>

**Fluting Wheel Performance Characteristics**  
3M has five standard constructions that are ideal for a variety different operations.



- |                        |   |
|------------------------|---|
| <b>665PK/164PK</b>     | <ul style="list-style-type: none"> <li>• Polyimide resin bond</li> <li>• Higher cut rate/fast stock removal</li> <li>• Better form retention</li> <li>• Designed for higher temperature operations</li> </ul>   |
| <b>X96A/X96B/154HJ</b> | <ul style="list-style-type: none"> <li>• Hybrid bond</li> <li>• Fastest cut rate</li> <li>• Best form retention</li> <li>• Designed for higher temperature operations than polyimide bond</li> <li>• Reduced frequency of dressing and minimal "white sticking" required</li> <li>• Ideal for long, uninterrupted runs</li> </ul> |





# 3M™ Fluting Wheels

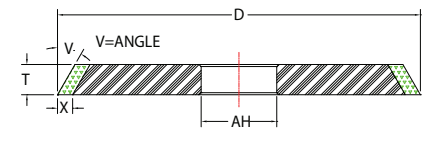
The wheels listed in this catalog are intended as a general starting point for the application indicated. **These wheels are recommended for wet applications.** For dry applications or wheel configurations/grades not listed here, please contact your 3M Customer Service Representative at 1-855-809-1710.

Flutes are the helical or straight grooves in the body of the tool. This provides a pathway to permit the removal of chips, and to allow coolants to reach the cutting surface.

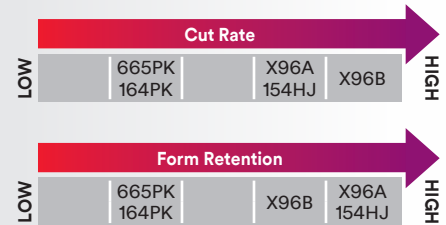
<b>AH Key</b>	1 = 20mm 2 = 32mm 3 = 1-1/4" 4 = 2"	<b>V° Key</b>	1 = 5° 2 = 10° 3 = 15° 4 = 20°
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Dimensions D × T × AH (inches)	Abrasive	Grade	Bond	Product ID	Catalog ID (see AH Key)
<b>4 × 1/4 × AH</b> X = 3/8 V = 5-20°	Diamond	D280	Hybrid	X96A	◆ <b>6005200-AH-V</b>
			Hybrid	X96B	◆ <b>6005201-AH-V</b>
			Polyimide	665PK	◆ <b>6005202-AH-V</b>
			Hybrid	X96A	◆ <b>6005203-AH-V</b>
<b>4 × 3/8 × AH</b> X = 3/8 V = 5-20°	Diamond	D280	Hybrid	X96B	◆ <b>6005204-AH-V</b>
			Polyimide	665PK	◆ <b>6005205-AH-V</b>
<b>4 × 1/2 × AH</b> X = 3/8 V = 5-20°	Diamond	D280	Hybrid	X96A	◆ <b>6005206-AH-V</b>
			Hybrid	X96B	◆ <b>6005207-AH-V</b>
			Polyimide	665PK	◆ <b>6005208-AH-V</b>
			Hybrid	154HJ	◆ <b>6005209-AH-V</b>
<b>4 × 1/2 × AH</b> X = 3/8 V = 5-20°	CBN	B180	Polyimide	164PK	◆ <b>6005210-AH-V</b>
			Hybrid	X96A	◆ <b>6005211-AH-V</b>
<b>5 × 1/4 × AH</b> X = 3/8 V = 5-20°	Diamond	D280	Hybrid	X96B	◆ <b>6005212-AH-V</b>
			Polyimide	665PK	◆ <b>6005213-AH-V</b>
<b>5 × 3/8 × AH</b> X = 3/8 V = 5-20°	Diamond	D280	Hybrid	X96A	◆ <b>6005214-AH-V</b>
			Hybrid	X96B	◆ <b>6005215-AH-V</b>
			Polyimide	665PK	◆ <b>6005216-AH-V</b>
			Hybrid	X96A	◆ <b>6005217-AH-V</b>
<b>5 × 1/2 × AH</b> X = 3/8 V = 5-20°	Diamond	D280	Hybrid	X96B	◆ <b>6005218-AH-V</b>
			Polyimide	665PK	◆ <b>6005219-AH-V</b>
<b>5 × 1/2 × AH</b> X = 3/8 V = 5-20°	CBN	B180	Hybrid	154HJ	◆ <b>6005220-AH-V</b>
			Polyimide	164PK	◆ <b>6005221-AH-V</b>
<b>5 × 3/4 × AH</b> X = 3/8 V = 5-20°	Diamond	D280	Hybrid	X96A	◆ <b>6005222-AH-V</b>
			Hybrid	X96B	◆ <b>6005223-AH-V</b>
			Polyimide	665PK	◆ <b>6005224-AH-V</b>
			Hybrid	X96A	◆ <b>6005225-AH-V</b>
<b>6 × 1/2 × AH</b> X = 3/8 V = 5-20°	Diamond	D280	Hybrid	X96B	◆ <b>6005226-AH-V</b>
			Polyimide	665PK	◆ <b>6005227-AH-V</b>
<b>6 × 1/2 × AH</b> X = 3/8 V = 5-20°	CBN	B180	Hybrid	154HJ	◆ <b>6005228-AH-V</b>
			Polyimide	164PK	◆ <b>6005229-AH-V</b>

## Shape – 1V1



**Fluting Wheel Performance Characteristics**  
3M has five standard constructions that are ideal for a variety of different operations.



<b>665PK/164PK</b>	<ul style="list-style-type: none"> <li>• Polyimide resin bond</li> <li>• Higher cut rate/fast stock removal</li> <li>• Better form retention</li> <li>• Designed for higher temperature operations</li> </ul>
	<ul style="list-style-type: none"> <li>• Hybrid bond</li> <li>• Fastest cut rate</li> <li>• Best form retention</li> <li>• Designed for higher temperature operations than polyimide bond</li> <li>• Reduced frequency of dressing and minimal "white sticking" required</li> <li>• Ideal for long, uninterrupted runs</li> </ul>



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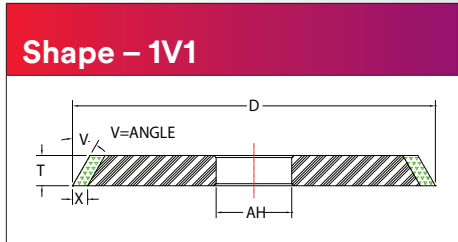
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# 3M™ Gashing Wheels

Gashing involves grinding a slot or notch along the cutting face to allow for chip flow.

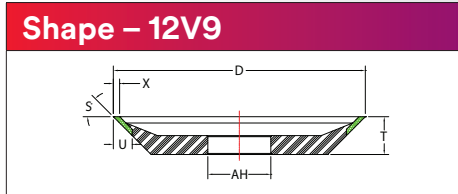
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<b>AH Key</b>	1 = 20mm 2 = 32mm 3 = 1-1/4" 4 = 2"	<b>V° Key</b>	1 = 30° 2 = 45°	<b>S° Key</b>	1 = 30° 2 = 45°
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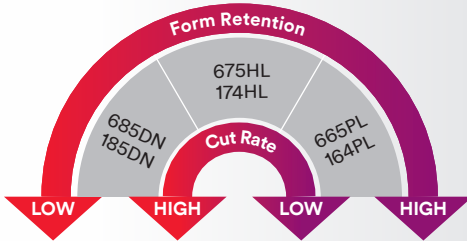
Dimensions D x T x AH (inches)	Abrasive	Grade	Bond	Product ID	Catalog ID (see AH Key)
<b>4 x 1/4 x AH</b> X = 3/8 V = 30-45°	Diamond	D280	Hybrid	675HL	<b>◆ 6006300-AH-V</b>
			Polyimide	665PL	<b>◆ 6006301-AH-V</b>
<b>4 x 3/8 x AH</b> X = 3/8 V = 30-45°	Diamond	D320	Hybrid	675HL	<b>◆ 6006302-AH-V</b>
			Polyimide	665PL	<b>◆ 6006303-AH-V</b>
<b>4 x 3/8 x AH</b> X = 3/8 V = 30-45°	CBN	B220	Polyimide	164PL	<b>◆ 6006304-AH-V</b>
			Resin	185DN	<b>◆ 6006305-AH-V</b>
<b>5 x 3/8 x AH</b> X = 3/8 V = 30-45°	Diamond	D320	Hybrid	675HL	<b>◆ 6006306-AH-V</b>
			Polyimide	665PL	<b>◆ 6006307-AH-V</b>
<b>5 x 3/8 x AH</b> X = 3/8 V = 30-45°	CBN	B220	Polyimide	164PL	<b>◆ 6006308-AH-V</b>
			Resin	185DN	<b>◆ 6006309-AH-V</b>
<b>6 x 3/8 x AH</b> X = 3/8 V = 30-45°	Diamond	D280	Hybrid	675HL	<b>◆ 6006310-AH-V</b>
			Polyimide	665PL	<b>◆ 6006311-AH-V</b>

Shape 12V9 and 11V5 are also commonly used for gashing.

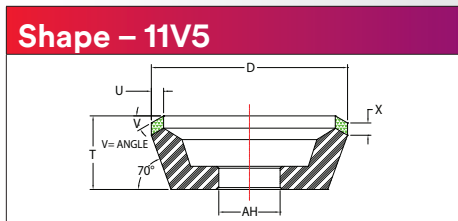
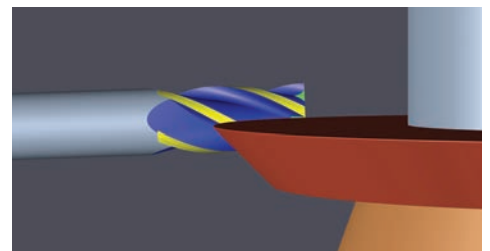
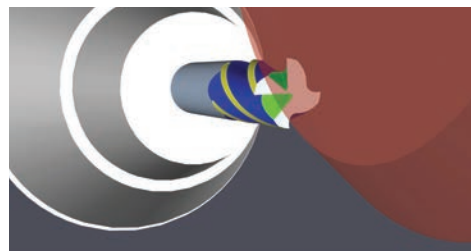


<b>4 x 3/4 x AH</b> X = 1/8, U = 3/8 S = 30-45°	Diamond	D320	Hybrid	675HL	<b>◆ 6006312-AH-S</b>
			Polyimide	665PL	<b>◆ 6006313-AH-S</b>
			Resin	685DN	<b>◆ 6006314-AH-S</b>
<b>4 x 3/4 x AH</b> X = 1/8, U = 3/8 S = 30-45°	CBN	B220	Hybrid	174HL	<b>◆ 6006315-AH-S</b>
			Polyimide	164PL	<b>◆ 6006316-AH-S</b>
			Resin	185DN	<b>◆ 6006317-AH-S</b>
<b>5 x 3/4 x AH</b> X = 1/8, U = 3/8 S = 30-45°	Diamond	D320	Hybrid	675HL	<b>◆ 6006318-AH-S</b>
			Polyimide	665PL	<b>◆ 6006319-AH-S</b>
			Resin	685DN	<b>◆ 6006320-AH-S</b>
<b>5 x 3/4 x AH</b> X = 1/8, U = 3/8 S = 30-45°	CBN	B220	Hybrid	174HL	<b>◆ 6006321-AH-S</b>
			Polyimide	164PL	<b>◆ 6006322-AH-S</b>
			Resin	185DN	<b>◆ 6006323-AH-S</b>

### Wheel Performance Characteristics



- Less Form Retention
- Shorter Production Runs
- Free Cutting
- Fast Cutting
- Best Form Retention
- Close Tolerances
- Long Wheel Life
- Long Production Runs
- Slower Cut Rate



<b>4 x 1-1/2 x AH</b> U = 1/4, X = 1/4 V = 30°	Diamond	D320	Hybrid	675HL	<b>◆ 6006324-AH</b>
			Polyimide	665PL	<b>◆ 6006325-AH</b>
			Resin	685DN	<b>◆ 6006326-AH</b>

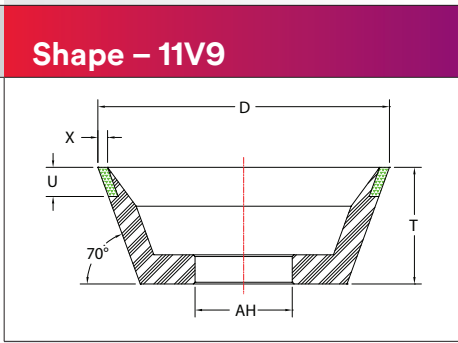
# 3M™ Primary & Secondary Relief Wheels

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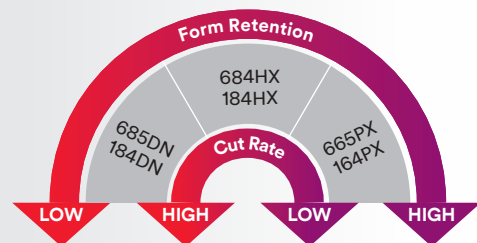
Cutting edges are typically “relieved” to enhance chip clearance. Primary relief involves removing material directly behind the cutting edge. For secondary relief, a slight bevel is ground next to the primary relief.

<b>AH Key</b>	1 = 20mm 2 = 32mm 3 = 1-1/4" 4 = 2"
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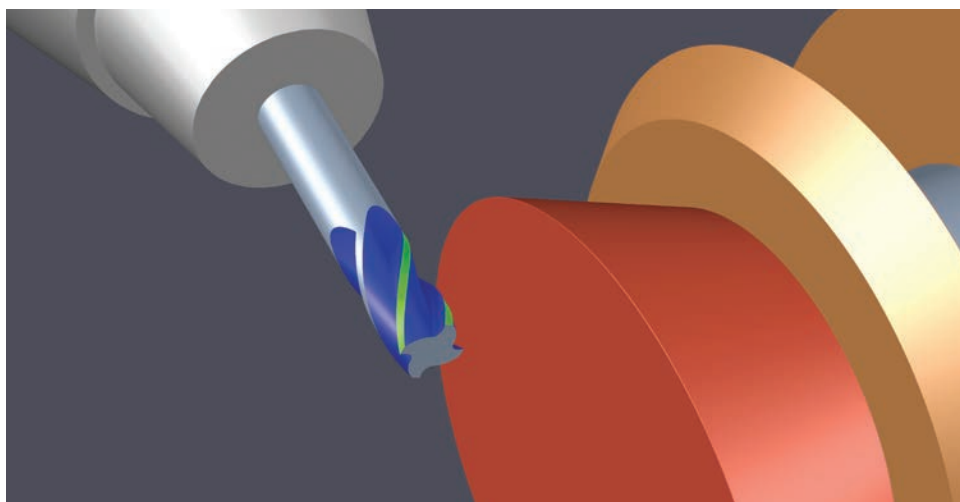
Dimensions D × T × AH (inches)	Abrasive	Grade	Bond	Product ID	Catalog ID (see AH Key)
<b>3-3/4 × 1-1/2 × AH</b> X = 1/8 U = 3/8	Diamond	D280	Hybrid	684HX	◆ <b>6007400-AH</b>
			Polyimide	665PX	◆ <b>6007401-AH</b>
			Resin	685DN	◆ <b>6007402-AH</b>
<b>3-3/4 × 1-1/2 × AH</b> X = 1/8 U = 3/8	Diamond	D320	Hybrid	684HX	◆ <b>6007403-AH</b>
			Polyimide	665PX	◆ <b>6007404-AH</b>
			Resin	685DN	◆ <b>6007405-AH</b>
<b>3-3/4 × 1-1/2 × AH</b> X = 1/8 U = 3/8	CBN	B220	Hybrid	184HX	◆ <b>6007406-AH</b>
			Polyimide	164PX	◆ <b>6007407-AH</b>
			Resin	184DN	◆ <b>6007408-AH</b>
<b>5 × 1-3/4 × AH</b> X = 1/8 U = 7/16	Diamond	D280	Hybrid	684HX	◆ <b>6007409-AH</b>
			Polyimide	665PX	◆ <b>6007410-AH</b>
			Resin	685DN	◆ <b>6007411-AH</b>
<b>5 × 1-3/4 × AH</b> X = 1/8 U = 7/16	Diamond	D320	Hybrid	684HX	◆ <b>6007412-AH</b>
			Polyimide	665PX	◆ <b>6007413-AH</b>
			Resin	685DN	◆ <b>6007414-AH</b>
<b>5 × 1-3/4 × AH</b> X = 1/8 U = 7/16	CBN	B220	Hybrid	184HX	◆ <b>6007415-AH</b>
			Polyimide	164PX	◆ <b>6007416-AH</b>
			Resin	184DN	◆ <b>6007417-AH</b>



**Wheel Performance Characteristics**  
3M™ Superabrasive Wheels are available in a variety of constructions, each with its own unique characteristics. Choose the 3M Wheel with the best balance of form retention and cut rate for your application.



- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Less Form Retention</li> <li>• Shorter Production Runs</li> <li>• Free Cutting</li> <li>• Fast Cutting</li> </ul> | <ul style="list-style-type: none"> <li>• Best Form Retention</li> <li>• Close Tolerances</li> <li>• Long Wheel Life</li> <li>• Long Production Runs</li> <li>• Slower Cut Rate</li> </ul> |
|--|---|





Stock Catalog IDs are noted in **◆ BOLD**.

### 3M™ Superabrasive Products for Manufacturing Cutting Tools

## 3M™ Wheels for End Work

End work involves grinding a small clearance, or relief angle on the face (tip) of the tool to reduce the contact area between the tool and the workpiece.

The wheels listed in this catalog are intended as a general starting point for the application indicated. **These wheels are recommended for wet applications.** For dry applications or wheel configurations/grades not listed here, please contact your 3M Customer Service Representative at 1-855-809-1710.

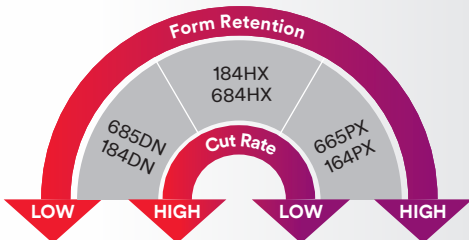
**AH Key** 1 = 20mm 2 = 32mm 3 = 1-1/4" 4 = 2"

**W Key** 1 = 1/4" 2 = 3/8"

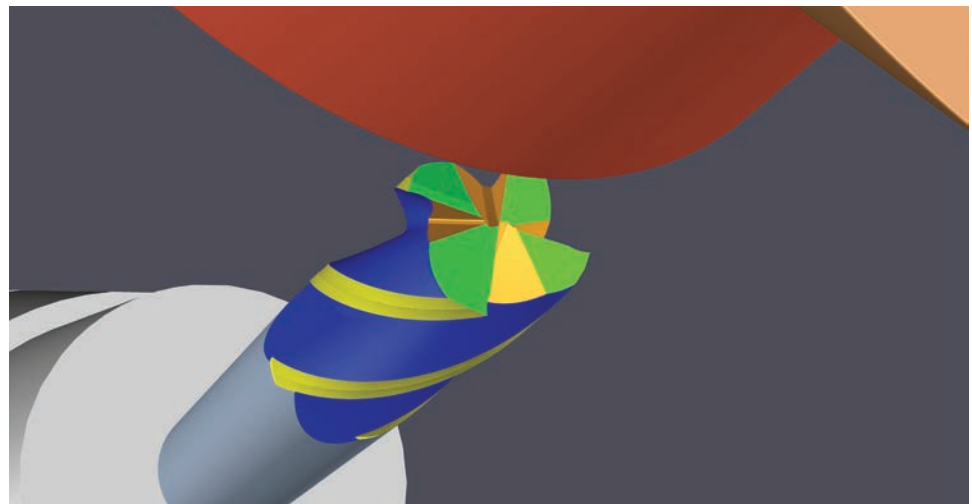
Shape – 11V2	Dimensions D × T × AH (inches)	Abrasive	Grade	Bond	Product ID	Catalog ID (see AH Key)	
	<b>4 × 1-1/2 × AH</b> X = 1/4 W = 1/4	Diamond	D280	Hybrid	684HX	<b>◆ 6008500-AH</b>	
				Polyimide	665PX	<b>◆ 6008501-AH</b>	
				Resin	685DN	<b>◆ 6008502-AH</b>	
	<b>4 × 1-1/2 × AH</b> X = 1/4 W = 1/4	Diamond	D320	Hybrid	684HX	<b>◆ 6008503-AH</b>	
				Polyimide	665PX	<b>◆ 6008504-AH</b>	
				Resin	685DN	<b>◆ 6008505-AH</b>	
	<b>4 × 1-1/2 × AH</b> X = 1/4 W = 1/4	CBN	B220	Hybrid	184HX	<b>◆ 6008506-AH</b>	
				Polyimide	164PX	<b>◆ 6008507-AH</b>	
				Resin	184DN	<b>◆ 6008508-AH</b>	
		<b>4 × 1-1/4 × AH</b> X = 1/4 W = 1/4–3/8	Diamond	D280	Hybrid	684HX	<b>◆ 6008509-AH-W</b>
					Polyimide	665PX	<b>◆ 6008510-AH-W</b>
					Resin	685DN	<b>◆ 6008511-AH-W</b>
<b>4 × 1-1/4 × AH</b> X = 1/4 W = 1/4–3/8		Diamond	D320	Hybrid	684HX	<b>◆ 6008512-AH-W</b>	
				Polyimide	665PX	<b>◆ 6008513-AH-W</b>	
				Resin	685DN	<b>◆ 6008514-AH-W</b>	
<b>4 × 1-1/4 × AH</b> X = 1/4 W = 1/4–3/8		CBN	B220	Hybrid	184HX	<b>◆ 6008515-AH-W</b>	
				Polyimide	164PX	<b>◆ 6008516-AH-W</b>	
				Resin	184DN	<b>◆ 6008517-AH-W</b>	
<b>5 × 1-1/2 × AH</b> X = 1/4 W = 1/4–3/8		Diamond	D280	Hybrid	684HX	<b>◆ 6008518-AH-W</b>	
				Polyimide	665PX	<b>◆ 6008519-AH-W</b>	
				Resin	685DN	<b>◆ 6008520-AH-W</b>	
<b>5 × 1-1/2 × AH</b> X = 1/4 W = 1/4–3/8	Diamond	D320	Hybrid	684HX	<b>◆ 6008521-AH-W</b>		
			Polyimide	665PX	<b>◆ 6008522-AH-W</b>		
			Resin	685DN	<b>◆ 6008523-AH-W</b>		

#### Wheel Performance Characteristics

3M™ Superabrasive Wheels are available in a variety of constructions, each with its own unique characteristics. Choose the 3M Wheel with the best balance of form retention and cut rate for your application.



- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Less Form Retention</li> <li>• Shorter Production Runs</li> <li>• Free Cutting</li> <li>• Fast Cutting</li> </ul> | <ul style="list-style-type: none"> <li>• Best Form Retention</li> <li>• Close Tolerances</li> <li>• Long Wheel Life</li> <li>• Long Production Runs</li> <li>• Slower Cut Rate</li> </ul> |
|--|---|





# 3M™ Trizact™ Diamond Polishing Wheel 685DC — Improving Tool Performance

## Breakthrough technology allows fast, dependable CNC polishing of cutting tools!

The new 3M™ Trizact™ Diamond Polishing Wheel 685DC is based on an advanced 3M technology that delivers a smooth, mirror finish on carbide and other tool materials. It can make polishing easier, more efficient and consistent, by replacing hand-polishing methods such as SiC brushes, stones and abrasive pastes. And it is designed for use on a variety of CNC grinding machines, for seamless integration into existing manufacturing processes.

With the development of the 3M Trizact Diamond Polishing Wheel 685DC, tool manufacturers now have the potential to add new value to their products, by building in more customer-pleasing features, including:

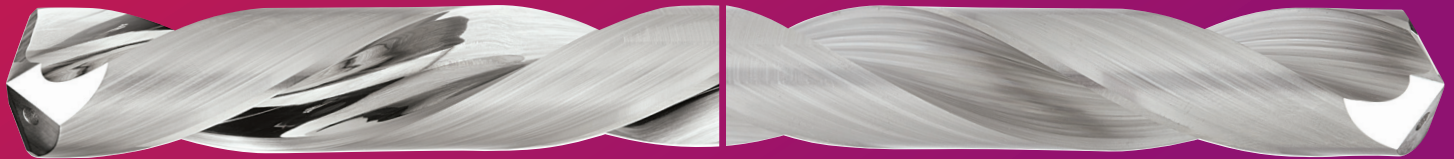
- Improved chip flow, reduced loading — especially beneficial for tough-to-machine materials
- Less heat and friction — tools last longer
- Cleaner, more consistent cut
- Improved tool aesthetics

3M Trizact Diamond Polishing Wheels are loaded with diamond particles throughout the entire wheel. As the wheel wears, fresh, sharp diamonds are constantly exposed to the workpiece, resulting in faster, more consistent cutting throughout the life of the wheel.



## Polishing Benefits

Polishing round tools to a mirror finish can significantly improve tool life and quality by helping the tool stay cooler and sharper. In addition, a polished tool allows chips to evacuate more easily — particularly on titanium, aluminum, composites and wood.



Tool Polished with 685DC

Conventional Tool Finish

Tools supplied by Form Tool Technology, Inc.

## Cutting Edge Quality Comparison

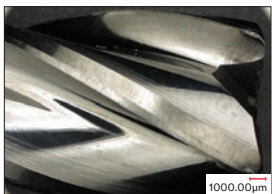
### Tool Description:

1/2 inch 4 flute carbide end mill

### Application Description:

Slot milling, 1/2 inch depth, 15-5 stainless steel

**Note:** Polished tool performance may vary by application.



Used Polished End Mill



Used Unpolished End Mill

## Ordering Information

**Contact:** 3MSupport.ASDPGF.US@mmm.com

**Wheel Shape:** 1A8

**Diameter:** 3, 4, 5, 6, 7 and 8"

**Thickness:** 1/8–3/4" (in 1/16" increments)

**Arbor Holes:** Sized to your specification, with a minimum 1/2" diameter.

**Made-to-order (not in stock).**



Stock Catalog IDs are noted in **◆ BOLD**.

Cut-Off wheels are thin abrasive wheels used to trim blanks to length. They are typically used on the cutting end of the tool when re-grinding and on the shank end when forming a blank.

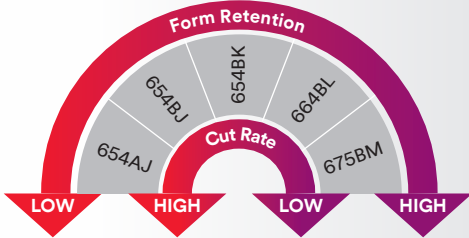
### 3M™ Superabrasive Products for Manufacturing Cutting Tools

## 3M™ Cut-Off Wheels

The wheels listed in this catalog are in stock and intended as a general starting point for the application indicated. Many other wheel configurations and grades are available. Contact your 3M Customer Service Representative at 1-855-809-1710.

### Shape – 1A1R

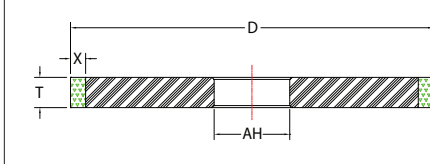
#### Cut-Off Wheel Performance Characteristics



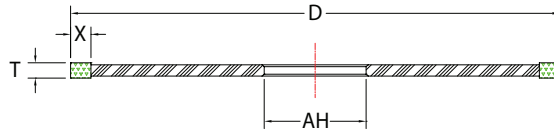
- Less Form Retention
- Shorter Production Runs
- Free Cutting
- Fast Cutting
- Best Form Retention
- Long Wheel Life
- Long Production Runs
- Slower Cut Rate

Tool shank preparation for TruTech applications.

### Shape – 1A1



Dimensions D × T × AH (inches)	Abrasive	Grade	Product ID	Catalog ID
6 × 0.035 × 1-1/4 X = 0.250	Diamond	D100	654BJ	◆ <b>6010600</b>
			654BK	◆ <b>6010601</b>
			675BM	◆ <b>6010602</b>
		D120	664BL	◆ <b>6010603</b>
			654AJ	◆ <b>6010604</b>



## OD Step Grinding

Dimensions D × T × AH (inches)	Abrasive	Grade	Product ID	Catalog ID
7 × 3/8 × 1-1/4	Diamond	D220	645BI	6010605
7 × 1/2 × 1-1/4	Diamond	D220	645BI	6010606

## Truing & Dressing

### 3M™ Dressing Wheels

Silicon carbide dressing wheels are used to true and dress superabrasive grinding wheels.



Dimensions D × T × AH (inches)	Abrasive*	Grade	Product ID	Catalog ID
8 × 1/4 × 1-1/4	Silicon Carbide	GC80	400TH	6010607
		GC120	400TH	6010608
		GC220	400TH	6010609
8 × 3/8 × 1-1/4	Silicon Carbide	GC80	400TH	6010610
		GC120	400TH	6010611
		GC220	400TH	6010612
8 × 1/2 × 1-1/4	Silicon Carbide	GC80	400TH	6010613
		GC120	400TH	6010614
		GC220	400TH	6010615

\*GC = Green Silicon Carbide. Standard quality, softer construction provides freer and faster cut.

### 3M™ Dressing Sticks

The most common means of dressing superabrasive wheels. Made of aluminum oxide or silicon carbide in popular sizes.



Dimensions	Abrasive	Grade	Product ID	Catalog ID
1/2 × 1/2 × 4	Aluminum Oxide	AO150	200TG	6010616
		AO220	200TH	6010617
3/4 × 3/4 × 4	Aluminum Oxide	AO150	200TG	6010618
		AO220	200TH	6010619
1 × 1 × 6	Aluminum Oxide	AO150	200TG	6010620
		AO220	200TH	6010621

# Custom Wheel Request for Quote

To place an order, specify: Shape, Dimension, Mineral, Grade, Product ID

**Check Appropriate Box**    Customer Order    Information Only

Customer	Distributor
Company _____	Company _____
Address _____	Address _____
City, State, Zip _____	City, State, Zip _____
Contact/Title _____	Contact/Title _____
Phone _____	Phone _____

**Note:** This information is collected in order to respond to your request for a quote.

## 1. Application Description

- High Volume Production (more than 50 pieces per batch)
- Custom Production (up to 50 pieces)
- End Work
- Fluting
- Gashing
- OD Grinding
- Primary Relief
- Secondary Relief
- Resharpener
- Wheel Pack (several applications)
- Other: \_\_\_\_\_

## 2. Tool Description

- Carbide                       Other: \_\_\_\_\_
- High Speed Steel                      \_\_\_\_\_
- Tool Type: \_\_\_\_\_
- Size: \_\_\_\_\_

## 3. Grinding Equipment Description

- CNC Grinder
- Manual
- Other: \_\_\_\_\_
- If CNC Grinder...what is the model?    HP: \_\_\_\_\_
- Anca
- Rollomatic
- Tru Tech
- Walters
- Other: \_\_\_\_\_

## 4. Coolant Type

- Straight Oil
- Water Based
- Other: \_\_\_\_\_

## 5. Current Wheel Specification

- 3M
- 3M NaxoForce
- Other Brand: \_\_\_\_\_
- Specification: \_\_\_\_\_

## 6. Wheel Size and Grade Description

Wheel Shape	Diameter	Thickness	Hole	Grade	Also Specify:
1A1					X=
1A1R					X=
1V1					X=    V=
11A2					X=    W=
11V9					X=    U=
12V9					X=    U=    S=
Other:					
Other:					

## 7. Performance Improvement Desired

- Faster Fluting
- Improved Finish
- Less Frequent Dressing
- Less Frequent Truing
- Other: \_\_\_\_\_

## Can't find what you need?

If you don't see what you need in this catalog, simply provide us with the information above, and we'll help you select the optimal product for your application.

**Contact 3M Customer Service for more information:**  
 3MSupport.ASDPGF.US@mmm.com  
 Phone: 1-855-809-1710 | Fax: 1-855-805-1711



Stock products are available for fast, 2–4 day U.S. shipping in the 48 contiguous states. Delivery time will vary based on carrier method. Qualifying Catalog IDs are noted in **♦ bold**.

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