





Chemcote Speciality Coatings (SEA) Pte Ltd
 12 Marina Boulevard | #17-01, Marina Bay
 Financial Centre Tower 3
 Singapore 018982
 Main : +65 68095056 | HP : 65 84550312 |
 Mobile : 65 9027 3821(24hrs)
 e-mail: john@chemcotecsc.com
 web site: www.chemcotecsc.com

Chemcote Speciality Coatings (SEA) P/L

Case Study

Date of first issue	Thursday, 24 January 2019	Client	Cyclct Electrical Engineering P/L
Written By	John Samuel	Project:	HE Tube and Shell Plate Coating Works
Designation	General Manager	Project Type	Structural Corrosion Protection Coating System
Application: Anti Corrosion and Chemical Resistant Coating System for Tube Sheet and Shell Plate Internals, Shell and Tube Heat exchanger			

Reference to part of this report which may lead to misinterpretation is not permissible. Restricted distribution only

Report Number 2019-02-CINSR	Revision Number: 0	
Inspection done by: John Samuel	Date Started: 21/1/2019	
Asset owner 	Date Completed: 24/01/2019	
	Client Rep:	
Location: 23 Tuas South Avenue 6, 637022	Client Ref: TBA	
Remarks:		

Report Summary

Objectives

RS 500 P Wet/Rust Tolerant solvent free primer and RA 500M Wet/Surface tolerant glass flake solvent free coating system was specified to asset owner in view of short turn around time of equipment during shut down. There was also restrictions on grit blasting and hydro blasting at location of the Heat Exchangers. Our total supply and apply cost was also a commercial consideration as we were competitive and cost effective. The Chemco Epo-chem coating system would also give the best long term corrosion and chemical protection for surface preparation standards achievable under prevailing site constraints. The Chemco Epo-chem coating system is the only coating system that will address and overcome surface preparation and environmental constraints.

Observations

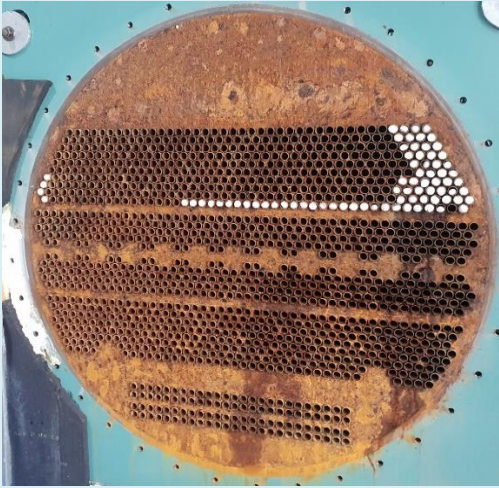
Above 95% of existing coating system break down with heavy corrosion observed. A combination of hand tools and power tools were used to achieve a minimum surface standard of SSPC St2. A Bristle Blaster was used on the Tube Sheet between the tubes. This area posed a challenge during surface preparation and during coating as well. Wet Film thickness gauges were used during paint applications to ensure specified DFT's were achieved. Syringes were used to apply product on Tube Sheet in between tubes as these areas could not be accessed by normal rollers or brushes.


Conclusions/Recommendations

All surface preparation requirements and specifications on TDS were met. Minimum DFT's were within specified tolerances and there were no major issues during coating installation. It is recommended the HE units are inspected during shut downs to address any "fair wear and tear" breakdowns.

Technical Report- Report No: 2019-02CINSR


Initial Conditions: Before Surface Preparation- HE Shell and Tube Plate


Corrosion Evaluation	
ASTM	
Degree of Blistering	
D714-56-2	
Degree of Chalking	
D659-44-2	
Degree of Checking	
D660-2	
Degree of Cracking	
D661-2	
Degree of Flaking	
D772-47-2	
Average DFT: 23.0	
Special Notes	Complete breakdown of old coating system observed with heavy corrosion in many areas. Tubes were plugged to ensure contaminants and paint do not flow into tubes.

Corrosion Evaluation	
ASTM	
Degree of Blistering	
D714-56-2	
Degree of Chalking	
D659-44-2	
Degree of Checking	
D660-2	
Degree of Cracking	
D661-2	
Degree of Flaking	
D772-47-2	
Average DFT: NA	
Special Notes	Complete breakdown of old coating system observed with heavy corrosion in many areas.

Technical Report- Report No: 2019-02CINSR


Initial Conditions: Before Surface Preparation- HE Shell and Tube Plate


Corrosion Evaluation ASTM	
Degree of Blistering D714-56-2-2	
Degree of Chalking D659-44-2	
Degree of Checking D660-2	
Degree of Cracking D661-2	
Degree of Flaking D772-47-2	
Average DFT: NA	
Special Notes	Complete breakdown of old coating system observed with heavy corrosion in many areas.

Corrosion Evaluation ASTM	
Degree of Blistering D714-56-2-2	
Degree of Chalking D659-44-2	
Degree of Checking D660-2	
Degree of Cracking D661-2	
Degree of Flaking D772-47-2	
Average DFT: NA	
Special Notes	Blisters and cracks due to deterioration of surface with heavy corrosion in many areas.

Technical Report- Report No: 2019-02CINSR


Initial Conditions: Before Surface Preparation- HE Shell and Tube Plate


Corrosion Evaluation ASTM	
Degree of Blistering D714-56-2-2	
Degree of Chalking D659-44-2	
Degree of Checking D660-4	
Degree of Cracking D661-4	
Degree of Flaking D772-47-4	
Average DFT:NA	
Special Notes	Blisters and cracks due to deterioration of surface with heavy corrosion in many areas.

Corrosion Evaluation ASTM	
Degree of Blistering D714-56-2-4	
Degree of Chalking D659-44-2	
Degree of Checking D660-4	
Degree of Cracking D661-4	
Degree of Flaking D772-47-2	
Average DFT:NA	
Special Notes	Blisters and cracks due to deterioration of surface with heavy corrosion in many areas.

Technical Report- Report No: 2019-02CINSR

Initial Conditions: Before Surface Preparation- HE Shell and Tube Plate


Corrosion Evaluation	
ASTM	
Degree of Blistering D714-56-2-2	
Degree of Chalking D659-44-2	
Degree of Checking D660-4	
Degree of Cracking D661-4	
Degree of Flaking D772-47-2	
Average DFT:NA	
Special Notes	Blisters and cracks due to deterioration of surface
with heavy corrosion in many areas.	


Corrosion Evaluation	
ASTM	
Degree of Blistering D714-56-2-4	
Degree of Chalking D659-44-2	
Degree of Checking D660-4	
Degree of Cracking D661-4	
Degree of Flaking D772-47-6	
Average DFT:NA	
Special Notes	Blisters and cracks due to deterioration of surface
with heavy corrosion in many areas.	



Technical Report- Report No: 2019-02CINSR

Initial Conditions: Before Surface Preparation- HE Shell and Tube Plate


Corrosion Evaluation	
ASTM	
Degree of Blistering D714-56-2-2	
Degree of Chalking D659-44-2	
Degree of Checking D660-4	
Degree of Cracking D661-4	
Degree of Flaking D772-47-2	
Average DFT: NA	
Special Notes	Blisters and cracks due to deterioration of surface
with heavy corrosion in many areas.	


Corrosion Evaluation	
ASTM	
Degree of Blistering D714-56-2-4	
Degree of Chalking D659-44-2	
Degree of Checking D660-4	
Degree of Cracking D661-4	
Degree of Flaking D772-47-6	
Average DFT: NA	
Special Notes	Blisters and cracks due to deterioration of surface
with heavy corrosion in many areas.	

Reference to part of this report which may lead to misinterpretation is not permissible. Restricted distribution only

Technical Report- Report No: 2019-02CINSR


After Surface Preparation- HE Shell and Tube Plate


Surface Preparation SSPC	
SP 2 Minimum Blasting Profile	
NA Soluble Salt Conc.	
Not Measured	
Special Notes	Picture shows HE domed cover after surface preparation with a combination of hand and power tools. Surface was washed down using fresh water to lower dissolved salts. A clean and tight surface was achieved.

Surface Preparation SSPC	
SP 2 Blasting Profile	
NA Soluble Salt Conc.	
Not measured	
Special Notes	Picture shows HE domed cover after surface preparation with a combination of hand and power tools. Surface was washed down using fresh water to lower dissolved salts. A clean and tight surface was achieved.

Technical Report- Report No: 2019-02CINSR


After Surface Preparation- HE Shell and Tube Plate


Surface Preparation SSPC	
SP2 Blasting Profile	
NA Soluble Salt Conc.	
Not measured	
Special Notes	Picture shows HE domed cover after surface preparation with a combination of hand and power tools. Surface was washed down using fresh water to lower dissolved salts. A clean and tight surface was achieved.

Surface Preparation SSPC	
SP2 Blasting Profile	
NA Soluble Salt Conc.	
Not Measured	
Special Notes	Picture shows HE domed cover after surface preparation with a combination of hand and power tools. Surface was washed down using fresh water to lower dissolved salts. A clean and tight surface was achieved.

Technical Report- Report No: 2019-02CINSR


After Surface Preparation- HE Shell and Tube Plate


Surface Preparation SSPC	
SP2	
Blasting Profile	
NA	
Soluble Salt Conc.	
Not measured	
Special Notes	

Surface Preparation SSPC	
SP2	
Blasting Profile	
NA	
Soluble Salt Conc.	
Not Measured	
Special Notes	

Technical Report- Report No: 2019-02CINSR


After Surface Preparation- HE Shell and Tube Plate


Surface Preparation	
SSPC	
SA 2 1/2	
Blasting Profile	
96 microns	
Soluble Salt Conc.	
70mg/m2	
Special Notes	

Surface Preparation	
SSPC	
SA 2 1/2	
Blasting Profile	
1088 microns	
Soluble Salt Conc.	
70mg/m2	
Special Notes	

Technical Report- Report No: 2019-02CINSR


After Surface Preparation- HE Shell and Tube Plate


Surface Preparation SSPC	
SA 2 1/2 Blasting Profile	
96 microns Soluble Salt Conc.	
70mg/m2	
Special Notes	

Surface Preparation SSPC	
SA 2 1/2 Blasting Profile	
1088 microns Soluble Salt Conc.	
70mg/m2	
Special Notes	

Technical Report- Report No: 2019-02CINSR


Primer RS 500P Application- HE Shell and Tube Plate


RS 500P Application	
Paint Temp: 23 deg C Powered Stirrer	
Stir Resin Part A for 2 min. Add Catalyst Part B	
Stir mixture for 1/2 min. Commence Application	
Pot life 30 minutes Extend Pot Life	
Imerse in water/ice bath	
Special Notes	Picture Shows RS 500P application

RS 500P Application	
Paint Temp: 23 deg C Powered Stirrer	
Stir Resin Part A for 2 min. Add Catalyst Part B	
Stir mixture for 1/2 min. Commence Application	
Pot life 30 minutes Extend Pot Life	
Imerse in water/ice bath	
Special Notes	

Technical Report- Report No: 2019-02CINSR


Primer RS 500P Application- HE Shell and Tube Plate


RS 500P Application	
Paint Temp: 18 deg C Powered Stirrer	
Stir Resin Part A for 2 min. Add Catalyst Part B	
Stir mixture for 1/2 min. Commence Application	
Commence Application	
Pot life 30 minutes Extend Pot Life	
Imerse in water/ice bath	
Special Notes	

RS 500P Application	
Paint Temp: 18 deg C Powered Stirrer	
Stir Resin Part A for 2 min. Add Catalyst Part B	
Stir mixture for 1/2 min. Commence Application	
Commence Application	
Pot life 30 minutes Extend Pot Life	
Imerse in water/ice bath	
Special Notes	

Technical Report- Report No: 2019-02CINSR


Primer RS 500P Application- HE Shell and Tube Plate


RS 500P Application	
Paint Temp: 22 deg C	
Powered Stirrer	
Stir Resin Part A for 2 min.	
Add Catalyst Part B	
Stir mixture for 1/2 min.	
Commence Application	
Roller Application	
Pot life 30 minutes	
Extend Pot Life	
Imerse in water/ice bath	
Special Notes	

RS 500P Application	
Paint Temp: 22 deg C	
Powered Stirrer	
Stir Resin Part A for 2 min.	
Add Catalyst Part B	
Stir mixture for 1/2 min.	
Commence Application	
Roller Application	
Pot life 30 minutes	
Extend Pot Life	
Imerse in water/ice bath	
Special Notes	

Technical Report- Report No: 2019-02CINSR

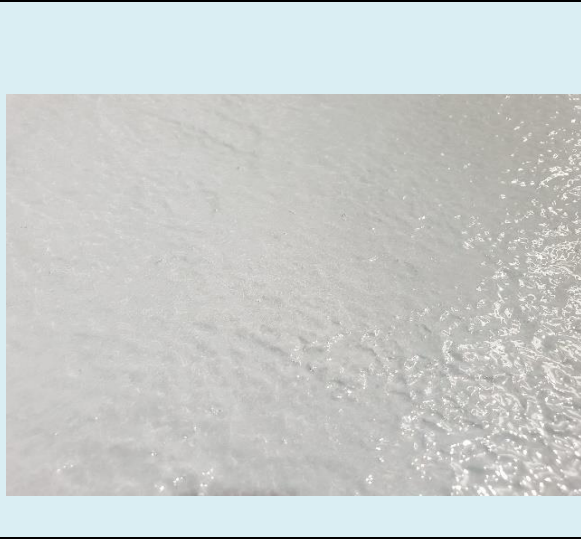
Top Coat RA 500M Application- HE Shell and Tube Plate

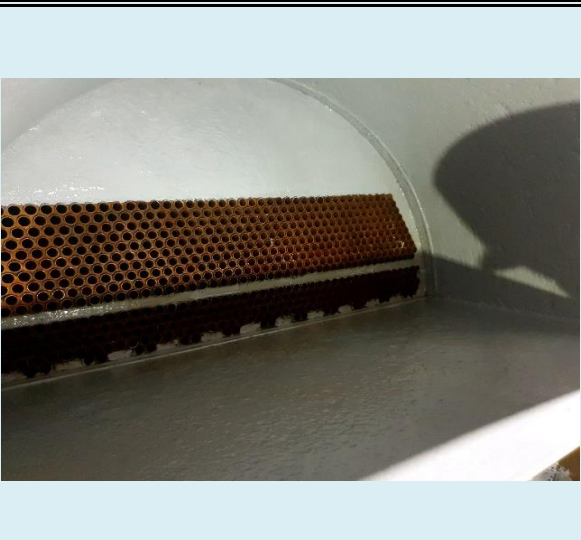
RA 500M Completed	
Shell Side Dome	
Cover	
DFT Min. 350 microns	
RA500M applied	
as a barrier coat	
Special Notes	

RA 500M Completed	
Shell Side Dome	
Cover	
RA500M applied	
as a barrier coat	
Special Notes	

Technical Report- Report No: 2019-02CINSR


Top Coat RA 500M Application- HE Shell and Tube Plate


RA 500M Completed	
Tube Sheet	
Bundle	
DFT Min. 350 microns	
RA500M applied	
as a barrier coat	
Special Notes	

RA 500M Completed	
Tube Sheet	
Bundle	
DFT Min. 350 microns	
RA500M applied	
as a barrier coat	
Special Notes	

Technical Report- Report No: 2019-02CINSR


Top Coat RA 500M Application- HE Shell and Tube Plate


RA 500M Completed	
Tube Sheet	
Bundle	
DFT Min. 350 microns	
RA500M applied	
as a barrier coat	
Special Notes	

RA 500M Completed	
Tube Sheet	
Bundle	
DFT Min. 350 microns	
RA500M applied	
as a barrier coat	
Special Notes	

Technical Report- Report No: 2019-02CINSR


Top Coat RA 500M Application- HE Shell and Tube Plate


RA 500M Completed	
Tube Sheet	
Bundle	
DFT Min. 350 microns	
RA500M applied as a barrier coat	
Special Notes	

RA 500M Completed	
Tube Sheet	
Bundle	
DFT Min. 350 microns	
RA500M applied as a barrier coat	
Special Notes	

Technical Report- Report No: 2019-02CINSR

Top Coat RA 500M Application- HE Shell and Tube Plate

RA 500M Completed	
Tube Sheet	
Bundle	
DFT Min. 350 microns	
RA500M applied	
as a barrier coat	
Special Notes	

RA 500M Completed	
Tube Sheet	
Bundle	
DFT Min. 350 microns	
RA500M applied	
as a barrier coat	
Special Notes	