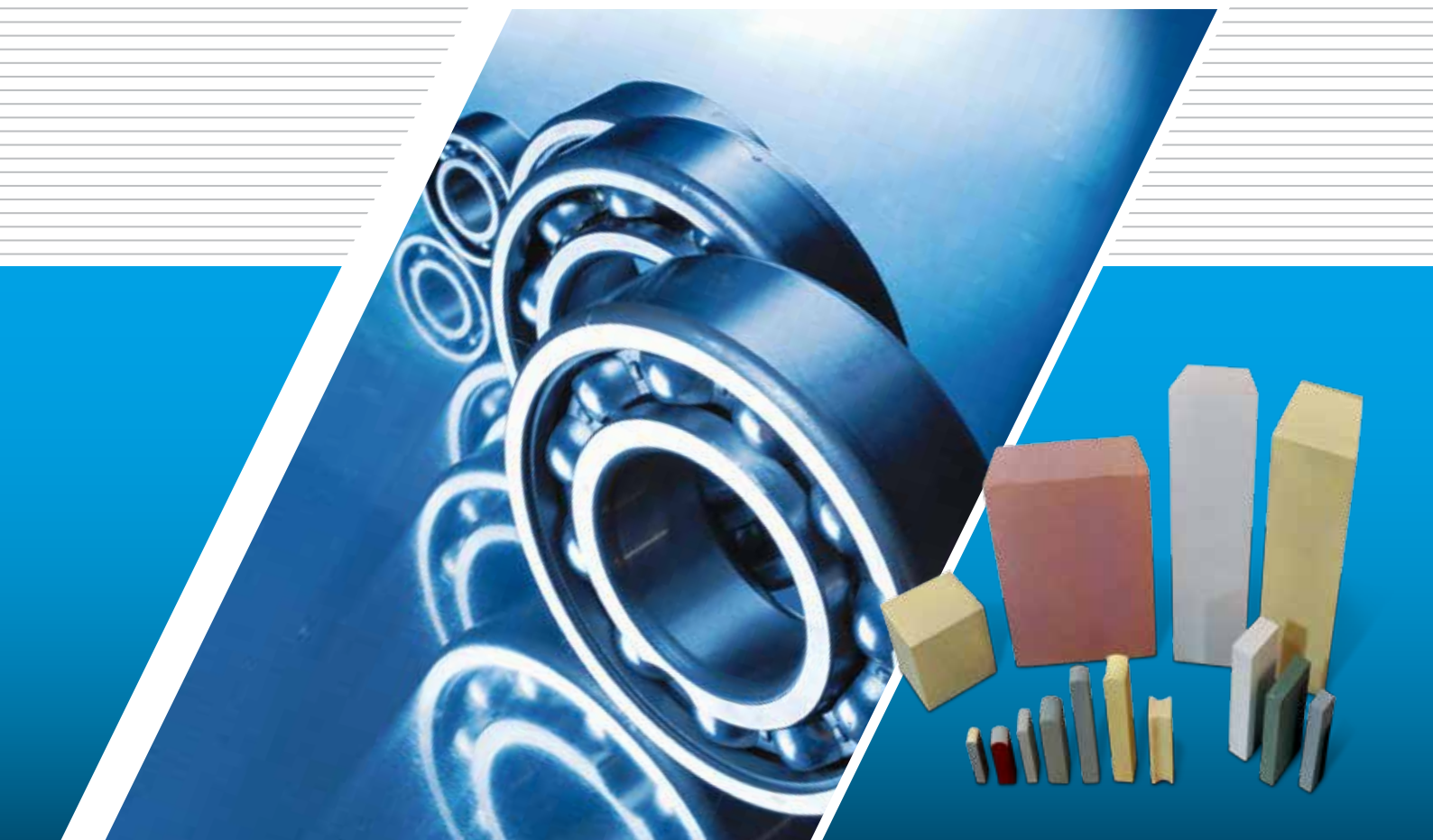


# MICROABRASIVES FOR HONING & SUPER FINISHING



**NORTON**

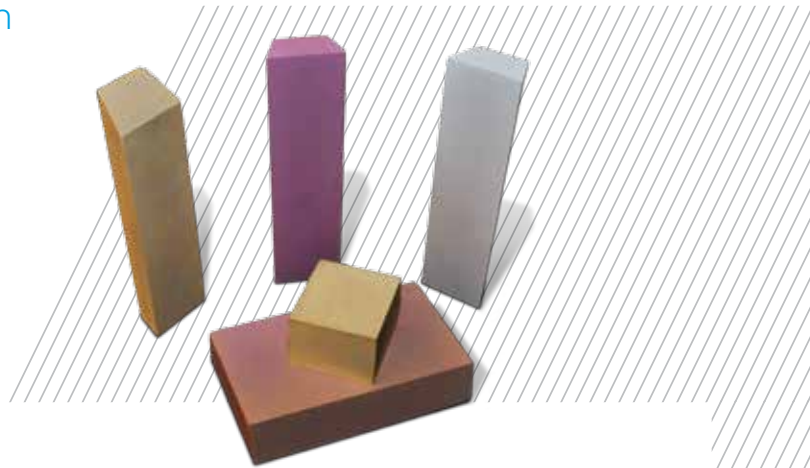
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TM

# HONING

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Honing is a material removal operation yielding excellent dimensional accuracy in terms of linearity and roundness for cylinders and tubes in assembled parts. It can be performed after cutting and grinding the part and before or after heat treatment.



Honing process is characterized by the simultaneous rotation and linear stroke of the honing head producing a typical cross-hatch pattern on the surface. This controlled roughness provides lodges for the lubricant during operation.

Honing is generally performed on tubes and cylinders used in the lifting, engine, and robotic industries. Examples of applications are hydraulic arms for cranes and hoists, plastic extrusion cylinders, hydraulic jacks and lifting platforms (with hydraulic or oil pistons). This operation is also performed on spherical valves, controlling the flow of gas, oil or water with a simple opening/closing system in pipelines.

Abrasive grains are aluminum oxide in grit size 60-80 for roughing, and down to 800 for finishing.

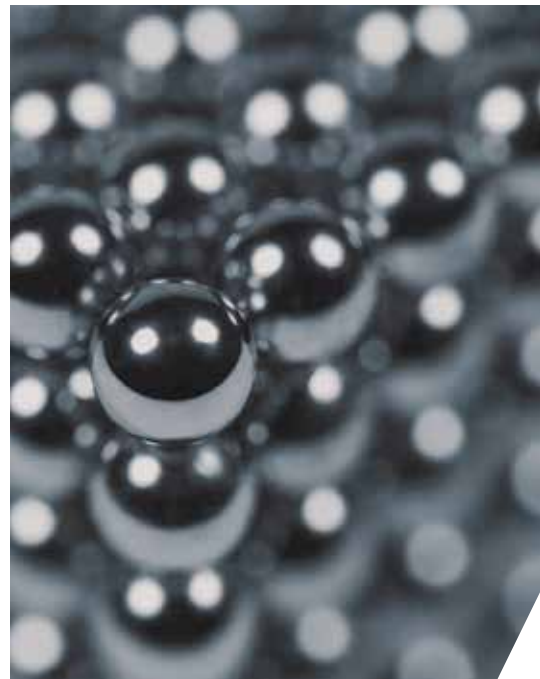
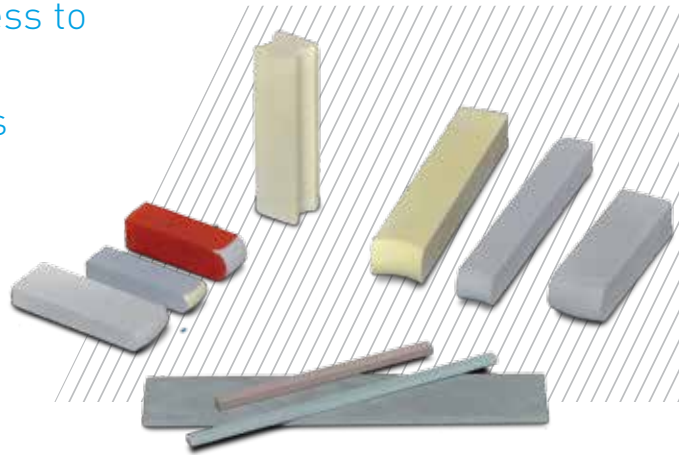


# SUPERFINISHING

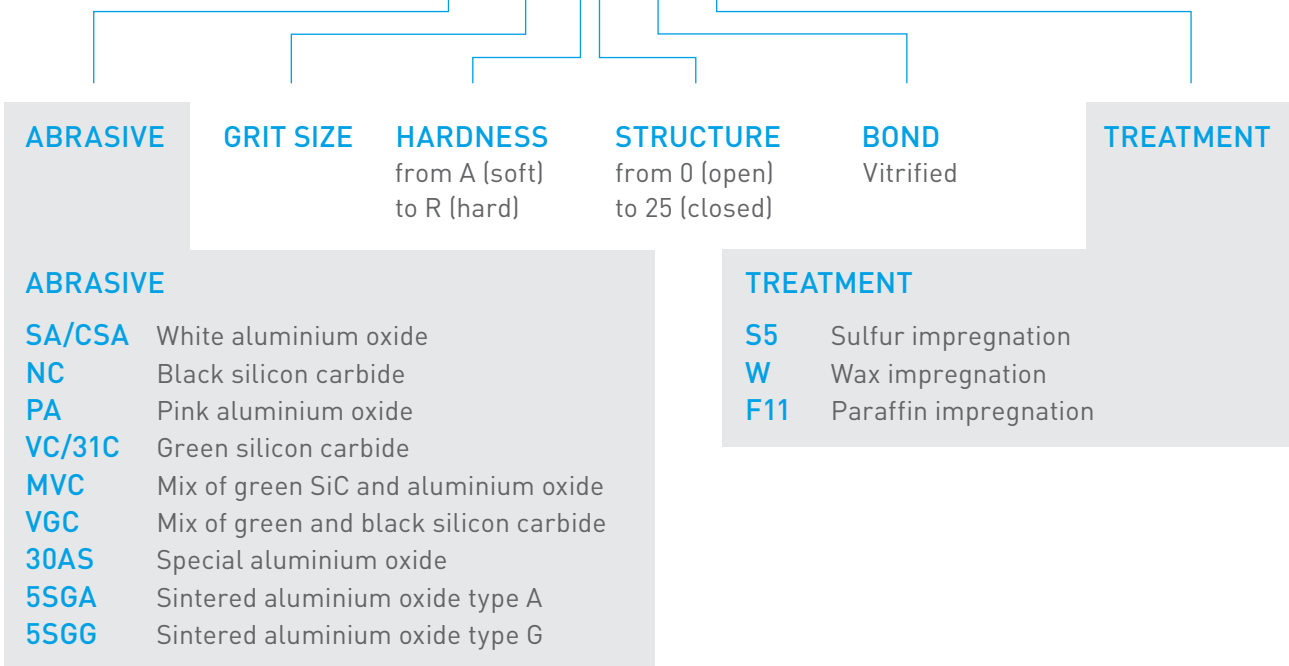
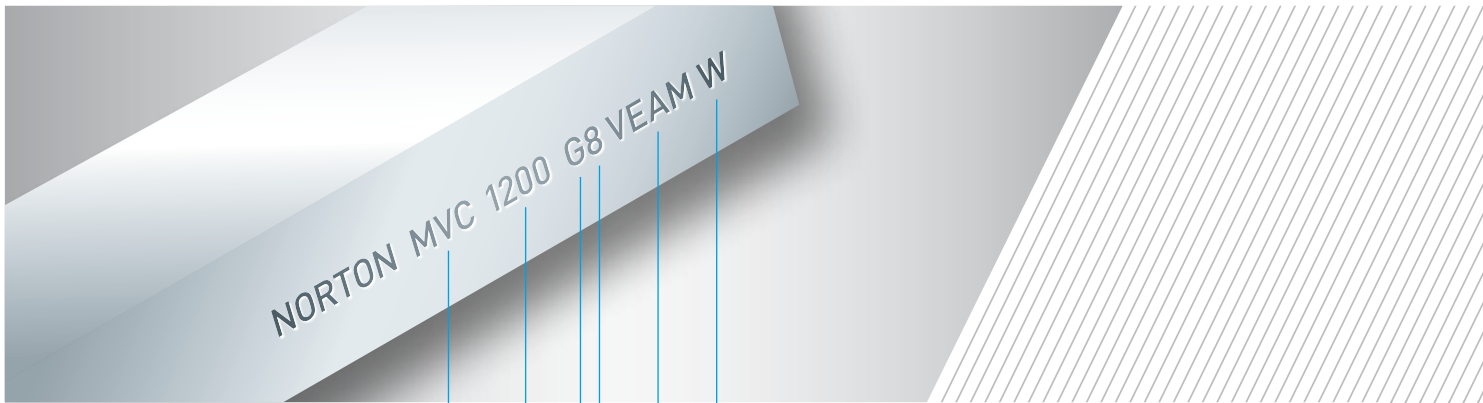
Superfinishing is a high precision process to improve the final geometry and surface finish of the part, and to remove defects generated during grinding operations. Microfinishing is characterized by an oscillation of the stone, and the pressure of the abrasive on the rotating workpiece.

Superfinishing are operations most frequently performed with mineral oil to improve the final roughness and avoid loading of the abrasive which might generate scratches and defects on the part.

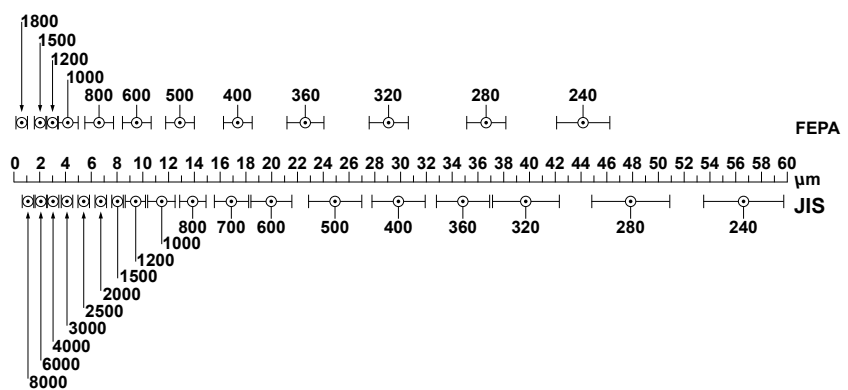
Depending on the initial and targeted average roughness (Ra) different sequences of abrasives are used. For example, with an initial Ra of  $0.30\ \mu\text{m}$ , two operations are performed: the roughing process with an aluminum oxide stone grit size 500 to remove  $5\text{-}6\ \mu\text{m}$ , and the finishing operation with silicon carbide grit size 1000-1200 to remove  $2\text{-}3\ \mu\text{m}$ . If a final Ra under  $0.10\ \mu\text{m}$  is required, a third stone in silicon carbide with finer grit size (1500-1800) can be used for a stock removal lower than  $2\ \mu\text{m}$ .



# MARKING SYSTEM



Conversion of the abrasive grit size in microns



## FINAL TREATMENTS (S5 - W - F11)

Sticks and stones can be impregnated with sulfur, wax or paraffin. The sulfur treatment (S5) improves the cutting ability of the abrasive and improves the final surface roughness. Due to health and environment regulations and industry standards, new treatments based on wax and paraffin (W and F11) are now available.



# SPHERICAL BALL VALVE HONING

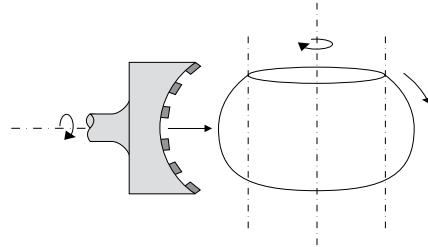


**MARKET:** Hydraulic, oil and gas

**MATERIAL:** Mild steel, stainless steel

## SPECIFICATION

ROUGH GRINDING	FINISHING	
PA 120 F 0 V S5	SA 320 I 8 V S5	BETTER +++++
-	SA 320 M 2 V F11	BEST ++++++



### KEY:

- Abrasive
- Abrasive holder
- Workpiece
- ↻ Directional movement of abrasive and workpiece

# DEEP HORIZONTAL HONING

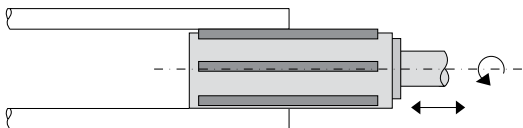
## SPECIFICATION

ROUGH GRINDING	FINISHING	
CSA120 M8 VS5	SA 800 H5 V S5	BETTER +++++
5S GG 100 P10 VEA S5		BEST ++++++

**MARKET:** Hydraulic, oil and gas

**MATERIAL:** Mild steel

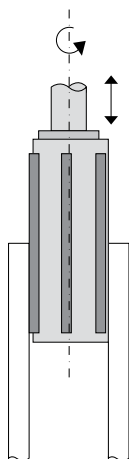
**CHARACTERISTICS:** External diameter: 60 - 100mm  
Length: 6000 - 10000 mm



### KEY:

- Abrasive
- Abrasive holder
- Workpiece
- ↻ Directional movement of abrasive

# CYLINDER HONING (VERTICAL)



## SPECIFICATION

ROUGH GRINDING	FINISHING	
SA 120 M V S5	SA 800 H V S5	BETTER +++++
5SG 120 N 12 VEA S5		BEST ++++++

**MARKET:** Hydraulic, oil and gas

**MATERIAL:** Mild steel

**CHARACTERISTICS:** External diameter: 100 - 350mm  
Length: 100 - 3500mm

### KEY:

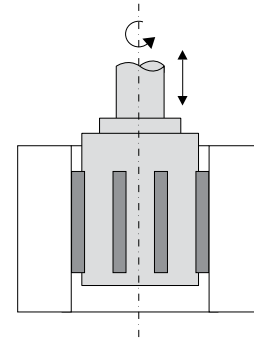
- Abrasive
- Abrasive holder
- Workpiece
- ↻ Directional movement of abrasive and workpiece

# ENGINE BLOCK HONING



## SPECIFICATION

ROUGH GRINDING	SEMI-FINISHING	FINISHING	
5SGG 100 O 8 VEA S5	5SGG 240 M 8 VCA S5	MNC 400L 5V S5	BETTER +++++



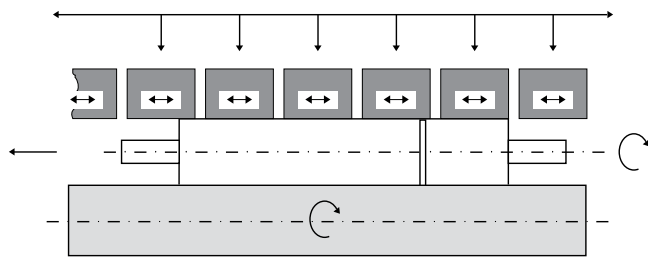
## KEY:

■ Abrasive	□ Workpiece
■ Abrasive holder	→ ↻ Directional movement of abrasive

MARKET: Automobile

MATERIAL: Cast iron

# SHAFT SUPERFINISHING



## KEY:

■ Abrasive	□ Workpiece
■ Feeding wheel	→ ↻ Directional movement of abrasive and workpiece



## SPECIFICATION

FINISHING	
MVC 600 H 8 VCA S5	BETTER +++++
MVC 800 J 8 VCA S5	BEST ++++++

# CAMSHAFT SUPERFINISHING

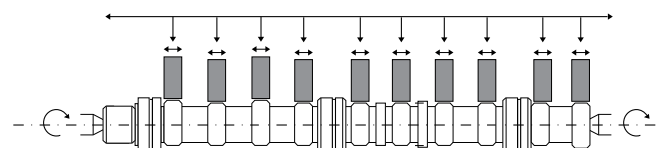


## SPECIFICATION

FINISHING	
VGC 1000 P 25 VAMX	BETTER +++++

MARKET: Automotive

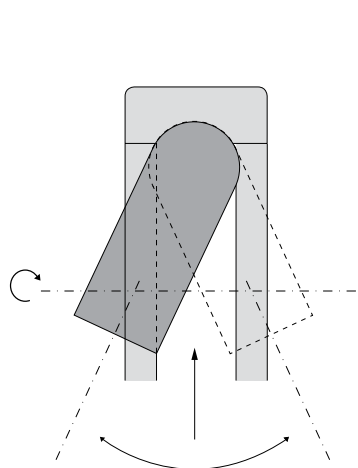
MATERIAL: Case hardened steel



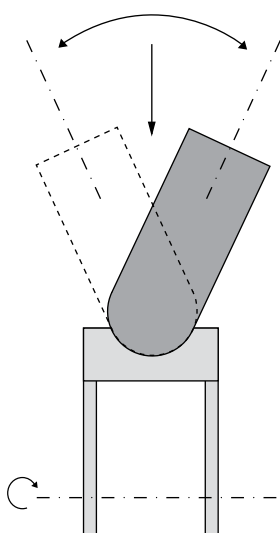
## KEY:

■ Abrasive	→ ↻ Directional movement of abrasive and workpiece
□ Workpiece	

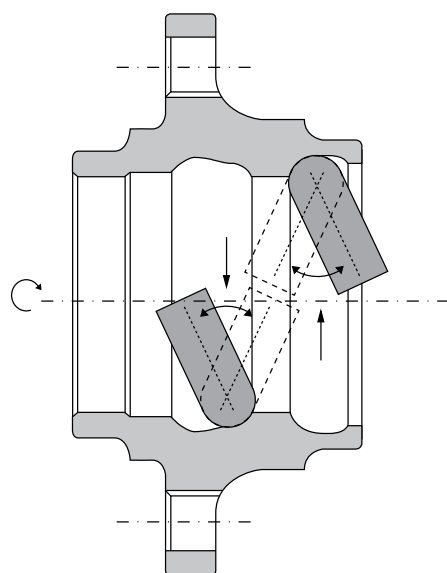
# SUPERFINISHING INNER / OUTER RING



Outer ring raceway superfinishing



Inner ring raceway superfinishing



Hub bearing raceway superfinishing

## KEY:

- Abrasive
- Workpiece
- Directional movement of abrasive and workpiece

## MARKET:

Bearing

## MATERIAL:

Steel 100Cr6

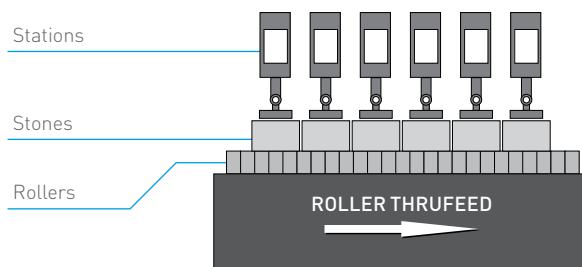
## SPECIFICATION FOR SINGLE STATION

ROUGHING & FINISHING		
SA 1000 K 10 V S5	SA 800 F 0 VAC S5	BETTER ++++
30AS 800/1000 L-M V 6448 F11		BEST +++++

## SPECIFICATION FOR DOUBLE STATION

ROUGHING	FINISHING	LAPPING	
SA 500 FV S5	MVC 1200 G 8 VCA S5		BETTER ++++
SA 600 L10 VS5	MVC 1500 / 8I2 VCAM S5	MVC 1800 / 8 G2 VCA MW	BEST +++++

# ROLLS AND ROLLERS SUPERFINISHING



**MARKET:** Bearing

**MATERIAL:** Steel 100Cr6

## SPECIFICATION

SMALL ROLLERS (3-10mm)	MEDIUM/LARGE ROLLERS (11-20MM)	POLISHING STATION	
MVC 1000 / 4 L01 VCA M S5	MVC 600 / 800 H8 VEA S5	31C 500 JB 860 (Graphite stone)	BETTER +++++
MVC 1200 / 6 K01 VCA M S5	30AS 400 / 600 / 800 F8 V6448 P15A	MVC 1800 / 8 G2 VCA MW	BEST +++++

# WATER PUMP BEARING SUPERFINISHING

## SPECIFICATION

WATER PUMP BEARING	
MVC 800 M 8 VEA S5 - 30AS 1000 L-M 3 V6448 F11	BEST +++++

**MARKET:** Bearing

**MATERIAL:** Steel 100Cr6



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Saint-Gobain Abrasivi S.p.A.  
Via per Cesano Boscone, 4  
20094 Corsico (MI) - Italy  
enmarkets@saint-gobain.com

Production Site:  
Via IV Novembre, 228  
20042 Caronno Pertusella (VA) - Italy  
Tel: +39 02 96 45 05 05  
Fax: +39 02 96 45 04 56

Plant Manager: Davide.Bonalumi@Saint-Gobain.com  
Customer Service Italy: Claudia.Banfi@Saint-Gobain.com  
Customer Service External: Laura.Colombo@Saint-Gobain.com

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