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Quick Guide to Ballast Tank Maintenance

(Crew or Riding Crew)

This brief introduction is intended as a guide for crew or riding 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 with salt and oxygen also present makes the ballast tank an ideal environment for severe corrosion. The rate of corrosion 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 begin from top-side down. The main cause for coating breakdown in tanks is solvent-based coatings. The use of soft coatings made of vegetable oils or animal fats/grease is no longer acceptable as they provide even less protection than solvent-based paints.

**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 Induced 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 induced 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, wet & rust** tolerant system. It can be used for any type of surface preparation, e.g. mechanical, wet/dry grit blast, HP or UHP water jetting; with the standard as low as ST2, WJ-4. This product can be used as a single coat or as a 2-coat system on its own or with **RA 500M** (glassflake topcoat).
2. **Epo-chem™ RA 500M:** This is a **solvent-free, wet tolerant** glassflake main/topcoat. It acts as an impermeable barrier topcoat for **RS 500P** or it can be used on its own. Minimum surface preparation standard required is ST3, WJ-2. This product is **FDA** approved for the carriage of drinking water and grain.

Benefits:

- **Solvent-free (odourless), wet & rust** tolerant
- Any surface preparation method can be utilised
- No humidity or dew point restriction
- Compatible with all ballast tank coatings, including coal-tar epoxies
- Fast turn-round (less than 24 hours), products can cure underwater
- No disruption to nearby ongoing work (including hot work)
- No overcoating limitations
- No major H&S or Fire Precaution
- Convenient 5 kg packs, less wastage
- Cost effective
- **NSF Certified** for fresh drinking water applications
- **Class 1 approval from Lloyds** for ballast tank maintenance
- Satisfy **IMO PSPC** for ballast tank maintenance

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 equipments e.g. **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)
- Two products only for the entire ship's refurbishment: including all tanks (ballast, fuel, waste and drinking water) decks, structures, etc.

Working instructions 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 to 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 100-250µ per coat.

A	1st coat	1 x RS 500P	@ 100µ DFT	Theo. Coverage: 6.25m²
B	2nd coat	1 x RA 500M	@ 250µ DFT	Theo. Coverage: 3.1m²

1 coat system: Total DFT 150µ (**RS 500P**) Theo. Coverage: 4.16m²

2 coat system: Total DFT 350µ (**RS 500P @ 100µ**) and (**RA 500M @ 250µ**)

Please ensure the following:

1. The applied film must be pinhole free and continuous.
2. Re-coating interval is unlimited; you can re-coat as soon as the 1st coat is touch dry.
3. Pot-life: 65 minutes min. for **RS 500P*** and 90 minutes min. for **RA 500M @ 15°C**.
4. Do **not** use thinners.
5. Cleaner, any epoxy cleaner on board will be suitable.

** Tropical grade (65 minutes @ 30°C) pot-life.*

Step by step guide:

1. Surface preparation

Remove hard rust by power tools ST2-3 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 ST2-3 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 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/topcoat

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

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



4. Full system/topcoat

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

The topcoat 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 topcoat (RA 500M @ 200 μ). This area would now have a minimum 10 years life-expectancy.
Total DFT 350 μ





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