



REPORT

TANK LININGS

Traditional & Solvent-free Systems

All Industries

December 2015

Contents

	Page
CHEMCO SYSTEMS	5
TRADITIONAL SYSTEMS	6
Chem-glass™ 200 Series (Polyester) & Chem-tect™ 300 Series (Vinylester)	6
SOLVENT-FREE SYSTEMS	7
Epo-chem™ 500 Series	7
Epo-chem™ RB 500 Series & RJ 500 Series	8
Epo-chem™ RF 500 Series	9
Epo-chem™ RW 500 Series	9
Ceramic Systems	10
CERTIFICATES AND APPROVALS	11
TECHNICAL DATA SHEETS	11
CASE STUDIES	13
CASE STUDY 1: Chemical Tanks – MV Kaprifol	14
CASE STUDY 2: Chemical Tanks – MT Key Fjord	16
CASE STUDY 3: Crude Oil Tank – BP Dalmeny	18
CASE STUDY 4: Process Vessel – Flotta Oil Terminal	19
CASE STUDY 5: Crude Oil Tank – BP Kinneil Oil Refinery	20
CASE STUDY 6: Tank Refurbishment – BP Grangemouth Oil Refinery	22
CASE STUDY 7: Swimming Pools – Navigator of the Seas	24
CASE STUDY 8: Potable Water Tank – Basingstoke Hotel	26
CASE STUDY 9: New Build (Shop Primer) – MV Lerrix	28
CASE STUDY 10: Ballast Tanks – MISC FPSO	30
CASE STUDY 11: Ballast Tanks – MV Auxis	32
CASE STUDY 12: Chemical Tanks – Intrepid Canada	34
CASE STUDY 13: Spiral Casing – Bonnington Hydro	36
APPENDIX 1: CERTIFICATES AND APPROVALS	39
1.1 ABS Certificate – RS 500P/RA 500M on bare steel and blast cleaned steel surfaces (Including on wet and rusty steel)	40
1.2 Lloyds Approval – Ballast Tank Maintenance Coating – RA 500M	41
1.3 Lloyds Type Approval – IMO Resolution MSC.215 (82) PSPC for New Build – Bare Steel	42
1.4 Lloyds Type Approval – IMO Resolution MSC.215 (82) PSPC for New Build – Shop Primer	44
1.5 NSF Certificate – Fresh Drinking Water System	46
1.6 FDA Approval – Food Contact – RA 500M	48
1.7 FDA Approval – Food Contact – RP 500	49
1.8 FDA Approval – Potable Water – RA 500M	50
1.9 FDA Approval – Potable Water – RP 500	51
1.10 FDA Approval – Alcoholic Beverage – RB 500	52

CHEMCO SYSTEMS

(Traditional & Solvent-free)

Traditional Systems

Chem-glass™ 200 Series (Polyester) & Chem-tect™ 300 Series (Vinylester):

Advantages:

- Best system for a combination of the most aggressive chemicals operating at high temperatures
- Fast turnaround – Fast and controlled cure
- pH range 1-14
- Long term guarantees (up to 25 years)
- Approved by major companies: Shell, BP, Talisman
- 30 years of successful case histories

Limitations:

- Although 100% solid, they are styrene based (flammable class 3)
- Grit blasting (2.5 standards) required
- No 'moisture/wet tolerance' – controlled application
- Dehumidification, ventilation and heating equipment required

Solvent-free Systems

Epo-chem™ RA 500 Series:

Solvent-free, glassflake epoxy specifically designed for tank linings/confined spaces for all industries, including marine, offshore and petrochemical.

Advantages:

- Very good chemical resistance for all general salt water and hydrocarbon environments.
- Wet tolerant – can be applied on soaking wet surfaces
- Application in any environmental conditions:
 - *No requirement for dehumidification, ventilation or heating
- Can be used as a one-coat system (self priming and good edge retention)
- Unlimited overcoating
- Any surface preparation method can be utilised:
 - *Grit blast, Wet blast, HP/UHP water jetting or Mechanical

Limitations:

- Slow cure at low temperature (below 5 °C)
- Temperature resistance < 60 °C

Epo-chem™ RB 500 & RJ 500 Series

Advantages:

- Ideal lining system for wine and beer applications
- Extremely smooth finish – easy to clean and minimises bacterial growth
- Finish helps to reduce batch to batch contamination
- Approved by UK and overseas breweries and wineries
- FDA approved for alcoholic beverage – RB 500

Limitations:

- RB 500 (Hot-spray system)
- H&S issues
- RJ 500 is NOT as chemical resistant as RB 500 (can be damaged by strong chemicals)
- Cleaning regimes in some breweries

Epo-chem™ RF 500 Series

Solvent-free, glassflake reinforced Novolac epoxy

Advantages:

- Exceptional chemical resistance against alkaline, solvents and acids; particularly against Sulphuric Acid 98%
- Used in confined space and tank lining applications, although most commonly used in secondary containment
- Solvent-free substitute for Vinylester glassflake system

Epo-chem™ RW 500 Series

Solvent-free, glassflake reinforced Novolac epoxy

Advantages:

- Exceptional resistance to aggressive chemicals operating at high temperature
- Used in confined space, secondary containment and tank lining applications
- Solvent-free substitute for Vinylester glassflake system

Ceramic Systems

- Epo-chem™ RP 500: - For General chemicals and salt water (< 60-70 ° C)
- Very smooth, low friction and extremely hardwearing topcoat
- Epo-chem™ RU 500: - Epoxy Novolac coating for combination of aggressive chemicals and high temperatures (< 120-130 ° C)
- Very smooth, low friction with very good chemical and thermal resistance
- Epo-chem™ RH 500: - High-build repair putty (metal filler) for use with above systems
- Fast-cure – machineable within 2 hours
- Epo-chem™ RT 500: - High density, high temperature Novolac epoxy putty
- Hot-cote™ RF 900: - High temperature epoxy coating for combination of aggressive chemicals and high temperatures (< 210-220 ° C)
- Very smooth, low friction with very good chemical and thermal resistance
- Hot-cote™ RE 900: - High-build, high temperature repair putty (metal filler) for use with RF 900 (< 250 ° C)

CERTIFICATES AND APPROVALS:

- ABS Certificate – on bare steel and blast cleaned steel surfaces – **RA 500M**
(Including on wet and rusty steel)
- Lloyds Approval:
 - Lloyds Approval – Ballast Tank Maintenance Coating – **RA 500M**
 - Lloyds Type Approval – IMO Resolution MSC.215 (82) PSPC for New Build – Bare Steel – **RA 500M**
 - Lloyds Type Approval – IMO Resolution MSC.215 (82) PSPC for New Build – Shop Primer – **RA 500M**
- NSF Certificate – Fresh Drinking Water – **RA 500M**
- FDA Approval:
 - FDA Approval – Food Contact – **RA 500M**
 - FDA Approval – Food Contact – **RP 500**
 - FDA Approval – Potable Water – **RA 500M**
 - FDA Approval – Potable Water – **RP 500**
 - FDA Approval – Alcoholic Beverage – **RB 500**

TECHNICAL DATA SHEETS:

*All related technical data sheets are available on request

CASE STUDIES

Case Studies 1-2:	Vinylester Systems
Case Studies 3-11:	Solvent-free Epoxy Systems
Case Study 12:	Solvent-free Epoxy Novolac Systems
Case Study 13:	Solvent-free Ceramic Systems

CASE STUDY 1: Chemical Tanks – MV Kaprifol

Case Study



Client: <i>Vadero Shipping</i>	Industry: <i>Marine</i>
Vessel: <i>Chemical Tanker MV Kaprifol</i>	Date: <i>May - June 2013</i>
Location: <i>Gryfia Shipyard, Szczecin, Poland</i>	Product: <i>Chem-tect™ RB 364</i>

Overview

Vessel "MV Kaprifol" had a requirement for cargo tank refurbishment for over 3,500m². The vessel would carry a selection of a very aggressive range of chemicals at high temperature.

Challenge

Complete failure of the previous lining as supplied by a major paint company had occurred; the usual phenolic epoxy specified and used would not have the resistance and had to be completely removed and a suitable coating applied; the new lining had to be resistant to most acids and alkaline chemicals at high temperature.

Solution

Chemco's new specification was based on a unique chemical resistant coating suitable for full pH range at high temperature as follows:
 Surface preparation standard: grit blast to Sa2.5
 Coating: two coats of Chem-tect™ RB 364 @ 500µ
 DFT per coat plus one stripe coat of Chem-tect™ RB 364.
 Total DFT: minimum 1,000µ

Outcome

The work programme was successfully completed within the requested time-scale and supervised by Chemco technical staff. All the cargo tanks were completed to class standard and certified accordingly to the satisfaction of all concerned.

Benefits

The advantages of this coating for these cargo tanks was to provide excellent resistant to high temperatures and to a wide range of corrosive chemicals. Fast-curing allowed quicker over-coating, fast application and quick return to service. The main advantage of the system is that it can be patch repaired and the repairs are 100% successful.

Continued overleaf



Photographs:

- Nos. 1 & 2 Original condition of cargo tanks before preparation
- No. 3 Tank after first coat of RB 364

CASE STUDY 1: Chemical Tanks – MV Kaprifol (cont.)

4 

6 

8 

5 

7 

9 

Photographs:

- No. 4 Tank (port) after stripe coating
- No. 5 Tank (port) after second coat of RB 364
- No. 6 Tank (starboard) after stripe coating
- No. 7 Tank (starboard) after second coat of RB 364
- Nos. 8 & 9 Tank (starboard) after second coat of RB 364

- Solvent-free • Water-based • Wet-tolerant
 • Rust-tolerant • Zero VOC
 • Tank & Pipe Linings • Under-water & Marine • Glassfibre
 • Rust Converters & Primers • Ceramic & Metal Repair • Anti-static, Conductive & Anti-slip Flooring
 • Approved for Contact with Food, Drinking Water & Beverages • Damp or Green Concrete Primers
 • Concrete Repair Systems • Elastomeric Systems
 • High Temperature Systems • Fire Retardant • Insulation Systems

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CASE STUDY 2: Chemical Tanks – MT Key Fjord

Case Study



Client: Brøvigtank AS	Industry: Marine
Vessel: MT Key Fjord	Date: April 2014
Location: Gdynia, Poland	Products: Chem-TECT™ RB 364 & RB 300TC

Overview

The tank tops found inside four cargo tanks (3 Port, 4 Port, 4 Starboard & 6 Port), onboard Brøvigtank AS's MT Key Fjord, required a full refurbishment as they were showing signs of severe corrosion damage.

Challenge

Replacing the original failed coating with a new protective coating system capable of handling highly aggressive chemicals at high temperatures. Working within a strict time frame also added to the difficulty of this project.

Solution

The tank tops and the bulkheads (up to 0.5m high) were grit blasted to Sa 2.5 standards. Prior to the coating application, the surfaces were swept and vacuumed to remove any dust and other contamination.

The coating specification was as follows:

- Two coats of Chem-TECT™ RB 364 @ 500µ DFT per coat by airless spray.
- One stripe coat of Chem-TECT™ RB 364 by brush.
- One topcoat of Chem-TECT™ RB 300TC @ 100µ DFT by airless spray.

Outcome

The work was carried out within the given time frame, with no delays and was supervised by Chemco's technical staff. All cargo tanks were completed to class standard and certified accordingly to the satisfaction of all concerned.

Benefits

- Excellent resistance to highly aggressive chemicals at high temperatures
- Fast curing allows quicker over-coating and quicker back-in-service times
- Reduced downtime
- Reduced H&S and Fire Precaution





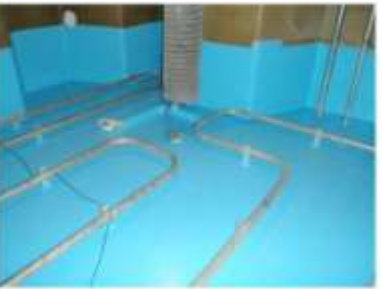

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Photographs:

- Nos. 1 & 2: Original condition
- No. 3: After first coat of Chem-TECT™ RB 364

CASE STUDY 2: Chemical Tanks – MT Key Fjord (cont.)

<p>4</p> 	<p>5</p> 
<p>6</p> 	<p>7</p> 
<p>8</p> 	<p>9</p> 
<p>Photographs:</p> <ul style="list-style-type: none"> • No. 4 After first coat of Chem-tect™ RB 364 • No. 5 After second coat of Chem-tect™ RB 364 • Nos. 6 - 9 Completed application 	

- Solvent-free • Water-based • Wet-tolerant
 • Rust-tolerant • Zero VOC
 • Tank & Pipe Linings • Under-water & Marine • Glassflake
 • Rust Converters & Primers • Ceramic & Metal Repair • Anti-static, Conductive & Anti-slip
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CASE STUDY 3: Crude Oil Tank – BP Dalmeny



Client: <i>BP Dalmeny</i>	Industry: <i>Petrochemical</i>
Scope: <i>Crude Oil Tank</i>	Date: <i>June 2007</i>
Location: <i>Scotland, UK</i>	Product: <i>Epo-chem™ RA 564</i>

Overview

Crude oil tank (75m diameter) internal lining required to be refurbished with a minimum 17 (12 + 5) years guarantee.

Challenge

To carry out the work in as short as possible time scale. Reduce cost and duration, as any tank out of service costs a huge amount due to the size and volume of these tanks. The work should also be carried out in a safe manner in a working tank farm.

Solution

Two coats of Epo-chem™ RA 564 solvent-free, wet-tolerant glassflake epoxy @ 500µ per coat by airless spray with no requirement for ventilation or dehumidification.

Outcome

The technical benefits offered by this system ensured that the work was carried out on time, within budget and with no H&S issues.

Benefits

- No major delays
- Min 9 days reduction in contract duration
- Reduced H&S and Fire Precaution
- Reduced cost of equipment
- Chemco system will protect the steel substrate in excess of 17years

1



2



3



Photographs:

- Nos. 1, 2 and 3 crude oil tank after application.

CASE STUDY 4: Process Vessel – Flotta Oil Terminal

Case Study



Client: <i>Talisman Energy (UK)</i>	Industry: <i>Petrochemical</i>
Scope: <i>Process Vessel</i>	Date: <i>May 2007</i>
Location: <i>UK</i>	Products: <i>Epo-chem™ RA 564 Ceram-chem™ RH 500</i>

Overview

A large process vessel, operational temperature at around 55°C, required to be completely refurbished without any disruption to other contractors working adjacent to this area. It also had to be carried out in a very tight timescale and in cold and very damp conditions during the plant shutdown.

Challenge

Working within a very tight timescale, severe pitting and corrosion, high humidity, confined space and other contractors working adjacent to the vessel refurbishment added to the difficulty of the project.

Solution

First coat of **Epo-chem™ RA 564 solvent-free glassflake epoxy system @ 500µ DFT** by airless spray.

All deep pitting were filled with **Ceram-chem™ RH 500 solvent-free, ceramic epoxy putty**.

Second coat of **Epo-chem™ RA 564 solvent-free glassflake epoxy system @ 500µ** by airless spray.
Total DFT: 1,000µ

Outcome

The major technical benefits offered by utilizing this complete system ensured that the work was carried out on time, within budget, with no major delays to the program and no impact on other contractors working in close proximity.

Benefits

- Solvent-free
- No delays
- Reduced cost of plant and equipment
- Reduced H&S and Fire Precaution
- Chemco system will protect the steel substrate



Photographs:

- The process vessel after application.

Rev: March 2015

CASE STUDY 5: Crude Oil Tank – BP Kinneil Oil Refinery

Case Study



Client: BP	Industry: Petrochemical
Scope: Crude Oil Tank	Date: November 2008
Location: BP Kinneil (Tank 3701)	Products: Epo-chem™ RA 564 Ceram-chem™ RH 500

Overview

The internal floor area and 2m up the walls of a large diameter tank holding Crude Oil, required to be completely refurbished in a limited timescale during the plant shutdown. There was also a requirement for a long-term corrosion system that would last until the tank re-opened again in 10 years time. This project was carried out by Hertel.

Challenge

After coming out of a long service, the tank floor was suffering from severe pitting and corrosion. Winter condition, cold weather and high humidity, combined with water ingress, added to the difficulties of this project.

Solution

First coat of Epo-chem™ RA 564 solvent-free glassflake epoxy system @ 500µ DFT by airless spray.
All deep pitting were filled with Ceram-chem™ RH 500 solvent-free, ceramic epoxy putty.
Second coat of Epo-chem™ RA 564 solvent-free glassflake epoxy system @ 500µ by airless spray.
Total DFT: 1,000µ

Outcome

The major technical benefits offered by utilizing this system ensured that the work was on time, within budget, with no major delays to the program and no impact on other contactors working in and around the tank. Similar tanks on site will now be refurbished utilizing the Chemco solvent-free epoxy system due to its great success.

Benefits

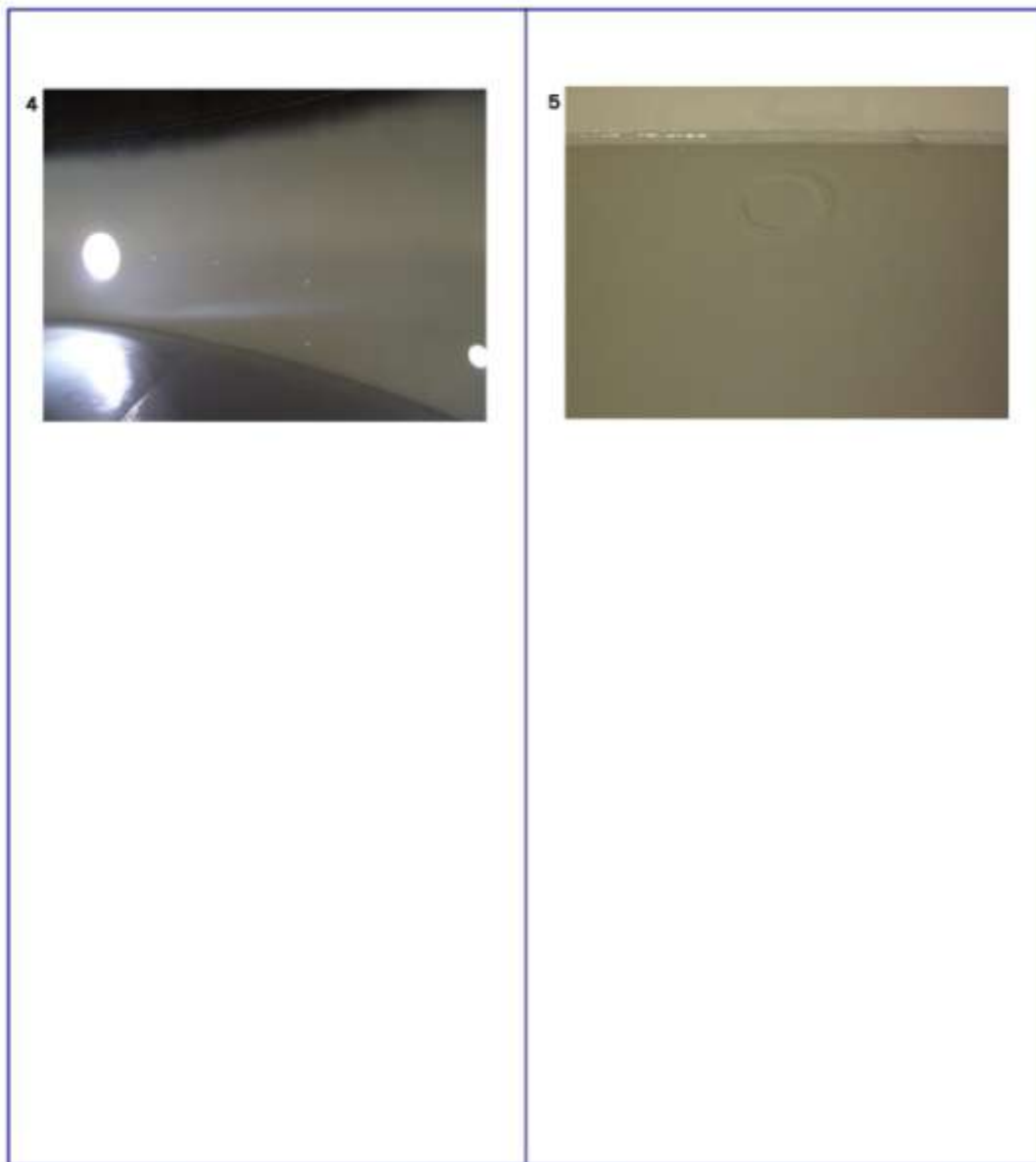
- No major delays to program
- Reduced H&S and Fire Precaution
- Reduced cost of plant and equipment
- Chemco International system will protect the steel substrate in excess of 10 years



Photographs:

- Nos. 1 - 5 application complete.

CASE STUDY 5: Crude Oil Tank – BP Kinneil Oil Refinery (cont.)



- Solvent-free • Water-based • Wet-tolerant
- Rust-tolerant • Zero VOC
- Tank & Pipe Linings • Under-water & Marine • Glassfibre
- Rust Converters & Primers • Ceramic & Metal Repair • Anti-static, Conductive & Anti-slip Flooring
- Approved for Contact with Food, Drinking Water & Beverages • Damp or Green Concrete Primers
- Concrete Repair Systems • Elastomeric Systems
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CASE STUDY 6: Tank Refurbishment - BP Grangemouth Oil Refinery

Case Study



Client: INEOS	Industry: Petrochemical
Scope: Drain Tank	Date: April 2010
Location: BP Grangemouth, UK	Products: Epo-chem™ RA 564 Ceram-chem™ RH 500

Overview

The main criteria of this project was to reinstate a 20 year old redundant tank back into service. This required the full internal floor area and 1m up the wall to be completely refurbished without the use of any hot-work and in limited timescale.

Challenge

Tank internals suffer from heavy corrosion, pitting and severe metal loss. Combined with the possibility of holes, open-top tank exposed to elements, high humidity, cold and rain adding to the difficulty of this work.

Solution

First coat of Epo-chem™ RA 564 solvent-free glassflake epoxy system was applied on grit blasted SA 2.5 @ 200µ by airless spray.

All welded areas and seams were filled using Ceram-chem™ RH 500 high density ceramic epoxy filler.

The complete floor area was then fibre-glassed using Epo-chem™ RA 500L (special laminating grade of RA 500 series) and 450gsm of chopped strand mat in 2 overlapping layers.

Second coat of Epo-chem™ RA 564 solvent-free glassflake epoxy system @ 400µ was applied by airless spray.

Final coat of Epo-chem™ RA 564 solvent-free glassflake epoxy system @ 400µ was applied by airless spray.

Outcome

The major technical benefits offered by utilizing this system ensured the client that the work was on time, tank integrity established, within budget and with no delays to the program (many days saved).

The use of this tank refurbishment system from Chemco will now be utilized for similar tank refurbishment projects on sites where hot-work is not feasible.

Cont'd



Photographs:

- No. 1 tank before application
- Nos. 2 - 4 application in progress
- Nos. 5 - 6 completed application

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CASE STUDY 6: Tank Refurbishment - BP Grangemouth Oil Refinery (cont.)

Benefits

- No hot work
- Structural/tank integrity restored
- Huge cost savings compared to tank floor replacement
- No delays
- Reduced H&S and Fire Precaution
- Reduced cost of plant and equipment
- **Chemco** system will protect the steel substrate for minimum of 25 years



- Solvent-free • Water-based • Wet-tolerant
- Rust-tolerant • Zero VOC
- Tank & Pipe Linings • Under-water & Marine • Glassfibre
- Rust Converters & Primers • Ceramic & Metal Repair • Anti-static, Conductive & Anti-slip Flooring
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CASE STUDY 7: Swimming Pools – Navigator of the Seas



Client: <i>Royal Caribbean Cruise Lines</i>	Industry: <i>Marine</i>
Vessel: <i>Navigator of the Seas</i>	Date: <i>February 2014</i>
Location: <i>Bermuda</i>	Products: <i>Epo-chem™ RS 500P & RA 500M</i>

Overview

The swimming pools on-board Royal Caribbean's Navigator of the Seas cruise vessel had to be refurbished as the existing tile system required regular maintenance and this was causing major problems.

Challenge

Removing the existing tiles and concrete backing to expose the steel. Utilising an alternative surface preparation method to grit blasting, which could not be considered due to problems of excessive dust contamination to the surrounding areas. The client was looking for a system offering a long-term solution which did not require regular maintenance. Working within a strict time-frame also added to the difficulty of this project.

Solution

Both mechanical preparation and water jetting were utilised as the surface preparation methods to St2 and WJ-3 standards respectively. Chemco's solvent-free, wet & rust tolerant primer Epo-chem™ RS 500P was applied followed by two coats of solvent-free, wet tolerant Epo-chem™ RA 500M.

Outcome

The project was completed in 20 days, much quicker than the given time-frame. The quality of the smooth, high gloss finish and the speed of the contract were to the satisfaction of all concerned. The surface preparation method utilised and the unique solvent-free properties of the Chemco system also allowed other work to continue nearby without disruption.

Benefits

- Solvent-free
- No grit blasting
- Reduced down-time and equipment cost
- Wet & rust tolerant properties of the Chemco system
- H&S compliant
- No disruption to other work
- Chemco system offers a long-term and easily repairable solution

Continued overleaf

1



2



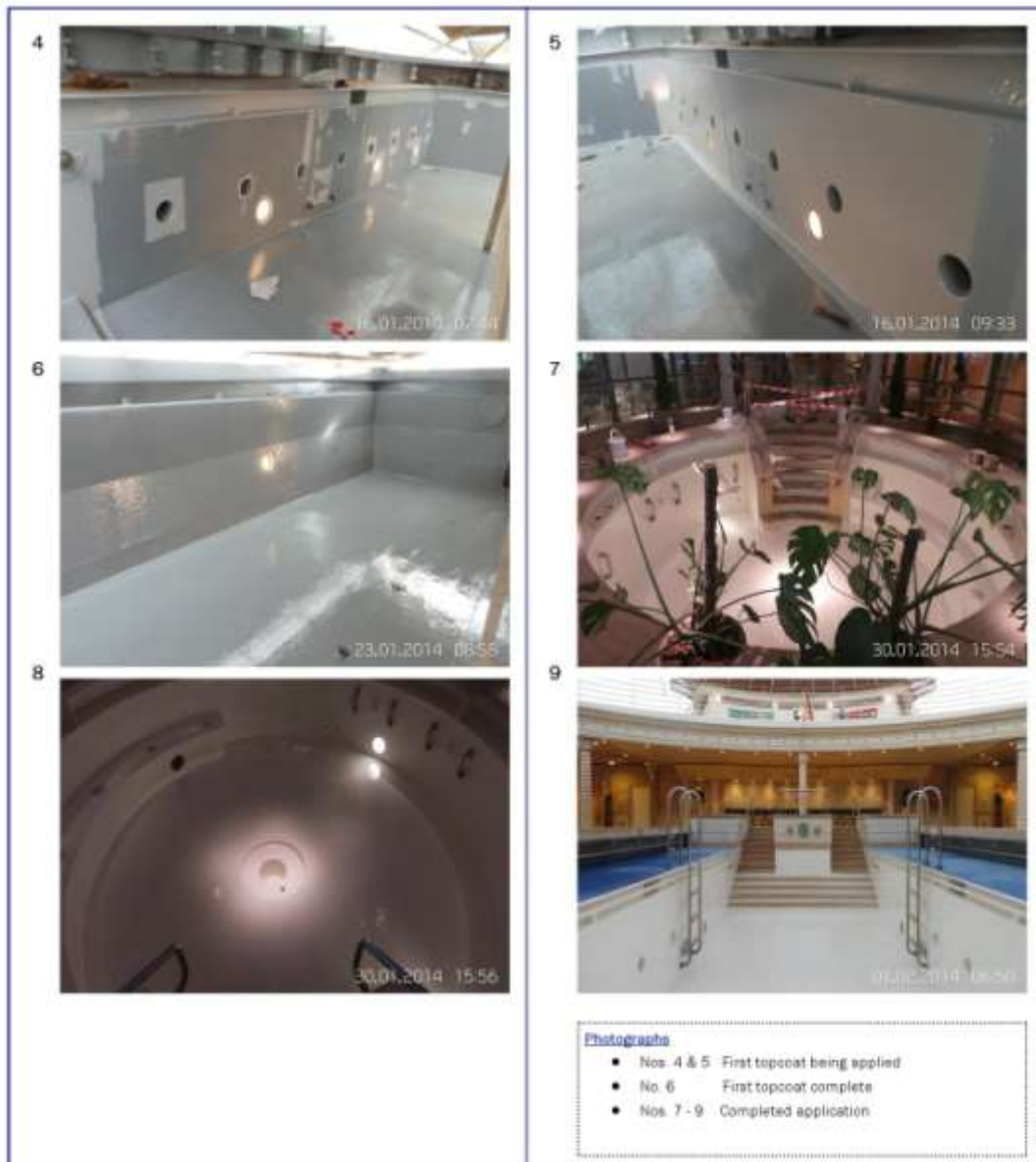
3



Photographs

- Nos. 1 & 2 After surface preparation
- No. 3 Topcoat being applied on top of primer

CASE STUDY 7: Swimming Pools – Navigator of the Seas (cont.)



- Solvent-free • Water-based • Wet-tolerant
- Rust-tolerant • Zero VOC
- Tank & Pipe Linings • Under-water & Marine • Glassfibre
- Rust Converters & Primers • Ceramic & Metal Repair • Anti-static, Conductive & Anti-slip Flooring
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CASE STUDY 8: Potable Water Tank – Basingstoke Hotel



Client: <i>Basingstoke Hotel</i>	Industry: <i>Industrial</i>
Scope: <i>Potable Water Tank Repair</i>	Date: <i>October 2012</i>
Location: <i>UK</i>	Product: <i>Epo-chem™ RS 500P & RA 500M</i>

Overview

The potable water tanks were approximately 90 years old and were showing signs of corrosion damage. The client required these tanks to be restored to "as good as new" condition.

Challenge

The tanks had holes through their shell, floors and lower walls. The tanks were also located in a confined space on the roof of the building. Working within a strict time frame also added to the difficulty of this project.

Solution

Manual preparation was selected as the surface preparation method. One primer coat of **solvent-free, wet & rust tolerant Epo-chem™ RS 500P** was applied first. This was followed by two topcoats of **solvent-free, wet tolerant Epo-chem™ RA 500M**.

Outcome

The work was completed in three working days with no delays. The tanks were restored to "as good as new" condition resulting in huge cost savings for the client as they did not need to purchase new tanks.

This system is **NSF Certified** for fresh drinking water applications.

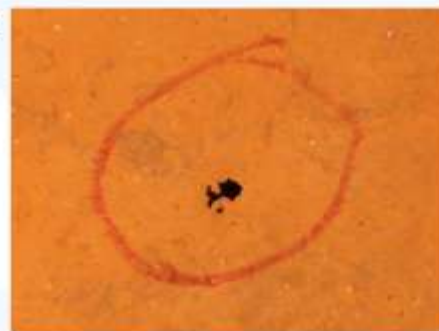
Benefits

- Solvent-free (odourless)
- Restored to "as good as new" condition
- Reduced H&S and Fire Precaution
- No grit blasting
- Substantial time and cost savings

1



2

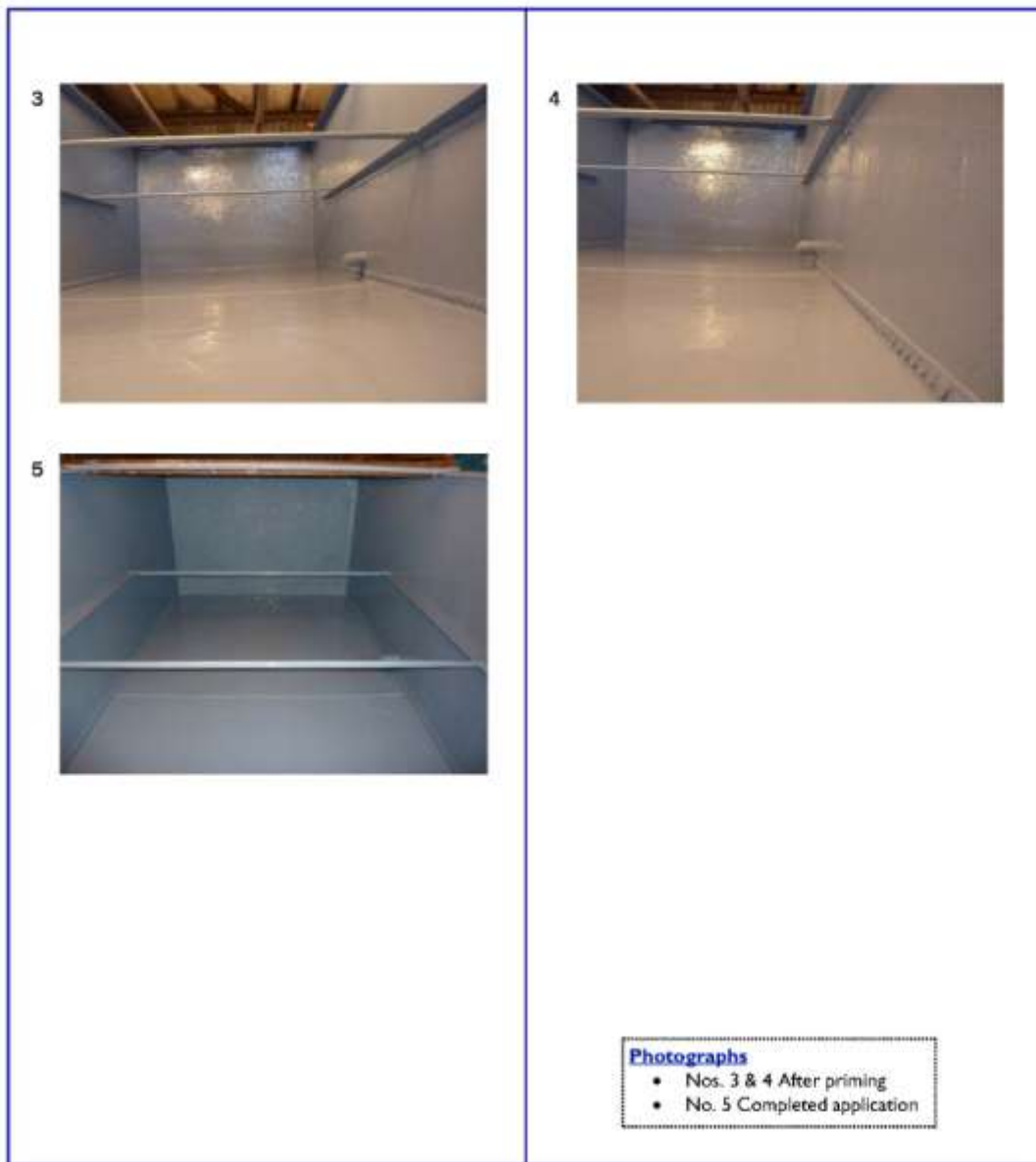


Photographs

- Nos. 1 & 2 Before application

*This project was completed by our approved contractor Specialist Coatings Ltd, UK

CASE STUDY 8: Potable Water Tank – Basingstoke Hotel (cont.)



- Solvent-free • Water-based • Wet-tolerant
- Rust-tolerant • Zero VOC
- Tank & Pipe Linings • Under-water & Marine • Glassflake
- Rust Converters & Primers • Ceramic & Metal Repair • Anti-static, Conductive & Anti-slip Flooring
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 Web Site: www.chemcoat.co.uk



CASE STUDY 9: New Build (Shop Primer) - MV Lerrix



Client: <i>Rix Shipping</i>	Industry: <i>Marine</i>
Vessel: <i>MV Lerrix</i>	Date: <i>2012</i>
Location: <i>UK</i>	Products: <i>Epo-chem™ RS 500P & RA 500M</i>

Overview

The New Build, MV Lerrix, required to have the double skin ballast tanks (over 5,000m²) coated with an IMO PSPC approved product. The owners decided that they required a solution which did not require grit blasting or solvent-based paints as the work had to be carried out in confined spaces. Traditionally, shop primers need to be completely removed prior to the application of a coating system. The vessel was visited by its owners and Lloyds as this was the first New Build in the UK that was coated under the new IMO PSPC regulations.

Challenge

To find a coating system which could be applied without the removal of the shop primer and without grit blasting. Working in very tight, confined spaces also added to the difficulty of this project.

Solution

Water jetting (500 bar) was utilised as the surface preparation method to remove any contaminants from the shop primed surfaces and the weld areas were mechanically prepared prior to the application of the IMO Approved Chemco System. One stripe coat of solvent-free, wet & rust tolerant Epo-chem™ RS 500P was then applied, followed by one full coat, both @ 100µ. To complete the system, one topcoat of solvent-free, wet tolerant Epo-chem™ RA 500M was applied @ 250µ.

Outcome

The work was successfully completed and supervised by Baymarine's QA and Chemco's Technical Representative, meeting all the parameters for IMO and Lloyds Register for class certification.

Benefits

- Solvent-free
- No grit blasting
- Wet & rust tolerant properties of Chemco system
- Compatibility with shop primers (IMO Approved)
- Reduced H&S and Fire Precaution
- Substantial time and cost savings

Continued overleaf

1



2



Photographs

- No 1 Before application
- No 2 Stripe coating

CASE STUDY 9: New Build (Shop Primer) - MV Lerrix (cont.)



- Solvent-free • Water-based • Wet-tolerant
- Rust-tolerant • Zero VOC
- Tank & Pipe Linings • Under-water & Marine • Glasslike
- Rust Converters & Primers • Ceramic & Metal Repair • Anti-static, Conductive & Anti-slip Flooring
- Approved for Contact with Food, Drinking Water & Beverages • Damp or Green Concrete Primers
- Concrete Repair Systems • Elastomeric System
- High Temperature Systems • Fire Retardant • Insulation Systems

East Showhead Industrial Estate
 Coatbridge ML5 4XD
 Scotland United Kingdom
 Tel: +44 (0) 1236 606060
 Fax: +44 (0) 1236 606070
 Email: sales@chemcoinc.com
 Web Site: www.chemcoinc.com



CASE STUDY 10: Ballast Tanks – MISC FPSO



Client: <i>Talisman Malaysia</i>	Industry: <i>Marine</i>
Vessel: <i>MISC Bhd.</i>	Date: <i>January 2008</i>
Location: <i>Malaysia</i>	Products: <i>Epo-chem™ RA 500M & RS 500P</i>

Overview

The MISC FPSO required her ballast tanks to be coated in order to achieve class certification. However, the vessel was in constant use and the owners required a solution which did not require dry-grit blasting or involve solvent-based paints due to the risk of explosion and fire. Furthermore, the requirement for a large number of equipment, e.g. compressor, dehumidifier etc., would make the contract impractical and expensive. Chemco was approached as the only company that could match the customer's requirements.

Challenge

Preparation of the tanks at sea with high pressure washing and coatings to be carried out in high humidity and on rusty steel. Application of solvent-free coatings capable of application on poorly prepared substrate, some without any profile and with mill scale, and still achieve class certification whilst the vessel is in full production/operation.

Solution

High pressure-wash (800 bar) to remove loose rust and loose mill scale. First/Primer coat and stripe coat was carried out with Epo-chem™ RS 500P solvent-free, wet & rust tolerant system @ 100µ DFT followed by the topcoat with Epo-chem™ RA 500M solvent-free, wet tolerant system @ 250µ DFT.

Outcome

The work was successfully supervised by Chemco Speciality Coatings (SEA), Chemco's subsidiary in Singapore. Class certification was achieved with zero downtime.

Benefits

Chemco was the only company which could provide the solution and did so in a cost-effective manner. The client gained class certification with no loss of production. They were also delighted to receive Chemco's comprehensive guarantee.

Continued overleaf

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Photographs

- No. 1 Talisman on station
- Nos. 2 & 3 Surfaces ready for coating
- Nos. 4 & 5 Stripe coating with RS 500P
- No. 6 Full coat RS 500P
- No. 7 RA 500M being applied on wet surface
- No. 8 Completed RA 500M topcoat.

CASE STUDY 10: Ballast Tanks – MISC FPSO (cont.)



- Solvent-free • Water-based • Wet-tolerant
- Rust-tolerant • Zero VOC
- Tank & Pipe Linings • Under-water & Marine • Glassfibre
- Rust Converters & Primers • Ceramic & Metal Repair • Anti-static, Conductive & Anti-slip Flooring
- Approved for Contact with Food, Drinking Water & Beverages • Damp or Green Concrete Primers
- Concrete Repair Systems • Elastomeric System
- High Temperature Systems • Fire Retardant • Insulation Systems

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CASE STUDY 11: Ballast Tanks – MV Auxis



Client: IBL - Ireland Blyth Ltd	Industry: Marine
Vessel: M/V AUXIS	Date: October 2013
Location: Durban, South Africa	Products: Epo-chem™ RS 500P & RA 500M

Overview

The ballast tanks of the vessel M/V AUXIS required a full refurbishment for over 6,000m² (double bottoms tanks, wings tanks and deep tank) after the original coatings had failed.

Challenge

Some areas of the ballast tanks were heavily corroded with limited access. There was also a very limited time-scale for completion of this project and as a result, grit blasting was not permissible.

Solution

Utilise water jetting as the surface preparation method to WJ-3 standards. Apply one stripe coat of solvent-free, wet & rust tolerant epoxy Epo-chem™ RS 500P followed by one full coat of Epo-chem™ RS 500P @ 200µ DFT. In some localized areas, where most of the existing paint was still adherent, one primer coat of Epo-chem™ RS 500P in all the bare steel areas was applied, followed by one topcoat of solvent-free, wet tolerant epoxy Epo-chem RA 500M applied @ 250µ DFT.

Outcome

The work programme was successfully completed, within the timeframe given and to the satisfaction of all concerned. Owner, Classification Society and Shipyard.

Benefits

- Solvent-free
- Environmentally friendly system (no grit blasting)
- Reduced H&S and fire precautions
- No dew point or humidity restrictions
- No overcoating limitations
- No delays
- No disruption to other on-going work (hot)

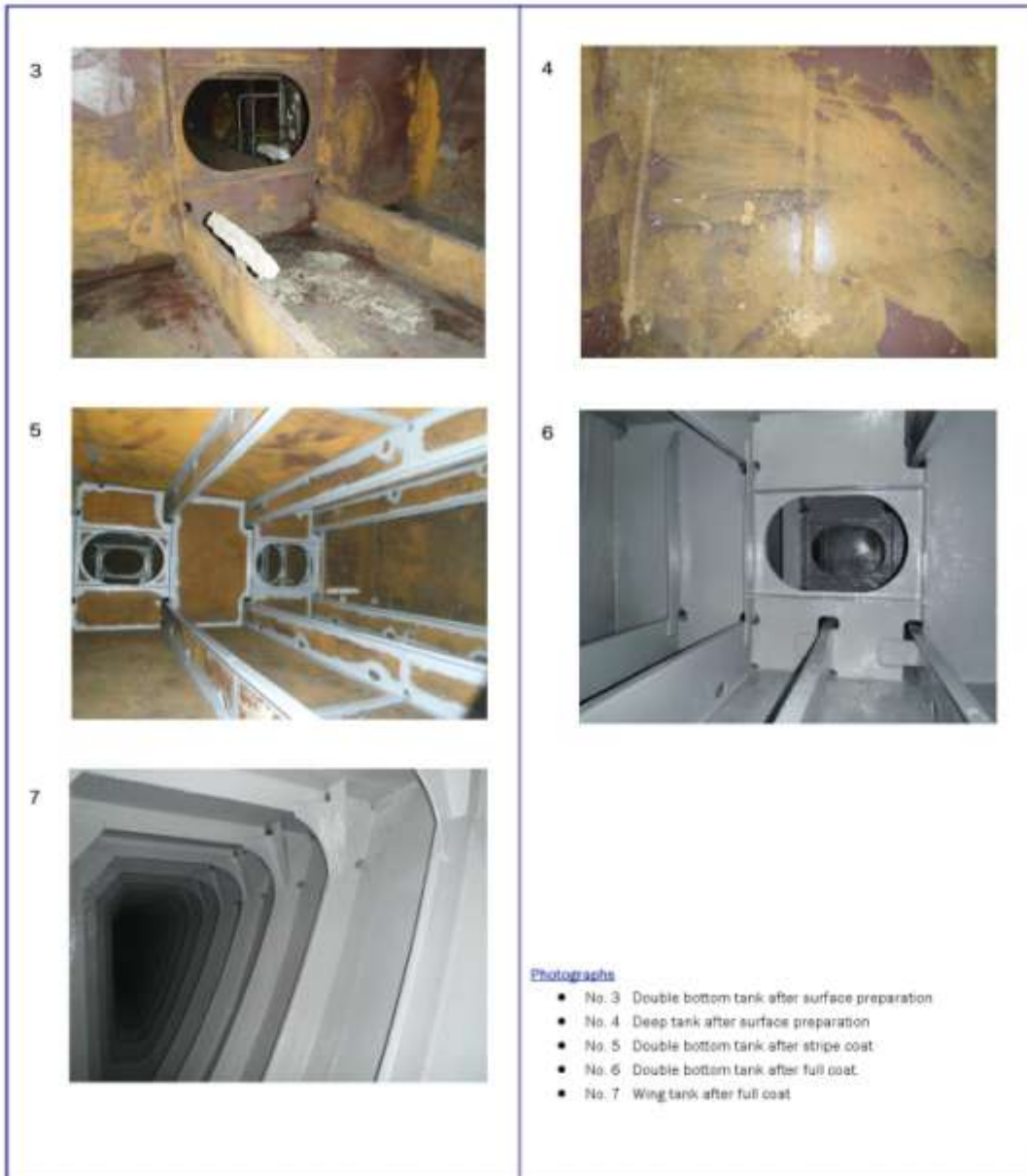
Continued overleaf



Photographs

- No. 1 Deep tank before surface preparation
- No. 2 Wing tank before surface preparation

CASE STUDY 11: Ballast Tanks – MV Auxis (cont.)



Photographs

- No. 3 Double bottom tank after surface preparation
- No. 4 Deep tank after surface preparation
- No. 5 Double bottom tank after stripe coat
- No. 6 Double bottom tank after full coat
- No. 7 Wing tank after full coat

- Solvent-free • Water-based • Wet-tolerant
- Rust-tolerant • Zero VOC
- Tank & Pipe Linings • Under-water & Marine • Glassfibre
- Rust Converters & Primers • Ceramic & Metal Repair • Anti-static, Conductive & Anti-slip Flooring
- Approved for Contact with Food, Drinking Water & Beverages • Damp or Green Concrete Primers
- Concrete Repair Systems • Elastomeric Systems
- High Temperature Systems • Fire Retardant • Insulation Systems

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CASE STUDY 12: Chemical Tanks – Intrepid Canada



Client: <i>Intrepid Chem 1021 Corporation</i>	Industry: <i>Marine</i>
Vessel: <i>Intrepid Canada Chemical Carrier</i>	Date: <i>September 2013</i>
Location: <i>Antwerp Ship Repair Yard</i>	Products: <i>Epo-chem™ RE 500PIRW500 Epoxy Novolac system</i>

Overview

Intrepid Canada chemical/oil carrier, built in 2011 and operated by Bernard Schulte Cyprus, had a requirement for a cargo tank refurbishment of 1200m² after the original coating (from new) had suffered failure.

Challenge

To remove all the previous coating to a sound substrate and provide a protective lining that would withstand a wide range of aggressive chemicals at high temperatures. Due to the clients budget and time constraints, a cost-effective alternative surface preparation method to grit blasting had to be considered. Chemco offered to utilise a revolutionary method of water blasting and use of a solvent-free coating system for the first time in this industry. The refurbishment process had to be completed within 10 days.

Solution

To achieve this challenge, water blasting was chosen as the alternative surface preparation method. Chemco's unique Epo-chem™ RE 500P and RW 500 were specified as the preferred coating system. Epo-chem™ RE 500P is a solvent-free, surface (rust) tolerant epoxy Novolac primer and RW 500 is a solvent-free epoxy Novolac glassflake topcoat. The original coating was removed by high pressure water jetting to achieve a WJ-2 standard. The following specification was applied.

- One stripe coat of RE 500P @ 100µ DFT
- One full coat of RE 500P @ 100µ DFT.
- One stripe coat of RW 500 @ 100µ DFT.
- Two topcoats of RW 500 @ 200µ DFT each.

Total DFT = 500µ

Continued overleaf



Photographs:

- Nos. 1 & 2 Original failed condition of existing lining
- No. 3 Stripe coat of Epo-chem™ RE 500P on the rusty surface

CASE STUDY 12: Chemical Tanks – Intrepid Canada (cont.)

Outcome

The work programme was successfully completed by Chemco's approved contractor, MSTC Global, in 10 days (including 3 days for post-curing). Substantial time and cost savings were achieved by post-curing to 35°C instead of the industrial procedure of 70°C. The system will increase the vessel cargo tank life-expectancy by another 5 - 10 years as requested by the owner. All the cargo tanks were completed to class standard and certified accordingly to the satisfaction of all concerned.

Benefits

With the Chemco system being applied to a water-jetted surface, it enabled the job to be completed ahead of schedule in 10 days, instead of 21 days as originally quoted by other contractors. Full refurbishment of cargo tanks utilising the procedure of water-jetting is a revolutionary breakthrough for the marine industry which has the following benefits:

- Solvent-free
- Excellent chemical and high temperature resistance
- No grit blasting
- Fast-curing and quick over-coating (faster application)
- Reduced contract duration and downtime
- No major delays
- Ease of decontamination (no cargo contamination).
- High gloss finish
- Chemco systems will protect the substrate for a minimum of 5 years

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Photographs.

- No. 4 - Stripe coat of Epo-chem™ RW 500 on primed surface of Epo-chem™ RE 500P
- No. 5 - Contrast between finished application of Epo-chem™ RW 500 and original surface
- No. 6 - COT 2 starboard after carrying ethanol for 14 days
- No. 7 - COT 5 Port after carrying ethanol for 14 days

Solvent-free • Water-based • Wet-tolerant
 • Rust-tolerant • Zero VOC
 • Tank & Pipe Linings • Under-water & Marine • Glassfibre
 • Rust Converters & Primers • Ceramic & Metal Repair • Anti-static, Conductive & Anti-slip Flooring
 • Approved for Contact with Food, Drinking Water & Beverages • Damp or Green Concrete Primers
 • Concrete Repair Systems • Elastomeric System
 • High Temperature Systems • Fire Retardant • Insulation Systems

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CASE STUDY 13: Spiral Casing – Bonnington Hydro

Case Study



Client: Scottish Power	Industry: Power Generation
Scope: Spiral Casing	Date: November 2002
Location: UK	Products: Epo-chem™ RA 564 & Ceram-chem™ RH 500 & RP 500

Overview

The 35 year old spiral casing required to be completely refurbished without any disruption to all other contractors working in this very busy area. It also had to be carried out in a very tight timescale and in cold and very damp conditions during the stations shutdown.

Challenge

Working within a very tight timescale, severe pitting and corrosion, extremely high humidity, confined space, water ingress and other contractors working adjacent to the spiral refurbishment added to the difficulty of the project.

Solution

First coat of **Epo-chem™ RA 564 solvent-free** glass-flake epoxy @ 250µ by airless spray and brush.

All severe areas of pitting were filled with **Ceram-chem™ RH 500 solvent-free**, high density epoxy putty.

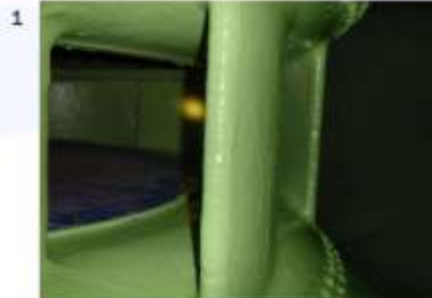
Second coat of **Ceram-chem™ RP 500 solvent-free**, ceramic epoxy system @ 200µ by airless spray and brush.

Outcome

The major technical benefits offered by utilizing this complete system assured the client that the work was carried out on time, within budget, with no major delays to the program and no impact on other contractors working in close proximity.

Benefits

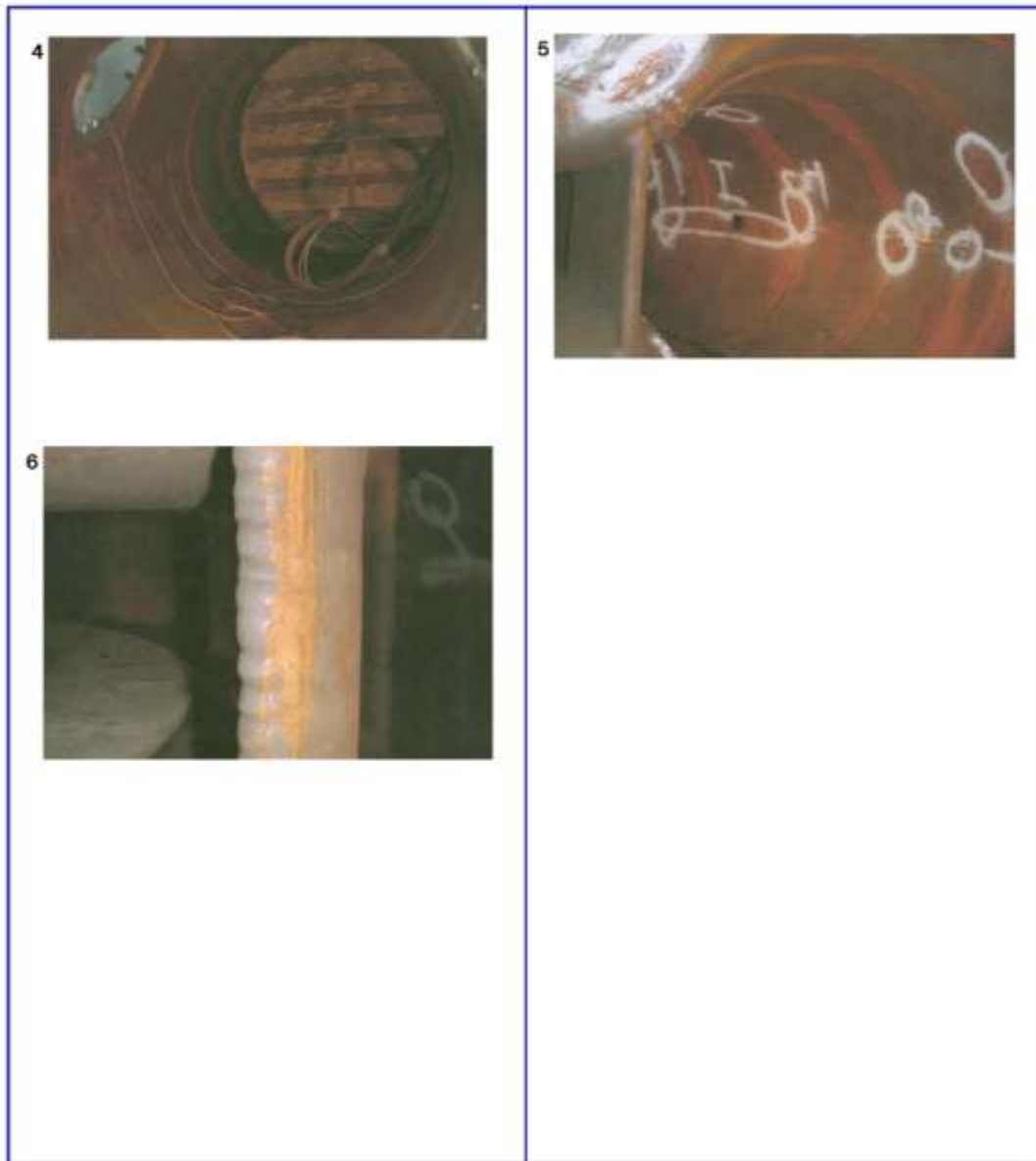
- Solvent-free
- No major delays to program
- Reduced H&S and Fire Precaution
- Reduced cost of plant and equipment
- Guaranteed long-term corrosion, abrasion and erosion protection



Photographs:

- Nos. 1, 2 and 3 The spiral casing after application
- Nos. 4, 5 and 6 The spiral casing before application

CASE STUDY 13: Spiral Casing – Bonnington Hydro (cont.)



- Solvent-free • Water-based • Wet-tolerant
- Rust-tolerant • Zero VOC
- Tank & Pipe Linings • Under-water & Marine • Glasslake
- Rust Converters & Primers • Ceramic & Metal Repair • Anti-static, Conductive & Anti-slip Flooring
- Approved for Contact with Food, Drinking Water & Beverages • Damp or Green Concrete Primers
- Concrete Repair Systems • Bestomeric System
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APPENDIX 1

CERTIFICATES AND APPROVALS

1.1 ABS Certificate – RS 500P/RA 500M on bare steel and blast cleaned steel surfaces
(Including on wet and rusty steel)



CERTIFICATE NUMBER

14-LD1135810A-PDA-01

DATE

23 January 2014

ABS TECHNICAL OFFICE

London Engineering Department

CERTIFICATE OF

DESIGN ASSESSMENT

This is to Certify that a representative of this Bureau did, at the request of
CHEMCO INTERNATIONAL - SCOTLAND

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

PRODUCT: IMO PSPC Approved Seawater Ballast Tank Coating

MODEL: RS 500P/RA 500M ON BARE STEEL AND BLAST CLEANED STEEL SURFACES.

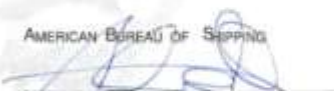
This Product Design Assessment (PDA) Certificate 14-LD1135810A-PDA-01, dated 23/Jan/2014 remains valid until 23/Jan/2019 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non-ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

AMERICAN BUREAU OF SHIPPING


Andrew Ward
Engineer

NOTE: This certificate complies with one or more of the Rules, Codes, standards or other criteria of ABS or a statutory, regulatory or mandatory code. It is issued only to the use of ABS, its members, its clients or other authorized users. Any application, change to the documented product or other approval from ABS will result in the certificate becoming null and void. The application certificate is governed by the "Terms and Conditions of the Request for Product Type Approval and Agreement" as contained in the ABS Rules.

44258713

1.2 Lloyds Approval – Ballast Tank Maintenance Coating – RA 500M



RECOGNISED CORROSION CONTROL COATING

Certificate No. **MATS/3810/2**

This certificate is issued to the company named below. The corrosion control coating described has been recognised for use as a tank coating in constructions built under Lloyd's Register survey. This recognition is subject to Lloyd's Register being informed of any changes in or modifications to the coating and the product being used in accordance with the manufacturer's instructions, and the relevant requirements of Lloyd's Register's Rules and Regulations.

Company	CHEMCO INTERNATIONAL LTD. UNITED KINGDOM
Trade name	EPO-CHEM RA 500M
Type of coating	Epoxy
Applicability	Salt Water Ballast Tanks, Void Spaces
Surface preparation	ISO 8501-1, 5a 2.5
Number of coats	1*- 2
Dry film thickness	250-600 microns
Remarks	* Additional stripe coat to be applied to all welds, edges and other changes in section. This recognition is applicable to vessels not within the scope of IMO Resolution MSC.215(82) 'Performance Standard for Protective Coatings for Dedicated Seawater Ballast Tanks in all Types of Ships and Double-side Skin Spaces of Bulk Carriers' adopted on 8th December 2006.

Valid until **1 October 2017**

Date **18 September 2012**

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R Dawson
Surveyor to Lloyd's Register EMEA
A subsidiary of Lloyd's Register
Group Limited

1.3 Lloyds Type Approval – IMO Resolution MSC.215 (82) PSPC for New Build – Bare Steel



Protective Coatings for Water Ballast Tanks and Double-side Skin Spaces

Certificate No: **MNDE/2011/4217**

Page 1 of 2

This is to certify that the protective coating system manufactured at the plant below is in compliance with IMO Resolution MSC.215(82) *Performance Standard for Protective Coatings for Dedicated Seawater Ballast Tanks in all Types of Ships and Double-side Skin Spaces of Bulk Carriers (PSPC)* adopted on 8th December 2006.

This approval is granted in accordance with the PSPC, IACS Regulations and LR Rules. The surface preparation and application requirements specified in the product technical data sheet (PTDS) have been reviewed and comply with the PSPC. This approval does not cover properties other than corrosion prevention, such as service life, safety or toxicity etc.

The approval is subject to Lloyd's Register being informed of any changes in the product's formulation, specification or status of manufacturing quality control accreditation. Periodic auditing of the manufacturer's quality control and assurance systems will confirm compliance. Lloyd's Register reserves the right to withdraw or re-issue this certificate.

Manufacturer:	Chemco International Ltd. East Shawhead Industrial Estate, Coatbridge, Scotland, United Kingdom
Coating system:	Epo-chem™ RS 500P / Epo-chem™ RA 500M
Product codes:	RS 500P / RA 500M
Curing agents:	HR 500P / HF 500M
Applications	Water ballast tanks and double-side skin spaces
Notes:	<ol style="list-style-type: none">1. Surface preparation and coating application should be carried out in accordance with the manufacturer's PTDS.2. Product approved for use with the compatible shop primers listed on page 2, or on clean blasted bare steel.
Date of issue:	26 May 2011
Date of expiry:	1 June 2016

A handwritten signature in black ink, appearing to read 'RD'.

Richard Dawson
Surveyor to Lloyd's Register EMEA
A member of Lloyd's Register Group

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Issue No. 1

1.3 Lloyds Type Approval – IMO Resolution MSC.215 (82) PSPC for New Build – Bare Steel
(Cont.)



**Protective Coatings for Water Ballast Tanks
and Double-side Skin Spaces**

Certificate No: MNDE/2011/4217

Page 2 of 2

Compatible Shop Primers:

<u>Primer</u>	<u>Product Code(s)</u>	<u>Manufacturer</u>
Bare steel only		
End of list		

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Issue No. 1

1.4 Lloyds Type Approval – IMO Resolution MSC.215 (82) PSPC for New Build - Shop Primer



Protective Coatings for Water Ballast Tanks and Double-side Skin Spaces

Certificate No: MNDE/2011/4217

Page 1 of 2

This is to certify that the protective coating system manufactured at the plant below is in compliance with IMO Resolution MSC.215(82) *Performance Standard for Protective Coatings for Dedicated Seawater Ballast Tanks in all Types of Ships and Double-side Skin Spaces of Bulk Carriers* (PSPC) adopted on 8th December 2006.

This approval is granted in accordance with the PSPC, IACS Regulations and LR Rules. The surface preparation and application requirements specified in the product technical data sheet (PTDS) have been reviewed and comply with the PSPC. This approval does not cover properties other than corrosion prevention, such as service life, safety or toxicity etc.

The approval is subject to Lloyd's Register being informed of any changes in the product's formulation, specification or status of manufacturing quality control accreditation. Periodic auditing of the manufacturer's quality control and assurance systems will confirm compliance. Lloyd's Register reserves the right to withdraw or re-issue this certificate.

Manufacturer: **Chemco International Ltd.**
East Shawhead Industrial Estate,
Coatbridge,
Scotland,
United Kingdom

Coating system: **Epo-chem™ RS 500P / Epo-chem™ RA 500M**

Product codes: **RS 500P / RA 500M**

Curing agents: **HR 500P / HF 500M**

Applications **Water ballast tanks and double-side skin spaces**

Notes:

1. Surface preparation and coating application should be carried out in accordance with the manufacturer's PTDS.
2. Product approved for use with the compatible shop primers listed on page 2, or on clean blasted bare steel.

Date of issue: **17 January 2012**

Date of expiry: **1 June 2016**

A handwritten signature in black ink, appearing to read 'RD'.

Richard Dawson
Surveyor to Lloyd's Register EMEA
A member of Lloyd's Register Group

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Issue No. 2

1.4 Lloyds Type Approval – IMO Resolution MSC.215 (82) PSPC for New Build - Shop Primer (Cont.)



Protective Coatings for Water Ballast Tanks and Double-side Skin Spaces

Certificate No: **MNDE/2011/4217**

Page 2 of 2

Compatible Shop Primers:

<u>Primer</u>	<u>Product Code(s)</u>	<u>Manufacturer</u>
Interplate 937	NQA933, NQA934, NQA936	International Paint Ltd.
Sigmaweld 190	179171, 179172	PPG Protective & Marine Coatings
Cerabond 2000	N/A	Chugoku Marine Paints, Ltd.
Nippon Ceramo (<i>Nippe Ceramo</i>)	N/A	Nippon Paint Marine Coatings Co., Ltd.

End of list

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Issue No. 2

1.5 NSF Certificate: Fresh Drinking Water System (when used in conjunction with RS 500P)

NSF International

789 N. Dixboro Road, Ann Arbor, MI 48105 USA

RECOGNIZES

Chemco International Ltd
Facility: Coatbridge, United Kingdom

AS COMPLYING WITH NSF/ANSI 61 AND ALL APPLICABLE REQUIREMENTS.
PRODUCTS APPEARING IN THE NSF OFFICIAL LISTING ARE
AUTHORIZED TO BEAR THE NSF MARK.



ANSI Accredited Program
NSF/ANSI 61
Certification Program
Accredited by the
American National
Standards Institute



Certification Program
Accredited by the
Standards Council
of Canada

This certificate is the property of NSF International and must be returned upon request. For the most current and complete information, please access NSF's website (www.nsf.org).

A handwritten signature in black ink, appearing to read "David Purkiss".

September 26, 2014
Certificate# C0184107 - 01

David Purkiss
General Manager, Water Systems

1.5 NSF Certificate: Fresh Drinking Water System (when used in conjunction with RS 500P) (cont.)



OFFICIAL LISTING

NSF International Certifies that the products appearing on this Listing conform to the requirements of NSF/ANSI Standard 61 - Drinking Water System Components - Health Effects

This is the Official Listing recorded on September 26, 2019.

Chemco International Ltd
13-23 Hagmill Road
East Shawhead Industrial Estate
Coatbridge ML5 4XD
United Kingdom
+44 1236 606060

Facility: Coatbridge, United Kingdom

Trade Designation	Protective (Barrier) Materials		Water Contact Temp	Water Contact Material
	Water Contact	Size Restriction		
[1] [2] [3] Tanks				
Epo-Chem RA 500		>= 1000 gal.	CLD 23	EPOXY
Epo-Chem RA 500 UW		>= 1000 gal.	CLD 23	EPOXY
Epo-Chem RA 500M		>= 1000 gal.	CLD 23	EPOXY

- [1] All RA500 products are used with Epo-Chem RS 500P primer.
- [2] Colors: <only capitalize the first color, put the colors in alpha order>
 Number of Coats: Primer 1, Top Coat 1
 Maximum Field Use Dry Film Thickness (in mils): Primer: 10; Top coat: 25; Total system: 35
 Maximum Thinner: 5% TS Thinner
 Recoat Cure Time and Temperature: Primer cure time is 2 hours at 30°C
 Final Cure Time and Temperature: 48 hours at 30°C
 Special Comments: Primer: Mix Ratio is 4.18:0.82 (Part A:Part B) by weight Top Coat: Mix Ratio is 3.67:1.332 (Part A:Part B) by weight
- [3] Product is Certified to NSF/ANSI 372 and conforms with the lead content requirements for "lead free" plumbing as defined by California, Vermont, Maryland, and Louisiana state laws and the U.S. Safe Drinking Water Act.

Note: Additions shall not be made to this document without prior evaluation and acceptance by NSF International.

1 of 1

789 N. Dixboro Road, Ann Arbor, Michigan 48105-9723 USA
 1-800-NSF-MARK / 734-769-8010
 www.nsf.org

C0184103

1.6 FDA Approval – Food Contact – RA 500M



Food Contact Plastics
Certificate of Conformity with the Test Requirements of USA FDA
Code of Federal Regulations (CFR21) Section 175.300 (Resinous and
Polymeric Coatings).

Certificate no: 2013/5091

Product Name:	RA 500M	Date of Issue:	17 October 2013
Manufacturer/ Supplier:	Chemco International	Pira Reference No:	13A12J5514
Address:	East Shawhead Industrial Estate Coatbridge Scotland ML5 4XD		

Samples of the above product have been found to comply with the following requirements, as specified in sections (1) of the USA FDA Code of Federal Regulations CFR21 Section 175.300 (Polyethylene Phthalate Polymers).

- The chloroform soluble portion of a distilled water extract of the food contact surface of the sample shall not exceed 0.5 mg per square inch when tested using extraction conditions of 24 hours at 120°F.
- The chloroform soluble portion of an n-heptane extract of the food contact surface of the sample shall not exceed 0.5 mg per square inch when tested using extraction conditions of 0.5 hours at 70°F.

Accordingly, the above sample is in compliance with the test requirements specified in the USA FDA Code of Federal Regulations CFR21 Section 175.300 (1) and is suitable for use in packaging, transporting or holding all non alcoholic foods, at temperatures not to exceed room temperature.

Certified by: Allison Chambers
Senior Analytical Chemist
Analytical Services

1.7 FDA Approval – Food Contact – RP 500



Food Contact Plastics
Certificate of Conformity with the Test Requirements of USA FDA
Code of Federal Regulations (CFR21) Section 175.300 (Resinous and
Polymeric Coatings).

Certificate no: 2013/5092

Product Name:	'RP 500'	Date of issue:	17 October 2013
Manufacturer/ Supplier:	Chemco International	Pira Reference No:	13A12J5514
Address:	East Shawhead Industrial Estate Coatbridge Scotland ML5 4XD		

Samples of the above product have been found to comply with the following requirements, as specified in sections (1) of the USA FDA Code of Federal Regulations CFR21 Section 175.300 (Polyethylene Phthalate Polymers).

- The chloroform soluble portion of a distilled water extract of the food contact surface of the sample shall not exceed 0.5 mg per square inch when tested using extraction conditions of 24 hours at 120°F.
- The chloroform soluble portion of an n-heptane extract of the food contact surface of the sample shall not exceed 0.5 mg per square inch when tested using extraction conditions of 0.5 hours at 70°F.

Accordingly, the above sample is in compliance with the test requirements specified in the USA FDA Code of Federal Regulations CFR21 Section 175.300 (1) and is suitable for use in packaging, transporting or holding all non alcoholic foods, at temperatures not to exceed room temperature.

Certified by: Allison Chambers
Senior Analytical Chemist
Analytical Services



Food Contact Plastics
Certificate of Conformity with the Test Requirements of USA FDA
Code of Federal Regulations (CFR21) Section 175.300 (Resinous and
Polymeric Coatings)

Certificate no: 2013/5093

Product Name: RA 500M / RP 500

Date of Issue: 17 October 2013

Pira Reference No: 13A12J5514

Manufacturer/

Supplier:

Address: Chemco International
East Shawhead Industrial Estate
Coatbridge
Scotland
ML5 4XD

Samples of the above product have been found to comply with the following requirements, as specified in sections (1) of the USA FDA Code of Federal Regulations CFR21 Section 175.300 (Polyethylene Phthalate Polymers).

- The chloroform soluble portion of a distilled water extract of the food contact surface of the sample shall not exceed 0.5 mg per square inch when tested using extraction conditions of 24 hours at 120°F.
- The chloroform soluble portion of an n-heptane extract of the food contact surface of the sample shall not exceed 0.5 mg per square inch when tested using extraction conditions of 0.5 hours at 70°F.

Accordingly, the above sample is in compliance with the test requirements specified in the USA FDA Code of Federal Regulations CFR21 Section 175.300 (1) and is suitable for use with fresh drinking water, at temperatures not to exceed room temperature.

A handwritten signature in cursive script, appearing to read 'Alli Chambers'.

Certified by: Allison Chambers
Senior Analytical Chemist
Analytical Services

1.9 FDA Approval – Fresh Drinking Water – Ceram-chem™ RP 500



Food Contact Plastics
Certificate of Conformity with the Test Requirements of USA FDA
Code of Federal Regulations (CFR21) Section 175.300 (Resinous and
Polymeric Coatings)

Certificate no: 2013/5093

Product Name: 'RA 500M / RP 500'
Date of Issue: 17 October 2013
Manufacturer/Supplier: Chemco International
Address: East Shawhead Industrial Estate
Coatbridge
Scotland
ML5 4XD
Pira Reference No: 13A12J5514

Samples of the above product have been found to comply with the following requirements, as specified in sections (1) of the USA FDA Code of Federal Regulations CFR21 Section 175.300 (Polyethylene Phthalate Polymers).

- The chloroform soluble portion of a distilled water extract of the food contact surface of the sample shall not exceed 0.5 mg per square inch when tested using extraction conditions of 24 hours at 120°F.
- The chloroform soluble portion of an n-heptane extract of the food contact surface of the sample shall not exceed 0.5 mg per square inch when tested using extraction conditions of 0.5 hours at 70°F.

Accordingly, the above sample is in compliance with the test requirements specified in the USA FDA Code of Federal Regulations CFR21 Section 175.300 (1) and is suitable for use with fresh drinking water, at temperatures not to exceed room temperature.

Certified by: Allison Chambers
Senior Analytical Chemist
Analytical Services

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Fax +44 (0) 1372 802240
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Food Contact Plastics
Certificate of Conformity with the Test Requirements of USA FDA
Code of Federal Regulations (CFR21) Section 175.300 (*Resinous and*
***Polymeric Coatings*).**

Certificate no: 2012/4646

Product:	<i>'Epo-Chem RB500'</i>	Date of Issue:	16 January 2012
Manufacturer:		Pira International	
Supplier:	Chemco International	Test Reference no:	11A12J4822A
Address:	East Shawhead Industrial Estate Coatbridge ML5 4XD		

The above product has been tested against, and found to comply with the following test requirements specified in the USA FDA Code of Federal Regulations CFR21 Section 175.300 (*Resinous and Polymeric Coatings*):

- The chloroform soluble portion of a distilled water extract of the food contact surface of the sample shall not exceed 0.5mg per square inch when tested using extraction conditions of 24 hours at 120°F.
- The chloroform soluble portion of an 8% ethyl alcohol extract of the food contact surface of the sample shall not exceed 0.5 mg per square inch when tested using extraction conditions of 24 hours at 120°F.

Accordingly, the above product is in compliance with the test requirements specified in the USA FDA Code of Federal Regulations CFR21 Section 175.300, and is suitable for use in contact with Food Types VI-A and B (i.e. 'non alcoholic and alcoholic beverages') under condition of use E (i.e. 'Room temperature filled and stored ('no thermal treatment in the container').

A handwritten signature in black ink, appearing to read "Allison Chambers".

Certified by: Allison Chambers
Senior Analytical Chemist
Analytical Services

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