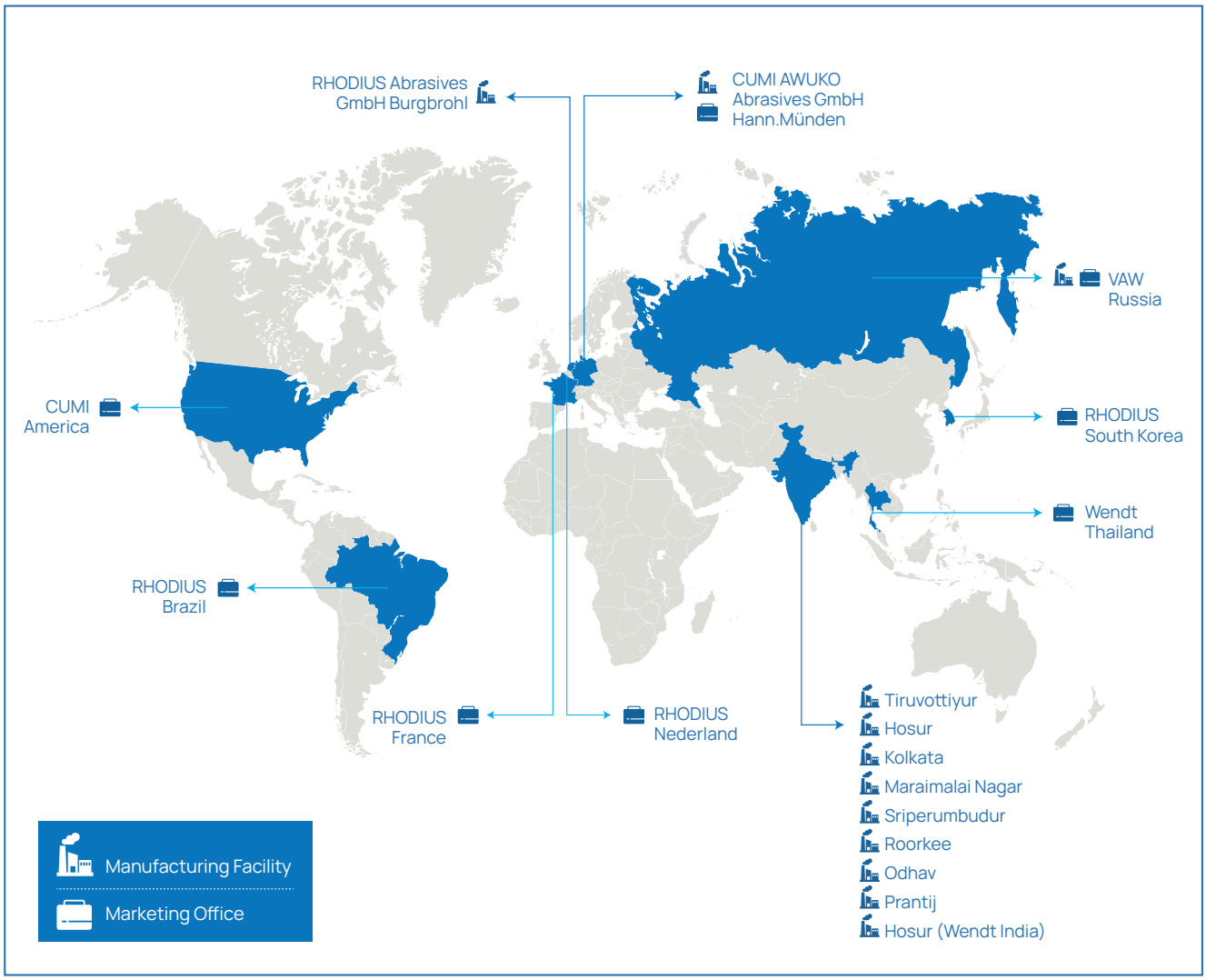
Grind Smarter
For the future.

Engine Valves

About CUMI Abrasives

With over 70 years of experience and a global reach, we're committed to building strong customer relationships. We measure our success by how well we help your business grow, and we're here to provide the best abrasive solutions with top-tier service. By understanding your challenges, we create solutions that fit your specific needs. Through value chain integration, CUMI has developed into a company that oversees the entire process from material to delivery.

CUMI Global Presence

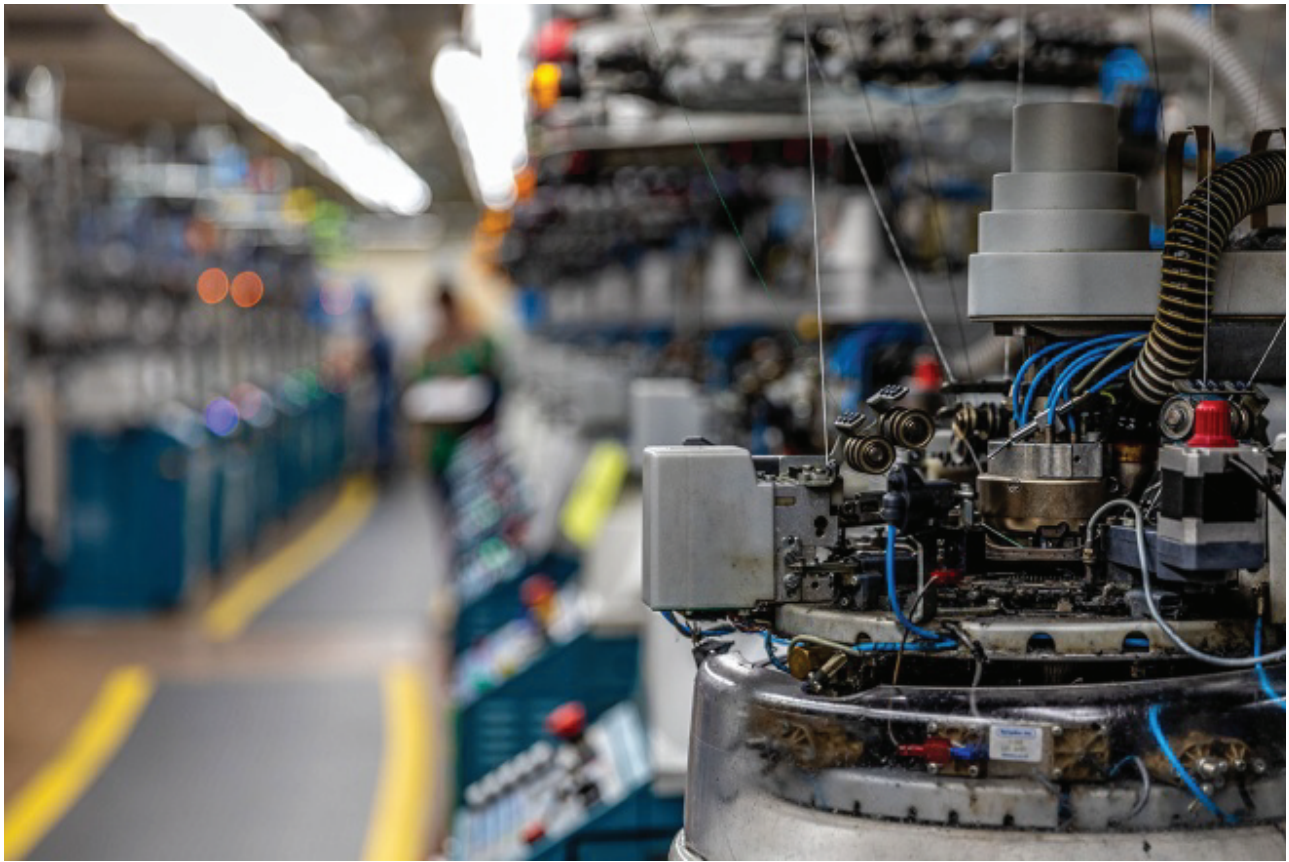


CUMI's Manufacturing Capabilities and R&D

CUMI Abrasives operates ten advanced manufacturing facilities in strategic locations such as Sriperumbudur, Thiruvottriyur, Maraimalainagar, Roorkee, and Hosur, as well as globally. This extensive footprint enables a deep understanding of domestic and international markets, ensuring high-quality, tailored solutions. With a comprehensive range of bonded and coated abrasives, CUMI integrates advanced technology and innovative processes to deliver unmatched precision and reliability.

Its Surface Technology Centre drives innovation through precision grinding simulations, rapid prototyping, and real-time testing, ensuring first-time-right solutions with exceptional accuracy and efficiency.

CUMI's commitment to excellence in manufacturing, combined with continuous investment in research and development, positions the company as a leader in the global abrasives market.



Milestones - Timeline

1954 | Coated & Abrasives manufacturing at **Tiruvottiyur**

Acquired Eastern Abrasives in **Calcutta** | **1974** | Greenfield facility in **Hosur** for vitrified & resin-bonded wheels

1996

1999 | Set up **CUMI America** to service Midwest customers

2004 | Set up **CUMI Canada** to expand Coated Abrasives in North America (exited in 2009)

Set up a greenfield plant in **Sriperumbudur** to produce Coated Abrasives | **2007** | Acquired **Volzhsky Abrasives Works** In Russia for large capacities of grinding wheels and to address markets

WENDT

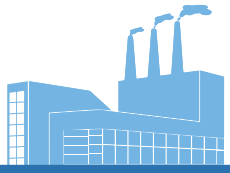
1984 | Invested in **Wendt India** for precision and Super Abrasives

Mid-90s
Distribution partnership with **Cincinnati Milacron,** Netherlands, for precision grinding coolants

STERLING ABRASIVES LTD.
GRINDING WHEELS

1994 | Acquired **Sterling Abrasives** in Ahmedabad for rice polishing & agro-processing

Acquired & merged CUTFAST Abrasives to expand market share in Coated Abrasives



2008 | Set up a greenfield plant in **Uttarakhand** to manufacture cutting and grinding wheels

Set up a joint venture at **China** to manufacture grinding wheels leveraging low-cost manufacturing (exited in 2015)

AWUKO

2022 | **Acquired AWUKO Abrasives for Coated Abrasives and RHODIUS for cutting and grinding wheels**

RHODIUS

About CUMI Application Engineering & Technology

Who We Are

CUMI's Application Technology Team consists of highly skilled engineers who serve as technical anchors for our customers across industries and geographies.

- Act as the **single point of technical contact** throughout the grinding solution journey
- Combine deep application knowledge with real-world manufacturing experience
- Deliver value beyond the product through process optimization and problem solving
- Seamlessly connected to our R&D, manufacturing, and testing infrastructure.

What We Deliver

Our mission is to go beyond supplying abrasives. We deliver complete grinding solutions with measurable impact on:

- Grinding System Engineering
- Wheel performance and life
- Surface finish and dimensional accuracy

Why Partner with CUMI?

Go-To Technical Guidance
One engineer team. Complete support. End-to-end guidance.

TCO-Driven Results
We optimize not just the wheel, but your entire process cost.

Global Presence, Local Action
Application experts across regions with direct factory access.

Collaborative Mindset
Working with OEMs, institutes, and your internal teams.

Ongoing Enablement
Hands-on training, troubleshooting, and knowledge transfer.

Engine Valve and its Types

- There are mainly two different types of valves used in internal combustion engines, differentiated as Inlet Valve and Exhaust Valve.
- The Inlet engine valves let fuel and air mixture get into the cylinder and the Exhaust Valve lets the exhaust evacuate out of the cylinder.
- Engine Valves are operating at high rpm till 15,000, and subjected to high temperature of 950 Deg C.
- Valves subjected to highly corrosive atmosphere should be made of materials with adequate resistance.

Functions of an Engine Valve

Inlet Valve

a) Allow incoming charge into the engine

b) Seal the port without leak for remaining period

c) Resistance to wear at the mating surfaces

d) Good sliding surface for seizure resistance

Exhaust Valve

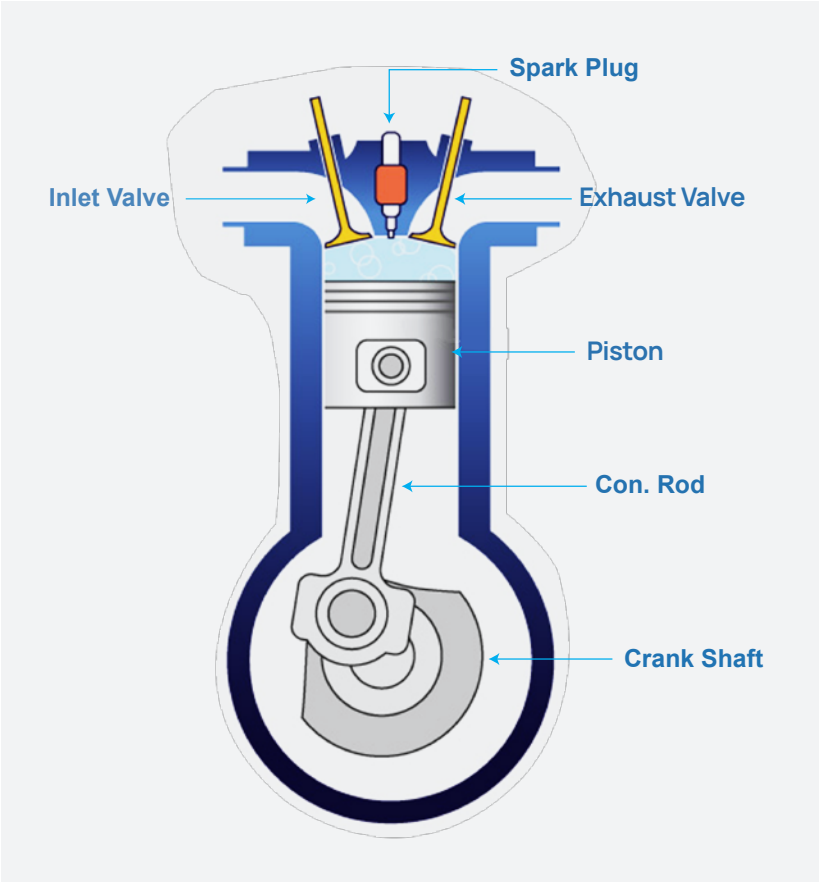
a) Allow gases to go out of the engine

b) Seal the port without leak for remaining period

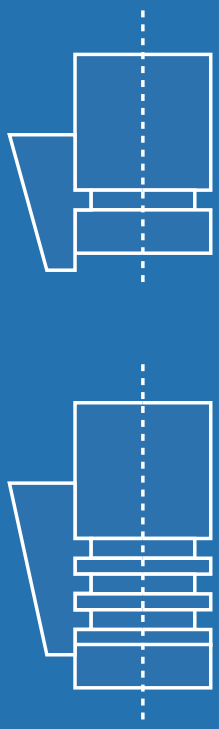
c) Strength to withstand high temperatures

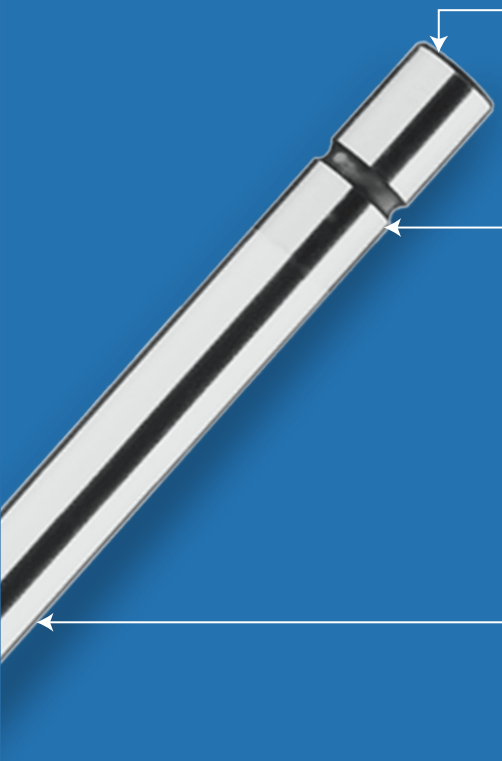
d) Resistance to wear at the mating surfaces

e) Good sliding surface for seizure resistance



Schematic Diagram of Engine Valve Grinding Parts:





Tip Area:
Functional contact with the valve actuation technology.

Tip hardening is used in order to increase the hardness and wear resistance

Groove Area:
Clamping
Single Bead to prevent rotation
Multi-Bead to encourage rotation

Stem Area:
Functional contact with the valve guide
Chrome plating and nitriding are used in order to increase wear resistance

Head Area:
Impacts on combustion chamber volume.

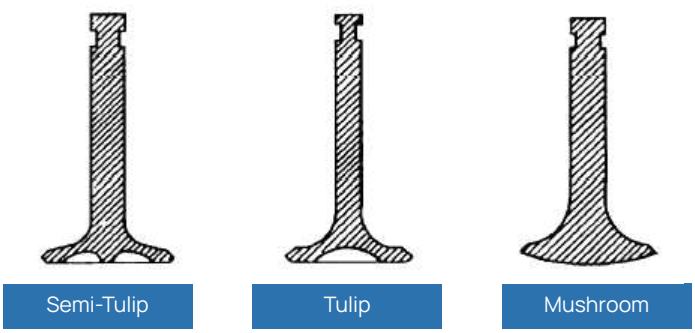
Head shape and cup impact on combustion chamber volume, flexing and seatability

Seat Area:
Functional Contact (sealing) with the cylinder assembly
Seat hardening and seat welding are used in order to increase the hardness and wear resistance

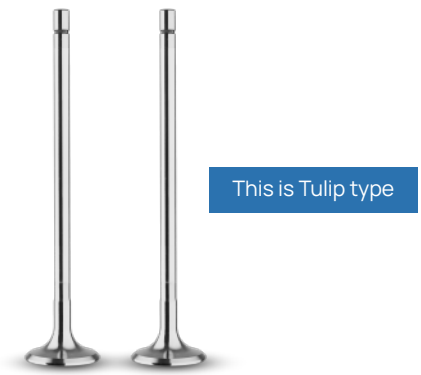
Trends and Challenges in Engine Valve

- Raw Material Challenge - Cr → Ni & Ti
  - High Wear resistance
  - Hard , ductile and high strength
  - Ability to withstand high temperature
- Hollow Mushroom Valve
  - Lower weight (Withstand up to 1150 Deg)
  - Compact size for sized engines
  - Sodium filled
- Inconel 751 alloy for high temp forced induction intake and exhaust valves; EV8 (21-4N) stainless steel for HP intake and exhaust valves
- Nimonic 80A for high temp, extreme duty exhaust valves

Titanium for high RPM, lightweight intake and exhaust valves.

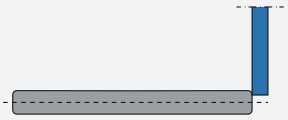


Structure of Semi-Tulip, Tulip and Mushroom types

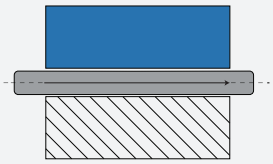


Grinding an Engine Valve

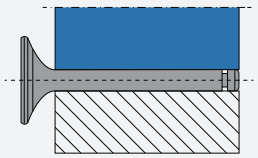
CUMI grinding solutions are integral to the precision finishing of engine valves, covering every critical operation from cutting and stem grinding to valve seat and weld seam finishing. Our abrasive products ensure superior dimensional accuracy, excellent surface finish, and enhanced valve performance across all grinding zones. With CUMI's trusted expertise, every valve component meets the highest standards of quality and reliability.



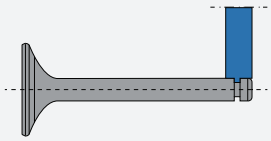
Bar Cutting



Bar Grinding

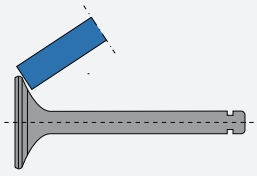


Valve Stem Centreless Grinding

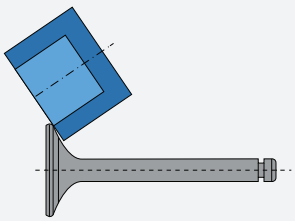


Groove Grinding

End Face Grinding



Seat Grinding



Seat Grinding with a Cup Wheel

Customised Solutions Tailor-Made for your Industry

The machining of engine valves poses unique challenges due to their varied applications and tight tolerance requirements. With decades of experience, CUMI offers proven grinding solutions backed by advanced abrasive technology and deep application expertise. Our dedicated support ensures consistent performance and precision at every stage of valve production.

Grinding Concepts:

Grinding Position	Grinding Process	Product Recommendation
Bar / Stem	Centerless Grinding	Krypton
Stem End Disc End	Face Grinding	Resinoid/Rubber
Seat Grinding Groove grinding	Angular / Cylindrical Grinding	Krypton / Krystal
Valve Cutting	Cutting	Samurai

Bar Cut-Off Wheel

CUMI Bar Cut Off Wheel is engineered for precise and efficient bar cutting in engine valve production. Designed to deliver clean cuts, minimal burr, and optimal productivity, it ensures consistent performance across high-speed operations. With superior grain-bond technology, it offers enhanced durability and reduced cycle time, making it the ideal choice for demanding valve manufacturing environments.

Features and Benefits:

- Excellent form retention and dimensional control
- Consistent performance across bar diameters
- No burr and burn Marks.

CUMI's Recommendation:

DA30 T5 BF101

Diameter Range
400 mm

Grit Range
24 - 30

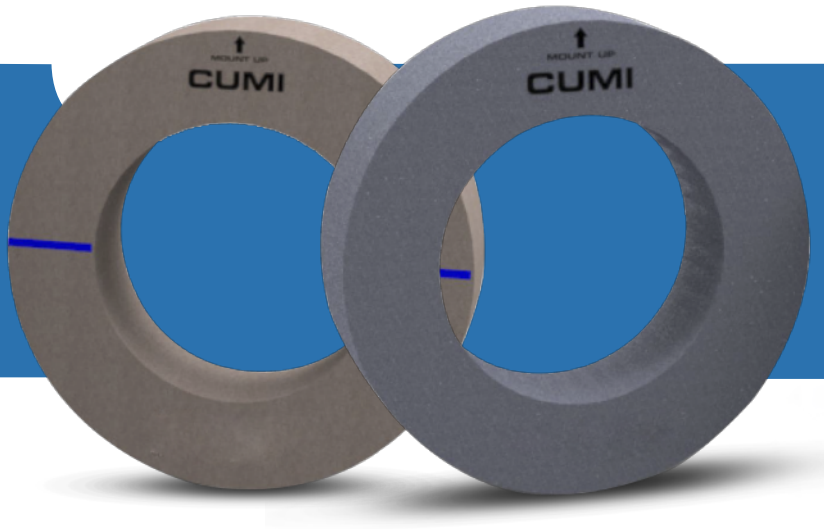
Hardness Range
R - T

Wheel Speed
80 mps

Bonds
Resin with reinforcement

Structure
2 - 4

Bar Centreless Grinding Wheel



CUMI Bar Centreless Grinding Wheels are designed for precision bar grinding in engine valve applications. With superior form retention, high frictional grip, and excellent resilience, they ensure stable, shock-absorbing performance for consistent output.

Features and Benefits:

- High metal removal capability
- Improved tool longevity
- Minimal dressing intervention

Diameter Range
400 - 610 mm

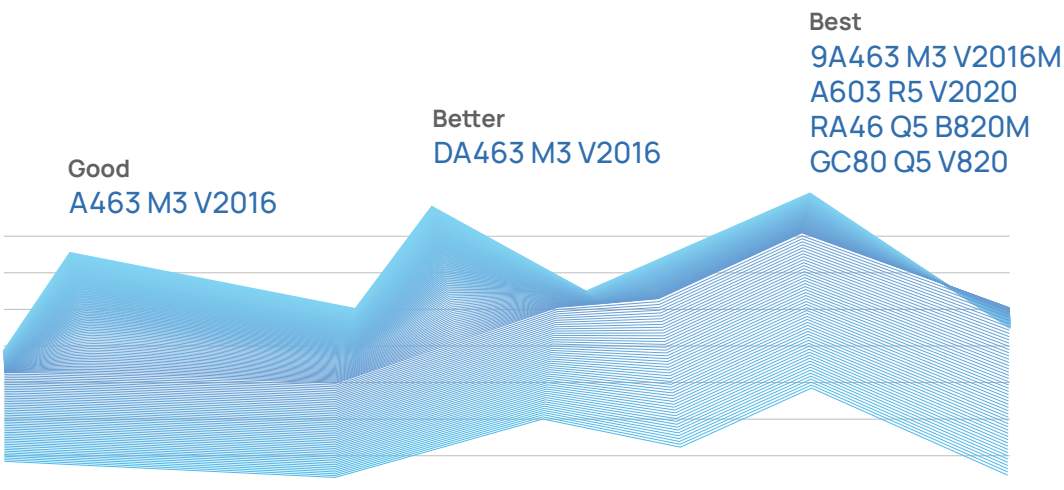
Grit Range
46 - 60

Hardness Range
K- Q

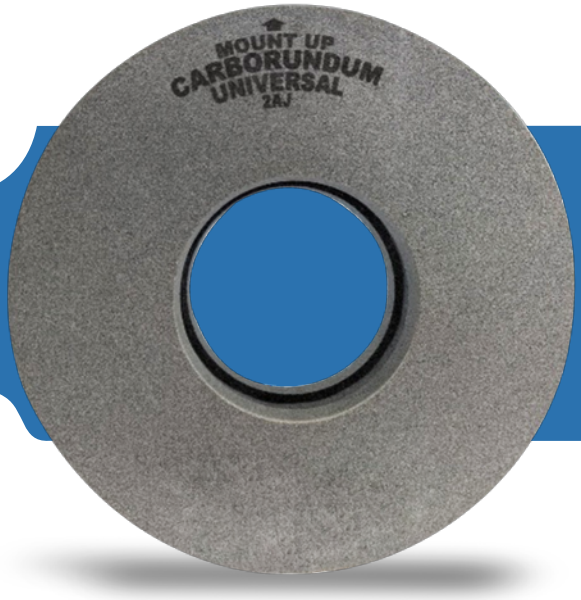
Wheel Speed
33 – 45 mps

Bonds
Vitrified

Structure
3 - 6



Valve Stem Centreless Grinding Wheel



CUMI Valve Stem Centreless Grinding Wheels deliver Ra 0.3–0.4 finishes post-nitriding, enhancing lubricity and reducing carbon deposits. Ideal for high-performance engine valves, they ensure burn-free, precise grinding. For high-Nickel valves, CUMI's advanced wheels resist substrate loading, minimizing dressing frequency and maximizing wheel life and efficiency.

Features and Benefits:

- Tough grains offer sharpness and efficient performance.
- Dual-grade design suits Inconel and high-Ni valves.
- Superior cutting reduces cycle time, boosts output.

Diameter Range
400 - 610 mm

Grit Range
46 - 120

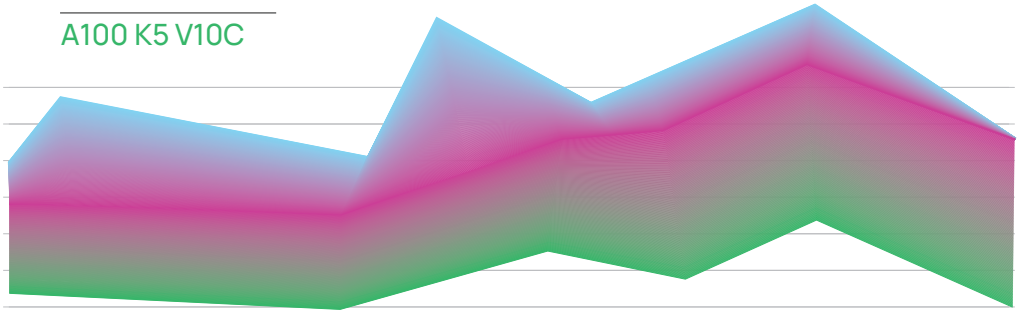
Hardness Range
L - M

Wheel Speed
33 – 45 mps

Bonds
Vitrified

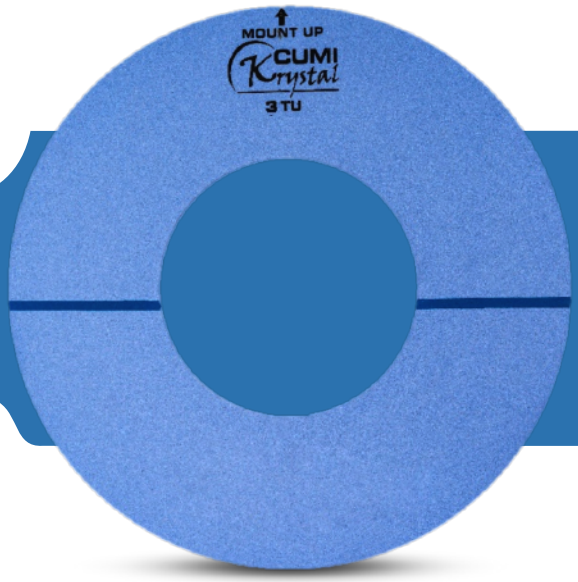
Structure
3 - 6

Good	Better	Best
A463 M3 V2016 A603 Q5 V2020	DA463 M5 V500	24A463 M3 V600
A60 L5 V10C	DA60 L5 V500	9A601 L5 V887A DA100 05 V2020 24A601 M3 V600
A100 K5 V10C	DA100 J5 V500	9A100 J5 V887A GC150 M5 VS2001 24A100 K5 V600



Roughing Semi - Finishing Finishing

Groove
Grinding Wheel



CUMI Groove Grinding Wheels are designed for precision cylindrical grinding in valve lock regions, enabling smooth, rounded interfaces that minimize wear during high-stress operations. Engineered for three-groove designs, these wheels ensure accurate groove profiles, supporting full valve rotation to reduce carbon buildup on the valve seat and enhance overall engine efficiency.

Features and Benefits:

- Superior material removal
- Maintains accurate profile shapes
- Cool, burn-free operation
- Extended tool life

Diameter Range
508 mm

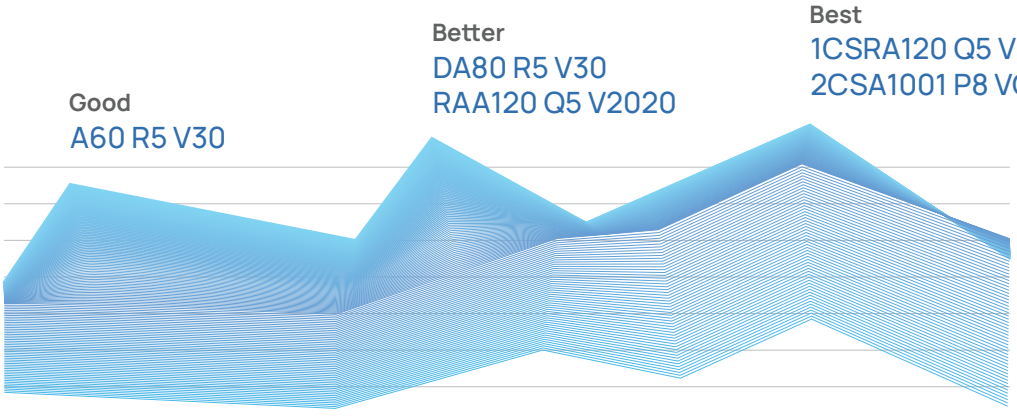
Grit Range
60 - 120

Hardness Range
O - R

Wheel Speed
35, 50, 63 mps

Bonds
Vitrified

Structure
4 - 5



Valve End
Face Grinding Wheel

CUMI End Grinding Wheels are engineered for precise grinding of hardened and stellite-deposited valve tips, where wear is most critical under high-speed engine conditions. These wheels deliver excellent surface finish, flatness, and durability ensuring enhanced wear resistance, longer valve life, and consistent performance in demanding applications.

Features and Benefits:

- Better form retention
- Maintains accurate profile shapes
- Consistent burn-free results

Diameter Range
200 – 400 mm

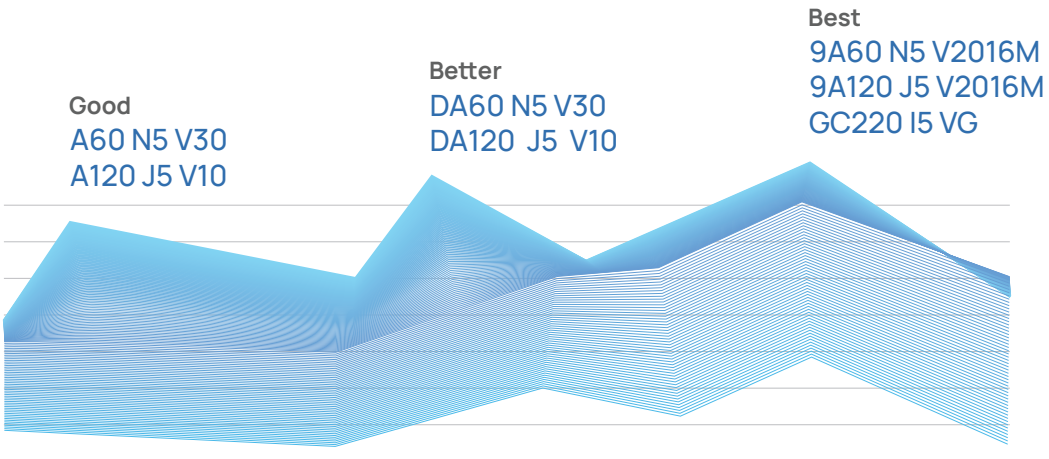
Grit Range
60 - 220

Hardness Range
I - N

Wheel Speed
35, 50, 63 mps

Bonds
Vitrified

Structure
5 - 8



Chamfer
Grinding Wheel

CUMI Chamfer Grinding solutions are engineered for precise beveling of engine valve edges, ensuring smooth transition between the valve face and seat area. This enhances seating accuracy, reduces stress concentration, and improves airflow dynamics. Our abrasives deliver consistent profiles, superior surface finish, and extended valve life for reliable engine performance.

Features and Benefits:

- Better form retention
- Maintains accurate profile shapes

Diameter Range
200 – 350 mm

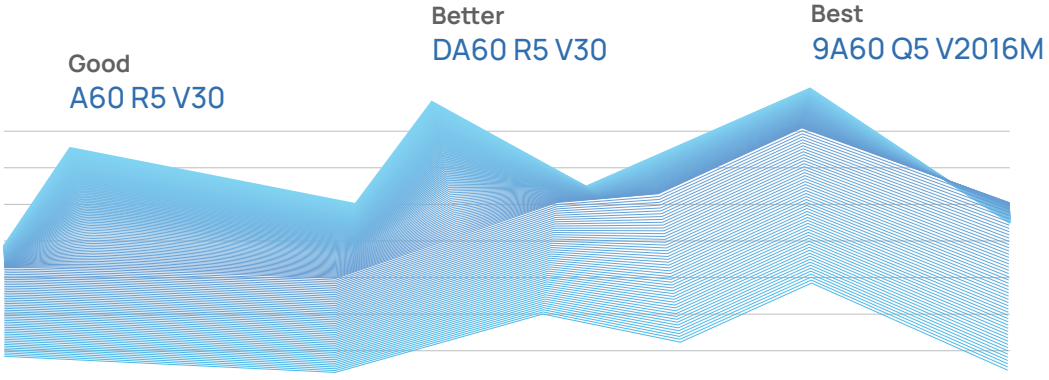
Grit Range
46-80

Hardness Range
O – R

Wheel Speed
33, 45 mps

Bonds
Vitrified

Structure
5 - 8



Seat
Grinding Wheel

CUMI Seat Grinding Wheels are engineered for precise and consistent valve seat machining, delivering excellent surface finish, form retention, and optimal seating geometry. This ensures tight sealing, minimal leakage, and improved engine efficiency. The advanced 24A range outperforms White and Pink AO wheels, offering 1.5X–3X better dressing frequency.

Features and Benefits:

- Superior form retention
- Advanced new generation bond increases dressing frequency and wheel life
- Engineered to withstand wheel speed up to 80 m/s

Diameter Range
400 - 610 mm

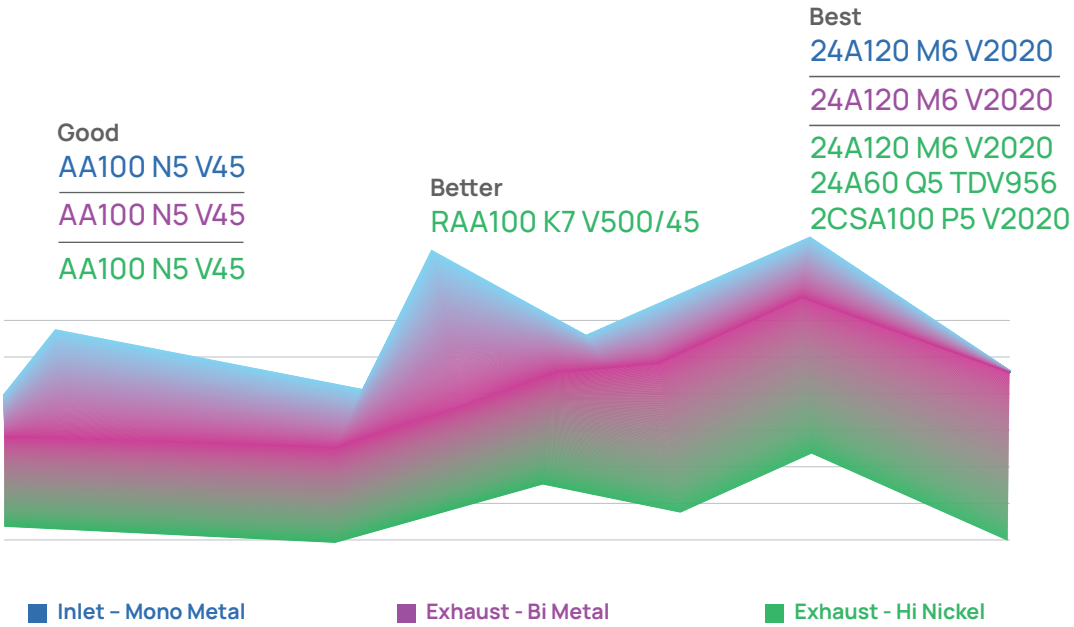
Grit Range
100 - 120

Hardness Range
K - Q

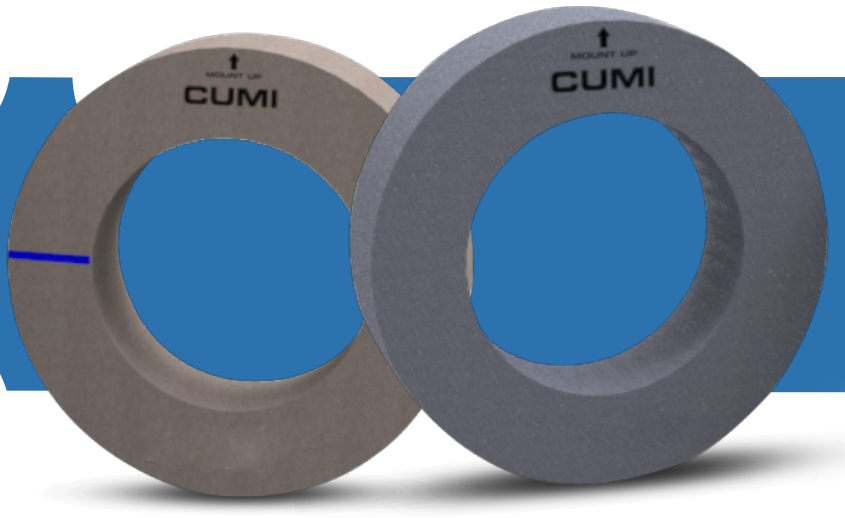
Wheel Speed
45, 80 mps

Bonds
Vitrified

Structure
5 -7



Blend Portion Grinding Wheels



CUMI Grinding Wheels are engineered for precise and consistent blend portion machining, ensuring superior surface finish, excellent form retention, and optimal seating geometry. Powered by the advanced 9A range, they deliver enhanced performance with 1.5X to 3X higher dressing frequency compared to conventional solutions, ensuring greater productivity and longer wheel life.

Features and Benefits:

- Superior form retention
- Advanced fusible bond increases dressing frequency and wheel life
- Engineered to withstand wheel speeds up to 60 m/s

Diameter Range
610 mm

Grit Range
80

Hardness Range
L - N

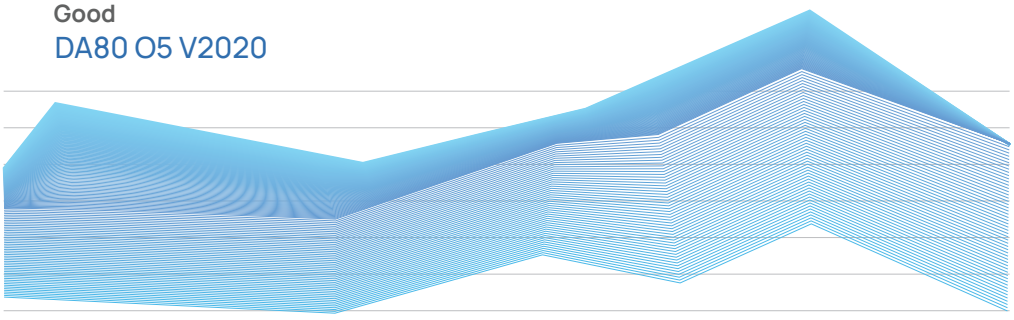
Wheel Speed
63 mps

Bonds
Vitrified

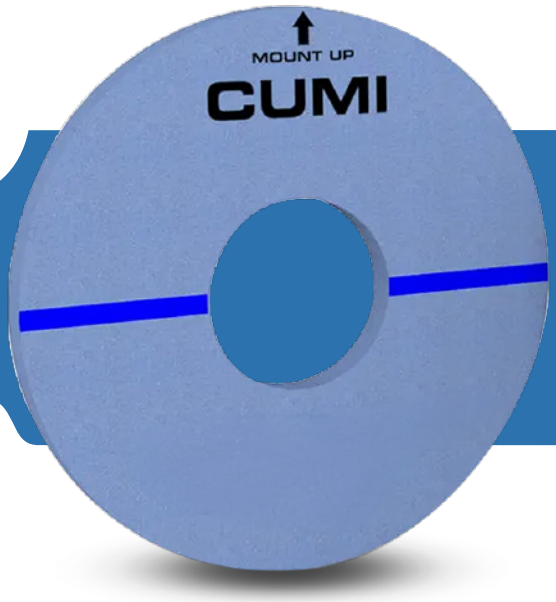
Structure
5 -7

Best
9A80 O5 V2020

Good
DA80 O5 V2020



Head OD
Grinding solutions



CUMI Head OD Grinding solutions are designed for precision machining of the valve head's outer diameter, ensuring concentricity with the stem and uniform head dimensions. This results in optimal sealing, balanced rotation, and enhanced engine efficiency. Our abrasives deliver tight tolerances, superior surface finish, and long-lasting performance for consistent quality.

Features and Benefits:

- More parts / dress
- Better form retention
- Better tool life
- Excellent surface roughness
- Improved Cycle Time

Diameter Range
610 - 762 mm

Grit Range
54 - 60

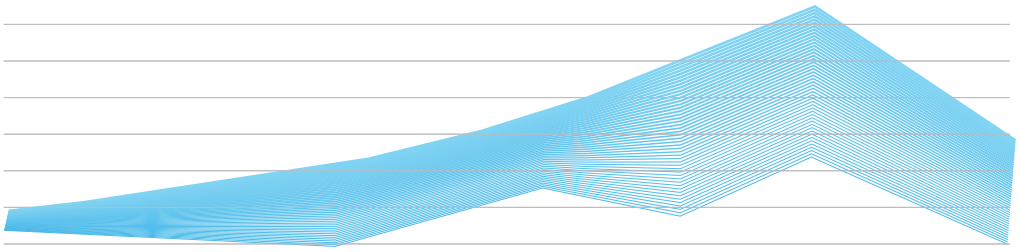
Hardness Range
P – R

Wheel Speed
63, 80 mps

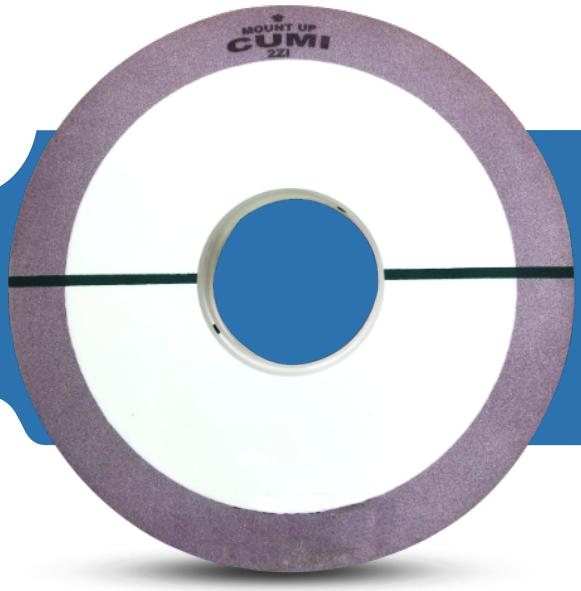
Bonds
Vitrified

Structure
5 -7

Best
5MCRA541 Q5 TDV956



High-Speed Profiling



CUMI High-Speed Profiling solutions are tailored for precision shaping of complex engine valve geometries at elevated speeds. Ideal for machining fillet radii, necks, and seat transitions, these wheels ensure superior contour accuracy, reduced cycle times, and consistent quality. Designed for productivity, they enhance flow dynamics and overall engine performance. The advanced 24A range outperforms White and Pink AO wheels, offering 1.5X–3X better dressing frequency.

Features and Benefits:

- Superior form retention
- Advanced fusible bond increases dressing frequency and wheel life
- Engineered to withstand wheel speeds up to 60 m/s

Diameter Range
400 - 610 mm

Grit Range
100 - 120

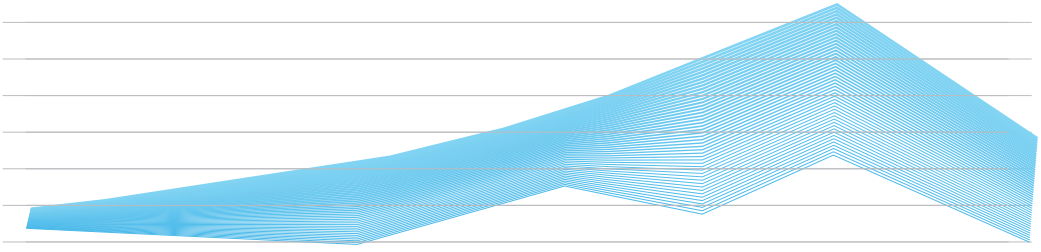
Hardness Range
P - R

Wheel Speed
45 - 80 mps

Bonds
Vitrified

Structure
5 -7

Best
24A80 Q5 V2020



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