

Ballast Water Tanks Repair Guide for Crew

This brief introduction is only intended as a guide for crew repairs with **CHEMCO** products **Epo-chem™ RS 500P** and **RA 500M**.

This is a guideline for how corrosion works and what you can do to prevent it.

Ballast Tank Corrosion:

Corrosion of steel in marine environment is an electrochemical process in which the steel reacts with its environment; the coating is acting as insulation between the two. When the coating is aged, it will lose its elasticity and begin to crack. A continuous wet environment, salt and oxygen, make the ballast tank an ideal environment for severe rusting. The rust growth is about 0.22mm/year.

High temperatures would also speed up the corrosion. Areas where diffusion is easy, such as edges and corners (where film thickness is low), will corrode the fastest.

Corrosion in ballast tanks always begins from top-side down. The main cause for coating breakdown in tanks is solvent-based coatings. Also, soft coatings made of vegetable oils or animal fats/grease collapse rather quickly.

**Double bottom tank top
after 7 years in service.**



Types of Corrosion in Ballast Tanks

Electrolytic Corrosion: Steel, sea water, oxygen, carbon dioxide.

Pitting Corrosion: The characteristic of this type of attack is that it is extremely localised and the penetration is deep in relation to the area attacked. Pitting is one of the most dangerous forms of corrosion as it often occurs in places (tank bottom) where it cannot be readily seen.

Microbial Influenced Corrosion (MIC)

This type of corrosion can occur within ballast tanks in sediments buried in mud. Microbes have been blamed for the excessive pitting to be found on the tank bottoms. All metals, even stainless steel, may be attacked from microbiologically influenced corrosion.

**Black slime deposit
at the surface can
indicate MIC corrosion!**



**Mud and sediments
can contain MIC!**





Products

1. **Epo-chem™ RS 500P:** This is a solvent-free, moisture (wet) tolerant / surface (rust) tolerant system. It can be used for any type of surface preparation (e.g. mechanical, HP or UHP water jetting) and the standard can be as low as ST2, WJ4. This product can be used as a single coat or as a 2-coat system on its own or with RA 500M (glassflake top-coat).
2. **Epo-chem™ RA 500M:** This is a solvent-free, moisture (wet) tolerant glassflake main/top coat. It is an impermeable barrier usually used as a top-coat for RS 500P or it can be used on its own as a 1 or 2-coat system. Minimum surface preparation standard required is ST3, WJ2. This product is FDA approved for the carriage of drinking water and grain.

Benefits:

- Solvent-free, wet/rust tolerant.
- No dew point restriction.
- Compatible with all ballast tank coatings including coal-tar epoxies.
- Fast turn-round (less than 24 hours) and can cure underwater.
- No major H&S or fire issues.
- Cost effective.
- Class 1 approval from Lloyds as a maintenance coating.

Why Chemco System?

For the first time in industry, these products enable crew or riding crew to carry out work in the ballast tank in a safe and cost effective manner simply because:

- **No requirement** for large specialist equipment such as **compressor, ventilation, dehumidifier, grit blasting** etc.
- Surface preparation by mechanical (chipping, grinding, scraping, wire brush) or water jetting with 500-800 bar machines (e.g. Denjet MasterMariner Series)
- 2 products only for the entire ship's refurbishment, including all tanks (ballast, fuel, waste and drinking water) decks, structures, etc.



Working instruction for crew!

Please read MSDS before starting work

- Remove mud and sediments.
- Remove oil and grease.
- Mechanical removal of hard rust.
- Smooth all rough edges of the existing coating.
- Remove dirt and residues.
- High pressure freshwater wash.
- Check all tank compartments prior coating application.
- Check the square metre (m²) to be coated (estimate!).
- Mix only the quantities of coating required for the estimated area.
- Stripe coat all rusty areas, welds and sharp edges.
- Large areas can be spray applied.

The systems can be applied by brush/roller to a DFT range of 100-250 μ per coat.

- A 1st coat 1 x RS 500P @ 100-150 μ DFT Theo. Coverage: 5m²**
B 2nd coat 1 x RA 500M @ 200-250 μ DFT Theo. Coverage: 3.1m²

1 coat system: Total DFT 150 μ (**RS 500P**)

2 coat system: Total DFT 300-350 μ (**RS 500P** and **RA 500M**)

Please ensure the following:

1. The applied film must be pinhole free and continuous.
2. Recoating interval is unlimited, recoat as soon as the coating is touch dry.
3. Pot-life: 40 minutes for **RS 500P** and 60 minutes min. for **RA 500M @ 15°C**.
4. Do not use thinners.
5. Cleaner, any epoxy cleaner on board will be suitable.

Step by step guide:

1. Surface preparation

Remove hard rust by power tools ST 2-3 followed by fresh water wash or pressure wash 500-800 bar (using fresh water).

De-rusting and decontamination with freshwater 500 bar rotation nozzle.



Mechanical power tool de-rusting ST 2-3 followed by high pressure freshwater washing.



Mechanical power tool de-rusting before high pressure washing.



2. Stripe coat

Stripe coat all sharp edges and corners using brush/roller to a DFT of 100 μ minimum.

Stripe coating using RS 500P by brush, ensuring all sharp edges and corners are covered with minimum 100 μ , no pinholes and the film is continuous.



Ensure all rusted areas are covered by the stripe coat.



All welds are stripe coated regardless of the condition.



3. Second coat/top coat

The final coat/full coat/top-coat is then applied to a minimum DFT of 150 μ (**RS 500P**).

The completed area with a stripe coat and top coat of RS 500P, this area would now have a minimum 5 years life-expectancy.
Total DFT 150 μ minimum



4. Full system / top-coat

Once the primer coat (**RS 500P**) is touch dry then apply the top-coat **RA 500M** to a DFT of 200 μ minimum.

The top-coat RA 500M (light grey colour) applied, completed area with a stripe coat (**RS 500P @ 100 μ**) and primer coat (**RS 500P @ 150 μ**) and the top-coat (**RA 500M @ 200 μ**) this area would now have a minimum 10 years life-expectancy.
Total DFT 350 μ





Marine Agents/Stockists

Main Office (UK)	<p>Chemco International Limited East Shawhead Industrial Estate Coatbridge North Lanarkshire ML5 4XD Scotland United Kingdom</p>	<p>Tel: +44 (0)1236 606060 Fax: +44 (0)1236 606070 Email: sales@chemcoint.com Website: www.chemcoint.com Marine Business Manager: Mr Alistair Neil Email: alistairneil@chemcoint.com Mobile: +44 (0) 7966 143762</p>
Singapore (South East Asia)	<p>Chemco Specialty Coatings (S.E.A) PTE LTD. Jalan Pesawat. Singapore 619364</p>	<p>Tel: +65 (0)6264 3008 Fax: +65 (0)6264 3009 Email: admin@chemco-csc.com.sg Website: www.chemco-csc.com.sg</p>
USA	<p>WCI, Inc. World Chandlery International, Inc. 6502 Rusk, Houston, TX 77011</p>	<p>Tel: 713-674-8072 (24-hour) Fax: 281-768-8482 Email: sales@wcisupplies.com Web site: www.wcisupplies.com Contact: Mrs. Vagie Iliakis (President)</p>
Germany	<p>Vecom Marine Services Gmbh Schlenzigstr. 7 21107 Hamburg Germany</p>	<p>Tel: +49 40 751721 Fax: +49 40 7535370 Mobile: +49 1735285104 Email: a.gizewski@vecom-marine.com Website: www.vecom-marine.com Contact: Mr. Adam Gizewski</p>
United Arab Emirates (Dubai)	<p>Charisma Ship Maintenance LLC P.O. Box 26443 Sharjah United Arab Emirates</p>	<p>Tel: +971 (0) 65548805 Fax: +971 (0) 65548806 Mobile: +971 (0) 506311425 Email: info@charismauae.net Website: www.charismauae.net</p>
Greece	<p>International Marine Services 15-17 Hatzikyriakou Av. 185 37 Piraeus Greece</p>	<p>Tel: +30 (0) 210 4517554 +30 (0) 210 4517243 Fax: +30 (0) 210 4282075 Mobile: +30 (0) 6973535612 Email: info@imsgr.net Skype: isidorosv</p>
Australia	<p>CEA Australia Pty Ltd Head office (Victoria & TAS) 19-23 Bailey Ave Keilor East VIC 3033</p>	<p>Tel: +61 (0)3 9336 2277 Fax: +61 (0)3 9336 2255 Email: vic@ceaaustralia.com.au Website: www.ceaaustralia.com.au Contact: Mr.Clive Sangster</p>