



Fluid Abrasion & Wear Protection

Introduction to Resimac

Resimac manufactures a wide range of ceramic enhanced epoxy repair materials which are ideal for repairs to process equipment and components subject to abrasion, wear and impact.

Our ceramic enhanced epoxy repair range is manufactured in the UK and exported to over 40 countries worldwide and we are able to provide local solutions in North America, South America, Africa, Europe, Middle East and Asia using our approved contractor network.

Our abrasion, wear and impact resistant repair products have been used by some of the largest corporations worldwide to help protect metallic and concrete surfaces from premature failure.

Our ceramic enhanced epoxy repair materials are used in a wide range of industries and through our extensive worldwide network of contractors we are able to offer onsite technical services, support, training, presentations and seminars, backed by our project method statements and specifications.

Oil & Gas

Power

Water

Chemical

Marine

Petrochemical

Paper & Pulp



Rebuilding grade Paste grade repair material for highly abrasive fluid erosion

2 component paste grade

Apply to 25mm WFT

Solvent free epoxy

No shrinkage

Base & activator component

Apply to any metallic surface

Contains ceramic fillers

Wear & abrasion resistant

201 Ceramic Repair Paste

Resurfacing grade Brush applied fluid for highly abrasive fluid erosion

2 component fluid grade

Apply by brush 2 coats

Solvent free epoxy

350 microns WFT per coat

Base & activator component

Apply to any metallic surface

Contains ceramic fillers

Wear & abrasion resistant

202 Ceramic Repair Fluid

Resurfacing grade Brush applied efficiency coating for medium to low fluid erosion

2 component fluid grade

Apply by brush 2 coats

Solvent free epoxy

300 microns WFT per coat

Base & activator component

Apply to any metallic surface

Contains ceramic fillers

Wear & abrasion resistant

203 Super Flow

Resurfacing grade Brush applied fluid for hydrocarbons at elevated temperatures (130°C)

2 component fluid grade

Apply by brush 2 coats

Solvent free epoxy novolac

500 microns WFT per coat

Base & activator component

Apply to any metallic surface

Contains ceramic fillers

Wear & abrasion resistant

205 Ceramic HT Fluid

Resurfacing grade Brush applied fluid for acids at elevated temperatures (110°C)

2 component fluid grade

Apply by brush 2 coats

Solvent free epoxy novolac

600 microns WFT per coat

Base & activator component

Apply to any metallic surface

Contains ceramic fillers

Wear & abrasion resistant

206 Ceramic HTA Fluid

Resurfacing grade Brush applied coating for high impact protection

2 component fluid grade

Apply by brush 3 coats

Solvent free polyurethane

400 microns WFT per coat

Base & activator component

Apply to any metallic surface

209 EIP PU

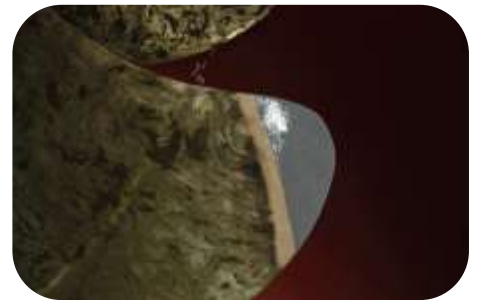
201 Ceramic Repair Paste

a two component solvent free epoxy repair paste containing hardened ceramic particles to give superior abrasion resistance. The product has been designed for use on a wide range of metallic surfaces

- Solvent free epoxy technology
- High build capability 1" without slump
- Simple mixing ratio 3:1 by volume
- Suitable for metallic surfaces
- No shrinkage
- Excellent chemical resistance
- Superior adhesion to metallic surfaces
- Enhanced wear & abrasion resistance



Container vessel propellers suffering from cavitation attack. Surfaces were abrasive blast cleaned and rebuilt using 201 Ceramic Repair Paste



Sea water pipe spool reducer was internally corroded and in need of repair, surfaces were mechanically abraded and rebuilt using 201 Ceramic Repair Paste

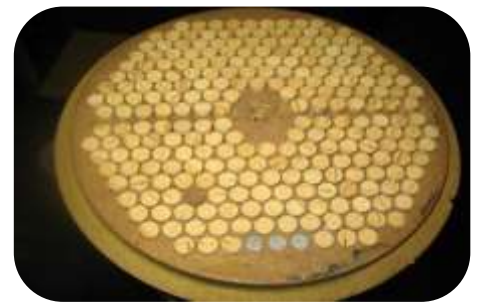




Chemical pump impeller had become badly corroded, the efficiency of the pump had been reduced by 50%. The impeller surface was abrasive blast cleaned and rebuilt using 201 Ceramic Repair Paste.

The product can be used to rebuild damaged or worn surfaces on equipment such as -

- **Pump housings**
- **Worn impellers**
- **Internal pipe surfaces**
- **Separator housings**
- **Bow thruster tunnels**
- **Rudders**
- **A-frames & P-brackets**
- **Tube sheets, end plates and water boxes**
- **Cyclones**
- **Centrifuges**
- **Process vessels**



Badly pitted and corroded tube sheets and end plates can be rebuilt to original OEM specifications using 201 Ceramic Repair Paste

202 Ceramic Repair Fluid

is a two component solvent free epoxy repair fluid containing hardened ceramic particles. The product is ideal for resurfacing and protecting metallic surfaces subject to severe abrasion, wear and impact.

- Solvent free epoxy technology
- Apply by brush up to 350 microns per coat
- Suitable for metallic surfaces
- No shrinkage
- Excellent chemical resistance
- Superior adhesion to metallic surfaces
- Enhanced wear & abrasion resistance
- Ideal for high particulate fluids and slurries



External surface of a vessel was badly corroded due to the design of the hull. Structural loss was measured at 3-5mm in certain areas. The hull was filled with 101 Metal Repair Paste and then over coated with 202 Ceramic Repair Fluid.



Impeller for a large water pump has become badly eroded and required resurfacing. The impeller was abrasive blast cleaned and 2 x coats of 202 Ceramic Repair Fluid applied to the surface





Sea water filter was in need of urgent repair. The internal surfaces were abrasive blast cleaned and lined with 2 coats of 202 Ceramic Repair Fluid. The coating was then post cured at 50C for 6 hrs to ensure the filter was back in operation within 24 hrs.

The product can be used to rebuild damaged or worn surfaces on equipment such as -

- **Pump housings**
- **Worn impellers**
- **Tube sheets, end plates and water boxes**
- **Internal pipe surfaces**
- **Separator housings**
- **Bow thruster tunnels**
- **Cyclones**
- **Centrifuges**
- **Process vessels**



Process vessel required rebuilding and resurfacing. Internal substrates were mechanically abraded and relined using 202 Ceramic Repair Fluid



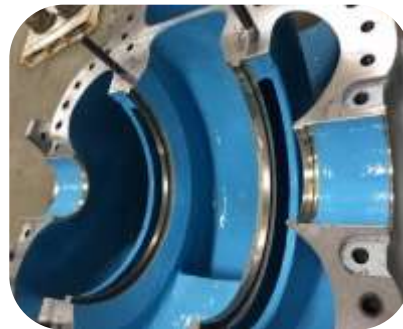
Impeller from a sea water pump was badly eroded. The pump was obsolete and no spare parts were available. The surface of the impeller was rebuilt using 301 Epoxy Resin with glass fillers and then machined to a smooth finish. Once cured 2 coats of 202 Ceramic Repair Fluid were applied to complete the repair



203 Super Flow

is a two component solvent free epoxy repair fluid which once cured has a hardened high gloss finish. The material is designed to improve flow rates and pump efficiency while giving superior abrasion resistance.

- Solvent free epoxy technology
- Apply by brush up to 300 microns per coat
- Suitable for metallic surfaces
- No shrinkage
- Excellent chemical resistance
- Superior adhesion to metallic surfaces
- High gloss finish for improved flow rates
- Ideal for low to medium particulate fluids



Large split case pump from a power station abrasive blast cleaned and then resurfaced using 203 Super Flow.



Heat Exchanger tube sheet, end covers and water box were all abrasive blast cleaned in situ to SA2.5 surface cleanliness. 201 Ceramic Repair Paste was used to rebuild any badly corroded areas and then all surfaces were coated with 2 x coats of 203 Super Flow at 300 microns per coat.





Promas pod constructed on a UK ferry had severe corrosion after 2 years operation. 203 Super Flow was applied in 2 coats to offer long term protection from cavitation attack.



The product can be used to rebuild damaged or worn surfaces on equipment such as -

- Pump housings
- Worn impellers
- Tube sheets, end plates and water boxes
 - Internal pipe surfaces
 - Rudders
- A-frames & P-brackets
 - Centrifuges



Centrifuge was abrasive blast cleaned and relined with 2 coats of 203 Super Flow applied at 300 microns per coat



Pump suffering from cavitation attack was rebuilt using 201 Ceramic Repair Paste and then resurfaced with 2 coats of 203 Super Flow



205 Ceramic HT Fluid

a two component solvent free epoxy novolac repair fluid. The product can resist continuous immersion conditions in hydrocarbons up to 130°C. The coating contains hardened ceramic particles to give superior abrasion resistance even at elevated temperatures.

- Solvent free epoxy novolac technology
- Apply in 2 coats at 500 microns per coat
- Suitable for metallic surfaces
- Apply by brush or roller
- Resists 130°C continuous immersion temperatures
- Protects against hydrocarbon and alkaline fluids



Process vessel operating at 95°C relined using 2 coats of 205 Ceramic HT



Ammonia distiller operating at 95-100°C had become badly corroded due to the harsh operating environment. The internal surfaces were abrasive blast cleaned and coat using 205 Ceramic HT Fluid





Sea water filter due to be placed in operation at a refinery required protecting from sea water containing high levels of sand at an operating temperature of 75-80°C. 205 Ceramic HT Fluid was applied in 2 coats to give a highly abrasion resistant coating even at elevated temperatures.

The product can be used to rebuild damaged or worn surfaces on equipment such as -

- **Process vessels**
- **Chemical storage tanks**
 - **Internal pipe surfaces**
- **Pump and process systems**
 - **Distillers**
 - **Separators**
 - **Filters**
- **Tube sheets, end covers, water boxes**



A badly corroded tube sheet situated on a refinery complex in Taiwan was abrasive blast cleaned in-situ and coated with 205 Ceramic HT Fluid.

206 Ceramic HTA Fluid

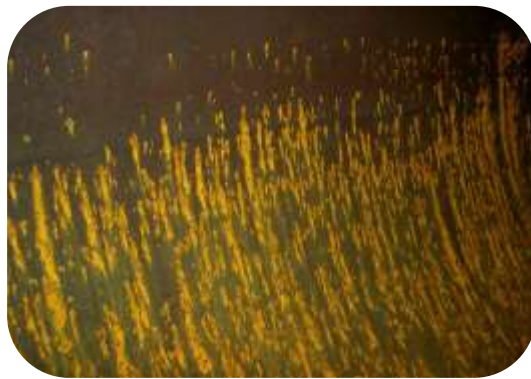
a two component solvent free epoxy novolac repair fluid. The product can resist continuous immersion conditions in hydrocarbons and acidic media up to 110°C.

- **Solvent free epoxy novolac technology**
- **Apply in 2 coats at 500-600 microns per coat**
- **Suitable for metallic surfaces**
- **Apply by brush or roller**
- **Resists 110°C continuous immersion temperatures**
- **Protects against acids and high concentration industrial chemicals**



Power station chimney containing steam & sulphur dioxide at 90-110°C relined using 206 Ceramic HTA Fluid





*De-mineralised water tank operating at 100-110°C
abrasive blast cleaned and lined using 206 Ceramic HTA*



The product can be used to rebuild damaged or worn surfaces on equipment such as -

- **Process vessels**
- **Chemical storage tanks**
- **Internal pipe surfaces**
- **Pump and process systems**
- **Distillers**
- **Separators**
- **Chimneys and kiln stacks**



*Pipe spool corroded from acidic water operating at 95°C
was abrasive blast cleaned and coated with 206 HTA*

209 EIP PU

a two component solvent free toughened polyurethane coating designed for high impact operating environments. The product when applied at 1mm+ gives a flexible but hard wearing finish to metallic surfaces to protect against impact from aggregates and slurries

- Solvent free polyurethane
- Apply in 3 coats at 400 microns per coat
- Suitable for metallic surfaces
- Apply by brush or roller
- Flexible once cured
- High impact and abrasion resistance



Chemical powder process vessel and chute were lined with 3mm of 209 EIP PU.



Seawater line with a high content of sand lined using a rotary Brush with 209 EIP PU





*Aggregate sieve
abrasive blast
cleaned and relined
with 3 coats of 209
EIP PU*



The product can be used to rebuild damaged or worn surfaces on equipment such as -

- **Hoppers and chutes**
 - **Pipe spools**
 - **Grinders**
- **Mixers and mixer blades**
- **Conveyor guides and sides**
 - **Back plates**



Pump impeller coated with 1mm of 209 EIP PU

Typical Applications

	201	202	203	205	206	209
Bow thruster tunnel						
Centrifuge						
Chemical box		5- 60°C		60-130°C	60-110°C	
Chemical drain		5- 60°C		60-130°C	60-110°C	
Chutes						
Cyclone housing		5- 60°C				
Digester		5- 60°C		60-130°C	60-110°C	
Evaporator		5- 60°C		60-130°C	60-110°C	
Fan housing		5- 60°C		60-130°C	60-110°C	
Fan blades						
Fermentation tank						
Filters		5- 60°C		60-130°C	60-110°C	
Gas holders		5- 60°C			60-110°C	
Gas vents		5- 60°C			60-110°C	
Heat exchanger tube sheet		5- 60°C	5- 60°C	60-130°C		
Heat exchanger end covers		5- 60°C	5- 60°C	60-130°C		
Hoppers						
Jet tubes						
Impeller		5- 60°C	5- 60°C	60-130°C	60-110°C	
Pipe spools		5- 60°C		60-130°C	60-110°C	
Pipe internals		5- 60°C		60-130°C	60-110°C	
Process vessel		5- 60°C		60-130°C	60-110°C	
Pump—sea water, fluids, effluent		5- 60°C				
Reactor vessel				60-130°C	60-110°C	
Rudder						
Screw— sea water, fluids, effluent						
Scrubber unit				60-130°C	60-110°C	
Tank lining		5- 60°C		60-130°C	60-110°C	
Tank rebuild						
Turbine blades						
Turbine housing						
Valves		5- 60°C	5- 60°C	60-130°C	60-110°C	
Water box		5- 60°C	5- 60°C	60-130°C	60-110°C	

 Product is suitable for this application

Abrasion, Wear & Impact Protection

Product Testing and Product Characteristics

	201	202	203	205	206	209
Compressive strength <i>Tested to ASTM D 695</i>	1075kg/ cm ² (15,300psi)	960kg/ cm ² (13,650psi)	735kg/ cm ² (10,450psi)	1046kg/ cm ² (14,880psi)	1046kg/ cm ² (14,880psi)	476kg/ cm ² (6750psi)
Corrosion Resistance <i>Tested to ASTM B117</i>	5000 hours	5000 hours	5000 hours	5000 hours	5000 hours	5000 hours
Flexural Strength <i>Tested to ASTM D790</i>	703kg/cm ² (10,000psi)	635kg/cm ² (9,000psi)	570kg/cm ² (8100psi)	614kg/cm ² (8710psi)	614kg/cm ² (8710psi)	614kg/cm ² (8710psi)
Hardness <i>Rockwell R to ASTM D785</i>	100	100	85	100	100	80
Sag Resistance	25mm	400 microns	400 microns	1000 microns	1000 microns	400 microns
Tensile Shear Adhesion <i>Tested to ASTM D1002</i>	206kg/cm ² (2920psi)	202kg/cm ² (2875psi)	187kg/cm ² (2650psi)	245kg/cm ² (3480psi)	245kg/cm ² (3480psi)	200kg/cm ² (2850psi)
Abrasion Resistance <i>Taber abrasion CS17 1000 cycles/ 1kg</i>	20mm ³	20mm ³	24mm ³	28mm ³	28mm ³	38mm ³
Volume Capacity <i>cc per kg</i>	406	446	657	459	425	1000
Base density <i>gm per cm³</i>	2.70	2.65	1.67	2.48	2.55	1.31
Activator density <i>gm per cm³</i>	1.70	1.00	1.05	0.99	0.97	1.22
Mixed product density <i>gm per cm³</i>	2.46	2.24	1.52	2.46	2.35	1.29
Dry heat resistance <i>(°C)</i>	200	200	200	240	240	120
Intermittent wet heat resistance <i>(°C)</i>	120	120	120	160	160	90
Immersion temperature resistance <i>(°C)</i>	60	70	70	130	110	70
Mixing ratio by volume	3:1	3:1	3:1	4:1	7:1	3:1
Mixing ratio by weight	5:1	8:1	5:1	10:1	18:1	3.25:1

	10°C			20°C			30°C			40°C		
	Pot life	Touch dry	Immersion	Pot life	Touch dry	Immersion	Pot life	Touch dry	Immersion	Pot life	Touch dry	Immersion
201	60mins	4hrs	6 days	30mins	2hrs	3 days	15mins	1hrs	36hrs	7.5mins	30mins	18hrs
202	50mins	4hrs	4 days	25mins	2hrs	2 days	12.5mins	60mins	1 day	6mins	30mins	12hrs
203	40mins	4hrs	4 days	20mins	2hrs	2 days	10mins	60mins	1 day	5mins	30mins	12hrs
205	70mins	8hrs	6 days	35mins	4hrs	3 days	17mins	2hrs	1.5 days	8.5mins	60mins	18hrs
206	50mins	12hrs	6 days	25mins	6hrs	3 days	12.5mins	3 hrs	1.5 days	6mins	90mins	18hrs
209	40mins	8hrs	6 days	20mins	4hrs	3 days	10mins	2hrs	1.5 days	5mins	60mins	24hrs

Chemical Resistance Chart

	201	202	203	205	206	209
Acetic acid >10%	2	2	2	2	2	3
Acetic acid 20%	4	4	4	3	3	4
Acetone	3	3	3	1	2	3
Ammonia Hydroxide 30%+	1	1	1	1	1	1
Benzene	1	2	2	1	1	2
Butanol	1	1	1	1	1	1
Carbonic acid 10-20%	1	1	1	1	1	1
Carbonic acid 20%+	2	2	2	1	1	3
Cyclohexane	1	1	1	1	1	1
Diesel	1	1	1	1	1	1
Diethanolamine	1	1	1	1	1	1
Ethanol	2	2	2	1	1	2
Formic acid 10%	3	3	3	2	2	4
Fuel Oil	1	1	1	1	1	1
Glycerine	1	1	1	1	1	1
Hydrochloric acid 10-20%	1	1	1	1	1	1
Hydrochloric acid 20-30%	2	2	2	2	1	1
Hydrochloric acid 36%	2	2	2	2	1	2
Hexane	1	1	1	1	1	1
Isopropanol	1	1	1	1	1	1
Lactic acid 20%	2	2	2	3	2	2
Naphtha	1	1	1	1	1	1
Nitric acid 10%	1	1	1	2	1	1
Nitric acid 10-20%	2	2	2	2	1	2
Nitric acid 20-30%	4	4	4	4	1	2
Phosphoric acid 30%	2	2	2	2	1	1
Phosphoric acid 50%	3	3	3	3	1	3
Sodium Hydroxide 30%	1	1	1	1	1	1
Sodium Hydroxide 50%	2	2	2	1	1	2
Sodium Hypochlorite 6%	2	2	2	2	2	1
Sodium Hypochlorite 15%	3	3	3	3	3	1
Sulphuric acid 10%	1	1	1	2	1	1
Sulphuric acid 10-20%	2	2	2	2	1	1
Sulphuric acid 50%	3	3	3	2	1	1
Sulphuric acid 98%	4	4	4	2	1	3
Toluene	3	3	3	1	2	2
White spirit	1	1	1	1	1	1

1: Suitable for immersion (20° C). 2: Suitable for short term immersion 72hrs (20° C). 3: Suitable for splash resistance
4: Unsuitable for contact

Resimac Technical Support and Expertise



Formed in 2009 and based in the North of England, Resimac manufactures a wide range of solvent free epoxy and polyurethane coatings and engineering materials for the Marine, Chemical, Water, Power, Oil and Gas Industries.



We are able to offer expert technical advice onsite or online 24 hours a day, 7 days a week in over 45 countries worldwide.



Contact us direct by email, telephone or by visiting our website.

Web: www.resimacsolutions.com

Tel: +44 (0) 1845 577498

Email: info@resimac.co.uk



With over 50 contractors worldwide we are able to offer fast and effective solutions in many of the worlds major industrial areas.

Fluid Abrasion & Wear Protection

Chemical Protection

Corrosion Protection

High Temperature Protection

Impact Protection

Metal Repair

Pipe Repair and Pipe Wrapping

Thermal Protection

Underwater Repair & Protection

Resimac Limited

Unit B, Park Barn Estate

Station Road, Topcliffe

Thirsk, North Yorkshire

YO7 3SE

UNITED KINGDOM

Tel: +44 (0) 1845 577498

Email: info@resimac.co.uk

Web: www.resimacsolutions.com
