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| Spec item #: HD-22 | SPECIFICATION | TCMSB Field #: N/A |
| HD-22 # 4 VOID TANKS | | |

Part 1: SCOPE:

- 1.1** The intent of this specification item is to clean two void tanks and repair coatings as per spec for Lloyd's Register Five Year Survey. Additional work required for the contractor, is to carry out Ultrasonic testing on areas listed in Technical description # 4 Port and Stbd Void tanks. Contractor to bid 40 shots on Stbd tank and 40 shots on Port tank. All inspection and testing shall be witnessed by the Chief Engineer and the attending Lloyd's Register Surveyor.

Part 2: REFERENCES:**2.1 Guidance Drawings/Nameplate Data**

- 2.1.1.** Drawing Capacity Plan 590-79
- 2.1.2.** #590-04 Sheet 1 of 2, Profile and Decks
- 2.1.3.** #590-04 Sheet 2 of 2, Profile and Decks
- 2.1.4.** #590-05 Transverse bulkheads FRS. 5- 52
- 2.1.5.** #590-01 Shell Exspansion

| Tank No. & Name | Loaction | Capacity Cubic meters | Area (Sq. Meters) | Add 20% For Floors / Framing |
|----------------------------|-----------------|----------------------------------|----------------------------------|---|
| No. 4 Void port | Fr. 18-21 | | 25 | 30 |
| No. 4 Void stbd | Fr. 18-21 | | 25 | 30 |

2.2 Standards**2.2.1****2.3 Regulations****2.3.1****2.4 Owner Furnished Equipment**

- 2.4.1** The contractor shall supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

Part 3: TECHNICAL DESCRIPTION:**3.1 General**

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- 3.1.1.** Prior to entry, tank is to be certified "Safe for Workers" or "Safe for Hot Work" as required by Transport Canada Marine Safety TP3177E. The certificates shall be given to the Chief Engineer and copies posted by the tank manhole and gangway.
- 3.1.2.** Contractor to remove and re-install interference items located in Engine Room Workshop in order to access #4 Port Void tank:
- Contractor must dismantle #4 Port Water Ballast tank 100mm vent pipe which has victaulic fittings. Note that end caps should be installed on the ends off the piping that is remaining to prevent contamination of the water ballast tank and void tank. **Note after all work is completed vent caps are to be taken off and vent pipes re-installed.**
 - Contractor to remove 38mm galley drain pipe and install a flex line to go around opening to void tank. **Noted this flex line is to be taken out and original line re-installed after work is completed on Port Void tank.**
- 3.1.3.** Contractor to remove and re-install interference items located in Purifier Room in order to access #4 Stbd Void tank:
- Contractor to remove a section of 50mm Grey water piping to overboard and 50mm overboard discharge valve and install a flex line to go around access opening to void tank. **Noted this flex line is to be taken out and original line and over board discharge valve is re-installed after work is completed on Stbd Void tank.**
 - Contractor must dismantle #4 Stbd Water Ballast tank 100mm vent pipe which has victaulic fittings. Note that end caps should be installed on the ends off the piping that is remaining to prevent contamination of the water ballast tank and void tank. **Note after all work is completed vent caps are to be taken off and vent pipes re-installed.**
 - Contractor Lock out and Tagout Lube Oil Purifier Heater, then disconnect two pipes (supply and return line), pipe diameters 25mm. contractor to move Lube Oil Purifier Heater forward approximately 0.3meters. **Noted after work is completed on Stbd Void tank. Contractor to put Lube Oil Purifier heater back in original position and the original pipes that were taken off are to be re-installed.**

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- 3.1.4.** The void tanks listed above shall be cleaned, coating repair, and survey by a Lloyd's Surveyor and the Chief Engineer. The Owner will provide the services of a NACE inspector to witness all aspects of painting.
- 3.1.5.** Contractor shall bid on 2 cubic meters total residue to be disposed of by the contractor in accordance with environmental regulations. Contractor shall quote unit cost per 1 cubic meter for adjustment up or down by PWGSC 1379 action.
- 3.1.6.** The above listed tanks shall be inspected by a Lloyd's Surveyor, Chief Engineer and NACE inspector prior to coating repairs.
- 3.1.7.** Contractor prior to carrying coating repairs must take 40 ultrasonic shots off port void tank and 40 ultrasonic shots of stbd void tank locations the same in each tank. Areas for contractor to take shots are :
- i. Aft bulkhead Frame number 18
 - 1. Upper strake inboard and outboard.
 - 2. Lower Strake inboard and outboard.
 - ii. Forward Bulkhead, Frame number 21
 - 1. Upper strake inboard and outboard.
 - 2. Lower Strake inboard and outboard.
 - iii. Stiffeners Frames 18-21
 - 1. Interm. Shell frame 18.5.
 - 2. Interm. Shell frame 19.5.
 - 3. Interm. Shell Frame 20.5.
 - 4. Shell Frame 19.
 - 5. Shell frame 20.
 - 6. Crown Bracket Frame 19 (web).
 - 7. Crown Bracket Frame 19 (flange).
 - 8. Crown Bracket Frame 20 (web).
 - 9. Crown Bracket Frame 20 (flange).
 - 10. Bilge Floor Frame 19 (web).
 - 11. Bilge Floor Frame 19 (flange).
 - 12. Bilge Floor Frame 20 (web).
 - 13. Bilge Floor Frame 20 (flange).
 - iv. Main Deck Plating Stringer Strake:
 - 1. Frame 18-19.
 - 2. Frame 19-20.
 - 3. Frame 20-21.
 - v. Shell Plating: Bilge Strake;
 - 1. Frame 18-19.
 - 2. Frame 19-20.

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3. Frame 20-21.
 - vi. Shell Plating: 1st Strake above Bilge;
 1. Frame 18-19.
 2. Frame 19-20.
 3. Frame 20-21.
 - vii. Stiffeners/Longitudinal Bulkheads: Frames 18-21.
 1. longl Bhd Stiffr Frame 19 (web).
 2. longl Bhd Stiffr Frame 19 (flange).
 3. longl Bhd Stiffr Frame 20 (web).
 4. longl Bhd Stiffr Frame 20 (flange).
 5. longl Bulkhead frame 20/21 (upper).
 6. longl Bulkhead frame 20/21 (lower).
 7. longl Bulkhead frame 19-20 (upper).
 8. longl Bulkhead frame 19/20 (lower).
 9. longl Bulkhead frame 18/19 (upper).
 10. longl Bulkhead frame 18/19 (lower).
- 3.1.8.** Any damaged tanks coating to be cleaned down to bare metal by (1) Power tooling to meet SSPC SP-11 with a suitable profile or (2) of SSPC SP-10/NACE 2 Near White Abrasive Blast clean with an angular Surface Profile of 50-75 microns (2-3 mils) with edges feathered out. All debris shall be removed ashore by Contractor and properly disposed of in accordance with enviromental regulations.
- 3.1.9.** Prior to Power tooling or Abrasive Blast cleaning the damaged areas of tank coatings has to be identified in agreement with Chief Engineer.
- 3.1.10.** Contractor to quote on repairs / coating of 60 m² of tank surface area and rate per square meter. On two types of surface preparation (1) Power tooling to meet SSPC SP-11 with a suitable profile, (2) or SSPC SP-10/NACE 2 Near White Abrasive Blast clean with an angular Surface Profile of 50-75 microns (2-3 mils). The method of surface preparations we be made by the Chief Engineer after the inspection of the tanks. Adjustments will be made by PWGSC 1379 action.
- 3.1.11.** Contractor to quote on cutting two access holes a minimum of 41cm by 61cm, one in Port Void Tank and one Stbd Void Tank, inserts for the same must be re installed as per Lloyd's Specification. Contractor to quote per one access hole for a Void tank for adjustment purposes.

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3.1.12. Contractor to quote on replacing two of each in total and one off each for adjustment purposes:

- i. Transverse beams.
- ii. Vertical Stiffeners.
- iii. Frames.
- iv. Bilge Floors consist off web and flange.
- v. Crown Brackets consist off web and flange.

3.1.13. Contractor to quote on replacing 0.37 square meters off Shell Plating and quote per 0.19 square meter.

3.1.14. Contractor to quote on replacing the top section of both tanks total area is 2.286 square meters, and quote per .5 square meter.

3.1.15. Contractor to quote on replacing the flooring in the Gym stbd side and #2 Program Officers Cabin port side. This is the location above both void tanks. The existing flooring is some type of fiber board. Contractor quote on replacing fiber board with A60 Decklite approximate 50mm thick and Dex-o-tex finish total area is 2.286 square meters, and quote per .5 square meter.

3.1.16. All ventilation requirements to assist in drying out of tanks prior to painting and to assist paint curing shall be Contractor supply.

3.1.17. Coating Specification for Application :

- i. **Surface Preparation:** Steel surface shall be prepared to meet a minimum off (1) Power tooling to meet SSPC SP-10/Nace2 with a suitable profile. or (2) of SSPC SP-11 Near White Abrasive Blast clean with an angular Surface Profile of 50-75 microns (2-3 mils).
- ii. **Coating System:** 2 (two) coats: One primer coat Intershiel ENA 300 – Aluminium and one Top coat Intershiel ENA 300 – Bronze or approved equal product. Apply each coat (8-10 mils) dry film thickness (dft) directly on to the prepared steel surface.
 - 1. 1st coat: Colour Aluminium, followed by a stripe coat.
 - 2. 2nd coat: Colour Bronze, followed by a stripe coat.

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General Information, Product Information, and Description of Work to be carried out in Ballast Tanks follows:

1.0 Description

1.1 Work Included

1.1.1 The work under this Section shall include the supply of all labour, supervision, materials, equipment, and transportation necessary for the supply, fabrication, surface preparation, and delivery to site required for the Work, as specified herein, and as directed by the Engineer, complete in every respect.

1.1.2 The Work shall include, but not be limited to, the following:

- (1) High pressure water cleaning at 3500 pounds per square inch (PSI) the Tank Surfaces. Collect the high pressure wash residue and remove from Site.
- (2) Dehumidification of the interior of the Void Tanks to control the environment and ensure a non-stop work schedule.
- (3) Surface preparation of areas to be painted. Collect all blasting residue and remove from Site.
- (4) Painting of the Void Tank Surfaces with the specified coating system.
- (5) Touch up of damaged applied coating.
- (6) Testing and Inspection of the applied coating.

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1.2 Codes, Standards, and, Related Documents.

- (1) SSPC PA 1 Specification for Shop, Field, and Maintenance Painting.**
- (2) SSPC PA 2 Specification for Measurement of Dry Coating Thickness.**
- (3) SSPC SP-1 Specification for Solvent Cleaning.**
- (4) SSPC SP-2 Hand Tool Cleaning.**
- (5) SSPC SP-6 Commercial Abrasive Blast Cleaning.**
- (6) SSPC VIS-1 Visual Standard for Abrasive Blast Cleaned Steel.**
- (7) Steel Structures Painting Manual Volume 1, Good Painting Practice.**
- (8) Steel Structures Painting Manual Volume 2, Systems and Specifications, 2005 Edition.**
- (9) Pictorial Surface Preparation Standards for Painted Steel Surfaces.**
- (10) SSPC SP-12/NACE No. 5. Surface Preparation and Cleaning of metal by Water Jetting prior to Abrasive Blast Cleaning of Metal surfaces to meet SSPC SP-6, Commercial Blast Cleaning (Pipe Tunnel) and SSPC SP-10, Near White Metal Blast Cleaning (Ballast Tanks).**
- (11) ASTM D 4285, Indicating Oil and Water in Compressed Air.**
- (12) International Standards ISO 8502-3, Part 3, Assessment of Dust on Steel Surfaces prepared for Painting (Pressure Sensitive Tape Method).**
- (13) ASTM D 5162-01 Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates, Method B.**
- (14) ASTM D 4417, Determining Surface Profile of Blast Cleaned Steel using Replica Tape, Method C.**
- (15) NACE RPO 287-95, NACE Standard Field Measurement of Surface Profile of Abrasive Blast Cleaned Steel Surfaces.**

1.2.1 Paint Manufacturer's Technical Bulletins:

- (a) Product Data and Safety Data Sheets.**
- (b) Repair procedures for correcting damage to coated surfaces.**

1.2.2 Guidelines for Application and Removal of Protective Coatings- Canadian Coast Guard Environment Operations Branch.

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1.3 Quality Assurance

- 1.3.1 Only skilled painters shall be used in performing work to produce the highest quality product. In the acceptance or rejection of applied finishes, no allowances will be made for lack of skill on the part of the painters. Contractor shall submit names and work experience of skilled painters to the Chief Engineer for review prior to commencement of coating system application.
- 1.3.2 The Contractor shall require strict quality control over surface preparation and application of coatings to ensure compliance with the specifications and applicable requirements of the paint manufacturer.
- 1.3.3 The following tests and checks shall be carried out before, during, and after the painting process. A Coating Application Log of these tests shall be maintained and submitted to the Chief Engineer upon completion of the Project.
- (a) Surface preparation including anchor profile and abrasive used.
 - (b) Wet and Dry film thicknesses.
 - (c) Surface temperature, ambient temperature, room temperature, relative humidity, dew point and coating temperature.
 - (d) Continuity of Paint to be checked using low voltage detector (Sponge Test) as specified by the Chief Engineer.
 - (e) Coating Batch Numbers.

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1.4 Product Delivery, Storage, and Handling

1.4.1 Delivery

- 1.4.1.1 Materials shall be delivered to the Contractor's shop or construction site in their original containers unopened and bearing original labels. Labels shall contain at least the following information: name of material, CGSB number if applicable, manufacturer's name and stock number, content constituents, preparation instructions, thinning instructions and application instructions.

1.4.2 Storage

- 1.4.2.1 Only approved materials shall be stored at the job site, and these shall be stored only in suitable and designated areas restricted to the storage of paint materials and related equipment. Provide and maintain dry temperature control and weather proof storage. Store materials and equipment in a well ventilated area with temperature range 7°C to 30°C. Store temperature sensitive products above minimum temperature as recommended by manufacturer. Remove only, quantities required for same day use. **Provide a minimum of one 9 kg type ABC dry chemical fire extinguisher adjacent to storage area.**
- 1.4.2.2 The Contractor shall use all means necessary to ensure the safe storage and use of paint materials and the prompt and safe disposal of waste.
- 1.4.2.3 Materials unsuitable for use or rejected by the Engineer shall be immediately removed from the site.

1.4.3 Combustion

- 1.4.3.1 All necessary precautionary measures shall be taken to prevent fire hazards and spontaneous combustion for materials stored on the Construction Site.

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1.4.4 Protection

1.4.4.1 The Contractor shall use all means necessary to protect paint materials before, during and after application and shall protect surfaces not to be painted from paint and damage. In the event of damage, the Contractor shall immediately notify the Chief Engineer and then make all repairs and replacements necessary to the Chief Engineer's approval and at no cost to the Owner.

1.4.4.2 The Contractor shall provide sufficient drop cloths, shields and protective equipment or materials to prevent spray or droppings from fouling surfaces not intended to be refinished.

2.0 PRODUCTS

2.1 Materials

2.1.1 General

2.1.1.1 All paint materials shall be the product of a single manufacturer.

2.1.1.2 Alteration of paint formulation will not be permitted without approval of the Chief Engineer.

2.1.1.3 The use of accelerators will not be permitted.

2.1.2 Compatibility

2.1.2.1 All paint materials and equipment shall be compatible in use. All tools and equipment shall be compatible with the paint to be applied.

2.1.2.2 Thinners, when used, shall be only those thinners recommended for that purpose by the paint manufacturer.

2.2 Application Equipment

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- 2.2.1 The Contractor shall use application equipment as recommended by the painting material manufacturer and compatible with the material being applied.
- 2.2.2 The Contractor shall ensure equipment used is capable of producing the required finish and appearance.

2.3 Protective Coating systems

- 2.3.1 The paint shall be a Primer coat Intershield ENA 300 – Aluminium and Top coat Intershield ENA 300 – Bronze as manufactured by International Paints Canada, or approved equal, applied to a dry film thickness of:
 - (1) 400-600 microns (16-24 mils) on flat and curved surfaces.
Total dry film thickness applied in two (2) coats.
 - (2) Stripe coating shall be applied to all corners, crevices, rivets, bolts, welds, and other edges using the specified coating prior to application of the full coat on the interior structure. Such striping shall extend a minimum of 2.2 cm (1-inch) from the edge. The stripe coat shall set to touch before the full coat is applied. **Note: stripe coating is most effective on edges that are rounded by grinding.**

2.4 Shop and Field Touch-Up Painting

- 2.4.1 At the completion of the painting and as part of acceptance of the Work by the Chief Engineer, the Contractor shall, in the presence of the Chief Engineer, inspect the painting system for damage.
- 2.4.2 Damaged areas shall be clearly noted by the Chief Engineer and when requested by the Chief Engineer the Contractor shall repair the previously agreed upon damaged areas at no cost to the owner.
- 2.4.3 Procedure to determine applied coating discontinuity using ASTM D 5162-01, ASTM D4787, Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates. This procedure is carried out at the request of the Engineer.

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2.5 Mixing

- 2.5.1 Painting materials shall be mixed and prepared in strict accordance with the manufacturer's recommendation.
- 2.5.2 Materials shall be stirred prior to and during application to produce a uniform mixture.
- 2.5.3 Materials shall be thinned, when required, in strict accordance with manufacturer's recommendations.

3.0 EXECUTION

3.1 Surface Preparation

3.1.1 Void Tanks

- 3.1.1.1 All surfaces to be coated shall be abrasive blast cleaned to a commercial blast finish according to Steel Structures Painting Council (1) specification SSPC-SP-11, near white metal abrasive blast. Steel shall be cleaned with a minimum surface profile of 50-75 microns (2-3 mils) or (2) Power tooling to meet SSPC SP-10/Nace2 with a suitable profile to obtain the required adhesion of the Intershield ENA 300 paint to the steel. The SSPC surface preparation, as specified, must be in evidence immediately before application of coating.
- 3.1.2 Determine level of cleanliness using International Standard ISO 8502-3, Part 3. Three random tests per tank to be recorded in the daily inspection report. **Note: acceptable level for dust quantity and dust particle size shall not exceed rating 2.**

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- 3.1.3 Determine surface profile of blast cleaned steel using Replica Tape (ASTM D 4417) Method C. **Note: This Replica Tape provides an anchor profile and shall be affixed to final report. A NACE Certified Coating Inspector shall witness and record the Test Results.**
- 3.1.4 All sharp edges shall be ground prior to sand blasting to form a rounded contour of minimum edge radius of 2 mm. This 2 mm rounding may be achieved by minimum 2 or 3 strokes of a grinding disc as recommended by coating manufacturer. Contractor to bid on 3 m of grinding and quote per 1 m grinding.
- 3.1.5 The acceptable chloride ion level on prepare surface shall be less than 2ppm. Coating shall not be applied until this level is achieved. Number of test one per tank, to be put into daily inspection report.
- 3.1.6 Weld joints which do not have a smooth ripple finish, shall be ground to a rounded contour.

3.2 Other Surface Preparations

- 3.2.1 Any major surface defects, particularly surface laminations or scales, and welding defects, as holes and very sharp transitions between layers detrimental to the protective coating shall be removed by suitable dressing and/or with repair welding as required. Where such defects have been revealed during blast cleaning and the dressing has been performed, the dressed area shall be reblasted to the specified standard. All welds shall be inspected and if necessary, repaired prior to final blast cleaning.
- 3.2.2 Steel surfaces shall not be blasted nor coated when:
- (a) surface temperature is less than 3°C above the dew point,
 - (b) when relative humidity is greater than 80% or,
 - (c) when there is a possibility that the blasted surface will be subjected to wetting or flash rusting before the primer can be applied.

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- 3.2.2.1 Surfaces shall be blown, wiped or vacuumed free of blasting abrasive and residue before the surface is coated. Particular care and effort shall be employed to remove residue from pockets, corners, bolt heads and other such irregular surfaces.
- 3.2.2.2 It is mandatory that no more surface be blasted than can be coated by the end of the same work shift.
- 3.2.3 A 200mm (8 inch) wide strip of uncoated, blasted surface shall be left between the coated and unblasted surfaces. When blasting is continued, the 200mm (8 inch) strip of previously blasted surface shall be reblast cleaned in a direction away from the coated surface.
- 3.2.4 Compressed air used for blasting shall be free of detrimental amounts of condensed water or oil. Adequate separators and traps shall be provided. Blast cleaning shall be done in such a manner that no damage is done to partially or entirely completed portions. In any case, execution shall commence at the top of the structures and progress towards the bottom.
- 3.2.5 If any rusting, including flash rusting or rust bloom occurs, the Contractor shall reblast the affected surfaces prior to coating.
- 3.2.6 All sharp edges, welds, high spots and edges shall be strip coated prior to application of any paint.
- 3.2.7 Any areas contaminated by oil or grease shall be washed with coating manufacturer's recommended solvent to SSPC-SP 1, Solvent Cleaning to remove all residues. The Contractor shall ensure that the solvent has evaporated or is removed prior to application of the touch-up primer.
- 3.2.8 All dirt, soil and extraneous matter shall be removed by water washing using stiff bristle brushes if necessary and allowed to dry.
All surfaces damaged after painting or designated to be "touched-up" shall be prepared by spot abrasive blast.
- 3.2.9 All edges of areas to receive touch-up shall be feathered so as to produce a sound edge and to provide a roughened

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surface to act as a mechanical key. Contact Coating Manufacturer for additional instructions for this procedure.

- 3.2.10 Any contamination which has taken place since the surface was prepared shall be removed and any dust settlement removed by blowing down with oil-free, dry air.
Coatings shall not be applied to damp surfaces or to surfaces below -7°C or above 43°C. Consult coating manufacturer.
- 3.2.11 Inhibitive washing to prevent rusting is prohibited unless approved by coating manufacturer.
- 3.2.12 All surfaces damaged after painting or designated to be 'touched up' shall be prepared by spot abrasive cleaning prior to coating application.
- 3.2.13 All edges of areas to receive a 'touch-up' shall be feathered so as to produce a sound edge and to provide a sound edge and to provide a roughened surface to act as a mechanical key.

3.3 Chloride ion Testing

- 3.3.1 Carry out chloride ion testing of prepared surfaces as listed.
- 3.3.2 **On completion** of pre-surface preparation by SSPC-SP 1 to ensure the chloride ion are not imbedded into the substrate when cleaning Void Tanks to near white metal (SSPC-SP10) as specified. If chloride ion level, as specified is not attained, a rewash of the affected area shall be carried out using a soluble salt remover, such as Chlor-Rid Liquid Salt Remover at a dilution ratio of 1:100, sprayed on the affected area at a minimum of 20 mps (3000 psi).
- 3.3.3 **On completion** of substrate preparation by SSPC-SP 10 (Void Tank) prior to coating application:
- 3.3.4 NACE Inspector shall witness and record these tests.

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- 3.3.5 The acceptable chloride ion level shall be less than $2\mu\text{g}/\text{cm}^2$. Coating shall not be applied until this level is achieved.

3.4 WORKMANSHIP

3.4.1 General

- 3.2.1.1 All coatings shall be applied in accordance with the paint manufacturer's published application instructions. Such instructions are deemed a part of this technical specification.

3.4.2 Inspection

- 3.2.2.1 All cleaned and prepared surfaces shall be inspected by NACE Certified Coating Inspector prior to the application of coating.

3.4.3 Application

- 3.4.3.1 All equipment shall be maintained in good working condition and shall be comparable to that described in the printed instructions of the coating manufacturer. All equipment shall be thoroughly cleaned before use.
- 3.4.3.2 All air lines shall be equipped with water traps to positively remove condensed moisture.
- 3.4.3.3 Materials shall be thinned, when required, in strict accordance with manufacturer's recommendations.
- 3.4.3.4 Paint film is to be of specified thickness, free of voids, pinholes, runs, sags or other signs of improper application techniques or undesirable shop conditions. Wet film thickness shall be applied so as to produce the required dry film thickness in one coat.

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- 3.4.3.5 Minimum drying time as stated in the printed instructions of the coating manufacturer shall be carefully observed.
- 3.4.3.6 The coating shall not be force dried under conditions which will cause checking, wrinkling, blistering, formation of pores, mudcracking or detrimentally affect its condition or appearance. Newly coated surfaces shall be protected to the fullest practical extent from detrimental forces until the coating has cured.
- 3.4.3.7 Errors or deficiencies resulting from poor workmanship will not be tolerated and, subject to the Chief Engineer's decision, shall be removed and redone.
- 3.4.3.8 Above all, application of coatings shall be as required to produce a high quality system with respect to appearance and integrity.
- 3.4.3.9 The coating manufacturer and the Chief Engineer shall be consulted concerning items not covered herein.
- 3.4.3.10 Newly coated surfaces will be inspected when the coating has thoroughly dried. The coated surfaces will be examined with respect to uniformity, continuity and soundness and may be rejected if any of the following defects are apparent and if the Engineer, in his judgement, believes the coating performance and life may be impaired by these conditions:
- (1) Runs, sags, holidays or shadowing caused by inefficient application methods.
 - (2) Evidence of poor coverage at plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
- 3.4.3.11 Coated surfaces rejected by the Chief Engineer shall be made good by the Contractor. Small affected areas may be touched up. Large affected areas, or where insufficient dry film thickness has been attained, shall involve the application of another complete coat at the Contractor's expense. Runs, sags or coating damaged in handling shall

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be removed by scraper prior to further application of coatings.

3.4.3.12 **Special care shall be taken so that difficult areas to paint such as edges, crevices, structural members or other intricate areas shall receive the specified amount of coating.**

3.4.3.13 Coatings shall not be applied closer than 8 inches to a non-blasted area. Any subsequent blasting operation shall not result in sand particles embedded in the coating film.

3.5 INSPECTION

- 3.5.1 The Chief Engineer may inspect all aspects of the work, or designate a NACE Certified Coating Inspector, in addition to testing required to be performed by the Contractor, it shall be clearly understood that it is the prime responsibility of the Contractor to provide all labour, materials and equipment to properly execute the Work, to confer with the manufacturer of the products used, and to keep the Chief Engineer informed of any problems or difficulties arising out of the Work.
- 3.5.2 All painting shall be inspected for such items as proper mixing, thinning, wet and dry film thickness, lifting, overspray, mud-cracking, sagging, runs, skips, sharp edge coverage, pinholing, bubbling, curing or any other common deficiency or problem area that would be detrimental to the life expectancy or quality of the system.
- 3.5.3 Testing by the Chief Engineer and repair by the Contractor, necessitated by destructive testing, of coatings which meet the requirements of this Specification will be at the expense of the Owner. The cost of testing and repair of coatings which do not meet the Specification will be at the expense of the Contractor.

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4.0 ENVIRONMENTAL AND SAFETY REQUIREMENTS

4.1 General

- 4.1.1 The Contractor is completely responsible for the environmental safety of the coating work. Precautions shall be taken to protect humans, and the environment from cleaning operations, sandblasting, solvents and chemical contamination.

4.2 Final Clean-Up

- 4.2.1 General Requirements, during application of the coating systems the Contractor shall prevent spillage of coating materials and, in the event of such spillage, shall immediately advise the Engineer, remove all spilled material and the waste or other equipment used to clean up spills, and return the surfaces to their original undamaged condition to the approval of the Engineer at no additional cost to the Owner.
- 4.2.2 Upon completion of the application work, the Contractor shall visually inspect all surfaces and remove all coatings and traces of coatings from surfaces not scheduled to be coated.

- 3.1.18.** Contractor shall remove from each individual tank vent the vent caps Contractor to inspect vent head screens for damage or blockage, any defects to be reported to the Chief Engineer immediately for corrective action. Upon completion of inspection and repairs, all vent caps shall be installed in good order, bolts used for connection shall be cleaned and coated with anti-seize compound.

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3.1.19. Contractor to supply all materials and equipment to carry out work on the tanks. The contractor is responsible for notifying the Lloyd's Surveyor and the Chief Engineer when tank is ready for inspection and testing.

3.1.20. Chief Engineer and Lloyd's Surveyor shall witness testing.

3.1.21. All work to be to the satisfaction of Chief Engineer and the Lloyd's Surveyor.

3.2 Location

3.2.1. .

3.3 Interferences

3.3.1 N/A

Part 4: PROOF OF PERFORMANCE:

4.1 Inspection

4.1.1. 100% visual By Chief Engineer, Lloyd's Surveyor.

4.1.2. Upon completion of all repairs and testing, the Contractor and the Chief Engineer shall conduct a final inspection and ensure all tanks, covers, vents and piping connections have been returned to operating conditions and the attending the Lloyd's Surveyor has completed all inspections.

4.2 Testing

4.2.1 Ultrasonic testing two void tanks to satisfaction of Chief Engineer and Lloyd's.

4.2.2 All new welding for hull inserts and tank tops to be tested for defects with U/T length off testing 13meters. Any defects found to be repaired at Contractors expense and retested to the satisfaction of the Chief Engineer and attending Lloyd's Surveyor.

4.3 Certification

Part 5: DELIVERABLES:

5.1 Drawings/Reports

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- 5.1.1** The Contractor shall provide to the Chief Engineer and NACE inspector, before the coating is applied, the following information sheets regarding the coating used: working procedures sheets, product data sheets, and the Material Safety Data Sheets.
- 5.1.2** Contractor shall provide the results of the testing in a service report format that is approved by Lloyd's with three copies presented to the Chief Engineer.
- 5.2 Spares**
N/A
- 5.3 Training**
N/A
- 5.4 Manuals** N/A