

The 3M logo is positioned in the top left corner of the page. It consists of the letters '3M' in a bold, red, sans-serif font. The background of the entire page is a close-up photograph of a grinding wheel, showing its textured surface and a yellow label with the number '415A191'. A large, semi-transparent orange triangle is overlaid on the right side of the image, pointing downwards.

3M

Science.
Applied to Life.™

Application Guide

Rotary

Tool

Grinding

Grinding wheels for rotary cutting tools.

For the development of grinding wheels used to manufacture cutting tools.

Modern cutting tools like drills and milling machines often have complicated geometries with very tight tolerances and high requirements on the surface finish quality. To meet these requirements and be in the position to grind with high quality at low cost, the demands on the grinding machine and especially on the grinding wheels have risen dramatically.

To meet these demands, CNC tool grinding machines must have significantly higher performance and be more stable, flexible and equipped with an efficient cooling system. At the same time, though, this also increases the demands placed on the grinding wheels used.

Our products and services

- Complete product portfolio of high quality tool grinding wheels in Diamond and CBN
- New development of resin bonded Cubitron II tool grinding wheels for HSS
- Competent application consultants at your production site
- Technical cooperation in order to increase productivity
- Calculation of the total cost
- Grinding seminars

Typical grinding operations: Tungsten carbide and HSS drills & mills production*

Peel grinding

Produces the final diameter.

Flute grinding

Flute grinding is the most critical, time consuming and cost intensive operation in manufacturing rotary tools.

Gashing

Creation of a taper along the cutting face to reduce the feed forces.

Clearance angle

Clearance angle reduces the contact area between the rotary tool and the workpiece. The clearance angles provide the tool with a free-cutting property and simultaneously reduce the feed forces when drilling and milling.

Relief grinding

Material is removed directly behind the cutting edge.

Profile roughing/finishing

Flute/Clearance angle polishing

Polishing is made to increase tool life and quality of the end product, w the drill bit or milling cutters.

3M grinding technologies for drills & mills for your special needs

1. Fluting

1A1 3M™ 6PHN;
T1 3M™ Resin Bond
Cubitron II 93BW/BY

2. Gashing

1V1 3M™ 6PHN

3. Clearance angle

6A2 3M™ 6CHN

5. Clearance polishing

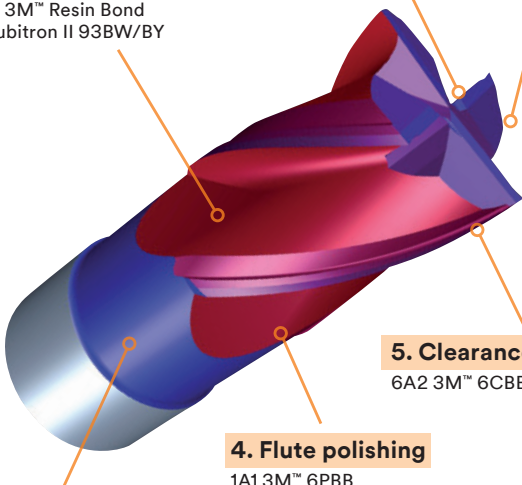
6A2 3M™ 6CBB

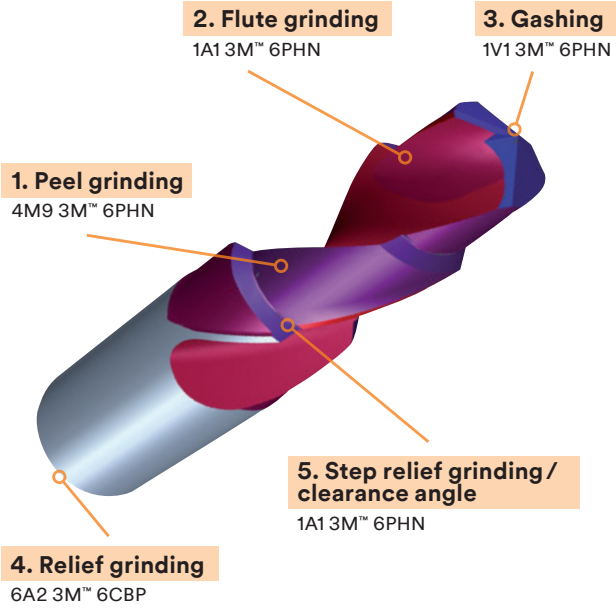
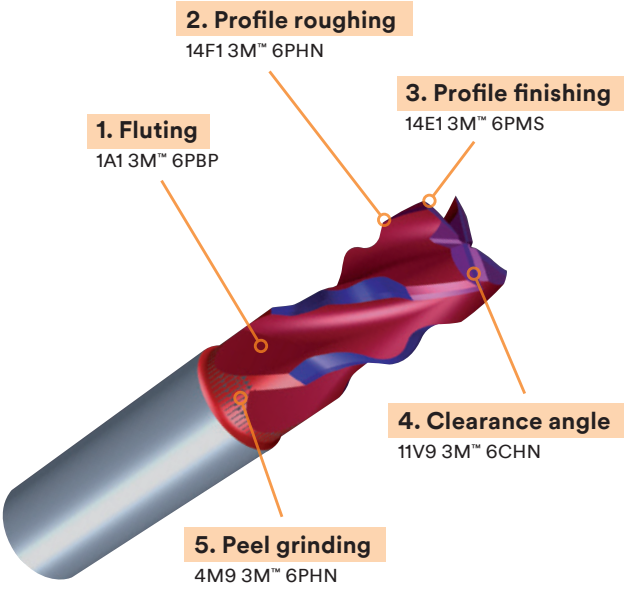
4. Flute polishing

1A1 3M™ 6PBB

6. Peel grinding

4M9 3M™ 6PHN





Rotary Tool Grinding

Workpiece	Workpiece Material	Grinding Process	3M™ Grinding Wheel	3M Product Code	Most Common 3M Bond	3M Diamond Grinding Wheel Specification	Performance Description	Typical Machines
Drill Bits	Tungsten Carbide	Flute Grinding	3M™ Hybrid Bond Diamond Wheel 6PHN	6PHN	NF	D64 - NF	<ul style="list-style-type: none"> ideal for fast deep grinding shorter production time reduced production costs high feed rates and large feed increments very good form retention 	Anca, Walter, Haas, Saacke
			3M™ Hybrid Bond Diamond Wheel 6PBP	6PBP	Q91	D64-B100Q91	<ul style="list-style-type: none"> balanced grinding behavior with universal applicability long service lives possible 	Anca, Walter, Haas, Saacke
			3M™ Hybrid Bond Diamond Wheel 6CHN	6CHN	NE	D64-NE	<ul style="list-style-type: none"> extreme feed and removal rates when grinding clearance angles and notching 	Anca, Walter, Haas, Saacke
		Polishing	3M™ Hybrid Bond Diamond Wheel 6PHN	6PHN	NE	D64-NE	<ul style="list-style-type: none"> extreme feed and removal rates when grinding clearance angles and notching 	Anca, Walter, Haas, Saacke
			3M™ Resin Bond Diamond Wheel 6CBN	6CBN	NP	D15-NP	<ul style="list-style-type: none"> extremely high flexibility and a brilliant polished finish while enabling minimal material removal at the same time 	Anca, Walter, Haas, Saacke
			3M™ Hybrid Bond Diamond Wheel 6PHN	6PHN	NF	D64 - NF	<ul style="list-style-type: none"> ideal for fast deep grinding shorter production time reduced production costs high feed rates and large feed increments very good form retention 	Anca, Walter, Haas, Saacke
Milling Cutters	Tungsten Carbide	Endwork (Clearance Angle, Flank Grinding)	3M™ Hybrid Bond Diamond Wheel 6PBP	6PBP	Q91	D64-B100Q91	<ul style="list-style-type: none"> balanced grinding behavior with universal applicability long service lives possible 	Anca, Walter, Haas, Saacke
			3M™ Hybrid Bond DIA Wheel 6CHN	6CHN	NE	D64-NE	<ul style="list-style-type: none"> extreme feed and removal rates when grinding clearance angles and notching 	Anca, Walter, Haas, Saacke
			3M™ Hybrid Bond Diamond Wheel 6PHN	6PHN	NE	D64-NE	<ul style="list-style-type: none"> extreme feed and removal rates when grinding clearance angles and notching 	Anca, Walter, Haas, Saacke

Taps	HSS	Flute Grinding	3M™ Resin Bond Grinding Wheel Cubitron™ II 93BW	93BW	B674	95DA	<ul style="list-style-type: none"> • significantly higher specific material removal rates Q_w • improved cycle time per part • more parts per dressing cycle • reduced dressing amount • minimal risk of burning 	Anca, Junker, Normac
		Gashing	3M™ Resin Bond Grinding Wheel Cubitron™ II 93BY	93BY	B674	93DA		

Dressing Wheels

Dressing Wheel		Dressing Wheel		Diamond Wheel		Application	
Type	Information	Grit Size	Grit Size	Bond	Grinding Method	Workpiece Material	
Vitrified bonded green silicon carbide (SiC)	Harder than Al_2O_3 , more aggressive to the diamond particles, more suitable for reprofiling the diamond wheel	120 mesh	≥ 46	Resin	All grinding wheels	Tungsten Carbide, Ceramics, Cermet	Tungsten Carbide, Ceramics, Cermet
		320 mesh	≤ 40	Metal/Hybrid			
				Resin		Tungsten Carbide, Ceramics, Cermet	
				Metal/Hybrid		Tungsten Carbide, Ceramics	



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