

# SPECIFICATION FOR THE RENOVATION OF COMPARTMENTS FLOORS & WALLS ON UPPER DECK

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## 1 HISTORY

Canadian Coast Guard Integrated Technical Services, Central & Arctic Region, sent out a TIES contract to produce a specification for the repair of the interior hull plate surface for compartments on the upper deck, and flooring. A faulty insulation of these hull surfaces caused important damage and inconvenient. Also, for many years, Ship's crew spent time repairing the wall insulation as best they could, without ever replacing/repairing all the insulation to try eliminating frost, and consequently heavy damage to walls and floors/decks.

Indeed, during the winter season, ice will form at poorly insulated spots on the exterior walls, especially around the sliding windows, and when this ice melts at springtime, the water will soak in the bottom of the walls, as well as in the floors of the cabins on both these decks. Damage is most important on Main & Upper decks, but has also been noticed on the 2 other higher decks, Boat deck & Officer's deck.

## 2 GENERAL NOTES

1. All the following work specified herein and all repairs, inspections and renewals shall be completed to the satisfaction of the Coast Guard Technical Authority (CGTA), who, unless otherwise advised, will be the Chief Engineer (C/E) of the ship. Upon completion of each item of the specification, the C/E shall be so notified so that he may inspect the work prior to final closing up and after complete closing up. Failure to give notification does not absolve Contractor of the responsibility of providing the C/E the opportunity to inspect any item. Inspection of any item by the C/E does not substitute for any required inspection by Transport Canada Marine Safety Branch (TCMSB).
2. Any item of work involving the use of heat in its execution requires that Contractor advises the C/E prior to starting such heating and upon its completion. Contractor shall be responsible for maintaining a competent and properly equipped fire watch during and for one full hour after all hot work. The fire watch shall be arranged such that all sides of surfaces being worked on are visible and accessible. Contractor shall provide sufficient suitable fire extinguishers and a fire watch during any such heating and until work has been cooled. Ship's extinguishers are not to be used except in an emergency. Contractor shall abide by the Coast Guard Hot Work policy that will be handed over to him before the beginning of work. Contractor shall be responsible to ensure that Contractor's personnel including all subcontractors shall follow the policy.

3. Contractor to include in quote the costs of any and all transportation, staging, rigging, slinging, crantage, removals, and installations of parts and equipment such as may be required to carry out work.
4. Any piping, manholes, parts and/or equipment requiring removal to carry out specified work and/or to gain access shall be replaced upon completion with new jointing, nuts, bolts, anti-seize compound, clamps and brackets as applicable (Contractor supply), and secured in original condition. Any removals shall be jointly inspected by both Contractor and the C/E prior to removal.
5. Contractor to ensure that all spaces, compartments, and areas of the ship, both internal and external, are left in as clean a condition as found. The cost of removing dirt, debris, and associated material shall be included in the quote on each item of this specification
6. Contractor to supply the C/E with marine chemist's certificates in accordance with CGSSB TP 3177E before any cleaning, painting or hot work is commenced in confined spaces or machinery compartments. Certificates shall clearly state the type of work permitted, and shall be renewed as required by the regulations.
7. Whenever any work is being carried out involving a ship's firefighting or fire detecting system, it shall be done in such a way as to leave the vessel and any persons aboard with adequate protection against fire at all times. This may be so accomplished by removal or disarming of only a portion of the system at a time, by replacement with spares while work is in progress or by other reasonable means acceptable to the C/E.
8. Unless specified otherwise, any replacement and/or disturbed steel work to be given a minimum of two (2) coats of marine primer immediately upon completion of work.
9. All materials, unless otherwise specified, shall be supplied by Contractor. Where a particular item is specified, or where substitution must be made, the Chief Engineer must approve all material offered.
10. Contractor to be responsible for calling in the services of Transport Canada Marine Safety Branch (TCMS), when and as required for survey and inspection.
11. Public Service Smoking Policy forbids smoking in Government ships in all areas inside the ship where shipyard personnel will be working. Contractor shall inform shipyard workers of this policy and ensure that it is complied with in all cases.
12. Contractor shall use fully qualified, certified and competent tradesmen and supervision to ensure a uniform and high level of workmanship as judged by normally accepted shipbuilding standards to the C/E's satisfaction.
13. The overhaul and installation of all machinery and equipment specified herein shall be as per the Manufacturers' applicable instructions, drawings and specifications.
14. Contractor shall provide adequate temporary protection for any equipment or areas affected by this refit. Contractor shall take proper precautions to maintain in a proper state of preservation any machinery, equipment, fittings, stores or items of outfit which might become damaged by exposure, movement of materials, paint, sand grit or shot blasting, welding,

airborne particles from sand grit or shot blasting, welding, grinding, burning, gouging, painting or airborne particles of paint. Any damage shall be the responsibility of Contractor.

15. Contractor must ensure that welding is performed by a welder certified by the Canadian Welding Bureau (CWB) in accordance with the requirements of the following Canadian Standards Association (CSA) standards:
  - a. CSA W47.1, Certification for Companies for Fusion Welding of Steel Structures (Minimum division level 2.0); and
  - b. CSA W47.2-M1987 (R2003), Certification for Companies for Fusion Welding of Aluminum (Minimum division level 2.1).
16. All electrical installations or renewals shall be in accordance with the latest editions of the following Marine Standards:
  - a. TP 127 – Ship Safety Electrical Standards
  - b. IEEE Standard 45 – Recommended Practice for Electrical Installation on Shipboard
17. All materials supplied and work carried out by Contractor shall be adequate to meet the following service conditions:
  - a. outside air temperature of minus (-) 400 C to plus (+) 350 C;
  - b. wind velocity of 50 knots;
  - c. water temperature of minus (-) 20 C to plus (+) 300 C;
  - d. Shock loading of 2.5g horizontal, 1.5g vertical.

## 3 UPPER DECK COMPARTMENTS

### 3.1 Inspection

A few lining wall panels on Upper deck cabins were taken down so as to permit us to see firsthand the extent of the damage caused by the ice melt that had formed during winter, principally around the sliding pane window and frame in cabin no.245, Upper deck (see figure no.1).



*Figure 1: cabin 245 + typical sliding window*

The compartments targeted by this work are as follows: main entrances # 206 and 207, QM room # 204, dining room # 202, kitchenette # 201 and data acquisition room # 203. Surface floors and exterior walls may vary, but the work to be carried out will be similar. The targeted spaces are all at the front of the upper deck, between the members 96 to 112.

### 3.2 Dismantling Work

Before undertaking any repairs to the insulation of the exterior walls of these spaces, it will be necessary to disassemble the fixed furniture and store it on the front deck in a container. See General Arrangement drawing in annex B.

#### 3.2.1 Furniture & Furnishings #204

Dismantle and put away, outside room #204, the following:

- a. Desk chair;
- b. Computer desk;
- c. Window frame;
- d. Accommodation ladder control box;
- e. Electric reheater, fastened to wall lining panel (if necessary).



*Figure 2 : Room 204 Quarter Master*

N.B It is to be noted that certain cabins have reheaters mounted on exterior lining panel, and others, on interior panel.

### 3.2.2 Furniture & Furnishings #202

Dismantle and put away, outside room #202, the following:

- a. Fixed tables (3);
- b. Fixed dresser and mirror;
- c. Window frame;
- d. Fixed chair/stool (16);
- e. Electric reheater, fastened to wall lining panel (if necessary).

N.B It is to be noted that certain cabins have reheaters mounted on exterior lining panel, and others, on interior panel.



*Figures 3, 4 et 5 : Room 202 Dining room*

### 3.2.3 Furniture & Furnishings #203

Dismantle and put away, outside room #203 data acquisition room, the following:

- a. Office chair (6);
- b. Computer tables and shelves;

- c. Surface wire-tray and electrical outlet;
- d. Window frames;
- e. Accommodation ladder control box;
- f. Electric reheater, fastened to wall lining panel (if necessary).

N.B It is to be noted that certain cabins have reheaters mounted on exterior lining panel, and others, on interior panel.

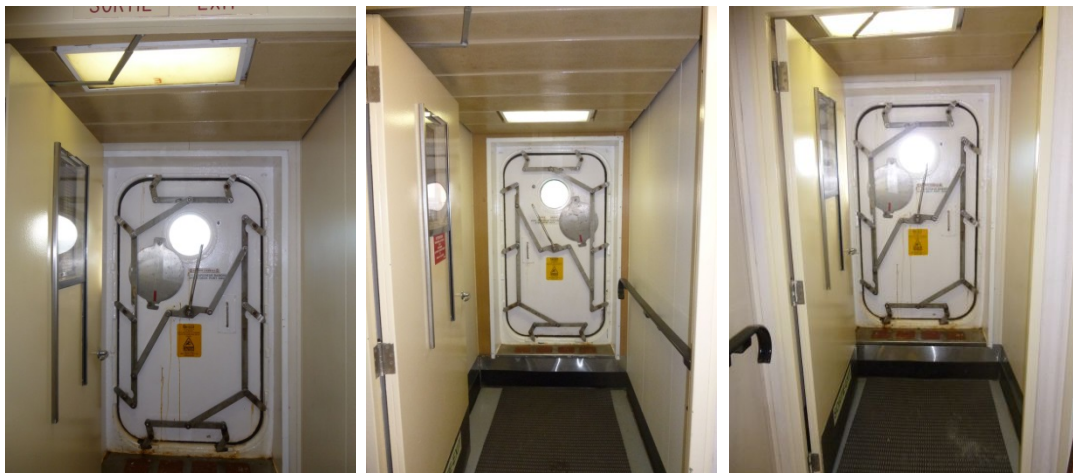


*Figures 6, 7 et 8 : Room 203 Data acquisition room*

### 3.2.4 Furniture & Furnishings #206 & 207

Dismantle and put away, outside room #206 et 207 main entrances, the following:

- a. Outside door frame;
- b. Furniture on rear adjacent wall to room #208 with port entrance;



*Figure 9, 10 et 11 : Rooms 206 port et 207 starboard main entrances*



### 3.2.5 Wall Lining Panels & Suspension Ceiling Tiles

In order to gain access to the insulation material that blankets the exterior steel plating, as well as the ceiling assembly, it will be necessary to dismantle the following:

#### 3.2.5.1 Sliding Window Frame

This frame will be reinstalled and the end of the prescribed work. See figure 12.



Figure 12: Sliding window frame + 4-drawer dresser cabin 245

#### 3.2.5.2 Wall Lining Panels

There are approximately 19 meters of wall lining panels, Joiner B-15, 50mm X 600mm X 2250mm, in outside walls, plus 5 meters of paneling in inside transversal wall. The actual panels are deteriorated by corrosion on the lower end, as well as the positioning channels. These will be replaced by new paneling and tracks of the same type and color. Refer to sketch 1, walls dimensions are shown with circle readings in inches. See figures 13 & 14.



Figure 13: Corroded lower part of Joiner panel



Figure 14: Typical 50mm (2'') Joiner panel

### 3.2.5.3 Electrical Outlets

We must ensure to remove the electrical outlets from actual lining panels, as well as reheater thermostats. Reinstall on new panels at the completion of work.

### 3.2.5.4 Suspension Ceiling

Suspension ceiling will be removed, to facilitate access to exterior wall insulation. This ceiling will need to be stored, as it will be reinstalled at the completion of work. See figure 15. Supply and install a new ceiling system (supports and tiles) in entrance lobbies 206 (4'x4 ') and 207 (4'x7') as well as the entire ceiling of the gymnasium (152 ft<sup>2</sup>).



*Figure 15: Typical suspension ceiling*

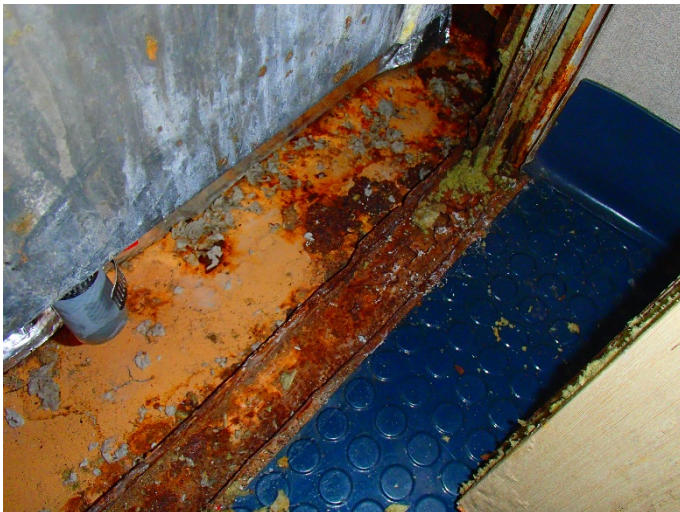
## 3.3 Insulation Removal

- a. The insulation material on cabin and washroom exterior walls must be completely removed. There is a minimum of 50mm of insulation on walls.
- b. The current insulation installed on vessel is CAFCO type C Spray on Insulation, 50mm thick & 25 mm over beams. This insulation is held in place using wire mesh and insulation pins, c/w spring washers over pins. These pins will be removed, as new insulation material will be thicker (twice as thick), which will require longer insulation pins.
- c. In certain areas, especially towards portholes, other types of insulation material were used, ex. urethane, bubble-type insulation, etc. This insulation will need to be removed also.
- d. An extra 75cm of insulation will need to be removed on ceiling, from outer shell plate towards center of vessel. This insulation is similar to the wall insulation, CAFCO Type C Spray on Insulation, 50mm thick, A-60 fire rating. A clean cut of CAFCO ceiling insulation will need to be done, to permit a better blend between CAFCO and new insulating material.

- e. All removed material to be taken off ship and Contractor will dispose of it in accordance with current regulations.

### 3.4 Installation Preparation Work

- a. Once all the insulation has been removed, Contractor will mechanically grind off all rust on exterior wall, ceiling and floor plating.
- b. Special attention will be exercised on the deck beneath the porthole, as water and humidity were particularly aggressive in that area. Also the lower lining track will be removed, as it is badly corroded. See figure 16.
- c. Grinding to be performed all around sliding window (frame), if necessary.
- d. Rusted surface to be grind and painted, 25% overall surface (350 ft<sup>2</sup> total to be grind), mostly 2 feet above deck, and around the sliding windows, applied on coat of marine enamel primer and two finishing coat.



*Figure 16: Corroded tracking & floor below sliding window*

### 3.5 Insulation Installation

All material to be supplied by Contractor.

#### 3.5.1 Installation Criteria

- a. Insulation to be fitted to bulkheads and decks by means of insulation pins spaced apart no more than 300mm max. Insulation pins to be 12mm longer than the insulation thickness.
- b. All joints and edges of vapour barrier and heads of pins to be capped & taped after insulation and prior to fitting of sheeting or lining. Extreme care to be taken to maintain the integrity of the vapour barrier.
- c. Unless noted otherwise, the last layer of insulation must be covered with a vapour barrier.

- d. All exposed decks or bulkheads shall be thermally insulated in addition of their fire protection A-15, A-30 or A-60.
- e. Installation of insulation shall conform to TP11469, of Transport Canada, and to specific details from insulation supplier (ISOVER or equivalent).
- f. Refer to drawing 108-H-4410 – M.L. Black Insulation Plan, in Appendix B.

### **3.5.2 Deck Head Insulation**

- a. Approximately 11 square meters of new insulation shall be installed on deck head of the compartments, at 0.5 meter from the outside bulkhead.
- b. The insulation material is ISOVER ULTIMATE 50mm, A-60, with built in vapour barrier, or equivalent.
- c. To blend in the actual CAFCO 75mm insulation to the new ISOVER 50mm sheet-type product, we will need to use the insulation pins already installed on the deck head. In effect, the CAFCO insulation is installed as follows: 25mm of CAFCO directly sprayed on the steel deck head, a wire mesh held in place by insulation pins and spring washers, and finally another 25mm of sprayed CAFCO that will mesh into the wire mesh and another coat of CAFCO under the wire mesh.
- d. Care must be taken to make sure new insulation blanket can be held tight against CAFCO using insulation pins and spring washers. If pins are missing, Contractor to install new ones.
- e. Again extra care to be taken to install adhesive aluminium vapour barrier tape to make sure vapour barrier is tight between new insulation and wire mesh already in place. If tape is pressed against CAFCO material, barrier will not be tight.

### **3.5.3 Exterior Shell Plate Insulation**

- a. Approximately 21 meters wide of new insulation shall be installed on exterior shell plate in all compartments, on all vertical length of the outside bulkhead.
- b. The insulation material is ISOVER ULTIMATE 100 mm, with a minimum of 50mm over beams, with built in vapour barrier, or equivalent.
- c. Make sure to insulate adequately (with vapour barrier) the sliding window frame, making sure that no ice will form again on the frame. Naturally, frame will then have been reinstalled.
- d. As the panels of the kitchenette are not removed, the maximum insulation must be replaced from the already open sides to cover the 4 meter width of the kitchenette.
- e. Make sure to follow the criteria already stated in 3.5.1.

## **3.6 Modification of Sliding Windows**

The sliding windows were installed with a stainless steel retention reservoir. This reservoir is too small (not high enough) and cannot prevent accidental overflowing of rain water or sea spray that can drip



down to the reservoir when window is partially open or not well sealed. Contractor must proceed with the following modification on all 7 sliding windows:

- a. The actual tank measures approximately 35cm high X 50cm wide. See figure 9.



Figure 17: Retention reservoir cabin 245



Figure 18: Flexible hose connection under reservoir

- b. A new reservoir approximately 70cm high X 50cm wide will need to be fabricated and installed, as this new tank will allow rain water and sea spray to be more readily captured. The bottom of tank to be designed to permit water being channelled towards drain connection.
- c. This new reservoir will be built using stainless steel 316 material.
- d. The actual reservoir is fitted with a drain connection under, permitting rain water and sea spray to be drained on deck. The new arrangement will need to be fitted with a similar arrangement, c/w flexible drain hose. Make sure drainage connection in wall is free flowing. See figure 18.
- e. A leak tightness test to be performed before boxing up panels.

### 3.7 Installation of Joiner Lining Panels

All materials to be contractor supplies, identical or similar to be supplied, approximate quantity indicated, to be confirmed by contractor, supply certificate from a marine classification society :

- PA33C50 B-15 Class 50mm thick Wall Panels PVC/Galv 600mm x 2250mm W80 Beige color Joiners Isolamine Marine wall panel; qty 40
- PA33C50 B-15 Class 50mm thick Wall Panels PVC/PVC 600mm x 2250mm W80 Beige color Joiners Isolamine Marine wall panel; qty 10
- Mounting accessories for 50 panels, top, bottom molding, and in between joining strip ;

- a. The old lining panels previously dismantled will be replaced by new Joiner B-15 panels, 50mm X 600mm X 2250mm. These new panels will be installed using all new tracks (lower & upper), inside and outside corners, and end caps.
- b. Once panels are installed, Contractor will then reinstall electrical outlets and reheater, and connect them in both cabins.
- c. Contractor to render lining panel under sliding window removable, as regular maintenance is often necessary in this area. The C/E will discuss with Contractor and convene with him in the best way to install such a panel.
- d. Once all lining panels are installed, reinstall suspension ceiling and fixtures.
- e. Finally, replace carpet and underlay carpeting using new linoleum product. Repair underlay surface over 50% of all floor, supply and install Tarkett Granit linoleum without joint with assorted vinyl 5" wall baseboard. All furniture and furnishings removed previously will be reinstalled after installing linoleum.

### **3.8 Reinstallation of Cabin Furnishings**

All furniture will be removed and stored in a container contractor on the boat deck before beginning work, and replace the furniture and fittings removed previously in 3.2.

### **3.9 Cleaning**

At the end of the work, a specialized cleaning team will fully clean cabins of upper deck, floors, walls, ceilings and furniture as well as the corridors / passages adjacent to the work.