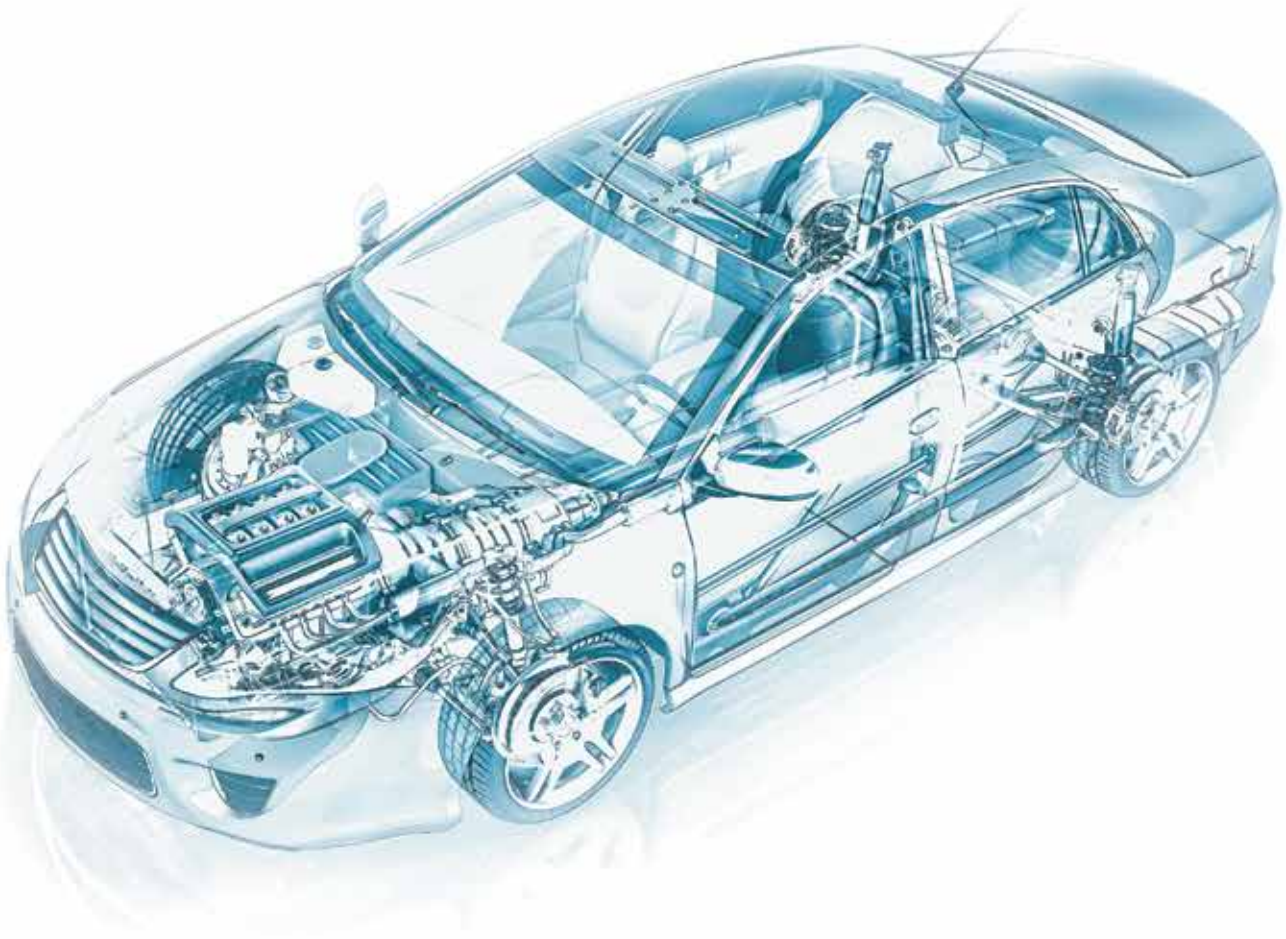
ABRASIVE SOLUTIONS



AUTOMOTIVE INDUSTRY

Centreless & Seat Grinding Wheels for Engine Valves

Engine valves regulate airflow and exhaust gases in internal combustion engines. Designed as Inlet (Hi-Cr) and Exhaust Valves (Hi-Cr & Ni), they demand precise grinding for durability and burn-free performance.

CUMI's precision grinding solutions ensure burn-free, highly accurate valve stem centerless grinding. For high-Nickel valves (35-70% Ni), CUMI's advanced wheels counteract reduced wheel life and frequent dressing caused by Nickel adhesion, ensuring superior performance and efficiency.

9A Range of Centreless Grinding Wheels

Introduced as an upgradation over regular grades which can enhance the dressing frequency by min 50%.

Key Features :

- High-purity Brown Aluminium Oxide with enhanced alumina content for superior cutting and durability.
- Fusible bond for consistent dressing frequency and longer wheel life.
- Sharper, tougher grains with uniform fracture for efficient performance and extended sharpness.
- Dual-grade wheels designed to balance dressing frequency for low-Ni and high-Ni exhaust valve parts.
- Operates at surface speeds up to 60 mps.

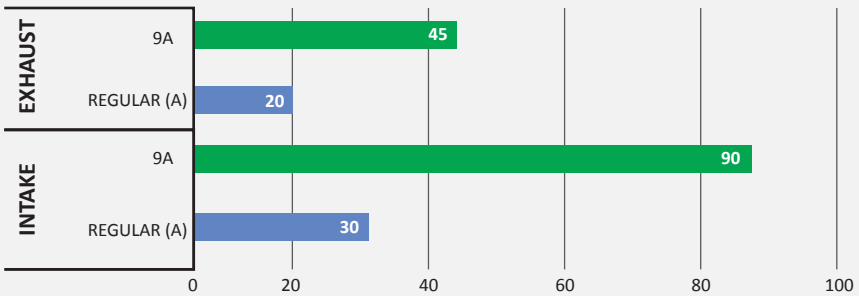
Advantages & Benefits :

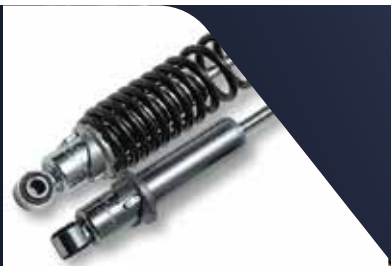
- Superior cutting action shortens cycle times and boosts productivity.
- Reduced grind injuries and power consumption, even during high stock removal.
- Consistent dressing frequency ensures reliable performance.
- Exceptional finish in finished products.

Material Overview

Product type	Inlet	Exhaust
Material used	X45-Cr SNB16 SUH 11 & 1	VAT-36 HRV 40 Inconel Crutonite
Description	Under normal load and wear-resistant. Can also merge for Bi-metal valves.	High strength, toughness, excellent corrosion resistance, high temperature resistance and oxidation-resistant properties. (Ni : > 30%)

Dressing Frequency





AUTOMOTIVE INDUSTRY

24A Range of Seat Grinding Wheels

Designed as an upgrade over traditional White and Pink Aluminum Oxide wheels, the 24A range enhances dressing frequency by 1.5X to 3X, depending on the material.

Key Features :

- Blend of semi-friable and microcrystalline grains for superior cutting action.
- Highly fusible bond enhances dressing frequency and wheel life.
- Capable of withstanding wheel speeds up to 60 m/s.
- Ideal for high-Nickel materials.

Advantages & Benefits :

- Min 1.5X more parts per dress for increased efficiency.
- Burn-free components with excellent form retention.
- Lower cost-per-component (CPC) and reduced inventory costs.
- Improved throughput for higher productivity.

Product Range

Operation	Grain Types	Grit Size	Dia - mm	Thickness - mm	Hardness	Structure	Bond	Speed
Seat Grinding	24A	100 - 120	400 - 610	10-25	L - N	5-7	Krypton	45-80
Rough Centreless	9A	46 - 60	400 - 610	90-200	L - N	3-6	V887A	33-45
Semi - Finish Centreless	9A	60 - 80	400 - 610	90-200	L - M	3-6	V887A	33-45
Finish Centreless	9A	100 - 120	400 - 610	90-200	L - M	3-6	V887A	33-45

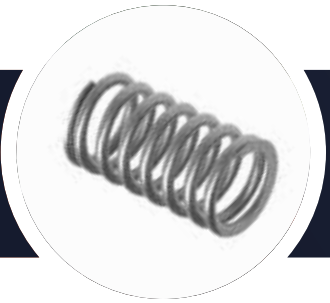
Recommendation - Stem Centreless Grinding

Operation	Good	Better (Skip dress by 25%-50%)	Best (2 times Skip Dress)
Roughing	A463 M3 V2016	DA463 M5 V2016	9A463 L5 V887A/45
Semi - Finishing	A60 L5 V2016	DA60 L5 V2016	9A601 L5 V887A/45
Finishing	A100 K5 2016	DA100 J5 V2016	9A100 J5 V887A/45

Recommendation - Seat Grinding

Type	Good	Better (Skip dress by 25%-50%)	Best (2 Times Dress Skip)
Inlet - Mono Metal	AA100 N5 V45	-	24A120 M6 V2020
Exhaust - Bi Metal	AA100 N5 V45	-	24A120 M6 V2020
Exhaust - Hi Nickel	AA100 N5 V45	RAA100 K7 V500/45	24A120 M6 V2020

AUTOMOTIVE INDUSTRY



Face Grinding Wheels for Springs

Compression springs, made from coiled wire, resist compressive forces and are essential in applications such as automotive shock absorbers, fuel injectors, and consumer electronics. They provide uniform load distribution and restoring force when compressed.

CUMI's advanced grinding wheels, with microcrystalline abrasives, excel in face grinding for springs, offering faster stock removal, enhanced precision, and longer wheel life. These solutions boost productivity and ensure high-quality finishes in spring manufacturing.

Key Features :

- Premium grain with coarser particles for superior stock removal and lower cutting energy.
- Honeycomb structure improves heat dissipation, enhancing load capacity and reducing grinding forces.
- Self-sharpening grains improve dressing frequency.
- Surface-treated grains enhance bond adhesion.
- Modified bond system ensures cooler cutting and burn-free components.

Advantages & Benefits :

- Increased material removal rate (MRR) and grinding ratio (GR).
- Burn-free cutting and improved dressing frequency.
- Reduced residual stress and cost per component.
- Longer product life and improved surface quality, ensuring better perpendicularity.

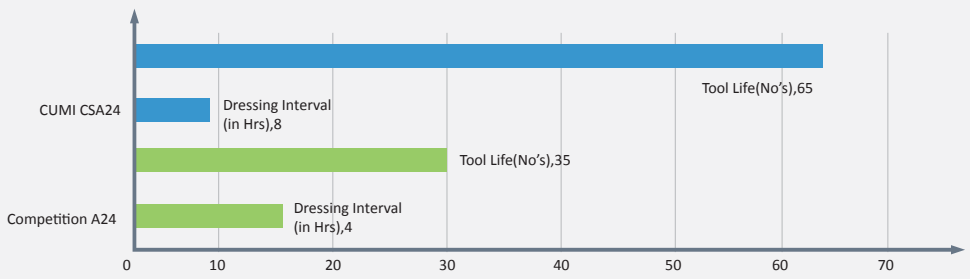
Product Range

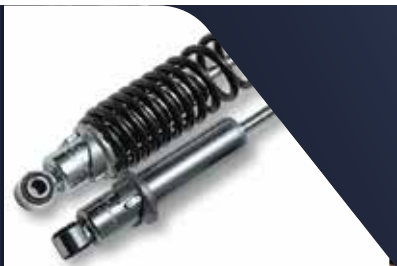
	Grain Type	Grit Size	Dia - mm	Thickness - mm	Hardness	Structure	Bond
Good	A	20 - 46	350 - 1000	40 - 120	K - 0	5 - 7	B266F
Better	55A	20 - 46	350 - 1000	40 - 120	K - 0	5 - 7	B266F
Best	CSA	20 - 46	350 - 1000	40 - 120	K - 0	5 - 7	B266F

Recommendation

Type	Operation	Good	Better	Best
Spring Steel	Rough	A24 N7 B266F	54AA24 N7 B266F	2CSA24N7 B266F

Performance Comparison





AUTOMOTIVE INDUSTRY

Face Grinding for Connecting Rod

The connecting rod in an IC engine transmits force from the piston to the crankshaft, converting linear motion into rotational motion. Grinding the Big End and Small End is critical for perfect alignment and smooth bearing contact, ensuring efficient engine operation.

CUMI's Epoxy bonded grinding wheels, formulated with premium Aluminum Oxide grains and high-strength organic bonds, offer cool cutting, high stock removal, long wheel life, and excellent finishes for precise conrod manufacturing.

Key Features :

- Premium Aluminum Oxide grains for superior grinding.
- Epoxy bond for cool, burn-free cutting and high stock removal.
- Extended wheel life with reduced dressing requirements.

Advantages & Benefits :

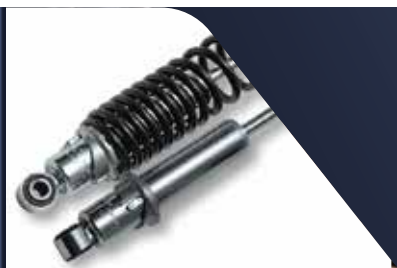
- High material removal rate (MRR) reduces cycle times and boosts productivity.
- Low grind injury and predictable dressing frequency for efficient operations.
- Consistent performance with minimal dressing needs and excellent surface finish.
- Lower power consumption and improved finished product quality.

Product Range

Grain Type	Grit Size	Dia - mm	Thickness - mm	Hardness	Structure	Bond	Wheel Speed
DA, 55A, RAA	46 - 400	400 - 750	50 - 100	G - P	4 - 9	EFC	Upto 33 m/sec

Recommendation

Operation	Good	Better	Best
Face Grinding	AA60 L5 B14F	52AA60 L7 BR9	RAA60 N5 EFC



AUTOMOTIVE INDUSTRY

Crankshaft Grinding Wheels

Crankshaft Pin and journal grinding restores precise dimensions and surface finishes, ensuring proper alignment, reduced wear and optimal engine performance. This process corrects wear or damage, extending the Crankshaft's lifespan and maintaining smooth operation.

CUMI's 51RA/52RA grinding wheels, crafted with advanced abrasive grains, deliver superior precision, excellent surface finishes and exceptional durability, enhancing engine efficiency and longevity across automotive, industrial and marine applications.

Key Features :

- Precision-engineered sharp grains for superior cutting.
- Excellent form retention for consistent results.
- Uniform grain fracture ensures lasting sharpness.
- Optimized for high stock removal with burn-free grinding for flawless finishes.

Advantages & Benefits :

- Lower Barkhausen Value (BV).
- Extended wheel life with reduced dressing depth.
- Faster grinding cycles enhance efficiency.
- Precise size control for high accuracy.
- Reduced cost per component increases profitability.
- Improved Overall Equipment Effectiveness (OEE).

Product Range

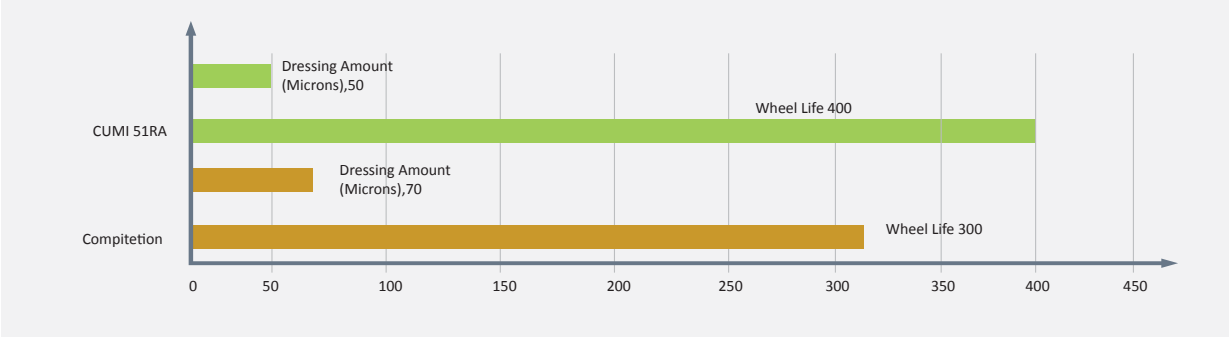
Grain Type	Grit Size	Dia - mm	Thickness - mm	Hardness	Structure	Bond	Wheel Speed
12A, 11RA, 51RA	46 - 80	760 - 1200	20 - 130	I - N	4 - 9	Krypton	Upto 60m/sec

Recommendation

Operation	Good	Better	Best
Pin/Journal Grinding	AA467 J5 V2020	12A54/60 J7 V2020	51RA54/60 I7 V2020

Performance Comparison

Case Study - Crankshaft Pin/Journal - 6Cylinder - 50m/s



AUTOMOTIVE INDUSTRY

Centreless Wheels for Shock Absorbers

Fork Pipes, integral to vehicle Fork Suspension Systems, and Piston Rods, crucial in Hydraulic and Pneumatic systems, require fine surface finishes to prevent seal damage and ensure efficient motion transfer. Both components rely on precise centreless grinding for optimal performance.

CUMI offers comprehensive centreless grinding solutions, from roughing to semi-finishing (grit sizes 60 - 220). Our new rubber cork-bonded centreless wheels deliver superior performance and precision across all grinding stages.

Key Features :

- Fine abrasives for precision grinding and polishing.
- Special rubber bond ensures excellent resilience and superior surface finish.
- Cork and fine grit abrasives enable bright, polished finishes.
- Cushioning effect minimizes pressure on components during grinding, enabling cool grinding with minimal heat generation.

Advantages & Benefits :

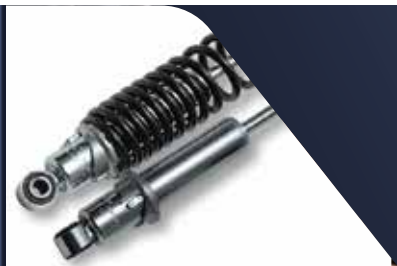
- Self-dressing wheels require little to no dressing throughout their life.
- Efficient stock removal up to 20 microns. Supports feed rates up to 5 m/min.
- Achieves a high-quality surface finish of up to 0.8 microns Rz.

Product Range

OD - MM	Thickness - MM	Grain	Grit Sizes	Hardness	Structure
400 - 610	100 - 508	A, DA, 55A	60 - 600 (FEPA)	F - N	4 - 8

Grading Recommendations

			Good	Better	Best
Fork Pipe	Roughing 1	120 - 150 µm	DA603 L7 B99	55DA603 N7 B99	55DA60 J7 B600
	Roughing 2	80 - 100 µm	A803 N8 TDR310	55DA603 N7 B99	55DA80 J7 B600
	Semi Finishing	40 - 60 µm	-	A220 LRT1	DA150 G7 RBCQ/A220 G7 RBCZ
	Finishing	30 - 40 µm	DA240/A400 G7 RBCX	DA240/A400 G7 RBCZ	DA240 G7 RBCQ /A400 G7 RBCZ
	Super Finishing	3 µm	DA400/A500 G7 RBCX	DA400/A500 G7 RBCZ	DA400 G7 RBCQ /A500 G7 RBCZ
	Post Chrome	2 µm	DA400/A500 G7 RBCX	DA400/A500 G7 RBCZ	DA400 G7 RBCQ /A600 G7 RBCZ
Piston Rod	Roughing 1	120 - 150 µm	DA603 N7 B99	55DA603 N7 B99	55DA60 J7 B600
	Roughing 2	80 - 100 µm	A803 N8 TDR310	55DA603 N7 B99	55DA80 J7 B600
	Semi Finishing	40 - 60 µm	A220 LRT1	DA220 LRT1	65A220 LRT1
	Finishing	15 - 20 µm	DA240/A400 H7 RBCX	DA240/A400 H7 RBCZ	DA180/DA240/A400 H7 RBCZ
	Post Chrome	3 µm	-	DA400/A500 H7 RBCX	DA400/A500 H7 RBCZ



AUTOMOTIVE INDUSTRY