resimac Ltd.

Repair Protect Upgrade

Abrasion, Wear & Impact Protection

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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

Resimac Abrasion, Wear & Impact Protection Product Range

201 CERAMIC REPAIR PASTE

Solvent free epoxy repair paste containing hardened ceramic particles for rebuilding damaged or worn metallic surfaces	Apply up to 25mm without sagging No shrinkage Apply by spatula or applicator tool	Rebuild damaged metallic surfaces Bond metal to metal	Usable life 30 mins Touch Dry 90 mins Hard Dry 8 hours	Dark grey

202 CERAMIC REPAIR FLUID

Brush applied solvent free epoxy repair fluid with hardened ceramic particles to give a superior abrasion resistant finish	Apply up to 400 microns per coat No shrinkage Apply by brush in 2 coats	Resurface worn metallic surfaces Protect against high particulate fluids and slurries	Usable life 25 mins Touch Dry 3 hrs Hard Dry 6 hours	Dark grey Light Grey Blue Red

203 SUPER FLOW

Brush applied solvent free epoxy repair fluid with a high gloss finish	Apply up to 300 microns per coat No shrinkage Apply by brush in 2 coats	Improve pump efficiency Increase flowrates with smooth finish to surfaces Protect against low to medium particulate fluid	Usable life 25 mins Touch Dry 3 hrs Hard Dry 6 hours	Light grey Light blue Red

204 HEAVY DUTY CERAMIC PASTE

Solvent free epoxy repair paste containing hardened ceramic beads for outstanding abrasion resistance	Apply at a minimum 6mm in a single coat No shrinkage Apply by applicator tool	Resurface eroded metallic surfaces Protect against slurries and aggregates	Usable life 50-60 mins Touch Dry 4hrs Hard Dry 8 hours	Mid grey Red Blue

205 CERAMIC HT FLUID

Brush applied high temperature solvent free epoxy novolac fluid containing hardened ceramic particles	Apply at 500-600 microns per coat Apply by brush in 2 coats	Resurface eroded or corroded metallic surfaces Protect against medium to high particulate fluids and slurries at temperatures up to 130˚C	Usable life 25 mins Touch Dry 3 hrs Hard Dry 6 hours	Dark grey Light grey

206 CERAMIC HTA FLUID

Brush applied high temperature solvent free epoxy novolac fluid containing hardened ceramic particles	Apply at 500-600 microns per coat Apply by brush in 2 coats	Resurface eroded or corroded metallic surfaces Protect against medium to high particulate fluids and slurries at temperatures up to 110˚C	Usable life 25 mins Touch Dry 3 hrs Hard Dry 6 hours	Dark grey Light grey

209 EIP PU

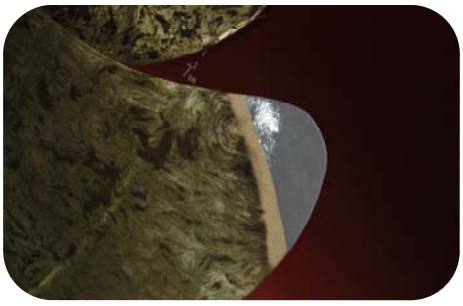
Toughened solvent free polyurethane coating system	Apply at 500-750 microns per coat, 3 coat system Apply by brush or roller Flexible and hard wearing once cured	Resurface metallic surfaces subject to extreme impact Protect against aggregate and slurry erosion	Usable life 20 mins Touch Dry 2 hours Hard Dry 8 hours	Light grey Light blue

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**

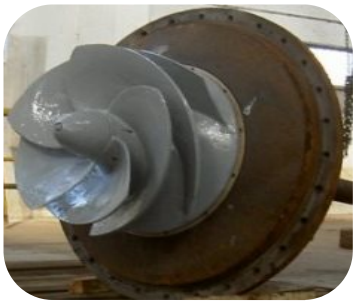
Badly pitted and corroded tube sheets and end plates can be rebuilt to original OEM specifications using 201 Ceramic Repair Paste

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 400 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**

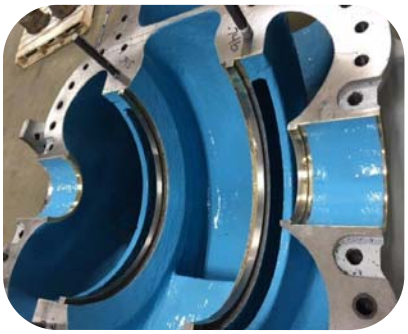
Process vessel required rebuilding and resurfacing. Internal substrates were mechanically abraded and relined using 202 Ceramic Repair Fluid

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 was applied to all of the impeller to complete the repair

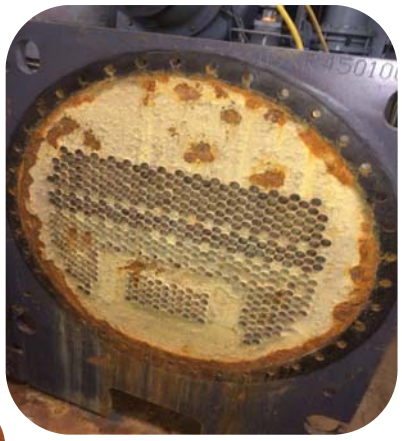
203 Super Flow

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

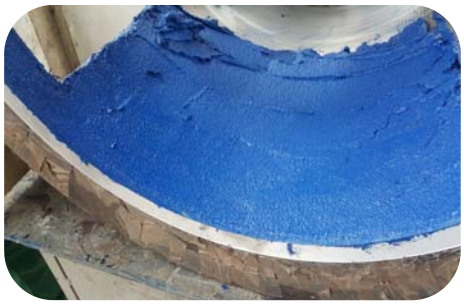
Pump impeller suffering from cavitation attack was rebuilt using 201 Ceramic Repair Paste and then resurfaced with 2 coats of 203 Super Flow

204 Heavy Duty Ceramic Paste

is a two component solvent free epoxy repair paste containing hardened ceramic beads. The product is ideal for repairs to metallic surfaces suffering from severe abrasive wear.

- **Solvent free epoxy technology**
- **Apply at 6-8mm film thickness**
- **Suitable for metallic surfaces**
- **No shrinkage**
- **Superior adhesion to metallic surfaces**
- **High abrasion resistance**
- **Ideal for aggregate and slurry erosion**

Internal surfaces of pump housing were abrasive blast cleaned and resurfaced using 204 Heavy Duty Ceramic Paste

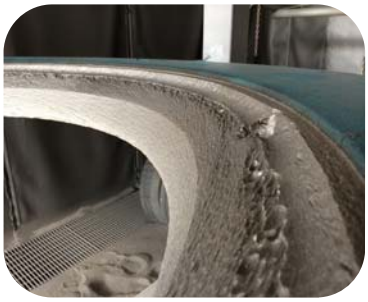


Coal grinder at a major European steel works was repaired using 204 Heavy Duty Ceramic Paste

Pipe spools carrying oil, water and sand were badly eroded due to the high flow rate and abrasive environment. The internal surfaces were abrasive blast cleaned and relined using 204 Heavy Duty Ceramic Repair Paste, once cured a coat of 202 Ceramic Repair Fluid was applied.

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

- **Worn pump casings and components**
- **Dredging pumps**
- **Hoppers and chutes**
- **Pipe spools**
- **Grinders**
- **Mixers and mixer blades**
- **Conveyor guides and sides**
- **Back plates**
- **Turbine covers**



Turbine cover abrasive blast cleaned and rebuilt using 204 Heavy Duty Ceramic Paste and over coated with 202 Ceramic Repair Fluid.

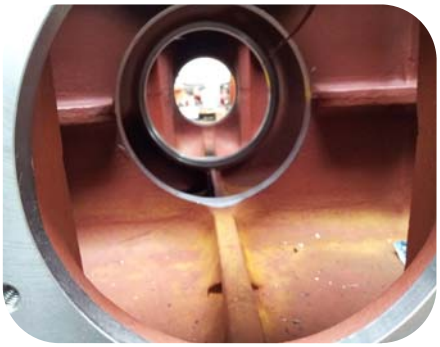
205 Ceramic HT Fluid

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 500-600 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 Fluid

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.

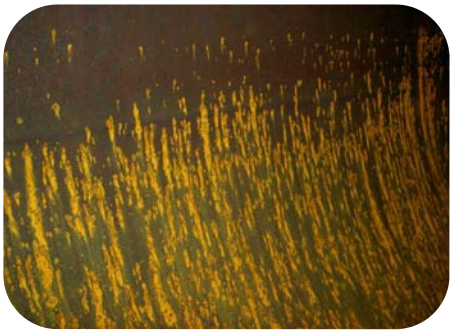
- **Solvent free epoxy novolac technology**
- **Apply in 2 coats at 500-600 microns per coat**
- **Suitable for metallic surfaces**
- **Apply by brush or roller**
- **Resists 110˚C continuous immersion temperatures**
- **Protects against acids and high concentration industrial chemicals**

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**

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 Fluid



209 EIP PU

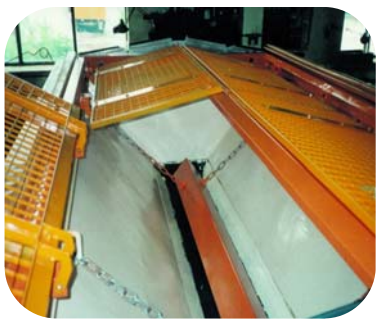
a two component solvent free toughened polyurethane coating designed for high impact operating environments. The product when applied at 2-3mm gives a flexible but hard wearing finish to metallic surfaces to protect against impact from aggregates and slurries

Chemical powder process vessel and chute were lined with 3mm 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**

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



Typical Applications

	201	202	203	204	205	206	209
Bow thruster tunnel	■	■					
Centrifuge	■	■	■				
Chemical box	■	5- 60℃			60-130℃	60-110℃	
Chemical drain	■	5- 60℃			60-130℃	60-110℃	
Chutes				■			■
Cyclone housing	■	5- 60℃					
Digester	■	5- 60℃			60-130℃	60-110℃	
Evaporator	■	5- 60℃			60-130℃	60-110℃	
Fan housing	■	5- 60℃			60-130℃	60-110℃	
Fan blades	■	■		■			
Fermentation tank	■	■					
Filters	■	5- 60℃			60-130℃	60-110℃	
Gas holders	■	5- 60℃				60-110℃	
Gas vents	■	5- 60℃				60-110℃	
Heat exchanger tube sheet	■	5- 60℃	5- 60℃		60-130℃		
Heat exchanger end covers	■	5- 60℃	5- 60℃		60-130℃		
Hoppers				■			■
Jet tubes	■		■				
Impeller	■	5- 60℃	5- 60℃		60-130℃	60-110℃	
Pipe spools		5- 60℃		■	60-130℃	60-110℃	
Pipe internals	■	5- 60℃		■	60-130℃	60-110℃	
Process vessel	■	5- 60℃			60-130℃	60-110℃	
Pump—sea water, fluids, effluent	■	5- 60℃	■				
Pump—slurries., aggregates				■			
Reactor vessel	■				60-130℃	60-110℃	
Rudder	■		■				
Screw– water water, slurries	■	■					
Screw—aggregates		■		■			
Scrubber unit					60-130℃	60-110℃	
Tank lining	■	5- 60℃			60-130℃	60-110℃	
Tank rebuild	■			■			
Turbine blades	■	■					
Turbine housing	■	■					
Valves	■	5- 60℃	5- 60℃		60-130℃	60-110℃	
Water box	■	5- 60℃	5- 60℃		60-130℃	60-110℃	

■ Product is suitable for this application

Abrasion, Wear & Impact Protection

Product Testing and Product Characteristics

	201	202	203	204	205	206	209
Compressive strength Tested to ASTM D 695	1089kg/ cm² (15,500psi)	960kg/ cm² (13,650psi)	735kg/ cm² (10,450psi)	1089kg/ cm² (15,500psi)	983kg/ cm² (13,960psi)	983kg/ cm² (13,960psi)	N/A
Corrosion Resistance Tested to ASTM B117	5000 hours	5000 hours	5000 hours	5000 hours	5000 hours	5000 hours	5000 hours
Flexural Strength Tested to ASTM D790	703kg/cm² (10,000psi)	635kg/cm² (9,000psi)	570kg/cm² (8100psi)	240kg/cm² (3400psi)	614kg/cm² (8710psi)	544kg/cm² (7725psi)	703kg/cm² (10,000psi)
Hardness Rockwell R to ASTM D785	100	100	85	100	100	100	80
Slump Resistance	25mm	400 microns	400 microns	25mm	1000 microns	1000 microns	750 microns
Tensile Shear Adhesion Tested to ASTM D1002	188kg/cm² (2675psi)	202kg/cm² (2875psi)	187kg/cm² (2650psi)	148kg/cm² (2100psi)	220kg/cm² (3125psi)	204kg/cm² (2895psi)	169kg/cm² (2400psi)
Abrasion Resistance Taber abrasion CS17 1000 cycles/ 1kg	147mg 0.06cc	145mg 0.065cc	122mg 0.08cc	21mg 0.012cc	85mg 0.036cc	196mg 0.083cc	90mg 0.036cc
Volume Capacity cc per kg	406	446	657	584	425	422	1000
Base density gm per cm³	2.70	2.65	1.67	2.10	2.55	2.56	1.31
Activator density gm per cm³	1.70	1.00	1.05	1.40	0.97	1.00	1.22
Mixed product density gm per cm³	2.46	2.24	1.52	1.96	2.35	2.37	1.29
Dry heat resistance (˚C)	**200**	**200**	**200**	**120**	**240**	**170**	**120**
Intermittent wet heat resistance (˚C)	**120**	**120**	**120**	**120**	**160**	**150**	**120**
Immersion temperature resistance (˚C)	**70**	**70**	**70**	**60**	**130**	**110**	**70**
Mixing ratio by volume	**3:1**	**3:1**	**3:1**	**3:1**	**7:1**	**7:1**	**3:1**
Mixing ratio by weight	**5:1**	**8:1**	**5:1**	**4:1**	**18:1**	**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	60mins	6hrs	4 days	30mins	3hrs	2 days	15mins	90mins	1 day	7.5mins	45mins	12hrs
203	60mins	12hrs	6 days	30mins	6hrs	3 days	15mins	3hrs	1.5days	7.5mins	90mins	18hrs
204	100mins	8hrs	8 days	50mins	4hrs	4 days	25mins	2hrs	2 days	12.5mins	1hrs	1 day
205	50mins	6hrs	6 days	25mins	3hrs	3 days	12.5mins	90mins	1.5 days	6mins	45mins	18hrs
206	50mins	6hrs	6 days	25mins	3hrs	3 days	12.5mins	90mins	1.5 days	6mins	45mins	18hrs
209	40mins	4hrs	4 days	20mins	2hrs	2 days	10mins	60mins	1 days	5mins	60mins	24hrs

Chemical Resistance Chart

	201	202	203	204	205	206	209
Acetic acid >10%	2	2	2	3	2	2	3
Acetic acid 20%	4	4	4	4	3	3	4
Acetone	3	3	3	3	1	2	3
Ammonia Hydroxide 30%+	1	1	1	1	1	1	1
Benzene	1	2	2	2	1	1	2
Butanol	1	1	1	1	1	1	1
Carbonic acid 10-20%	1	1	1	1	1	1	1
Carbonic acid 20%+	2	2	2	2	1	1	3
Cyclohexane	1	1	1	1	1	1	1
Diesel	1	1	1	1	1	1	1
Diethanolamine	1	1	1	1	1	1	1
Ethanol	2	2	2	2	1	1	2
Formic acid 10%	3	3	3	3	2	2	4
Fuel Oil	1	1	1	1	1	1	1
Gylcerine	1	1	1	1	1	1	1
Hydrochloric acid 10-20%	1	1	1	1	1	1	1
Hydrochloric acid 20-30%	2	2	2	2	2	1	1
Hydrochloric acid 36%	2	2	2	2	2	1	2
Hexane	1	1	1	1	1	1	1
Isopropanol	1	1	1	1	1	1	1
Lactic acid 20%	2	2	2	2	3	2	2
Naphtha	1	1	1	1	1	1	1
Nitric acid 10%	1	1	1	1	2	1	1
Nitric acid 10-20%	2	2	2	2	2	1	2
Nitric acid 20-30%	4	4	4	4	4	1	2
Phosphoric acid 30%	2	2	2	2	2	1	1
Phosphoric acid 50%	3	3	3	3	3	1	3
Sodium Hydroxide 30%	1	1	1	1	1	1	1
Sodium Hydroxide 50%	2	2	2	2	1	1	2
Sodium Hypochlorite 6%	2	2	2	2	2	2	1
Sodium Hypochlorite 15%	3	3	3	3	3	3	1
Sulphuric acid 10%	1	1	1	1	2	1	1
Sulphuric acid 10-20%	2	2	2	2	2	1	1
Sulphuric acid 50%	3	3	3	3	2	1	1
Sulphuric acid 98%	4	4	4	4	2	1	3
Toluene	3	3	3	3	1	2	2
White spirit	1	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.

Our work force has over 120 years experience in the coatings industry and we are able to offer expert technical advice onsite or online 24 hours a day, 7 days a week.

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

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

Repair Protect Upgrade

Abrasion & Wear Protection

Chemical Protection

Corrosion Protection

High Temperature Protection

Impact Protection

Metal Repair

Pipe Repair and Pipe Wrapping

Thermal Protection

Underwater Repair & Protection

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