3M Science. Applied to Life.™

3M[™] Cubitron[™] II Resin Bond Grinding Wheels 92BC for Hot Mills Roll Grinding Application

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Let's Rock the Rolls together!

Premium Grinding Solutions



Market and Application

Scope definition:

Market Sub-Segment	Application	Work parts	Materials
Hot Rolling Mills	OD cylindrical Grinding	Working Rolls	ICDP, HiCr, HSS, Semi HSS,
Steel processing industry	Roll Grinding	Intermediate and Back up rolls	LowCr rolls

Market Trends driving the Industry:

While developing our newest generation of 3M[™] Cubitron[™] II Resin bond Grinding wheels 92BC for the Hot strip mills Roll grinding industry, we have been considering following key market trends to drive our new Products design concept:

Process optimization - looking for Costs savings:

In a very competitive Steel market landscape, Roll Grinding workshops are searching for ways to optimize their operational grinding costs. Increasing grinding wheels' durability and overall grinding performances is how the new 3M[™] Cubitron[™] II Resin Bond grinding wheels 92BC help our customers to achieve their costs savings targets.

Process efficiency - searching for Capacity improvement:

Nowadays, pressure to increase productivity is getting higher for Roll Grinding workshops. In such context, our 3M[™] Cubitron[™] II Resin bond Grinding wheels 92BC can free up capacity while helping to reduce overall grinding times. Get your profile back to its original shape into record times by leveraging our 3M[™] Precision Shaped-Grains Technology.

Harder materials to grind:

The most suitable grinding wheel specification will depend on the composition of the rolls. The content of chromium and other alloying elements is an important factor when selecting a grinding wheel's specification. Generally, the carbide-forming elements (Cr, W, Mo, V, Ti, Nb, Ta, Zr), which generate these hard carbides in high alloyed steels, contribute strongly to how hard the specific steel grade is to grind. The harder the steel, the better our new 3M[™] Cubitron[™] II Resin bond grinding wheel 92BC outperforms other conventional solutions.

Quality Standards are becoming more and more demanding:

One of the key challenges, Roll Grinding workshops face is the rise of demanding Quality standards: Narrow and tighter profiles' tolerances, finer surface roughness expectations, or total absence of defects such as feedlines or scratches require adapted grinding solutions.

Get our local Application Engineers on board, they will help you to achieve your goals!

For those Hot Mills Roll Grinding Workshops looking for a Grinding wheel which cuts faster, lasts longer, runs cooler in a very repetitive and constant way aiming to achieve substantial Costs savings or Productivity improvements, our newly developed 3M[™] Cubitron[™] II Resin Bond Grinding Wheel 92BC is the solution you are seeking for!



New Features Introduction

Oriented 3M[™] Precision-Shaped Grains:

Conventional grains tend to plow thru the metal causing heat to build up in the workpiece and the abrasive resulting in slower cut and shorter lifetime. Whereas our unique 3M[™] Precision-Shaped Grains made with 3M[™] Micro-Replication Technology continuously form sharp peaks that easily slice thru metal, thus cutting cooler, faster and lasting longer than conventional grains.

Our 3M[™] Precision-Shaped Grains can be nowadays oriented into specific direction allowing us to best optimize usage of each single oriented grain.

In case grinding wheel shows wide area with low amount of grains, bond creates pressure. Because Bond does not grind, it does slide on surface and increases temperature generation. With our new 3M[™] Cubitron[™] II Resin bond grinding wheels 92BC, we have observed that grains stacking into specific zone is far reduced which prevents from minerals agglomeration. By this way, we notably reach better grains anchorage into the bonding system.

New Resin bond formulation with homogeneous pores forming and distribution:

The latest development of our new Resin bond formulations leads to better distribution of the pores forming into the Resin bond matrix.

Having a more homogenously distributed pores structure helps to drastically improve the overall cooling system since the entire wheel's thickness is instantly flooded by the cooling fluid being captured by the wheel's opened structure. Even in extreme stock removal conditions, it does facilitate chips evacuation outside of the contact area preventing from generating heat which may lead to thermal damages.

The grinding process runs cooler with substantial positive impact on performances such as wheel's durability extension and work parts quality improvements (free of burning marks).

Our 3M[™] Precision-Shaped Grains ...







Advantages:

The following advantages will help meeting the most extreme Roll Grinding performances expectations:

Lasts Longer



Extended Lifetime: up to 70% extra rolls being ground against regular conventional wheels performances.

Cuts Faster



Stock removal Rate (Q'w) up to 20% higher





Homogeneous pores distribution next to 3M[™] Precision-Shaped Grains self dressing properties **improve overall performances and quality** outcome.

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Quality: Profile Geometry in tolerances



Get your original profile **back in tolerances** into record time.

Leading to following valuable Benefits:

Benefits:

Substantial Costs savings



Positive Financial impact: Grinding costs up to 30% lower



Higher G Ratio up to 20% higher than regular conventional grinding wheels.



Grinding cycle time (ts) up to 30% lower

Quality: Stable and repetitive performances



Stable performances during the whole wheel's lifetime. Best fit when operators must deal with more than one grinder at a time.

Absence of Defects as well as Fine Surface Quality



Absence of cosmetics defects such as: scratches, feedlines, or burning marks. Finest Surface Roughness (Ra): down to 0.3-0.5 µm easily achieved and maintained.

Productivity Improvement



Your solution when you are lacking capacity (machine's breakdown, maintenance period, or higher steel demand).

Case Studies

Product Characteristics

Cost per ground roll improvement:

Case Study #1			
Market segment	Primary Metal industry, Hot Rolling Mills		
Customer work piece	Work roll	753×2050mm HSS 65ShC - CVC Profile	
Application description	Hot Mills HSS Rolls outer diameter grinding		
	Surface Finish: 0.3 - 0.5 µm	Lubricant Emulsion: 3,5% to 4%	(High) cutting speed: 35 m/s
Current grinding solution in used	Competitor, 3M [™] regular Resin bond Grinding wheels		
Customer pain	Cost per ground roll improvement		
3M [™] Solution	T1 915×100×304.8mm, 3M [™] Cubitron [™] II 93DAC M8 B700, New formulation		
Resulting Advantages	 Higher G ratio Extended grinding wheels' durability (up to +70%) Extra number of rolls being ground per used wheel 		
Customer's benefits	Grinding operation substantial costs savings. Very stable and repetitive grinding performances throughout the whole wheels' lifetime.		



Number of ground rolls 🗌 G ratio

Shorter cycle time leading to potential capacity improvement



Competitor: > 30 min/roll _ 3M[™] 92BC: 20 min/roll

Case Study #2			
Market segment	Primary Metal industry, Hot Rolling Mills		
Customer work piece	Work roll	610×1676mm HSS & HiCr - straight Profile	
Application description	Hot Mills HSS & HiCr Rolls outer diameter grinding		
	Surface Finish: 0.3 - 0.7 μm	Lubricant Emulsion: 3,5% to 4%	(High) cutting speed: 35 m/s (roughing op.)
Current grinding solution in used	Competitor, 3M™ regular Resin bond Grinding wheels		
Customer pain	Capacity issue. Looking for productivity improvement.		
3M™ Solution	T1 915×100×304.8mm, 3M™ CubitronTM II 93DAC M8 B700, New formulation		
Resulting Advantages	Reduced grinding time: from >30 min. down to 19-21 min.		
Customer's benefits	Huge productivity gains. Increased Capacity and grinding machine throughput by up to 30%		

Below tables introduce standard shapes and dimensions:



External diameter x	Thickness (range, from - to) x	Bore size *	Eco-Center
915 x	50 - 150x	304.8	500
915 x	50 - 150x	508	610
1070 x	50 - 150x	508	676
1000 x	50 - 150x	381	540

Illustrative example of dimensions designation: T1 - 915×100×304.8

Extra notes:

Above values are in millimeters (mm) unit system. Bore size can be enlarged to other desired dimensions. All wheels have Eco-Center standard feature. Wheels cannot be used to any further extend below this diameter.

Below table details all potential combinations of standard B700 specifications:

Standard Specifications definition:				
Mineral	Grit Size	Hardness	Bond Code	
-	36	J8	B700	
93DAC	-	К8	-	
-	-	L8	-	
-	-	M8	-	
-	-	N8	-	
	Mineral - 93DAC - - -	Mineral Grit Size - 36 93DAC - - - - - - - - - - - - -	Mineral Grit Size Hardness - 36 J8 93DAC - K8 - - L8 - - M8 - - N8	

Illustrative example of Premium specification designation: 93DAC36 M8 B700.

Below table details specifications we do recommend into specific application context:

Standard specifications recommendations:			
Standard Specification	Machine Power (kW)	Roll Hardness	
93DAC36 J8 B700	<70	All	
93DAC36 L8 B700	70 – 110	>85 ShC	
93DAC36 L8 B700	70 – 110	<85 ShC	
93DAC36 L8 B700	>110	<85 ShC	
93DAC36 L8 B700	90 – 110	>85 ShC	
93DAC36 M8 B700	>110	<85 ShC	

Other Specifications and dimensions are available on demand. Please, consult local Application Engineers for a specification recommendation based on your personal application environment

Expertise delivery a reliable resource at your service

because we are more than a bonded abrasive wheels supplier.

Being global, acting local! Through each of the main geographical regions, we have local teams of experienced Application Engineers supported by a global organization.

Our technical community is available upon request for closer analysis of your grinding process. On demand, we are assisting our customers through on-site support including hands-on their specific process environment.

Feel free to consult us for:

- Overall grinding process improvement
- Dealing with quality issues and for troubleshooting diagnostic
- Developing new products subjected to grinding operations

Our service includes dispensing technical seminars upon any grinding topics of your particular interest and online technical consulting is also available in case of emergencies.

Do not hesitate anymore and onboard us into your grinding journey for a valuable collaboration.



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