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CANADIAN COAST GUARD ATLANTIC REGION

CCGS SIR WILLIAM ALEXANDER



DRY DOCKING AND REFIT SPECIFICATION

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GENERAL NOTES

1. **ON-SITE PROJECT OFFICER:** All the specified work, as well as all work arisings, shall be completed to the satisfaction of the **Coast Guard Technical Authority (CGTA)** who, unless otherwise advised, shall be the **Chief Engineer** of the ship, or their designated representative. Upon completion of each item of the specification, the CGTA shall be notified so that he/she may inspect the work prior to the complete closing up of any work. Failure to give notification does not absolve Contractor of the responsibility of providing CGTA the opportunity to inspect any item. Inspection of any item by the CGTA does not substitute for any required inspection by Transport Canada Marine Safety and Security (TCMSS), Public Works and Government Services Canada (PWGSC) or Health Canada (HC).
2. **SAFETY:** Vessel shall be under Contractor's Safety Management program while under their Care & Custody. Potential Contractor's shall include with their bids the name of their Safety Manager or Supervisor who will ensure that these requirements for workplace safety are met. When under Canadian Coast Guard (CCG) Care & Custody the ISM Safety annex shall apply.
3. **SUB-CONTRACTORS:** All conditions, stipulations etc. listed in the General Notes apply to any Sub-Contractors employed by the Main Contractor to carry out work on any Specification item.
4. **SCHEDULE:** At the Pre-Refit Meeting, the successful Contractor shall provide a Production Bar Chart or Schedule showing commencement and completion dates for each item in this specification. This document shall highlight any critical dates and be capable of showing the effects of late completion date of the work package. Contractor shall provide updated Production Schedules to the CGTA, Senior Vessel Maintenance Manager and PWGSC Inspector whenever the schedule is revised.
5. **SAFE WORK CERTIFICATES:**
Before any cleaning, painting or hot work is commenced in confined spaces or machinery compartments, Contractor and subcontractor personnel issuing these certificates shall be fully trained, qualified and certified in accordance with Canada Labour Code (CLC) requirements and all relevant provincial legislation. Certificates shall clearly state the type of work permitted and shall be renewed as required by the regulations. Contractor and his sub-Contractors are advised that any work carried out in confined spaces as defined by the CLC and relevant provincial legislation shall fully comply with all provisions therein.

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6. CONFINED SPACE:

For all work requiring entering or working in confined spaces; Contractor shall note that Canadian Coast Guard ships are presently working under the ISM CODE and that each ship has a FLEET SAFETY MANUAL onboard. This manual is also available in soft copy and can be distributed upon request. As a minimum, Contractor shall comply with the WORK REQUIREMENTS as outlined in the FLEET SAFETY MANUAL during the contracted work period. In accordance with the CCG Fleet Safety and Security manual, all work involving the entering of confined spaces shall make use of a qualified rescue team. This team shall be used at all times when tanks or confined spaces are to be entered. The costs associated with all known work requiring the services of a confined space rescue team shall be the responsibility of Contractor.

7. WELDING: All welding work shall be performed in accordance with all of the requirements of the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014.

7.1 CONTRACTOR REQUIREMENTS

7.1.1. Steel Structures

All welding contractors shall be certified by the CWB to CSA Standard W47.1 Division 1 or 2 for new construction and work packages other than new construction.

7.1.2. Aluminum Structures

All welding contractors shall be certified by the CWB to CSA Standard W47.2 Division 1 or 2 for new construction and work packages other than new construction.

7.1.3. Welding Procedures

All welding procedure specifications and/or welding procedure data sheets shall be reviewed and approved by the CWB prior to use.

7.1.4. Welding Personnel

All welding personnel shall be approved by the CWB prior to their commencing any welding work.

7.1.5. Performance and Qualification Testing

All performance and procedure qualification testing shall be fully witnessed and documented by the CWB.

7.1.6. Limitations Prior to Commencing Welding Work

All Contractors shall submit their welding personnel qualification records and approved welding procedures to the Delegated Representative prior to commencing any welding work.

All welding procedures, including welding procedure specifications and welding procedure data sheets, shall include an indication of acceptance by Contractor (by signature, seal or other appropriate means) and a stamp of acceptance by the CWB.

7.1.7. Governing Standards for Welding

For structural steels > 3 mm in thickness, welding shall meet the requirements of CSA Standards W47.1 and W59, except as modified by the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014.

For structural aluminum > 3 mm in thickness, welding shall meet the requirements of CSA Standards W47.2 and W59.2, except as modified by the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014.

7.2 INSPECTION OF WELDS

The methods of inspection, extent, acceptance criterion and inspection personnel qualifications shall be in accordance with all of the requirements of the Canadian Coast Guard Welding Specification CT-043-EQ-EG-001, March 2014.

8. **HOTWORK VENTILATION AND CONTAINMENT:** During all known work and work arisings, that involve hotwork, Contractor shall ensure that all dust, debris, gas and smoke generated by the work is evacuated from the vessel by the most direct method.

Each item that involves hotwork shall have a defined zone which shall be kept sealed off from the rest of the vessel during the complete work period that involves the generation of welding gases, smoke, and grinding dust etc. These zones shall be indicated in the items contained within the known work package. All extra work arisings that involve hotwork shall have a zone determined using the same logic. The zone shall be limited to the space(s) where the hotwork is being done, boundary areas where fire watches are required, and the access routes between the zone and the exterior of the vessel for workers, welding and cutting equipment and ventilation ductwork.

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In areas where accommodations and or workplaces cannot be completely isolated from personal access a double sealed door (air lock) arrangement shall be erected to minimize ingress of the contaminants into occupied areas. A ventilation extraction point shall be located as near as practical to the inside door on the worksite side to reduce the egress into the air lock and subsequently the accommodations and/or workspaces.

All doorways within the affected area that are not being worked or require access for fire watch activities shall be sealed off to prevent all containments from getting in. Passageway branches that connect to the zone shall be sealed off. Contractor shall completely clean all surfaces and fabrics within a compartment that are not suitably protected.

9. **ENCLOSURES AND HEATING:** Contractor shall provide all enclosures and heating required to carry out all the scheduled work, taking into account the nature of the work, the time of year the refit is, and the weather conditions for that time of year in Contractor's geographic area. Examples of where heating and enclosures could be required include but are not limited to painting, Potable Water coating, and tank cleaning.
10. **SERVICE CONDITIONS:** Unless specified otherwise, all components, materials and installations supplied by or carried out by Contractor shall be adequate to meet the following service conditions:

In areas that are exposed to the elements:

- outside air temperature of minus (-) 40⁰ C to plus (+) 35⁰ C;
- wind velocity of 50 knots;
- water temperature of minus (-) 2⁰ C to plus (+) 30⁰ C;
- shock loading of 2.5g horizontal, 1.5g vertical.

All new components, materials and installations within the ship shall be adequate to withstand the specified shock loading accelerations.

11. **HOTWORK & FIRE WATCHES:** Contractor shall abide by their Safety Management Program when performing Hot-work. Contractor shall provide sufficient suitable fire extinguishers and a fire watch during any such heating and until the work has cooled. Ship's extinguishers are **not** shall be used except in an emergency. Should Contractor have to use ship's extinguishers in an emergency they shall be recharged and re-certified by a local facility, of CCG's choice, at Contractor's cost.

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12. **RELOCATIONS:** Any piping, manholes, parts and/or equipment requiring temporary relocation to carry out specified work, or to gain access, shall be refitted upon completion with new jointing, anti-seize compound, clamps and brackets as applicable (Contractor supply). All equipment and systems, so disturbed, shall be tested to prove correct function and fluid integrity upon completion. Defects shall be corrected at Contractor's cost. **NOTE:** It is Contractor's responsibility to identify equipment and systems that shall be tested to verify correct function, prior shall being disturbed for required work.
13. **LIGHTING:** Temporary lighting and/or temporary ventilation required by Contractor to carry out any item of this specification shall be supplied, installed and maintained in safe working condition by Contractor and removed on completion of the related work. Naked light bulbs or tubes shall not be used as temporary lighting inside the vessel. All lights used in the vessel shall be supplied with approved guards.
14. **CLEANUP:** Contractor to ensure that all spaces, compartments, and areas where work has been carried out, or Shipyard staff has used for transit routes, are left in **"as clean a condition as found"** when the vessel commenced refit. All rags, debris, and associated garbage generated by the shipyard staff while on board shall be removed to the garbage container(s) each day. The costs associated with the removal of dirt, debris, and garbage shall be included in the quote.
15. **INSPECTION:** Contractor shall be responsible for calling in the services of TCMSS, PWGSC and HC Inspectors when and as required for survey and inspection items. All TCMSS surveyors called in by Contractor shall sign-off the CGTA's Inspection Log Book for all items surveyed.
16. **CORRESPONSANCE & REPORTS:** Unless otherwise agreed upon, all type written correspondence, reports, certificates and drawings presented to the CGTA shall be in English. All reports shall be computer generated and provided in **English**. Additional copies may be submitted in French.

All reports shall be completed in a timely manner and provided to the CGTA immediately following their completion, and shall continue as required throughout each specification item.

Upon delivery of the vessel, a compilation of all reports, drawings and correspondence shall be provided on a CD or DVD to CGTA.

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17. **PAINTING:** Unless specified otherwise, replacement and/or disturbed steelwork shall be given a minimum of two (2) coats of Intershield 300 Aluminum Pure Epoxy, each coat shall be of contrasting colour. **Lead-based paints shall not be used.** Prior to painting, all new and disturbed steelwork shall be power tool cleaned as a minimum standard of surface preparation. Contractor shall arrange for the PWGSC Inspector shall be notified after the first coat of paint is fully cured so that it may be inspected prior to the application of the second coat. Failure to do so shall result in another coat being applied at Contractor's expense.
18. **MATERIALS & TOOLS:** All materials, unless otherwise specified, shall be supplied by Contractor. Contractor to supply all necessary tools and equipment to perform the specified work. Also referred to as Contractor Furnished Material (CFM). Special, ship-specific tools, as required, will be issued by and returned to CGTA. Contractor shall be responsible for removing the tools from their stored location aboard the vessel, and returning them and securing them in place when finished. Otherwise, ship's tools and equipment will not be available for Contractor's use.
19. **MEASUREMENTS:** All dimensional measurements shall be taken and recorded in inches. Unless otherwise specified, the dimensions shall be taken and reported in thousandths of an inch (0.000 inch). All measuring devices shall be described on the submitted reporting sheets. All reported dimensions shall be either typed or printed in a neat legible manner, and shall include the name of the person who took the readings.
20. **CO-OPERATION:** During the period that the ship is in refit, members of the ship's complement, Coast Guard technical staff, and service specialists may be carrying out repairs to, maintenance of, or modifications of various ships' equipment not covered in this specification. Contractor shall not deny access to the vessel to these persons. Every effort will be taken to ensure that this Coast Guard controlled work will not interfere or conflict with that being carried out by Contractor.
21. **SMOKING:** The Public Service Smoking Policy forbids smoking in Government ships in all areas inside the ship where shipyard personnel will be working. Contractor shall inform workers of this policy and ensure that it is complied with in all cases.
22. **ACCESS:** The following areas are out of bounds to Contractor's personnel except to perform work as required by the specifications: all cabins, offices, workshops, Wheelhouse, Control Room, public washrooms, Officers' and Crew's Messes and Lounges. Contractor shall ensure that no workers bring meals onboard the ship.

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23. **INSPECTION & GUIDANCE**: During this contract, Ship's Crew and Regional Staff will be onboard conducting inspections and providing guidance to Contractor personnel.
24. **ASBESTOS**: There may be locations having asbestos containing materials (ACM). The latest Asbestos Assessment Report is available upon request.

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HD-1 DRY DOCKING

The intent of this specification item is to dock and undock the vessel and allow sufficient time to complete the specified work.

HD-1.1

Contractor shall quote on docking and undocking the ship, allowing sufficient service days to carry out the specified work, with a reasonable time allowance for arising new work. A vessel docking plan (978-02) on board the vessel shall be made available to Contractor.

HD-1.2

NOTE: The vessel has a duct keel from frames 96 – 165. Docking blocks shall be placed so that each block picks up the offset girder and the centreline in an alternating pattern. The vessel shall not be blocked in this area using centre line keel blocks only, unless they are of sufficient width to pick up the offset girders.

HD-1.3

Dry docking shall be under the direct supervision of a Certified Docking Master. Prior to docking the vessel, Contractor shall present to Canadian Coast Guard their plan to effect a safe docking. This will include, but not limited to, an explanation of block loading, dock preparation, tide-wind-tug issues, manpower arrangements and communications. Contractor shall provide reasonable notice to CCG prior to undocking the vessel and make similar presentations regarding safe undocking and for the vessel's on dock period. Vessel's crew shall be present for docking and undocking.

HD-1.4

Contractor shall supply the services of a diver to confirm that the vessel is sitting evenly on the bilge and keel blocks. (Contractor shall comply with the CCG Diving Policy as outlined in the Safety Annex)

HD-1.5

Contractor shall quote a unit daily service day cost on dock. This cost shall form part of the overall bid. This quote shall include any tug and/or pilotage service cost.

HD-1.6

Docking shall be undertaken during the first day of refit. If necessary, Contractor shall prepare the dock in advance of the ship's arrival and the official start date of the contract period. If evening shifts or weekend work is required to meet this objective, Contractor shall identify this and include all costs in the bid.

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HD-1.7

The vessel shall not be placed in the same dock with any other ship for any part of the contract period.

HD-1.8

Ship's personnel shall be responsible for all line handling on board the vessel only during the docking and undocking operations. Contractor shall supply personnel on the dock walls and ashore for all line handling. It is understood that when the vessel is afloat and under care and custody of CCG, ships lines shall be used. Otherwise all lines shall be CFM.

HD-1.9

Contractor shall ensure that docking blocks are clear of transducer faces and sea bay access covers, and docking plugs for Tanks.

HD-1.10

Contractor shall endeavour to give the CGTA at least one (1) weeks prior notice of the undocking date to allow for the arrival of the vessels full crew.

HD-1.11

During undocking Contractor shall ensure that sufficient personnel are in attendance throughout the ship's spaces to monitor for leakage from the numerous sea connections, stern tubes, sea chests, etc. and any other areas in communication with the underwater area of the vessel that were opened up during dry docking and to correct any deficiencies that may arise.

HD-1.12

In addition, Contractor's bid shall include the cost for one additional and separate dry docking. This quote shall include the connection and disconnection for services as outlined in Specification item H-2 as well as daily unit cost. This quotation shall be priced separately and included in the overall bid.

HD-1.13

Contractor shall quote a unit cost on the removal of keel blocks as well as a unit cost on the insertion of keel blocks. This quote shall be priced separately and included in the overall bid.

HD-1.14

A copy of the Sir William Alexander stability book shall be made available to Contractor. Contractor shall note that the vessel cannot be brought to a "lightship" condition. Bidders shall assume that the displacement upon arrival for docking shall be 4250 (Metric) Tonnes. All established stability requirements shall be satisfied, and Contractor is responsible for all costs related to safely docking and undocking the vessel.

HD-2 STERN TUBE BEARING WEAR DOWN

The intent of this specification item is to measure the wear down on the stern tube staves in way of each propeller tail shaft. Both the port and starboard rope guards shall be removed to gain access to each stern tube.

Contractor shall note; The Shaft Turning Gear shall be operated by the Vessels' Engineering Staff only.

HD-2.1

Stern tube bearing wear down readings shall be taken on the Port and Starboard stern tubes within 8 hours of dry docking the ship. Both poker gauges are GSM and feeler gauges shall be used to take readings. Readings shall be recorded and tabulated in two typewritten reports and given to the CGTA.

HD-2.2

Contractor shall supply and erect staging as required to access both stern tubes to carry out the readings. This staging shall also be used by the CGTA to inspect the propellers and rudder. Upon completion of all work, staging shall be removed.

HD-2.3

Upon completion of all work and in conjunction with the starboard shaft removal under specification item HD-15 PROPELLER AND TAIL SHAFT (SURVEY), both rope guards shall be installed in good order. Poker gauge plugs shall be installed and locked in place.

HD-2.4

All disturbed paintwork shall be mechanically cleaned to bare metal, primed and coated as per HD-14 Hull Cleaning and Painting.

HD-3 HULL WELDING INSPECTION AND REPAIRS

The intent of this specification item is to address some deteriorating welds that may require attention at the “shoulders” of the vessel. The vessel hull welds were for the most part in relatively good condition at the last docking.

HD-3.1

In conjunction with the hull inspection, hull cleaning, and hull painting, Contractor shall carry out seam weld repairs as required by TCMSS Surveyor. Contractor shall schedule the visit of a TCMSS Surveyor. The Surveyor shall carry out a hull inspection and shall determine those areas that require weld renewal.

HD-3.2

Contractor shall supply all scaffolding, materials, equipment, and personnel to arc gouge and re-weld the existing deteriorating welds as identified by the TCMSS Surveyor on both sides of the vessel. For bid purposes, quote on 20 feet of arc gouging per side and 100 linear feet of weld (5 passes @ 20 feet) per side. The actual amount shall be adjusted up or down through PWGSC 1379 actions.

HD-3.3

Upon completion of all work, NDT (x-rays) shall be carried out by a qualified technician in areas chosen by the attending TCMSS Surveyor. Contractor shall schedule the attendance of the NDT Technician as well as the TCMSS Surveyor to choose the areas requiring attention.

HD-3.4

In addition to the above work, Contractor shall quote on the following;

- HD-3.4.1. > 100 linear feet of arc gouging
- HD-3.4.2. > 100 linear feet of weld x 5 passes for a total of 500 bead feet of weld on the vessel's hull as well
- HD-3.4.3. > Unit cost per additional foot of arc gouging.
- HD-3.4.4. > Unit cost per additional foot of welding.

This cost shall include gouging and back gouging as well as the cost for six (6) x-rays of the new welds. The quote will also include all necessary staging, materials, and equipment required to perform the repairs. This work shall be carried out in conjunction with Specification Item HD-14 Hull Cleaning and Painting. The quote shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action.

HD-4 RUDDER & RUDDER STOCK STEADY BEARING (SURVEY)

The intent of this specification item is to measure and record rudder stock steady bearing clearances.

Note: Steady bearing bushing cannot be changed unless the bronze sleeve is removed; the bronze sleeve is a larger outside diameter than steady bearing bore. Work shall be performed in conjunction with E-4 Steering Gear VLE Upgrade / Renewal (Survey).

Reference Ship's Drawing 228-01 & 228-02

Table HD-4.1 Rudder

Rudder	Pintle removal tool	2040-21-TAG-8739
Rudder	Thordon rudder rubbing pads	N/A
Rudder	Thordon pintle bushings	N/A
Rudder	Thordon steady bearing bushing	N/A

HD-4.1

Rudderstock steady bearing clearances shall be measured and recorded. Bearing clearances shall be measured and recorded when the rudder is in each of the following positions:

- HD-4.1.1. > Hard to Port
- HD-4.1.2. > Hard to Starboard
- HD-4.1.3. > Midships

Copies of all hand-written recorded measurements shall be given to the CGTA immediately. Type written copies of the same measurements shall be provided to the CGTA within forty-eight (48) hours of their being taken

HD-4.2

Prior to commencing any work, Contractor shall tag and lock out each steering pump set as per DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT to prevent inadvertent turning of the rudder. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

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HD-4.3

It will also be necessary to open up the Aft Void Tank to access the rudder stock steady bearing. The manhole cover is located in the steering flat deck, #70, located at frame 6, port side. The Aft Void Tank shall be opened out and certified gas free and safe for personnel to enter. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the tank and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each tank. Spaces shall be tested each day that personnel are required entry in the tanks.

Note; Contractor shall follow the procedure for DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES which deals with Entry into Enclosed Spaces as well as the Coast Guard Hot Work Guidelines DFO/5737 Fleet Safety Manual, 7.B.4 - HOTWORK.

Contractor shall provide the space with a mechanical ventilation/extraction system, vented to the outside of the ship. Good ventilation shall be provided and any blowers/extractors shall ensure good air movement and solvent vapour removal from the lowest point in the tanks. Vapours as well as airborne dust and debris shall not be allowed to enter the vessel

The rudder trunk can be accessed via manhole cover #76 at frame 7 on the aft side of the rudder trunk which is located inside the Aft Void Tank. This manhole cover shall be removed to access the rudder stock steady bearing.

HD-4.4

Within eight (8) hours following docking of the ship, Contractor shall remove rudder fairwater plates and take readings of all bearing and pintle clearances. Contractor shall note the tight time constraints involved, and adhere to the requirements and bid accordingly.

HD-4.5

Contractor shall back-gouge each of the fairwater plates for removal to access the pintle bearings. Note: the fairwater plates shall not be sectioned for ease of removal and shall be removed in complete sections

HD-4.6

Rudder drain plug shall be removed in the presence of the CGTA and TCMSS Surveyor. Checks shall be carried out to confirm the absence of internal leakage. Contractor shall pressurize internal area of rudder with one (1) psi of air and apply soap solution to all areas. Any repairs required or leaks discovered shall be corrected by PWGSC 1379 action.

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Upon completion of testing, the drain plug shall then be reinstalled and locked. Contractor shall quote on 2 pneumatic pressure tests for the rudder. The quote shall form part of the overall bid & adjusted as required.

HD-4.7

Rudder gland and tiller head (Tiller head weight 1.25 tonnes, approximately.) shall be disconnected in steering flat. Steering gear rams shall be let go and supported in preparation for unshipping the rudderstock (7.7 tonnes, approximately.). Rudder jump collar clearance shall be checked prior to rudder being unshipped. The rudder steady bearing shall be unbolted from the mount in the rudder trunk prior to rudderstock being unshipped. Contractor shall make fast steady bearing to rudderstock once steady bearing foundation bolts are removed. **Note:** Rudder stock and steady bearing shall be unshipped together.

HD-4.8

Rudderstock / palm bolts shall be removed from rudder. Rudder (12 tonnes, approximately) shall be unshipped from the rudder stock with pintles in place.

HD-4.9

Care shall be exercised during the entire operation, preventing any damage to the pintles. All pintles and bearings shall be inspected by TCMSS Surveyor for survey credit and gauged for wear. All hand-written recorded measurements shall be given to the CGTA immediately. Typed copies of the same measurements shall be provided to the CGTA within forty-eight (48) hours of their being taken.

HD-4.10

If deemed necessary to remove the pintles, Contractor shall use the fitted pilgrim nuts to remove pintles, three (3) in number, in accordance with manufacturer's specifications. The travel of the hydraulic piston shall not exceed the specified limit to avoid damage to the tube when removing and replacing the pintles. Contractor shall assume the Pintles require removal.

HD-4.11

Contractor shall quote on renewing each of the 3 GSM pintle bushings. This shall also include the rudder rubbing pads on the aft end of the rudder post. This quote shall form part of the overall bid.

HD-4.12

Rudder trunk shall be abrasive blasted and re-coated as per Specification Item HD-14.

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HD-4.13

Zinc anodes in the rudder trunk shall be inspected for wastage. Contractor shall quote on the supply and install of twelve (12) M40 zinc anodes fitted in the rudder trunk. This quote shall be included in the overall bid and will be implemented if required or adjusted via 1379. Contractor shall also quote, but not form part of the overall bid, the cost of supply and install of one (1) anode for adjustment purposes through PWGSC 1379 action.

The fitting of the anodes shall be carried out in conjunction with HD-14 Hull Cleaning and Painting. New anodes shall be protected during hull coating.

HD-4.14

Steady bearing (Thordon Bush) shall be measured with feelers in 4 directions and examined for wear. Hand-written recorded measurements shall be given to the CGTA immediately. Typed copies of the same measurements shall be provided to the CGTA within forty-eight (48) hours of their being taken.

HD-4.15

During the 2012 (last) docking, abrasion resistant coating Amercoat 238 and Amercoat 339 was applied to the rudder stock in way of the steady bearing. This area shall be inspected by both CGTA and TCMSS Surveyor. If past repair deemed acceptable, Contractor shall profile the top coat and damaged areas. The damaged areas (bare steel) shall have 1 coat of Amercoat 238 applied. The entire stock shall have 3 coats of Amercoat 339. Between each coat, the paint shall be allowed to harden, to allow sanding of the surface in order to maintain an even concentric surface. The stock shall be repositioned between coats to prevent any excessive build-up of paint on one side. Measurements shall be taken to ensure sufficient operating clearance exists between the stock and the steady bearing.

HD-4.16

Brass liner on stock shall be examined and cleaned up and measured in 4 directions. Thrust bearing shall be checked for wear, measured and recorded. Hand-written recorded measurements shall be given to the CGTA immediately. Typed copies of the same measurements shall be provided to the CGTA within forty-eight (48) hours of their being taken.

HD-4.17

All grease ways shall be proven free and clear. All internal areas shall be cleaned and prepared for re-installation of rudder stock.

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HD-4.18

Rudderstock shall be reinstalled in ship with jump collar clearances re-established, rudder re-hung and pintles re-installed. Rudder stock shall be re-connected to tiller head as per original position of rudder. Rudder gland shall be repacked with approximately 5 meters (4 turns) of "Kohinoor" 1 inch square packing, (actual packing diameter shall be determined when rudder stock removed). Drawing specifies manilla hemp material for the packing.

HD-4.19

Contractor shall obtain the services of an authorized Wagner Steering Gear Service Field Service Representative. The FSR shall be reimbursed for the authorized travel and living expenses reasonably and properly incurred in the performance of the work, at cost without any allowance for the overhead or profit. The Allowance shall form part of the overall bid and shall be adjusted by PWGSC 1379 action upon proof of final invoice.

Steering gear assembly and rudder stock tiller arm final set-up shall be completed with the guidance of the authorized Wagner Steering Gear Service FSR. The FSR is to ensure that all limits are properly set prior to having ship back in water. This work shall be performed in conjunction with specifications E-4 STEERING GEAR VLE UPGRADE/RENEWAL (Survey).

HD-4.20

Cost of staging required to carry out specified work shall be included in the bid price.

HD-4.21

Contractor shall quote on supplying 2 new Rudder Fairwater plates, fabricated out of Lloyds Grade "A" 25mm thick plate. The radius of the curved section is approximately 250 mm. This quote shall form part of the overall bid and it will be implemented if required or adjusted via 1379. Drawing 228-1 (shows Rudder Fairwater plates) shall be made available for copying. Original drawings shall be returned to the CGTA once copies have been made. Rudder fairwater plates shall be fitted in good order. Plates shall be painted as per HD-14 Hull Cleaning and Painting specification.

HD-4.22

Upon completion of all work, the Rudder Trunk and Aft Void Tank shall be closed up in good order using new, CFM, neoprene jointing. Any defective manhole cover studs shall be renewed as per H-08.

HD-4.23

Damaged areas of paint shall be prepared and re-coated as per paint specification Item.

HD-4.24

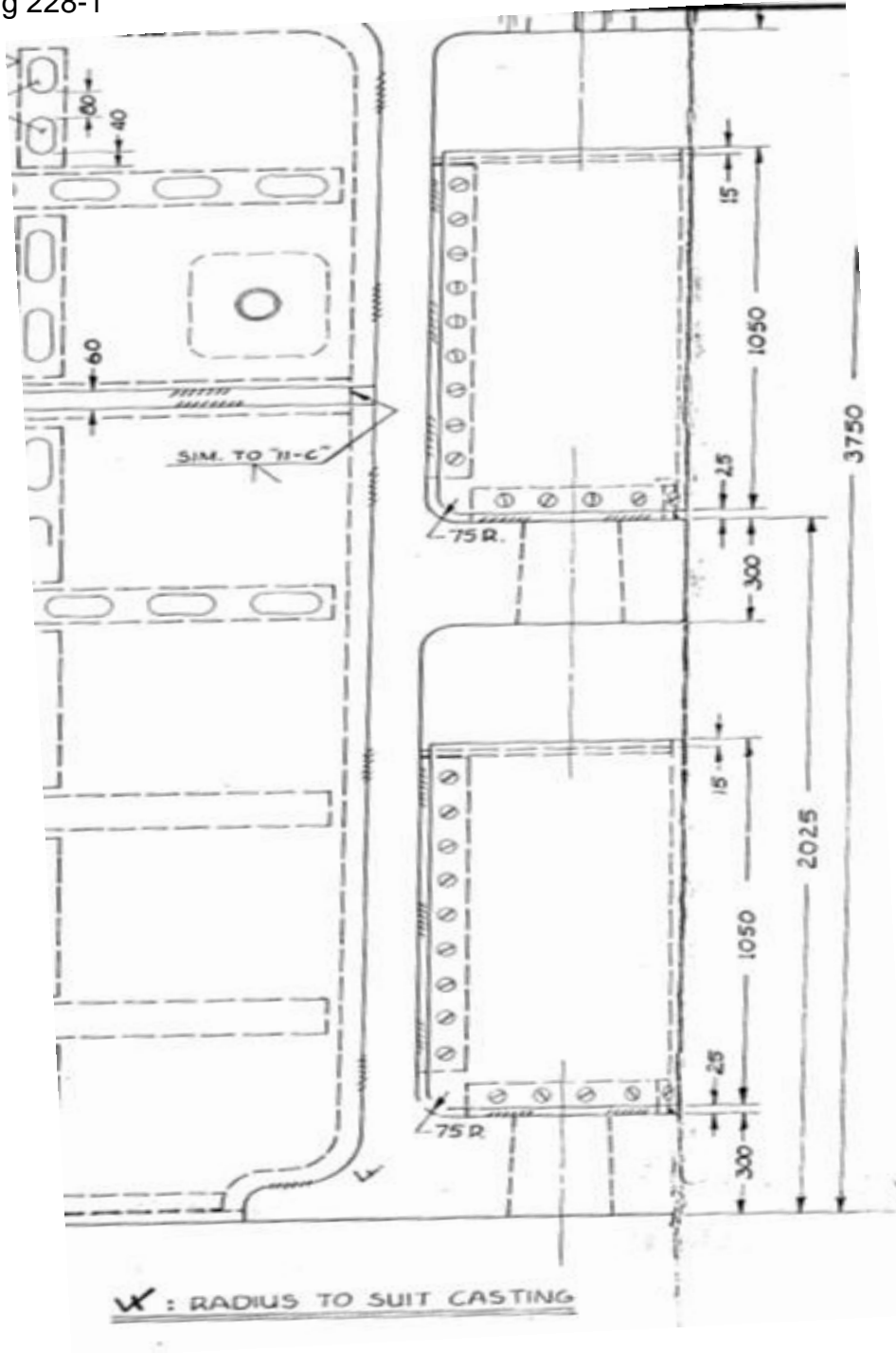
All work shall be completed to the satisfaction of the CGTA.

HD-4 RUDDER & RUDDER STOCK STEADY BEARING (SURVEY)

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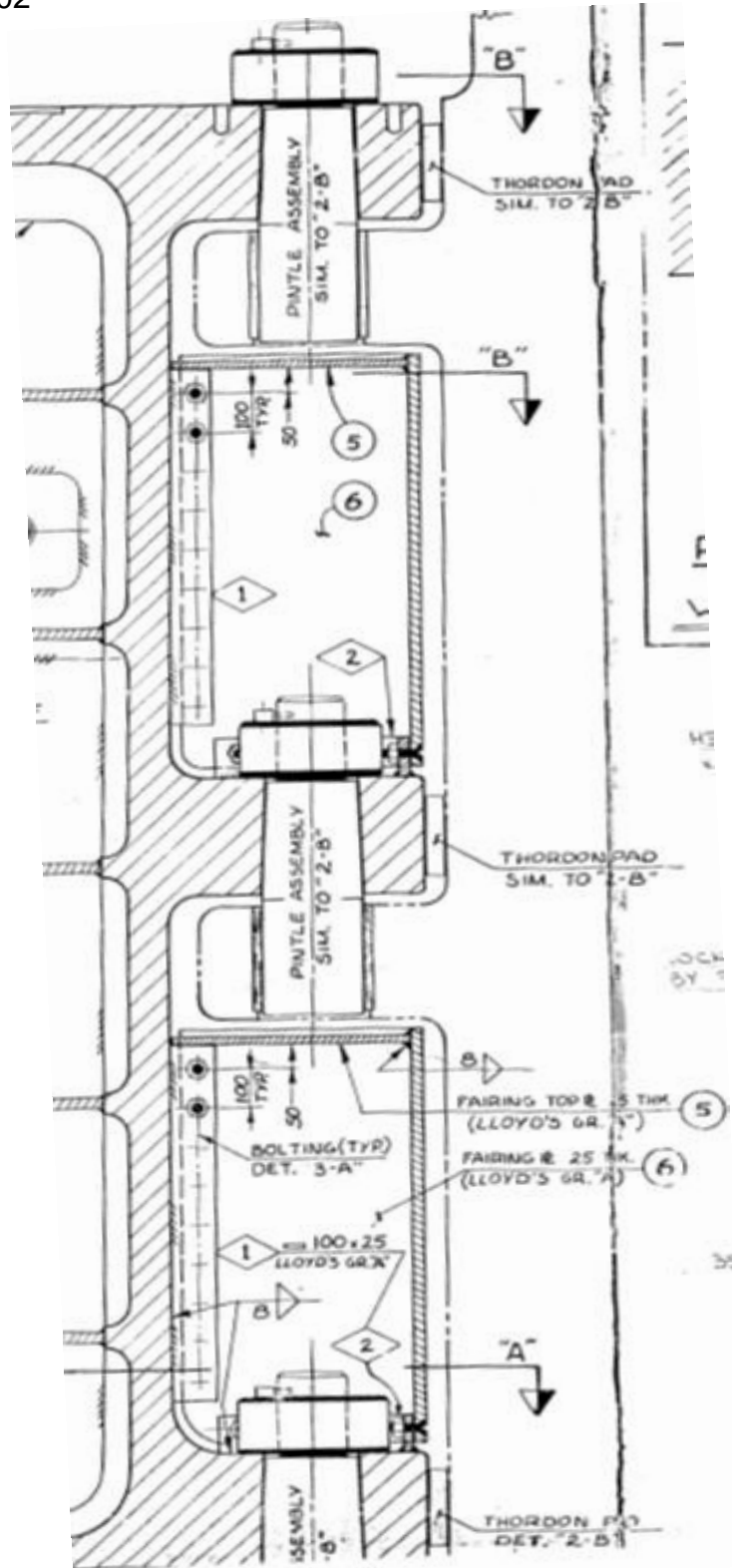
CCGS SIR WILLIAM ALEXANDER DRY DOCKING & REFIT 2015

Drawing 228-1



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Drawing 228-02



HD-4 RUDDER & RUDDER STOCK STEADY BEARING (SURVEY)

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HD-5 WATER BALLAST TANKS (SURVEY)

The intent of this specification item is to open out the Water Ballast Tanks on the attached list for cleaning, inspection, and testing as required by TCMSS.

Table HD-5.1 Water Ballast Tanks

Field #	Tank Name	Location	Volume	Manhole Location
3L018	Aft DB WB Tank Port	Fr 54-70	51.8	#26 & 28 CCV Room port side
3L019	Aft DB WB Tank Stbd	Fr 54-70	51.8	#27 & 29 CCV Room inboard
3L022	Fwd Wing WB Tank Port	Fr 152-163	50.5	#53 Cargo Hold tween deck port side
3L023	Fwd Wing WB Tank Stbd	Fr 152-163	50.5	#54 Cargo Hold tween deck stbd side

HD-5.1

All docking plugs and locking bars for the above tanks shall be removed by Contractor to permit the draining of the ballast tanks listed above. All plugs shall be given to the CGTA until required for reinstallation. Tanks without docking plugs shall be pumped down by Contractor. Contractor shall supply all pumps, hoses, hardware, and personnel to carry out these operations.

HD-5.2

Contractor shall open the hatch cover for each tank and certify the spaces as gas free for workers to enter. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the tank and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each tank. Spaces shall be tested each day that personnel are required entry in the tanks. Please note that Contractor shall follow the procedure outlined in DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES which deals with Entry into Enclosed Spaces as well as the Coast Guard Hot Work Guidelines DFO/5737 Fleet Safety Manual, 7.B.4 - HOTWORK.

HD-5.3

Contractor shall provide each tank with a mechanical ventilation/extraction system, vented to the outside of the ship. Good ventilation shall be provided and any blowers/extractors shall ensure good air movement and solvent vapour removal from the lowest point in the tanks. Vapours as well as airborne dust and debris shall not be allowed to enter the vessel.

HD-5.4

Contractor shall quote on the supply and installation, complete with brackets, M24 sacrificial zinc anodes. The total shall be 10 anodes per tank in the list above for a total of 40 anodes. The anodes shall be affixed in locations as per the CGTA's instructions. Paint work shall be touched up as per HD-14 BELOW WATERLINE AREAS. Contractor shall provide a quote for supplying and installing one anode for adjustment purposes through PWGSC 1379 action.

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HD-5.5

Each tank shall be thoroughly cleaned on all surfaces internally to remove debris, rust, and scale. Cleaning shall be carried out using freshwater hydro blasting at 2,000 psi minimum. Contractor shall remove and dispose of all material and liquids as a result of cleaning. Tank internals shall be inspected by the CGTA and a TCMSS Surveyor. Rusty and bare areas shall be Power Tool Cleaned to Bare Metal (SSPC.SP11) and sufficiently feathered to existing coatings. All power tool cleaned areas shall be coated with 2 coat of Intershield 300 (Bronze) to 11 mil DFT and a final coating of Intershield 300 (Aluminum) to a total of 16 mil DFT. Contractor shall quote on touching up 100 square meters for each tank and the unit cost for preparing and touching up of each additional square meter. The final total area for touch up coating shall be adjusted up or down (credit) through PWGSC 1379 action.

HD-5.6

Contractor shall quote on and perform Power Tool Cleaning to Bare Metal (SSPC.SP11) for an additional 200 square meters of rusty and loose coating to bare areas in the Forward Wing Tanks. The entire wing tanks shall be prepped and painted as per HD-5.5 (the area of each tank is approximately 220 square meters – this would include framing areas on the Deck head as well).

HD-5.7

Sounding pipes, suction pipes, and vents shall be proven clear.

HD-5.8

Contractor shall carry out testing on each tank using air pressure. A water column shall be used in all air testing as a precaution against over pressure. The water column shall be calibrated to blow off at between 2-3 psi. Contractor shall supply all materials and hardware for this test. Quote for tests shall include the installation and removal of blanks for suctions, sounding pipes, overflow pipes, vent head removals, additional tank openings, and tank drainage. All Testing shall be performed after HD-5A WATER BALLAST WING TANK HEATING COILS work is completed.

HD-5.9

Vent heads requiring removal for this testing shall be re-installed in good order with new gaskets upon completion of all work. Vent heads (WinTab Vents) shall be replaced using stainless steel bolts and insulated sleeves.

HD-5.10

Contractor shall quote a unit price for hydrostatic testing of each tank. This price shall include the cost of the water for filling as well as subsequent draining. Whichever method (air pressure or Hydrostatic) is not used shall be credited through PWGSC 1379 action.

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HD-5.11

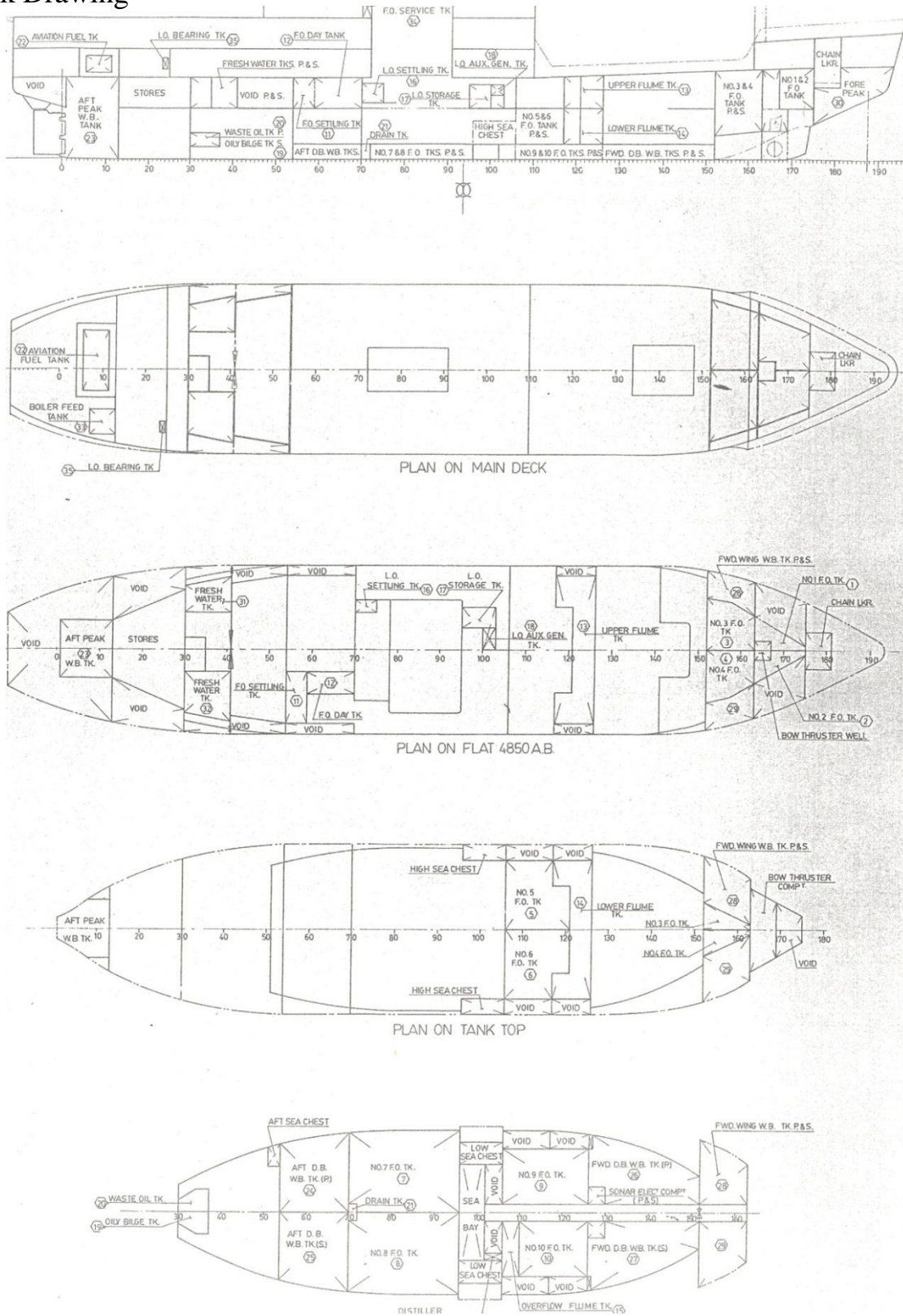
Upon completion of a final inspection by the CGTA and TCMSS Surveyor, Contractor shall close up each tank using new ¼ inch neoprene rubber manhole gaskets. The CGTA shall inspect each tank prior to the final closing. Each docking plug shall be installed using new packing. All locking bars shall be welded in place and adjacent areas shall be wire brushed, primed, and painted as per specification item HD-14 Hull Cleaning and Painting.

HD-5.12

All work shall be done to the satisfaction of the CGTA.

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Tank Drawing

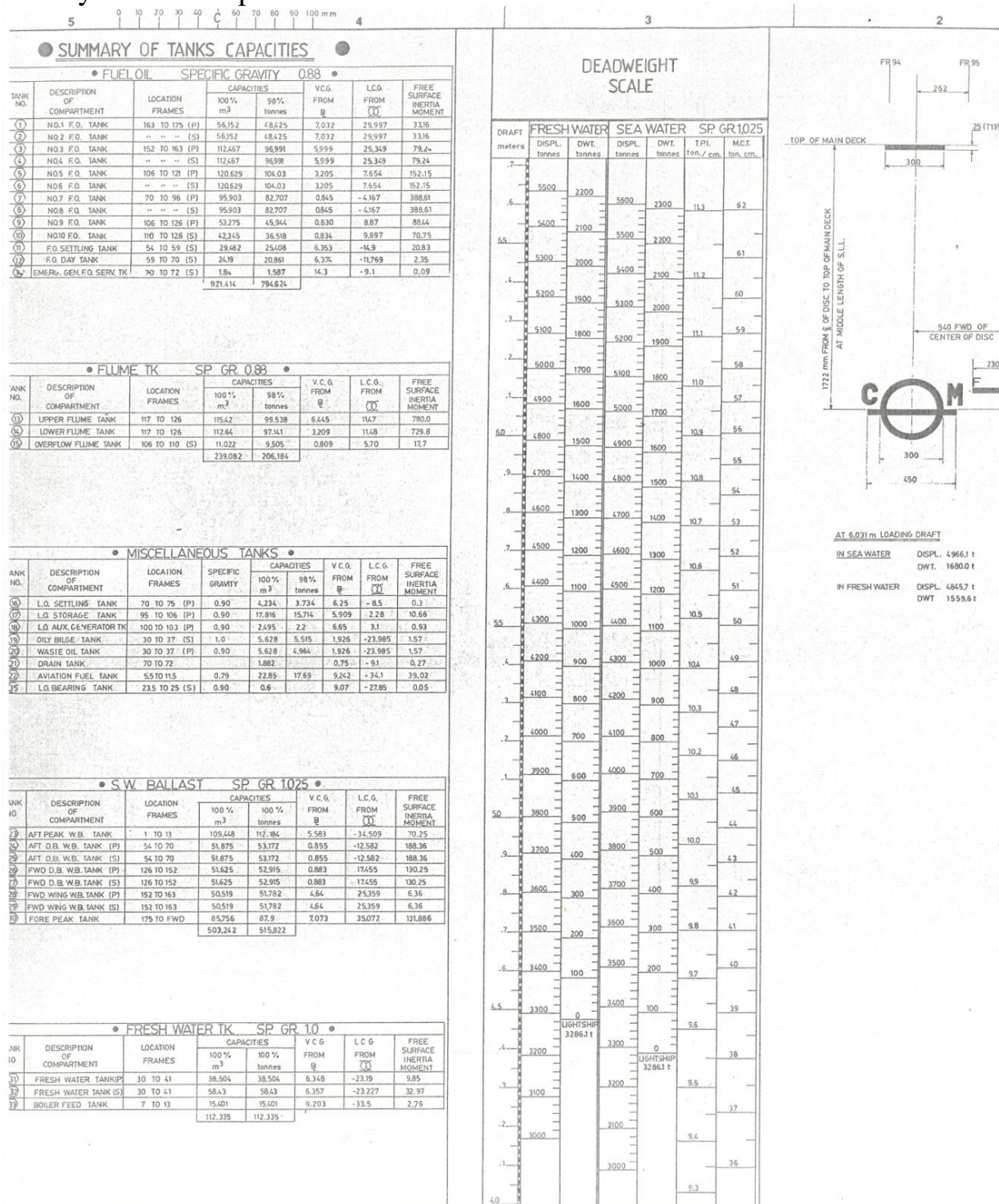


[HD-5 WATER BALLAST TANKS \(SURVEY\)](#)

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CCGS SIR WILLIAM ALEXANDER DRY DOCKING & REFIT 2015

Summary of Tank Capacities



HD-5A WATER BALLAST WING TANKS HEATING COILS

The intent of this specification item is to have the steam heating coils renewed in the 2 forward wing tanks.

HD-5A.1

Drawings 232-13, sheets 1 to 4 shall be made available to Contractor to copy. Original drawings shall be returned to the CGTA once copies have been made.

HD-5A.2

Contractor shall open the forward hatch to the pipe tunnel as per HD-6 VOID TANKS (SURVEY).

HD-5A.3

Contractor shall renew the heating coils in both wing tanks. Access to the heating coils is difficult, with limited space to perform the work. Contractor shall assume the pipe tunnel/forward wing tank bulkhead penetrations (Supply & Return pipe with compensation penetration) require renewal. The supply line to the heating coil is ½ inch seamless schedule 80 black iron pipe. The return is ¾ inch seamless schedule 80 black iron pipe. The heating coil is 1 ½ inch seamless schedule 80 black iron pipe.

HD-5A.4

For bidding purposes, the following items are required for each heating coil renewal. Contractor to provide individual pricing for each item;

- HD-5A.4.1. > 0.3 meter of ½ inch seamless schedule 80 black iron pipe
- HD-5A.4.2. > 0.2 meter of ¾ inch seamless schedule 80 black iron pipe
- HD-5A.4.3. > 13 meters 1 ½ inch seamless schedule 80 black iron pipe.
- HD-5A.4.4. > 2 x compensating bulkhead penetrations (1 ¼ inch extra strong pipe sleeve for ¾ inch pipe & 1 extra strong pipe sleeve for ½ inch pipe)
- HD-5A.4.5. > 1 x 1 ½ inch to ¾ inch reducer schedule 80
- HD-5A.4.6. > 1 x 1 ½ inch to ½ inch reducer schedule 80
- HD-5A.4.7. > 1 x ¾ inch slip on flange + fasteners
- HD-5A.4.8. > 1 x ½ inch slip on flange + fasteners
- HD-5A.4.9. > 6 x 1 ½ inch 90 degree elbows schedule 80
- HD-5A.4.10. > 6 x 1 ½ inch 45 degree elbows schedule 80
- HD-5A.4.11. > 8 x 1 ½ inch couplings schedule 80
- HD-5A.4.12. > Steam rated gasket material for 2 flanges

The quote shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action.

HD-5A.5

Once pipe has been fitted, the entire assembly shall be hydro pressure tested to 10 bar pressure. Any leaks found shall be repaired by Contractor.

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HD-5A.6

Tank shall be air tested as per specification item HD-6.7.

HD-5A.7

Upon successful pressure testing, the heating coil inlet and return lines shall be acid flushed clean and connected to the existing steam piping with new gaskets and fasteners. New insulation wraps shall be fitted at the flange connections and extended to the bulkhead connection.

HD-5A.8

All work shall be done to the satisfaction of the CGTA.

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HD-6 VOID TANKS (SURVEY)

The intent of this specification item is to open out the Void Spaces listed below for cleaning, inspection, and testing as required by TCMSS.

Table HD-6.1 Void Tanks

Field #	Tank #	Location	Manhole Location
3L027	Void Space	Fr aft - 13	#69&70 Steering flat and Stores #2
3L043	Pipe Tunnel	Fr 102-163	#17 Engine room tank top forward, centre

HD-6.1

Contractor shall open the hatch cover for each void space and certify the spaces as gas free for personnel to enter. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the tank and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each tank. Spaces shall be tested each day that personnel are required entry in the tanks. Please note DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES (Entry into Enclosed Spaces).

HD-6.2

Contractor shall provide each tank with a mechanical ventilation/extraction system, vented to the outside of the ship. Good ventilation shall be provided and any blowers / extractors utilized shall ensure good air movement and solvent vapour removal from the lowest point in the tanks. Vapours as well as dust and debris shall not be allowed to enter the ship.

HD-6.3

Void spaces shall be thoroughly cleaned on all surfaces internally to remove debris, rust, and scale. Care shall be taken so as not to wet existing steam piping insulation that may exist in some void spaces. All residues shall be disposed of ashore. Tank internals shall then be inspected by the CGTA and TCMSS Surveyor. Rusty and bare areas shall be power tool cleaned and sufficiently feathered to existing coatings. All power tool cleaned areas shall be coated with 2 coats of Intershield 300 (Bronze) to 11 mil DFT and a final coating of Intershield 300 (Aluminum) to a total of 16 mil DFT. Contractor shall quote on touching up 20 square meters for each void tank and the unit cost for preparing and touching up of each additional square meter. The CGTA has the right to re-distribute the areas being cleaned/coated where required. The final total for touch up coating shall then be adjusted up or down (credit) through PWGSC 1379 action

HD-6.4

Sounding pipes, suction pipes and vents shall be proven clear and the tanks shall be closed up using new ¼ inch neoprene rubber manhole gaskets.

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HD-6.5

Each level alarm shall be tested for correct operation by Contractor. Ship's personnel shall verify that each alarm has been activated.

HD-6.6

Any studs broken in the removal and replacement of the manhole covers shall be renewed. The CGTA shall inspect each tank prior to final closing. Contractor shall install the docking plugs, including locking bars, using new packing.

HD-6.7

Void spaces shall be pressure tested using air to the satisfaction of the attending TCMSS Surveyor. Contractor shall supply all necessary materials, fittings, blanks, etc. and labour for these tests. A water column shall be used in this type of testing to prevent over pressure. The column shall be calibrated to relief any pressure in excess of 2-3 psi.

HD-6.8

Vent heads requiring removal for testing shall be reinstalled in good order with new gaskets upon completion of all work. Vent heads (WinTab Vents) shall be replaced using stainless steel bolts and insulated sleeves.

HD-6.9

Upon completion of all work, Contractor shall close up the pipe tunnel using new ¼ inch neoprene rubber manhole gaskets. The CGTA shall inspect the tunnel prior to the final closing. Each void space shall be closed up in good order using new manhole gaskets. Any defective studs shall be renewed.

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HD-7 FUEL TANK (SURVEY)

The intent of this specification item is to open out the fuel tanks listed below for cleaning, inspection, and testing as per a TCMSS Surveyor.

Table HD-7.1 Fuel Tanks

Field	Tank Name	Location	Volume	Manhole Location
3L007	No. 7 Fuel Oil Tank	Fr. 70-96	95.9	#22 & #24 Eng Room port tank top
3L008	No. 8 Fuel Oil Tank	Fr. 70-96	95.9	#21 & #23 Eng Room stbd tank top
3L011	FO Day Tank	Fr. 54-59	24.2	#44 inboard side of Aux Generator
3L012	FO Settling Tank	Fr. 59-70	29.5	#45 aft of Auxiliary Generator
3L026	Drain Tank	Fr. 70-72	1.8	#25 Aft E/R bulkhead behind No. 2 ME

HD-7.1

The ship's crew will pump the tanks down to the suction levels. Contractor shall remove the manhole covers from the tanks and remove the residual fuel oil for disposal ashore. Contractor shall quote a cost for removal and disposing of 500 litres from each tank. The quote shall also include the cost per litre for removal and disposal for adjustment purposes. The total amount shall be adjusted up or down (credit) through PWGSC 1379 action. Contractor shall provide fuel metering or tank sounding to accurately measure fuel removed. The residues shall be disposed in an environmentally safe manner as per provincial and federal government requirements. Contractor shall provide documentation to the CGTA to demonstrate that this practice has been carried out.

HD-7.2

Contractor shall ventilate each tank and provide mechanical ventilation to all areas of the tank. Each tank shall be gas freed and certified gas free as required for entry. Each tank shall be safe for personnel to enter and safe for hot work. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the tank and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each tank. Spaces shall be tested each day that personnel are required entry in the tanks. Please note DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES (Entry into Enclosed Spaces).

HD-7.3

Contractor shall thoroughly clean the internal surfaces of the tanks and remove all debris, rust, and scale. In addition, each fuel tank shall be hot water cleaned to ensure that all microbiological contaminants are killed. The required water temperature shall be 70 degrees Celsius, minimum. Contractor shall supply the hot water source. Hot water from the ship's supply shall not be used. All material and liquids remaining in the tank resulting from the cleaning shall be removed and disposed of ashore by Contractor. All surfaces shall be wiped down using lint free material upon completion of all work to remove excess moisture. Rusty areas shall be wire brushed cleaned.

HD-7.4

Following the completion of each tank cleaning, Contractor shall notify the CGTA and TCMSS Surveyor to allow for inspection prior to final close up.

HD-7.5

Contractor shall clean the sealing surfaces around the manhole and cover and install the original cover using new ¼ inch thick neoprene gaskets. Any studs found broken or missing shall be renewed by Contractor.

HD-7.6

Contractor shall quote a price on hydrostatically testing the tanks. The quote shall include the installation and removal of blanks for suction, sounding pipes, overflow pipes, vent head removals, additional tank openings for subsequent water removal and wipe down and subsequent closing as required for hydrostatic testing of fuel tanks. In addition, Contractor shall quote on pneumatically testing each tank. A water manometer shall be used during air testing to prevent over pressure of the tank and shall be set up to limit air pressure in each tank to 2-3 psi. Quotes shall be included in the overall bid. Whichever method is not used shall be credited through PWGSC 1379 action. Contractor is responsible for scheduling TCMSS Surveyor to witness the testing of the tanks. CGTA shall also be in attendance whenever TCMSS Surveyor is on board for the testing of the tanks.

HD-7.7

Note:

Contractor shall note that the fuel oil tanks are interconnected to a fuel overflow tank via a 3 inch diameter pipe. This overflow pipe is routed from the vent of each tank just above the tank top. It is necessary to blank the overflow line on each tank. Contractor shall verify that all blanks from overflow pipes have been removed upon completion of testing. New gaskets shall be installed in way of the disturbed piping.

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HD-7.8

Upon completion of tank testing, each vent (Winteb vents) shall be installed using new packing as well as new stainless steel bolts, washers, Nylon insulators and nuts.

HD-7.9

All testing shall be done as per the requirements of the attending TCMSS Surveyor.

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HD-8 SEACHESTS AND SEABAYS SEACHESTS (SURVEY)

The intent of this specification item is to open Seachests and Seabays Seachests for cleaning and inspection.

HD-8.1

The six sea chests and associated sea bays shall be opened for cleaning and inspection. In addition, the 2 main inlet sea strainers shall be opened as well. This work shall be carried out in conjunction with HD-14 Hull Cleaning and Painting.

Table HD-8.1 Seachests and Seabays

Field	Tank Name	Location	Manhole Location
3L025	Seabay	Fr. 96-102	Bilge – Fwd of #2 M/E
3L050	Low Sea Chest - Port	Fr. 96-106	N/A
3L051	Low Sea Chest - Stbd	Fr. 96-106	N/A
3L052	High Sea Chest - Port	Fr. 96-106	N/A
3L053	High Sea Chest - Stbd	Fr. 96-106	N/A
3L054	Aft Emerg Sea Chest - Stbd	Fr. 51-54	N/A
3L055	Distiller Sea Chest - Stbd	Fr. 102-106	N/A

HD-8.2

NOTE: *There shall be no welding or hot work operations carried out on the forward and aft bulkheads of the sea chests and seabays. These bulkheads are common with fuel tanks.*

HD-8.3

The seachests and seabay shall be opened out and certified gas free and safe for personnel to enter. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the tank and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each tank. Spaces shall be tested each day that personnel are required entry in the tanks. Please note that Contractor shall follow the procedure outlined in DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES which deals with Entry into Enclosed Spaces as well as the Coast Guard Hot Work Guidelines DFO/5737 Fleet Safety Manual, 7.B.4 - HOTWORK.

HD-8.4

Contractor shall provide each space with a mechanical ventilation/extraction system, vented to the outside of the ship. Good ventilation shall be provided and any blowers / extractors used shall ensure good air movement and solvent vapour removal from the lowest point in the tanks. Vapours as well as airborne dust and debris shall not be allowed to enter the vessel.

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HD-8.5

Contractor shall follow the coating manufacturer's recommendations and procedures when applying the coatings outlined below. Contractor shall allow sufficient curing times as outlined by the manufacturer during the application of all coatings. Contractor shall take random thickness readings (mils) between coats with the CGTA in attendance.

HD-8.6

Contractor shall note that access to the sea chests is only available via removable shell grids (one per chest). Contractor shall note the location of shell grids when planning blocking arrangements for dry docking. Contractor shall identify (mark) each grid being removed for their original location.

HD-8.7

Contractor shall use hydro-blasting at 5,000 psi minimum and mechanical means (power brushing) for the cleaning the areas identified in this specification item. All debris shall be removed and disposed of ashore by Contractor. Copies of invoices detailing disposal of the debris shall be given to the CGTA.

HD-8.8

The measured area of the sea chests and sea bays is 400 square meters. For quoting purposes, estimate that 100% of the area is bare. The quote shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action.

HD-8.9

The grids shall be removed from all sea chests for cleaning and inspection. The grid and inlet areas shall be high pressure washed and grid holes shall be mechanically reamed to their original diameter. Zinc anodes shall be inspected for wastage and renewed as directed by the CGTA. Contractor shall quote total and unit price for supplying and fitting 42 x M24 zinc anodes (pricing shall be given separately for supply the anodes and for fitting them, quote shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action).

HD-8.10

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Anode configuration for each seabay / sea chests are as follows:

Table HD-8.2 Seachest and Seabay Anodes

High Sea Chest - Port	M24 anodes	15
High Sea Chest - Stbd	M24 anodes	16
Low Sea Chest - Port	M24 anodes	34
Low Sea Chest - Stbd	M24 anodes	37
Distiller Sea Chest -Stbd	M24 anodes	7
Aft Sea Chest - Port	M24 anodes	8
Main Seabay	M24 anodes	24

HD-8.11

Sea chests are located as follows:

Table HD-8.3 Propulsion Generator Room

High Sea Chest (P)	Frames 96-106
High Sea Chest (S)	Frames 96-106
Low Sea Chest (P)	Frames 96-106
Low Sea Chest (S)	Frames 96-106
Distiller Sea Chest (S)	Frames 102-106

Table HD-8.4 Propulsion Motor Room

Aft Sea Chest (P)	Frames 51-54
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HD-8.12

Contractor shall inform the CGTA when the sea chests are open and prior to cleaning. Sea chests shall be inspected by the CGTA and a TCMSS Surveyor. The sea chests shall be coated as follows:

- HD-8.12.1. > Two coats of Intertuf 203 anti-corrosive (black). This shall be applied to yield 3-4 mils DFT per coat.
- HD-8.12.2. > One coat of Interspeed 640 anti-fouling (red). This shall be applied to yield 4-5 mils DFT per coat.

HD-8.13

Upon completion of cleaning and coating, the grids shall be re-installed in good order. Locking arrangements shall be installed on all fasteners as per original. Stainless steel lock wire shall be used and adjacent bolts shall be locked in pairs only. Contractor shall quote on the unit cost for renewal of defective stainless steel fasteners. Assume standard stainless steel $\frac{3}{4}$ inch cap screws.

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SEA BAY

HD-8.14

The locking bar and docking plug shall be removed by Contractor to allow the sea bay to drain. The docking plug is located at frame 97 approximately 2 meters to the starboard side of the centreline of the ship. Contractor shall give the docking plug to the CGTA until required for close up. The manhole cover (Fr. 96, Forward engine room tank top) shall be removed. All sea bay spaces shall be thoroughly cleaned.

HD-8.15

Contractor and CGTA shall examine the zinc anodes for wastage. Contractor shall quote on the renewal of 24 x M24 zinc anodes. Contractor shall also quote the unit price for renewal; pricing shall be for supply the anodes and for fitting them. Actual requirements shall be decided after inspection and negotiated through PWGSC 1379 action. All anodes shall be suitably protected using plastic or paper wrap and tape during cleaning and painting activities. All protective wraps shall be removed prior to closing the sea bay. Contractor shall not coat anodes with any form of grease, paint or mastic.

HD-8.16

Upon completion of cleaning, inspections, and anode work, the sea bays shall be coated as follows:

- HD-8.16.1. > 2 coats of Intertuf 203 anti-corrosive (black).
This shall be applied to yield 3-4 mils DFT per coat.
- HD-8.16.2. > 1 coat of Interspeed 640 anti-fouling (red).
This shall be applied to yield 4-5 mils DFT per coat.

HD-8.17

Upon completion of inspection and repair work, all docking plugs, locking bars, and manhole cover shall be installed by Contractor in good order using new CFM neoprene jointing on the manhole cover. Contractor shall quote on the renewal of 6 manhole cover studs for bid purposes. Any defective studs shall be renewed.

HD-8.18

The Sea bay shall be hydrostatically tested (filled to overflow the vent for a static head test) on dock with the test being witnessed by the CGTA and a TCMSS Surveyor. Contractor shall remove and replace the vent head to carry out the test. During vent head reinstallation, Contractor shall use a new gasket and stainless fasteners.

CCGS SIR WILLIAM ALEXANDER DRY DOCKING & REFIT 2015

HD-8.19

Should it be found necessary to drain the sea bay for the purposes of hull coating or touch-up, the docking plug shall be removed and on completion of all work, the docking plug shall be re-installed with new packing and the locking bar welded over as per original. Contractor shall quote on the unit cost per additional removal / installation. The quote shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action.

SEA BAY STRAINER BOXES PORT & STARBOARD

HD-8.20

Both strainer boxes, port & starboard, shall be opened for cleaning and inspection. Both strainer baskets shall be removed, cleaned, and inspected. Both strainer baskets shall have the holes reamed to their original diameters. Upon completion of all work in this specification item Contractor shall re-install both strainer baskets. Contractor shall quote on the renewal of 2 tear-drop shaped zinc anodes on each sea strainer (total of 4) as per existing. The quote shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action.

Port sea strainer opened up with basket removed.



HD-8.21

One coat of Intershield 300 and One coat of Interspeed 640 anti-fouling paint shall be applied to all strainer box internal surfaces, including the underside of each strainer cover. A suitable drying time shall be incorporated between coats as per the manufacturer's guidelines. Upon completion of all work, both strainer box covers shall be re-installed with new CFM ¾ inch square neoprene jointing. Estimate 17 feet of ¾ inch square cord required. Water proof sealant shall be used at the butt joints of the square cord.

HD-8A SEABAY & SEACHEST VENT RENEWALS

The intent of this specification item is to renew the entire section of venting system. The port & starboard side Seachests / Seabay venting pipes have deteriorated with age.

STARBOARD SIDE; the length of pipes being renewed runs from the top of the starboard lower seachest vent valve, starboard upper seachest vent, starboard side Seabay vent valve, starboard sea strainer vent valve and distiller sea chest vent valve up through the next deck to a position behind the workshop false bulkhead. The pipe is joined into a common header, it is then routed to the starboard ship side, through the galley and out through the upper deck where a 90 degree short radius elbow/special formed pipe is fitted to the ship side bulwarks plating.

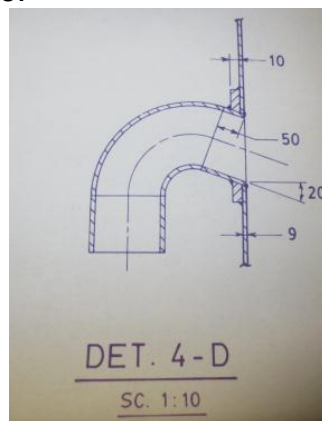
The distiller sea chest vent follows a similar route on the starboard side, alongside & aft of the starboard main Sea chest / Seabay vent system.

PORT SIDE; main Sea chests / Seabay venting pipes follow a similar path of the starboard side main vent. The only difference is the pipes are on the port side. The common header is located just above and forward to the auxiliary switchboard in the MCR. Access to the pipes is very limited around the switchboard. The port side main vent line passes through the main deck, behind the isolaminar panels located in the alleyway, near the well deck door.

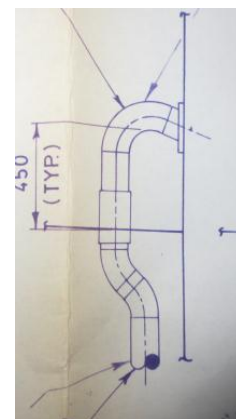
NOTE; The difficulty in this scope of work is access.

HD-8A.1.

Drawings 232-12 (#5, #10, #11 & #12 OF 12 drawings) shall be made available to Contractor to copy. Original drawings shall be returned to The CGTA. once copies have been made.

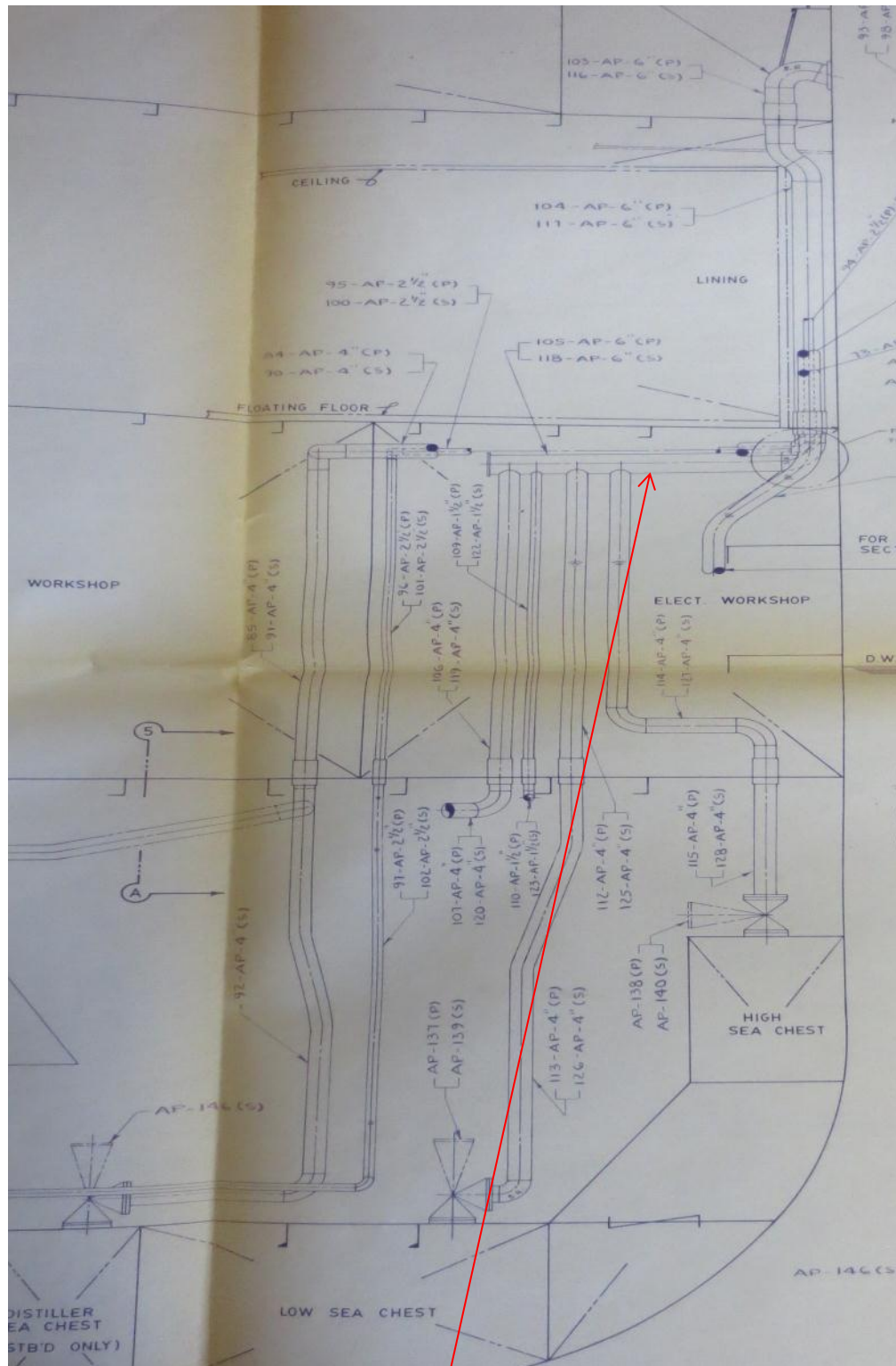


Detail of Stbd Sea Chest
Vent Outlet



Detail of Evaporator Stbd
Sea Chest Outlet

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Sea Chest/Bay Vent Header arrangement

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HD-8A.2.

This work shall be carried out in conjunction with the HD-12 SEA VALVE CONNECTION (SURVEY) and Sea Chest NDT Inspections (HD-8A.11.).

HD-8A.3.

Work shall not commence until the tank top and all associated work areas have been certified gas free and safe for hot work. Contractor is responsible for any cleaning in this area to prepare for hot work. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the tank and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each tank. Spaces shall be tested each day that personnel are required entry in the tanks. All precautions shall be taken to protect all areas from hot work damage. Contractor is responsible for maintaining an adequate fire watch during the course of all hot work. This shall include providing various applicable extinguishers and extinguishing mediums as necessary. This shall also include any necessary preparations and cleaning in the vicinity of the work area to obtain a gas-free permit.

HD-8A.4.

All expanded metal and insulation materials shall be removed as necessary and replaced with new materials upon completion of all work. It is anticipated that Contractor shall undertake considerable removals in the galley (outboard bulkhead) and in work shop in way of the welding bench to access the sea chest/bay vent pipes. Similar on the port side, it is anticipated that Contractor shall undertake some removals in the port side change room alleyway (outboard bulkhead), inner door and frame, and in around the auxiliary switchboard to access the sea chest/bay vent pipes. The auxiliary switch board shall be covered to prevent any ingress of debris or water using 10mils plastic vapour barrier material. This includes sealing off the wire transits.

HD-8A.5.

Removals for the workshop area shall include but may not specifically be limited to:

- | | |
|-------------|---|
| HD-8A.6.1.> | False bulkhead behind the work bench. |
| HD-8A.6.2.> | Expanded metal and insulation materials. |
| HD-8A.6.3.> | 8 inch fire main pipe |
| HD-8A.6.4.> | 2 inch sea strainer vent pipe |
| HD-8A.6.5.> | Welding bench (welded in place) |
| HD-8A.6.6.> | Portable welding & plasma cutting machines. |

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GALLEY AREA; Contractor shall bid on an area of 12 square meters in the galley, galley deck and above the galley deck head in way/around the area of the vent lines. Contractor shall include in their overall bid price, the cost for removal and reinstallation of interference items such as any cabinets, overhead shelving & cabinets, exhaust and supply ventilation trunking, deck head panels, bulkhead panels, electrical wires/conduits, and insulation required to access and complete the repairs to the vent lines and steel plating. This bid shall be included in the overall bid.

Contractor shall also include a quote for unit cost per square meter for removals and reinstallations, the quote shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action.

The work area within the galley shall be sealed off from the rest of the galley to reduce the accumulation of dirt and debris.

All gallery equipment shall be powered down as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT, and cover over/sealed with 10mils plastic vapour barrier material. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

The removals in the Galley consist of but not limited to the following:

HD-8A.6.7.>	Galley Exhaust Vent Trunking, Stainless Steel (S.S.) sheathing cover
HD-8A.6.8.>	S.S Bulkhead Cabinet (87 inches x 24 inches)
HD-8A.6.9.>	2 x S.S. Bulkhead Panels
HD-8A.6.10.>	S.S. Corner Cabinet with Correntic Countertop Outboard Bulkhead section (64 inches x 31 inches) Fwd Bulkhead section (59 inches x 31 inches)

NOTE: The S.S. Corner Cabinet correntic countertop shall be removed and the S.S. top under that also removed to allow each cabinet section to be removed individually.

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Galley Corner section showing Upper Cabinet and Exhaust Trunking



Galley Corner section showing Lower Corner Countertop and Cabinet



Contractor shall re-install all removed sections as per their original locations and condition.

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PORT ALLEYWAY; Contractor shall bid on an area of 12 sq. meters in the port alleyway, alleyway deck and above the alley deck head in way/around the area of the vent lines Contractor shall include in their overall bid price, the cost for removal and reinstallation of interference items of the inner door and frame, exhaust and supply ventilation trunking, deck head panels, bulkhead panels, electrical wires/conduits, and insulation needed to perform the vent lines and possible steel repairs. This bid shall be included in the overall contract bid for this item.

Contractor shall also provide a quote for a unit cost per square meter for removals and reinstallations, the quote shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action.



Port Alleyway & Inner Door Frame

HD-8A.6.

Contractor shall sub-contract a marine flooring company to repair the galley deck floor and coaming around the S.S. Corner Cabinet after it is re-installed. The flooring in the port alley will also require repairing. Both floors are A60 rated insulated floors with tiles fitted for the galley & décor Dex-o-tex flooring in the port alleyway.

Contractor shall allow \$10,000.00 for this work. This cost shall be included in the overall bid. Contractor shall provide an original invoice from the sub-contractor; final cost shall be adjusted through PWGSC 1379 action.

Any disturbed or removed insulation shall be renewed with marine grade insulation similar to the original.

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HD-8A.7.

The vent lines (both port & starboard sides) shall be let go once the Sea Chest Vent Valves, Sea bay and sea strainer vent valves have been removed for survey. Contractor shall crop the sleeved deck penetrations at the bulwarks, upper deck, main deck and engine room flat. The vent pipes and associated components shall be removed and disposed of ashore by Contractor.

HD-8A.8.

For bidding purposes, (approximately) the following piping material are required for the starboard side, Contractor shall double the material cost of renewal to address both sides; the quote shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action.

- HD-8A.9.1. > 6 inch hot dip galvanised steel schedule 80 seamless pipe 5.5 meters
- HD-8A.9.2. > 4 inch hot dip galvanised steel schedule 80 seamless pipe 22.4 meters
- HD-8A.9.3. > 1 ½ inch hot dip galvanised steel schedule 80 seamless pipe 6.2 meters
- HD-8A.9.4. > 6 inch hot dip galvanised steel schedule 80 seamless 90 degree elbow 3
- HD-8A.9.5. > 6 inch hot dip galvanised steel schedule 80 seamless 45 degree elbow 3
- HD-8A.9.6. > 4 inch hot dip galvanised steel schedule 80 seamless 90 degree elbow 7
- HD-8A.9.7. > 4 inch hot dip galvanised steel schedule 80 seamless 90 degree elbow 4
- HD-8A.9.8. > 1 ½ inch hot dip galvanised steel schedule 80 seamless 90 degree elbow 4
- HD-8A.9.9. > 1 ½ inch hot dip galvanised steel schedule 80 seamless 45 degree elbow 3
- HD-8A.9.10. > Various flanges, couplings

Contractor shall fit flanges in order to allow easier pipe installations and removals in the future, CGTA shall be consulted on their location. In addition, the pipe sections requiring compensation flanges (at each deck transit) and pipe sections with flanges shall be fabricated and test fitted, then the entire assembly hot dip galvanised. The compensation flange shall be large enough to allow welding to the existing deck without disturbing the pipe galvanised coating and small enough to fit the accessible space.

Gasket material shall be rated for possible hot water/steam service especially on the 1 ½ inch vent line from the main sea basket strainer. The ship uses live steam in the vent system to prevent freezing when operating in ice. Red rubber or neoprene gasket material is not acceptable.

Contractor shall note that a “Roust-A-Bout coupling” has been fitted on the lower sea chest vent. This item is not allowed and cannot be fitted on the new vent line.

HD-8A.9.

All deck sleeve penetrations shall be tested for vapour/water tightness.

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HD-8A.10.

All pipe flange faces shall be cleaned and new gaskets shall be fabricated and installed on all new and disturbed pipe work and fittings. Anti-seize compound shall be applied to all fasteners. All new gaskets shall be fabricated and installed by Contractor on any disturbed flanges.

HD-8A.11.

Once the vent pipe is fully welded in place and all welding repairs completed NDT testing shall be performed on all welds and joints, including compensation flanges. Assume 100% testing shall be required; combination of Mag-particle and dye-penetrant testing. A type written report for the test results shall be submitted to the CGTA. Personnel performing non-destructive examination for the purpose of assessing quality of welds in connection with this specification item, shall be qualified in accordance with Classification Society rules or to a recognized international or national qualification scheme. Records of operators and their current certificates shall be kept and supplied to the CGTA and made available to the TCMSS Surveyor during inspection.

HD-8A.12.

All areas that have been affected by this work shall be mechanically cleaned to SSPC.SP11 standards. Upon completion of cleaning to SSPC.SP11 standards, all areas shall be given 2 coats of primer paint, Interprime 198 grey, colouring No. CPA098 International Paint. Coatings shall be applied to yield 2 – 3 mils (ASTM D1640) DFT per coat. All areas shall then be given 2 top coats of CLB000/1 Interlac 665Fire Retardant White, International Paint. Final coat shall be applied to yield 2 mils (ASTM D 1640) DFT per coat. All paint shall be contractor supply. Contractor shall allow sufficient curing time between coats as per the manufacturer's recommendations and instructions.

HD-8A.13.

For testing, Contractor shall seal off each vent piping system and apply a hydrostatic test of 10 bar for at least a 2 hour period. All section of the vent pipes shall be inspected for any leakage. Any leaks found shall be properly repaired by Contractor.

HD-8A.14.

All materials and equipment that were removed, disturbed, or otherwise relocated during the course of this work, shall be put back in good order. Removed fasteners shall be renewed and installed.

HD-8A.15.

All work shall be to the satisfaction of the onsite CGTA and TCMSS Surveyor.

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HD-8B SEABAY SEACHEST PIPING RENEWALS

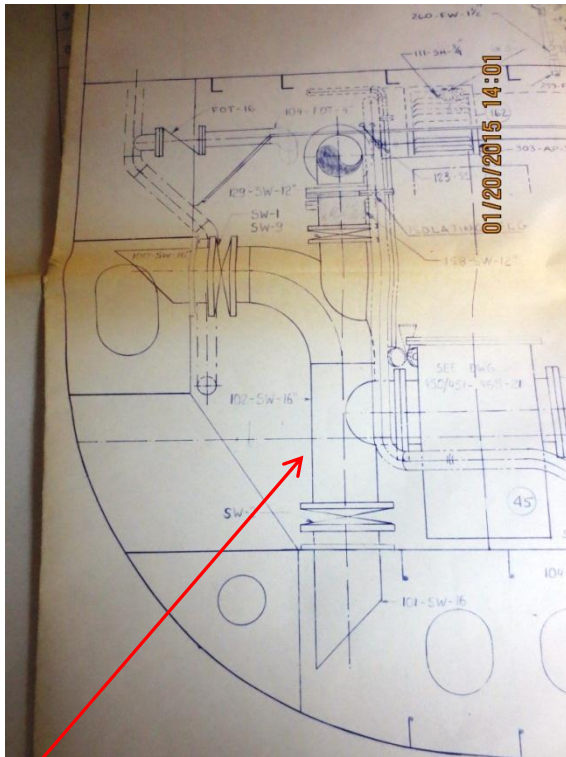
The intent of this specification item is to renew the sea water piping in the seabay seachest.

HD-8B.1.

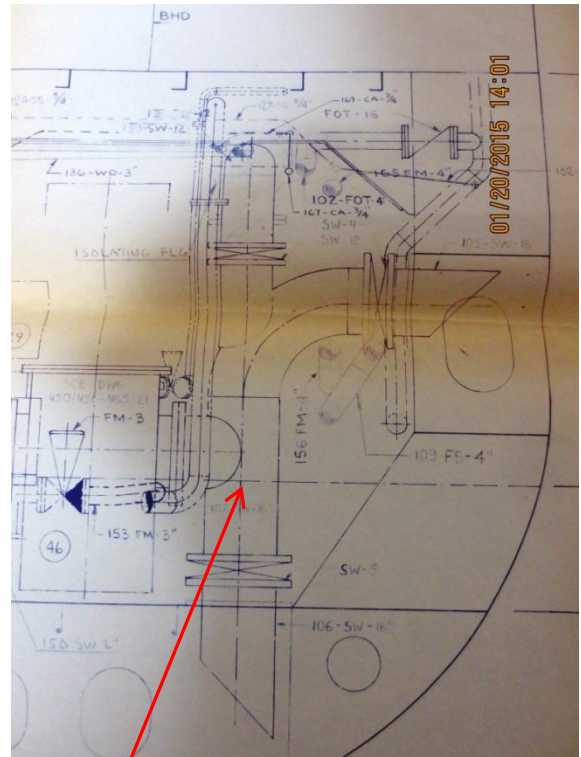
The following sea water pipe sections and components are suspected as in need of renewal. Drawing 977-80 12 of 45 shall be made available for Contractor to copy. Once copied, the original drawing shall be returned to onsite CGTA.

HD-8B.2.

Pipe sections noted shall be removed to allow work listed HD13. Contractor shall remove the pipe sections ashore for jigging.

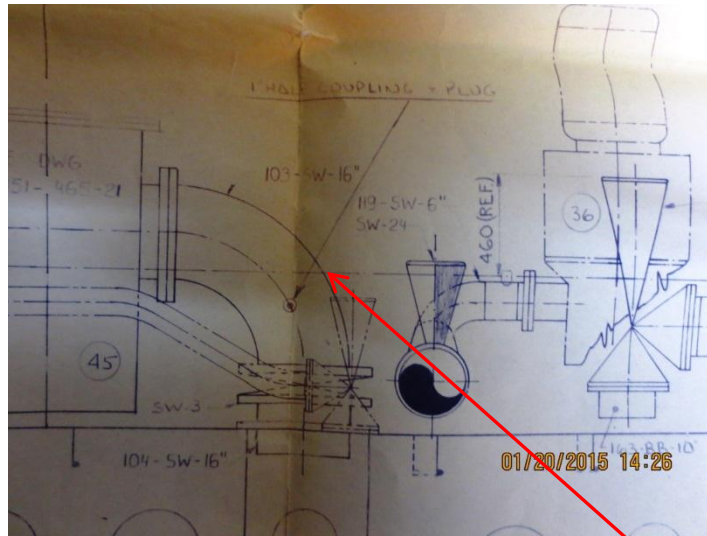


Port side pipe renewals



Starboard side pipe renewals

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Sea strainer to sea bay inlet pipe renewals (Port & Stbd)

The pipe ID numbers are;

- HD-8B.2.1. > 102 SW 16/12 Combo of 16 inch and 12 inch pipe
- HD-8B.2.2. > 103 SW 16 90 degree elbow
- HD-8B.2.3. > 107 SW 16/12 Combo of 16 inch and 12 inch pipe
- HD-8B.2.4. > 108 SW 16 90 degree elbow
- HD-8B.2.5. > 159 SW 12 90 degree elbow

Materials required for estimating;

- HD-8B.2.6. > Approximately 3.5 meters of 16 inches pipe schedule extra strong
- HD-8B.2.7. > Approximately 1.5 meters of 12 inches pipe schedule extra strong
- HD-8B.2.8. > 2 x 16 inch 90 degree elbows with flanges schedule extra strong
- HD-8B.2.9. > 1 x 12 inch 90 degree elbow with flanges schedule extra strong
- HD-8B.2.10. > 4 x 16 inch butt welded flanges
- HD-8B.2.11. > 2 x 16 inch slip on welded flanges
- HD-8B.2.12. > 2 x 1 inch NPT threaded connection female coupling halves schedule extra strong (port connection for recirculation valve controllers)

HD-8B.3.

Contractor shall quote on fabricate 5 pipe sections, made of E.R.W schedule extra strong, Black steel ASTM –A53 Grade B pipe material.

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HD-8B.4.

Contractor shall fit butt welded flanges (heavy wall) at the butterfly valve connections where possible. At the flange to flange connections, slip on flanges shall be accepted. Contractor shall ensure the butterfly valve wafer can successfully rotate into the opening of the butt welded flange. Contractor shall assume that some machining of the bore of the butt welded flange shall be required. For estimate purposes, Contractor shall allow for 20 hour of machining and fitting in overall bid.

The 90 degree elbows fitted at the sea strainer to sea bay will require a 1 inch NPT extra coupling halves fitted to allow fitting of a temperature probe port.

All pipe components shall be hot dip galvanised after welding, fabrication and successful fitting. Contractor shall note that pipe material and fittings manufactured in China are not acceptable.

HD-8B.5.

New gaskets shall be fitted at all flange connections, similar to the as found fitted gasket material.

HD-8B.6.

Paint shall be applied to the external section: of the spool pipes

HD-8B.6.1. > 2 coats of primer paint, Interprime 539 (Grey). Coatings shall be applied to yield 30 microns dry

HD-8B.6.2. > 2 top coats of CLB000/1 Interlac 665 Fire Retardant White, International Paint. Coatings shall be applied to yield 3.2 mils dry

HD-8B.7.

Pipe sections shall be tested during the hydrostatic testing performed under HD-8A.13

HD-8B.8.

Upon completion of all work, Contractor shall remove all equipment, dirt, debris, materials, etc. All items that were disturbed in order to carry out this work shall be reinstalled and connected in good order. The spaces shall be left in a clean and tidy condition.

HD-8B.9.

All work shall be to the satisfaction of the CGTA.

HD-9 RENEWAL OF ANODES IN SEACHESTS

The intent of this specification item is to renew the seachest anodes.

Table HD-9.1

Seachest anodes	Copper anodes	5340-21-TAP-1576
Seachest anodes	Aluminum anodes	5340-21-TAP-1575

HD-9.1

In conjunction with HD-8 SEACHESTS AND SEABAY SEACHESTS (SURVEY), the existing marine growth and corrosion control anodes shall be inspected by the CGTA and FSR. A total of 8 anodes shall be inspected. This work shall be completed in conjunction with HD-10, HULL CATHODIC PROTECTION ANODES. Note that the same FSR shall be required for both jobs.



HD-9.2

Prior to commencing any work, Contractor shall tag and lock out the anode supply as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

HD-9.3

CGTA will indicate the location of the anodes and provide any relevant drawings.

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HD-9.4

Contractor shall check the 8 anode cables for continuity. If a megger is used, Contractor shall ensure that the cables are isolated from the electronic controls. The ship's Electrical Officer will assist in the location of the various components.

HD-9.5

Contractor shall quote a cost to install all 8 anodes, with a unit cost per anode renewal. This quote shall form part of the overall bid. Adjustments to the total number of renewed anodes shall be through PWGSC 1379 action.

HD-9.6

Anodes shall be GSM, supplied as per Table HD-10.1. Note: There are 2 types of anodes, i.e. 4 of each type for a total of 8. Each anode shall be renewed with its corresponding type of anode

HD-9.7

Upon completion of anode renewal, the anode connection box caps shall be filled with a non-conductive grease to prevent the ingress of water.

HD-9.8

All work shall be completed to the satisfaction of the CGTA.

HD-9.9

Contractor shall obtain the services of a Cathelco Field Service Representative to oversee this job as well as the hull anodes. Contractor shall schedule the contracted work so that the FSR is available for both jobs and thereby avoid multiple visits. In the overall quote, Contractor shall provide all equipment, hardware, personnel, etc to carry out the required work under the direction and guidance of the FSR.

Contractor shall include an allowance of \$10,000 to cover expenses of a Cathelco FSR. The FSR shall be reimbursed for services, authorized travel and living expenses reasonably and properly incurred in the performance of the work, at cost without any allowance for the overhead or profit.. The Allowance shall form part of the overall bid and shall be adjusted through PWGSC 1379 action upon proof of final invoice.

Suggested FSR:

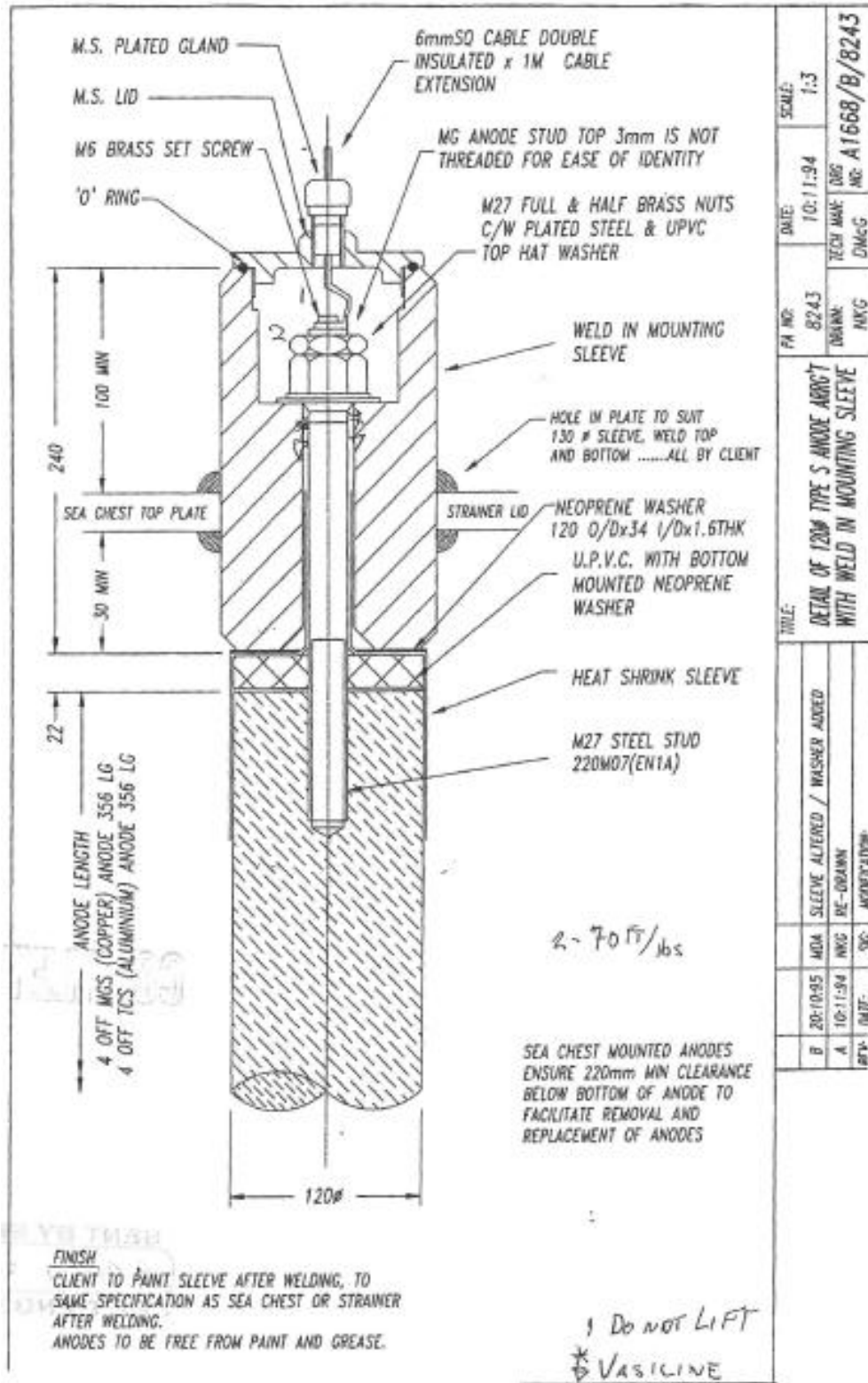
Jastram Technologies

214 Wright Ave.

Dartmouth, NS Tel: (902) 468-6450

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Antifouling Anode Drawing



HD-9 RENEWAL OF ANODES IN SEACHESTS

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HD-10 HULL CATHODIC PROTECTION ANODES

The intent of this specification item is to carry out an inspection on the hull impressed current cathodic protection anodes and to renew any defective anodes..

Table HD-10.1 Anodes

Hull Cathodic Protection	Anodes	5340-21-TAK-1727	Ea. 4
Hull Cathodic Protection	Junction box sleeves for hull anodes	2040-21-TAP-0909	Ea. 4
Hull Cathodic Protection	Electrodes (Reference Cells)	2040-21-TAH-1560	Ea. 2
Hull Cathodic Protection	Gland Set	2040-AM-CDS-5025	Ea. 6

HD-10.1

This work shall be carried out in conjunction with HD-14 HULL CLEANING AND PAINTING. Contractor shall obtain the services of a Corintec Impressed Current Cathodic Protection Field Service Representative to oversee this job as well concurrently with specification item HD-9 RENEWAL OF ANODES IN SEACHESTS. Contractor shall schedule the contracted work so that the FSR is available for both jobs and thereby avoid multiple visits. In the overall quote, Contractor shall provide all equipment, hardware, personnel, etc. to carry out the required work under the direction and guidance of the FSR.

The FSR allowance for this item shall be part of, included in, the allotment included in Specification Item HD-9 RENEWAL OF ANODES IN SEACHESTS. The FSR shall be reimbursed for services, authorized travel and living expenses reasonably and properly incurred in the performance of the work, at cost without any allowance for the overhead or profit. The Allowance shall form part of the overall bid and shall be adjusted though PWGSC 1379 action upon proof of final invoice.

Suggested FSR:
Jastram Technologies
214 Wright Ave.
Dartmouth, NS
902-468-6450.

HD-10.2

There are a total of 4 anodes on the hull of the vessel. These anodes are located at frames 31, port and starboard sides, and at frame 106, port and starboard sides. The 2 aft hull connection boxes are found in the Motor Room, at the aft end of the space. The 2 forward hull connection boxes are located inside the port and starboard void spaces between frames 106-117.

In order to gain access to the 2 forward hull connection boxes, Contractor shall first remove the tank access to port and starboard void spaces located between frames 117-126. Once this space has been certified "Safe for Entry", then the tank access cover for voids 106-117 can be accessed and removed.

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Contractor shall ventilate each void tank by providing mechanical ventilation to all areas of the tank. Each void tank is to be gas freed, and certified as gas free, safe for personnel to enter and work. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the tank and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each tank. Spaces shall be tested each day that personnel are required entry in the tanks. Please note DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES.

Contractor shall install the manhole covers with new gaskets fabricated from ¼ inch neoprene material.

Note: All void spaces shall be inspected by CGTA prior to closing up.

Contractor shall reinstall the manhole covers on completion of all work, ensuring that the gasket is in good condition.



Table HD-10.2 Anode Location

3L036	Void Space, port	Fr 106-117	#12, via #37 in Cargo Hold, port side
3L037	Void Space, stbd	Fr 106-117	#11, via #38 in Cargo Hold, stbd side
3L048	Void Space, port	Fr 117-126	#37, Port side of Cargo Hold
3L038	Void, Space, stbd	Fr 117-126	#38, Stbd side of Cargo Hold

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HD-10.3

Reference electrodes, two (2) in number located on the exterior of the hull. Recessed reference electrode assemblies are located Port and Starboard at the turn of bilge, frames 69-70. The hull connection boxes are found in the Purifier Room and the Cyclo- Converter Room. Contractor shall remove the filing cabinet in the Cyclo- Converter Room to access the connection box. Contractor shall reinstall the filing cabinet in good order upon completion of all work.

Contractor, FSR and CGTA shall inspect the two (2) JT-091248A-5 Zinc "Polo" reference electrodes. These reference anodes shall be renewed only if required.

HD-10.4

All repairs shall be through PWGSC 1379 action.

HD-10.5

Corrintec Impressed Current Cathodic Protection

Project #:	M10788-450/451
Manufacturer:	Corrintec/UK Limited
Phone:	(0962) 69622
Fax No:	(0962) 66628

HD-10.6

The ship's Electrical Officer will identify the power supply for the Cathodic Protection system to Contractor. Prior to commencing any work, Contractor shall tag and lock out the anode supply as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

HD-10.7

Contractor shall remove the covers from the anode connection boxes. The anode connection boxes shall be opened up for inspection only.

HD-10.8

The four hull anodes shall be inspected for defects. Contractor shall use staging for this inspection. Contractor shall erect and remove staging as required for all inspections.

HD-10.9

All work shall be performed as per manufacturer's specifications and recommendations.

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HD-10.10

Contractor shall quote the unit cost per anode and reference cell renewal. This quote shall form part of the bid. New anodes & reference cells shall be GSM. The quote shall include grit blasting the hull area under the anode to a bare steel condition of **(SSPC-SP10)/NACE No. 2(Sa 2-1/2) near white metal standards**. Note: Anodes shall be embedded in a coat of Devcon 140, contractor supply. Filler shall be built up to at least a 3 mm thickness at Anode encapsulation edges, and feathered in to the Inerta 160 / Intershield 300 coating. New studs shall be fitted for installation of the Anodes; cost shall be negotiated through PWGSC 1379 action.

The manufacturer has indicated that there is no requirement to use "Capastic" anymore.

HD-10.11

The Cathodic Protection system shall be calibrated and functionally tested once all work has been completed and the ship is floating in the water.

HD-10.12

Specific system information shall be made available to Contractor. Three (3) copies of the calibration test results in a type written report shall be provided to the CGTA upon completion of all work.

HD-10.13

On Completion of inspections, a sufficient quantity of Corroshield Epoxy Mastic (Devcon 140) shall be mixed and used to fill and fair any cavities in way of anode/electrode mounting studs or around the outer perimeter edges of their recessed housings. Cost for this requirement shall be negotiated through PWGSC 1379 action

HD-10.14

Care shall be exercised throughout the inspection, repairs and painting to ensure that anode elements and reference electrodes are not damaged or contaminated. Under no circumstances shall paint solvents be applied to anodes.

HD-11 BOWTHRUSTER OIL CHANGE

The intent of this specification item is to change the oil on the Bow Thruster Propeller Gearbox while the vessel is on dock.

Thruster Data:

Manufacturer:	Ulstein
Model:	900TT
Type:	Tunnel Thruster
Oil type:	Petrocanada Traxon XL 75W90
Oil quantity:	300 litres

HD-11.1

Contractor shall erect and remove the necessary staging to access the bow thruster tunnel guard. The guard shall be cleanly cut away to allow access to the drain plugs on the thruster propeller gear box.

HD-11.2

Contractor shall remove the drain plugs and collect a sample of oil in a clean new container for oil analysis purposes. The samples shall be passed on to the CGTA. The remainder of the oil shall be drained and collected by Contractor for disposal as per local environmental requirements. Copies of invoices detailing disposal of the oil shall be given to the CGTA.

HD-11.3

Contractor shall open up the header tank located in the Foc'sle. The tank shall be wiped clean of all dirt and sludge. Contractor shall verify during the draining of the system that the level switch activates and sets off the alarm in the ECR. Upon completion of all work, the tank cover shall be installed by Contractor using new gasket material and the drain plugs shall be installed using new O-rings. The system shall be filled via the header tank, and purged of air, with new CFM oil. Oil Used is Petro Canada Traxon XL 75W90. Approximately 225 litres of oil is required

HD-11.4

Contractor shall install the three (3) GSM zinc anodes in the Bow Thruster Tunnel.

HD-11.5

The tunnel guard shall be installed and prepared for painting in conjunction with HD-14 HULL CLEANING AND PAINTING.

HD-12 SEA VALVE CONNECTIONS (SURVEY)

The intent of this specification item is to open up the attached list of valves and their associated steam de-icing valves for cleaning, inspection and maintenance as per the quadrennial survey required by TCMSS.

Note:

All valves and associated items shall be removed ashore to Contractor's workshop. Valves shall not be worked on in situ except for installation and removal work.

HD-12.1

All valves and associated steam valves, where applicable, prior to commencement of work shall be suitably tagged such that they may be reinstalled in their original respective locations.

HD-12.2

Contractor shall remove all overboard valves listed (including bodies), as well as their respective steam clean out valves. Spindles shall be removed from the valve bonnets, cleaned and laid out for inspection. The internals of the valve bodies, valves, and sealing surfaces shall be cleaned thoroughly.

HD-12.3

All butterfly valves shall have their respective operating gearbox removed, opened, disassembled, cleaned, and inspected. Each gearbox shall be identified to prevent inadvertent swapping with other units. All motion components shall be proven free and operational. Upon completion of all work, each gearbox shall be reassembled in good order and installed on its original respective valve spindle. Each gearbox shall be lubricated and repacked with CFM grease. A new cover gasket shall be supplied and installed by Contractor.

HD-12.4

Metal to metal seated valves shall be lapped to provide a watertight seal. Contractor shall provide a bench test method to insure that a watertight seal is maintained between the valve and valve seat. .

HD-12.5

Upon completion of all work and satisfactory testing, all valves shall be assembled with new gland packing, applicable to the valves service environment. Each valve shall be installed in its original respective location aboard the vessel, using new jointing applicable to the valves service conditions.

HD-12.6

All work shall be to the satisfaction of the CGTA and TCMSS Surveyor.

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HD-12.7

Table HD-12.1 List of sea connection valves:

Port Sea Chest	
4 inch screw lift valve	Air vent high chest
4 inch angle screw lift valve	Air vent low chest
¾ inch screw lift valve	Air injection high chest
¾ inch angle screw lift	Steam injection high chest
¾ inch angle screw lift	Steam injection low chest
10 inch butterfly valve	Recirculating high chest
10 inch butterfly valve	Recirculating low chest
16 inch butterfly valve	Sea inlet high chest
16 inch butterfly valve	Sea inlet low chest
Starboard Sea Chest	
4 inch screw lift valve	Air vent high chest
4 inch angle screw lift valve	Air vent low chest
¾ inch screw lift valve	Air injection high chest
¾ inch angle screw lift	Steam injection high chest
¾ inch angle screw lift	Steam injection low chest
10 inch butterfly valve	Recirculating high chest
10 inch butterfly valve	Recirculating low chest
16 inch butterfly valve	Sea inlet high chest
16 inch butterfly valve	Sea inlet low chest
Starboard Stern Tube	
1-1/2 inch screw lift valve	Stern tube water delivery valve
Distiller Sea Chest	
4 inch angle screw lift valve	Air vent
4 inch angle screw lift valve	Nirex distiller suction
2-1/2 inch angle screw lift valve	R/O unit suction
½ inch SDNR globe	Steam injection
Aft Sea Chest (Motor Room)	
4 inch angle screw lift valve	Air vent
4 inch angle screw lift valve	Submersible fire pump
2-1/2 inch angle screw lift valve	Stern tube pump
¾ inch angle screw lift valve	Steam injection
Sea Bay	
16 inch butterfly valve	Sea inlet port
16 inch butterfly valve	Sea inlet starboard.
4 inch angle screw lift valve	Air vent port
4 inch angle screw lift valve	Air vent starboard
5 inch angle screw lift valve	Fire pump suction
3 inch angle screw lift valve	Stern tube/RO/Aux gen suction
8 inch angle screw lift valve	Foam pump
10 inch Butterfly Valve	Sea Water Pumps Fwd Strainer In
10 inch Butterfly Valve	Sea Water Pumps Fwd Strainer Out
10 inch Butterfly Valve	Sea Water Pumps Aft strainer In
10 inch Butterfly Valve	Sea Water Pumps Aft strainer Out
10 inch butterfly valve	#1 seawater pump
10 inch butterfly valve	#2 seawater pump
10 inch butterfly valve	#3 seawater pump
4 inch angle screw lift valve	Ballast pumps

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TCMSS Sea Connection Field Numbers

HD-12.8.1.)	3LL110-01	Port & starboard sea chest engine room. Seabay inlet valves. 2 valves x 16 inch butterfly valves sea chest low inlet.
HD-12.8.2.)	3LL110-02	Port & starboard sea chest engine room Sea chest vents. 4 valves x 4 inch screw lift globe valves.
HD-12.8.3.)	3LL110-03	Port & starboard sea chest engine room. Sea chest recirculating valves. 4 valves x 16 inch butterfly valves
HD-12.8.4.)	3LL110-04	Port side Motor Room sea chest. Submersible fire pump suction. 1 valve x 4 inch angle SDNR globe valve.
HD-12.8.5.)	3LL110-05	Sea chest Motor Room port side. Sterntube pump suction. 2 valves x 2 inch angle SDNR globe valves.
HD-12.8.6.)	3LL110-06	Sea bay engine room starboard side. Fire & General Service pump suction. 1 valve x 4 inch SDNR globe valve.
HD-12.8.7.)	3LL110-07	Fr 168-169 Foc'sle starboard side. Deck bilge pump overboard discharge. 1 valve x 2 inch SDNR globe valve.
HD-12.8.8.)	3LL110-08	Fr 20-21 Sewage room, port side. Media tank wet well pump overboard discharge. 1 valve x 3 inch SDNR globe valve.
HD-12.8.9.)	3LL110-09	Fr 32-33 Port side Motor Room. Oily Water Separator overboard discharge. 1 valve x 2 inch SDNR globe valve.
HD-12.8.10.)	3LL110-10	Fr 42-43 Port side Motor Room. Submersible fire pump overboard discharge. 1 valve x 4 inch non-return, pneumatically operated valve.
HD-12.8.11.)	3LL110-11	Fr 72-73 Port side engine room. Boiler blow down skin valve. 1 valve x 2 inch gate valve.

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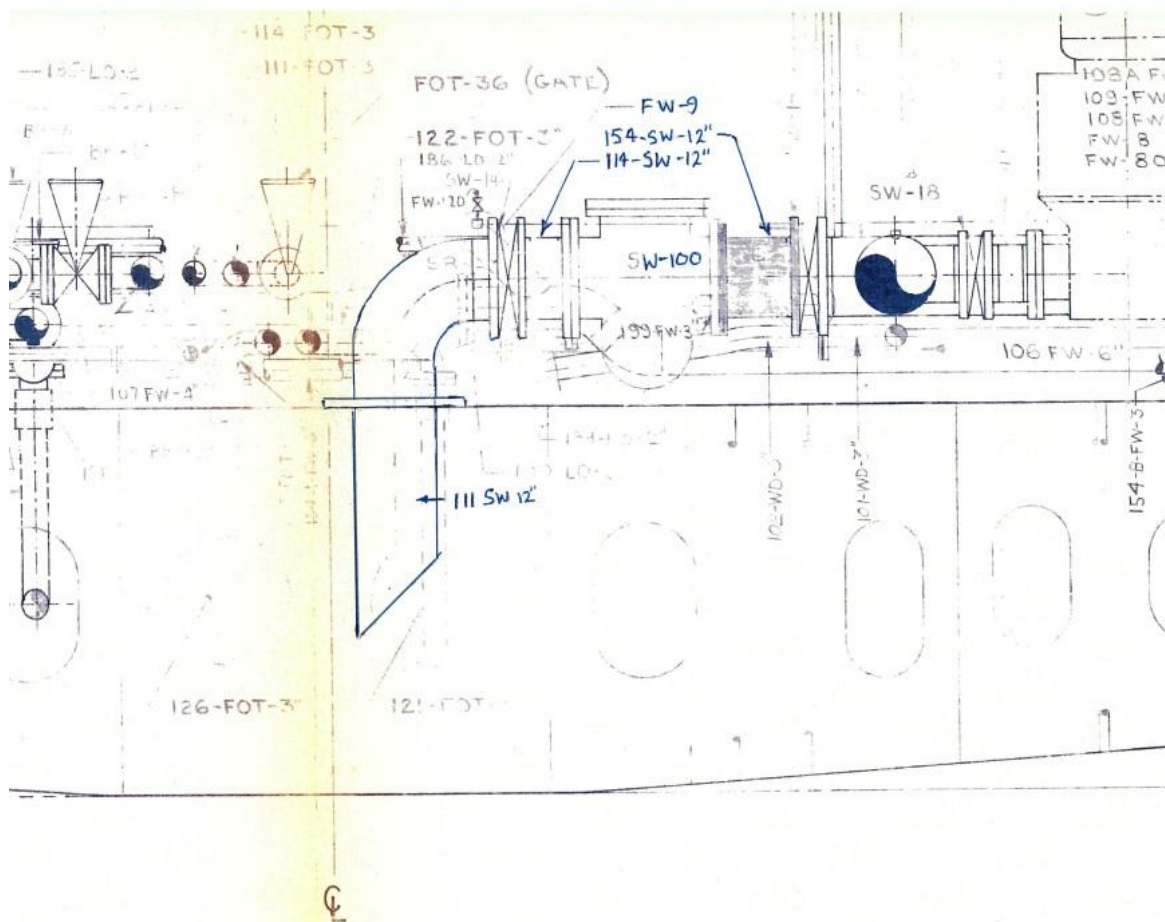
HD-12.8.12.)	3L110-12	Port side of engine room. Central cooler sea water overboard valve. 1 valve x 10 inch SDNR globe valve.
HD-12.8.13.)	3LL110-13	Fr 72-73 Starboard side of engine room. Auxiliary generator emergency sea water cooling overboard discharge valve. 1 valve x 4 inch SDNR globe valve.
HD-12.8.14.)	3LL110-14	Fr 81-82 Starboard side of engine room. Nirex distiller sea water overboard discharge valve. 1 valve x 4 inch SDNR globe valve.
HD-12.8.15.)	3LL110-15	Fr 91-92 Starboard side of engine room. Matrix RO unit sea water overboard discharge valve. 1 valve x 3 inch SDNR globe valve.
HD-12.8.16.)	3LL110-1	Fr 93-94 Starboard side of engine room. Foam Pump sea water overboard discharge valve. 1 valve x 3 inch SDNR globe valve.
HD-12.8.17.)	3LL110-1	Fr 96-97 Port side of engine room. Aft bilge & ballast pump overboard discharge valve. 1 valve x 4 inch SDNR globe valve.
HD-12.8.18.)	3LL110-18	Fr 98-99 Port side of engine room. Forward bilge & ballast pump overboard discharge valve. 1 valve x 4 inch SDNR globe valve.
HD-12.8.19.)	3LL110-19	Fr 104-105 Starboard side of engine room. Fire & General service pump overboard discharge valve. 1 valve x 3 inch SDNR globe valve.
HD-12.8.20.)	3LL110-20	Fr 3-4 Starboard side of Steering Compartment. Deck bilge pump overboard discharge valve. 1 valve x 2 inch SDNR globe valve.

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HD-12A SEA VALVE SPOOL PIPES

HD-12A.1

Various sea water spool pipes may need to be renewed. Contractor shall quote on renewing a number of spool pipe sections such as item 114-SW -12" on drawing 977-80 11/45 (section of the drawing is displayed below).

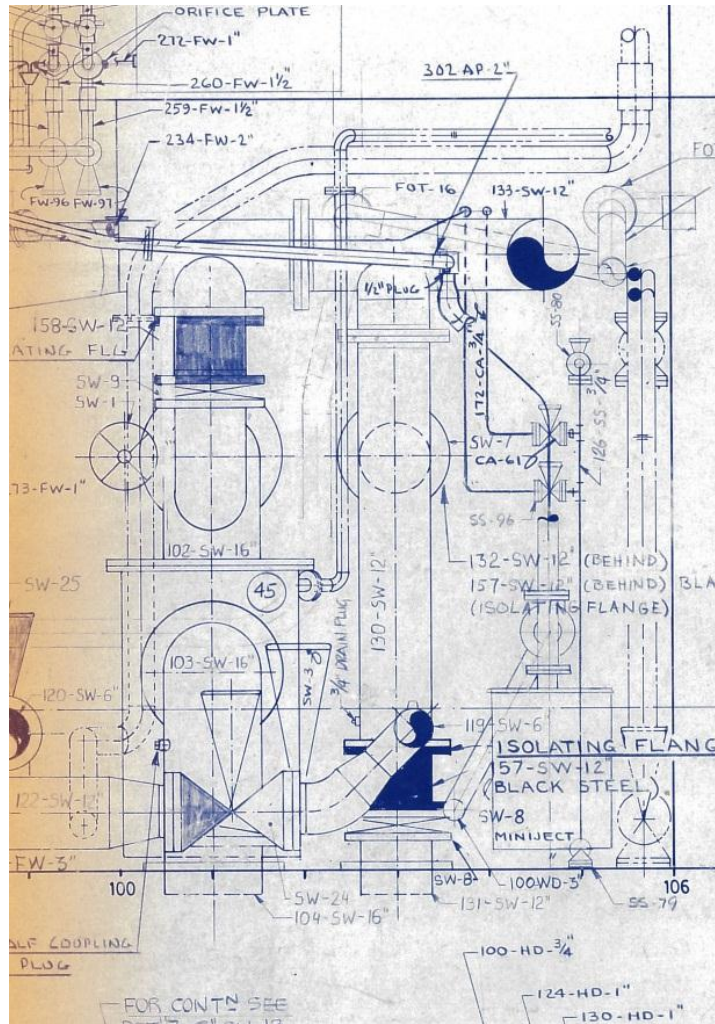


SECTION AT FR. 100 LKG AFT

Also shown on the following excerpt from drawing 977-80 4/45.

Items 157-SW-12" and 158-SW-12"

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HD-12A.2

Contractor shall quote on fabricating 10 spool pipes made of E.R.W schedule extra strong, Black steel ASTM –A53 Grade B pipe material. The quote shall be included in the overall bid and shall be negotiated up or down (credit) through PWGSC 1379 action.

HD-12A.3

Contractor shall assume on each spool that a butt welded flanges (heavy wall) shall be required at the butterfly valve connection. At the flange to flange connection, slip on flanges shall be accepted. The overall length of each spool pipe is estimated at 12 inches. Actual length shall be adjusted depending on which spool pipe actually requires renewal. The quote shall be included in the overall bid and shall be negotiated up or down (credit) through PWGSC 1379 action. All pipe components shall be hot dip galvanised after welding/fabrication. Note, pipe material and fittings manufactured in China are not acceptable.

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HD-12A.4

New gaskets shall be fitted at all flange connections, similar to the originally fitted gasket material.

HD-12A.5

Paint shall be applied to the external section: of the spool pipes;

HD-12A.5.1. > 2 coats of primer paint, Interprime 539 (yellow). Coatings shall be applied to yield 30 microns dry

HD-12A.5.2. > 2 top coats of CLB000/1 Interlac 665 Fire Retardant Grey, International Paint. Coatings shall be applied to yield 3.2 mils dry

HD-12A.6

Pipe sections shall be tested during the hydrostatic testing performed under HD-8A.13

HD-12A.7

Upon completion of all work, Contractor shall remove all equipment, dirt, debris, materials, etc. All items that were disturbed in order to carry out this work shall be reinstalled and connected in good order. The spaces shall be left in a clean and tidy condition.

HD-12A.8

All work shall be to the satisfaction of the CGTA.

HD-13 OVERBOARD DISCHARGE VALVES (SURVEY)

The intent of this specification item is to open up the attached list of valves and their associated steam and air de-icing valves for cleaning, inspection and maintenance as per the quadrennial survey required by TCMSS.

Note:

All valves and associated items shall be removed ashore to Contractor's workshop. Valves shall not be worked on in situ except for installation and removal work.

HD-13.1.

Prior to the commencement of any work, Contractor shall tag all valves and associated steam/air valves, where applicable, such that each valve may be reinstalled in its original respective location.

HD-13.2.

Contractor shall remove all the overboard valves listed (including bodies), as well as their respective clean out valves. Spindles shall be removed from the valve bonnets, cleaned and laid out for inspection. The internals of the valve bodies, valves, and sealing surfaces shall be cleaned thoroughly.

HD-13.3.

Metal to metal seated valves shall be lapped to provide a watertight seal. Contractor shall provide a bench test method to insure that a watertight seal is maintained between the valve and valve seat.

HD-13.4.

Upon completion of all work and satisfactory testing, all valves shall be assembled with new gland packing, applicable to the valve's service application. Each valve shall be installed in their original respective positions aboard the vessel, using new jointing applicable to the valve's service conditions. Note, rubber gasket material shall not be used on steam de-icing valves.

HD-13.5.

All work shall be to the satisfaction of the CGTA and TCMSS Surveyor.

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See below for the list of valves.

HD-13.6.

Identification of valves:

Table HD-13.1 List of Valves

Location	Description	Application	Steam Valve
Motor room, Frame 33, stbd	2 inch SDNR globe	OW separator	Yes
Motor room, Frame 43 stbd.	4 inch air driven SDNR	Sub fire pump	Yes
Engine room, Frame 73 port.	2 inch gate	Boiler blow down	No
Engine room, Frame 98, stbd.	4 inch SDNR globe	Fwd bilge Pump	Yes
Engine room Frame 96, stbd.	4 inch SDNR globe	Aft bilge pump	Yes
Engine room, Frame 87, port.	10 inch SDNR globe	Central cooler	No
Engine room, Frame 82, stbd.	4 inch SDNR globe	Nirex distiller	Yes
Engine room, Frame 93, stbd	3 inch SDNR globe	RO unit	Yes
Engine room, Frame 73, stbd.	4 inch SDNR globe	Aux. Gen.	Yes
Engine room, Frame 94, stbd	3 inch SDNR globe	Foam Pump	Yes
Engine room, Frame 105, stbd	3 inch SDNR globe	Fire & GS Pump	Yes
Sewage Room, Frame 21, stbd	3 inch SDNR globe	Sewage discharge	Yes
Bosun's Stores, Frame 169, stbd	2 inch SDNR globe	Fwd. Bilge pump	Yes
Steering Flat, Frame 4, stbd	2 inch SDNR globe	Aft Bilge pump	Yes

HD-14 HULL CLEANING AND PAINTING (VLE)

The intent of this specification item is to clean the entire hull, repair any defective paintwork, and paint the entire ship's hull to the top of the bulwarks, including the fishplate apron surrounding the helicopter deck aft. Contractor shall supply all coatings, paints, equipment, and hardware necessary for the cleaning and painting of the underwater and above water areas of the hull.

HD-14.1

The vessels underwater hull area shall be cleaned of all growth. The existing low friction coating shall be repaired and/or renewed utilizing International Marine Coatings.

HD-14.2

Contractor shall prepare the underwater hull and apply the coating system in accordance with the manufacturer's recommendations. In conjunction with any functional Q & A procedure, the following points shall be carried out:

- HD-14.2.1. > Provide a list of batch numbers with correspondent dates of manufacture.
- HD-14.2.2. > Record the quantity and type of any solvent added.
- HD-14.2.3. > Measure and record the ambient conditions.
- HD-14.2.4. > Record details of spray tips and pressures.
- HD-14.2.5. > WFT gauge readings shall be taken on a regular basis during application.
- HD-14.2.6. > Using a calibrated DFT gauge, fifteen (15) measurements per 100 square ft. shall be taken and recorded. Upon agreement of consistency with the CGTA, fifteen (15) measurements per 1000 square ft. shall be taken and recorded.

HD-14.3

All recorded information shall be typewritten and three (3) copies given to the CGTA.

HD-14.4

All hull mounted equipment and appliances such as the 4 anodes, 2 reference cathodes, 2 echo sounder plates, and the speed log shall be effectively covered and sealed using thin masonite or equivalent to protect these items from damage during all phases of hull preparation and coating. Greases and mastic type compounds shall not be used. All protective coverings shall be removed upon completion of all work.

HD-14.5

Contractor shall hydro blast the entire hull area, including areas above the water line up to the top of all bulwarks. This shall include rudders, propellers and the thruster tube. Hydro blasting shall be done at 10,000 psi minimum. All marine growth, salts, and surface contaminants shall be removed. This work shall be done as soon as possible after docking the vessel.

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NOTE: The amount of marine growth on the underwater hull has been quite heavy in recent years. Contractor shall quote on what would be considered a “heavy” marine growth.

HD-14.6

The CGTA and TCMSS Surveyor shall then inspect the entire hull for defects and deficiencies.

HD-14.7

Contractor shall take precautions to ensure that no damage, unnecessary cleaning, or repairs shall occur from abrasive blasting and/or the application of coatings.

HD-14.8

Grit used for blasting shall not be allowed to enter any part of the vessel or its exposed equipment, and where such ingress may occur, the equipment shall be suitably protected.

HD-14.9

Prior to grit blasting the hull, Contractor shall temporarily mark the original location of each hull symbol so that the GSM decals can be applied, upon completion of all work, as per their subsequent original locations.

HD-14.10

Contractor shall plug deck scuppers and discharges as well as taking other measures necessary to prevent any liquids from contaminating areas being prepared or coated. Contractor shall ensure that every opening into the vessel where grit can gain entry is suitably covered.

HD-14.11

Measures shall be taken to ensure that surfaces and equipment other than those specified are not coated and that any inlets or discharges will not be blocked by the coating or grit. Contractor is responsible for removing any over spray on the vessel as a result of this work. Deck machinery and other gear, susceptible to damage by grit or coating material is also shall be protected as necessary.

HD-14.12

Contractor shall also quote a unit price per square foot for abrasive blasting for adjustment purposes. Adjustment shall be negotiated through PWGSC 1379 action.

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HD-14.13

Areas of obvious concern include but are not limited to:

- HD-14.13.1. > stern tubes
- HD-14.13.2. > sea bay and chests
- HD-14.13.3. > overboard discharge valves
- HD-14.13.4. > machinery spaces
- HD-14.13.5. > funnel outlets
- HD-14.13.6. > searchlights
- HD-14.13.7. > navigation equipment
- HD-14.13.8. > air intake plenums and air intake and exhaust trunking;
- HD-14.13.9. > accommodations air intake and exhaust plenums and trunking
- HD-14.13.10. > barge, lifeboat, FRC
- HD-14.13.11. > deck machinery including crane and winches
- HD-14.13.12. > exposed steel wires for davits, winches, etc.
- HD-14.13.13. > rudder trunk void

HD-14.14

Sea bay grids shall be protected during application of all coatings. Orifice diameters shall be verified as original before undocking (i.e. not blocked or reduced). Scuppers and overboard discharges in use shall be fitted with extension tubes to prevent liquid run off onto the ship's hull while coatings are curing.

BELOW WATERLINE AREAS

HD-14.15

The ship's underwater hull area is approximately 1700 square meters.

HD-14.16

All shell areas containing loose paint and/or bared steel shall be dry abrasive blasted to bare steel condition. Corroded and damaged areas spot grit blast to SA2 STD and remaining all areas full grit blast to SA1. Apply the coating material before visible oxidation occurs. If oxidation does occur, the entire oxidised surface shall be re-blasted to the standard specified above. Contractor shall bid on abrasive blasting, to the above noted standard, 50% of the underwater hull surface (approximately 850 square meters). Contractor shall quote on a unit price per square meter for adjustment purposes. All coating edges shall be feathered back a minimum of 300mm. The hull shall be swept clean of all traces of grit with compressed air. The surface profile shall have a minimum roughness of 2 mils.

HD-14.17

The underwater hull, in the area of damage, shall be sand swept to a condition of **SSPL-SP7** standards having a minimum profile of 2 mils in preparation for application of the new hull coatings

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HD-14.18

The whole underwater area of the ship's hull and the rudder is presently coated with an International Intershield 300 coating. The new coating shall be Intershield 163 Inerta 160. Contractor shall consult with and adhere to the manufacturer's recommendations for preparing the existing hull coating, bare spots and applying the new coating.

Following completion of the touch up coatings, the entire underwater hull area shall be given 1 full coat of Intershield 163 Inerta 160.

New coating is as follows:

Table HD-14.1 New Underwater Hull Coatings

Product	Sales Code	Colour	Coats	WFT Mils	Volume Solids (%)	DFT Mils
Intershield 163 Inerta 160	ERA162/A	Red	50% TU	21.1	95	20
Intershield 163 Inerta 160	ERA162/A	Red	FC	10.5	95	10
				31.6		30

Table HD-14.2 Previous Underwater Hull Coatings

Product	Sales Code	Colour	Coats	WFT Mils	Volume Solids (%)	DFT Mils
Intershield 300	ENA301/A	Aluminum	50% TU	8.3	60	5.0
Intershield 300	ENA300/A	Bronze	FC	8.3	60	5.0
Intershield 803	EGA807/A	Grey	FC	8.0	75	6.0
Intershield 803	EGA808/A	Red	FC	8.0	75	6.0
				32.6		22.0

ABOVE WATERLINE AREAS

The ship's above water area is approximately 750 square meters.

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HD-14.19

All paint system damage areas above the waterline and up to the top of the bulwarks, including the anchor pockets, shall be abrasive blasted to a condition of **(SSPC-SP10)/NACE No. 2(Sa 2-1/2) near white metal**. This shall include the fishplate apron around the helicopter deck, from Frame 90 Port, around the stern area of the vessel, to Frame 90 on the starboard side. Con

tractor shall remove the helicopter deck net and stanchions. Contractor shall fit temporary stanchions to helicopter deck and fit rope to protect yard/ship personnel from falling overboard. Contractor shall grit blast and paint all of the stanchions as per upper hull painting scheme. Upon completion of all work, all painted stanchions and associated net shall be fitted to the ship, using new stainless steel fasteners. The fishplate apron is 22 inches wide x 120 feet long for an approximate area of 75 square meters. The hull shall be swept clean of all traces of grit with compressed air. Contractor shall provide a unit price for adjustment purposes. The quote shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action.

HD-14.20

The entire hull area from the water line to the top of the bulwarks as well as the fishplate apron described in HD-14.20 shall be sand swept to **SSPL-SP7** standards having a minimum profile of 2 mils in preparation for application of coatings as follows:

Table HD-14.3 Coatings

Product	Sales Code	Colour	Coats	WFT Mils	Volume Solids (%)	DFT Mils
*Intershiel 300	ENA301/A	Aluminum	FC	8.3	60	5.0
Intershiel 300	ENA300/A	Bronze	FC	8.3	60	5.0
Intershiel 803	EGA808/A	Red	FC	8.0	75	6.0
**Interthane 990 Interthane 990	PHA162/A PHA163/A	RAL3000	FC	3.5	57	2.0
		C.Guard Red RAL9003 White	FC	3.5	57	2.0
**Interthane 990 Interthane 990	PHA162/A PHA163/A	RAL3000	FC	3.5	57	2.0
		C.Guard Red RAL9003 White	FC	3.5	57	2.0
				31.6 / 23.3		20.0 / 15.0

* Apply 1 full coat up to and including the anchor pockets and angle it back to the well deck height and use the same system for the length of the well deck. Also apply the same process in way of the Miranda davit roller track

** Colour is dependent on location

HD-14.21

Contractor shall arrange for the services of a qualified installation technician to install the hull symbol decals.

Suggested company: 3M Trimline (supplier of GSM decals)

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HD-14.22

For bid purposes, Contractor shall allow \$3,000 for the services of a technician to install the GSM hull identification decals. Contractor shall supply all necessary craneage, manlifts, scaffolding, manpower, materials, etc. to permit the installation of the hull decals by the technician. Final cost of the technician's services shall be adjusted accordingly upon receipt of original invoice. Actual cost shall be adjusted up or down (credit), through PWGSC 1379 action.

HD-14.23

Contractor shall quote on painting the hull symbols on by hand. This quote shall form part of the overall bid. The CG Stripes, draft marks, load lines, thruster symbols, and all government symbols and icons shall be painted white using 2 full coats of the following products:

Table HD-14.4 Coatings

Product	Sales Code	Colour	Coats	WFT Mils	Volume Solids (%)	DFT Mils
Interthane 990	PHA163/A	RAL9003 White	FC	3.5	57	2.0
Interthane 990	PHA164/A	RAL9004 Black SG	FC	3.5	57	2.0

HD-14.24

Upon completion of all painting, Contractor shall take 40 paint thickness measurements (20 per side) in areas that were cleaned to bare steel prior to application of the coating. The measurements shall be recorded and marked on copies of the shell expansion drawing. Contractor shall be supplied with a shell expansion drawing for creating copies.

HD-14.25

All traces of grit used for blast cleaning shall be removed by Contractor. Contractor shall be responsible for ensuring that the hull is clear and clean prior to, during, and immediately after the coating application.

HD-14.26

Contractor shall remove all protective materials from the machinery, equipment and hull openings on completion of the coating work. All grit, dirt, debris, rust, scale, etc shall be removed from all decks and areas of accumulation and disposed of ashore by Contractor

HD-14.27

All staging, cranes, screens, lighting and any other support services, equipment, paint and materials necessary to carry out these specifications shall be CFM, installed, and removed upon completion of all work.

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HD-14.28

Suitable storage facilities shall be provided close to the work site by Contractor for the material and equipment, to ensure they shall be maintained at the recommended temperature of the coating manufacturer for ease of preparation and proper application.

HD-14.29

All coatings shall be applied in strict accordance with the manufacturer's instructions and recommendations.

HD-14.30

All work shall be completed to the satisfaction of the CGTA.

HD-15 PROPELLER AND TAILSHAFT (SURVEY)

The intent of this specification item is to remove the Starboard Propeller and Tailshaft for TCMSS.

Table HD-15.1 Propeller Data

Type	Propeller Superstone 70
Configuration	4 blades @ 2.825 mm pitch
Diameter	3600 mm
Weight	6775 kilograms

Table HD-15.2 Tail Shaft Data

Length overall	14.513 meters
Diameter	510 mm
Weight	24,644 kilograms

HD-15.1

It shall be noted that the Shaft Turning Gear shall be operated by the Vessels' Engineering Staff only.

HD-15.2

Contractor shall remove the Starboard propeller cone, rope guard, ring anode, and associated fasteners and locks. Contractor shall scribe proof marks on the propeller and tail shaft. The CGTA shall be shown the proof marks prior to moving the propeller. The propeller shall be removed to the dock floor.

HD-15.3

The propeller is held on with a Pilgrim nut. The CGTA shall supply special tools for the removal of the Pilgrim nut; Contractor shall return specialty tools to the CGTA after completion of work. Contractor shall supply all equipment and gear for lifting the propeller and shaft including any brackets, slings, etc. that may require fabrication for this work as well as all associated labour. The propeller and cone shall be thoroughly cleaned and examined for defects. CGTA and the TCMSS Surveyor shall witness the final installation of the propeller on the shaft to ensure that the propeller is properly aligned with the original proof marks and that the travel is equivalent. Contractor shall renew the propeller O-ring. Contractor shall procure 6 m x 15 mm diameter o-cord for the propeller as well as a sufficient supply of Loctite 404 to glue (bond) the ends.

HD-15.4

Instruction guide lines for the Pilgrim nut shall be supplied by the CGTA.

HD-15.5

Note: The drive ring travel shall never exceed ½ inch at a time to prevent permanent damage to the nitrile tyre.

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HD-15.6

Upon completion of all work, the propeller cone shall be filled with CFM preservative and fitted to the propeller. All securing nuts shall be locked in position as per original installation using stainless steel locking materials. Cone bolt recesses shall be filled with cement and faired flush with the cone surfaces.

HD-15.7

The tail shaft shall be let go at the shaft coupling, motor end. Coupling flanges, nuts, and fitted-bolts shall be proof marked to ensure subsequent replacement in their respective original positions. The turning gear and brake assembly located in the motor room on the shaft shall be removed to gain access to the pilgrim nut so as to permit shaft removal. The Pilgrim nut shall be removed and the coupling shall be jacked from the shaft. Contractor shall ensure the coupling and shaft are properly supported at all times. The shaft shall not be lifted or contacted in the resin coating area at any time.

HD-15.8

Contractor shall quote a unit price on chasing the threads on a fitted bolt and nut set.

HD-15.9

Contractor shall quote on a unit price of fabricating a fitted nut and bolt set.

HD-15.10

The John Crane mechanical stern tube seal (Magneseal Type MD) shall be disassembled / unsecured from the Sterntube (as per FSRs Instructions – HD-16) prior to the shaft removal to prevent damage to the seal components. All internal components shall be cleaned and checked for wear and defects as per the manufacturer's recommendations.

HD-15.11

Contractor shall measure the wear down at the aft end of the sterntube using feeler gauges. Once the John Crane Marine seal has been disassembled / unsecured from the Sterntube (as per FSRs Instructions – HD-16) at the forward end of the sterntube, Contractor shall take Sterntube ("Thorden" Full Form Tubes) wear down readings at various points using feeler gauges. These readings shall be recorded in the final report.

HD-15.12

Upon completion of all work and after the shaft has been installed, and prior to the installation of the seal, Contractor shall once again take readings at both ends of the sterntube and record these.

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HD-15.13

Upon completion of seal removal, the tail shaft shall be withdrawn and removed ashore to Contractor's shop. The shaft shall be properly supported at all times and not contacted in the shaft coating areas.

HD-15.14

Contractor shall open up the aft void space. The manhole cover is located in the steering flat on the deck. Contractor shall ensure that the space is certified safe for personnel to enter and for hot work being carried out. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the space and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each space. Spaces shall be tested each day that personnel are required entry in the tanks. Contractor shall weld lifting eyes as required on the hull of the ship to facilitate removal and installation of the shaft. A fire watch shall be placed in the aft void tank during all hot work operations. No hot work operations shall be carried out on the hull forward of frame 12. Upon completion of all work, the lifting eyes shall be removed, the hull ground flush, and all disturbed paint work shall be primed and coated as per HD-14 HULL CLEANING AND PAINTING.

HD-15.15

The shaft shall be thoroughly cleaned and checked for wear and defects. Particular attention shall be paid to the following areas:

- HD-15.15.1. > Forward and aft key ways on shaft tapers.
- HD-15.15.2. > Forward and aft shaft tapers
- HD-15.15.3. > Forward and aft ends of each of the two liners where they meet the tail shaft.
- HD-15.15.4. > Forward and aft pilgrim nuts and threads on shafting.
- HD-15.15.5. > Liner wear in way of staves and condition of staves.
- HD-15.15.6. > Forward end of fwd liner in way of John Crane Marine seal.
- HD-15.15.7. > Shaft resin coating between liners.

HD-15.16

Inspection of the key ways and shaft taper areas shall include crack detection inspection using dye penetrant. Contractor shall ensure that the dye penetrant test is conducted by a certified NDT technician. All testing materials shall be supplied by Contractor. Inspection of the shaft resin coating shall consist of thoroughly cleaning the resin coating but not to include any cutting, peeling, or otherwise disturbing the coating in situ.

HD-15.17

Contractor shall conduct a Hi-Pot Test (Holiday Pore Test), work to be performed by a certified technician on the tail shaft to ensure that the resin coating is sound.

[HD-15 PROPELLER AND TAILSHAFT \(SURVEY\)](#)

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HD-15.18

Contractor's bid shall include an allowance of \$10,000.00 for the complete renewal of the shaft resin coating. The allowance shall form part of the overall bid. The actual cost for replacing the coating shall be adjusted up or down upon proof of invoice using PWGSC 1379 action. Philadelphia Resin (Phillyclad) 1775/620TS is recommended as a suitable wrap. The quote shall include the cost of an additional Hi-Pot test on the new wrap to demonstrate its integrity.

HD-15.19

Contractor shall quote separately a cost for the tail shaft to be set in a lathe and checked for trueness. In this event, Contractor shall supply 4 type written copies of the run out readings on the shaft and a drawing showing the extent of grooving on the shaft. When the shaft is set up in the lathe, the lathe steady shall not be located so as to interfere with the shaft surface in way of the mechanical seal. Every effort shall be made to prevent the lathe steady from grooving the shaft. The quote shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action.

HD-15.20

Contractor shall allow a \$5,000 allowance for dressing both shaft keys as well as the corresponding keyways in the propeller and the forward coupling. This shall include the polishing of the forward coupling bores. Magnaflux testing shall be carried out on each of the keyways as part of the allowance. The allowance shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action.

HD-15.21

Both inner and outer sterntube "Thordon" full form tubes shall be cleaned and inspected for wear and defects. Internal measurements shall be taken at 4 positions over the length of the sterntube "Thordon" full form tubes. Contractor shall record the measurements in type written form and given to the CGTA.

HD-15.22

Contractor shall quote on machining two (2) GSM Thordon full form tubes to suit the shaft liners. This quote shall include machining the outside diameter on each tube as well as the bore to suit the corresponding shaft liner. Thordon tubes shall have a surface finish of 3.2 micro-metres Ra.

Contractor shall also broach/mill into the bore of each of the tubes, 18 water longitudinal channels per tube. Each tube shall have an annular groove at each end approximately the size and depth of the water grooves. Prior to machining, Contractor shall obtain the necessary specifications from the Thordon manufacturer, for dimensions to suit the shaft liners. The quote for this work shall be a separate quote from the overall bid and will not be required unless the "Thordon" full form tubes need to be renewed for some unknown reason.

[HD-15 PROPELLER AND TAILSHAFT \(SURVEY\)](#)
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HD-15.23

Cooling water lines to the stern tube shall be proven clear and water flow to the stern tube shall be proven adequate, not restricted.

HD-15.24

The stern tube area between the “Thordon” full form tubes shall be mechanically cleaned to an SSPC-SP-3 standard and coated with one coat of Amercoat 78 HB Coal Tar Epoxy. The coating shall be applied to yield 8 mils DFT. The stern tube area is approximately 5 meters long x 0.65 meters diameter. Both “Thordon” full form tubes shall be suitably protected during this work and the inner tube opening into the Motor Room shall be closed over to prevent the ingress of dirt and debris. All pits and holes in this area shall be suitably prepared and filled with Belzona or equivalent prior to painting.

HD-15.25

Contractor shall quote on supplying and applying 6 kilograms of Belzona compound to the stern tube.

HD-15.26

Upon completion of inspection and repairs, Contractor shall install the shafting, turning gear, brake, propeller, mechanical seal and couplings and propeller as per manufacturer's recommendations, in good running order and to satisfaction of the CGTA and attending TCMSS Surveyor.

HD-15.27

Contractor's bid shall include the cost for two separate fits of the propeller on the tail shaft. Contractor shall provide a quotation, separate from the overall bid, for the unit cost of each additional fit.

HD-15.28

Survey credits shall be obtained for each applicable item. The shafting system shall be test run under load for 1 hour after the vessel is afloat.

HD-15.29

Upon completion of shaft installation, Contractor shall take an additional set of stern tube clearances at the aft end of the stern tube. These clearances shall be recorded and given to the CGTA in report form.

HD-15.30

Contractor shall install GSM circular sacrificial zinc ring anodes on the aft end of the stern tube. Contractor shall measure and drill holes in the new anodes to correspond with the existing fastener holes on the aft end of the stern tube. Stainless steel fasteners complete with stainless locking wire shall be installed. Fasteners shall be locked in adjacent pairs only.

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Note: A set of jigs is available aboard the ship that can be used at Contractor's discretion for drilling matching bolt holes in each circular sacrificial zinc anode. Upon completion of all work, the jigs shall be returned to the CGTA.

HD-16 STERN TUBE SEALS

HD-16.1.

The Starboard Stern tube Seal assembly (JOHN CRANE MANESEAL TYPE MD) including base ring (bolted to bulkhead) shall be opened up for cleaning and inspection. This work shall be performed in conjunction with Specification Item HD-15, PROPELLER AND TAIL SHAFT (SURVEY).

Note: The Shaft Turning Gear shall be operated by the Vessels' Engineering Staff only.

HD-16.2.

Contractor shall allow \$20,000 for the services of a John Crane Marine Seal Field Service Representative (FSR) in their bid. Contractor shall make all necessary arrangements for acquiring the FSR's services. The FSR shall be reimbursed for the authorized travel and living expenses reasonably and properly incurred in the performance of the work, at cost without any allowance for the overhead or profit. The Allowance shall form part of the overall bid and shall be adjusted by PWGSC 1379 action upon proof of final invoice.

HD-16.3.

CGTA suggests the following company:

Wärtsilä Canada Inc.

Dartmouth, Nova Scotia,
Tel: 902.468.1264

or

St. John's, NL
Tel: 709.747.4600

HD-16.4.

Seal compression distance shall be measured prior to disassembly and removal of stern tube seals.

HD-16.5.

Contractor shall pressure test the inflatable seal prior to removal. Upon completion of all work, the seal shall again be tested to prove its integrity.

HD-16.6.

The Stern tube Seal shall not be dis-assembled on board the vessel by Contractor personnel. The Seal, as a complete unit, shall be removed from the shaft and transported to Contractor's shop. The FSR shall overhaul, as required, and the seal shall be re-installed on the shaft as a complete unit.

The FSR shall be present for the removal and re-installation of the Stern tube Seal on the shaft.

CCGS SIR WILLIAM ALEXANDER DRY DOCKING & REFIT 2015

HD-16.7.

Tail shaft and liner in way of the seal shall be polished to remove all traces of rust and salt.

HD-16.8.

CGTA will provide the following parts (if required) for renewal purposes:

HD-16.8.1. >	Split face seal inserts and sealing strips
HD-16.8.2. >	"O" Cord
HD-16.8.3. >	Bellows assembly
HD-16.8.4. >	Neoprene guard
HD-16.8.5. >	Pins

HD-16.9.

Contractor shall provide the CGTA with a type written copy of the final dimensions for the reassembled stern tube seals.

HD-16.10.

Contractor shall install the seal in good order as per the manufacturer's specification.

HD-16.11.

Clearances shall be taken and seals adjusted as per manufacturer's specifications.

HD-16.12.

Contractor shall quote on taking the brass seat to their facilities for machining to an RMS 32 finish (Ra 0.8 micro-meters). Machining shall be as per the manufacturer's recommendations.

HD-16.13.

Note: Should it be necessary to renew the seal, the new Government supplied material (GSM) seal components are "green" and will require machining to suit the shaft liner. Contractor shall include in their bid to carry out the necessary machining on the seal components to suit the shaft liner diameter.

HD-17 ANCHORS, CHAINS AND CHAIN LOCKERS (SURVEY)

The intent of this specification item is to remove both anchors and chains and open both chain lockers for cleaning, painting, and inspection as per TCMSS survey requirements.

Table HD-17.1

Field #	Tank Name	Location	Manhole Location
3L044	Port Chain Locker	Fr 175-181	#62 B/H 141 in Bosun's Stores forward
3L045	Starboard Chain Locker	Fr 175-181	#61 B/H 141 in Bosun's Stores forward

HD-17.1

Both anchors shall be lowered to the dock floor by Contractor. The ship's windlass may or may not be available and so Contractor shall bid on the assumption that they shall supply craneage, personnel, and equipment to lower the anchors and run out both cables. The port and starboard anchor cables are 8 shots and 9 shots in length respectively and made of 2 inch SL chain.

HD-17.2

Both port and starboard chain lockers shall be adequately ventilated to provide good air movement and permit entry of personnel. Each chain locker shall be tested for oxygen content and proven safe for personnel to enter. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the tank and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each tank. Spaces shall be tested each day that personnel are required entry in the tanks. Contractor shall take note of the requirement outlined in the DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES and DFO/5737 Fleet Safety Manual, 7.B.4 – HOTWORK.

HD-17.3

After both chain lookers have been proven and certified as gas free, Contractor shall release both cable bitter ends & lower the remaining chain to the dock floor.

HD-17.4

Both anchor cables shall be arranged in a suitable area for cleaning, inspection, and subsequent inspection. The joining shackles shall be broken at both anchors.

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HD-17.5

Each cable shall be hydro blasted clean. All seizing wire markings shall be removed from each cable and disposed of by Contractor. All links and studs on each cable shall be hammer tested and visually inspected for defects. Any defective links and studs shall be marked for identification and brought to the attention of the CGTA and attending TCMSS Surveyor. Contractor shall quote a cost of repairs to 12 stud links per cable. This quote shall form part of the overall bid. Adjustments to the total number of stud links shall be through PWGSC 1379 action

HD-17.6

Anchor shackle pins shall be removed for inspection. Swivels shall be cleaned, inspected for ease of operation, and lubricated. Upon assembly, new taper pins shall be fitted.

HD-17.7

The first 2 shots on each cable shall be removed, rejoined to the bitter end of the remaining cable. Upon completion of all work, each cable shall be attached at their respective bitter ends in the chain locker. The bitter end pins shall be locked as per original.

HD-17.8

Contractor shall sand blast both anchors to an SSPC-SP-6 standard. Both cables shall be sand swept, chain flipped and a second sand swept blast prior to painting. Contractor shall apply 2 coats of Intershiel 300 Abrasion Resistant Epoxy (Black). Each coat shall be applied to yield 8 -10 mils DFT per coat. The first coat shall be thoroughly dried prior to the second application. The chain shall be flipped after the second coat has dried and the back side of chain coated with 1 coat of Intershiel 300 Abrasion Resistant Epoxy (Black).

HD-17.9

Upon completion of inspection, the joining shackles shall be assembled and the split pins sealed in place with lead. Cable shots shall be marked as per accepted marine practice using new seizing wire. The shot lengths shall be marked off with white paint and joining shackles shall be painted with red marine enamel as per standard marine practice.

HD-17.10

All internal surfaces of each chain locker shall be hydro blasted and cleaned to remove all rust, scale, and debris. The false floor plates shall be unfastened and taken up for thorough cleaning and subsequent painting on both sides. Bilge wells shall be thoroughly cleaned and suctions proven clear. The proper operation of the bilge alarm shall be proven and the test shall be witnessed by the CGTA. All scale, dirt, debris, liquid from cleaning shall be disposed of ashore. Total tank area is 75 square meters.

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HD-17.11

Contractor shall quote on renewing 30 feet of bilge piping (1 ½ inch diameter) inside the Chain Locker. This quote shall form part of the overall bid. Actual amount of piping and materials renewed shall be adjusted up or down (credit), through PWGSC 1379 action. Contractor shall note that the piping is all welded construction except the flange connections to the Bilge Strainers. There are two (2) bilge suction in the Chain Locker (Port and Starboard). Piping to each bilge suction line shall incorporate at least 2 x 90° elbows and one flange. Sections of piping and exact lengths shall be determined by the CGTA after inspection of the pipes.

HD-17.12

Upon completion of work to the Chain Locker Bilge System, Contractor shall prove the proper operation of the system to the CGTA.

HD-17.13

Both chain lockers, both sets of false floors and new bilge piping shall be coated with 2 full coats and 2 stripe coat of Intershield 300 contrasting colours (Bronze & Aluminium for final coat). Each coat shall be applied to yield 5-6 mils DFT per coat. For bid purposes, quote on 50 square meters of interior surface area for each chain lockers.

Sounding pipes, drains, and vents shall be checked for obstruction and proven clear. Both chain lockers shall be inspected by the CGTA and a TCMSS Surveyor upon completion of all cleaning and prior to coating application. This inspection shall be carried out while the false floor plates are removed.

HD-17.14

Upon completion of all work to the chain lockers, all false floors shall be installed and fastened in place.

HD-17.15

Both anchors shall be reconnected to its respective cable and both sets of anchors and cables shall be stowed on board, while ensuring the proper fleeting of each cable within the locker. Contractor shall supply the necessary manpower and equipment to carry out the stowage of the anchors and cables.

Both manhole covers shall be replaced using new ¼ inch thick neoprene gaskets. Any defective studs shall be renewed as per H-8

HD-18 CENTRAL COOLING SALT WATER CROSS OVER LINE (SURVEY) - VLE ITEM

HD-18.1

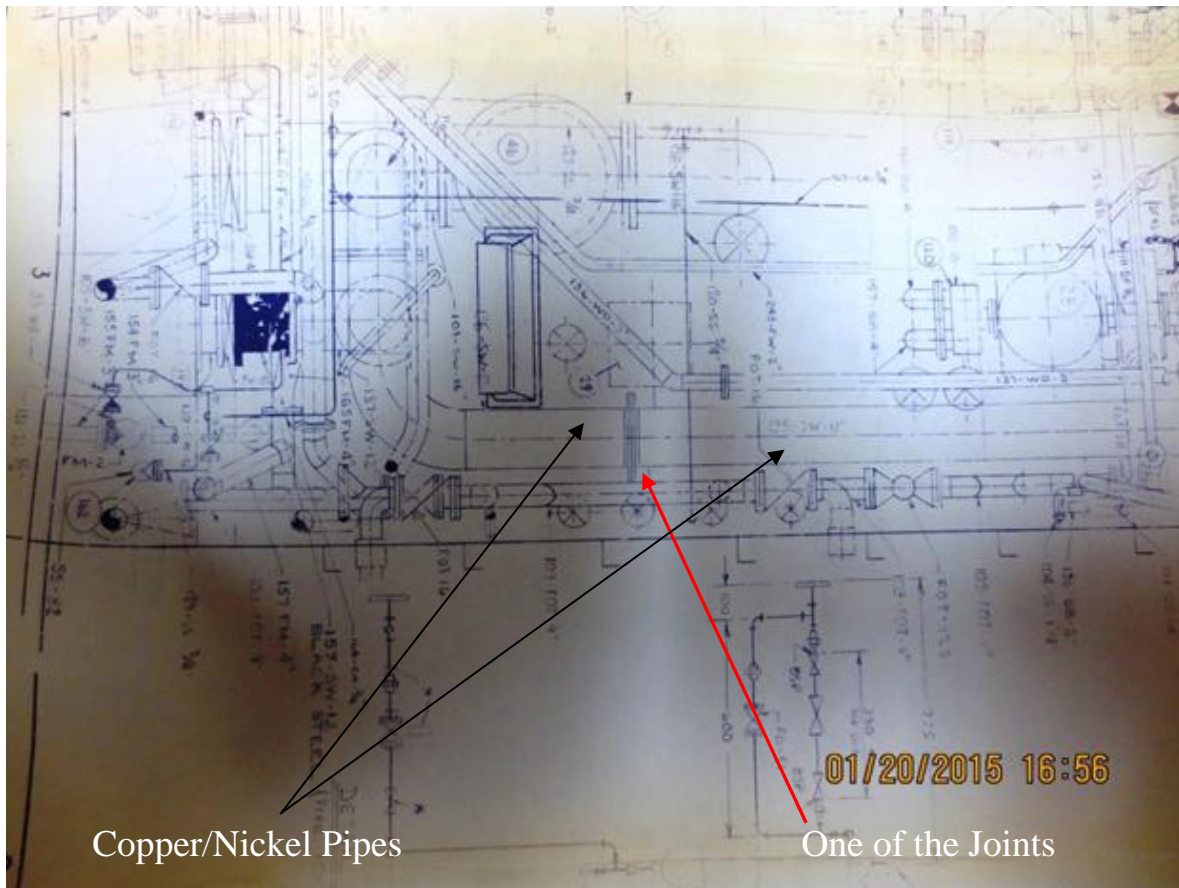
The following sea water pipe sections require new gaskets at the sealing joints. In addition, the pipe internals shall be inspected for possible erosion and or wastage. Drawing 977-80, 2 of 45 shall be made available for Contractor to copy. Once copied, the original drawing shall be returned to the CGTA

HD-18.2

Contractor shall mark (identify) and remove the pipe sections as per the following list:

The pipe ID numbers are:

- HD-18.2.1. > 133 SW 12 Copper/Nickel 90-10
- HD-18.2.2. > 134 SW 12 Copper/Nickel 90-10
- HD-18.2.3. > 135 SW 12 Copper/Nickel 90-10
- HD-18.2.4. > 136 SW 12 Copper/Nickel 90-10



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HD-18.3

Contractor shall transport pipe sections ashore to their facilities to allow for proper cleaning and inspection. Contractor shall take all precautions to prevent any damage to the pipe sections throughout this task

Once pipe work has been cleaned, pipe internals shall be inspected for erosion and corrosion by contractor. All defects shall be marked prior to CGTA inspection

HD-18.4

All floating steel flanges shall be power tool cleaned to SSPC.SP03 standards.

HD-18.5

New gaskets shall be fitted at all flange connections, similar to the as found fitted gasket material.

HD-18.6

Contractor shall supply and fit new bolts with anti-seize compound, washers and nuts at each flange connection

HD-18.7

Paint shall be applied to the floating flanges and to any damaged coatings on the external section of the pipes:

HD-18.7.1. > 2 coats of primer paint, Interprime 539 (Grey). Coatings shall be applied to yield 30 microns dry

HD-18.7.2. > 2 top coats of CLB000/1 Interlac 665 Fire Retardant White, International Paint. Coatings shall be applied to yield 3.2 mils dry

HD-18.8

Pipe sections shall be tested during the hydrostatic testing performed under HD-8A.13

HD-18.9

Upon completion of all work, Contractor shall remove all equipment, dirt, debris, materials, etc. generated during this work, ashore. All items that were disturbed in order to carry out this work shall be reinstalled and connected in good order. The spaces shall be left in a clean and tidy condition.

HD-18.10

All work shall be to the satisfaction of the CGTA.

HD-19 PORTHOLE TUBE RENEWAL

The intent of this specification item is to describe the work to renew 6 hull porthole tubes that were not renewed in 2010.



HD-19.1

The scope of work shall be carried out mostly in the main deck accommodation cabins, the Galley spaces, and the crew's mess. Contractor shall take every necessary precaution to keep all spaces clean and tidy for the duration of this specification item and upon completion.

HD-19.2

This work shall be carried out in conjunction with HD-14 HULL CLEANING AND PAINTING. All affected hull areas shall be coated as per the hull coating.

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HD-19.3

Hot work shall not commence until all areas in the vicinity of the hot work have been certified gas free and safe for hot work. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the space and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each space. Spaces shall be tested each day that personnel are required entry in to the space. All precautions shall be taken to protect all areas and personnel from hot work damage. Contractor is responsible for maintaining an adequate fire watch during the course of all hot work. This shall include providing various applicable extinguishers and extinguishing mediums as necessary. This shall also include any necessary preparations and cleaning in the vicinity of the work area to obtain a gas-free permit.

HD-19.4

All staging, manlifts, equipment, etc. for access to each port hole in way of the hull shall be provided by Contractor.

HD-19.5

Contractor shall remove the curtains, curtain tracks, adjacent metal sheathing, insulation, and trim in way of each porthole tube for hull access.

HD-19.6

Contractor shall provide suitable ventilation/extraction equipment complete with flexible ducting. This shall be used continuously and the ducting shall be led to the outside of the ship during grinding operations and during the curing process for all coatings. Contractor shall take precautions to prevent dust, dirt, and vapours from entering the cabin and adjacent alleyways.

HD-19.7

Contractor shall provide suitable floor coverings in the cabin to protect existing floor coverings and cabin furnishings prior to commencing any work.

HD-19.8

Once all materials have been removed down to the hull steel, each tube shall be cropped from the hull and transported ashore to Contractor's facilities. Each porthole glass and frame as well as its associated dead light shall be zipped from each tube at the ears and kept as a unit for subsequent installation on a new tube.

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HD-19.9

Each porthole glass and frame shall be serviced. The glass securing ring shall be carefully removed by using CGTA supplied special tool. Contractor shall return the specialty tool to the CGTA after the work is completed. The glass shall be removed so that the frame can be cleaned of old sealing gasket. New sealing gaskets shall be CFM & fitted to each frame. The material is suspected to be 1/16 inch thick by ½ inch wide Neoprene material. Actual material shall be determined once the glass has been removed.

HD-19.10

Contractor shall quote on supplying 6 new port lights and dead light hinge pins (total of 6 pins) and rework the existing hinge ear holes (24 in total). Contractor shall provide a unit cost for replacing a pin and reworking the ears for one port/dead light assembly. The pins are 5 inches in length by 0.630 inch diameter. This quote shall be a separate item; actual work carried out shall be negotiated through PWGSC 1379 action if deemed as being required by on site CGTA.

HD-19.11

Contractor shall fabricate and install a tube for each hull port hole located on the Main Deck at the following cabin locations:

- M-18 1 unit
- M-32 1 unit
- M-14 Crew's Mess (3 units)
- Galley forward, center 1 unit

A total of 6 tube installations required

HD-19.12

For bid purposes, each tube is approximately 9 inches long x 18 inches diameter x 3/8 inches thick. Contractor shall confirm the exact scantlings prior to the commencement of work. Contractor shall quote on the renewal of 6 tubes. In addition, Contractor shall quote on the unit cost per tube renewal. This unit cost shall be included in the bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action.

HD-19.13

Each tube shall be welded internally and externally. Porthole glass / deadlight units shall be attached by welding the associated ears to the tube. All units shall be aligned properly with its tube. New CFM seals shall be installed in each glass frame and deadlight. Tubes shall be chalk marked and each port hole closed to demonstrate correct contact.

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HD-19.14

Upon completion of all welding and grinding operations, all internal hull and adjacent areas that have been affected by this work shall be mechanically cleaned to SSPC-SP-11 standards and shall be given 2 coats of primer paint, Interprime 198 grey, colour No. CPA098 International Paint. Coatings shall be applied to yield 2 – 3 mils (ASTM D1640) DFT per coat and 2 top coats of CLB000/1 Interlac 665 Fire Retardant White, International Paint. Final coat shall be applied to yield 2 mils (ASTM D 1640) DFT per coat. All paint shall be contractor supply. Contractor shall allow sufficient curing time between coats as per the manufacturer's recommendations and instructions. The external areas of the hull shall be dealt with as per HD-14 HULL CLEANING AND PAINTING.

HD-19.15

Upon completion of all work new CFM insulation, cladding, and stainless metal flashing shall be installed similar to existing. Insulation shall be of a non-wicking (non-absorbent) liquid resistant type of material. All materials and equipment shall be contractor supply. New caulking shall be applied as per existing.

HD-19.16

Upon completion of all work, Contractor shall remove all equipment, dirt, debris, floor coverings, materials, etc. generated during this work, ashore. All hardware, plumbing, etc. that was disturbed in order to carry out this work shall be reinstalled and connected in good order. The cabins and washrooms shall be left in a clean and tidy condition.

HD-19.17

Upon completion of all welding, and prior to recoating, the hull welds shall undergo NDT. Contractor shall include an allowance of \$3,000 and arrange for the services of a qualified NDT technician. Contractor shall confer with TCMSS Hull Surveyor to inspect welds, inspection shall be examined as directed by the Surveyor. Contractor shall provide a report upon completion of all NDT work detailing the inspection results.

HD-19.18

Upon completion of NDT, high pressure (2,000) hose testing shall be carried out by blasting each tube in the vicinity of the hull weld. Each tube shall be witnessed to verify that no weld leaks exist. In addition, each port hole shall be proven leak free (no water entering the vessel) using a fire hose directing a stream of water at and around the exterior of the port hole glass assembly.

HD-19.19

Contractor shall arrange for TCMSS Surveyor visits and all work shall be carried out to the TCMSS Surveyor's and CGTA's satisfaction.

CCGS SIR WILLIAM ALEXANDER DRY DOCKING & REFIT 2015

H-1 PRODUCTION CHART

H-1.1

Contractors shall provide an estimated for the dates / times that the ship shall be on the drydock. PWGSC shall relay the estimated times to the CGTA.

H-1.2

The successful Contractor shall supply 3 type written copies of a detailed colored bar chart showing the planned work schedule for the ship's refit. This bar chart shall show for each specification item; the start date, the manpower loading, the duration and the completion date. The chart shall also outline Contractor's "critical path" for completion and actual time the ship is in the drydock. The bar chart shall be realistic and shall show items that may cause delays, i.e. lead time for materials and conflicts, such as tasks that are dependant on one another i.e - weather /dry time for paint coatings.

H-1.3

The bar chart shall be updated weekly or for each scheduled progress meeting and shall reflect the actual production on the refit and changes to the anticipated completion dates of each individual item.

H-1.4

A copy of the original and a copy of each weekly update shall be given to the CGTA prior to each weekly or scheduled progress meeting. All copies shall be in colour as per the originals.

H-1.5

A copy of the original bar chart shall be sent via e-mail before the close of business **on the day of the ships arrival at Contractor's premises** to the Technical Service Marine Engineering Senior Vessel Maintenance Manager (SVMM) at: dan.chipman@dfo-mpo.gc.ca and the Production Manager at darren.kennedy@dfo-mpo.gc.ca .

CCGS SIR WILLIAM ALEXANDER DRY DOCKING & REFIT 2015

H-2 SERVICES

GENERAL: The following services shall be supplied, fitted and/or connected upon arrival at Contractor's facility, maintained throughout the docking / contract period, and removed from the vessel on completion of the work. Contractor shall be responsible for any additional connections required when ship is moved between dock/slipway and alongside berth at Contractor's premises.

MANNED REFIT: During the contract period, the CCGS Sir William Alexander shall be manned. As a result, the ship shall remain in the care and custody of the Canadian Coast Guard. Every effort shall be taken to ensure that the vessel's crew shall not interfere or conflict with Contractor's work.

GENERAL (MANNED): The services as described in HD-2 Services shall be supplied, fitted and/or connected whenever ship's crew are living aboard the ship. This is expected to include the time period after arrival at Contractor's facility and prior to formal handover to Contractor. The services shall also be provided after the vessel has been returned to the care and custody of the ship's crew until signing of the acceptance document and departure of the ship from Contractor's facilities. Contractor shall be responsible for any additional disconnections and re-connections required when the ship is moved between dock / slipway and any berth at Contractor's premises.

DOCKING: Contractor shall be responsible to coordinate a safe transfer of the ship between its pre/post-docking berth and its docking blocks. During docking and undocking of the ship, radio contact shall be maintained between the vessel's Commanding Officer and Contractor's Docking Officer.

PRICES: Contractor shall quote a global price and daily or unit cost rates for all services supplied to the vessel during the refit period.

GANGWAYS: Contractor shall supply and install two (2) gangways complete with safety net, while the ship is on the dock or slipway or at berth. Gangways, complete with safety nets, one of the two gangways shall be installed in such a manner that they provide separate routes for escape in the event of fire. CGTA shall advise of specific locations.

Safety nets shall be in compliance with the Canada Labour Code. Gangways shall be safe, well lit and structurally suitable for the passage of shipyard personnel and the ship's crew. Contractor shall maintain gangways in a safe condition throughout the duration of the refit while the ship is out of the water.

Initial installation and later removal of gangways shall be included in quote, as well as maintenance and upkeep while vessel is in Contractor's yard. Any movement of gangway(s) required by Contractor shall be at his cost.

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ELECTRIC POWER: Contractor shall connect and quote on supplying electrical power at 600 VAC, 3 PH, 60 Hz at 400 Amp rating upon ship's arrival at Contractor's facilities.

Contractor shall bid on the supply of 3000 kWh per day for refit period. The actual consumption shall be pro-rated up or down as per power used as indicated by vessel's kWh meter. The power meter shall be read and recorded by CGTA and Contractor's Representative together at the start and end of contracted period. The kWh unit price shall be quoted for PWGSC 1379 adjustment purposes. Cost of connection and disconnection shall be included in the quote.

If no kW consumption meter is available, a daily consumption (amps) shall be negotiated and power requirement determined by the following formula:

$$\mathbf{KWH = I \times E \times P.F. \times 1.73 \times 24/1000.}$$

A ground cable shall be attached to the ship's hull. Contractor shall ensure compliance as per the Transport Canada Marine Safety Bulletin – “Grounding Safety in Dry dock”.

Note: Problems have been experienced in the past with the loss of one phase with Contractor supplied shore power, due to a fuse blowing. Contractor shall ensure the electrical service provided has protection system fitted such that loss of a single phase at Contractor's end of the cable results in immediate opening of the remaining phases.

FIRE MAIN: Contractor shall connect a two (2) inch diameter fresh water line to the ship's fire main, with an isolation valve placed onboard. **Fire main shall be charged and maintained at 100 psig.**

POTABLE & SANITARY WATER: Contractor shall supply Two (2) Portable toilets shall be placed on the Helo hangar deck for duration of contract and emptied weekly. Potable fresh and sanitary water at 415 kPa (60 PSI) constant pressure shall be connected to ship's systems, complete with pressure regulator and shut-off valves. Approximately 10 cubic meters shall be supplied for duration of the contract. Contractor shall supply and connected a water meter to the ship's inlet line. Contractor shall quote a unit rate for PWGSC 1379 adjustments, and include all connection / disconnection costs in bid price. Contractor shall make arrangements to prevent the potable water supply piping/hoses are protected against freezing. Contractor shall provide to CGTA at the Pre-Refit Meeting a certificate of potable water quality before water service is connected to the vessel.

This potable water supply shall be connected by running a hose through the porthole on the towing deck aft and down through the escape trunking to the discharge side of the potable water pumps located in the Propulsion Motor Room.

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HULL DISCHARGE CONNECTIONS:

Connections shall be made to the following and directed to suitable drains:

- Central Cooling System Overboard
- Reverse Osmosis Discharge Ovbd.
- Sewage Treatment Tank Overboard Contractor to include the cost of disposal for 10 cubic meters per day and provide a unit cost per cubic meter for adjustment purposes.
- Aux Gen Overboard (for air conditioning system cooling water)

These connections shall be maintained for the duration of the vessel's docking period. Arrangements shall be made to prevent the freeze up of these drains. Contractor shall include the cost of all connections and disconnections in their quotations, and quote a daily rate for PWGSC 1379 adjustment purposes.

GARBAGE: A garbage container, 6 m3 (215 Ft.3) minimum capacity, strictly for ship's use shall be placed in a convenient location as close as possible to the ship's gangway. Contractor shall provide this service for the duration of the refit. The bin shall be empty on a regular base to negate the problems of odors.

CRANAGE: Contractor shall bid on supplying general services of a dockside crane, driver and rigger for ten (10) hours during the dry-docking period as and when required by the CGTA, plus an hourly rate for PWGSC 1379 adjustment purposes.

WASTE OIL: Contractor shall bid on removal and disposal of 10,000 liters of waste oil / water mixture from the vessel during the refit period, and quote a unit rate for PWGSC 1379 adjustment purposes. Removal and disposal shall be performed by an identified licensed waste oil disposal company in full compliance with regulatory requirements.

Copies of all dirty water and oily water removal invoices with quantities shall be given to the CGTA. Copies of invoices detailing disposal of the liquids shall be given to the CGTA.

CLEANING: Contractor shall ensure that all spaces, compartments and areas of the ship where work has been carried out, or Shipyard staff has used for transit routes, are "as clean as found" when work is completed. The cost of clean-up work shall be included in the quote for each specification item.

PARKING: Sufficient parking for DFO/CCG and PWGSC representatives shall be provided conveniently close to the berthed or docked vessel. Contractor shall provide five (5) clearly designated for "DFO/CCG and PWGSC use only" parking spaces for the duration of the docking period.

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TELEPHONES: Two (2) private telephone lines shall be provided to the vessel on arrival at Contractor's facilities, and shall be maintained for the refit's duration. Both telephone lines shall be direct lines to the vessel's telephone system. All telephones shall be active 24 hours a day for the duration of the contract. Contractor shall be responsible for giving notice for connection/disconnection times to the Telephone Company as required for any ship movements during the contract period.

Contractor shall supply a listing of shipyard contacts, fire, police and emergency telephone numbers to CGTA when vessel arrives at Contractor's facilities. Contractor shall ensure that the CGTA is notified of any "on call personnel" and their contacts during non-working hours and days.

Long distance charges shall be billed directly to:

Fisheries and Oceans Canada
Canadian Coast Guard – Accounts Payable
Coast Guard Maritimes Regional Headquarters Building
50 Discovery Drive
Dartmouth, Nova Scotia
B2Y 3Z8
Attn: Diane McNair

INTERNET:

Contractor shall supply two dedicated hard wired high speed internet supplies and wireless access to the vessel.

Internet charges shall be billed directly to:

Fisheries and Oceans Canada
Canadian Coast Guard – Accounts Payable
Coast Guard Maritimes Regional Headquarters Building
50 Discovery Drive
Dartmouth, Nova Scotia
B2Y 3Z8
Attn: Diane McNair

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ALLEYWAY AND BULKHEAD PROTECTION: Alleyways and area that shall be used by Contractor's personnel on a regular basis for access to required work areas shall be suitably protected from damage, soil, etc. All affected alleyways shall have deck surfaces covered by ¼ inch Masonite extending to the full extremities of the areas dealt with. All seams, butts, and edges of the applied Masonite shall be taped to discourage ingress of soil beneath, as well as to stop any migration of the applied sections. Contractor shall quote on supplying and installing 5200 sq. ft. of ¼ inch Masonite rough one side and installed rough side up. Upon completion of refit, Contractor shall lift all Masonite. The area shall be swept and mopped on completion of the refit and any tape residue shall be removed. Contractor to quote separately a price per square foot for cost of supply, installation and removal of any additional Masonite as may be required.

All internal bulkhead panels in the above-noted areas shall be suitably protected with application of 1/8 inch Masonite panels (or heavy construction paper) extending to a minimum five (5) foot height above the deck level and all corners shall be covered and taped. Again, all butts, seams and edges shall be taped. Contractor shall quote on supplying and installing 3200 sq. ft. (297 square meters) of 1/8 inch Masonite (or heavy construction paper). Upon completion of refit Contractor shall remove all Masonite/paper and dispose. The areas shall be wiped clean on completion of the refit and any tape residue shall be removed. Contractor to quote separately a price per square foot for cost of supply, installation and removal of any Masonite/paper that may be required. Total cost shall be adjusted up or down by PWGSC 1379 action

SCAFFOLDING: Contractor shall supply the necessary manpower and equipment to erect, as necessary, scaffolding and staging to facilitate the inspection of the ship's hull as necessary by TCMSS Surveyor and Ship's personnel. This will include scaffolding and equipment to access propellers, rudder, thruster and renewal of anodes. The scaffolding shall be removed when the work is complete, at Contractor's expense.

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H-2A BERTHING

H-2A.1.

During the contract period at Contractor's facilities, while not in dock, the vessel shall be berthed at Contractor's wharf at a safe and secure berth with adequate water at extreme low tide to ensure that the vessel will not touch bottom.

H-2A.2.

The vessel shall be delivered to Contractor's facility under its own power.

H-2A.3.

Contractor shall include in the overall quote, all costs for initial tying up, any movement of the vessel during refit, and letting go of lines from Contractor's wharf on departure after completion of contract. Contractor shall be responsible for supplying all necessary lines for securing the vessel at their facility.

H-2A.4.

Manoeuvring of the vessel into and out of Contractor's docking facilities shall be done under the direction of Contractor. Costs for tugs and pilots required for any movements of the vessel during the contract period shall be included in the bid price quoted, but shown separately as well.

H-2A.5.

Two gangways shall be supplied and set up by Contractor while alongside Contractor's jetty. This gangway shall be set up and rigged from the wharf onto the buoy deck, complete with safety net. Gangways shall be safe, well lit and structurally sufficient to support passage of Contractor's workmen and ship's crew.

Vessel Particulars

Length Overall.....	83.00 m
Length B.P.....	75.00 m
Breadth Moulded.....	16.20 m
Depth Moulded.....	7.75 m
Design Draft.....	5.75 m
Extreme Draft Aft.....	6.00 m
Displacement.....	4,662 tonnes @ design draft

H-3 VENTILATION DUCT CLEANING

The intent of this item shall be to access and clean the air ducting for accommodations, the exhaust air ducting for the washrooms, the supply air ducting to the wheelhouse windows, the supply and exhaust galley air ducting (including the galley range hood) as well as the return air ducting for the accommodations and wheelhouse systems. In addition Contractor shall clean the dryer ducting from both laundry rooms and the exhaust fan trunking from the Carpenter's shop.

H-3.1.

Contractor shall provide the services of a qualified HVAC representative to mechanically clean the vessel's ducting. All ducting shall be cleaned thoroughly of dust, dirt, debris, scale, rust, etc. Contractor is responsible for making penetrations for the cleaning equipment and the subsequent sealing of such access points upon completion of all work.

H-3.2.

Since this task has been carried out in previous maintenance periods, a good many access points exist. Note: Plastic plugs shall not be used to seal access points. All access points shall be sealed with contractor supply metal plugs.

H-3.3.

Contractor shall remove ceiling panels and difusers on all decks in order to access the applicable ventilation trunking, ducting, and tubes. All items shall be replaced in good order upon completion of all work. Any wiring, piping, lighting, fixtures, fasteners, metal work, etc. that has been removed or repositioned to carry out this work shall be reinstalled in good order in its original location and condition. All insulation removed shall be reinstalled accordingly and all taped seams shall be retaped with new approved tape for HVAC systems.

H-3.4.

Prior to commencing any work, Contractor shall tag and lock out each system supply/exhaust fan set as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

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H-3.5.

Contractor is responsible for all materials, coverings, and equipment required to perform this task. All labour required to complete the cleaning, including that required for removals, reinstallation, opening, and closing up of equipment and ducting is Contractor's responsibility. Contractor will remove all materials used in the project from the vessel. Ship's waste receptacles and those on the dock will not be used for disposal of any removed materials.

H-3.6.

Contractor is responsible for the cleaning of all spaces, furniture, equipment, etc. that is contaminated or soiled during the project.

H-3.7.

All systems shall be closed up as per original upon completion of the cleaning process.

H-3.8.

Presently some diffusers have been physically blocked with stuffing, etc. in various cabins and spaces. This has been carried out by various personnel without approval or knowledge. Contractor shall remove all blanks or plugs as they are encountered. These blanks are not shall be put back such that all spaces shall be served by ventilation and exhaust flow as applicable.

Galley

H-3.9.

The range hood and exhaust trunking is 400mm x 160mm, and 200mm x 125mm, and 600mm x 150mm - approximately 10m in length overall.

H-3.10.

Contractor shall co-ordinate the cleaning of this trunking with the galley staff in order to minimise interruption of normal work routines. Contractor shall conduct work either during weekends or weekday quiet hours (1700 to 0600). Contractor shall note the time constraints involved, and adhere to the requirements and bid accordingly.

H-3.11.

The Range Hood and trunking shall be chemically and/or steam cleaned. All dirt, grease, debris, and cleaning fluids shall be trapped and shall be removed ashore and disposed of by Contractor.

H-3.12.

Prior to cleaning, all mechanical and electrical connections to range hood shall be released, including piping for fire extinguishing system, associated controls and electrical lighting. All fittings liable to interfere with cleaning of the range hood shall be temporarily relocated and protected.

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[H-3 VENTILATION DUCT CLEANING](#)

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H-3.13.

The range hood filter screens shall be removed and steam cleaned.

H-3.14.

The trunking in way of the exhaust fan shall be opened to allow complete degreasing of fan, fan motor, and its support brackets. Approximately 9m of 700mm x 260mm trunking is involved. Contractor shall remove sections of the stainless steel cladding for access.

H-3.15.

The trunking and range hood shall be reassembled in good order and adjustment upon completion of cleaning and inspection. All items removed or relocated to allow this work package to proceed shall be reassembled in good order and functionally tested to the satisfaction of the CGTA.

Accommodation Ventilation Cleaning

H-3.16.

The accommodation HVAC supply and return air system shall be mechanically cleaned of dust, dirt, oil, grease and other debris. Both air handling units are located on the Boat Deck in the Accommodation Fan Room, Frames 48- 60. The system consists of the components and interconnecting ductwork, which are located throughout the Accommodations on, and between the Boat, Upper, and Main Decks.

H-3.17.

Contractor shall have access to 1:100 scale drawings:

A/C System Diagrams which details the location of air handling units, outlets, return air dampers and ducting runs.

- H-3.18.1. > 229-01 (2 sheets) HVAC various decks
- H-3.18.2. > 229-02 (2 sheets) HVAC various decks
- H-3.18.3. > (8 sheets) Aft Cargo Hold
- H-3.18.4. > (12 sheets) Laundry Room list of materials on sheet 12
- H-3.18.5. > (2 sheets) Wheelhouse A/C system and materials list

H-3.18.

Most cabins shall be occupied during the scope of this work. Contractor shall not enter personnel cabin's without prior permission of the individual or without the personnel in attendance.

[H-3 VENTILATION DUCT CLEANING](#)

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H-3.19.

During the cleaning of ductwork, care shall be taken not to allow the ingress of contaminants into the accommodations and work areas serviced by the air outlets. Particular attention shall be paid to the following locations:

- H-3.20.1. > Boat Deck - Radio Room and Electronics Equipment Room
- H-3.20.2. > Upper Deck - Ship's Office, Engineering Office
- H-3.20.3. > Main Deck - Galley, Crew's Mess, Officer's Mess

H-3.20.

All equipment exposed to the possibility of contamination shall be protected with taped down polyethylene film. Contractor is responsible for removal from the vessel of all dirt and debris removed from the air handling system.

Carpenter's Shop

H-3.21.

M-55 Aft Cargo Hold, port side.

Contractor shall access and clean the exhaust fan ducting that services the Carpenter's Workshop located in the aft Cargo Hold on the Main Deck aft. The ingress point is in the Aft Cargo Hold, runs through the Carpenter's Shop (normally locked) and up through the deck head to a termination point on the Upper Deck aft at frame 20 in the port breezeway. The vent head is labelled "Cargo Hold Outlet".

H-3.22.

Contractor shall cut access points in the ducting to carry out cleaning. The approximate run of ducting is 35 mm diameter x 8 m long. All access points shall be covered and sealed upon the completion of all work.

Laundry Dryers

H-3.23.

M-58 Main Deck, port side (Crew's Laundry)
U-64 Upper Deck, aft (Officer's Laundry)

H-3.24.

Contractor shall clean the dryer ducting in each of the above spaces. There is 1 combination washer/dryer unit in the Officer's Laundry and 3 combination washer/dryer units and a commercial dryer unit in the Crew's Laundry.

H-3.25.

In order to access the combination washer/dryer ducting, it shall be necessary for Contractor to unbolt each unit and pull it forward to access the ducting behind each unit. Units shall be fastened in place upon completion of all work.

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H-3.26.

In addition to cleaning the dryer ducting, Contractor shall unfasten the Crew's Laundry Room dryer exhaust fan located in the port breezeway, Upper Deck at frame 60. The unit shall be isolated and locked out electrically. Contractor shall remove the unit ashore for cleaning and to gain access to the dryer outlet ducting which shall also be cleaned. Upon completion of all work, the dryer exhaust fan shall be installed with a new gasket and new sealant. The louver assembly shall be checked for correct operation and freedom of movement.

Crew's Laundry Room dryer exhaust fan



Wheelhouse HVAC System

The Wheelhouse HVAC supply and return air system shall be mechanically cleaned of dust, dirt, oil, grease and other debris. The air handling unit is located in the Air Conditioning Compartment on top of the Wheelhouse. The system consists of the components and interconnecting ductwork which supplies the Bridge with heating and air conditioning and defrosting air for the bridge windows.

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H-4 SP BARGE DAVIT (ANNUAL INSPECTION)

The intent of this specification item is to have Annual Inspection carried out on the SP Barge Davit.

H-4.1.

Manufacturer: Caley Ocean Systems Ltd.
Ph: +44 (0) 1355 246626
Fx: +44 (0) 1355 229359
Email: caley_ocean_systems@compuserve.com
Job #: J3029
Model: 18 Te Barge Launch and Recovery Davit

H-4.2.

Contractor shall obtain the services of a qualified Caley Representative (local Caley Representatives are Pennecon Energy/Hydraulic Systems). Contractor shall provide all equipment, hardware, personnel, etc. to carry out the required work under the direction and guidance of the FSR. Contractor shall obtain certification for the FSR.

<http://www.pennecon.com/Energy/ContactInfo>

H-4.3.

Contractor shall include an allowance of \$5,000 for to cover the travel and living expenses the FSR if required. The FSR shall be reimbursed for the authorized travel and living expenses reasonably and properly incurred in the performance of the work, at cost without any allowance for the overhead or profit. The Allowance shall form part of the overall bid and shall be adjusted by PWGSC 1379 action upon proof of final invoice.

H-4.4.

All manufacturer's procedures and recommendations shall be followed during the scope of all work with all technical specifications being adhered to as a minimum by Contractor. Contractor shall arrange for scheduling the TCMSS Surveyor as required for onsite inspections/testing during the course of all work.

H-4.5.

Contractor shall supply all the necessary staging and craneage as required to work on, remove, transport, and install the various components during this overhaul. All personnel working on the davit system shall be suitably trained in fall restraint and all fall restraint equipment shall be certified and current.

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H-4.6.

Prior to the commencement of any and all work, Contractor/FSR shall lock out the power pack unit, associated 110 volt condensation heaters, and the oil reservoir immersion heater. Contractor/FSR shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

H-4.7.

The aluminum Barge shall be removed by Contractor for storage if required by the FSR. Contractor shall provide all equipment, manpower, etc. to remove and land the Lifeboat and to re-install it upon the completion of all work. No cradle is required for the Barge. The Barge shall be protected from damage, paint, and dirt/debris during the Refit period.

H-4.8.

The FSR will complete an Annual Inspection on the SP Barge Davit as per the manufacturers' instructions/requirements. Any defects requiring repairs shall be worked on through PWGSC 1379 actions.

H-4.9.

Upon completion of the annual inspection, two (2) copies of the type written report shall be provided to the CGTA within 24 hours of the completion of the job.

H-4.10.

All work shall be carried out to the satisfaction of the FSR and CGTA.

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H-5 LIFEBOAT and LIFEBOAT DAVIT REPAIRS (SURVEY)

The intent of this specification item is to survey the Harding Safety Canada Lifeboat Davit system, for a TCMSS quadrennial inspection and testing. In addition, the Lifeboat shall receive an annual inspection as per Harding Safety Canada recommendations.

NATURE OF SERVICE

- **Carry out Dynamic Load Test or Lifeboat & Davit 110%**
- **Lifeboat = Equipment & Provision 4,015 kg (Boat Empty)**
- **50 Persons = 50 X 75 Kg = 3,750 kg**
- **Total Davit load = 7,765 kg**
- **10 % of Davit Load to be added 776.5 kg**
- **Total Test Load 8,541.5 kg**

- **Load to be put in boat = 8,541.5 kg - 4,015 kg Boat weight = 4,526.5 kg**
- **Note: 1 Gallon of fresh water = 10.002 Lbs per gallon OR 4.54 Kg per gallon**

Total Imp Gallons of Fresh water to be added = 998 Imp Gallons

Prior to the test being conducted, ensure that all rigging and equipment is ready and in good order. Ensure that all safety precautions are taken, and that the test area is cleared of all personnel, particularly the test area.

Recorded Information

NOTE 2: A proper Lifeboat Cradle needs shall be transported to the Shipyard by the vessel. Some repairs to both systems are known and listed.

H-5.1.

Contractor shall ensure that no damage is done to surrounding areas of the vessel or uncovered bearing or bushing areas during any sandblasting done during the course of this specification/repair.

H-5.2.

Davit: Schat, LB Davit 13972
 Schat Winch #2303
 Type: BE 4500
Lifeboat: Watercraft, 50 person, LB #9012975
Hooks: Mills Titan

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H-5.3.

Contractor shall obtain the services of a qualified Harding Safety Canada Field Service Representative. Contractor shall provide all equipment, hardware, personnel, etc. to carry out the required work under the direction and guidance of the FSR. Contractor shall obtain certification for the FSR from Harding Safety Canada.

Harding Safety Canada Inc.

#120 - 20575 Langley By-Pass

Langley, British Columbia V3A 5E8

Canada

Tel: 1-604-530-0814

Fax: 1-604-530-0812

E-mail: colin.edwards@harding.no

Contact: Colin Edwards (604) 543-0849

H-5.4.

Contractor shall allow \$10,000 for the services of an attending FSR and \$5,000 for parts and materials. Contractor shall provide the fee schedule from Harding Safety Canada for the services of the FSR. This info shall be included in the PWGSC data pricing sheet. Final costs for the FSR as well as parts and materials shall be adjusted up/down separately upon proof of invoices. The FSR shall be reimbursed for the authorized travel and living expenses reasonably and properly incurred in the performance of the work, at cost without any allowance for the overhead or profit. The Allowance shall form part of the overall bid and shall be adjusted by PWGSC 1379 action upon proof of final invoice.

H-5.5.

All manufacturer's procedures and recommendations shall be followed during the scope of all work with all technical specifications being adhered to as a minimum by Contractor. Contractor shall arrange for scheduling the TCMSS Surveyor as required for onsite inspections/testing during the course of all work.

H-5.6.

Contractor shall supply all the necessary staging and craneage as required to work on, remove, transport, and install the various components during this overhaul. All personnel working on the davit system shall be suitably trained in fall restraint and all fall restraint equipment shall be certified and current.

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H-5.7.

Prior to the commencement of any and all work, Contractor shall lock out the power pack unit, associated 110 volt condensation heaters, and the oil reservoir immersion heater as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

H-5.8.

The lifeboat shall be removed by Contractor for storage. Contractor shall provide all equipment, manpower, etc. to remove and land the cradle ashore. The cradle shall be transported to Contractor's facilities.

H-5.9.

The Lifeboat Davit system and components shall be disassembled, cleaned, inspected for wear and defects, and reassembled in good order upon completion of all work.

SHEAVES & PULLEYS

H-5.10.

There are 14 pulleys and 2 blocks that will require inspection and servicing. Contractor shall remove all blocks and pulleys. Removed items shall be disassembled for cleaning and inspection.

H-5.11.

All sheaves and pulleys with associated components shall be kept as units. Contractor shall mark and identify all components to prevent inadvertent swapping of components. All units shall be reassembled and installed in their respective subsequent locations upon completion of all work.

H-5.12.

Measurements shall be taken of all pins and bushings. Defects/excessive wear shall be noted and brought to the attention of the CGTA. All defects shall be repaired and noted in the final service type written report. Contractor shall arrange for the viewing of applicable components by a TCMSS Surveyor when items are ready for viewing.

H-5.13.

Each sheave assembly shall be totally disassembled, including associated subcomponents. Each component shall be cleaned and laid out for inspection by the attending TCMSS Surveyor. All grease passages shall be proven clear. All new grease nipples shall be installed in place of existing units. All defective components shall be repaired/renewed as determined by the CGTA and TCMSS Surveyor.

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H-5.14.

All pin diameters shall be measured in way of each bearing surface. The measurements shall be taken at each pin end, in the middle, and at 90 degrees to each position, for a total of 6 measurements per bearing surface. Each pin bushing bore shall be measured in the same manner.

H-5.15.

Upon completion of examination and survey, all items shall be assembled in good order. Grease ways in all pins proven clear

H-5.16.

All the foregoing measurements shall be recorded in the final type written report.

DECK BRACKETS and DAVIT ARMS

H-5.17.

Each davit arm deck bracket pins (4 pins total) locking devices shall be removed and each pin withdrawn, while fully supporting the each davit arm assembly at all times.

H-5.18.

Each davit arm deck bracket shall be sandblasted to bare metal to allow for inspection of all components and welds by the FSR and TCMSS Surveyor. Contractor shall ensure that all bushing/bearing areas are properly protected from any damage due to sandblasting. Upon completion of all inspections and any repairs shall be negotiated through PWGSC 1379 action as required by the CGTA. All components shall be painted with one (1) coat of marine primer (CFM) and two (2) coats of GSM white paint.

H-5.19.

Each davit arm shall be transported to Contractor's facility and sandblasted bare to allow for inspection of all components and welds by the FSR and TCMSS Surveyor. Contractor shall ensure that all bushing/bearing areas are properly protected from any damage due to sandblasting. Upon completion of all inspections and any repairs shall be negotiated through PWGSC 1379 action if required. All components shall be painted with one (1) coat of marine primer (CFM) and two (2) coats of GSM white paint.

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Picture of deck brackets



H-5.20.

Each of the 2 deck brackets and components shall be disassembled, cleaned, and inspected for wear and defects. All grease passages shall be proven free and clear. New grease nipples shall be installed in place of existing units.

H-5.21.

Each heel pin shall be cleaned, inspected for defects, and measured in 6 locations as per the sheaves. All reading shall be recorded in a report. Each corresponding bushing/bearing surface shall be cleaned, inspected for wear and defects. Readings shall be recorded in the type written final report and given to the CGTA.

H-5.22.

Each of the deck bracket fasteners shall be renewed with CFM fasteners.

H-5.23.

Contractor shall remove each pin, one at a time for servicing. Work shall be carried out as per the recommendations of the FSR.

GEARBOX AND WINCH

H-5.24.

The winch gearbox shall be drained (19 liters), with oil being disposed of ashore as per above and an oil sample shall be sent away as per the reservoir, complete with report.

Picture of winch and gearbox



H-5.25.

Davit winch shall be opened up for cleaning, examination of brake linings, and complete overhaul under the direct supervision of the FSR. All parts required for the overhaul of the winch shall be GSM other than gaskets, nuts and bolts which shall be CFM. In addition, both centrifugal and disc brake assemblies shall be opened up for inspection. Contractor shall quote on removing/reinstalling the winch from the vessel for the overhaul work. This quote shall be separate, but form part of the overall bid. Actual work carried out shall be adjusted up or down (credit), through PWGSC 1379 action.

H-5.26.

All gears shall be visually inspected for wear and defects.

H-5.27.

The gearbox shall be refilled with new CFM oil, Esso Ultima EP 68, upon completion of all work. A new cover gasket shall be supplied and fitted by Contractor.

HYDRAULIC POWER PACK RESERVOIR

H-5.28.

All Denso tape that is removed to carry out the following work shall be discarded and new CFM tape shall be installed upon completion of all work.

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H-5.29.

An oil reservoir sample shall be taken and sent ashore for analysis by Contractor. The analysis results shall be given to the CGTA upon receipt. Contractor shall drain the reservoir of all oil, approximately 400 liters. The oil shall be disposed of ashore by Contractor in an environmentally safe manner as per local, provincial, and federal requirements. Proof of this disposal shall be given to the CGTA by way of invoice or other pertinent documentation.



Picture of Hydraulic Power Pack Reservoir

H-5.30.

The hand hole cover shall be removed. The tank internals shall be wiped cleaned and visually inspected by the CGTA prior to final closing. New contractor supply oil resistant hand hole gasket shall be installed.

H-5.31.

Contractor shall supply all equipment, fittings, hardware, filters, manpower, etc. to carry out a full system filter/flush. This shall include the services or subcontracting of a certified hydraulics technician to carry out the work. Flushing oil shall be CFM and disposed of in an environmentally safe manner upon completion of all work. The davit system shall be flushed and filtered down to 10 micron status. Contractor shall have periodic oil samples tested to determine the status of flushing/filtering. Copies of final oil cleanliness certificates shall be given to the CGTA.

H-5.32.

Upon completion of all work, the unit shall be filled with new CFM oil, Petrocanada Hydrex MV36. The reservoir shall be filled via filter cart with a 10 micron rating.

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H-5.33.

Upon completion of all operational testing, Contractor shall take an additional oil sample and send away for analysis complete with report.

HOSE RENEWAL

H-5.34.

All hydraulic hoses shall be drained, removed, and renewed with new similar units, complete with new fittings as per existing. This shall include hoses on the davit components as well as the hand pumping station. Copies of manufacturer's compliance certificates for each hose shall be given to the CGTA. All hose openings shall be suitably plugged/capped to prevent the ingress of dirt and debris until the hoses are installed on the davit system. All new hoses shall have jackets fitted to prevent UV deterioration. All materials are CFM. An allowance of \$7,000 shall be made to cover the cost of hydraulic hoses fittings, and associated hardware. The quote shall form part of the overall bid. Actual work carried out shall be adjusted up or down (credit) upon proof of invoice, through PWGSC 1379 action.



LUFFING CYLINDERS

H-5.35.

Each luffing cylinder shall be removed ashore to Contractor's facilities. Each spherical self-aligning bearing at the cylinder rod end and cylinder clevis shall be cleaned, inspected, and measured for wear/defects. Each pin shall have its associated lock removed and each pin shall be withdrawn to permit removal of both cylinders. Pins shall be identified to prevent inadvertent swapping of pins. Both cylinders shall be supported at all times and the piston rods shall not be used for support or movement of the unit.

Picture of luffing cylinder



H-5.36.

Contractor shall ensure that there is no system pressure remaining, prior to hydraulic cylinder removal. Each cylinder shall be removed and landed ashore. Both cylinders shall be transported to Contractor's facilities for disassembly, cleaning, inspection, and overhaul.

H-5.37.

Contractor shall disassemble both hydraulic cylinders. All components shall be cleaned and laid out for inspection. Precautions shall be taken to prevent interchanging components. The cylinder bore, rod, piston, gland, etc. shall be inspected for wear and defects. All pins and cylinder connection bores shall be measured at 6 locations (2 at each end and 2 in the middle at 90 degrees apart). All readings shall be record and entered into the final type written report. All defective parts shall be renewed, CFM. New OEM piston and gland seal kits shall be supplied and installed by Contractor.

H-5.38.

The grease passages in each hydraulic cylinder pin bores shall be proven clear and free. Any defective grease fittings shall be renewed with similar fittings.

H-5.39.

Contractor shall notify the TCMSS Surveyor and CGTA, so they can be present for inspection of components.

H-5.40.

Both cylinders shall be assembled and returned to the vessel upon completion of all work. The cylinders shall be attached with their respective original pins. All applicable fasteners and pins shall be locked. All fasteners shall be torqued accordingly and all threaded fasteners shall be coated with anti-seize compound.

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H-5.41.

All fittings shall be wrapped in Denso tape upon completion of work. New CFM seals and O-rings shall be installed on all connections.

H-5.42.

Contractor shall include an allowance of \$8,000 to cover the cost of labour, transportation and for services to re-chrome each cylinder rod. This allowance shall form part of the bid. Final cost shall be adjusted through PWGSC 1379 action upon proof of final invoice.

H-5.43.

Contractor shall confer with the FSR as to the necessity for carrying out the work required on the luffing cylinders and shall only carry out as much work as deemed necessary by the FSR. The foregoing is a list of anticipatory work required. The FSR and attending TCMSS Surveyor shall be the final authority on work required.

LIFEBOAT HOOKS

H-5.44.

While the Lifeboat is off the vessel, the two (2) existing release hooks shall be renewed with new GSM LHR-6 release hooks. Contractor, under FSR supervision, will remove the existing release hooks and install the new release hooks. As per section H-5.8 of this specification Contractor shall provide all equipment, hardware, personnel, etc. to carry out the required work and testing of the new release hooks under the direction and guidance of the FSR.

HYDRAULIC TANK/HAND PUMP ASSEMBLY

H-5.45.

Contractor shall remove the existing hydraulic tank and associated hand pumps (2 of) and install the new hydraulic tank and hand pumps (2 of). Any modifications to the piping or mounting arrangements shall be minor and are the responsibility of Contractor, under FSR supervision. As per section H-5.8 of this specification Contractor shall provide all equipment, hardware, personnel, etc. to carry out the required work and testing of the new release hooks under the direction and guidance of the FSR.

LUBRICATION POINTS

H-5.46.

Prior to functional tests, all grease points shall be suitably greased with CFM Unirex EP2 grease.

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FUNCTIONAL AND LOAD TESTING/NDT INSPECTION

H-5.47.

Upon completion of all work Contractor shall carry out operational testing and system load testing. Contractor shall supply certified weights as well as all appliances, hardware, and manpower necessary to load test the system using certified weights. All test equipment used, as well as weights, shall have verification and applicable test certificates. Contractor shall show these to the inspection Authority or CGTA. Equipment, materials, etc. not having applicable certification shall not be used, and the testing shall not proceed until as such time as authentication can be provided.

H-5.48.

Prior to load testing, the davit system shall be proven operational.

H-5.49.

A functional test shall be performed with the Lifeboat. Boat shall be lowered with CFM certified weights. A weight of 4,526.5 kg shall be put in the boat to perform the test. Lowering speed shall be noted. Both manual and hydraulic systems shall be checked. Release hook and suspension chain shall be inspected. Contractor shall arrange for the services of the TCMSS Surveyor.

H-5.50.

Upon completion of load testing, Contractor shall carry out non-destructive testing on various assembly welds and components as per the directions of the attending TCMSS Surveyor. Contractor shall use a certified NDT technician or sub-contract to a certified NDT company.

H-5.51.

Contractor shall include in the bid, 100 linear feet of NDT as well as a quote per additional foot. This price shall include preparations for the weld areas, actual dye-penetrant inspection using the technician's services, and subsequent priming and 2 top coats of coating. Top coatings shall be as per existing grade and colour.

H-5.52.

Upon completion of all NDT, Contractor shall include in the overall work report, the results of the tests such as locations and results.

H-5.53.

All locations chosen for NDT shall be at the direction of the attending TCMSS Surveyor.

H-5.54.

All oils and lubricants shall be contractor supply.

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H-5.55.

The cost of all craneage and transportation of components shall be provided and arranged by Contractor. All costs shall be included in the overall quote.

H-5.56.

Contractor shall supply 4 typewritten reports upon completion of all work. The report shall at a minimum list all work undertaken, repairs, parts used, measurements, readings, etc.

H-5.57.

All documentation shall be provided to demonstrate OEM compliance. No material substitutions shall be undertaken without the expressed written consent of Harding Safety Canada.

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H-6 MIRANDA DAVIT (ANNUAL INSPECTION)

The purpose of this specification item is to have Annual Inspection carried out on the Miranda Davit.

H-6.1.

This work shall be carried out in conjunction with Specification H-5 LIFEBOAT and LIFEBOAT DAVIT REPAIRS (SURVEY).

H-6.2.

The davit is a "MIRANDA" Type MRT 3900. The winch is a Type BHY 5300
Manufacturer Contact Info:

Harding Safety Canada Inc.
#120 - 20575 Langley By-Pass
Langley, British Columbia V3A 5E8
Canada
Tel: 1-604-530-0814
Fax: 1-604-530-0812
E-mail: colin.edwards@harding.no
Contact: Colin Edwards (604) 543-0849

H-6.3.

Contractor shall obtain the services of a qualified Harding Safety Canada Field Service Representative. Contractor shall provide all equipment, hardware, personnel, etc. to carry out the required work under the direction and guidance of the FSR. Contractor shall obtain certification for the FSR from Harding Safety Canada.

H-6.4.

Contractor shall include an allowance of \$5,000 for to cover the travel and living expenses of a Harding Safety Canada FSR. The FSR shall be reimbursed for the authorized travel and living expenses reasonably and properly incurred in the performance of the work, at cost without any allowance for the overhead or profit. The Allowance shall form part of the overall bid and shall be adjusted by PWGSC 1379 action upon proof of final invoice.

H-6.5.

All manufacturer's procedures and recommendations shall be followed during the scope of work with all technical specifications being adhered to as a minimum by Contractor. Contractor shall arrange for scheduling the onsite presence of a TCMSS Surveyor as required for inspections/testing during the course of all work.

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H-6.6.

Contractor shall supply all the necessary staging and craneage as required to work on, remove, transport, and install the various components during this overhaul. All personnel working on the davit system shall be suitably trained in fall restraint and all fall restraint equipment shall be certified and current.

H-6.7.

Prior to the commencement of any and all work, Contractor/FSR shall lock out the power pack unit, associated 110 volt condensation heaters, and the oil reservoir immersion heater. Contractor/FSR shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

H-6.8.

The FRC shall be removed by Contractor for storage if required by the FSR. Contractor shall provide all equipment, manpower, etc. to remove and land the FRC and to reinstall it upon completion of all work. Contractor will store the FRC in CFM fabricated chocks suitable for the boat. The FRC shall be protected from damage, paint, and dirt/debris during the Refit period.

H-6.9.

The Miranda Davit Cradle shall be removed by Contractor for storage if required by the FSR. Contractor shall provide all equipment, manpower, etc. to remove and land the Cradle and to reinstall it upon completion of all work. Contractor shall store the Cradle as per FSR instructions. The Cradle shall be protected from damage, paint, and dirt/debris during the Refit period.

H-6.10.

The FSR will complete an Annual Inspection on the FRC Davit as per the manufacturers' instructions/requirements. Any defects requiring repairs shall be worked on and cost negotiated through PWGSC 1379 actions.

H-6.11.

Upon completion of the annual inspections, two (2) type written copies of the report shall be provided to the CGTA within 24 hours of the completed work.

H-6.12.

All work shall be carried out to the satisfaction of the CGTA.

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H-7 Fresh Water Tank Cleaning (SURVEY)

The intent of this specification item is to open out the fresh water tanks, clean and prepare them for TCMSS inspections.

Table H-7.1 Fresh Water Tanks

Field	Tank Name	Location	Volume	Manhole Location
3L059	FW Tank Port	Fr 30-41	38.5 cu M	#49 Motor Room bulkhead, aft landing
3L060	FW Tank Stbd	Fr 30-41	58.4 cu M	#48 Motor Room bulkhead, aft landing

H-7.1.

Contractor shall drain the tanks of water. The manhole covers shall be removed from each tank by Contractor. Contractor shall provide each tank with a mechanical ventilation/extraction system, vented to the outside of the ship. Good ventilation shall be provided and any blowers/extractors shall ensure good air movement and solvent vapour removal from the lowest point in the tanks. Vapours, dust, dirt, etc. shall not be allowed to enter the Motor Room of the ship and shall be directed by flexible ducting to the outside of the vessel.

H-7.2.

Tanks shall be certified safe for personnel to enter prior to any work being carried out internally. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry certificates. A copy of a gas free certificate shall be given to the CGTA prior to personnel entering the tank and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each tank. Spaces shall be tested each day that personnel are required entry in the tanks. Contractor shall take note of the DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES.

H-7.3.

Contractor shall open both tanks and remove any remaining water from the tanks. The amount is estimated to be approximately 2 cubic meters per tank.

H-7.4.

Approximate surface area of the tanks;

- 120 square meters for Starboard
- 160 square meters for Port

H-7.5.

The internals of each tank shall be hydro-blast clean. Contractor shall protect each tank sounding transducer prior to commencing work and for the duration of all work in the tanks.

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H-7.6.

Both sight glasses shall be removed, cleaned internally, and reinstalled. Contractor shall provide all equipment, hardware, materials, manpower, etc. to carry out this work.

H-7.7.

Contractor shall take precautions to ensure that no damage, unnecessary cleaning, or repairs shall occur from hydro blasting and/or the application of coatings. Contractor shall ensure that every internal tank opening, where paint chips and debris from hydro blasting can gain entry, is suitably covered. Measures shall be taken to ensure that surfaces and equipment other than those specified are not coated and that any inlets or discharges will not be blocked by the coating or grit.

H-7.8.

Any rust areas and/or bare areas in the tanks shall be power tool buffed with a hand wire wheel to remove rust and bring areas to clean metal surfaces. The bare areas shall be buffed to SSPC-SP-3 standards. Contractor shall be responsible for disposing of all removed paintwork, scale, dirt, etc. in an environmentally safe manner and shall demonstrate compliance to the CGTA.

H-7.9.

Upon completion of hydro blasting and the removal of all debris, both tanks shall be thoroughly wipe down using lint free material or air swept to remove all visible signs of moisture on all surfaces. Contractor shall supply industrial dehumidification equipment to remove all moisture from each tank to a humidity level as required by the coating manufacturer for the application of their product. Contractor shall demonstrate that these conditions are met to the CGTA prior to the application of each coat. Contractor shall ensure that each coating application is thoroughly dry before any further applications take place. Contractor shall be responsible for landing this equipment on board and the subsequent removal including all personnel, hardware, lifting equipment, etc. Contractor shall also be responsible for monitoring this equipment as required.

H-7.10.

Upon completion of blasting, all residue and debris shall be cleaned and removed from the tanks. Upon completion of all cleaning, the CGTA and attending TCMSS Surveyor and local accredited Health Inspection Representative shall thoroughly inspect the tank internals.

H-7.11.

Contractor is responsible for arranging and co-ordination the TCMSS Surveyor and Health Inspection Representative for all required inspections identified in this specification item.

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H-7.12.

All disturbed areas shall be coated with 3 coats of Interline 925. The 3 coats shall be applied to yield 5 mils DFT per coat, with a suitable drying time provided for between coats. Contractor will supply and maintain heating equipment to obtain a tank surface temperature of 18 to 20 degrees Celsius on steel. Steel shall be coated during periods of drying and curing. The tanks shall be allowed to cure for seven days under these conditions prior to being filled. When coating is thoroughly cured, tank shall be inspected by CGTA and local accredited health inspector. Coating adhesion and condition shall be acceptable to the CGTA and local accredited health inspector. For bid purposes, Contractor shall bid on repairing 30 square meters and provide a unit cost for repairing 1 square meter for adjustment purposes through PWGSC 1379 action.

H-7.13.

All recorded information shall be type written and three (3) copies given to the CGTA.

H-7.14.

Upon completion of the above work and to the satisfaction of the Chief Officer and accredited health inspection representative, tanks shall be wiped clean. Sounding pipes, suction pipes and vents shall be proven clear prior to filling the tanks with water. All debris shall be removed ashore and each tank closed up in good order. The Chief Officer shall examine each tank prior to final closing. Manhole covers shall be replaced using new 1/4 inch neoprene gaskets. Any studs broken during the removal and replacement of the manhole covers shall be renewed by Contractor.

H-7.15.

Suction, discharge and fill valves on each tank shall be labelled for their respective location, disconnected, removed and taken ashore for overhaul.

H-7.16.

All valve bonnets shall be removed, valves dismantled, and disks cleaned and lapped in with compound to ensure a good seat. All valve stems, shall be cleaned and examined for wastage and then rung out. Any valve discs, seats and/or valve stems that require machining or renewal shall be brought to the attention of the CGTA and the TCMSS Surveyor for remedial action. All contiguous piping and studs shall be examined for wastage.

H-7.17.

Upon completion of all cleaning and overhauls, all parts shall be laid out for inspection by the CGTA and the TCMSS Surveyor.

H-7.18.

After completion of successful survey and/or repairs, all valves shall be reassembled to a working order, using new gaskets and valve stem packing and then returned to the vessel and reinstalled in their respective positions using new gaskets.

[H-7 FRESH WATER TANK CLEANING \(SURVEY\)](#)
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H-7.19.

All moving parts and fasteners shall be coated with CFM anti-seizing compound ("Never Seize" or equivalent).

H-7.20.

The final closing up of all valves shall be witnessed by the CGTA and the TCMSS Surveyor. Following inspection, all valves shall be reassembled in the closed position.

H-7.21.

Upon completion of all work each tank shall be filled with fresh water (contractor supply). Each vent shall be removed and each tank shall be filled to overflowing for a hydrostatic test on each tank to the satisfaction of a TCMSS Surveyor. Vents shall be installed with new contractor supply gaskets upon completion of all work.

H-7.22.

Contractor shall supply and add 12% chlorine to each tank and test to ensure a minimum level of 50 mg/l free chlorine. The solution shall be circulated by ship's personnel and then let set for 24 hours.

H-7.23.

The super-chlorinated water shall then be run through various potable water piping systems on board the vessel for at least one hour. Testing shall be carried out to ensure that the super-chlorinated solution is flowing through each tap. Contractor shall test various locations to prove this.

H-7.24.

Upon completion of super-chlorinated, the tank solutions shall be neutralised in each tank using CFM 35% hydrogen peroxide. The contents of the tank water shall be tested to determine that the chlorine has been neutralised. Once this has been achieved Contractor shall remove and dispose of the water. Contractor shall submit a type written report to the Chief Officer showing the results of the various tests during the super-chlorinated /de-chlorination process.

H-7.25.

Upon completion of all testing, Contractor shall fill the tanks with potable water. Contractor shall dose and test the tank contents until a free chlorine maintenance level of 0.2-0.5 mg/l of free chlorine has been attained.

H-7.26.

Contractor shall obtain test certificates from the Provincial Regulator that certifies that the water in the tanks is "fit to drink". These certificates shall be passed on to the CGTA.

H-7.27.

Contractor shall arrange and co-ordinate the visits required for the Provincial Health Inspector or accredited testing authority.

[H-7 FRESH WATER TANK CLEANING \(SURVEY\)](#)
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H-8 MANHOLE COVER STUD RENEWAL

H-8.1.

Any studs broken or found to be broken during the removal and replacement of all manhole covers by Contractor shall be renewed.

H-8.2.

Contractor shall include in their bid, the unit cost to renew one stud and an allowance to renew 10 studs.

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H-9 FIXED FIRE SUPPRESSION SYSTEMS (SURVEY)

The intent of this specification item is to have the vessel's fixed CO2, Wet and Dry, chemical fire suppression systems inspected and certified for TCMSS.

H-9.1.

The system shall be inspected and certified by a current factory certified fire suppression system inspection and certification specialist. Any defects found shall be corrected and dealt with through PWGSC 1379 action.

H-9.2.

The system cylinders are as follows;

- H-9.3.1. > 1 x 100 lb CO2 System – Crawl Space under Wheelhouse
- H-9.3.2. > 1 x 100 lb CO2 System – Crawl Space under Wheelhouse
- H-9.3.3. > 4 x 100 lb CO2 System – Aft Cargo Hold
- H-9.3.4. > 15 x 100 lb CO2 System – Fwd Cargo Hold
- H-9.3.5. > 1 x 50 lb CO2 System – Center Main Generator
- H-9.3.6. > 1 x 50 lb CO2 System – Port Main Generator
- H-9.3.7. > 1 x 50 lb CO2 System – Stbd Main Generator
- H-9.3.8. > 1 x 50 lb CO2 System – Port Propulsion Motor
- H-9.3.9. > 1 x 50 lb CO2 System – Stbd Propulsion Motor
- H-9.3.10. > 1 x 50 lb Dry Chemical Wheel Unit – Main Engine Room
- H-9.3.11. > 2 x 125 lb Wheel units – Helicopter Hanger
- H-9.3.12. > 2 x 23 cu.ft. N2 Cylinders – Helicopter Hanger
- H-9.3.13. > 2 x 3 Gal. Kidde Wet Chemical System – Galley

H-9.3.

All weights, levels, and pressures of cylinders shall be measured and recorded.

H-9.4.

All rotating beacons and flashing lights shall be tested and proven in good working order.

H-9.5.

All audible alarms shall be tested and proven in good working order.

H-9.6.

All wires and cables shall be proven in good working order.

H-9.7.

All piping and nozzles shall be proven clear.

H-9.8.

Certification in two (2) copies shall be passed to CGTA on completion of work.

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H-10 FM-200 FIXED FIRE SUPPRESSION SYSTEMS (SURVEY)

The intent of this specification item is to have the vessel's fixed fire suppression systems inspected and serviced. System is a Kidde Marine (FM-200)

H-10.1.

The system shall be inspected and certified by a current factory certified marine fire suppression system inspection and certification specialist.

H-10.2.

All weights, levels, and pressures of cylinders shall be measured and recorded.

H-10.3.

The system cylinders are as follows;

H-10.3.1. >	2 x 108 cu.in. Nitrogen Pilot Cylinder – Central Stores
H-10.3.2. >	2 x 108 cu.in. Nitrogen Pilot Cylinder – Cycloconverter Room
H-10.3.3. >	2 x 108 cu.in. Nitrogen Pilot Cylinder – Emergency Gen. Room
H-10.3.4. >	2 x 108 cu.in. Nitrogen Pilot Cylinder – Main Engine Room
H-10.3.5. >	1 x 108 cu.in. Nitrogen Pilot Cylinder – Motor Propulsion Rm
H-10.3.6. >	2 x 108 cu.in. Nitrogen Pilot Cylinder – Paint Locker
H-10.3.7. >	2 x 108 cu.in. Nitrogen Pilot Cylinder – Purifier Room
H-10.3.8. >	1 x 1040 cu.in. Nitrogen Pilot Cylinder – Main Engine Room
H-10.3.9. >	2 x 108 cu.in. Nitrogen Pilot Cylinder – Rope Stores
H-10.3.10. >	1 x 1040 cu.in. Nitrogen Pilot Cylinder – Motor Propulsion Rm
H-10.3.11. >	2 x 108 cu.in. Nitrogen Pilot Cylinder – Sewage Compartment
H-10.3.12. >	1 x 108 cu.in. Nitrogen Pilot Cylinder – Av.Gas / Coffer Dam
H-10.3.13. >	2 x 108 cu.in. Nitrogen Pilot Cylinder – Steering Gear
H-10.3.14. >	2 x 108 cu.in. Nitrogen Pilot Cylinder – Transformer Room
H-10.3.15. >	2 x 108 cu.in. Nitrogen Pilot Cylinder – Winch Rm/Bow Thruster
H-10.3.16. >	2 x 4070 cu.in. Nitrogen Pilot Cylinder – Main E/R Port Lower
H-10.3.17. >	2 x 4070 cu.in. Nitrogen Pilot Cylinder – Main E/R Stbd Lower
H-10.3.18. >	1 x 4070 cu.in. Nitrogen Pilot Cylinder – Main E/R Stack
H-10.3.19. >	4 x 4070 cu.in. Nitrogen Pilot Cylinder – Main E/R Upper
H-10.3.20. >	4 x 4090 cu.in. Nitrogen Pilot Cylinder – Motor Propulsion Rm
H-10.3.21. >	1 x FM200 – 125 lb. Cylinder ECS – Emergency Generator Rm
H-10.3.22. >	1 x FM200 – 125 lb. Cylinder ECS – Rope Stores
H-10.3.23. >	1 x FM200 – 200 lb. Cylinder ECS – Control Room
H-10.3.24. >	1 x FM200 – 395 lb. Cylinder ADS – Main E/R Stack
H-10.3.25. >	1 x FM200 – 200 lb. Cylinder ECS – Purifier Room
H-10.3.26. >	1 x FM200 – 675 lb. Cylinder ADS – Main E/R Port Lower
H-10.3.27. >	1 x FM200 – 200 lb. Cylinder ECS – Winch Rm/Bow Thruster
H-10.3.28. >	1 x FM200 – 675 lb. Cylinder ADS – Main E/R Stbd Lower
H-10.3.29. >	1 x FM200 – 350 lb. Cylinder ECS – Central Stores
H-10.3.30. >	2 x FM200 – 675 lb. Cylinder ADS – Main E/R Upper
H-10.3.31. >	1 x FM200 – 350 lb. Cylinder ECS – Transformer Room
H-10.3.32. >	1 x FM200 – 40 lb. Cylinder ECS – Paint Locker
H-10.3.33. >	1 x FM200 – 600 lb. Cylinder ECS – Cycloconverter Room
H-10.3.34. >	1 x FM200 – 600 lb. Cylinder ECS – Sewage Compartment
H-10.3.35. >	1 x FM200 – 60 lb. Cylinder ECS – Steering Gear
H-10.3.36. >	1 x FM200 – 70 lb. Cylinder ECS – Av.Gas / Coffer Dam
H-10.3.37. >	2 x FM200 – 101 lb. Cylinder ADS – Motor Propulsion Rm

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H-10.4.

All rotating beacons and flashing lights shall be tested and proven in good working order.

H-10.5.

All audible alarms shall be tested and proven in good working order.

H-10.6.

All wires and cables shall be proven in good working order.

H-10.7.

All piping and nozzles shall be proven clear.

H-10.8.

Any defects found shall be corrected and dealt with by PWGSC 1379 action.

H-10.9.

Certification in two (2) copies shall be passed to CGTA on completion of work.

Table H-10.1 Fixed Fires Suppression System Bottle Locations

Bottle Location	Space Protected	Pull Station	Pressure Switch
Compressor Room w/ N2 Delay	Transformer Room	Outside Officer's Lounge	Yes
Compressor Room w/ N2 Delay	Propulsion Motor Room - Fwd Set	Outside Officer's Lounge	Yes
Compressor Room w/ N2 Delay	Propulsion Motor Room - Aft Set	Outside Officer's Lounge	Yes
Prop. Motor Room Port w/ N2 Delay	Cyclo Converter Room	Transverse Alleyway Aft of Crew's Lounge	Yes
Prop. Motor Room Stbd w/ N2 Delay	Purifier Room	Transverse Alleyway Aft of Crew's Lounge	Yes
Fwd of Central Stores w/ N2 Delay	Sewage Compartment	Transverse Alleyway Aft of Crew's Lounge	Yes
Fwd of Central Stores w/ N2 Delay	Central Stores	Transverse Alleyway Aft of Crew's Lounge	Yes
Fwd of Central Stores w/ N2 Delay	Steering Gear Compartment	Transverse Alleyway Aft of Crew's Lounge	Yes
Fwd of Central Stores w/ N2 Delay	Aviation Fuel Cofferdam	Transverse Alleyway Aft of Crew's Lounge	No

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Table H-10.1 Fixed Fires Suppression System Bottle Locations (continued)

Bottle Location	Space Protected	Pull Station	Pressure Switch
Fwd CO2/FM200 Room w/ N2 Delay	Bowthruster & Winch Room	Foc'sle Head Port Side	Yes
Fwd CO2/FM200 Room w/ N2 Delay	Paint Locker	Foc'sle Head Port Side	Yes
Fwd CO2/FM200 Room w/ N2 Delay	Bosun's Stores	Foc'sle Head Port Side	Yes
A/C Room, Boat Deck w/ Delay	Emergency Generator	Outside Space, Aft of Door	Yes
Compressor Room	Generator Room - Fwd Set	Outside Officer's Lounge	Yes
Compressor Room	Generator Room - Aft-Mid Set	Outside Officer's Lounge	Yes
Compressor Room	Generator Room - Fwd-Mid Set	Outside Officer's Lounge	Yes
Compressor Room	Generator Room - Aft Set	Outside Officer's Lounge	Yes
Bottle Location	Space Protected	Pull Station	Pressure Switch
SAR Locker	Generator Room Stack	Outside Officer's Lounge	Yes
MCR	Fridge Compressors	Outside Officer's Lounge	Yes

CO2

Bottle Location	Space Protected	Pull Station	Pressure Switch
Compressor Room	Aft Cargo Hold	Outside Officer's Lounge	Yes
Lifesaving Locker - Boat Deck Stbd	Wheelhouse Void Space	After Bulkhead on Bridge	No
Aft Bulkhead Generator Room	Generators	At Bottle - Aft Generator Room Port Side	No
Propulsion Motor Room - Aft Starboard	Propulsion Motors	E/R Flats Outside Electrical Workshop	No
Fwd CO2/FM200 Room	Forward Cargo Hold	Outside Officer's Lounge	Yes

H-11 PORTABLE FIRE EXTINGUISHERS

H-11.1.

The extinguishers shall be weighed, inspected, and tagged for recertification by a qualified service agency.

H-11.2.

The type and quantity of extinguishers are listed in Appendix A.

H-11.3.

Two (2) copies of the certificates of inspection and test reports shall be turned over to the CGTA as soon as they are received from the inspection authority.

H-11.4.

Portable extinguishers shall remain operational and onboard the vessel at all times, except when being serviced. Any extinguishers that are required to be sent out for the purpose of recharging, repairs or testing, shall be replaced with temporary extinguishers of the same type and size provided by Contractor. Time required to carry out this work shall be kept to a minimum.

H-11.5.

Any additional service work shall be negotiated through PWGSC 1379 actioned.

H-11.6.

All work shall be completed to the satisfaction of the CGTA and TCMSS.

H-12 FIRE DETECTION SYSTEM

The intent of this specification item is to have the vessel's fixed fire detection system inspected and serviced by marine certified personnel. The system is a Notifier NFS-640.

H-12.1.

The system shall be inspected and certified by a current Notifier factory certified marine fire detection system inspection and certification specialist. Any defects found shall be corrected and dealt with by PWGSC 1379 action.

H-12.2.

The vessel's fire detection system consists of the following:

- H-12.1.1. > 151 Smoke Detectors
- H-12.1.2. > 19 Heat Detectors (rate of rise) or (fixed)
- H-12.1.3. > 3 Flame Detectors
- H-12.1.4. > 33 Pull Station
- H-12.1.5. > Monitor
- H-12.1.6. > Bells
- H-12.1.7. > General Alarm Activation
- H-12.1.8. > Fire Door Activation

All the above components shall be tested.

H-12.3.

All rotating beacons and flashing lights shall be tested and proven in good working order.

H-12.4.

All audible alarms shall be tested and proven in good working order.

H-12.5.

Two (2) copies of the certificates of inspection and test reports shall be turned over to the CGTA as soon as they are received from the inspection authority.

H-12.6.

Contractors certified for land based systems only are not acceptable.

H-12.7.

All work shall be completed to the satisfaction of the CGTA and TCMSS.

H-13 FOAM FIRE SUPPRESSION SYSTEMS (SURVEY)

The intent of this specification item is to have the vessel's three (3) main fixed foam fire suppression systems inspected and certified for TCMSS.

H-13.1.

The system shall be inspected and certified by a current factory certified fire suppression system inspection and certification specialist.

H-13.2.

The fixed foam systems are used on the Helicopter Deck and are as follows;

- H-13.3.1. > 1 x 1000 Litre Foam Tank System – Dead Start Air Compressor Compartment
- H-13.3.2. > 1 x 567 Litre Foam Tank System – Starboard Foam Tank in Helicopter Hanger
- H-13.3.3. > 4 x 567 Litre Foam Tank System – Port Foam Tank in Helicopter Hanger

H-13.3.

All weights, levels, and pressures shall be measured and recorded.

H-13.4.

All rotating beacons and flashing lights shall be tested and proven in good working order.

H-13.5.

All audible alarms shall be tested and proven in good working order.

H-13.6.

All wires and cables shall be proven in good working order.

H-13.7.

All piping and nozzles shall be proven clear.

H-13.8.

Contractor shall note that the main “Heli Foam Pumping Unit and Control” (TCMSS Field Number 3H040), for the 1000 Litre Foam Tank System has already been inspected and certified by TCMSS.

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H-13.9.

Contractor shall provide certification and documentation of foam concentrate tests for each of the three (3) main tanks. The foam shall be proven acceptable for use by certification.

H-13.10.

Any defects found shall be corrected and negotiated through PWGSC 1379 action.

H-13.11.

Contractor shall provide 2 copies of the certificates and type written reports to the CGTA upon completion of specified work.

H-14 ABOVE WATERLINE PAINTING (SUPERSTRUCTURE) VLE

The intent of this specification item is to clean and paint the entire ship superstructure, masts, deck machinery, including the helicopter hanger. Contractor shall supply all coatings, paints, equipment, and hardware necessary for the cleaning and painting of the above water areas of the hull. The existing Alkyd Enamel coating shall be repaired and/or renewed utilizing International Marine (Akzo Nobel Coating Ltd) epoxy coatings.

H-14.1

Contractor shall prepare the superstructure, mast, deck machinery, including the helicopter hanger and apply the coating system in accordance with the manufacturer's recommendations. In conjunction with any functional Q & A procedure, the following points shall be carried out:

- H-14.1.1. > Provide a list of batch numbers with correspondent dates of manufacture.
- H-14.1.2. > Record the quantity and type of any solvent added.
- H-14.1.3. > Measure and record the ambient conditions.
- H-14.1.4. > Record details of spray tips and pressures.
- H-14.1.5. > WFT gauge readings shall be taken on a regular basis during application.
- H-14.1.6. > Using a calibrated DFT gauge, fifteen (15) measurements per 100 square ft. shall be taken and recorded. Upon agreement of consistency with the CGTA, fifteen (15) measurements per 1000 square ft. shall be taken and recorded.

H-14.2

All recorded information shall be typewritten and three (3) copies given to the CGTA.

H-14.3

All superstructure mounted windows, fixtures and equipment such as the exterior light fixtures, speakers, receptacles, ventilation inlets shall be effectively covered and sealed. All windows shall be covered and sealed using thin masonite or equivalent to protect the glass items from damage during all phases of hull preparation and coating. Greases and similar types of compounds shall not be used. All protective coverings shall be removed upon completion of all work.

H-14.4

Contractor shall take precautions to ensure that no damage, unnecessary cleaning, or repairs shall occur from abrasive blasting and/or the application of coatings.

H-14.5

Contractor is responsible for all removals of ladders, fenders, damage control wood beams to allow access to perform the work. All removals shall be put back in good order upon completion of this specification work.

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H-14.6

Grit used for blasting shall not be allowed to enter any part of the vessel or its exposed equipment, and where such ingress may occur, the equipment shall be suitably protected.

H-14.7

Prior to grit blasting the superstructure, Contractor shall temporarily mark the original location of each decal symbol so that the GSM decals can be applied by Contractor upon completion of all work, in their subsequent original locations.

H-14.8

Contractor shall plug deck scuppers and discharges as well as taking other measures necessary to prevent any liquids from contaminating areas being prepared or coated. Contractor shall ensure that every opening into the vessel where grit can gain entry is suitably covered.

H-14.9

Measures shall be taken to ensure that surfaces and equipment other than those specified are not coated and that any inlets or discharges will not be blocked by the coating or grit. Contractor is responsible for removing any over spray on the vessel as a result of this work. Deck machinery and other gear, susceptible to damage by grit or coating material shall be protected as necessary.

H-14.10

Areas shall be addressed include but are not limited to:

- H-14.10.1. > Tank and Void space vents.
- H-14.10.2. > Machinery spaces
- H-14.10.3. > Funnel outlets
- H-14.10.4. > All exterior lights
- H-14.10.5. > PA speakers
- H-14.10.6. > Helicopter fueling system
- H-14.10.7. > Hanger Tracks
- H-14.10.8. > Helicopter deck and hanger lighting system
- H-14.10.9. > Searchlights
- H-14.10.10. > Navigation equipment
- H-14.10.11. > Air intake plenums and air intake and exhaust trunking;
- H-14.10.12. > Accommodations air intake and exhaust plenums and trunking
- H-14.10.13. > Barge, lifeboat, FRC
- H-14.10.14. > Deck machinery including crane, winches, and davits
- H-14.10.15. > Exposed steel wires for davits, winches, etc.

H-14.11

The ship's superstructure area is approximately 1100 square meters (including masts, davits and other equipment). In addition, the aluminum hanger is approximately 350 square meters.

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H-14.12

Contractor shall fresh water wash the areas to remove all dirt and contamination, as necessary. Degrease according to SSPC-SP1 solvent cleaning. Ensure area is clean and dry prior to application. Corroded and damaged areas spot grit blast to SA2 STD and remaining all areas full grit blast to SA1. In areas where grit blasting cannot be use, Contractor shall use "Power Tool Cleaning to Bare Metal SSPC.SP11" method to service damaged areas.

Contractor shall ensure the area is clean and dry prior to application of coatings.

Contractor shall bid on abrasive blasting to the above noted standard 30% of the Superstructure surface plus 100 % of the Hanger structure (approximately 680 square meters in total). Contractor shall quote on a unit price per square meter for adjustment purposes. All coating edges shall be feathered back a minimum of 300mm. The superstructure and hanger areas shall be swept clean of all traces of grit with compressed air. The surface profile shall have a minimum roughness of 2 mils.

Blasting material used on the aluminum shall be non-metallic. It may be preferable to use a Hydro blasting. However, water ingress to the hanger shall be prevented and the overall result shall produce a surface prep, minimum roughness of 2 mils.

H-14.13

Contractor shall stripe coat all welds, edges and inaccessible areas. A stripe shall be completed with each coat. All areas (except boat ramps) shall receive a touch up coat of Intershield 300 abrasion resistant epoxy. A full coat of Intergard 263 as a tar free tie coat to the subsequent 2 coats of Interthane 990 polyurethane top coat finish

The following paint process shall be used for each colour and area:

Table H-14.1 White areas of the Super Structure including Davits:

Product	Sales Code	Colour	Coats	WFT Mils	Volume Solids (%)	DFT Mils
Intershield 300	ENA300/A	Bronze	50% TU	8.3	60	5.0
Intergard 263	FAJ034/A	Light Grey	FC	5.3	57	3.0
Interthane 990	PHA163/A	RAL9003 White	FC	3.5	57	2.0
Interthane 990	PHA163/A	RAL9003 White	FC	3.5	57	2.0
				21.6		12.0

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Table H-14.2 Mast & Areas that are Buff and Cranes etc.:

Product	Sales Code	Colour	Coats	WFT Mils	Volume Solids	DFT Mils
Intershield 300	ENA300/A	Bronze	50% TU	8.3	60	5.0
Intergard 263	FAJ034/A	Light Grey	FC	5.3	57	3.0
Interthane 990	PHA165/A	RAL7040 Buff	FC	3.5	57	2.0
Interthane 990	PHA165/A	RAL7040 Buff	FC	3.5	57	2.0
				21.6		12.0

Table H-14.3 Boat Davit Ramps:

Product	Sales Code	Colour	Coats	WFT Mils	Volume Solids	DFT Mils
Intershield 803	EGA808/A	Red	50% TU	6.7	75	5.0
Intershield 803	EGA807/A	Grey	FC	4.0	75	3.0
Interthane 990	PHA163/A	RAL9003 White	FC	3.5	57	2.0
Interthane 990	PHA163/A	RAL9003 White	FC	3.5	57	2.0
				17.7		12

Table H-14.4 Aluminum Hanger and Workshops:

Product	Sales Code	Colour	Coats	WFT Mils	Volume Solids	DFT Mils
Intershield 300	ENA300/A	Bronze	FC	8.3	60	5.0
Interthane 990	PHA163/A	RAL9003 White	FC	3.5	57	2.0
Interthane 990	PHA163/A	RAL9003 White	FC	3.5	57	2.0
				15.3		9

Table H-14.5 Grey areas of the Super Structure including Deck equipment:

Product	Sales Code	Colour	Coats	WFT Mils	Volume Solids	DFT Mils
Intershield 300	ENA300/A	Bronze	50% TU	8.3	60	5.0
Intershield 300	ENA301/A	Aluminium	FC	8.3	60	5.0
Interthane 990 ***Color shall be Grey Ral 7042***	PHA100/A	Base Ultra Deep	FC	3.5	57	2.0
Interthane 990 ***Color shall be Grey Ral 7042***	PHA100/A	Base Ultra Deep	FC	3.5	57	2.0
				23.6		14.0

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H-14.14

Contractor shall arrange for the services of a qualified installation technician to install the hull symbol decals on the Superstructure. All costs for this work shall be covered under the allowance listed in HD-14.22.

Suggested company: 3M Trimline (supplier of GSM decals)

H-14.15

All traces of grit used for blast cleaning shall be removed by Contractor. Contractor shall be responsible for ensuring that the superstructure is clear and clean prior to, during, and immediately after the coating application.

H-14.16

Contractor shall remove all protective materials from the machinery, equipment windows, vents etc. on completion of the coating work. All grit, dirt, debris, rust, scale, etc. shall be removed from all decks and areas of accumulation and disposed of ashore by Contractor

H-14.17

All Winteb Vents shall be opened up and cleaned, removing any possible debris from the grit blasting. Vents shall be assembled with new GSM gaskets fitted.

H-14.18

All staging, cranes, screens, lighting and any other support services, equipment, paint and materials necessary to carry out these specifications shall be CFM, installed, and removed upon completion of all work.

H-14.19

Suitable storage facilities shall be provided close to the work site by Contractor for the material and equipment, to ensure they shall be maintained at the recommended temperature of the coating manufacturer for ease of preparation and proper application.

H-14.20

All coatings shall be applied in strict accordance with the manufacturer's instructions and recommendations.

H-14.21

All work shall be completed to the satisfaction of the CGTA.

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H-15 BRIDGE CLEAR-VIEW WINDOW RENEWAL & REPAIRS

The intent of this specification item is to renew one Heated Clear-view screens and service the existing window frame. A new window and clear view screen shall be fitted at the following location.

WBD-7 (see drawing at end of specification)

H-15.1.

Contractor shall electrically and mechanically isolate the Clear-view Window and heater system to allow the removal of the components. All electrical and mechanical lockouts and tag outs shall be carried out to the satisfaction of the CGTA, as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

H-15.2.

Contractor is responsible for removal, disassembly of all furniture, electric heaters and reassembly to gain access to these windows.

H-15.3.

Where required, Contractor shall implement a fall restraint system for all workers working on the windows. Contractor shall supply all necessary and currently certified fall restraint equipment and devices for all their workers.

Contractor shall note that there is a “catwalk” outboard of the Bridge.

H-15.4.

Hot work shall not commence until the all associated work areas have been certified gas free and safe for hot work. Contractor is responsible for any cleaning in this area to prepare for hot work. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the space and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each space. Spaces shall be tested each day that personnel are required entry in the space. All precautions shall be taken to protect all areas from hot work damage. Contractor shall take note of the requirements under the DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES and DFO/5737 Fleet Safety Manual, 7.B.4 – HOTWORK for these spaces.

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Contractor is responsible for maintaining an adequate fire watch during the course of all hot work. This shall include providing various applicable extinguishers and extinguishing mediums as necessary. This shall also include any necessary preparations and cleaning in the vicinity of the work area to obtain a gas-free permit. Forced portable ventilation with flexible ducting shall be used during any hot work or grinding operations to lead any dirt, dust, smoke, etc. to the outside of the ship.

H-15.5.

The fittings and flooring within the Bridge shall be adequately covered and protected from dirt, debris, materials, etc. during the course of all work. Contractor shall ensure the entire Bridge Control Panels in way of the clear view windows being renewed, is completely protected from damage and debris from the work involved.

All window openings shall be covered sealed to prevent the ingress of water or debris due to inclement weather.

H-15.6.

For all areas where the existing coating has been disturbed, Contractor shall power tool clean/prepare all steel surfaces in accordance with "SSPC.SP11Power Tool Cleaning" standards. A minimum profile of 25 microns (1mil) is specified, 2 mils is preferred.

H-15.7.

Contractor shall ensure all coated surfaces are clean and dry before any over-coating. Contractor shall "feather back" existing coating around all heavy pitted areas so that the appearance of the front structure is smooth.

H-15.8.

Contractor shall apply primer and top coats to all new and disturbed steel work as specified in H-14 ABOVE WATERLINE PAINTING (SUPERSTRUCTURE).

H-15.9.

Contractor shall remove the existing window and clean the window coaming of all old sealant materials. Contractor shall note that there is a stainless steel interior frame that shall be removed before the window is removed. The metal frame shall be power tooled clean (as required – in consultation with the CGTA). Once the coaming and exterior sealing lip has been cleaned to bare metal, the CGTA shall inspect the coaming and exterior lip to determine if these items are in need of renewal.

H-15.10.

Removed window and clear-view shall be carefully placed into a Contractor fabricated shipping crates. The crates shall be placed aboard ship, CGTA will advise on the location.

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H-15.11.

Window Size: 1228mm x 828mm x 19 mm

Interior S.S. Frame is secured with 38 x ¼ inch S.S. Bolts.

H-15.12.

The new window (GSM Supplied, P.O. #F5561-15-2019) shall be installed using the following sealing compounds or equivalent (any equivalent sealing compound shall be approved prior to use by the CGTA);

HD-15.12.1. > Pro Form Products (part # PF225) – Fast Cure Windshield Adhesive (Ships part # 8040-21-TAP-5069)

HD-15.12.2. > Pro Form Products (part # PF940) – Double Sided ½” Adhesive Tape (Ships part # 7510-21-TAP-5071)

H-15.13.

The new window shall be properly sealed secured. New stainless steel bolts shall be fitted to the securing interior frame.

H-15.14.

Contractor shall install the new clear view screens (GSM Supplied, P.O. #F5561-15-2018) as per manufacturer's directions. A new controller for the clear-view shall also be fitted (also GSM supplied). The location of the control panel/box shall be determined by the CGTA at the time of install.

Any damaged wiring for the clear-view screens shall be renewed. Contractor shall consult with the CGTA before the window is rewired to confirm whether any wiring shall be renewed. Contractor shall estimate that approximately 3 meters of 16 gauge, 5 conductor marine rated armoured cable for the heater and motor circuit. Actual wiring requirements shall be determined at the time of installation, using manufacturers' recommended specifications. This estimate shall be included in the overall bid. Actual amount of wiring required shall be adjusted up or down (credit), through PWGSC 1379 action.

Window Frame Renewal

H-15.15.

Contractor shall remove the interior window trim bulkhead panels and insulation material so that the existing 49.5 inch W x 41.5 inch H x 3 inch D, 3/8 inch thickness window coaming (all outside dimensions listed) can be accessed for removal. A new coaming shall be fabricated with the same inside dimensions as existing, but fabricated using 5/8 inch thick flat bar instead of 3/8 inch thickness. The same radius corners shall be made. The coaming shall be drilled and threaded for 38, ¼ inch UNC securing bolts. The bolt holes shall be centered on the coaming and evenly spaced.

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A new $\frac{3}{4}$ inch high by $\frac{1}{2}$ inch thick exterior sealing lip shall be fitted to the new coaming, using continuous weld. The actual position of the seal lip shall be similar to original. Contractor shall ensure that a proper distance is allowed so that the new window can be properly fitted sealed.

The wheelhouse bulkhead will require trimming in order to fit the new frame. New coaming shall be welded to the wheelhouse bulkhead. Welding shall be performed on both sides, continuous welds (welding sequence shall be required to prevent distortion of the coaming). New CFM insulation shall be installed.

H-15.16.

Watertight integrity of the frame, plug and insert welds shall be check; when checking the window seal.

H-15.17.

Bulkhead panel trim segments need some adjusting in order to fit to the slightly larger securing frame, all disturbed new steel shall be painted with primer and top coat as per specification H-14. In addition, the areas surrounding the frame to a distance of at least one foot shall be power tool cleaned and painted.

H-15.18.

The new windows shall be properly secured using the new stainless steel securing frame and stainless steel bolts.

H-15.19.

Contractor shall include a cost in their bid for 3 meters of 14 gauges, 2 conductor marine rated armoured cable for the heater circuit and 3 meters of 16 gauges, 2 conductor marine rated armoured cable. The actual required lengths shall be adjusted through PWGSC 1379 action.

H-15.20.

Upon completion of the window installation work and clear-view renewal, the window and associated clear-view unit shall be tested for watertight integrity using a fire hose, with the CGTA in attendance. Contractor is responsible to investigate and repair any leaks found for work conducted in this specification item.

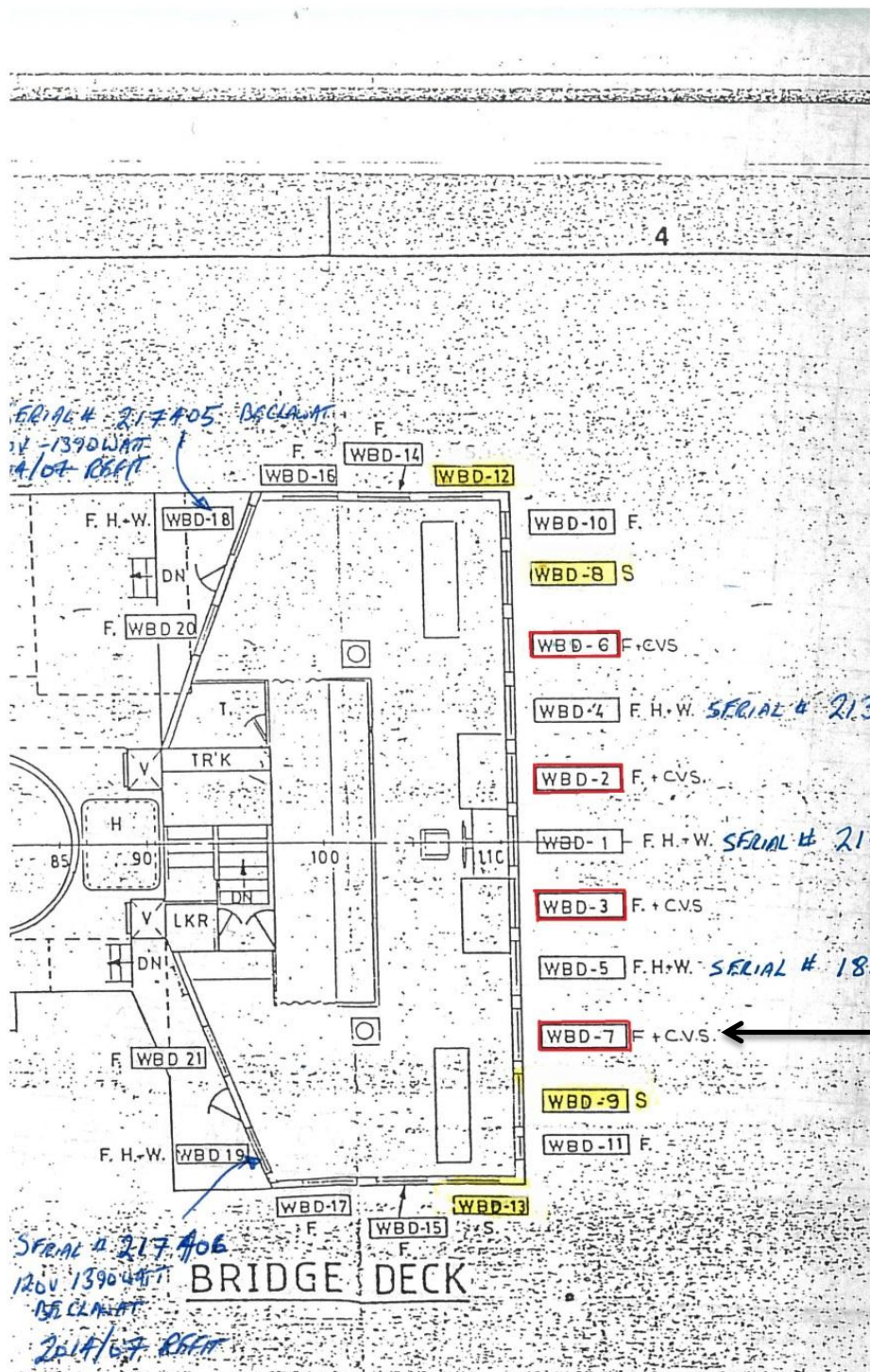
Once proven leak free, the clear-view shall be functional tested. This shall include testing the heaters and the operation of the clear-views. Any problems due to work performed by Contractor shall be rectified by Contractor. All final measurements are the responsibility of Contractor.

H-15.21.

All work shall be carried out to the satisfaction of the CGTA.

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Bridge Window Location



Clear-view window is located at the “red box” ID position in front of arrow.

H-16 BRIDGE WINDOW REPAIRS

The intent of this specification item is to remove the following Heated Bridge Windows for repairs to the framing:

- H-16.1.1. > Starboard forward heated window (in front of Captain's chair)
- H-16.1.2. > Centre forward heated window (in front of Quartermasters chair)

In addition, 2 new wiper units shall be fitted at each heated window location (Newer style with greater blade pressure).

General Window Work

H-16.1.

Prior to the commencement of any and all work, Contractor shall issue a Safety Lockout Procedure. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed. Contractor is responsible for removal, disassembly of all furniture, electric heaters and reassembly to gain access to these windows.

H-16.2.

Where required, Contractor shall implement a fall restraint system for all workers working on the windows. Contractor shall supply all necessary and currently certified fall restraint equipment and devices for all their workers.

H-16.3.

All precautions shall be taken to protect all areas from hot work damage. All hot work shall be carried out as per Contractor's and Coast Guard hot work authorization with all necessary precautions being taken. Forced portable ventilation with flexible ducting shall be used during any hot work or grinding operations to lead any dirt, dust, smoke, etc. to the outside of the ship. Contractor shall take note of the requirements under the DFO/5737 Fleet Safety Manual, 7.B.4 – HOTWORK for these spaces.

H-16.4.

The fittings and flooring within the Bridge shall be adequately covered and protected from dirt, debris, materials, etc. during the course of all work. Contractor shall ensure the Control Panel in way of the Centre Bridge Window shall be protected from damage and that all window openings shall be covered to prevent the ingress of inclement weather.

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H-16.5.

For all areas where the existing coating has been disturbed, Contractor shall power tool clean/prepare all steel surfaces in accordance with “SSPC-SP3 Power Tool Cleaning” standards. A minimum profile of 25 microns (1mil) is specified.

H-16.6.

Contractor shall ensure all coated surfaces are clean and dry before any over-coating. Contractor shall “feather back” existing coating around all heavy pitted areas so that the appearance of the front structure is smooth.

H-16.7.

Two primer coats of Amerlock 2 epoxy (1st one grey and the 2nd one white) and a top coat of Amercoat 5450 Marine Enamel White (CFM) shall be applied, **NOTE:** The top coat of Amercoat 5450 Marine Enamel “White” shall match with International Interlac 665 – “White” CLB 000/1 CLC287/1 (this is the white used onboard the vessel).

Starboard and Centre Forward Bridge Windows

H-16.8.

Contractor shall note that there is a “catwalk” outboard of the Bridge, but the catwalk does not extend across the center section of the Bridge. Contractor is responsible for staging or “bridging” equipment required to work on the center Bridge window.

H-16.9.

Contractor shall remove external Window Wiper units (complete) prior to replacing the window glass. The Window Heater grid wiring shall be also disconnected prior to removal of the windows. Both the wiper and the window heater grid power breakers shall be isolated and locked-out – refer to H-16.1. Upon completion of the window replacement, a new wiper assembly (GSM Supplied, P.O. #F5561-14-2752) shall be installed and tested for proper operation.

H-16.10.

Contractor shall remove the existing window. Contractor shall note that there is a stainless steel interior frame shall be removed before the window is removed. Contractor shall be extremely careful when removing, handling, and storing the windows. The windows shall sit on their edges and not laid down flat. Windows shall be properly protected while removed from the window frames.

H-16.11.

At each heated window location, the existing wiper drive shaft hole and mounting bolt screw holes will require sealing off since the new unit has a different mounting arrangement. Contractor shall fit a round insert approximately 57mm diameter of 6mm thick Lloyds Grade “A” steel. The insert shall be welded on both sides, ground flush on the exterior portion. The 4 x 10mm bolt holes can be welded, both sides, ground flush on the exterior.

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H-16.12.

Note: Contractor shall check to see if the mounting holes for the new wiper unit match the old prior to welding over. Contractor shall mark new mounting holes for the new wiper assembly if old do not match. Four holes shall be drilled to 11mm diameter as per template.

H-16.13.

Contractor shall remove the interior window trim bulkhead panels & insulation material so that the existing 49.5 inch W x 41.5 inch H x 3 inch D, 3/8 inch thickness window frame (all outside dimensions listed). A new frame shall be fabricated with the same inside dimensions as existing, only using 5/8 inch thick flat bar instead of 3/8 inch. The same radius corners shall be made. Contractor shall quote separately, but part of the overall bid, for the renewal of the window frame. Contractor shall also quote, but not part of the overall bid, the cost of replacing a 1 foot section of the frame for PWGSC 1379 purposes. The frame shall be drilled and threaded for 38, 1/4 inch UNC securing bolts. The bolt holes shall be centered on the frame and evenly spaced. The wheelhouse bulkhead will require trimming in order to fit the new frame. New frame shall be welded to the wheelhouse bulkhead. Welding shall be performed on both sides, continuous welds (welding sequence will be required to prevent distortion of the frame).

H-16.14.

A new interior securing frame shall be fabricated from "316" stainless steel. New bolt holes (38) shall be drilled into the new interior frame, evenly spaced and centered & matched to the new steel frame

H-16.15.

Watertight integrity of the frame, plug & insert welds shall be checked. When checking the window seal.

H-16.16.

Bulkhead panel trim segments will need some adjusting in order to fit to the slightly larger securing frame all disturbed new steel shall be painted with primer & top coat as per H-14. In addition, the areas surrounding the frame to a distance of at least one foot shall be power tool cleaned & painted.

H-16.17.

Window Size: 1228mm x 828mm x 19 mm

H-16.18.

Interior S.S. Frame is secured with 38 x 1/4 inch S.S. Bolts

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H-16.19.

The windows shall be re-installed using the following sealing compounds or equivalent (any equivalent sealing compound shall be approved prior to use by the CGTA);

Pro Form Products (part # PF225)
Fast Cure Windshield Adhesive
(Ships part # 8040-21-TAP-5069)

Pro Form Products (part # PF940)
Double Sided ½ inch Butyl Adhesive Tape
(Ships part # 7510-21-TAP-5071)

H-16.20.

The windows shall be properly secured using new stainless steel bolts. The Window Heater grid and thermostats shall be electrically connected. Any damaged wiring shall be renewed. Contractor shall consult with the CGTA before the window is rewired to confirm whether any wiring shall be renewed. Contractor shall estimate that approximately 3 meters of 14 gauge, 2 conductor marine rated armoured cable for the heater circuit and 3 meters of 16 gauges, 2 conductors marine rated armoured cable is required.

H-16.21.

Contractor shall disconnect and removed the existing wiper controllers (2) on the Bridge and renew them with GSM new controllers (part #1000-115-110-1: Nato #6685-AM-142-3101). New Coast Guard supplied controller boxes shall be used to fit the new controllers. Contractor shall drill and fit wiring conduits, mounting holes, mounting plates, etc.

H-16.22.

Upon completion of all the window installation work & wiper renewal, the two windows and associated wiper units shall be tested for watertight integrity using a fire hose, with the CGTA in attendance. Contractor is responsible to investigate and repair any leaks found on the items worked on in this specification.

H-16.23.

All final measurements are the responsibility of Contractor.

H-16.24.

All work shall be carried out to the satisfaction of the CGTA.

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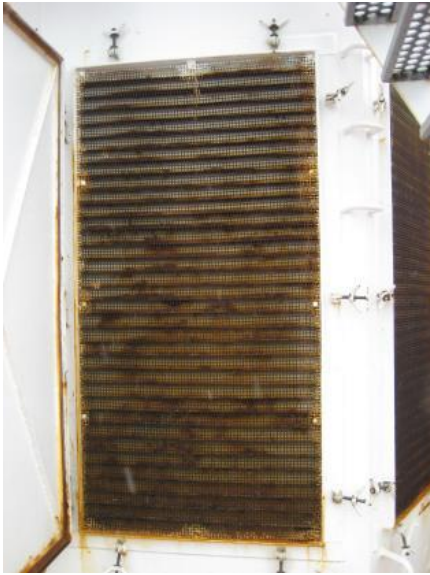
H-17 MACHINERY/ACCOMMODATION SPACE VENT SCREENS & DOOR REPAIRS

The intent of this specification item is to remove the doors to de-scale the corrosion on the doors & louvers (louver renewals, H-17.2), paint, fit new gaskets and clean stainless steel screening of rust stains.

The following Vent Screens and Doors require attention. The hinges shall be made free.

- H-17.1.1. > Port and stbd, forward E/R inlets (2) Size 72.5 inch x 36.5 inch Gasket 1 ¼ inch x ½ inch thick.
- H-17.1.2. > Port and stbd, aft E/R inlets (2) Size 72.5 inch x 29.25 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.3. > Transformer room inlet Size 47 inch x 39 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.4. > Prop Motor room inlet Size 35 inch x 23 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.5. > Purifier Room intake Size 23.25 inch x 15.25 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.6. > Vent fan room 11.5 inch x 11.5 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.7. > Converter Room inlet 46.75 inch x 31 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.8. > Emergency Generator Air Out 46.5 inch x 35 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.9. > Emergency Generator air intake 27.25 inch x 17.5 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.10. > Generator cooling air 47 inch x 36.5 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.11. > Port & Stbd Accommodation air intake (2) 18.5 inch x 44.5 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.12. > Port & Stbd Accommodation room vents (2) 11.5 inch x 11.5 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.13. > Aft Cargo hold inlet 19.25 inch x 17 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.14. > Sewage compartment inlet 22.25 inch x 18.5 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.15. > Officers dryer vent 11 inch x 11 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.16. > Av Gas Air in 33.5 inch x 32.25 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.17. > Av Gas Outlet 12.5 inch x 12.5 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.18. > Steering gear inlet 32.25 inch x 28 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.19. > Steering gear outlet 19 inch x 19 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.20. > Central Stores inlet 21.5 inch x 27.25 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.21. > Sewage compartment outlet 30.75 inch x 14.75 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.22. > Cargo hold outlet 19.75 inch x 15.5 inch Gasket 1 ¼ inch x ½ inch thick
- H-17.1.23. > Central stores outlet 27 inch x 21.75 inch Gasket 1 ¼ inch x ½ inch thick

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Port Fwd E/R Inlet



Transformer Rm Inlet

H-17.1

All doors shall be removed by removal of the hinge pins. Hinge pin assemblies for each door shall be cleaned & pins freed up. Pin grease ways shall be flushed with new grease. Pins shall be retained at each hinge to ensure there is no mixing up of components

H-17.2

The following vent inlets require new louvers fitted:

- H-17.3.1. > Port and stbd, forward E/R inlets (2) Size of louvers 36.5 inch x 2.75 inch x 3/16 inch
Quantity 33 per inlet
- H-17.3.2. > Port and stbd, aft E/R inlets (2) Size of louvers 33 inch x 2.75 inch x 3/16 inch
Quantity 33 per inlet
- H-17.3.3. > Transformer room inlet Size of louvers 38.5 inch x 2.75 inch x 3/16 inch
Quantity 22
- H-17.3.4. > Prop Motor room inlet Size of louvers 22.5 inch x 2.75 inch x 3/16 inch
Quantity 17
- H-17.3.5. > Purifier Room intake Size of louvers 15 inch x 2.75 inch x 3/16 inch
Quantity 11
- H-17.3.6. > Vent fan room (2) Size of louvers 11 inch x 2.75 inch x 3/16 inch
Quantity 5 per inlet
- H-17.3.7. > Converter Room inlet Size of louvers 30.5 inch x 2.75 inch x 3/16 inch
Quantity 21

New louvers shall be fabricated using 304L stainless steel material. In addition, 3/8 square 304L stainless steel center support bar shall be fitted on the inboard side of the louvers. All louvers shall be welded to the center support rod. New louvers shall be attached to the steel casing of the vent using 309L rods.

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H-17.3

Hot work shall not commence until all areas in the vicinity of the hot work have been certified gas free and safe for hot work. Contractor shall determine by testing/inspection and proof of certificate that the area is safe for hot work. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the tank and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each space. Spaces shall be tested each day that personnel are required entry in the space. All precautions shall be taken to protect all areas and personnel from hot work damage. Contractor is responsible for maintaining an adequate fire watch during the course of all hot work. This shall include providing various applicable extinguishers and extinguishing mediums as necessary. This shall also include any necessary preparations and cleaning in the vicinity of the work area to obtain a gas-free permit. Contractor shall take note of the requirements under the DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES and DFO/5737 Fleet Safety Manual, 7.B.4 – HOTWORK for these spaces.

H-17.4

All areas that have been affected by this work shall be mechanically cleaned to SSPC-SP11 standards and shall be primed and painted as per H-14 ABOVE WATERLINE PAINTING (SUPERSTRUCTURE).

H-17.5

Fitted woven stainless steel wire mesh screen at each vent shall be removed and chemically cleaned, removing all rust stains. The fine mosquito mesh screens fitted to each accommodation fan intake, aft cargo hold inlet, and central stores inlet/outlet shall be removed and disposed of. Contractor shall supply and fit new stainless steel fine mosquito mesh screen at these locations. The cleaned mesh screen shall be fitted using **F 593C** stainless steel fasteners.

H-17.6

The louvers and frame, both internal (where possible), and external at each ventilation door location shall be cleaned to SSPC-SP-11 standards. All louvers (existing and newly fitted), plus all frame casings at each ventilator door location shall be primed and painted as per H-14 ABOVE WATERLINE PAINTING (SUPERSTRUCTURE). Louver openings shall be sealed as best as possible to prevent debris accumulating in the ventilation trunk. Where accessible, Contractor shall clean & paint/coat the inlet trunk as mentioned above.

H-17.7

Gasket material shall be removed from each door and disposed of ashore by Contractor.

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H-17.8

The doors shall be fitted with new CFM neoprene gaskets, 25-30 Duro hardness. All securing dogs shall be made free. The pins shall be removed and excess paint cleared off. Threaded portion of the dogs shall be cleaned using a die nut or die.

H-17.9

All doors except the 2 Accommodation air inlet doors shall have all rusty corroded areas power tool clean SSPC-SP11 to bare metal. All power tooled cleaned surfaces, of each door, shall be primed and painted as per "H-14, Above water line area".

The Accommodation doors are made of aluminum. These doors shall have all corroded areas power tool clean SSPC-SP11 to bare metal. The doors shall be painted using 2 coats of International Paint aluminum compatible pure epoxy primers & 2 top coats as per H-14 ABOVE WATERLINE PAINTING (SUPERSTRUCTURE). Contractor shall note that a tie coat of POLYURETHANE maybe required to allow proper application of the top coats. Contractor shall consult with the International Paint representative on this requirement.

H-17.10

Upon completion of all painting, Contractor shall supply and fit neoprene gasket material, glued in place. Doors shall be installed and checked for a good fit. All hinges shall be lubricated. Each door shall be hose tested to prove its integrity.

H-17.11

Contractor shall supply and fit brass nameplates accordingly to both sides of each door. The nameplates set shall read the same as the existing name plates. The name plates shall be pinned or screw locked to the name plate mount using stainless steel fasteners.

H-17.12

All work shall be completed to the satisfaction of the CGTA.

E-1 ANCHOR WINDLASS (SURVEY)

The intent of this specification item is to have Contractor opened up the anchor windlass for a survey/inspection as per TCMSS requirements.

Contractor shall arrange to have a TCMSS Surveyor as required during the scope of the work to ensure a survey credit is obtained.



E-1.1

Contractor shall electrically and mechanically isolate the anchor windlass to allow the removal of the components. All electrical and mechanical lockouts and tag outs shall be carried out to the satisfaction of the CGTA, as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

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E-1.2

Hot work shall not commence until the all associated work areas have been certified gas free and safe for hot work. Contractor is responsible for any cleaning in this area to prepare for hot work. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the space and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each space. Spaces shall be tested each day that personnel are required entry in the space. All precautions shall be taken to protect all areas from hot work damage. Contractor is responsible for maintaining an adequate fire watch during the course of all hot work. This shall include providing various applicable extinguishers and extinguishing mediums as necessary. This shall also include any necessary preparations and cleaning in the vicinity of the work area to obtain a gas-free permit. Contractor shall take note of the requirements under the DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES and DFO/5737 Fleet Safety Manual, 7.B.4 – HOTWORK for these spaces

E-1.3

If work has not been started on HD-17 ANCHORS, CHAINS AND CHAIN LOCKERS (SURVEY) then, both anchors shall be secured using the existing cable lifter locking bars as well as wire straps and shackles, contractor supply. Securing of the anchor cables and anchors shall be done to the satisfaction of the CGTA.

E-1.4

Contractor shall remove port and starboard anchor cables, from the anchor windlass chain lifters prior to disassembling the windlass. These shall be lifted clear and secured on deck to the satisfaction of the CGTA. Contractor shall supply all craneage, hardware, and personnel to carry out this task. NOTE: This spec can be done in conjunction with HD-17 ANCHORS, CHAINS AND CHAIN LOCKERS (SURVEY).

E-1.5

Contractor shall measure and record main gear backlash. Last reading was 0.080 inch. Contractor shall provide a copy of the readings to the CGTA.

E-1.6

The windlass gear case shall be drained of oil, approximately 70 liters. Contractor shall dispose of this waste gear oil in an environmentally approved manner and shall demonstrate compliance to the CGTA.

E-1.7

The 4 shaft bearing caps shall be removed and tagged to prevent inadvertent swapping of bearing caps.

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E-1.8

The upper gear case cover shall be removed. The gear case cover shall be raised and set aside. The windlass shaft, complete with bull gear, wildcats, and warping heads shall be raised from its seats and removed ashore to Contractor's workshop. Care shall be exercised to ensure no damage occurs to the oil seals on the shaft at gear case sides during removal, disassembly, and subsequent reinstallation. All exposed bearing seats and the gear case shall be protected from dirt and moisture ingress while the shaft is removed. The windlass shaft shall be suitably supported while being slung out and while ashore, to maintain true alignment.

E-1.9

Contractor shall quote on fabricating a new shaft made of AISI 4340 Lloyd's certified for cold weather operation, suitable for arctic conditions. Contractor shall note that an OEM dimension drawing is not available. The existing shaft shall be used as a template. A copy of the last set of readings before machining is attached to this specification. The overall length of the shaft is approximately 136 inches by 7 inches diameter.

In addition to this quote, Contractor shall be required to fabricate 4 new saddle bearings and bearings sleeves for the 2 wild cats. Material shall be a Tin bronze suitable for grease lubrication, high load-carrying capacity, good wear resistance and the ability to withstand pounding. Contractor shall fit the new saddle bearings to the housing/cap and the new bearing sleeves to the 2 wild cats. All bearings shall have grease ways and passaged formed in the bearing shell as per original design. This quote shall form part of the overall bid.

E-1.10

Both band brake assemblies shall be removed, disassembled, cleaned, and inspected for wear and defects. The brake lining material on both brakes shall be inspected for wear and defects. Brake linkages and pins shall be disassembled, cleaned, and inspected for wear and defects. The brake assemblies shall have the linkages and pins greased during assembly. Upon completion of assembly, the brake assemblies shall be adjusted as required.

E-1.11

The warping drum cover plates shall be removed, along with the retainer plates. The warping heads shall then be withdrawn from the shaft, followed by the clutch assemblies. Split collars, locating the wildcats on the shaft, shall be removed and the wild cats drawn off the shaft.

E-1.12

All parts shall be cleaned of grease and oil. All grease ways shall be proven clear.

E-1.13

Contractor shall supply and install 2 new pinion shaft bearings, SKF 23030 CC/W33.

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E-1.14

When cleaned and laid open, all components shall be inspected by a TCMSS Surveyor for survey credit.

E-1.15

Contractor shall carry out magnaflux inspections on the 2 windlass shaft keyways as well as the associated keyways in the warping drums.

E-1.16

Upon completion, the wildcats, locating collars, clutches, and warping heads shall be reassembled on the windlass shaft in good order and adjustment.

E-1.17

In conjunction with hull painting, all exterior/exposed surfaces of the winch unit containing loose paint, rust, and/or bare steel shall be dry abrasive blasted to a bare steel condition of **(SSPC-SP10)/NACE No. 2(Sa 2-1/2) near white metal**. This shall include the warping drums, wildcats, and clutches. It shall also include the deck area inside the bed plate perimeter. This shall not include the windlass shaft or bull gear. All bearing surfaces, gear case internals, grease passageways shall be sealed up and protected from all grit.

E-1.18

All adjacent and surrounding areas, machinery, etc. shall be protected from the ingress of grit and blast particles as per the requirements of hull painting. The surrounding areas shall be cleaned of all grit and blast materials by Contractor upon completion of all work.

E-1.19

Upon completion of sandblasting, the entire winch unit and components shall be swept clean of all grit using compressed air.

E-1.20

Contractor shall apply 2 strip coats and 2 full coats of Intershield 300 Abrasion Resistant Epoxy to all bare areas using contrasting colours. Contractor shall then apply 2 topcoats of Interthane 990 to all winch components. The colour shall match the existing yellow/beige "buff" colour paint scheme aboard ship. Contractor shall adhere to International Paint recommendations for DFT readings & coating applications.

E-1.21

The windlass is powered by a high torque, low speed radial piston hydraulic motor, Hydrostar MRH-190. The motor shall be removed from the vessel and taken to a marine hydraulic repair and service shop for inspection and possible overhaul as per manufacturer's recommendations. Contractor shall identify their hydraulic specialist / sub-contractor.

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Contractor shall provide a cost for a core exchange and the cost to rebuild the existing motor to CGTA. CGTA will advise what method shall be employed.

For estimating purposes, Contractor shall allow for \$8,000.00 for a core exchange or parts and labour to overhaul fitted motor. This allowance shall form part of the overall bid and shall be adjusted through PWGSC 1379 action upon proof of final invoice.



E-1.22

If Contractor does not use the services of a certified hydraulic subcontractor then Contractor shall employ or demonstrate that one of their employees carrying out this work is a certified technician to oversee any technical work that may be required.

E-1.23

The hydraulic motor flexible hoses and hydraulic deck penetrations shall be renewed. The welded 4 deck penetration couplings shall be renewed with 10,000 to 15,000 psi rated (depending on size of port) straight couplings that are welded on both sides of the deck plate. Contractor shall remove the focsile deck head expanded metal sheathing and insulation to allow access to the backside. Once new penetrations are fitted, Contractor shall check for leaks at the welded joints using a pressurized fire hose. New CFM insulation shall be fitted at the deckhead once all testing has been completed and proven leak free. The removed expanded metal sheathing shall be fitted in good order.

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E-1.24

The new CFM hoses are attached to the windlass hydraulic motor and are comprised of 2 each #12 hoses x 3 feet and 2 each #16 hoses x 2 feet each. The renewal shall include the hose fittings as well.

E-1.25

All new flexible lines shall be pressure tested and cleaned to a preferred NAS 6 Standard, all pressure testing and cleanliness shall be complete with certification stating the 1.5 times Working Pressure test and the NAS 6 cleanliness. Copy of certification shall be given to the CGTA.

E-1.26

New Denso tape shall be applied to all fittings upon completion of hose renewal and testing for leaks. Contractor shall apply Denso tape to the deck fittings on exposed portions.

E-1.27

The Rexroth hydraulic pump shall be dealt with as per E-1A ANCHOR WINDLASS POWER PACK PUMP OVERHAUL. In conjunction with this work Contractor or subcontractor shall perform the following work on the windlass hydraulic pumping unit:

1. Collect a hydraulic oil sample and send away for analysis. Report shall be forwarded to the CGTA.
2. Drain and dispose of approximately 300 liters of hydraulic oil from the reservoir. Contractor shall demonstrate that this oil was disposed of in an environmentally safe manner to the CGTA. This shall include oil in piping, pumps, reservoir and oil coolers, etc.
3. Remove the cover and clean the oil reservoir using lint-free rags or wipers. CGTA shall inspect the tank internals prior to final closing. Contractor shall supply and install new door seal to the tank.
4. Renew all filter elements with new filter elements, GSM.
5. Replenish the hydraulic system oil using contractor supply filtered to 3 micron.

Oil type: Petro-Canada Hydrex MVI-36

Note: **Do Not** substitute this product or grade.

6. Relief valve settings, as recommended by the manufacturer, shall be verified.

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E-1.28

The windlass, pumping unit, and all associated components shall be reassembled in good order. Care shall be exercised when returning the windlass shaft to its seating in order to prevent damage to the gear-case seals and the brass spacer rings located on the windlass shaft between the warping heads and the adjacent bearing seats.

E-1.29

The gear case flanges shall be cleaned of all old jointing materials and sealant. The gear case shall be wiped out using clean lint free rags. This work shall include the interior of the gear case cover. New oil proof jointing shall be used on the flanges, as well as jointing compound required to obtain an oiltight/watertight seal. The gear case cover shall be installed in good order and the flange bolts shall be secured, using anti-seize compound on threads

E-1.30

The support bearings shall be closed up in good order and adjustment, and lubricated with contractor supply EP grease.

E-1.31

All bed plate seating bolts shall be checked for slackness and tightened/renewed as required. Any other fasteners found worn, corroded, or defective shall be renewed through PWGSC 1379 action as per original.

E-1.32

The gear case shall be filled with new CFM oil, Petro Canada Synthetic Enduratex EP 220 (approximately 70 liters of oil required). Contractor shall remove, clean, and reinstall the gear case sight glass.

E-1.33

All grease points shall be refilled with CFM grease. The ship's Winchman will assist as required in pointing out the various grease points and shall witness the greasing of the entire windlass.

E-1.34

Upon completion of all work, and before reinstallation of the anchor cables, the anchor windlass shall be test run to check for leaks and to ensure satisfactory operation.

E-1.35

The anchor cables shall then be installed in conjunction with HD-17 ANCHORS, CHAINS AND CHAIN LOCKERS (SURVEY) and the windlass shall be operationally tested again to demonstrate satisfactory operation of the unit as well as the clutches and wild cats.

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E-1.36

The windlass shall be test run to the satisfaction of the TCMSS Surveyor and the CGTA. All inspections shall be carried out to the satisfaction of the CGTA and attending TCMSS Surveyor.

E-1.37

Any and all oil spills that occur aboard the vessel in the course of this repair item are the responsibility of Contractor and shall be immediately cleaned up by Contractor.

E-1.38

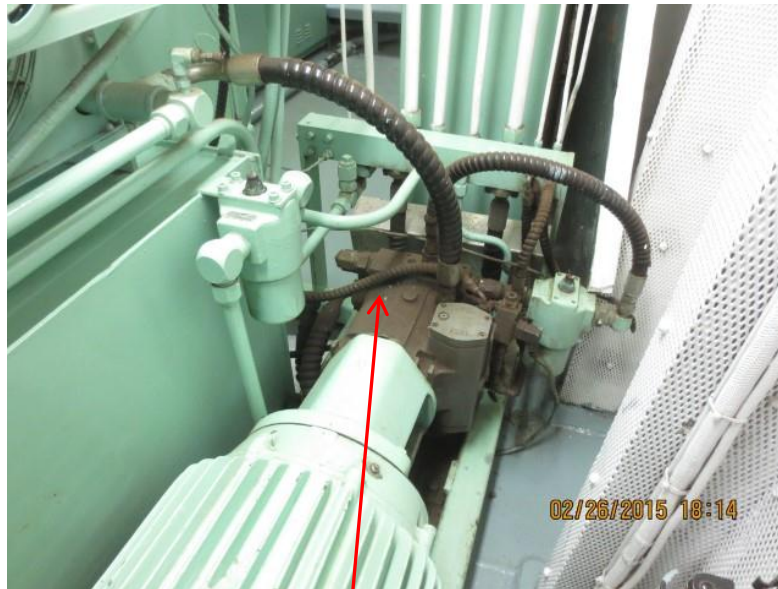
All work shall be done to the satisfaction of the CGTA. Contractor shall supply the CGTA with 3 typewritten copies of a report detailing the work undertaken, defects, measurements with a drawing of the shaft, bearing bushes and saddle bearings, parts renewed, and material test certificates.

E-1A ANCHOR WINDLASS POWER PACK PUMP OVERHAUL

The intent of this specification item is to service/renew the anchor windlass hydraulic power unit, renew all hydraulic hoses and service the anchor windlass control desk components.



Anchor Windlass Hydraulic Pump set



Rexroth pump

E-1A.1

HPU Pump is a Rexroth Hydrostatic Transmission Pumps, type AA4V.
Anchor Windlass: AA4V125HD302020

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E-1A.2

Contractor shall remove the anchor windlass pump from its respective location. All oil lines shall be plugged / capped to prevent the ingress of dirt and debris during pump absence as well as the drainage of hydraulic oil. All pipe leakage shall be contained and disposed of ashore by Contractor to an environmentally approved disposal facility. Contractor shall immediately clean up any spillage during removal and installation.

E-1A.3

Contractor shall examine each half of the Magnaloy 500 series pump drive coupling. This shall include removing the half from the drive motor shaft to examine the condition of the splines. The drive motor coupling half shall be installed upon completion of inspection. A new CFM spider element shall be supplied and fitted during installation. The size of the element is not known.

E-1A.4

Contractor shall transport the pump to their facilities. All craneage, manpower, equipment, and hardware to transport and return the pump on board shall be supplied by Contractor. The electric motor shall be serviced on L-3 MOTOR OVERHAULS (SURVEY).

E-1A.5

Contractor shall provide a cost for a core exchange of the Rexroth Pump. For estimating purposes, Contractor shall allow for \$17,000.00 for a pump core exchange and for parts and labour to renew all hydraulic line including pilot control lines fitted to the anchor windless control desk and for a new magnaloy coupling spider element. This allowance shall form part of the overall bid and shall be adjusted through PWGSC 1379 action upon proof of final invoice. All large hydraulic lines shall have a bursting deflective cover fitted similar to as fitted, but with better protection

E-1A.6

Upon completion receipt of a new pump, the pump shall be bench load tested at Contractor's facilities to prove the integrity of the unit. The CGTA shall witness each bench test.

E-1A.7

All new hydraulic flexible lines shall be pressure tested and cleaned to a NAS 6 Standard, all pressure testing and cleanliness shall be complete with certification stating the 1.5 times Working Pressure test and the NAS 6 Cleanliness. Contractor shall supply a copy of the certificates to the CGTA.

E-1A.8

Contractor shall overhaul the anchor windlass control valve Rexroth 2TH7P05-/X/M05 CGTA shall supply the rebuild kits, Plunger kit 07212141 and seal kit 2TH7KIT, for this work

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Contractor shall verify the operation of the control desk start, stop controls. The fitted pressure gauge shall be removed, tested/calibrated. A test certificate shall be issued indicating the accuracy of the pressure gauge to the CGTA.

Contractor shall test the function of the indicating lights.

New CFM brass tags shall be fitted to the control desk for the lights, electric controls, meter, pressure gauge and control lever indicating the purpose of each item i.e. red Button is "Stop HPU". CGTA will supply a list of ID names for the tags. 10 tags are required.



Anchor Windlass Control Desk

E-1A.9

The pump shall be returned to the vessel and installed. Alignment shall be made good with the drive motor with a new spider fitted to the Magnaloy coupling. All connections shall be made and any connection O-rings or seals shall be renewed, CFM.

E-1A.10

Upon completion of installation, anchor windlass pump set shall be operationally tested. Contractor is responsible for any fine turn adjustments to the stroke of the pump swash plate. The pump set shall be tested while stowing the anchor and chains

E-1A.11

Contractor shall supply the CGTA with 3 typewritten copies of a report detailing the work undertaken, defects, measurements, parts renewed for the HPU inspection / survey.

E-1A.12

All work shall be completed to the satisfaction of the CGTA.

Anchor Windlass



**E-2 MAIN STEAM LINE TESTING & ISOLATION VALVE
OVERHAUL (SURVEY)**

The intent of this specification item is to carry out an inspection on the main steam cross over / header pipe and service the steam header isolation valves.



Steam Header pipe connection at #2 Boiler check valve



Steam Header pipe with 5 distribution/isolation valves

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E-2.1

Contractor shall remove the 7 isolation wraps, fitted to the 5 isolation valves and the 2 flange connections. All valves shall be suitably tagged such that they may be reinstalled in their original respective locations. The four 1 ½ inch and one 2 inch isolation valves shall be removed and taken ashore to Contractor's facility for overhauling.

E-2.2

Spindles shall be removed from the valve bonnets, cleaned and laid out for inspection. The internals of the valve bodies, valves, and sealing surfaces shall be cleaned thoroughly. Metal to metal seated valves shall be lapped to provide a watertight/steam-tight seal.

E-2.3

Contractor shall release pipe connections at each boiler check valves. Also, Contractor shall release pipe flange connections at the header pipe. All pipe flange connections shall be power tooled clean, removing all old gasket material.

E-2.4

Contractor shall arrange to have a TCMSS Surveyor view the isolation valves, header pipe flange connections.

E-2.5

Upon approval by the TCMSS Surveyor, Contractor shall reassemble the header pipe flange connections using new gaskets (Durlon 9000) and fit blanks at all header pipe flange connections in preparation for a hydrostatic test on the header pipe assembly. Contractor shall make sure that a method is put in place to capture most of the water from the header pipes once testing is complete. A hydrostatic test of 9 bar is required for at least 4 hours.

Contractor shall arrange to have TCMSS Surveyor present to view the hydrostatic test.

E-2.6

Upon completion of all work and satisfactory inspection, all valves shall be reassembled with new steam service gland packing. Each valve shall be installed in its original respective location aboard the vessel, using new CFM Durlon 9000 jointing material. The boiler check valves shall be fitted in the correct flow direction new CFM Durlon 9000 gaskets fitted on each end of the check valve.

E-2.7

Contractor shall repair the calcium silicate insulation at the starboard boiler connection to the check valve. Approximately 1 foot of formed calcium silicate pipe insulation is required with a 2 inch wall thickness. Pipe size is 3 inch. The calcium silicate insulation shall be coated with fiberglass cloth, with lagging paste applied.

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E-2.8

Contractor shall supply and fit new removable heat wraps at all valves and the flange connections at each boiler check valve. The wraps shall have a silicon type cloth material on outer jacket.

E-2.9

All work shall be completed to the satisfaction of the CGTA.

E-3 FORWARD MOORING WINCH OVERHAUL

The intent of this specification item is to describe the work required to overhaul both forward mooring winches. Currently, the port mooring winch motor is leaking at the shaft seal.



E-3.1

The port and starboard forward single drum Mooring Winches located on the Forecastle deck shall be opened up for inspection and overhaul. The winches were manufactured by Pacific Winch, model 56/3B-4-3. The units are powered by a hydraulic motor, Hagglund 43-0096. The hydraulic pump unit is a Rex Roth A4V125 HD powered by a 50 HP, 600 volt motor.

E-3.2

The mooring lines shall be removed from the drums by ship's crew. Contractor shall electrically and mechanically isolate the anchor windlass to allow the removal of the components. All electrical and mechanical lockouts and tag outs shall be carried out to the satisfaction of the CGTA, as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

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E-3.3

Hot work shall not commence until the all associated work areas have been certified gas free and safe for hot work. Contractor is responsible for any cleaning in this area to prepare for hot work. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the space and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each space. Spaces shall be tested each day that personnel are required entry in the space. All precautions shall be taken to protect all areas from hot work damage. Contractor is responsible for maintaining an adequate fire watch during the course of all hot work. This shall include providing various applicable extinguishers and extinguishing mediums as necessary. This shall also include any necessary preparations and cleaning in the vicinity of the work area to obtain a gas-free permit. Contractor shall take note of the requirements under the DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES and DFO/5737 Fleet Safety Manual, 7.B.4 – HOTWORK for these spaces

E-3.4

All components of the assembly shall be protected from corrosion and dirt ingress during overhaul.



E-3.5

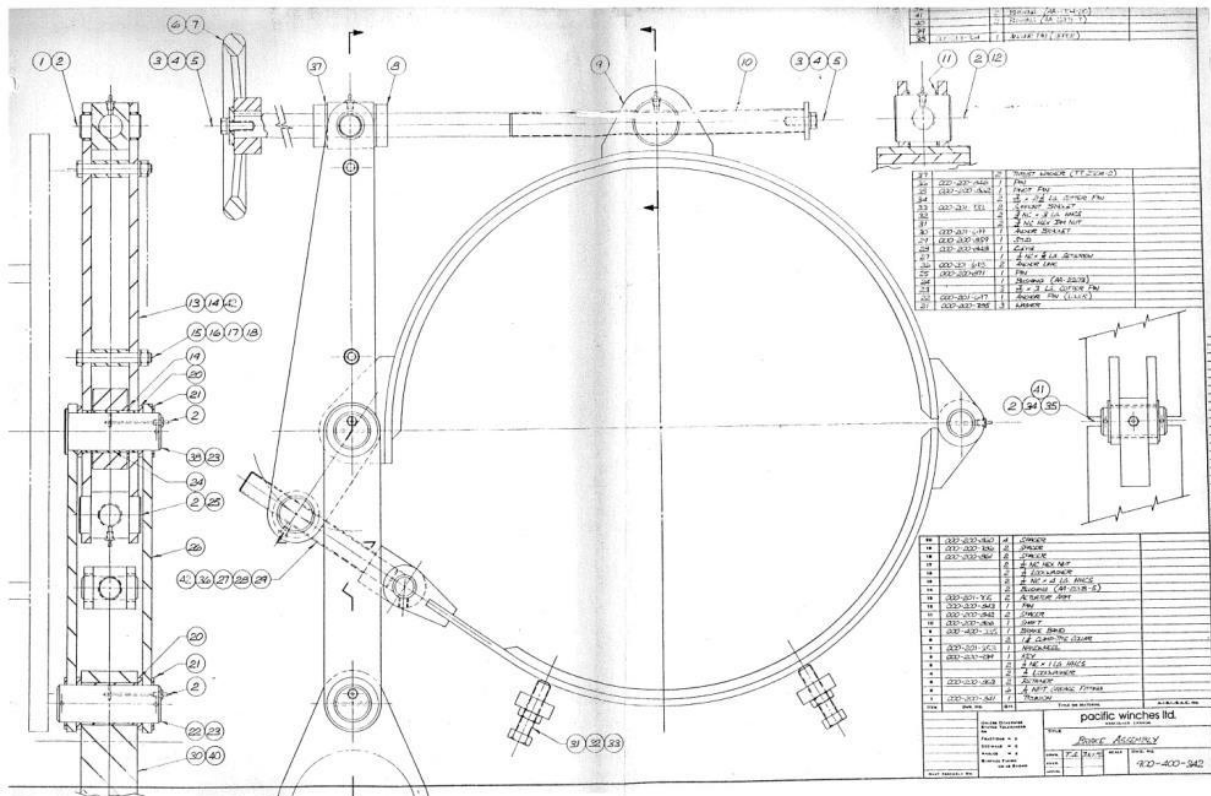
The winch drum brakes and clutch assemblies shall be completely disassembled; all pins, linkages screws, and bushings shall be renewed. Levers and arms shall be power tool cleaned to SSPC-SP-3, given one coat of International Marine Primer and two top coats of GSM buff.

[E-3 FORWARD MOORING WINCH OVERHAUL](#)
[E-3 FORWARD MOORING WINCH OVERHAUL](#)

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Brake bands shall be renewed with new material of the same dimensions and quality as original. The brake drums shall be cleaned of all scale by power tool cleaning and then degreased.



E-3.6

The mooring winch shaft bearing caps shall be let go and the shaft and drum assembly lifted clear. The winch shaft shall be cleaned and dressed in way of the bearings. The bearings shall be cleaned and opened for inspection. The shaft diameter and bearing bore diameter measurements shall be observed and recorded in a typewritten report and three copies given to the CGTA.

E-3.7

All grease passages for both winches, clutches and brake assemblies shall be cleared of all old grease and then proven clear using compressed air. New stainless steel grease nipples shall be supplied and installed.

E-3.8

In conjunction with H-14 ABOVE WATERLINE PAINTING (SUPERSTRUCTURE), all exterior/exposed surfaces of the winch unit containing loose paint, rust, and/or bare steel shall be dry abrasive blasted to a bare steel condition of (SSPC-SP10)/NACE No. 2(Sa 2-1/2) near white metal. This shall include the warping drums, and clutches. It shall also include the deck area inside the bed plate perimeter. All bearing surfaces, gear case internals, grease passageways shall be sealed up and protected from grit.

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E-3.9

Contractor shall stripe coat all welds, edges and inaccessible areas. A stripe shall be completed with each coat.

The following paint process shall be used for the winch components & frame:

Table E-3.1 Coatings

Product	Sales Code	Colour	Coats	WFT Mils	Volume Solids (%)	DFT Mils
Intershield 300	ENA300/A	Bronze	FC	8.3	60	5.0
Intergard 263	FAJ034/A	Light Grey	FC	5.3	57	3.0
Interthane 990	PHA165/A	RAL7040 Buff	FC	3.5	57	2.0
Interthane 990	PHA165/A	RAL7040 Buff	FC	3.5	57	2.0
				21.6		12.0

E-3.10

New CFM grade 8 securing bolts for each winch assembly shall be fitted.

E-3.11

Contractor shall bid an allowance of \$8,000.00 for fabricating new pins, bushings, motor seal kits, motor relief valves and other items identified as requiring renewal. This allowance shall form part of the overall bid and shall be adjusted through PWGSC 1379 action upon proof of final invoice

E-3.12

The 5 flexible hoses (per unit) shall be renewed using materials of equal quality and sizes as the original equipment installation.

The welded 5 deck penetration couplings (per unit) shall be renewed with 10,000 to 15,000 psi rated (depending on size of port) straight couplings that are welded on both sides of the deck plate. Contractor shall remove the expanded metal sheathing and insulation in way of the Boson stores and the winch/bowthruster Compartment Deck Head to carry out safe cropping and welding operations. Once new penetrations are fitted, Contractor shall check for leaks at the welded joints using a pressurized fire hose.

New CFM insulation shall be fitted at the deckhead once all testing has been completed and proven leak free. The removed expanded metal sheathing shall be fitted in good order. Insulation shall be of a non-wicking (non-absorbent) liquid resistant type of material with vapour barrier.

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E-3.13

All new CFM flexible lines shall be pressure tested and cleaned to a preferred NAS 6 Standard, all pressure testing and cleanliness shall be complete with certification stating the 1.5 times Working Pressure test and the NAS 6 cleanliness. Contractor shall provide a copy of the certifications to the CGTA. Oil spills that occur aboard the vessel in the course of this repair item are the responsibility of Contractor and shall be immediately cleaned up by Contractor.

E-3.14

New Denso tape shall be applied to all fittings upon completion of hose renewal and testing for leaks. Contractor shall apply Denso tape to the deck fittings on exposed portions.

E-3.15

The Rexroth hydraulic pump shall be dealt with as per spec E-4A. In conjunction with this work Contractor or subcontractor shall perform the following work on the mooring winch hydraulic pumping units (2 units):

- E-3.15.1. > Collect a hydraulic oil sample and send away for analysis. Report shall be forwarded to the CGTA.
- E-3.15.2. > Drain and dispose of approximately 300 liters of hydraulic oil from each reservoir for a total of 600 liters approximately. This shall include oil in the piping, pumps, reservoir and oil coolers.
- E-3.15.3. > Open and clean both oil reservoirs using lint-free rags or wipers.
- E-3.15.4. > Remove, dismantle, clean, and inspect all mountings on both reservoirs. This shall include but not be limited to valves, heaters, doors, temperature elements, etc. Upon completion of inspections, re-assemble all items using new sealants and gaskets. Renew all filter elements with new filter elements of equal capacity and filtration ability. Elements are GSM.
- E-3.15.5. > Replenish the hydraulic system oil using contractor supply filtered to 3 micron. Oil type is Petro-Canada Hydrex MVI-36. **NOTE:** Do Not substitute this product or grade.
- E-3.15.6. > Leak check both systems when in operation and correct all defects found.
- E-3.15.7. > Verify relief valve settings and adjust as required to the manufacturer's recommendations.
- E-3.15.8. > Conduct a function/operation test of each mooring winch and control system as a whole unit to ensure the unit performs as listed in the manufacturer's manual.
- E-3.15.9. > Provide a detailed type written report for each mooring winch listing the repairs carried out, parts used, measurements, readings, etc.

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E-3.16

Upon completion of inspections and cleaning, both of the mooring winches and associated components shall be reassembled in good order and adjusted. All exterior deck steel hydraulic fittings shall be wrapped in 'Denso-tape' after leak testing.

E-3.17

All grease fittings shall be charged with CFM EP grease.

E-3.18

Brake bands shall be adjusted to provide even clamping around circumference of drum.

E-3.19

Final testing shall verify hydraulic circuit free of leaks, relief valve settings correct and brake operation to the satisfaction of the CGTA. Hydraulic oil sample shall be taken after run in of machinery. All materials are CFM unless where otherwise noted.

E-3.20

Reference drawings:

- E-3.20.1. > Pacific Winches 900-400-283C
- E-3.20.2. > Rex-Roth manual series AA4V
- E-3.20.3. > Hagglunds Installation & Maintenance Manual Series 21,43,63,&84.

E-3.21

All work shall be done to the satisfaction of the CGTA. Contractor shall supply the CGTA with 3 typewritten copies of a report detailing the work undertaken, defects, measurements with a drawing of the shaft, bearing bushes and saddle bearings, parts renewed, and material test certificates.

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E-3A PORT AND STARBOARD MOORING WINCH POWER PACK PUMP OVERHAUL

The intent of this specification item is to service/renew the Port & Starboard Mooring Winch hydraulic power unit, renew all hydraulic hoses and service the Port & Starboard Mooring Winch control desks components.



Rexroth pump



Mooring winch Hydraulic Pump set

E-3A.1.

HPU Pump is a Rexroth Hydrostatic Transmission Pumps, type AA4V.

Mooring winch: AA4V125HD302020 (2 units)

E-3A.2.

Contractor shall remove the mooring winch pumps from their respective locations. All oil lines shall be plugged/capped to prevent the ingress of dirt and debris during pump absence as well as the drainage of hydraulic oil. All pipe leakage shall be contained and disposed of ashore by Contractor to an environmentally approved disposal facility. Contractor shall immediately clean up any spillage during removal and installation.

E-3A.3.

Contractor shall examine each half of the Magnaloy 500 series pump drive couplings. This will include removing the half from the drive motor shaft to examine the condition of the splines. The drive motor coupling half shall be installed upon completion of inspection. A new CFM spider elements shall be supplied and fitted during installation. The size of the element is not known.

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E-3A.4.

Contractor shall transport the pump to their facilities. All craneage, manpower, equipment, and hardware to transport and return the pump on board shall be supplied by Contractor. The electric motor shall be serviced, work is listed on L-3 MOTOR OVERHAULS (SURVEY).

E-3A.5.

Contractor shall provide a cost for a core exchange of the Rexroth Pump. For estimating purposes, Contractor shall allow for \$17,000.00 for each pump core exchange and for parts and labour to renew all pilot control lines fitted to the anchor windless control desk and for a new magnaloy coupling spider element. This allowance shall form part of the overall bid and shall be adjusted through PWGSC 1379 action upon proof of final invoice. In the past, it was noted that it was easier to renew the fitted steel tubing lines with flexible hydraulic lines due to slight changes with newer versions of the Rexroth AA4V pumps. If flexible lines are used, Contractor shall fit all large hydraulic lines with bursting deflective covers fitted similar to as fitted to the anchor windlass HPU but with better protection.

E-3A.6.

Upon completion and receipt of the new pumps, the pumps shall be bench load tested at Contractor's facilities to prove the integrity of the unit. The CGTA shall witness each bench test.

E-3A.7.

All new hydraulic flexible lines shall be pressure tested and cleaned to a NAS 6 Standard, all pressure testing and cleanliness shall be complete with certification stating the 1.5 times Working Pressure test and the NAS 6 Cleanliness. Contractor shall provide a copy of the certificates to the CGTA.

E-3A.8.

Contractor shall overhaul the mooring winch control valve Rexroth 2TH7P05-/X/M05 (4 units). CGTA shall supply the rebuild kits; Plunger kit 07212141 and seal kit 2TH7KIT

Contractor shall verify the operation of the control desk start / stop controls. The fitted pressure gauge shall be removed, tested / calibrated. A test certificate shall be issued indicating the accuracy of the pressure gauge to the CGTA.

Contractor shall test the function of the indicating lights.



Mooring Winch Control Desk

E-3A.9.

The pumps shall be returned to the vessel and installed. Alignment shall be made good with the drive motor with a new spider fitted to the Magnaloy coupling. All connections shall be made and any connection O-rings or seals shall be renewed, CFM.

E-3A.10.

Upon completion of installation, mooring winch pump set shall be operationally tested. Contractor is responsible for any fine turn adjustments to the stroke of the pump swash plate. The pump set shall be tested while stowing the rope.

E-3A.11.

Contractor shall supply the CGTA with 3 typewritten copies of a report detailing the work undertaken, defects, measurements, parts renewed for the HPU inspection / survey.

E-3A.12.

All work shall be completed to the satisfaction of the CGTA.

E-4 STEERING GEAR VLE UPGRADE/RENEWAL (SURVEY)

VESSEL LIFE EXTENSION WORK

General Note

Part 1: Scope

E-4.1.

The intent of this specification shall be to provide the services of a Jastram™ Engineering Ltd. approved Field Service Representative to oversee and direct Contractor for the installation of the hydraulic, mechanical, and electrical components of the new Jastram Steering System Reference # JQ 101009.

Please refer to Table 1.1 'Equipment Scope of Supply' for the list of equipment supplied by the customer through the OEM for this specification item.

E-4.2. References

E-4.2.1. Installation Instructions

Jastram Steering System Installation & Service Manual

Sperry Autopilot Navinet 4000 Installation & Service Manual

E-4.2.2. Standards

- A) Fleet Safety and Security Manual (DFO / 5737)
- B) TP 127 - Ship's Electrical Standard
- C) IEEE 45:2002 - Recommended Practice for Electrical Installation on Ship's
- D) Society for Protective Coatings (SSPC) Standards

E-4.2.3. Regulations

Canada Shipping Act 2001 - Marine Machinery Regulations

E-4.2.4. Government Supplied Material

Unless otherwise stated Contractor shall supply all materials, equipment, and parts required to perform the specified work. The work shall follow the Installation & Service Manual provided.

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E-4.2.5. Drawings & Tables

Table E-4.1 Components

Drawing Number	Drawing Name
D-611633	Hydraulic Schematic
D-601835	Piping Diagram for Steering Refit
D-651586	Steering Gear Arrangement
D-521399	Hydraulic Power Unit Overall Dimensions
C-521270	Emergency Hydraulic Power Unit Dimensions
D-751873	Steering Control Cabling Diagram
D-751874	Motor Starter & Alarm Cabling Diagram
C-2513	Existing TA15 HPU's Overall Dimensions
C-2479	Existing TA100 HPU's Overall Dimensions
D-4-677	Existing Steering Gear Arrangement
C-7-917	Existing System Piping Diagram
C-7-919	Existing System Hydraulic Schematic
X-1	Composite Steering Gear and Aft Cargo
X-2	Composite Steering and Aft Cargo

Table E-4.2 - Scope of GSM Components & Equipment

JA-401010-1	3-WAY SHUT OFF VALVE 1-1/4 NOM	4
JQ-101009-16	FLEX HOSE 1-1/4 SAE 4 BOLT	12
JQ-101009-31	HPU 40 hp 575 v	2
JQ - 101009-32	HPU 7.5 hp 575 V	1
JA - 401048-1	DARB VALVE ASSEMBLY 100 GPM	1
JA - 701120-1	EW 200-31 ELECTRIC WHEEL	1
JA - 701005-2	JO 100-2 JOG LEVER	3

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Table E-4.2 - Scope of GSM Components & Equipment (Continued)

JA - 701008-2	LC 100-2 LEVER CONTROLLER	2
JA - 701110-12	RFU 2000-2410 RUDDER FEEDBACK	2
JB - 801045	ROI 380 METER, STANDARD SCALE	1
JB - 801038	RAI 580 METER, STANDARD SCALE	3
JQ - 101009-81	CP 600 MODE CONTROL PANEL	1
JQ - 101009-82	CP 375 MODE CONTROL PANEL	2
JA - 701147-8	DSC 100-202 ST'R CONTROL	2
JQ - 101009-79	MCP100-22 JUNCTION BOX	2
JQ - 101009-77	EMERGENCY STN JUNCTION BOX	1
JA - 701197-2	HLAP 100-2 UNIT ASSEMBLY	1
JQ - 101009-51	MSA 40 hp 600/3/60	2
JQ - 101009-61	MSA 7.5 hp 600/3/60	1
JQ - 101009-61	AP 600 ALARM PANEL	4
JQ - 101009-62	AP 375 ALARM PANEL	1
JA - 701005-1	JO 100-1 JOG LEVER	1
JB - 801030	RAI 3300 3-FACE INDICATOR	1
JB-819009	RAI 3300 INDICATOR POWER SUPPLY	1
JQ - 101009-11	SL200 - 1047 SPEC CYLINDER ASS'Y	2
JQ - 101009-76	HIGH FLOW VALVE CONTROLLER	1
JA - 950117-1	RAI 380 SINGLE STAGE DIMMER	2
JA - 950117-2	RAI 380 DUAL STAGE DIMMER	1
JQ - 101009-83	UNIT CHANGE OVER PANEL	1
JQ - 101009-12	L200 MOUNTING PIN	2
JQ - 101009-13	L200 TILLER PIN	2
JQ - 101009-15	L200 INSTALLATION SLEEVE	2
N/A	INSTALLATION MANUALS	2

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E-4.3. Drawings & Tables

E-4.3.1. Technical Description

Contractor shall arrange for a Jastram Engineering Field Service Representative (FSR) to oversee the installation of the Steering System during the installation, commissioning, and sea trials. Contact information for the FSR is:

Tim O'Connor
East Coast Hydraulics
9 Sagona Avenue
Mount Pearl, Newfoundland
Telephone: 709 747 2121
Email: toconnor@eastcoasthydraulics.ca

It is estimated that 2 Jastram FSR's shall be required for 15 days, working 8 hour days, for this project. The FSR shall be reimbursed for their services, the authorized travel and living expenses reasonably and properly incurred in the performance of the work, at cost without any allowance for the overhead or profit. The Allowance shall form part of the overall bid and shall be adjusted by PWGSC 1379 action upon proof of final invoice.

E-4.3.1.1.

The Jastram FSR shall be responsible for arranging the services of a Sperry Auto Pilot FSR for their portion of this workscope.

E-4.3.2.

Contractor shall be responsible to arrange for TCMSS attendance in order to obtain a survey credit when completing this specification.

E-4.3.3.

Contractor shall supply all equipment, enclosures, ventilation, staging, chain falls, crane usage, slings, and shackles necessary to perform the work. All lifting equipment shall be appropriate for expected duties, and be accompanied by current certification indicating, or be permanently marked as being of an adequate safe working load for the expected duties. Any brackets or other welded attachments required in the performance of this specification shall be welded into lace by CWB certified welders certified to welding standard W47.1, Div.1, all Hydraulic work to be carried out by Certified Hydraulic Technicians, and any Electrical work shall be carried out by Certified Electrical Technicians.

E-4.3.4.

Prior to any hot work taking place Contractor shall ensure that the area of work and all equipment, wiring, transits, etc. have been sufficiently protected from any sparks or metal filings. Contractor shall also ensure that the area of work, the system, and any adjacent space is certified gas free and suitable for work as per the preamble. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the tank and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each tank. Spaces shall be tested each day that personnel are required entry in the tanks.

E-4.3.4.1.

Contractor shall schedule work in this specification, and HD-4 so that no delays are incurred. If there are delays as a result of Contractor's scheduling of work, then Contractor shall be responsible for covering any additional costs associated with retaining the Jastram FSR.

E-4.3.5.

Contractor shall be responsible to ensure that all areas have been thoroughly cleaned and free of any debris resulting from the performance of this specification item.

E-4.3.6.

Contractor shall include for all temporary and permanent removals for the completion of this specification item. All permanent removals of components shall be returned to CGTA for disposal by the Crown. All parts shall be carefully handled to prevent damage, and placed in crates or on pallets for transport.

E-4.3.7.

Contractor shall remove weld spatter, smooth weld seams and sharp edges, and remove grease, smoke, and soot marks as per SSPC-SP1. All welds shall be power tool cleaned to SSPC-SP11.

E-4.3.8.

Contractor shall recoat all heat affected and new steel with two coats of Amercoat Red Oxide Primer followed by two topcoats of Amercoat 5450 of the appropriate color on all surfaces for a final DFT of 3.5 mils. All coatings shall be CFM.

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E-4.3.9.

Contractor shall provide all WHMIS data sheets for all chemicals, coatings, solvents, etc. which are being used during the course of this specification item. All containers of such shall be removed from the work site at the end of each work day.

E-4.3.9.1.

Contractor shall ensure that all identified piping isolations for the steering system are closed and are secured using the established lock-out / tag-out system as outlined in the preamble.

E-4.3.9.2.

Contractor shall ensure that all identified electrical supplies for the system have been isolated and secured using the established lockout / tag-out system as outlined in the preamble.

E-4.3.9.3.

Electrical Isolations are as follows:

E-4.3.9.3.1. Steering System Power Failure Alarm

E-4.3.9.3.2. Steering Helm Autopilot

E-4.3.9.3.3. Steering Gear Motor (Port)

E-4.3.9.3.4. Steering Gear Motor (Starboard)

E-4.3.9.3.5. Emergency Steering Gear Motor

E-4.3.9.4.

Contractor shall be responsible to drain the necessary hydraulic oil from the system to permit the work shall be carried out on the system as well as replenish the oil in the system that has been lost during this work. Oil replenishment shall be of the same type as that already in use and shall be filtered through a portable filtration unit with a 3 micron rating prior shall being admitted to the system.

E-4.3.9.5.

Contractor shall work in conjunction with the Coast Guard Electronics Technician / CGTA / First Officer to oversee the installation of the new steering system to ensure compliance with the Coast Guard Standards and all work shall be carried out to the CGTAs satisfaction. Contractor shall follow the Jastram Installation and Service Manual for the installation.

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E-4.3.9.6.

Included drawings are provisional and for guidance only, if drawings have been updated, actual final drawings shall be provided by FSR at time of work.

E-4.3.9.7.

Drawings including all connections and placement of components and equipment shall be approved by CGTA and FSR before any work begins.

E-4.3.9.8.

Contractor shall be responsible to supply all seamless piping & tubing, fittings, and hoses required for the installation of the steering gear. Black iron pipe is not shall be used. All new flexible lines shall be pressure tested and cleaned to a preferred NAS 5 Standard, all pressure testing and cleanliness shall be complete with certification stating the 1.5 times Working Pressure test and the NAS 5 Cleanliness. All new hard lines shall be cleaned to a preferred NAS 5 level and reference to the procedure and results shall be supplied within a signed certificate.

Contractor shall supply and install sufficient new pipe and tube hangers and supports as needed to prevent any movement of the pipe or tubing when under full operating pressure

E-4.3.10.

All associated wiring from present system shall be removed.

Contractor shall supply all necessary cabling for the installation.

Contractor shall use the Cabling Drawings referenced to determine all of the specifications of the cable, and shall take notice of the 'Note:' section of the drawings to ensure the proper cables are supplied.

Contractor shall confirm final layout and components locations, as well as cable construction standards. Check the cabling or wiring diagram for the type of cable and number of conductors. For ease of installation the cable conductors shall be colour coded.

Cables, terminal blocks, disconnect switches and over-current protection on power supplies are CFM and shall be provided as indicated on the cabling drawings.

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Before installing the cabling Contractor shall check that the following conditions are met.

Terminal Blocks, if fitted, shall be housed in fire and water resistant enclosures.

Cables and components shall not be placed in close proximity to high current or voltage devices.

To avoid damage, components and their cables shall not be installed in unrelated machinery or work spaced.

Ensure that the cable ends can terminate to Jastram supplied components approximately as shown in the cabling diagrams. The general location of cable terminations are represented in the diagrams.

The system shall be installed has its components distributed on a port and starboard or unit 1 or unit 2 basis, so the cables and components for each system shall be separated as widely as practical throughout the vessel.

E-4.3.11.

All signal, line supply, and power cables shall be routed away from each other as much as possible to minimize interference. Actual routing shall be approved by the CGTA and FSR.

E-4.3.12.

Contractor shall be responsible to supply and install new cabling for the installation of the steering gear.

E-4.3.12.1.

Contractor shall supply and install the necessary cables for the required 24V power supply in the steering compartment as per Drawing No. 751873 for the necessary electrical components. This power supply shall originate in the Emergency Generator Room, where a distance of approximately 250 feet is measured to reach the Steering Compartment based on a path shall be taken recommended by the Electrical Officer. This path could require up to 3 glands to complete the transit.

E-4.3.13.

All wiring shall be labeled as per the Jastram Installation Package during this installation

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E-4.3.14.

All cabling shall follow existing cable trays throughout the vessel where fitted. Once installed, all cabling shall be secured as per TP127E

E-4.3.15.

Contractor is responsible to modify existing consoles and panels where applicable, and is responsible for any reinforcement necessary. All modifications shall return the console to a finish matching the panels or consoles previous state.

E-4.4. Technical Steering Gear

E-4.4.1.

Installation of the components for the steering gear shall follow the Jastram Installation and Service Manuals.

E-4.4.2.

Contractor shall use;

C-2513	Existing TA15 HPU's Overall Dimensions
C-2479	Existing TA100 HPU's Overall Dimensions
D-4-677	Existing Steering Gear Arrangement
C-7-917	Existing System Piping Diagram
C-7-919	Existing System Hydraulic Schematic
X-1	Composite Steering Gear and Aft Cargo
X-2	Composite Steering and Aft Cargo

as a reference for the removal of the existing gear that shall not be reused.

E-4.4.2.1.

Contractor shall remove the Emergency Manual Helm Pump from the Main Hydraulic Power Unit, this shall be re-installed after the new components are installed. The re-installation of this shall follow Drawing No. D-601835 & Drawing D-611633.

E-4.4.2.1.1.

The existing three (3) HPU's complete with the steering manifolds shall be removed from the steering flat by the following means:

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Contractor shall obtain the services of an Engineer and/or Marine Architect to oversee and approve the method and procedure for cutting of the deck through to the steering flat. This cutting of the deck to obtain entry way into the steering flat shall include cutting through a thwart ship's main beam.

No cutting shall occur without the final approval by the CGTA and then so only after consultation with Contractor supplied Engineer and/or Marine Architect.

When all equipment required shall be removed and all equipment required is lifted into the steering flat, the portion of deck cut away shall be renewed back following whatever requirements that Contractor supplied Engineer and/or Marine Architect has required.

Any disturbed ship's property or equipment shall be properly removed, capped, plugged, closed and/or whatever preventive action is required to prepare it for proper reassembly or connection. This includes but not limited to electrical lines, piping, mooring bits, ladders, and hatches.

The portion of deck shall be cut away can be no less in dimension than 60 inch x 60 inch square to allow for the new HPU's shall be lowered down into place in the steering flat.

E-4.4.3.

Contractor shall remove the existing hydraulic steering cylinders, taking extra precaution to not disturb the tiller.

E-4.4.3.1.

Contractor shall remove all the existing hydraulic lines and dispose of in a proper means, draining the oil and following any jurisdiction regulations and environmental disposal laws for used oil.

E-4.4.4.

Contractor shall use Drawing No. D-751873, as guidance and reference, to remove the redundant electrical components for the steering system. No components shall be removed without first obtaining approval from the FSR and CGTA.

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E-4.4.5.

Contractor shall install the two (2) Hydraulic Power Units, 40 Horsepower, Proportional in the location of the existing HPU's utilizing the existing base that the existing HPU is mounted. CFM shock absorbing pads shall be utilized. Contractor shall assume that existing 3 inch x 3 inch x 1.5 inch solid mounting pads shall require removal and that new mounting pads, drilled to allow fitting to the shock absorber pads shall be required and welded to the existing frames, continuous full penetration welds are required (4 pads per HPU).

E-4.4.5.1.

Before installing the two (2) Hydraulic Power Units (40 Hp), Contractor shall supply and install a ¾" NPT locking ball valve with cap into the bottom of the reservoir for the purpose of complete draining capability. The tank shall be cleaned out so that it is free of any debris that has originated from the installation of this locking ball valve.

E-4.4.5.2.

Before installing the one (1) Hydraulic Power Units (7.5 Hp), Contractor shall supply and install a ¾ inch NPT locking ball valve with cap into the bottom of the reservoir for the purpose of complete draining capability. The tank shall be cleaned out so that it is free of any debris that has originated from the installation of this locking ball valve.

E-4.4.6.

Contractor shall install the one (1) Hydraulic Power Unit, 7.5 Horsepower, On / Off in the location of the existing HPU utilizing the existing base that the existing HPU is mounted. CFM shock absorbing pads shall be utilized. The existing angle frame shall require mounting holes drilled for the new shock absorber pads.

E-4.4.7.

Contractor shall supply all new hydraulic lines, hard and flexible units, except any lines listed as OEM supplied.

Contractor shall follow Specification part 3.9.8 in the fabrication and certification for cleanliness with regards to all new lines. Contractor shall also clean OEM supplied lines as per part 3.9.8.

E-4.4.8.

Contractor shall install the two new hydraulic cylinders, complete with mounting pin, installation sleeve, and tiller pin. New hydraulic flexible lines are OEM, CGTA supplied.

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E-4.4.9.

Contractor shall install the new DARB valve and DARB isolation valves as per the Drawing No. D-611633.

E-4.4.9.1.

Contractor shall install 4 isolation valves for the DARB as per the Drawing No. D-611633.

E-4.4.10.

Contractor shall supply and install 4 Low Pressure 2 Inch Shut Off Valves and install in the system as per Drawing No. D-611633. the valves shall be installed directly to the tank and the connecting hydraulic lines shall connect to the locking shut off valves.

E-4.4.10.1.

Contractor shall re-install the Emergency Helm Pump removed from the existing HPU, utilizing the Helm Pump isolation valves, and connect this pump to the GSM Header tank following Drawing No. D-601835 & Drawing D-611633.

E-4.4.11.

Contractor shall remove all obsolete items from the Main Console and the Starboard and Port Wing Consoles using Drawing No. D-751873 for reference.

E-4.4.12.

Contractor shall, in consultation with the CGTA and the FSR design and fabricate a modification to the existing steering console so that the new components can be fitted in a manner approved by the CGTA and FSR for proper use. The modified panel shall follow item no. 3.9.14 as per reinforcement and finishing.

E-4.4.13.

Contractor shall install the Electric Wheel, the Control Panel, Unit Change Over Panel, Rudder Order Indicator, Rudder Angle Indicator, Dimmer and JO 100-2 JOG Lever.

E-4.4.14.

Contractor shall install the two (2) MCP 100-22 Mode Control Processor and 2 x DSC 100-202 in one of the following suitable spaces, firstly under the existing steering console, if not possible, in another approved location in the wheelhouse, and finally if no other location is possible, within the crawl space under the wheelhouse.

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E-4.4.15.

Contractor shall in consultation with the CGTA and the FSR design and fabricate a modification to the existing Starboard and Port Wing Steering consoles so that the new components can be fitted in a manner approved by the CGTA and FSR for proper use. The modified panel shall follow item no. 3.9.14 as per reinforcement and finishing.

E-4.4.16.

Contractor shall install in each steering wing the LC 100-2 Lever Controller, JO 100-2 Jog Lever, CP 375 Mode Control Panel, Jastram Dimmer and RAI 580 as per Drawing No. D-751873.

E-4.4.17.

Contractor shall remove the existing overhead Rudder Angle Indicator and install the new RAI 3300 with RAI 330 Power Supply in the location to the satisfaction of the CGTA as per Drawing No. D-751873.

E-4.4.18.

Contractor shall install the two (2) RFU 2000-2410 units in the steering compartment as per the Drawing No. D-751873.

E-4.4.19.

Contractor shall install the (1) Emergency STN Junction Box in the Steering Compartment as per the Drawing No. D-751873.

E-4.4.20.

Contractor shall install the two (2) of the four (4) AP 600 Alarm Panels in the Steering Compartment as per Drawing No. D-751874, in a location suitable and approved by the CGTA and FSR.

E-4.4.21.

Contractor shall install the remaining two (2) of four (4) AP 600 Alarm Panels in the Engine Control Room as per Drawing No. D-751874, in a location suitable and approved by the CGTA and FSR.

E-4.4.22.

Contractor shall install the one (1) AP 375 Alarm Panel in the Engine Control Room as per Drawing No. D-751874, in a location suitable and approved by the CGTA and FSR.

E-4.4.23.

Contractor shall install the one (1) JO 100-1 Jog Lever in the Steering Compartment at the Emergency Station Junction Box as per Drawing No. D-751873.

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E-4.4.24.

Contractor shall install the two (2) Motor Starter and Alarm Units for the two 40 HP HPU's in the Steering Compartment as per Drawing No. D-751873.

E-4.4.25.

Contractor shall install the one (1) Motor Starter and Alarm Unit for the Emergency HPU in the Steering Compartment as per Drawing No. D-751873

E-4.4.26.

Contractor shall install the one (1) HLAP (Hydraulic Lock Alarm Processor) in the Steering Compartment as per Drawing No. D-751873.

E-4.4.27.

Contractor shall install the one (1) High Flow Valve Controller in the Steering Compartment as per Drawing No. D-751873.

E-4.4.28.

Contractor shall as per 3.9.4 re-fill the system with CFM Petro Canada MV 36 Hydraulic oil (no substitutions), passing the oil through a 3 micron filter cart as it enters into the system.

E-4.5. Auto Pilot

E-4.5.1. Auto Pilot

The CGTA shall supply one (1) Navinet 4000™ Auto Pilot system complete with a flush mounting kit for the Bridge Center Console, and Contractor shall make consideration for this unit in the remaking of the Center Console and modifications to the Wing Steering Stations as well. This system shall be installed as per the Manufacturer's Installation and Service Manual and with the direction of the Jastram FSR & Sperry FSR. Contractor is responsible for supplying the necessary cables and terminations for the installation.

The Navinet 4000™ requires a bus backbone cable which is approved for compatibility with the requirements of the CAN bus according to IEC 611-3. Contractor shall confirm that the wiring they supply meets this requirement as well, (note: Lapp 2705250 Unitronic Bus DeviceNet™ Trunk Cable, manufactured by U.I Lapp, Schultze-Delitsch Str. 25, D-70565 Stuttgart, Germany meets this requirement)

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E-4.6. Interference

E-4.6.1.

Contractor shall be responsible for the identification of interference items, their removal, storage, and refitting to vessel.

E-4.7. Proof of Performance

E-4.7.1.

All work shall be subject to witness by the CGTA, IA, and attending TCMSS Surveyor in order to obtain a survey credit.

E-4.7.2.

The commissioning of the steering and control system shall be done under the direction of the Jastram Engineering FSR & Jastram Field Engineer and in accordance with the manufacturer's practices.

E-4.7.3.

Testing shall be completed on the system to confirm that all systems aspects are in compliance with the requirements of Transport Canada. A report on all testing and findings shall be submitted to the TA prior to the acceptance of this item.

E-4.7.4.

Dock Trials shall be conducted to verify the operation of all new components in a variety of operational conditions including the follow up, non-follow up, single pump operation, dual pump operation, and timed movements of the rudder in accordance with TCMSS.

E-4.7.5.

Sea Trials shall be conducted for a period of four (4) hours to verify the operation of the new components and the integration of the system with the Autopilot control.

E-4.8. Certification

All original Transport Canada approval certificates for all system components shall be submitted to the CGTA prior to the acceptance of this item.

E-4.9. Deliverables

Contractor shall provide the CGTA with the typewritten report of Contractors work in both electronic and hard-copy formats outlining the details of the inspection and any alterations / repairs prior to the acceptance of this item.

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E-4.10. Spares

Contractor shall return any items CGTA supplied with this item that have not been used prior to the acceptance of this item.

E-4.11. Training

Contractor shall provide one (1) training course of eight (8) hour duration shall be held onboard after the final installation and commissioning of all new steering controls and governors. This training shall be provided to applicable staff and be conducted by the OEM of the system. Training shall encompass all items outlined in the operating and maintenance instructions as supplied by the OEM.

E-4.12. Manuals

Contractor shall ensure that all operation, maintenance, and installation manuals supplied with the new equipment are submitted to the CGTA prior to the acceptance of this item.

E-5 **INCINERATOR RENEWAL AND SLUDGE TANK
INSTALLATION**

VESSEL LIFE EXTENSION WORK

General

E-5.1

Contractor shall employ the services of an authorized TeamTec Field Service Representative (FSR) to supervise the installation and commissioning of the new incinerator, associated equipment, and sludge tank.

The Teamtec Factory Service Representative shall be coordinated through Hermont Marine Inc. who are the Canadian Teamtec representatives. The contact information is:

Stephen Boyd
National Sales
Tel: (514) 856-1212 ext. 227

It is estimated that 1 TeamTec FSR shall be required for 12 days, working 10 hour days, for this project. The FSR shall be reimbursed for the authorized travel and living expenses reasonably and properly incurred in the performance of the work, at cost without any allowance for the overhead or profit. The Allowance shall form part of the overall bid and shall be adjusted by PWGSC 1379 action upon proof of final invoice.

E-5.2

Contractor shall follow all manufacturers' installation instructions for the installation and mounting of all GFE for this specification item in order to maintain warranty of the components.

E-5.3

Contractor shall ensure that the work on the following specifications shall be completed prior to any testing of the new incinerator and control systems:

- HD-7 FUEL TANK (SURVEY) for the day & settling tanks

Contractor shall schedule the work accordingly so that no delays are incurred. If there are delays as a result of Contractor's scheduling of work, then Contractor shall be responsible for covering any additional costs associated with retaining the TeamTec FSR.

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E-5.4

Contractor shall electrically and mechanically isolate the existing incinerator and remove it down to the bed frame. All electrical and mechanical lockouts and tag outs shall be carried out to the satisfaction of the CGTA as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

E-5.5

Existing wiring shall be marked as per OEM drawings prior to removal in case it can be reused. A drawing of the existing incinerator controls shall be provided to Contractor to copy. Contractor shall return the original drawing to the CGTA immediately after making a copy.

Incinerator Removals

E-5.6

Contractor shall remove the following components: incinerator casing, control panel, refractory, seal kits, pilot fuel heater, flue gas damper, flue gas fan, sludge dosage unit, burner kit, sensor and control kit, door kit, flue gas pipe expansion compensators, and counter flanges for the flue gas pipe.

E-5.7

Contractor shall disconnect all wiring (not cut), labelled and secured so as not to interfere with the removal and installation process. Any fitted cables that Contractor intends to re-use for the installation of the new incinerator shall be surveyed and megger tested by contractor prior to integration into the new circuits. Any defects shall be presented to CGTA for negotiation through PWGSC 1379 action.

For estimating purposes, Contractor shall supply 1 skilled Mechanical Technical-Welder –Fitter for 12 days, working 10 hours a day with the TeamTec FSR. In addition, it is estimated that approximately 100 hours of various skilled trades' persons shall be required at various times throughout the installation. This allowance shall form part of the overall bid and shall be adjusted through PWGSC 1379 action upon proof of final invoice and time sheets.

E-5.8

Contractor shall dismantle and return to CGTA for disposal by the Crown all components removed from the ship for this specification item. All parts shall be carefully handled to prevent damage, and placed in crates or on pallets for transport.

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E-5.9

Fuel lines (two) and sludge lines (two) to the incinerator shall be disconnected and the ends of the pipes shall be capped off so as not to interfere with the removal of the existing incinerator or the installation of the new incinerator components.

E-5.10

Contractor shall be responsible for determining if there are any interference items that need shall be removed from inside the incinerator room or at the entrance to the incinerator room that may be damaged during the removal or installation process. Items which are electrically energized shall be electrically isolated at their supply breakers with the concurrence of the CGTA. All interference items shall be stowed safely by Contractor. Pipes shall be blanked off with suitable flanges and gaskets, or pipe caps, of the correct size. Any items that are not removed and are subsequently damaged during the removal or installation process shall be repaired at Contractor expense.

E-5.11

The compartment shall be cleaned of all debris prior to the installation of the new incinerator components. All deck areas that have been affected by this work shall be mechanically cleaned to SSPC-SP-11 standards and shall be given 2 coats of primer paint, Interprime 198 Grey color No. CPA098 International Paint. Coatings shall be applied to yield 2-3 mils (ASTM D1640) DFT per coat.

Contractor may be required to modify the bolt hole arrangement on the bed plate to accommodate the new incinerator.

Incinerator Installation (Installation Information from TeamTec Provided Appendix A)

E-5.12

The new incinerator shall be delivered flat packed and require assembly under the direction of the TeamTec FSR. The incinerator shall be secured to the bed plate as recommended in the manufacturer's instructions and under the guidance of the TeamTec FSR. All electrical connections, glands, pipe sealant, flange gaskets, pipe and pipe fittings, fasteners, isolation valves, and other consumable products required for this installation shall be new and CFM.

E-5.13

Contractor shall install the following components: incinerator casing, control panel, slave panel in Control Room, refractory, seal kits, pilot fuel heater, flue gas damper, sludge dosage unit, associated piping, burner kit, sensor and control kit, door kit, flue gas pipe expansion compensators, and counter flanges for the flue gas pipe under the direction and guidance of the TeamTec FSR.

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E-5.14

The proper electrical wiring shall be run from the incinerator to the slave panel in the Control Room. The wiring shall be properly secured to existing cable runs. All new wiring shall meet or exceed Team Tec specifications.

Contractor shall be responsible for the proper securing of all electrical cabling. All work shall be to code, as per TP127 and Canada Shipping Act. Contractor shall be responsible to make arrangements to have TCMSS Surveyor to view the wiring installation as work progresses.

E-5.15

The incinerator slave panel shall be installed in the Main Control Room (MCR) below the "Notifier" Fire Detection Slave Panel (see picture below). Contractor shall fully wire in the slave panel and confirm proper operation upon completion of the Incinerator installation.



E-5.16

Contractor shall install a new CFM flue gas fan, flue damper, and sludge oil tank with heating coil.

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E-5.17

Contractor shall install new power supply wiring to the incinerator from a 600v breaker shall be identified by the CGTA. In addition, Contractor shall install new wiring from the incinerator control panel as follows:

- a) 600VAC 3phase power wiring to the flue gas fan and sludge service tank pump;
- b) 600VAC 3phase power wiring to the sludge service tank heater
- c) 220 VAC 1 phase power wiring the emergency stop;
- d) 24VDC supply to the sludge oil tank level sensor, the flue gas temperature sensor, the flue gas damper and the run indicator.

E-5.18

Contractor shall install all wiring under the direction of the FSR for the sensor and control wiring required for the upgraded components. All electrical connections, including to the VTS alarm and monitoring system shall be reconnected by Contractor and proven functional to the satisfaction of the CGTA and the TeamTec FSR.

E-5.19

Contractor shall re-install any interference items that had been removed at the completion of the incinerator installation using new electrical connections, pipe fasteners and insulation as required. For estimating purposes, Contractor shall allow \$5,000.00 for materials and supplies. Allowance shall form part of the overall bid and shall be adjusted by PWGSC 1379 action upon proof of final invoice.

Sludge Tank (see Sludge Tank Installation and Associated Piping Appendix “B”)

Sludge tank shall be mounted at the “Upper deck” level of the engine room casing, starboard side aft (same level as the flue gas fan unit). In addition, a suitable catch all shall be fitted beneath the new sludge tank with a drain line that is plumbed into the existing boiler fuel strainer catch all drains.

The existing support framing on aft bulkhead in this area will have to stiffened/enlarged in order to support a 786 Kg sludge tank at operating conditions & catch all.

The fitted fuel transfer pipe will have shall be rerouted around the sludge tank.

E-5.20

Contractor shall install new mounting seats for the sludge oil tank in accordance to the FSR supplied guidance drawings.

E-5.21

All welding, piping, gaskets and flanges associated with the incinerator sludge tank shall meet or exceed TCMSS requirements and TeamTec specifications for this installation. All piping and fittings shall be CFM.

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E-5.22

Contractor shall install a vent line from the sludge tank. Contractor shall install a 2 inch schedule 80 vent line from the top of the sludge tank to the starboard side of the funnel on the bridge deck. Approximately 7 meters of seamless schedule 80, 2 inch pipe, 3x 90 degree elbows, 4 slip on 2 inch, 4 bolt flanges. Contractor shall fit GSM Winteb DIN 50 heated vent. The vent head flange shall be positioned approximately 60 cm above the bridge deck. Contractor shall use full penetration fillet welds on the pipe and shall ensure that the interior of the vent remains free of any weld obstructions at the seams. Internal portion of the vent pipe shall be insulated up to the funnel side plate, once proven leak free.

Contractor shall mount a GSM 115 VAC Pauluhn receptacle for the Winteb Vent. The exact location shall be determined by the CGTA.

E-5.23

Contractor shall install a 1- ¼ inch filling line for the new sludge tank from the existing sludge transfer pump. This line shall be tee' d into the existing discharge line from the pump and fitted with an isolation ball valve at the transfer pump. Approximately 6 meters of seamless schedule 80, 1- ¼ inch pipe, 4 x 90 degree elbows, 6 slip on 1- ¼ inch, 4 bolt flanges.

E-5.24

Contractor shall install supply and return pipes from the sludge tank to the incinerator in accordance with the FSR supplied documentation. Pipes shall be insulated as per manufacturer's recommendation. New pipe route shall travel aft from the incinerator then turn 90 degrees starboard towards the sludge tank. For estimating, approximately 8 meters of seamless schedule 80, 1 inch pipe, 8 x 90 degree elbows, 10 slip on 1 inch 4 bolt flanges shall be required. Pipes shall be secured with welded brackets at appropriate intervals to prevent vibration and shall be located with consultation with the CGTA.

Exhaust Piping

E-5.25

Contractor shall remove and properly dispose of the exhaust lagging wrapping of the incinerator exhaust piping in way of the new flue gas fan, and expansion compensators.

E-5.26

The exact location of piping shall be removed shall be determined by Contractor in consultation with the FSR and the CGTA and take into account the installation of the flue gas fan mounting arrangement and access to the flue gas damper.

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E-5.27

Contractor shall quote on constructing two (2) new sections of 12 inch OD spiral weld 0.25 inch wall ASTM A-242 Corten Steel exhaust piping, two (2) feet long, including 4 flanges. Contractor shall also fit a new flange to the existing pipe. Contractor to use full penetration fillet welds on the pipe and shall ensure that the interior of the exhaust pipe remains free of any weld obstructions at the seams. These exhaust pipes shall be needed to tie the new flue gas fan unit to the incinerator outlet and exhaust uptakes. The exact size and length shall be determined by the FSR. This quote shall form part of the overall bid and shall be adjusted through PWGSC 1379 action. Also, any additional changes required to the exhaust system shall be presented to the CGTA & FSR for review & approval. If changes are accepted, work shall be negotiated through PWGSC 1379 shall be actioned.

Note, if any work is required to the 16 inch OD exhaust outlet pipe. The pipe is made of stainless steel – ¼ inch wall thickness.

E-5.28

Any welding and any new piping, flanges, and fasteners for the exhaust gas system shall meet or exceed TCMSS requirements and TeamTec specifications for this installation. All piping and fittings shall be CFM.

E-5.29

Contractor shall construct and install a foundation mount for the flue gas fan assembly in accordance with the TeamTec diagrams supplied. The flue gas fan shall be mounted using new stainless steel fasteners.

E-5.30

Contractor shall supply and install new pipe hangers as needed to support the length and weight of exhaust piping, flue gas fan, damper, and expansion compensators installed. The hangers shall prevent any undue stress from being exerted on the incinerator exhaust outlet flange or the flue gas fan exhaust outlet.

E-5.31

Contractor shall ensure the exhaust piping is routed a suitable TCMSS approved distance from combustibles and allow for the installation of approved new lagging.

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E-5.32

Contractor shall provide and install Marine approved exhaust lagging & calcium silicate with fiberglass sheathing (where applicable) for disturbed and new lengths of the exhaust piping installation, including all custom transition laggings for the flue gas fan, flue gas damper, expansion compensators and incinerator's exhaust uptake. All blankets & calcium silicate insulations forms shall have sufficient insulating capacity to reduce the surface temperature at the surface to maximum of 60 degrees Celsius. The exhaust blankets shall have hook and loop closure devices such that they can be secured in place with stainless steel lock wire and be removable for the servicing and inspection of the flue gas components.

E-5.33

Contractor supply and fit new gaskets to all new and disturbed exhaust pipe joints. The material to use is "Slade Pyro-Tex Woven Gasket" material. Contractor shall prove all welds and exhaust piping connections shall be free from leakage.

E-5.34

Contractor shall provide the CGTA the opportunity to witness the final exhaust piping uptake installation prior to the application of the exhaust lagging blankets.

Commissioning

E-5.35

Contractor shall have on hand the FSR for the commissioning and set to work of the incinerator and sludge tank and prove the correct operation of the entire system. The FSR shall be on hand to make final adjustments to optimize the incinerator firing settings, the forced draft air setting and any other adjustments necessary to fully commission the system.

E-5.36

The incinerator shall be test fired prior to the installation of the exhaust blankets. The attending TCMSS Surveyor shall witness the test firing of the incinerator once the FSR is satisfied the unit will operate correctly. All bolts on newly fitted and disturbed flange joints shall be re-secured after the test firing & the pipe has cooled down.

E-5.37

Once the incinerator operation has been established, the incinerator uptake shall be insulated and the incinerator shall be run for a period of six hours to ascertain that all sections are tight and that there are no leaks in the system.

E-5.38

Contractor shall provide documentation on any new exhaust piping and fittings used for the construction of any new exhaust piping.

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E-5.39

Contractor shall provide documentation and certification that the new exhaust pipe hangers installed are of sufficient capacity to support the exhaust uptake piping.

E-5.40

All work shall be completed to the satisfaction of the CGTA

E-6 PORT AND STARBOARD BOILER CONTROLS RENEWAL

VESSEL LIFE EXTENSION WORK

General

E-6.1

Contractor shall employ the services of two (2) authorized Alfa Laval Aalborg Field Service Representatives (FSR) for the installation of the new port and starboard boiler controls and associated components, and commissioning of the units. The Alfa Laval Aalborg Field Service Representatives shall be coordinated through Alfa Laval Inc.

The contact information is:

Bob Keating
Email: bob.keating@alfalaval.com
Tel: (416) 297 6308

It is estimated that 2 Alfa Laval Aalborg FSRs shall be required for 12 days, working 12 hour days, for this project. The FSRs shall be reimbursed for their services, authorized travel and living expenses reasonably and properly incurred in the performance of the work, at cost without any allowance for the overhead or profit. The Allowance shall form part of the overall bid and shall be adjusted by PWGSC 1379 action upon proof of final invoice.

E-6.2

Contractor shall ensure that the work on the following specifications shall be completed prior to any testing of the new boiler burners and control systems:

- E-6.2.1. > L-7 . At least 1 feed pump motor shall be available when testing is required to fill the boilers with feed water
- E-6.2.2. > HD-7 FUEL TANK (SURVEY) for the day & settling tanks
- E-6.2.3. > E-2 "Main Steam Line testing".
- E-6.2.4. > HD-12 Boiler blow down line. Note. When the boilers are drained, precautions shall be taken to ensure the dock area in the vicinity of the blow down discharge is clear if there is a need to discharge heated boiler water.

Contractor shall schedule the work accordingly so that no delays are incurred. If there are delays as a result of Contractor's scheduling of work, then Contractor shall be responsible for covering any additional costs associated with retaining the two Alfa Laval Aalborg FSRs.

E-6.3

Contractor shall follow all manufacturers' installation instructions, FSR instructions for the installation and mounting of all GFE for this specification in order to maintain warranty of all components.

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E-6.4

Contractor shall electrically and mechanically isolate the existing boilers to allow the removal of the components. All electrical and mechanical lockouts and tag outs shall be carried out to the satisfaction of the CGTA, as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

Existing wiring shall be marked as per OEM drawings prior to removal in case it can be reused. A drawing of the existing boiler controls shall be provided to Contractor to copy.

E-6.5

Work shall not commence until the all associated work areas have been certified gas free and safe for hot work. Contractor is responsible for any cleaning in this area to prepare for hot work. Contractor is responsible for arranging for a certified Marine Chemist to visit the vessel and to carry out the necessary testing to obtain safe entry and safe for hot work certificates. A copy of a gas free/safe for hot work certificate shall be given to the CGTA prior to personnel entering the space and a copy of each certificate shall be posted in a conspicuous location in close proximity to the manhole cover for each space. Spaces shall be tested each day that personnel are required entry in the space. All precautions shall be taken to protect all areas from hot work damage. Contractor is responsible for maintaining an adequate fire watch during the course of all hot work. This shall include providing various applicable extinguishers and extinguishing mediums as necessary. This shall also include any necessary preparations and cleaning in the vicinity of the work area to obtain a gas-free permit. Contractor shall take note of the requirements under the DFO/5737 Fleet Safety Manual, 7.B.3 - ENTRY INTO CONFINED SPACES and DFO/5737 Fleet Safety Manual, 7.B.4 – HOTWORK for these spaces.

E-6.6

Contractor shall supply any gases, oxygen, acetylene, and argon necessary for the repair.

E-6.7

Contractor shall supply all equipment enclosures, ventilation, staging, chain falls, crane, slings, and shackles necessary to perform the work. All lifting equipment shall be appropriate for the expected duties, and be accompanied by current certification indicating, or be permanently marked as shall being, of an adequate safe working load for the expected duties. Any brackets or other welded attachments required in the performance of this specification shall be welded into place as per section 7 of the general notes.

[E-6 PORT AND STARBOARD BOILER CONTROLS RENEWAL](#)

[BACK TO TABLE OF CONTENTS](#)

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Scope of Work

E-6.8

Contractor shall assist the Alfa Laval Aalborg FSR's with the following work on the port and starboard boilers:

- E-6.8.1. > Mobilise, including all transportation, and crantage required to carry out the work.
- E-6.8.2. > Open up for access.
- E-6.8.3. > Disconnect existing oil burner and forced draft fan.
- E-6.8.4. > Disconnect & remove existing water columns
- E-6.8.5. > Disconnect existing fuel oil pump group.
- E-6.8.6. > Disconnect and remove existing control panel.
- E-6.8.7. > Prepare and install new burner.
- E-6.8.8. > Install new control panel.
- E-6.8.9. > Installation of new oil pump group and new gas/air separator unit.
- E-6.8.10. > Install/renew cables if necessary for connections to the new control panel.
- E-6.8.11. > Install/renew pipes if necessary for the fuel oil ring line.
- E-6.8.12. > Installation of new water level control & columns.
- E-6.8.13. > Installation of casing in way of repair.
- E-6.8.14. > Boxing up everything.
- E-6.8.15. > Make pre-inspection, commissioning and start up.
- E-6.8.16. > Demobilise.

For estimating purposes, Contractor shall supply 1 skilled Mechanical Technician - Welder-Fitter for 12 days, working 12 hours days with Alfa Laval Aalborg FSR. In addition, it is estimated that approximately 100 hours of various skilled trades' persons shall be required at various times throughout the installation. This allowance shall form part of the overall bid and shall be adjusted through PWGSC 1379 action upon proof of final invoice & time sheets.

E-6.9

Contractor shall dismantle and return to CGTA for disposal by the Crown all components removed from the ship for this specification item. All parts shall be specially handled to prevent damage, and placed in crates or on pallets for transport.

E-6.10

Contractor shall determine if there are any interference items that need to be removed from around the boilers and include the cost of removal and reinstallation in their bid. Items which are electrically energized shall be electrically isolated at their supply breaker with the concurrence of the CGTA. All interference items shall be safely stowed by Contractor. Pipes shall be blanked off with suitable flanges and gaskets, or pipe caps, of the correct size. Any items that are not removed and are subsequently damaged during the removal or installation process shall be repaired at contractor expense.

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E-6.11

Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

E-6.12

The new boiler up-grade kits shall be delivered flat packed and will require assembly by the Aalborg FSR's. All electrical connections, glands, pipe sealant, flange gaskets, pipe and pipe fittings, fasteners, isolation valves, and other consumable products required for the installation shall be new and CFM. For estimating purposes, Contractor shall allow for \$5,000.00 for materials & supplies. Allowance shall form part of the overall bid and shall be adjusted through PWGSC 1379 action upon proof of final invoice.

E-6.13

The new boiler control panels shall be installed in the same location as the existing ones. The new panel is larger than the existing panel and modifications shall be required to allow the new panels shall be fitted.

E-6.14

Contractor shall properly secure all electrical cabling. All work shall be to code, as per TP127E & Canada Shipping Act. Contractor shall make arrangements to have TCMSS Surveyor to view the wiring installation as work progresses.

E-6.15

Contractor shall fabricate the new fuel oil supply and return lines for each boiler. The route shall be determined by CGTA and the Aalborg FSR's. Contractor shall ensure that enough hangers are provided to properly secure the piping in place and prevent vibration. Contractor shall arrange to have a TCMSS Surveyor view the propose changes to the fuel system piping prior to commencing this work

E-6.16

Contractor shall install any interference items that had been removed at the completion of the boiler work.

Commissioning

E-6.17

Contractor shall ensure that at least one Aalborg FSR is on hand during the commissioning and setup work to both boilers. This includes the setup of the boiler control and alarm systems and proves the correct operation of the entire system for both boilers.

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E-6.18

Once the Boiler control systems are fully functional, Contractor shall make arrangements for TCMSS Surveyor to witness the testing of various safety features of the Boiler controls. The testing shall be performed to the satisfaction of both the TCMSS Surveyor and the CGTA.

E-6.19

All work shall be completed to the satisfaction of the CGTA.

L-1 GALLEY STOVE CLEANING



L-1.1

Both galley stoves (Garland 10 - Electric Ranges) shall be opened up for degreasing and thoroughly cleaned internally and externally. The Convection (Garland TE2A-6) oven shall be moved in order to allow cleaning underneath the unit and around the backside of the main stoves

L-1.2

The stoves and stove tops shall be moved as required to permit access for cleaning under and between the units. Contractor shall move the stoves as required for access to cleaning and inspection of components.

L-1.3

Prior to the commencement of any and all work, Contractor shall lock out the stoves as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

L-1.4

An insulation test shall be taken prior to the commencement of all work with the ship's Electrical Officer in attendance.

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L-1.5

All wiring, connections, and insulation shall be inspected. Particular attention shall be paid to burned insulation, loose terminal screws, heating elements and thermostats to ensure proper condition and operation. Contractor shall open the lower door and open the cover plate to access the circuit breakers and contactor for the convection oven.

L-1.6

Repairs to defects arising from this inspection shall be negotiated through PWGSC 1379 action.

L-1.7

The CGTA shall be present for a final inspection prior to closing up each unit. Both stoves shall be reassembled in good order and adjusted upon completion of all work.



L-1.8

All work shall be coordinated with the CGTA and shall be performed so as to provide a minimum disruption to the Galley personnel. Contractor shall quote this work during weekends and quiet hours (6:00 pm - 6:00 am). Contractor shall note the tight time constraints involved, and adhere to the requirements and bid accordingly.

L-1.9

Readings shall be recorded and given to the CGTA and Electrical Officer in a report form upon completion of all work. Upon completion of all work, a second set of insulation readings shall be taken and recorded with the Electrical Officer present.

L-1.10

Contractor shall limit the work area to the immediate vicinity of the galley stoves. The galley shall be left in a clean and tidy condition daily and upon completion of all work.

L-1.11

All work shall be completed to the satisfaction of the CGTA.

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L-2 PORT PROPULSION MOTOR (SURVEY)

The intent of this specification item is to open up the Port Propulsion Motor and components for a 5-year inspection and survey as required by TCMSS.

Contractor is responsible for arranging the scheduling of the TCMSS Surveyor.

L-2.1

Prior to the commencement of any and all work, Contractor shall lock out the motor as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor/FSR shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

L-2.2

Contractor shall allow \$30,000.00 for the services of a rotating machine specialist to conduct the inspection of this electric motor and the #2 and #3 propulsion generators. The specialist shall be reimbursed for the authorized travel and living expenses reasonably and properly incurred in the performance of the work, at cost without any allowance for the overhead or profit. The Allowance shall form part of the overall bid and shall be adjusted through PWGSC 1379 action upon proof of final invoice.

Suggested source

Peter Klinoski; EPM

(905) 945-3230

L-2.3

An insulation test shall be taken prior to the commencement of all work with the ship's Electrical Officer in attendance. Upon completion of all work, a subsequent test shall be taken. Prior and subsequent readings shall be recorded in a type written report, three (3) copies being given to the CGTA upon completion of all work.

L-2.4

The various motor covers, including the exciter cover, shall be removed to permit an inspection to be carried out. All covers shall be identified to permit subsequent installation in their original respective locations. Once opened, the propulsion motor exciter and exposed motor assembly shall be suitably covered and protected from all dirt or water while inspection is being performed.

L-2.5

All wiring, connections, and insulation shall be inspected. Particular attention shall be paid to loose terminal screws, fasteners, locking devices, etc. to ensure proper condition and operation.

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L-2.6

The 5 connection boxes shall have the covers removed. All cables and internal connections shall be inspected for defects. All fasteners shall be checked for tightness. All connection box covers shall be installed upon completion of all work.

L-2.7

The air gap between the commutator and stator shall be measured and recorded between each pole at each end and the commutator. Recorded measurements shall be tabulated in a type written report.

L-2.8

A borescope inspection shall be conducted to inspect the motor internal parts. A type written report of borescope inspection shall be tabulated. A DVD shall be produced of the borescope inspection and submitted to the CGTA along with all reports.

L-2.9

All hold down bolt lock nuts shall be slackened and all hold down bolts shall be checked for tightness. Upon completion of checks, all lock nuts shall be hardened up.

L-2.10

Three copies of each report shall be prepared and submitted to the CGTA.

3E014 Propulsion Motor Cooler Inspection (Survey)

Cooler data:

Size is 10 feet long x 32 inches wide x 12 inches high

Weight approximately 1,800 pounds

Manufactured by KEEPRITE UNIFIN.

Air Flow 1,000 CFM

Water Flow 85 Imp. GPM

L-2.11

In conjunction with the internal motor inspection, the top motor covers shall be removed to permit removal, cleaning, inspection, and testing of the water-cooled air cooler. Contractor shall remove all piping, brackets, gauges, sensors, and wiring necessary to gain access to the work. All items removed or disturbed shall be reassembled and installed in good order upon completion of all work. New contractor supply gaskets shall be installed in place of all disturbed gaskets and pipe work. Contractor shall supply all necessary slings, hardware, and personnel for the removal of the cooler. All equipment shall have current (within the past 12 months) test certificates to demonstrate compliance.

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L-2.12

The headers on both ends of the cooler shall be removed to expose the tube ends. The cooler tubes shall be brushed through their entire length to clean the internals of the tubes. The brush shall be of a suitable material so as not to cause scoring and damage to the cooler tubes. The cooler shall be cleaned externally as well. Contractor shall remove the 4 sacrificial rod style zinc anodes in each end of the air cooler water header. Each anode shall be renewed. Contractor shall quote on supplying and installing 4 zincs per cooler. Each is $\frac{3}{4}$ inch x 6 inches long. This quote shall form part of the overall bid.

L-2.13

Upon completion of all cleaning, the cooler shall be hydrostatically tested to 65 psig. Contractor shall supply all equipment, hardware, and personnel to carry out the pressure testing including pressure gauges with recent test certificates. The test shall be carried out in presence of The CGTA and TCMSS Surveyor.

L-2.14

The manufacturer's maintenance instructions are available on ship. This unit shall be thoroughly cleaned on the airside to remove all dirt build up.

L-2.15

Upon completion of all work, the cooler shall be reinstalled in the motor in good order and reconnected to existing pipe work with all new contractor supply gaskets.

L-2.16

Propulsion Motor Forward Pedestal Bearing

Manufacturer: General Electric
Shaft Size at Bearing: 381mm Diameter
Oil Capacity: 45 liters per bearing
Ref. Drwg: General Electric, Bearing and Pedestal
Assembly, # 4004D1025KT

L-2.17

The pedestal bearing shall be opened for cleaning, and inspection by TCMSS.

L-2.18

Contractor shall drain the oil from the bearing housing. Contractor shall remove and dispose of this oil ashore in an environmentally safe manner as per local regulations. Compliance shall be demonstrated by proof of invoice to the CGTA.

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L-2.19

The oil cooler shall be removed from the bearing pedestal. Contractor shall clean the oil cooler internally and externally. The cooler shall be hydrostatically tested to 200 psi. All equipment, hardware, personnel, etc. including a calibrated pressure gauge, shall be CFM. The test shall be witnessed by the CGTA and TCMSS Surveyor.

L-2.20

Contractor shall remove the auxiliary gearbox assembly on the front of the pedestal bearing. The ship's Electrical Officer shall provide guidance as required.

L-2.21

Contractor shall remove all measuring instruments, sensors, etc. for access to the pedestal bearing for disassembly. The bearing top cover shall be lifted and the lower bearing shell rolled out. There is an onboard jacking arrangement in the pedestal bearing housing for lifting the shaft to permit ease of rolling the lower bearing shell out.

L-2.22

All parts shall be cleaned and laid out for inspection. The pedestal bearing internals and sumps shall be cleaned out thoroughly and inspected.

L-2.23

The FSR shall perform a Resistance Test to the Pedestal / Bearing. Results of this test shall be incorporated in the type written report that shall be submitted to the CGTA.

L-2.24

Contractor shall quote the cost (labor and materials) of re-insulating the Pedestal Bearing (4 bolts, 2 dowels, and bottom "mylar" pad) for possible PWGSC 1379 purposes. This quote will not be part of the overall Contract bid.

L-2.25

Wear down readings shall be measured for the pedestal bearing, using ship's supplied depth gauge. Bearing thickness measurements shall be taken. All readings shall be recorded in a type written report.

L-2.26

The oil sump shall be drained and oil disposed of ashore by Contractor. Sump shall be cleaned using lint free rags.

L-2.27

Contractor shall disconnect pedestal cooling coils and remove them for hydrostatically testing. The cooling coils shall be hydrostatically tested to 65 psig. Contractor shall provide all equipment for testing as per the air cooler testing.

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L-2.28

Pedestal, bearings, cooler, main rotor, bearing cover and all other associated equipment shall be re-installed as per manufacturer's instructions.

L-2.29

Upon completion of all work, the pedestal bearing sump shall be refilled with GSM oil (38 litres PetroCanada AW100).

Propulsion Motor Air Blower Inspection

L-2.30

A total of five (5) air blowers shall be removed for cleaning, inspection, and overhaul. These motors shall be electrically isolated and locked out prior to work being performed. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

L-2.31

The 5 blowers are as follows:

1 x Make-up Blower,
Novenco model LM-4a blower driven by a CGE model 31102FA11
motor 0.25 HP, 3 phase 600 v

4 x Circulating Blowers,
Novenco model 10185, driven by CGE model 2F1175M 5 HP
motors, 3 phase, 600 V.

L-2.32

All motors shall be electrically disconnected, removed, disassembled, and opened for cleaning and inspections. All bearings shall be renewed with CFM sealed units and bearing bores in the motor end bells shall be measured for tolerance fit. Motors shall be re-assembled in good order, insulation resistance readings taken and recorded.

L-2.33

The blowers shall be cleaned and re-installed on shafts. The motor blower assemblies shall be test run and balanced to ISO standard G-2.5 at rated speed. On completion of work, the blower assemblies shall be re-installed and test run once again to verify operability.

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L-2.34

Upon completion of work and inspections, the starboard propulsion motor shall be reassembled in good order and adjusted. All new gaskets shall be installed where disturbed. The motor shall be functionally tested to the satisfaction of the CGTA.

L-2.35

All work shall be completed to the satisfaction of the CGTA and TCMSS.

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L-3 MOTOR OVERHAULS (SURVEY)

The intent of this specification item is to describe the work involved for the overhauls of the electric motors listed below.

L-3.1

Boiler Feed Pump(s) Motor data:

Brook Hansen
Cat #2425109W-00
Stbd side Motor Serial #E622760
Port side Motor Serial #E622756
Type TEFC
Frame WD184T
5 hp, 3460 rpm, 575 VAC, 3 phase, 4.6 Amps
Rating: cont. Design B, Class F, Code J

Av.Gas. Cofferdam Exhaust Fan Motor

Brook Crompton Parkinson
Model: C143T
HP: 0.33
Volts: 600/3/60
Amps: 0.75
RPM: 840
Serial #: X992190

Anchor Windlass HPU Motor

Estatech Type CF1
Model: 6929635 Serial # ML-3688
HP: 50
Volts: 600/3/60
Amps: 49
RPM: 1755

Bearing DE 6213ZZ
Bearing DE 6213ZZ

Port Mooring Winch HPU

Estatech Type CF1
Model: 6929635 Serial # ML 3694-2
HP: 50
Volts: 600/3/60
Amps: 49
RPM: 1755

Bearing DE 6213ZZ
Bearing DE 6213ZZ

Stbd Mooring Winch HPU

Estatech Type CF1
Model: 6929635 Serial # ML-3689-2
HP: 50
Volts: 600/3/60
Amps: 49
RPM: 1755

Bearing DE 6213ZZ
Bearing DE 6213ZZ

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#2 Fuel Oil Purifier Motor

ASEA

Type MBT1 32SA4 Serial #L410043015/3

HP: 7.5

Volts: 575/3/60

Amps: 8.5

RPM: 1720

Prior to commencement of work, and upon completion of work, Contractor shall take insulation readings and current readings (both speeds where applicable) on all phases. Contractor shall record all readings in a type written report and provide 3 copies to the CGTA.

L-3.2

Contractor shall electrically and mechanically isolate the motors, fan units and pump systems to allow the removal of the motors. All electrical and mechanical lockouts and tag outs shall be carried out to the satisfaction of the CGTA, as per the DFO/5737 Fleet Safety Manual, 7.B.5 - LOCKOUT AND TAGOUT. Contractor shall install /remove locks and tags accordingly during the scope of work. Electrical Officer will assist Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. Contractor shall supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the Electrical Officer shall be in attendance when all locks/tags are removed.

L-3.3

Each pump/fan motor shall be disconnected electrically, unbolted from its respective base/fan casing, and transported to Contractor's facilities for servicing. Contractor shall take care to note the use of any alignment shimming materials.

L-3.4

At Contractor's facilities each motor shall be disassembled for cleaning and inspection. Bearing housings shall be measured for wear. Rotors shall be checked for loose bars, shafts for trueness and balanced. All readings shall be recorded and a type written report shall be submitted upon completion of all work to the CGTA. Stators and motor windings shall be steam cleaned and shall be air dried. Motor windings shall be dip insulating epoxy/varnish that is compatible with the existing coating. Windings shall be baked dry. Each motor shall be reassembled with new CFM bearings.

L-3.5

Each motor shall be reassembled and reinstalled in their respective locations with new fasteners. Motor and pump alignment shall be checked and shall be made good.

L-3.6

All CFM gaskets and spacers shall be renewed for the re-installation of the motors and fan casings.

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L-3.7

Contractor shall ensure that no foreign materials or debris fall into the Av.Gas Cofferdam. Contractor is responsible for removal and clean-up of any such materials including the obtaining of a "Safe for Entry" certificate for the cofferdam.

L-3.8

Upon completion of all work, each motor shall be operationally tested with its associated pump and fan. Vibration readings shall be taken and recorded in a type written report and a copy given to the CGTA. Any further balancing shall be carried out in situ.

L-3.9

Contractor is responsible for all craneage and transport of the motors.

L-3.10

All work shall be completed to the satisfaction of the CGTA.

APPENDIX - A

PORTABLE FIRE EXTINGUISHERS

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FIRE EXTINGUISHERS

Location:	Extinguisher Type:	Serial #
Fan Room above Wheelhouse.	10 lb CO2	11317
Wheelhouse Port	51b CO2	602345
Wheelhouse Stbd.	51b CO2	724733
Wheelhouse Stbd	10 lb ABC	305544
Passage at Radion Room	10lbABC	219730
Electronics Room.	51b CO2	724724
Fire Station #6 Centre.	10 lb ABC	305619
Computer Room	151b CO2	112647
Fire Station #8 Port Aft	10 lb ABC	305629
AC Room Stbd. Side	20 lb ABC	395480
Emergency Generator Rm	10lbABC	305456
Fire Station #9 Stbd Aft	10 lb ABC	219746
Fire Station #10 Stbd Fwd	10 lb ABC	305630
Ships Office	10 lb CO2	397511
Engineers Office	5 lb CO2	363331
Fire Station #14 Port Aft	10 lb ABC	305455
Fire Station #15 Stbd Aft	10 lb ABC	305612
Fire Station #16 Stbd Fwd	10 lb ABC	305622
Fire Station #17 Port Fwd	10 lb ABC	305626
Incinerator Compartment	20 lb ABC	306342
Incinerator Compartment	10 lb ABC	305624
Galley Fwd at Stairs	KCLASS	377077
Galley Aft at Steam Table	KCLASS	370091
Steering Gear Port	10 lb ABC	305436
Aft Cargo Hold Centre Fwd	10 lb ABC	305529
Carpenters Shop	10 lb ABC	305881
Dry Store	10 lb ABC	31459
By Auxiliary Generator	10 lb ABC	305559
By Auxiliary Generator	10 lb ABC	305610
By Engine Room Control Room	20 lb ABC	548699
By Engine Room Control Room	10 lb ABC	305590

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FIRE EXTINGUISHERS

Location:	Extinguisher Type:	Serial #
By Engine Room Control Room	10 lb ABC	395447
By Fwd Stairs	10 lb ABC	305612
By Fwd Stairs Engine Room	15 lb CO2	112655
Fire Station #11	10 lb ABC	305631
Workshop	20 lb ABC	395459
Workshop (for Hotwork only)	10 lb CO2	387158
Workshop (for Hotwork only)	20 lb CO2	627415
Transformer Room	15 lb CO2	112320
Engine Room Control Room	15 lb CO2	23625
Engine Room Control Room	5 lb CO2	724729
Engine Room Control Room	10 lb CO2	29559
At Transformer Room	15 lb CO2	16398
Engine Room Lower	10 lb ABC	305607
Engine Room Lower	10 lb ABC	305600
Engine Room Lower FWD	20 lb ABC	395445
Engine Room Lower FWD	10 lb ABC	305578
Engine Room Lower FWD	15 lb CO2	559337
Converter Room	15 lb CO2	112327
At Purifier Room	20 lb ABC	395468
At Converter Room	15 lb CO2	5572105
At Converter Room	10 lb ABC	219739
prop Motor Room	10 lb ABC	305632
prop Motor Room	10 lb CO2	387137
Prop Motor Room AFT	15 lb CO2	112335
Prop Motor Room AFT	10 lb ABC	305628
By Electrical Workshop	5 lb ABC	810379
Central Stores	10 lb ABC	305619
By Electrical Workshop	15 lb CO2	917340
Central Stores	10 lb CO2	231528
Workshop Helicopter	20 lb ABC	306340
Workshop Helicopter	20 lb ABC	918602
Workshop Helicopter	5 lb ABC	940297
Stbd Side Fwd Helicopter	10 lb CO2	925853
Port Side Fwd Helicopter	10 lb CO2	129178

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FIRE EXTINGUISHERS

Location:	Extinguisher Type:	Serial #
Lower Cargo Hold Stbd	5 lb ABC	304121
Tween Cargo Hold Stbd	10 lb ABC	305604
Tween Cargo Hold at Ladder	5 lb CO2	679837
Winch Room Door	10 lb ABC	305591
Winch Compartment Entrance	5 lb CO2	484442
Winch Compartment Stbd	15 lb CO2	112351
Life Boat Control Console	5 lb ABC	23129
Life Boat Stbd Fwd	5 lb ABC	23114
Barge	5 lb ABC	581747
Locker	10 lb ABC	305611
Locker	10 lb ABC	508581
Locker	10 lb ABC	305609
Locker	10 lb ABC	305605
Locker	10 lb ABC	305587
Locker	10 lb ABC	305584
Locker	20 lb ABC	548894
Locker	10 lb ABC	305592
Locker	10 lbABC	305608
Locker	20 lb ABC	548700
Locker	5 lbABC	005787
Locker	10 lb CO2	392822
Locker	10 lbABC	305555
Locker	10 lbABC	719941
Locker	10lbABC	305601
Fire Locker	10lbABC	305613
Fire Locker	10 lb ABC	305606
Fire Locker	10 lb BC	295592
Bowthruster	10lbABC	305614