



# **REPORT**

## **TANK LININGS**

**Traditional & Solvent-free Systems**

**All Industries**

**August 2018**



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# **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 hydro-carbon 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)
- ABS Certificate – IMO PSPC-COT Approved Oil Cargo Tank Coating
- Lloyds Approval:
  - Lloyds Approval – Ballast Tank Maintenance Coating – **RA 500M**
  - Lloyds Type Approval – IMO Resolution MSC.215 (82) PSPC for New Build  
– Bare & Shop Primed Steel – **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 – Chemical Tanker (Vadero)

### Case Study



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

#### Overview

A Chemical Tanker had a requirement for cargo tank refurbishment for over 3,500m<sup>2</sup>. 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 Sa 2½

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 – Chemical Tanker (Vadero) (cont.)

<p>4</p> 	<p>5</p> 
<p>6</p> 	<p>7</p> 
<p>8</p> 	<p>9</p> 
<p><u>Photographs:</u></p> <ul style="list-style-type: none"><li>• No. 4 Tank (port) After Stripe Coating</li><li>• No. 5 Tank (port) After Second Coat of RB 364</li><li>• No. 6 Tank (starboard) After Stripe Coating</li><li>• No. 7 Tank (starboard) After Second Coat of RB 364</li><li>• Nos. 8-9 Tank (starboard) After Second Coat of RB 364</li></ul>	

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## CASE STUDY 2: Chemical Tanks – Chemical Tanker

### Case Study



<b>Client:</b> Brøvigtank AS	<b>Industry:</b> Marine
<b>Vessel:</b> Chemical Tanker	<b>Date:</b> April 2014
<b>Location:</b> Gdynia, Poland	<b>Products:</b> Chem-tect™ RB 364 & RB 300TC

#### Overview

The tank tops found inside four cargo tanks (3 Port, 4 Port, 4 Starboard & 6 Port), onboard the Chemical Tanker, 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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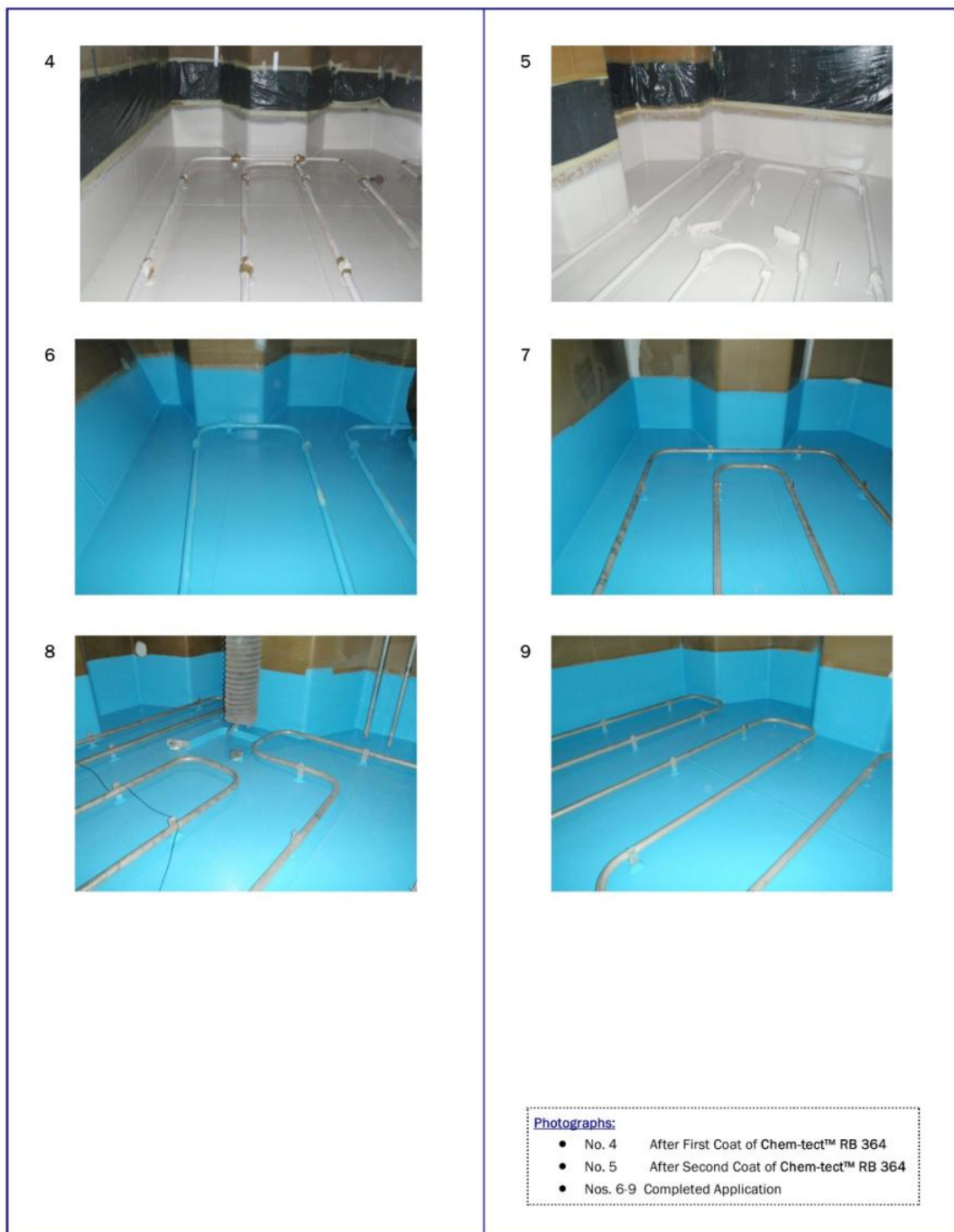


#### Photographs:

- Nos. 1-2 Original Condition
- No. 3 After First Coat of Chem-tect™ RB 364



## CASE STUDY 2: Chemical Tanks – Chemical Tanker (cont.)



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## CASE STUDY 3: Crude Oil Tank – BP Dalmeny

### Case Study



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

#### 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, we 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
- Minimum 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

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#### Photographs:

- Nos. 1 - 3 Crude oil tank after application



## CASE STUDY 4: Process Vessel – Flotta Oil Terminal

### Case Study



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

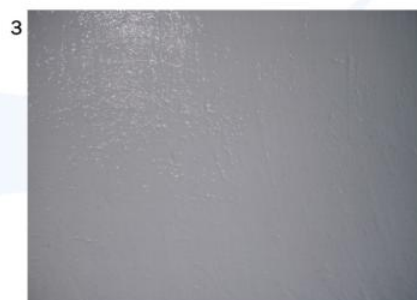
First coat of **Epo-chem™ RA 564** solvent-free glassflake epoxy system @ 500µ DFT by airless spray. All deep pitting were filled with **Ceram-chem™ RH 500** solvent-free, ceramic epoxy putty. Second coat of **Epo-chem™ RA 564** solvent-free glassflake epoxy system @ 500µ by airless spray. Total DFT: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

- Nos. 1 - 3 The process vessel after application

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

### Case Study



<b>Client:</b> BP	<b>Industry:</b> Petrochemical
<b>Scope:</b> Crude Oil Tank	<b>Date:</b> November 2008
<b>Location:</b> BP Kinneil (Tank 3701)	<b>Products:</b> 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 glass-flake 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 contractors 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

- Solvent-free
- 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

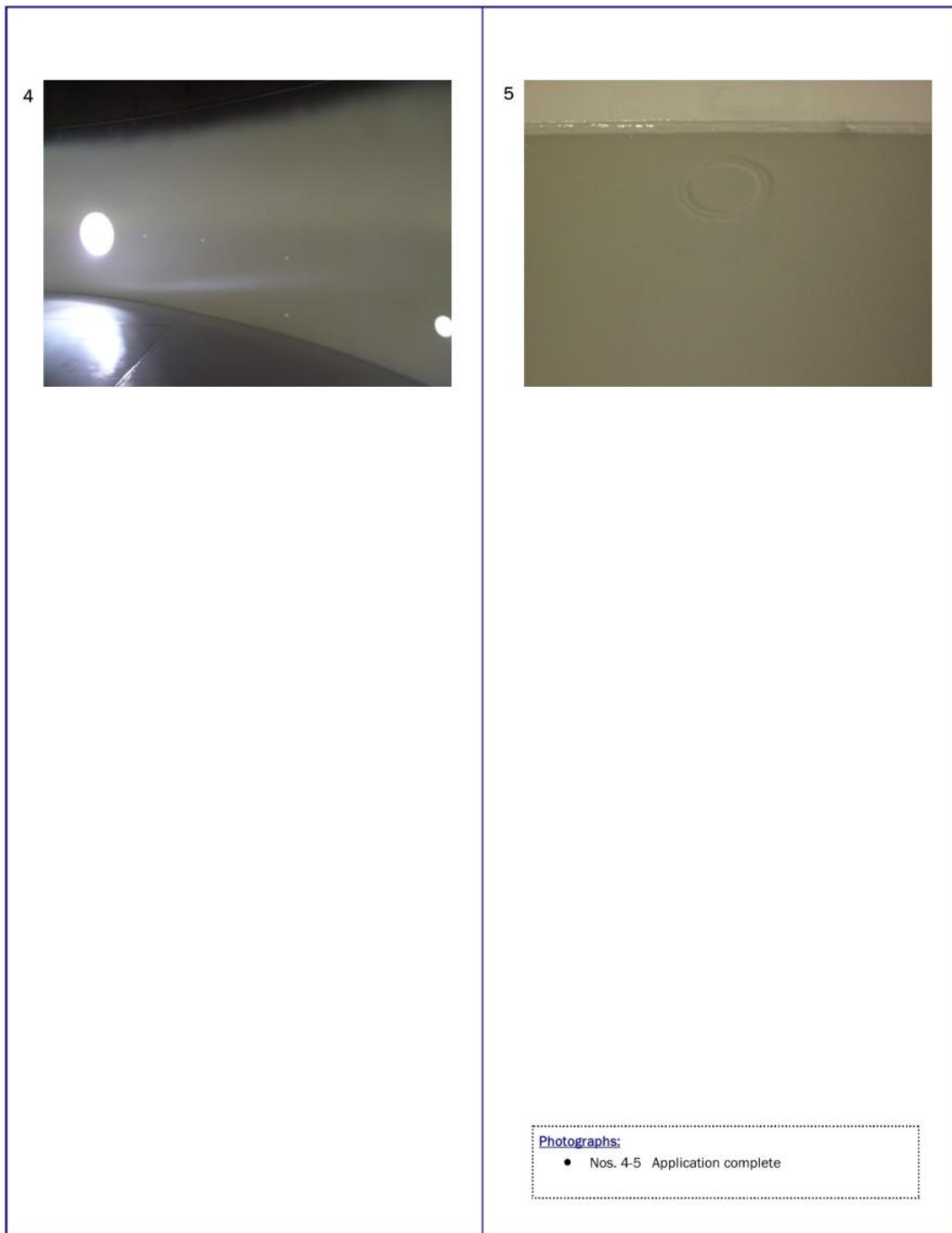
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#### Photographs:

- Nos. 1-3 Application complete

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



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## CASE STUDY 6: Fibreglass Tank Refurbishment - BP Grangemouth

### Case Study



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

#### 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.

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#### Photographs:

- No. 1 Before application
- Nos. 2-4 Application in Progress



## CASE STUDY 6: Fibreglass Tank Refurbishment - BP Grangemouth

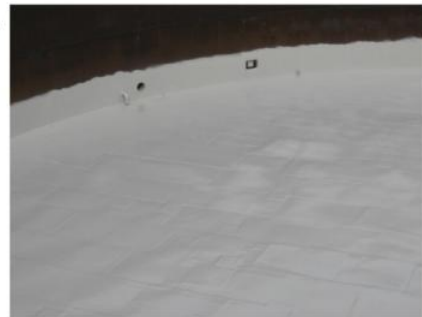
### Benefits

- 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

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6



#### Photographs:

- No. 4 Application in Progress
- Nos. 5-6 Completed Application

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## CASE STUDY 7: Swimming Pool Refurbishment – Cruise Ship

### Case Study



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

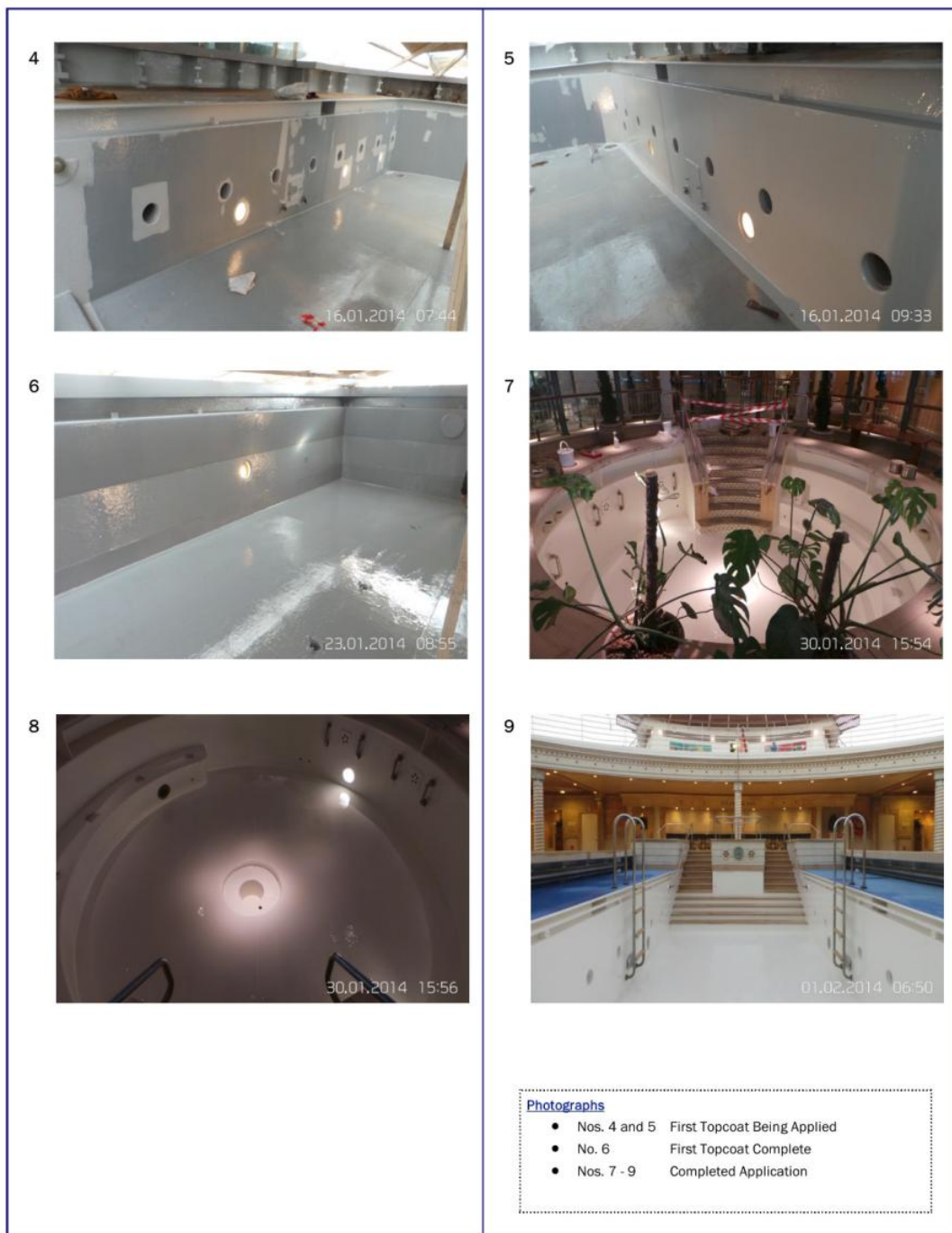
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#### Photographs

- Nos. 1-2 After Surface Preparation
- No. 3 Topcoat Being Applied on Top of Primer

## CASE STUDY 7: Swimming Pool Refurbishment – Cruise Ship (cont.)



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## CASE STUDY 8: Potable Water Tank – Basingstoke Hotel

### Case Study



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

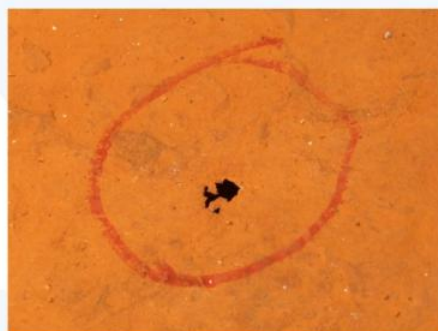
- Solvent-free
- Restored to “as good as new” condition
- Reduced H&S and Fire Precaution
- No grit blasting
- Substantial time and cost savings

Continued overleaf

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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.)

3



4



5



Photographs

- Nos. 3 & 4 After priming
- No. 5 Completed application

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## CASE STUDY 9: New Build (Shop Primer) – Oil Products Tanker

### Case Study



<b>Client:</b> <i>Rix Shipping</i>	<b>Industry:</b> <i>Marine</i>
<b>Vessel:</b> <i>Oil Products Tanker</i>	<b>Date:</b> <i>2012</i>
<b>Location:</b> <i>UK</i>	<b>Products:</b> <i>Epo-chem™ RS 500P &amp; RA 500M</i>

#### Overview

This Oil Products Tanker New Build, required to have the double skin ballast tanks (over 5,000m<sup>2</sup>) 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



#### Photographs

- No. 1 Before application
- No. 2 Stripe coating

## CASE STUDY 9: New Build (Shop Primer) – Oil Products Tanker (cont.)



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## CASE STUDY 10: Ballast Tanks – MISC FPSO

### Case Study



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

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



### Photographs

- 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

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## CASE STUDY 11: Ballast Tanks – MV Auxis

### Case Study



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

#### Overview

The ballast tanks of the vessel M/V AUXIS required a full refurbishment for over 6,000m<sup>2</sup> (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.)

<p>3</p> 	<p>4</p> 
<p>5</p> 	<p>6</p> 
<p>7</p> 	<p><u>Photographs</u></p> <ul style="list-style-type: none"> <li>• No. 3 Double bottom tank after surface preparation</li> <li>• No. 4 Deep tank after surface preparation</li> <li>• No. 5 Double bottom tank after stripe coat</li> <li>• No. 6 Double bottom tank after full coat.</li> <li>• No. 7 Wing tank after full coat</li> </ul>

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## CASE STUDY 12: Chemical Tanks – Chemical/Oil Carrier

### Case Study



<b>Client:</b> <i>Intrepid Chem 1021 Corporation</i>	<b>Industry:</b> <i>Marine</i>
<b>Vessel:</b> <i>Chemical/Oil Carrier</i>	<b>Date:</b> <i>September 2013</i>
<b>Location:</b> <i>Antwerp Ship Repair Yard</i>	<b>Products:</b> <i>Epo-chem™ RE 500P &amp; RW 500</i>

#### Overview

The chemical/oil carrier, built in 2011 and operated by Bernard Schulte Cyprus, had a requirement for a cargo tank refurbishment of 1200m<sup>2</sup> 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: RE 500P @ 100µ DFT
- One full coat: RE 500P @ 100µ DFT.
- One stripe coat: RW 500 @ 250µ DFT.
- Two topcoats: RW 500 @ 250µ DFT each.

Total DFT = 600µ

Continued overleaf

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#### 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 – Chemical/Oil Carrier (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

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## CASE STUDY 13: Spiral Casing – Bonnington Hydro

### Case Study



<b>Client:</b> <i>Scottish Power</i>	<b>Industry:</b> <i>Power Generation</i>
<b>Scope:</b> <i>Spiral Casing</i>	<b>Date:</b> <i>November 2002</i>
<b>Location:</b> <i>UK</i>	<b>Products:</b> <i>Epo-chem™ RA 564 &amp; Ceram-chem™ RH 500 &amp; RP 500</i>

#### 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.

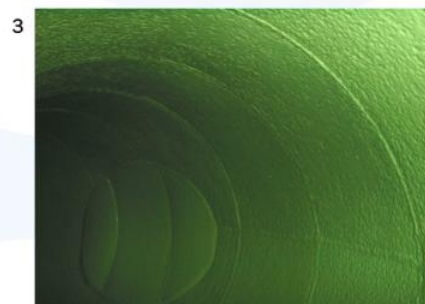
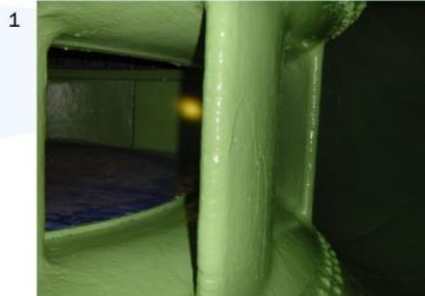
#### Outcome

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

Continued overleaf



#### Photographs:

- Nos. 1-3 Spiral Casing After Application

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



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