



Resichem 530 HA100

Heat Activated Epoxy Novolac Corrosion Protection Coating

Introduction to Resichem 530 HA100

Resichem 530 HA100 is a single component solvent free heat activated epoxy novalac coating.

The product has been designed to be activated when applied to surfaces at 100°C or above.

Once applied to a metallic surface operating at an elevated temperature (100°C +) the material cures like any other epoxy coating. The maximum temperature the material can be applied at is 240°C.

The unique curing properties allow this product to be applied to process equipment and pipework suffering from chemical attack, environmental corrosion or corrosion under insulation without having to switch off the process system. Also due to the outstanding adhesion achieved between the coating and the metallic substrate this coating once cured can be over coated with other systems such Polypropylene, Polyethylene & Mineral Rockwool.

The product has been independently tested by certified laboratories in the United Kingdom and is approved for use by major oil and gas companies worldwide.

Key Markets for this material—

Oil & Gas

Power

Chemical

Petrochemical



Surface Preparation for Resichem 530 HA100

All oil and grease must be removed from the surface of the repair using an appropriate cleaner.

For optimum performance, the surface should be abrasive blasted to ISO 8501/4 Standard SA2.5 (SSPC SP10/ NACE 2) and a minimum blast profile of 75 microns (3mil) using an angular abrasive.

However the coating has been designed to be applied to mechanically prepared surfaces and the following standards must be used to achieve acceptable levels of adhesion between the coating and the metallic substrate.

The surface should be roughened by using an MBX Bristle Blaster (or equivalent equipment) or by mechanical grinding using a coarse grinding pad to ISO8501 ST2/ SSPC-SP-3.

Application

Resichem 530 HA100 is a single component material. The product must be pre-heated prior to application to a maximum 50°C.

Apply the material onto the prepared surface by brush or roller. In normal circumstances this should be in two coats at a target thickness of 250 microns (10mil) per coat.

Alternatively the material can be applied by heated airless spray in a single coat in multiple passes. The material should be heated to 50°C (120°F), using a GRACO EXTREME standard airless spray unit with heated spray lines at 50°C (120°F).

Coverage Rates

4ltrs (1.25 US gallons) of fully mixed product will give the following coverage rates –

16m² at 250 microns 172ft² at 10mil

Cure Times

Cure times are dependent on the cure temperature as indicated in the table below.

Temp	Touch dry	Light loading	Full Loading
100°C (212°)	50 mins	2 hours	24 hours
110°C (230°F)	35 mins	70 mins	16 hours
120°C (248°F)	25 mins	50 mins	12hours
130°C (266°F)	15 mins	30 mins	8 hours
140°C (284°F)	7 mins	15 mins	6 hours
150°C (302°F)	3 mins	7 mins	4 hours

Technical Specifications

Resimac Laboratory Testing— 530 HA100 applied at 500 microns

Tensile Shear Adhesion	ASTM D1002 Blast cleaned steel plate 75 micron profile, cured at 120°C	197 kg/cm ² (2800 psi)
Hardness Shore D	ASTM D2240	20°C 90 100°C 86 150°C 80 200°C 72
Corrosion Resistance	ASTM B117	Minimum 1000hrs Salt Spray Resistance

Columbia Oil Pipeline Field Trial— 530 HA100 applied at 300 microns Flame sprayed Polypropylene top coat

Cathodic Disbondment	CAN/CSA-Z245.20 28 days at 90°C	<5mm radial
Adhesion after Hot Water Soak	CAN/CSA-Z245.20	Class 1
Tensile Elongation	ASTM D638	10% at 25°C
Flexibility	CAN/CSA-Z245.20	No cracks at 3°C PDD
Hardness Shore D	ASTM D2240	>60
Impact Resistance	DIN 30670	>20 joules
Taber Abrasion PP Top coat	ASTM D4060/84 500gm load 1000 cycles	55mg weight loss
Vicat Softening Point	ISO 306	116°C

Shell Corrib Pipeline Testing— 530 HA100 applied at 300 microns Flame sprayed Polypropylene top coat

Cathodic Disbondment	ISO 21809 part 1 28 days at 23°C	<1mm radial
	Sample 1	
	Sample 2	

Technical Specifications

Chevron Global Projects Testing — 530 HA100 applied at 300 microns

<p>Immersion resistance</p>	<p>ASTM 4541</p> <p>Blast cleaned steel with 75 micron profile</p> <p>Immersion in 4°C water for 120hrs with steel at 75°C</p> <p>Followed by dry exposure at 200°C for 167 hrs</p>	<p>>21 Mpa (3045psi)</p> 
<p>Immersion Resistance</p>	<p>Tested by Eddy current and ultra sonic techniques</p> <p>Immersion in 4°C water for 120hrs with steel at 75°C</p> <p>Followed by dry exposure at 200°C for 167 hrs</p>	<p>No change in thickness or disbondment of coating</p> 
<p>Cathodic Disbondment</p>	<p>ISO 21809-3 Annex F</p> <p>3% NaCl at 1500 Mv AT 23°C for 28 days</p>	<p>4mm (pass)</p> 
	<p>ISO 21809-3 Annex F</p> <p>3% NaCl at 1500 Mv AT 65°C for 28 days</p>	<p>4mm (pass)</p> 
	<p>Bend Test</p>	<p>20° (pass)</p> 

Global Approval

Matthew McDonnell

Subject: Chevron's HITACC Project - Resichem 530 HA 100 Coating

From: Bairéad, Colman Garan [<mailto:colman.bairead@chevron.com>]
Sent: 25 November 2015 11:20
To: 'P Hughes'
Subject: FW: Chevron `s HITACC Project - Resichem 530 HA 100 Coating

Hi Paul,

As a follow up from our previous discussions, I would like to briefly summarise the work that we carried out with the Resimac coating, Resichem 530 HA100.

We carried out a Service Simulated Test (SST) using fresh water on the HITACC pipe which included the Resimac coating along with two other HT anti-corrosion coatings in a pressure vessel, at 200 Deg C and 40 BAR.

We subsequently carried out Material Property Testing to verify the integrity of the coating. The tests carried out were Visual Inspection, Pull Off Tests as well as Cathodic Disbondment Testing. It was found that the Resichem coating performed well when subjected to the mentioned tests.

The pipe was also subjected to bending (in a reeling rig) to simulate the pipeline reeling process. The pipeline's 90 Deg position was in tension during the reeling bend and the 270 Deg position was in tension during the straightening bend.

The pipe reeling rig was set-up with:

- a reeling former of 8m radius and 5m arc length;
- a straightening former of 55m radius and 5m arc length;

There was no back tension applied during the bending/straightening. From post bending visual inspection, there were no signs of coating degradation.

Therefore, this coating is considered to be qualified to TDS Level 6 and is ready to be deployed on a Chevron MCP should a suitable project be identified.

Let us know if you have any further questions on this matter.

Thanks & Regards

Colman Bairéad
Subsea Engineer
colman.bairead@chevron.com

Chevron Energy Technology Company
Seafield House
Hill of Rubislaw
Aberdeen AB15 6XL
United Kingdom
Tel: +44 1224 236004

Mob: +44 7798 572014

<http://etc.chevron.com/aberdeen/default.aspx>

A division of Chevron North Sea Limited

Please access the attached hyperlink for corporate information on the sender of this e mail:
<http://europeanupstream.chevron.com/CompaniesActRegistrationDetails.html>

Global Projects—Columbia Oil Pipeline



Resichem 530 HA100 applied by brush to pipe field joints, while the coating was still wet Polypropylene was flame sprayed onto the surface of the Resichem 530 HA100.

Global Projects— Croatia INA refinery



As part of the site improvement plan over 300 valves , pumps and spools were coated Resichem 530 HA100. The coating was applied to surfaces operating at 150° C. Surface preparation was high pressure water jetting at 1000 psi to clean off any surface contaminants and the coating was applied at 300 microns per coat.

Global Projects— UK Liquid FBE alternative



Resichem 530 HA100 was trialled for a large overseas field joint coating contract by a UK based contractor. The steel pipe was abrasive blast cleaned to SA2.5 surface cleanliness and a minimum 75 micron profile. Resichem 530 HA100 was applied by spray at 300 microns WFT and pory cured at 150-170C in 3 minutes.

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, Nr Thirsk

Y07 3SE, North Yorkshire

UNITED KINGDOM

Tel: +44 (0) 1845 577498

Email: info@resimac.co.uk

Web: www.resimacsolutions.com
