

120. LIFE FLOATS (CONT'D)

All floats on board shall be stencilled by the Contractor with the name of the ship and the capacity of the float at the fore and aft ends of the floats.

121. HATCH SQUARE TROOP BERTH FITTING REMOVAL

Remove in their entirety from the ship all installed or stowed berths, standees, chains, angles, straps, sockets, studs, clips, or any other securing devices pertaining to the berthing of troops on the squares of the hatches throughout the ship.

122. AMMUNITION HOISTS

Accomplish the following work on the two (2) ammunition hoists and trunks at Second Platform, between frames 209 and 210.

Thoroughly clean free of all rust, scale, and loose paint, all interior surfaces of the hoist trunks, entrance doors, and scuttles, hoist shafting, chain, sprockets, and all working parts of the hoists, from Second Platform up to First Platform.

Free up all working parts of the hoist in the aforementioned area. Apply a heavy coat of rust preventive compound Military Department Specification MIL-C-272 Grade 3, or equal as approved, to all parts and surfaces specified

above which do not receive paint, paint the interior surfaces of the hoist trunks from Second Platform to First Platform with one (1) prime coat of Red Lead, Bu-Ships Formula N. 116, and one (1) finish coat of inside white Navy Formula No. 27.

123. FLYING BRIDGE WING REMOVAL

Remove in their entirety all plating, framing, supporting structure, rails, bulwarks, piping, wiring and fittings forming, or a part of, the flying bridge wings port and starboard (top of wheelhouse level) outboard of the sides of the navigating bridge deckhouse. Properly close any openings resulting from this removal and install coaming plate in way of removals so as to continue the existing coaming around top of house. Furnish and install railing, similar and equal to existing adjacent railing around aft end of house, in way of removed bridge wings. Relocate signal locker and any other fittings as may be necessary. Rearrange deck drainage from top of house as may be made necessary by removals and so as to properly drain top of house and to eliminate any drainage down the side of house plating. Remove the existing windows and their supporting structure from the outside area of Navigating Bridge port and starboard of the wheelhouse.

124. DAMAGE CONTROL LOCKERS

Two (2) damage control lockers shall be established in the following locations and in the following manner:

Navigating Bridge Deck

The forward end of the existing deck locker between frames 91 and 95, starboard side, shall be divided-off by the installation of a 1/4" steel plate transverse bulkhead, properly constructed, stiffened, and sealed, at about frame 92-1/2, and by the installation of a steel plate door complete with approved hardware, in the inboard longitudinal bulkhead separating this space from the inside passageway.

Bridge Deck

The forward end of the existing deck locker between frames 102 and 106, starboard side, shall be divided-off by the installation of a transverse bulkhead and door similar to that noted above. The bulkhead shall be installed 6" aft of frame 103, the existing weather-tight outside door being relocated as and if necessary. The new door shall be installed in the existing transverse bulkhead at frame 102.

124. DAMAGE CONTROL LOCKERS (CONT'D)Bridge Deck (Cont'd)

Any and all alterations to existing or new ventilation equipment made necessary by the above installations shall be properly accomplished.

All additional deck, door, and bulkhead insulation made necessary by U.S. Coast Guard fire control requirements shall be furnished and installed.

Each of the two lockers shall be equipped with one (1) vapor-proof lighting fixture with guard, controlled by one (1) watertight switch located just inside the door to the locker, and properly wired to the emergency source of electric current.

Each of the two lockers shall be supplied with natural ventilation consisting of a "torpedo" type exhaust head, high up on outside bulkhead, and a scoop or cowl supply from outside thru a duct delivering the air to a point approximately 6" above deck level. Each of the two lockers shall be supplied with a properly piped and installed deck drain fitting.

125. SALOON-MESS LINEN LOCKER

The "Purser's Locker", Main Deck, frames 85-87 to port of centerline as shown on Contract Guidance Drawings as issued for bidding, shall be re-designated as "Saloon-Mess Linen Locker" and the entrance door installed in the longitudinal bulkhead between the locker and the port-side passageway, instead of in the bulkhead between the locker and the Purser's Office. The arrangement of the new shelving shall be so as to suit the door location.

126. SALOON-MESS ADDITIONAL SERVING TABLES

The three (3) serving tables shown in saloon-mess on Contract Guidance Plans as issued for bidding, located between frames 124 and 125 shall be changed to six (6) serving tables arranged back-to-back in pairs, facing athwartships, each pair located where one (1) serving table shows on above noted plan.

127. CANCELLED

128. CANCELLED

129. CANCELLED

130. REARRANGEMENT OF LIFE BOATSGeneral

Present life boat installation and arrangement shall be altered to agree with the arrangement shown on MSTS plan #T-AP110-68221-1179026. The U. S. Government will furnish the following new equipment:

1. Two (2) 26'-0" x 9'-0" x 3'-10", 43-person, aluminum, radio equipped motor lifeboats.
2. Two (2) 35'-0" x 12'-4" x 5'-3", 135-person galvanized steel hand propelled lifeboats.
3. Eight (8) sets of nested gravity davit heads, complete with associated grilles, simultaneous gripe release assembly, pendants, floating blocks, sheaves, sheave brackets for existing trackways, load release assembly for upper boats, wire falls, etc.
4. Two (2) sets of single gravity davit heads, complete with blocks, falls, grilles, simultaneous gripe release assembly, pendants, etc.
5. Two (2) sets of single gravity davits, complete with trackways, blocks, wire falls, pendants, simultaneous gripe release assembly, etc.
6. Two (2) Vertical Welin Type BWB winches (no quick return mechanism), complete with 25 H.P. electrical equipment, limit, emergency and master switches.
7. Two (2) sets Crescent "C" Davits to accomodate 26 ft. aluminum motor lifeboat.
8. Twelve (12) Emergency Switches, 100 amp., 25 H.P., 250 V. D. C., watertight bronze enclosure.
9. Twenty (20) Limit Switches, 2-pole unfused, watertight bronze enclosure.
10. Twelve (12) Master Switches, momentary contact type, watertight bronze enclosure.

The U. S. Government will also perform the following alterations to existing boats and winches presently on board the ship.

- (a) Convert ten (10) existing BWB horizontal winches to BWB vertical winches.
- (b) Fit Rottmer type release gear in ten (10) 35'-0" lifeboats.
- (c) Fit Rottmer type release gear in ten (10) 30'-3" lifeboats.

The new equipment to be furnished by the government and the government alterations to the existing equipment will be in accordance with the requirements of and to the approval of the U. S. Coast Guard.

The Contractor shall provide all necessary labor and material to relocate and properly install the existing, new and altered equipment to the satisfaction and the approval of the U. S. Coast Guard and as specified herein. The lifeboat installation shall be complete with all wiring, switches, controls, etc., the Contractor furnishing all equipment other than that specified to be furnished by the U. S. Government. The Contractor shall make provision for any fittings or structure necessary for access, maintenance, inspection, or operation of the life saving equipment including ladders for access to top of davit "A" frames, hand and foot rungs and/or steps for access to stowed boats and davit trackways, debarcation aids, frapping cleats, etc.

(Continued)

130. REARRANGEMENT OF LIFE BOATS (CONT'D)General (Cont'd)

The Contractor shall provide all labor and material to properly connect up all new and relocated equipment to the ships electrical system. This shall include all necessary power feeders and distribution panels and the installation of new limit switches, master switches and emergency switches, in accordance with current U. S. Coast Guard requirements. One (1) limit switch shall be located on each gravity davit trackway. Master Switch and Emergency Switch shall be located at the railing adjacent to the respective winch. New winch controllers shall be located adjacent to existing winch controllers. Remove the ten (10) 25 HP lifeboat winch controllers and enclosures to shop.

New enclosures shall be fabricated to include the following: They shall be of sufficient size to remove panels when permanent cables are installed. They shall be made of 1/4" steel, welded construction and proven watertight, with doubler plate 3/8" thick at cable entrance area. Mounting bars 3/8" x 1 $\frac{1}{2}$ " shall be welded to the back of the enclosure. Suitable clips shall be welded inside the enclosure for mounting the panel in a manner to allow six (6) inches clearance between back of enclosure and panel.

A suitable channel shall be mounted on the front of the box and a 1/2" x 1/2" one-piece gasket installed with a dovetail splice located at bottom of box.

The door shall be flanged on all four edges and shall be secured with a sufficient number of hinged dogs to insure watertightness and prevent warping.

All fittings used on enclosure dogs, pins and wing nuts shall be brass.

Prior to installation of fittings entire enclosure shall be hot-dip galvanized and exteriors painted with two coats of red lead and one coat to match surrounding area. Interiors shall be painted with two coats of approved insulating air drying varnish black in color.

The panels shall be altered as follows:

Completely dismantle panels removing all electrical equipment.

Thoroughly clean all electrical parts to remove verdigrease and foreign substance. Dress up contacts and cadmium plate all electrical parts.

Provide new mounting panels of the same quality as those removed and a minimum of 1" thick coated with six coats of approved switchboard dressing.

Remount necessary contactors, switches, fuse clip, relays and overload and safety devices required for hoisting operation only. Manufacturer's nameplate shall be installed on new panels. New switchboard wire or busing of sufficient current-carrying capacity shall be used in the inter-connecting of electrical parts.

Any electrical equipment removed from original panel and to be re-used on the altered panels found to be worn or defective shall be renewed.

Electrical equipment on panels shall be marked with the usual designations, and a wiring diagram using the same designations and complete with bill of material and part numbers shall be prepared and secured to the inside of the enclosure door.

130. REARRANGEMENT OF LIFE BOATS (CONT'D)General (Cont'd)

The original "CB" reproducible tracing shall be delivered to the Contracting Officer MSTSPACAREA.

Upon completion of alteration of controller, it shall conform with figure 113-70-25 (e) (1) of US Coast Guard "Navigation Vessel Inspection, Circular #8-51" of August 1952.

All electrical parts remaining unused shall be properly tagged, designated and boxed and returned to the Chief Engineer to be used as spares.

Provide all material and cable and install in all lifeboat winch controllers, a total of fourteen (14), 110 volt, 50 watt heating element, which will be fed one (1) circuit port and one (1) circuit starboard from a lighting panel located on Promenade deck.

Upon completion, the entire lifeboat installation shall be tested in accordance with current U. S. Coast Guard requirements.

Removals

Remove all lifeboats, trackways, davits, davit heads and winches from the vessel. Ten (10) 35° lifeboats, ten (10) 30°-8" lifeboats and ten (10) horizontal winches will be altered by the U. S. Government. It shall be the Contractor's responsibility to ship to the Welin Boat and Davit Co. representative, San Francisco, California, this equipment which will be altered under separate contract by the U. S. Government. Ten (10) 35°-0" lifeboats, ten (10) winches and eight (8) 30°-8" lifeboats will be returned to the Contractor for reinstallation. The Contractor shall exercise care in the removal of all equipment to be reused.

All "A" frames, trackway brackets, chocks, pads, blocks, miscellaneous foundations, supporting structure, etc., in way of former trackway, winch, boat or davit location shall be removed.

All debarkation ladders, trackway access ladders, debarkation lights and brackets, inboard chain rail and stanchions, obsolete wiring, etc., shall be removed.

Remove gun foundation trunk, clipping room, piping, wiring, etc., Bridge Deck, frs. 85-89, port and starboard, and Boat Deck, frs. 75-82, port and starboard, as specified elsewhere in these specifications.

Remove gun bulwarks, mounting rings and overhang on Bridge Deck, frs. 151-158, port and starboard.

The Contractor shall make all necessary repairs or replacements to structural surfaces in way of and adjoining removals. All openings in decks, bulkheads and structure in way of removals shall be properly blanked off and made watertight. All surfaces in way of removals shall be free of sharp edges, burrs or openings.

Provide matching deck coaming and pipe railing in way of removed structure, Bridge Deck, frs. 151-158, port and starboard.

Installations

The twenty (20) removed gravity trackways shall have the upper and lower brackets, sheaves, limit switches, stopper bars, cleats, pads and other extraneous fittings including wire mesh guards removed. The trackways shall be modified in length as shown on MSTS plan T-AP110-S8221-1179026, and shall be checked for alignment and trueness, and faired up as necessary. The trackways shall be provided with

130. REARRANGEMENT OF LIFE BOATS (CONT'D.)Installations (Cont'd.)

all required fittings for the new installation such as sheaves, brackets, stopper bars, pads and simultaneous gripe and stopper release assembly, gripe pads, limit switch pads, cleats, etc. All trackways shall be fitted with a new protective, flattened expanded metal guard on the underside of the tracks, extending from the deck to approximately 8'-0" above the deck.

The davit trackways along with the altered and new lifeboats, winches, davits, equipment, etc., shall be relocated and installed as indicated on MSTS plan and as specified below.

The Contractor shall provide and install all structure, foundations and fittings required for the new installations.

The Contractor shall alter existing ship's structure under lifeboat davit trackways and winches to provide adequate support for the boats in their new location.

Exhaust vent outlets, railing, lighting fixtures, etc., shall be altered as necessary to clear new trackways and brackets.

Lifeboat Stations #1 and #2

New Government furnished 26'-0" aluminum motor lifeboat on new Government furnished "Crescent" type davits. Boats to be handled by existing CWB winches which shall be relocated as indicated on drawing T-AP110-S8221-1179026. The CWB winches shall be opened up, scaled inside and out, given two (2) coats of red lead, clutch lining and manual brake band renewed. All moving parts freed up, lubricated, and winch reassembled. Blocks on deck shall be provided as required to accommodate the new equipment. Puddins and breasting gripe shall be fitted in way of boats. New 5/8" diameter, 6 x 37 Monitor grade, preformed, grease impregnated wire falls shall be provided. Removable diamond plate protective covering over wire rope leads and blocks and portable 2-course chain railing shall be provided as shown on plan.

Lifeboat Stations #3 and #4

Government altered single 35'-0" lifeboat on relocated trackways with new Government furnished davit heads. Boats to be handled by Government altered BWB winches which shall be located as indicated on plan.

Lifeboat Stations #5, #6, #7, #8, #9, #10, #11, and #12

Government altered nested 35'-0" and 30'-8" lifeboats on relocated trackways with new Government furnished davit heads. Boats to be handled by Government altered BWB winches which shall be located as indicated on plan. Boat Deck shall be extended in way of lifeboats, Stations #11 and #12, as shown on plan, and as indicated elsewhere in these specifications.

Lifeboat Stations #13 and #14

New Government furnished single 35'-0" lifeboat on new Government furnished gravity davits. Boats to be handled by new Government furnished BWB winches.

(Continued)

130. REARRANGEMENT OF LIFE BOATS (CONT'D.)Miscellaneous

Provide two (2) sets of hinged access steps on the Promenade Deck bulwark for debarkation to each of lifeboats #3 to #12 inclusive.

The wire rope falls extending along the Bridge Deck at the railing shall be covered with protective pipe covering.

New boom rests for booms at #3 Hatch with vertical ladder access or ladder rungs shall be furnished and installed on the booby hatches about frames 75-76, port and starboard, as shown on plan.

New accommodation ladders davits shall be furnished and installed on the Boat Deck, fr. 117, port and starboard, as indicated on drawing T-AP110-S8221-1179026.

The sounding machine, booms and platforms shall be relocated to a position as indicated on drawing.

Access ladder leading from Boat to Bridge Deck, frame 93, port and starboard, shall be relocated as shown on drawing. New ladder cut in deck shall be provided, and platform, handrail, coaming, etc., altered as indicated and required.

A new steel access ladder, complete with pipe handrail, necessary deck cut, coaming, etc., shall be installed, leading from Promenade Deck to Boat Deck at frame 132, port and starboard. Ladder design, size and slope shall be the same as existing ladders in similar location, frame 96, port and starboard.

A protective rail guard shall be installed at the forward end of #1 and #2 motor lifeboats. Guard shall be constructed and located as shown on drawing.

The existing pipe railing, chain or cable shall be removed from the following locations, complete with all stanchions and braces.

- (a) Boat Deck, port and starboard, forward and aft, frs. 56 to 158.
- (b) Promenade Deck, port and starboard, frs. 160-200. New 4course pipe rail 42" high shall be furnished and installed in way of removed railing, as shown on MSTS plan T-AP110-S8221-1179026. Railing shall have top rail of 1 $\frac{1}{4}$ " pipe with lower rails of 3/4" pipe with suitably spaced pipe stanchions and braces. Railing shall be portable in way of #3 and #6 Cargo Hatch and a 4'-0" wide portable section shall be provided in way of each lifeboat station. Railings shall be recessed in way of debarkation nets and debarkation lights when in stowed position.

The Contractor shall provide labor to remove all present water and provisions from all lifeboats, before removing from vessel. After installation of altered and new lifeboats, the Contractor shall provide labor to install required Government furnished water and provisions in lifeboats.

131. DECK COVERING(a) Magnesite

Magnesite type deck covering shall be laid throughout all living spaces, including ship's Officers' quarters, crew quarters, permanent military staff quarters, ship's offices, troop officers' quarter, all recreation spaces, troop areas, dining saloon, all mess rooms, hospital areas (excluding wet spaces) and all related passageways and stair wells adjoining these spaces, not presently covered with magnesite type deck covering. Any magnesite existing in the above areas which is disturbed due to removals, installations or relocations, shall be repaired, finished and made to match existing deck covering.

All steel decks, prior to installation, shall be scaled, wire-brushed or otherwise cleaned to bare steel. All vertical surfaces adjoining these decks shall also be cleaned to the height of the cove base.

New magnesite shall have an incombustible aggregate without foreign fillers and shall be 3/4" thick, except where greater thickness is specified or required to meet U. S. Coast Guard Fire control requirements as last amended. The magnesite used shall be the product of a recognized manufacturer, experienced in the marine field, and magnesite deck covering must be in the approved "Equipment Lists for Merchant Vessels" of the U. S. Coast Guard as last amended. The magnesite used shall be installed in accordance with the manufacturer's recommendations and after finishing shall be "sealed". The thickness of magnesite shall be a minimum of 3/4" in way of all doubler plates and other raised sections of deck plating and shall be sloped to meet the adjacent deck covering. The slope shall be 1/4" per foot.

Suitable steel spools or blocks shall be welded to steel decks arranged to take bases or legs of existing, new or reused furniture and equipment. Height of steel spools or blocks shall equal thickness of magnesite deck covering.

A steel trowelled finish shall be applied.

The steel deck plating, and bulkhead plating and other vertical projections in way of magnesite deck covering and cove bases, after being scaled to bare metal and thoroughly cleaned as hereinbefore specified shall be coated with a protective coating and bonding medium similar and equal to "Dex-O-Tex Magnabond" manufactured by Crossfield Products Corporation, Los Angeles, Calif. The protective coating shall be 1/8" thick and shall be applied in accordance with the manufacturer's directions and under his direct supervision.

A Magnesite cove base of suitable height shall be installed in way of all bulkheads and the foundations of all built-in furniture and equipment. Magnesite deck covering shall be laid under all new, reused and existing furniture and equipment. Deck covering shall in all cases slope towards the deck drains and, in addition, shall slope locally away from bulkheads and fittings to prevent water standing against the bulkhead. Door sills shall be raised where necessary. Joiner bulkhead bases shall be raised or suitably flashed in way of magnesite coves, where necessary. In areas where the door sills must be raised, the door frame shall be altered and the clear height of the door opening shall be retained wherever possible. Deck drains, water closets, piping, pipe flanges, sounding tubes, etc., where terminating or located in way of new magnesite deck covering shall be raised as

131. DECK COVERING(CONT'D.)Magnesite (Cont'd.)

necessary or replaced. All hand operated, flexible cable or solid rod, remote control systems which terminate at the deck level, shall be modified and raised to suit the installation of the new deck covering.

Where new magnesite deck covering is installed adjacent to existing magnesite of a different thickness, the new deck covering shall slope into the existing covering at a rate of 1/4" per foot.

Where existing deck covering, such as rubber tile and linoleum, is removed in spaces or compartments covered by magnesite, the removal shall be accomplished without damaging the underlay. The surface of the remaining covering shall be cleaned, scratched and wet down with magnesium chloride solution before laying a finish coat. The finished coat shall be 1/4" to 3/8" thick, and shall be steel trowelled.

The color of exposed magnesite throughout shall be red, obtained by using a red oxide pigment.

Within twenty-four (24) hours after the final trowelling, and before the area is open to traffic, the magnesite decks shall be sealed with an approved sealing compound. The sealing compound shall be a chlorinated, penetrating, fast drying type sealer. The seal shall be applied generously and allowed to penetrate a minimum of ten (10) minutes and a maximum of twenty (20) minutes, after which all excess shall be removed so that no deposit remains on the surface. The deck shall be allowed to dry for at least one (1) hour before traffic is permitted.

(b) White Ceramic Tile

Decks in wet spaces in the Hospital Area, all troop and permanent enlisted men's washrooms, shower and toilet spaces, all transient officer toilet and shower spaces and washrooms, whether attached to staterooms or separate, toilet and shower spaces for ship's civilian and permanent military staff officers as listed below, and all cleaning gear lockers shall be covered with 15% non-slip white ceramic tile. Hospital wet spaces shall include washrooms, cleaning gear lockers, diet kitchen, X-ray dark room, utility rooms and pharmacy.

Washrooms, toilets and showers adjoining the following quarters, whether attached to staterooms or separate, shall be tiled:

Master, First Officer, Second Officer, Third Officers, Chief Radio Officers, Chief Engineer, First Asst. Engineer, Second Asst. Engineer, Third Asst. Engineer, Jr. Deck Officers, Jr. Engineers, Chief Steward, Purser, CO Military, Surgeon, Chaplain, Division Officer and Executive Officer.

The 15% non-slip white ceramic tile deck covering shall be 2" hexagonal type tile in the troop toilet, wash and shower spaces, and 1" hexagonal type tile in the Hospital and other tiled spaces.

131. DECK COVERING (CONT'D.)White Ceramic Tile (Cont'd.)

All existing deck tiling, if consistent with new use of the space concerned shall be retained. Furnish all labor and material necessary to repair and/or replace all missing, broken or defective existing tiling in spaces where it is to be retained as any is necessary to place in good order and repair.

A 6" white sanitary cove base shall be installed at all bulkheads and partitions, across the front of all showers, on both sides of new steel coaming plates separating the individual shower receptors which shall be provided under each of all multiple shower installations, both new and existing, and on the outside of all steel coamings in front of all showers.

The scratch coat for the tile shall be one (1) inch thick concrete, consisting of one (1) part Portland cement and two (2) parts clear, sharp sand with not more than four (4) gallons of water per sack of cement. The float coat for the tile shall be 1/2" thick, consisting of one (1) part Portland cement and one (1) part clear, sharp sand. The tile shall be 1/4" thick, thereby making a total thickness of not more than 1-3/4", except as required for drainage. The float coat shall be laid before the scratch coat is completely dried out, but after taking its initial set. Tile shall be well wet before laying. All steel decks prior to installation of ceramic tile, and bulkheads and other vertical projections prior to installation of cove bases shall be scaled, wire-brushed or otherwise cleaned to bare metal. On completion of cleaning decks, bulkheads and vertical projections after being scaled to bare metal and thoroughly cleaned as hereinbefore specified shall be completely coated with a protective coating and bonding medium similar and equal to "Dex-O-Tex Magnabond" manufactured by Crossfield Products Corporation, Los Angeles, Calif. The protective coating shall be 1/8" thick and shall be applied in accordance with the manufacturer's directions and under his direct supervision.

Deck drains shall be modified and/or replaced as required to suit the tile deck covering. Existing piping, door sills and washroom facilities shall be altered and raised to a height equivalent to the thickness of the tile decking.

The minimum height to the tops of all new and existing washbasin shall be 31" above the finished tile deck. Tiling shall in all cases slope towards the drain and, in addition, shall slope locally away from the bulkheads and fittings. Fillet tile shall be used at bulkheads and openings. All hand operated, flexible cable or solid rod, remote control systems which terminate at the deck level shall be modified and raised to suit the installation of the new deck covering.

In areas where the door sills must be raised, the door frames shall be altered and the clear height of the door opening shall be retained wherever possible.

Deck drains, water closets, pipe flanges, sounding tubes, pipe flanges, etc., where terminating in way of new tile deck covering shall be raised up to the new finished deck level.

(Continued)

131. DECK COVERING (CONT'D.)c. Quarry Tile

Decks in Captain's pantry on Bridge Deck; Saloon Galley, Scullery, Service and Cold Pantry, Galley Storerooms, Service Pantry, Bakery, Passageway (on port side forward end of Galley), Lobby (on starboard side forward end of Galley), and Cleaning Gear Locker in Galley on Promenade Deck; Troop Sculleries, Troop Mess Garbage Disposal Rooms and Troop Mess Cafeterias on "A" Deck; Main Galley, Galley Storeroom, Bread Room, Flour Room, Crew Mess Pantry, CPO Mess Pantry, and Crew Scullery on "B" Deck; after being thoroughly cleaned as hereinafter specified shall be covered 6" x 6" x 3/4" non-skid red Quarry tile. Six-inch round top cove bases complete with angles and door stops shall be installed in way of all bulkheads and other projections.

The steel deck plating and bulkhead plating and other vertical projections in way of Quarry tile and cove bases, after being scaled to bare metal and thoroughly cleaned as hereinbefore specified, shall be completely coated with a protective coating and bonding medium similar and equal to "Dex-O-Tex Magnabond" manufactured by Crossfield Products Corporation, Los Angeles, California. The protective coating shall be 1/8" thick and shall be applied in accordance with the manufacturer's directions and under his supervision.

The Quarry tile shall be laid on a sub-base of the same specifications as previously specified for the installation of the ceramic tile.

All tile shall be red Quarry tile, similar and equal to "Ludowici Red Quarry Tile" or red Quarry tile made in accordance with Federal Specifications SS-T-308 as last amended.

Gutter waterways will be installed in locations where and as directed by the MSTS Inspector. The waterways shall be formed with 3/8" x 2 $\frac{1}{2}$ " flat bars welded to deck plating, bulkheads and vertical projections with continuous electric welds. All welds shall be made on waterway side of the bars. Waterways shall be fitted with 3/16" perforated steel plates approximately 48" long, with 5/16" diameter holes spaced 15/32" centers. Each plate shall be secured with 3/8" diameter flat head brass machine screws, spaced not to exceed 11" centers. Tiling shall in all cases slope towards waterways, and away from bulkheads and vertical projections.

All equipment, dressers, etc., shall be raised to suit the thickness of the tile decks; minimum height to top of dressers and table working surfaces shall be 35 inches. Pedestal mounted equipment shall be raised as may be required to clear the new tile deck.

Suitable steel spools or blocks shall be welded to steel decks and arranged to take bases or legs of existing, new or reused equipment; height of steel spools or blocks must equal the thickness of the tile deck.

In areas where door sills must be raised, the door frames shall be altered and the clear height of the door opening shall be retained wherever possible.

Deck drains, sounding tubes, pipe flanges, etc., where terminating in way of the new tile deck shall be raised up to the top of the finished surface of the tile or replaced. All hand operated, flexible cable or solid rod, remote control systems which terminate at the deck level shall be modified and raised to suit the installation of the new deck covering.

131. DECK COVERING (CONT'D.)d. Surgery Area Deck Covering

An electrically conductive magnesite type deck covering, H.H. Robertson "Hubbellite" cement or similar and equal magnesite type deck covering, approved by U.S. Coast Guard, for use in surgical operating rooms, shall be installed in the sterilizing and operating rooms on the Boat Deck, Frames 134-143. The total thickness of the deck covering shall not exceed $1\frac{1}{2}$ ". A 6" sanitary cove base shall be installed at all bulkheads consisting of a 5/8" bottom coat and a 3/8" finish coat.

All steel decks, prior to the installation of the deck covering, shall be scaled, wire-brushed, or otherwise cleaned to bare steel. All vertical surfaces adjoining these decks shall also be cleaned to the height of the cove base.

Suitable steel spools or blocks shall be welded to steel decks arranged to support and secure bases or legs of existing, new, or re-used equipment; height of steel spools or blocks shall equal in thickness the deck covering to be applied.

The steel dock plating, after having been scaled to bare metal and thoroughly cleaned as hereinbefore specified, shall be prepared for the application of conductive deck covering by the spot-welded installation of approved type deck-cups spaced on 12" centers in both directions and not more than 6" from all bounding edges of the areas to be covered.

The conductive deck covering shall be installed under the direction of the manufacturer's representative and in full accordance with the latest U.S. Coast Guard Rules and Regulations pertaining to approved deck covering for use in surgery areas on board ocean-going passenger vessels employing inflammable or explosive anesthetics.

In lieu of the application of "Magnabond" protective coating and bonding medium to steel decks, bulkheads, and other vertical projections under and in way of magnesite, White Ceramic Tile and Quarry Tile deck coverings, as hereinbefore specified in Addendum 1 to this Item of these Specifications, the Contractor may install and weld to the deck plating corrugated cups, approximately 4" diameter, made of Number 14 gauge steel sheet, spaced not to exceed 12" centers or more than 6" from bulkheads or other vertical projections. After installation of the steel cups and spools for the furniture and equipment, the decks, bulkheads, etc. shall be thoroughly cleaned and coated with two (2) coats of an approved coal tar pitch emulsion equal to U.S. Navy Standard Specification 53 P 17 bituminous solution and enamel.

132. LABEL PLATES

Existing label plates, except those for tanks, operating stations and remote control gear shall be removed where nomenclature does not conform to these specifications.

Provide new label plates for compartments, tanks, staterooms, service spaces, working spaces, ventilation systems, operating stations and remote control gear throughout the vessel. Space designations and numbering shall be as shown on the contract guidance plans, except when directed otherwise by the Naval Inspector. New label plates for tanks, operating stations and remote control gear indicating new compartment numbering shall be installed adjacent to existing plates.

102. LABEL PLATES (CONT'D)

Label plates shall be engraved brass or phenolic of 0.095" minimum thickness. The lettering shall be cut to a depth of 0.03" and filled in with material of a contrasting color. Plates and lettering shall be sufficiently large and so located as to be easily read. Securing shall be done by brass machine screws, or by rivets on tight structure where screws would penetrate plating. Screw tips shall not project beyond opposite side of bulkhead.

Label plates shall be located over, or adjacent to all access openings to compartments or rooms, and shall indicate the number and/or designation of the compartment or room being entered. The first line shall indicate compartment or room designation (room occupant's title, area use, etc.) and the second line shall indicate the compartment or stateroom number.

Each watertight bulkhead shall have at least one (1) label plate in each compartment, indicating frame number and watertightness. Watertight doors shall be labelled on each side indicating watertightness and frame numbers. Watertight bulkheads number plates shall be combined with door plates where possible. Weathertight doors shall be marked on weather side indicating spaces and frame number.

Label plates for tanks and cofferdams shall be located adjacent to manholes or other access to tanks, and shall indicate service and compartment number on the upper line and capacity of tank, in tons of fresh water for feed water and ballast tanks, in gallons for other fresh water tanks and in gallons and tons for fuel oil tanks. Capacities of small oil tanks shall be given in gallons.

Identifying label plates shall be provided at the following operating stations and remote control gear:

1. Tank filling connections
2. Sounding Tubes
3. Air escapes
4. Flooding and damage control valves
5. Watertight door handwheels

Plates shall indicate the function of the fitting, the compartment or equipment served, and the number of the fitting, if any.

All new piping and valves shall be properly marked to indicate intended service in a manner similar to the existing piping, valves, etc.

Stencilled directions and location signs shall be installed throughout the vessel in officer, crew and troop areas. These signs shall clearly designate decks and the directions to stairways, escapes, offices, bunks, public spaces, medical spaces, exits to weather decks, etc.

All ventilation systems throughout the vessel shall be labelled at each ventilation fan, at each ventilation closure and operating stations, and at each ventilation gooseneck (unless cover is labelled), and at each ventilation trunk or duct in each compartment in accordance with the following specifications. Existing labels which do not conform to the following specifications shall be removed.

(continued)

132. LABEL PLATES (CONT'D)

All labels shall indicate whether system is supply or exhaust and number of system. Labels for ventilation closures shall contain the word "COVER" or "VALVE" and labels for ventilation fans shall contain the words "VENT FAN". In addition, labels for ventilation fan, and closures and operating stations therefore, shall indicate the numbers of compartments served by the system.

Ventilation systems shall be numbered as follows:

1. First numbers to indicate deck on which fan is located.

04 - Top of Nav. Bridge Deck
 03 - Navigating Bridge Deck
 02 - Superstructure Deck
 01 - Upper Deck
 1 - Main Deck
 2 - Second Deck
 3 - Third Deck
 4 - First Platform
 5 - Second Platform
 6 - Hold

2. Second number to indicate number of frame at which fan is located.

3. Third number to indicate port or starboard fan location.

1 - Starboard side
 2 - Port side

Examples:

COVER 1-27-1
 EXHAUST A302L

Label indicates a cover for an exhaust system serving compartment A302L with fan located on Main Deck, frame 27 starboard.

EXHAUST 01-95-2

Label indicates that the vent duct or gooseneck on which it is placed is served by an exhaust fan located on the UpperDk. at frame 95 port side.

VENT FAN 2-120-2
 SUPPLY A-307L, A-407L, A-507L

Label indicates a vent blower on the 2nd Deck, frame 120 port, which supplies air to the compartments listed.

133. WATERTIGHT DOORS

The Contractor shall furnish motors, controls, and necessary labor and materials to complete the installation of power operated watertight sliding doors in the locations specified. Existing sliding, manually operated doors shall be reused. Existing gearing and shafting may be reused if suitable. Doors and any reused gearing and shafting shall be freed up and placed in good operating condition.

Machinery Space, fr. 119, stbd. (existing manually operated door)

Machinery Space, fr. 130, stbd. " " " "

Machinery Space, fr. 146, stbd. " " " "

All doors shall be power operated (either electric or hydraulic), with controls and indicator panel in Fire Control Room, with the gearing so arranged that the doors can also be power operated at the door. The arrangements shall be such that the doors will close automatically if opened by local control after being closed by central control, and also such that any door can be kept closed by local control, which will prevent the door from being opened from the central control. Doors shall in addition be provided with hand operated controls workable from both sides of the door and from an accessible location above the bulkhead deck.

Installation shall be complete with all necessary gearing, shafting, operating instruction plates, warning signs, klaxons and indicators at all operating stations showing whether the door is opened or closed. The doors and control system shall be installed to meet U.S. Coast Guard requirements as to materials, installation, tests and control features.

The indicator for remote control stations shall be operated independently of the manual operating gear.

The Contractor shall relocate, reinstall or renew piping, equipment, wiring, etc., in way of door locations. This is to be taken to include the relocation of any valves, equipment, piping, etc., in the respective machinery and auxiliary spaces which, while not in way of the installations, are rendered inaccessible for efficient operation.

The existing unconnected gear box for shaft alloy door shall be removed along with any obsolete gearing and shafting attached thereto.

134. FIRE CONTROLa. General

Bulkheads, decks, doors, hatch covers and other closing appliances throughout the entire ship shall be insulated, installed, altered and/or renewed as required to meet latest applicable U.S. Coast Guard requirements for ocean going passenger vessels and as indicated on the fire control drawings which accompany and form part of this specification.

Any existing vent trunks accessible to personnel, or obsolete escape or access trunks, the upper end from which escape has for any reason been rendered impossible, shall be barred or blocked-off on other levels to prevent attempted use as an escape by any personnel, as may be required by U.S. Coast Guard.

134. FIRE CONTROL (CONT'D)

Existing construction which meets or exceeds the fire control plan requirements, shall be retained. Openings in decks and bulkheads shall be enclosed, blanked off, or fitted with approved closing appliances, as indicated on the fire control plans, and elsewhere as required throughout the vessel. All existing watertight, main vertical zone, stairwell enclosure, and corridor bulkheads shall be examined and all work necessary to make the bulkheads watertight and/or flamstight around electric cables, piping, etc. shall be performed to the satisfaction of the Contracting Officer. Doors, hatch covers, stairways, and bulkheads, shall be rearranged, removed or installed as indicated on the fire control plans and as required throughout the vessel. Any removals or relocations of equipment, piping, etc., in way of alterations specified below, shall be made as necessary to provide access and passage. Any bulkheads, equipment, piping, etc., disturbed or removed, shall be properly reinstalled or removed as necessary. In any case where fire control requirements conflict with the requirements of other items of these specifications, the fire control requirements shall govern, except in such cases where the requirements of the conflicting specification items are in excess of the U.S. Coast Guard fire control requirements, in which cases the higher requirements shall govern.

b. Deck Covering

Magnesite deck covering shall be laid in locations and to meet requirements shown on the fire control drawings. Materials and installation shall meet requirements of the "Deck Covering" item of these specifications except that where A-30 and A-60 requirements are indicated on fire control plans, the thickness shall be suitably increased. Magnesite shall be 1¹/₂" thick to meet the current U.S. Coast Guard requirements for class A-60 deck covering, with correspondingly reduced thicknesses for lower classes of decks. Minimum thickness of magnesite shall be 3/4". Magnesite in excess of 3/4" thick shall be laid in two (2) coats, the first being scratched and wet down with magnesium chloride solution before laying the second coat.

An electrically conductive terrazzo deck covering shall be installed in the Operating and Sterilizing Rooms, Upper Deck, frs. 134-143, centerline, as specified elsewhere in these specifications.

c. Insulation

Insulation shall be installed on bulkheads and at deckheads, as indicated on the fire control plans. No deck covering shall be installed on decks exposed to weather in lieu of required deckhead insulation. Fire control insulation shall consist of U.S. Coast Guard approved rockwool or fiber glass wool, and/or marine joiner panels. All newly installed exposed fire control insulation shall be covered with an approved incombustible sheathing. Sheathing shall be well secured to ship's structure and shall be free from gaps at seams. It shall be sufficiently rigid to prevent vibration noise, and damage due to handling of stores or baggage.

d. Bulkheads

Bulkheads shall be erected in locations and to meet requirements shown on the fire control plans. Materials and construction shall be in accordance with the "Alterations to Accommodations" item of this specification except where otherwise required by the fire control plans, and the requirements of U.S. Coast Guard requirements for ocean going civilian manned U.S. Navy Transports. Existing sheet metal and metal

134. FIRE CONTROL (CONT'D)Bulkheads

clad inner bulkheading may be considered as meeting A-0 requirements except where surrounding stair enclosures; however, new "A" class bulkheading shall be $\frac{1}{4}$ " steel plate, properly stiffened.

E. Portlights

Portlights on the Main Deck shall be fitted with wire inserted glass where indicated on the fire control plans.

F. Doors

Fire screen doors shall be installed in locations and hinged to swing as indicated on the fire control plans. They shall be installed in such a manner as to obstruct traffic as little as possible when in the open position. All doors throughout the vessel shall meet fire control requirements of the bulkheads in which they are installed, as specified in the U.S. Coast Guard requirements for ocean going civilian manned U.S. Navy Transports. "A-0" doors in crew and troop spaces may be constructed of steel plate. All other "A-0" doors shall be of hollow steel construction. Doors required to meet class A-60, A-30, or A-15 requirements shall be of hollow steel construction, filled with insulation capable of meeting requirements of an A-15 bulkhead.

Fire doors designated as "D.C." or "M.C." on fire control plans, shall be provided with surface mounted door closers and door checks capable of closing doors when vessel has a list of $3\frac{1}{2}$ degrees port or stbd. Springs shall be installed to supplement door closers if necessary to meet above requirements.

Fire doors designated as "M.C." on fire control plans shall be fitted with magnetic holdbacks, each operable locally. A master switch shall be provided in the wheelhouse for releasing all magnetically controlled doors simultaneously. Magnetic holdbacks and master switch shall be furnished by the U.S. Government. All other "M.C." door accessories and wiring shall be furnished by the Contractor.

Entrance doors to stairway enclosures, and passageway doors except in main vertical zone bulkheads shall be fitted with hose ports at the bottom corner of the door on the lock side. Hose ports shall be covered with swinging or sliding metal covers operable from either side of the door.

G. Hatch Covers

Hatchboards and hatch covers shall be provided to meet requirements shown on the fire control plans. Hatchboards shall be of #14 USS gauge sheet steel box construction with lock seam joint or equivalent construction, reinforced internally and the interior coated with an approved anti-corrosive compound. A-15, A-30 and A-60 hatchboards shall be constructed with 2" laps and filled with insulation to meet fire control requirements. Existing metal lumber hatchboards may be used where A-0 hatchboards are specified.

H. Escapes

Emergency escapes shall be provided from all compartments in locations shown on the fire control plans.

134. FIRE CONTROL (CONT'D)Escapes

Frs. 71 - 72 port Flush manhole on Second Platform - Vertical ladder Hold to Second Platform.

Frs. 86 - 87 stbd. Flush manhole on Second Platform - Vertical ladder Hold to Second Platform

Frs. 31 - 32 port Manholes on First Platform and Second Platform - Vertical ladder Second Platform to First Platform and Hold to Second Platform.

Frs. 67 - 68 port Flush manhole on First Platform - Vertical ladder Second Platform to First Platform

Frs. 88 - 89 stbd. Flush manhole on First Platform - Vertical ladder Second Platform to First Platform.

Frs. 165-166 stbd. Manhole on First Platform - Vertical ladder Second Platform to First Platform.
Relocate existing manhole and ladder and blank off deck opening in way of removed manhole.

Frs. 230-231 ~~2~~ Flush watertight manhole on Third Deck - Vertical ladder First Platform to Third Deck.

Frs. 16 - 17 port Flush manhole (operable from under-side only) on First Platform, vertical ladder Second Platform to First Platform.

Frs. 129-130 port From Second Platform, trunked through First Platform area, to manhole on Third Deck.

Frs. 186-187 port Manhole on First Platform --ladder from Second Platform firepump room to First Platform.

Escape manholes shall be operable from both sides and those leading from areas served by CO/2 shall be fitted with fumetight rubber gaskets. Grab rods and holdback hooks shall be provided adjacent to escape manholes as required. Vertical ladder shall be 15" wide.

135. INSTALLATION OF VENDING MACHINES

Furnish labor and material to install six (6) Government furnished, 115 volt A.C. soft drink vending machines in the following locations as indicated on contract guidance plan.

1. Officers' Lounge, Main Deck, fr. 102, port
2. Stairwell 2nd Deck, frs. 57-58, centerline
3. Stairwell 2nd Deck, frs. 152-159, port
4. Stairwell 2nd Deck, frs. 185-186, centerline
5. Troop Recreation Area 3rd Deck, fr. 148, port

Installation shall be complete with all required foundations, piping, power connections and cables, etc. Stowage brackets shall be installed on bulkheads adjacent to each machine for stowage of Carbon Dioxide bottles. All vending machines shall be supplied with 115 volt, 60 cycle A.C. fed from an existing twenty circuit 115 volt A.C. distribution panel board located in the I.C. Room, 2nd Deck, fr. 86 centerline. All removals and reinstallations required to accomplish the above installation shall be performed by the Contractor.

Existing vending machines in the following locations shall be removed, complete with all foundations, piping, power connections, motor generators, cables, stowage brackets, etc.

135. INSTALLATION OF VENDING MACHINES

1. Main Deck, fr. 102, port of centerline
2. 2nd Deck, frs. 62-63, port of centerline
3. 3rd Deck, fr. 95, starboard
4. 2nd Deck, fr. 172, starboard

Removed machines, if so designated by the Naval Inspector, will form part of the Government furnished equipment specified above.

The existing vending machine in the Crew Day Room shall be retained in its present location.

136. DEBARKATION NETS AND LAUNERS

Debarkation nets shall be provided and installed port and starboard generally in the locations shown in the contract guidance plans:

Upper Deck

<u>Number of Nets</u>	<u>Locations</u>
1 - 10' Sections	Frs. 65-70
1 - 5' "	Frs. 70-73
2 - 10' "	Frs. 90-103 (In way of life boats)
2 - 10' "	Frs. 103-116(" " " ")
2 - 10' "	Frs. 119-131(" " " ")
2 - 10' "	Frs. 133-145(" " " ")
2 - 10' "	Frs. 148-160(" " " ")

Main Deck

2 - 5' Sections	Frs. 130-134
2 - 5' Sections	Frs. 144-148
2 - 10' Sections	Frs. 162-174

Nets shall be installed clear of vents and sounding tubes.

Nets shall extend from the deck on which they are installed to the light load line. Nets shall be installed on steel stowage platforms, approximately six (6) inches off the deck. Where space permits, 10'-0" wide nets may be used.

Nets shall be secured in such a manner as to be easily released. Two (2) five foot nets may be substituted for each ten-foot net shown and listed.

Any of the existing nets which are not in accordance with the above specifications, or in good condition as determined by the MSTS Hull Inspector, will be replaced with U.S. Government furnished nets. All existing nets which are in good condition and in accordance with the above specifications may be reused by the Contractor. All existing nets which are not in good condition shall be removed from the ship. The existing nets if reused together with new U.S. Government furnished nets shall be placed on board and properly installed and stowed by the Contractor.

136. DEBARKATION NETS AND LADDERS (CONT'D)

U. S. Coast Guard approved debarkation ladders shall be provided and installed in way of all life boats in locations shown on the contract guidance plans. The debarkation ladders shall be of sufficient length to extend from the deck on which they are installed to the light load line.

137. SCUPPER GUARDS

All overboard discharges between bulkheads Numbers 40 and 214 except deck scuppers discharging directly overboard from weather decks, shall be covered outside the shell with scupper guards of an approved design extending from a point 18" above the top of the discharge to a point 24'-0" above the base line of the ship.

The guards shall be constructed of double extra strong pipe, split longitudinally to form half round, or equivalent rolled sections, welded to the shell plating. The interior cross sectional area of the half round pipe shall be equal to the cross sectional area of the discharge pipe or flap. Scupper guards shall be sniped off top and bottom at about 45° with shell. Top of guard shall be left open.

138. TESTING OF CARGO HANDLING GEAR

Conduct the complete Quadrennial Survey of all cargo gear to conform with American Bureau of Shipping rules and regulations as last amended and in presence of American Bureau of Shipping Inspector.

Note: Requirements are set forth in the American Bureau of Shipping book "Requirements for the Certification of the Construction and Survey of Cargo Gear on Merchant Vessels", dated 1952.

139. INTERIOR PAINTING OF SHIP

It is the intent and purpose of this item that the entire exposed painted surfaces including new installations of the interior of ship shall be cleaned and painted upon completion of the troop lift and safety at sea alterations and immediately prior to delivery of ship, to the Government including but not limited to wheel house, chart room, radio room, all living quarters of ship's personnel, passengers staterooms, troop quarters, doors, fixtures, furniture, berths, berth stanchions, ducts, piping, showers, heads, washrooms, laundry, galleys, pantries, messrooms, offices, lounges, shops, storerooms, hospital areas, passageways, stairwells, auxiliary machinery spaces, evaporator flat, shaft alley, steering engine room, emergency generator room, battery room, fan rooms, machinery and appurtenances, cargo spaces, storage spaces including the interior surfaces of ships stores refrigerators, escape trunks, etc., excluding only main machinery spaces, the interior of tanks, cofferdams, drain and bilge wells, and tanktops under machinery space floor plates. All painting shall be in accordance with the following MSTSPACARTA painting schedule which for all intents and purposes shall become a part of these specifications.

139. INTERIOR PAINTING OF SHIP (CONT'D)

Prior to painting, the surfaces shall be thoroughly cleaned and all rust preservative coatings, grease, oil and other foreign matter completely removed.

All loose and blistered paint and rusted areas shall be thoroughly scraped and power wire-brushed to a clean and smooth surface free of rust, scale, and foreign matter. All rough and jagged edges of paint in way of scraped and wire-brushed areas shall be power wire-brushed and sanded to a smooth and tapered finish.

The bare steel areas as a result of scraping and wire-brushing and all new steel work shall be primed with one (1) coat of red lead BuShips Navy Formula Number 116.

Prior to painting all cracks and other small openings in the painted surfaces shall be filled in with approved filler and made smooth and even with adjacent surfaces and given one (1) coat of sizing, which shall be permitted to dry prior to any paint being applied.

All new work shall after priming be painted with one (1) flat under-coat and two (2) finishing coats. All existing painted surfaces shall be painted with one (1) flat undercoat and one (1) finishing coat. Where type of coating is not specified for spaces to be painted out, it shall be of the same type as existing.

Magnesite decks shall not be painted and shall be protected against falling paint.

All magnesite and tile decks on completion of painting shall be thoroughly cleaned by the Contractor.

All stenciling and markings shall be restenciled to conform with U.S. Coast Guard and MSTS requirements.

All surfaces to be painted shall be inspected and passed by the ~~MSTS~~ Hull Inspector prior to application of paint and under no circumstances shall paint be applied to wet surfaces.

Paint shall not be applied until the necessary steps are taken to prevent paint from coming in contact with name plates, grease fittings, wooden decks, hardwood doors, trim, furniture, equipment, plumbing fixtures, valve stems, machine threads, brass, chromium, aluminum and other bright metal surfaces, rubber gaskets, knife edges on door frames and hatches, unpainted parts and fittings.

Contractor shall supply all paints and primers, and all paints and primers required to accomplish work specified herein shall be delivered to the job in sealed containers, plainly marked by the manufacturer, identifying type and grade of paint therein contained. The U.S. Government reserves the right to request evidence that paints were manufactured in accordance with formulas specified.

Spraying of paint is acceptable, provided masking procedure is properly performed and approved by the MSTS Hull Inspector prior to performing any painting. Use of excessive thinners will not be permitted.

139. INTERIOR PAINTING OF SHIP (CONT'D)

Areas involved shall be left in clean and ship-shape condition on completion of all work. All dirt and debris resulting from this work shall be removed from ship daily.

INTERIOR PAINTING SCHEDULE

PUBLIC SPACES			PASSENGER AND OFFICER SPACES			SHIP'S SPACES		
AREA	HHD	DECK Head	AREA	BHD	Deck Head	AREA	BHD	Deck Head
LOUNGE	5	1	LOBBIES & PASSAGEWAYS	7	1	WHEELHOUSE, CHART RM, FIRE CONTROL RM	6	6
BARBER SHOP	3	1	SHIP'S OFFICERS DAY ROOM	7	1	RADIO AND CRYPTO ROOM	6	6
SALES EXCHANGE	3	1	STATEROOMS	3	8	EMERG. GEN. ROOM MACHINERY ROOMS	20	20
DINING SALOON	4	1	TOILETS, WASH-ROOMS & SHOWERS	1	1	RESISTOR AND FAN ROOMS	20	20
HOSPITAL AREA	4	8				Gyro Room	20	20
TOILETS, WASH-ROOMS & SHOWERS	1	1	TROOP AREAS			I. C. ROOM	20	20
INTERIOR DOORS	Pass	Room Side	PASSAGEWAYS & STAIRWELLS	3	1	LOCKERS UTILITY ROOMS	20	20
NAV. BRIDGE DECK	9	9	MESS ROOMS	6	1	SHOPS	1	1
SUPERSTRUCTURE DECK	9	9	RECREATION	7	1	GALLEY	23	23
UPPER DECK	11	9	BERTHING	8	1	PANTRIES & DIET KITCHENS	23	23
MAIN DECK	13	9	TOILETS, WASH-ROOM & SHOWERS	1	1	LAUNDRY	1	1
SECOND DECK	12	9	C R E W & P E R M. E. M.			STOREROOMS	20	20
THIRD DECK	10	9	PASSAGEWAYS & STAIRWELLS	3	1	REFRIG. SPACES	33	33
FIRST PLATFORM	9	9	MESS ROOMS	3	1	STOREROOM, LOBBIES & STAIRWELLS	1	1
			DAY ROOM	6	1	CARGO HOLDS & HATCH TRUNKS	20	20
			CREW STATEROOMS	7	1			
			TOILET WASH-ROOMS & SHOWERS	1	1			
FURNITURE	9							

(continued)

139. INTERIOR PAINTING OF SHIP (CONT'D)INTERIOR PAINTING SCHEDULE
MACHINERY AND MACHINERY SPACES

AREA		AREA	
BULKHEADS	20	EVAPORATOR	20
DECKHEADS	20	ASSOCIATED EQUIPMENT PUMPS	9
BOILERS	31	UNLAGGED PIPING	20
UPTAKES	20	AIR COMPRESSORS	9
ALL LAGGING	20	REFRIGERATION COMPRESSORS	9
MAIN TURBINE-UNLAGGED AREAS	31	FORCED DRAFT BLOWERS	31
REDUCTION GEAR CASING	9	STEERING GEAR & ENGINE	9
CONDENSERS	20	SHAFT BEARINGS	1
GENERATORS - STEAM END UNLAGGED	20	AIR EJECTOR	9
GENERATORS ELECTRIC END	9	POTABLE WATER PRESSURE TANKS	20
PUMPS	9	DISEL FUEL TANKS	20
FEED PUMPS NOT LAGGED	31	OVERHEAD CRANE	20

(continued)

139. INTERIOR PAINTING OF SHIP (CONTINUED)PAINT FORMULA LEGEND

Legend Number	Name of Paint	Chemical Code Number Sherman Williams	Pitt. Pl. Glass	Navy Formula Number
1	Soft white semi-gloss	501		
3	Cloud Gray semi-gloss	F52AF3	N-29083	
4	Marine Green semi-gloss	F52GF3	N-29079	
5	Clipper Blue semi-gloss	F52IF2	N-29081	
6	Sea Spray Blue semi-gloss	F52GF2	N-29077	
7	Beach Sand semi-gloss	F52HF6	N-29078	
8	Sun Glow semi-gloss	F52YF2	N-29080	
9	Light Gray Gloss	514	UC32257	111
10	Red glow	535	UC32263	
11	Dark Oak gloss		UC32265	
12	Medium Blue gloss	582	UC32267	
13	Jade Green gloss	564	UC32271	
20	Inside White (Fire resistant)			27
23	White enamel			30
31	Heat Resisting (aluminum)			52-P-3029-950
33	Tnemec - Diamond Kote	554 OD		

Note: This legend is to be used in conjunction with Interior Paint Schedule for identification of paint.

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM1. General

Mechanical ventilation systems shall be modified as specified herein, and a new system of air conditioning shall be installed to serve troop berthing spaces, dining saloon, officers' lounge and crew dayroom, Troop Mess, Hospital Areas, and Day Room.

General Information

This existing mechanical supply and exhaust system, together with natural ventilation, should be redesigned, altered and supplemented with new systems so as to work in conjunction with one another, as shown on the sketch and also form part of a cooling and/or air conditioning hereinbefore.

All ventilation systems shall be carried as indicated on the architectural drawings. Modifications to pipe and locations of ducts shall be made if found necessary in the opinion, systems in detail, however, the air and clearance requirements shall be met in drawings and specifications, shall be met. The Company or shall perform the work in way of obstructions and other installations, and shall relocate piping, wiring, equipment, fixtures, etc., as necessary in way of ventilation and air conditioning and regulation, and Coast Guard and American Bureau of Lighthouses. All new or altered ventilation and air conditioning systems shall be balanced to the following requirements.

The Contractor shall provide a plenum and ductwork, air conditioning grilles, piping, and control system as necessary after specified. The air conditioning system is designed to supply heated air to spaces served during winter operation or to convert heated air to spaces during summer operation. Existing heating, supply and exhaust fans and ductwork takeoffs shall be incorporated into the new system as indicated in contract guidance drawings. It is understood that a separate space conditioning system, designed for winter heating, be installed completely in all details and in accordance with the most organized standards, and the omission of specified items, equipment, labor or materials from these specifications or drawings shall release the Contractor from this responsibility.

The Contractor shall install all required filters, louvers, grilles, air conditioning equipment, etc., in accordance with Ventilation Plans. Records of ductwork, fans, the total duct circuit, etc., shall be submitted as Ventilation guides, manual plans and as specified hereinafter. In way of altered and newly installed ventilation and air conditioning systems, the contractor shall make all removals and modifications to existing ductwork, louvers, etc., by isolating valves, scissor, etc. Where the temporary removal of heated, ductwork or equipment is necessary to facilitate installations and installations, the Contractor shall reasonably do so in a satisfactory manner. Also remove all ventilation equipment, natural, mechanical or natural, that has been made obsolete as a result of these alteration specifications. Where the removals and installations of ventilation equipment leave openings in decks, berms, walkways, bulkheads, etc., they shall be sealed in an approved manner. Sealed openings specified shall be made only to point necessary for connection to new ducts, as shown on ventilation and air conditioning layouts.

Detail working and equipment arrangements for ventilation, air conditioning and heating shall be submitted to the Contracting Officer for approval prior to commencement of work. All equipment, equipment and materials shall be properly stowed to the satisfaction of the Contracting Officer.

ANSWER TO THE QUESTION

the first time in the history of the country. The first of these was the *Act of 1862*, which provided for the creation of a national system of education, and the second was the *Act of 1867*, which provided for the creation of a national system of higher education.

故其子曰：「吾父之子，其名也。」

19. 1996.05.22. 10:00-11:00. 1996.05.22. 10:00-11:00. 1996.05.22. 10:00-11:00.

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)C. Supply Diffusers and Outlets (cont'd)

Diffusers installed in air conditioned spaces shall be of the air conditioning ceiling type, equipped with built-in key operated opposed blade operated volume dampers. or equal, having a two, three, or four-way blow, as indicated on ventilation plans.

Diffusers installed in Crew and Permanent Military Staff quarters shall be the air conditioning type fitted with adjustable opposed blade volume dampers permitting manual control.

Diffusers, installed in other spaces shall be the air conditioning type having two, three or four-way blow, as indicated on ventilation plans.

Air conditioning diffusers shall be installed in ductwork as detailed. Where the direction of supply air throw is parallel to the direction of air movement within the duct, a minimum of five inches of duct shall be provided beyond the diffuser in both directions of throw. Where the direction of supply air throw is perpendicular to the direction of air movement within the duct, a minimum of five inches of duct shall be provided on each side of the diffuser in the direction of supply air throw. Air conditioning supply ducts shall be installed to meet those requirements. Duct sizes shown on the contract guidance drawings in way of diffusers are guidance sizes only and must be revised where necessary to comply with the above requirements.

Where diffusers are installed on insulated ducts, suitable neck extensions shall be utilized so that the diffuser base is flush with the outside surface of the insulation. Diffusers recessed in insulation will not be acceptable.

Manufactured exhaust grilles shall be installed in all staterooms, offices, smoking rooms and messrooms, and public spaces except where indicated on ventilation drawings. Exhaust outlets to Washrooms, Toilets, Pantries, and Galleys shall be #16, 1/2" wire mesh, #22 USSG frame.

The maximum allowable air velocity for all diffusers and grilles shall be as indicated on ventilation drawings.

Approved, adjustable type "E" terminals shall be installed in locations where indicated on ventilation drawing. In all galleys, pantries and spaces requiring spot cooling, "E" terminals shall be equipped with damper (Standard Navy Spring Barrel Handle).

D. Hoods

Hoods shall be furnished and installed over dishwashing machines and all steam producing equipment where shown on ventilation plans.

Hoods shall be constructed of #16 USS gauge galvanized iron.

(continued)

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)D. Hoods (Cont'd)

Hoods shall be fitted with 2" x 1" continuous gutters that shall be connected to 1" drain pipes for suitable disposal of the condensate.

E. Ventilation and Air Conditioning Design and Duct Construction

In the preparation of detailed installation drawings, and during installations, due consideration shall be given to existing ship obstructions, such as structural interference, steam and water piping, electrical conduits, ceiling, etc. Where ducts are concealed, outlets shall be installed to terminate flush with false ceilings. In mental cell and mental and N.P. wards and washrooms, all ductwork shall be concealed above ceiling.

Every effort shall be made to secure as efficient an arrangement of ducts as possible.

All ductwork shall be installed to maintain maximum headroom. Ventilation and Air Conditioning ducts shall be run as directly as possible, avoiding the use of sharp bends.

If the development of the ventilation systems require additional fan room vents or plenum chamber space, in addition to that indicated on the contract guidance plans, it shall be the Contractor's responsibility to provide such additional fan rooms, plenum chambers, etc., with a minimum interference to the contract arrangements.

Guide vanes shall be installed where necessary to keep friction losses tolerable.

Friction loss of radius elbows shall not exceed 20% of the velocity pressure nor more than 30% for elbows with guide vanes.

Square turn elbows shall be kept to a minimum, in no case shall square turns be used where it is possible to use radius turns. All square turns shall be fitted with guide vanes. Branch take offs (tap sizes) shall be sized proportional to CFM air and fitted with splitter dampers, or individual diffusers may be fitted with air scoops or opposed blade volume dampers as required for balancing purposes.

Where it is necessary for vent ducts to pierce girders in order to maintain headroom, compensating doubler plates shall be installed to give equivalent strength of section in accordance with requirements of the American Bureau of Shipping. All cuts and doublers to have rounded corners.

Weather louvres shall be constructed of not less than 5.1# plate.

(continued)

**140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)**

F. Ventilation and Air Conditioning Trunks and Ducts

The thickness of plating, and stiffening of ventilation ducts that pass through compartments subject to tightness tests shall be sufficient to withstand the test pressure of compartments without undue deflection.

The thickness of material for rectangular watertight ductwork shall not be less than 0.120" unless otherwise directed or approved.

Non-watertight ductwork shall be fabricated of galvanized sheet steel. Thickness shall be in accordance with the following table:

<u>Size of Ductwork</u> (Dia. or longer side)	<u>Thickness</u>
Under 12"	22 gauge
12" up to and including 18"....	20 "
Over 18"	18 "

Slip joints for ventilation piping shall be used only where it is not practicable to provide flanged connections. The ductwork shall have flanges at such intervals as will permit ready removal for repairs and cleaning. Flanges of ducts having a diameter or rectangular dimension of more than 10" shall be as follows:

<u>Size of Duct</u>	<u>Flanges</u>
Up to and including 36"	1" x 1" x 1/8" angles
Over 36"	1½" x 1½" x 1/8" angles

Flanged connections shall be provided at all cuts in bulkheads. Flanged spools shall be installed where ducts pass through steel bulkheads or girders. Spools shall be 5.1# plate minimum thickness and shall extend 3" each side of bulkhead.

Angle flanges shall be bolted together with $\frac{1}{4}$ " cadmium plated cap screws on $2\frac{1}{2}$ " centers. Duct joints shall be fitted with 1/8" thick impregnated wool felt gaskets conforming to Navy Department Specification 33 F 8. Angles shall be secured to the ducts by riveting or electric resistance (spot) welding.

Ventilation and Air Conditioning ducts shall be installed in sections not more than 8'-0" long, Pittsburgh or equal seamed, and erected with 1½" x 3/16" galvanized cradle type strap hangers on not more than 8'-0" centers.

Large Ventilation and Air Conditioning ducts shall be fitted with angle stiffeners to prevent breathing and buckling.

All vertical vent trunks shall be constructed of not less than 5# steel plate.

(continued)

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)F. Ventilation and Air Conditioning Trunks and Ducts Cont'd

Gooseneck ventilators and trunks passing through decks shall be fitted with watertight coamings constructed in accordance with the American Bureau of Shipping rules and regulations. Gooseneck ventilators shall be fitted with $\frac{1}{2}$ " wire mesh screens and dogged watertight hinged covers.

A sufficient number of handholes and access holes of adequate size shall be provided in structural trunks, ducts and connections to heaters to permit cleaning, painting and inspection.

G. Arrangement of New Ventilation Equipment

The ventilation equipment installed in fan rooms shall be so arranged as to permit servicing and testing of motors, cleaning of filters and heating units, etc. Bypass doors and $\frac{1}{2}$ " wire mesh removable screens shall be installed on transition pieces between Fan and Heating Unit.

H. Description of Air Conditioning System

The summer air conditioning system shall condition air within specified spaces by means of air conditioning units located within the space. Cooling coils within the air conditioning units shall be supplied with chilled water from a water chiller located in the forward machinery space. A turbine driven centrifugal refrigeration compressor, complete with refrigeration condenser, shall furnish refrigerant to the water chiller. Auxiliary water pumps, accessory equipment and automatic controls will also be located in the forward machinery space.

Each space to be air conditioned will be treated as a separate and independent zone, and each zone shall have either one or two air conditioning units located within the space, as hereinafter specified. Each zone shall be individually controlled by a system of pneumatic automatic controls.

Excess outside air from air conditioned spaces shall be used to ventilate non-conditioned spaces as indicated on drawings.

Where existing louvered or mesh openings in doors or bulkheads are not required to facilitate operation of air conditioning systems, they shall be removed and openings properly blanked off. Provide new louvers in doors or adjacent bulkheads, as indicated on drawing.

(continued)

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)

3. Air Conditioning Units (Zones #1 and #7 to #40 Incl.)

Air conditioning units shall be factory units, each consisting of structural frame, steel plate panels, centrifugal fans, chilled water cooling coil, drain pan, motor and belt drive, air filters, drain connections, access panels, and mixing boxes with fresh air and return air dampers, in locations as shown on drawings.

It shall be the contractor's responsibility to relocate, remove or rearrange berths, tables, electric fans, general announcing amplifiers, lighting panels, etc., or other structural obstructions where necessary and as listed below in order to facilitate installation of air conditioning units.

<u>Deck</u>	<u>Frs.</u>	<u>Side</u>	<u>Items</u>	<u>Remarks</u>
Boat	99-101	P/CL	Round table & 4-chair	Remove entirely
Prom	89-91	P	Settee	" " "
Prom	89-91	S	Settee	" " "
Prom	106-108	P	2 tables & 4-chairs	" " "
Prom	" "	S	" " " "	" " "
Prom	" "	P	Portlight	Remove portlight & blank opening
Prom	" "	S	" "	Remove Portlight & blank opening
Prom	142-143	S/CL	Settee	Remove entirely
"A"	119-122	S	2 tables (9 persons)	Omit from new installation
"A"	127-129	P	" " (20 persons)	" " "
"B"	118-120	S	2 high berths	Relocated to suit new ducts.

Structural frames shall be fabricated from hot dipped galvanized angle iron, electric welded into rigid frame assemblies that will properly support the various component parts of the units. The entire frame assembly shall be primed and coated with corrosion resistant paint.

Panels shall be fabricated from a minimum of 16 gauge galvanized steel, fastened to the frame by means of corrosion resistant, self tapping metal screws. The entire inside surface of units shall be insulated with $\frac{1}{2}$ " fiber glass, or equal semi-rigid board insulation, applied with asbestos filled mastic, and then coated with the same material to form an effective vapor seal.

(continued)

140. ALTERATION & INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)3. Air Conditioning Units (Zones #1 and #7 to #40 Incl.) (Cont'd)

Fans shall be of the centrifugal forward curved type, and have static and dynamic balance, tested and rated in accordance with N.A.F.M. standards, after galvanizing has been applied. Fans shall be capable of delivering specified CFM against required static pressure. The scrolls shall be fabricated from 16 gauge steel, fan wheels and scrolls shall be hot dipped galvanized after shearing and forming operations have been completed. The scrolls shall be further primed and coated on the interior with corrosion resistant paint, and on the exterior with asbestos filled asphalt mastic.

Chilled water cooling coils shall be of the finned type. Fins shall be bonded to the water tubes in such a manner as to obtain an effective, positive, mechanical and thermal bond between tubes and fins. The coils shall be sturdily framed, cased and supported by a hot dipped galvanized steel casing. Tubes, water headers and fins shall be constructed of copper. All cooling coils shall be at least six rows deep, and shall be designed for 45°F. entering water and 53° leaving water, the maximum face velocity of the coil shall not exceed 500 feet plus 5%.

Fan bearings shall be of the roller or ball bearing type, and shall be either exposed or otherwise readily accessible for inspection by means of access panels.

Fan motors shall be mounted with adjustable base securely bolted to the units in such a manner as to be vibration and noise free. Motors shall have adjustable V-belt sheaves permitting at least 25% adjustment in fan speed. V-belts and pulley assemblies shall be furnished and protected by belt guards. A minimum of two (2) V-belts per unit shall be installed. Fan motors shall be of the ball bearing, dripproof, marine type, designed to operate on 230 volts D.C., and shall be in accordance with AIEE #45 and ABS specifications. Motor horsepower shall be as required for rated volume of supply air plus 20% at design total pressure. Fan motor starters shall be operated through a pneumatic-electric switch as hereinafter specified and/or as shown on the drawings, in lieu of the normally furnished pushbutton control.

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)3. Air Conditioning Units (cont'd)

Air filters shall be 20" x 20" x 2" nominal size, and shall conform to filter requirements elsewhere in this specification.

Static pressure gauges shall be installed adjacent to filter banks, so as to indicate pressure drop across filters. Brass plates shall be attached directly under gauge inscribed as follows: REMOVE AND CLEAN FILTERS WHEN STATIC PRESSURE GAUGE REACHES 0.25 INCHES OF WATER.

Static pressure gauges shall be as manufactured by Hays Corp., Michigan City, Ind., or equal.

Units shall be complete with structural steel mounting legs, bolted securely to a steel foundation welded to the deck, and two condensate drain connections, one located at each end of the unit. The drain connections shall be covered by suitable dome type strainer inside the drain pan and shall be a minimum of 1 $\frac{1}{2}$ " nominal pipe size. Access panels shall be provided in the casing so that these strainers may be readily accessible for cleaning.

Large size access openings shall be provided to permit ready removal of coils, filters and fans. Removable access panels shall have tamper proof bronze hardware, of a type requiring the use of an Allen set screw wrench or similar tool to open or remove the panels.

Where specified on the plans, mixing boxes shall be installed on the upstream side of the filter section, and shall consist of automatic fresh air damper and an automatic return air damper, installed on the outside of the metal mixing box. Both dampers shall have adjustable operating linkages connected for gang operation. Dampers shall be of the multi-blade type, supported at each end with shaft bearings. Units with filter boxes in lieu of mixing boxes shall have return air dampers in the return air inlets to the filter boxes. Fresh air dampers shall be installed in the fresh air duct near the unit. Dampers may be connected by and adjustable linkage for gang operation, or may be operated separately by individual damper motors.

Air Conditioning Units shall be as manufactured by the Bush Manufacturing Company or Marlo Coil Company, or approved equal, modified as specified above.

Air Conditioning Units (Hospital Area, Zones 2-6 Incl)

Units installed in hospital area shall consist of a chilled water coil, supply air fan, fan motor, belt drive with variable pitch diameter motor sheave, metal filter section and insulated steel enclosure complete with waterproof drain pan which shall be erected on board ship by the Contractor. Quality of construction shall be equal to that of the hereinbefore specified manufactured units. Component parts of the various units shall be of like manufacture. Air filters shall be similar and equal to those specified under other sections but shall be of all copper construction.

**140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)****3. Air Conditioning Units (Cont'd)****Cooling Coil Operating Characteristics**

All cooling coils shall be designed for 45° F. entering water and 53° F. leaving water. Coils shall be selected on the basis of 95% R.H. Entering Air, Leaving Air, and Total CFM shall be as indicated on the drawings.

4. Automatic Controls**A. Automatic Temperature Controls for Winter Operation**

Existing self-contained temperature controllers on preheater and reheater coils shall be removed and replaced by a pneumatic type system of controls as herein specified. New duct thermostats for preheaters shall be liquid filled, fully compensated capillary type "A" insertion thermostats (equal to Johnson Service Co., Series T-800) with sensitive element located in duct on downstream side of preheater coil and adjusted to maintain approximately 60° (adjustable) temperature by operating a pneumatic diaphragm valve with renewable seat ring equal to Johnson Service Co. type V-185. Rod and tube type thermostats (Johnson Service Co., type T-802, or equal) will be acceptable only when conveniently located and adequately protected from vibration.

All troop areas served by reheaters shall be controlled by a fluid filled capillary insertion type thermostat, Johnson Service Co., type T-800 Minneapolis Honeywell type LC900A, equal, installed in the exhaust duct, in the path of exhaust air adjacent to an exhaust grille. The adjusting head shall be located as close as practicable to the thermostat bulb and high on an appropriate bulkhead, enclosed in a tamper-proof steel box, complete with hinged door and lock. The control shall modulate a Johnson Service Co., type V-185, or equal, steam valve, installed in the steam supply to the reheater.

Where new reheaters are installed in other than troop spaces, the above control arrangement shall be used, except that a room type thermostat, mounted on a bulkhead, shall be used in lieu of the thermostat and bulb in the exhaust duct.

A thermometer shall be placed adjacent to each insertion thermostat to indicate temperature controlled by same, and a thermometer shall be provided in each fan room with bulb located inside of louvers to indicate outdoor air temperatures. These thermometers shall be of a capillary type, equal to Johnson Service Co., type T-33D, or where location is such that straight stem thermometers can be read from floor, type T-25 or existing thermometers in good condition will be acceptable. Proper length liquid filled capillary shall be used to enable thermometer bulb to be located adjacent to bulb of duct thermostat and dial case to be located close to thermostat adjusting head.

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)4. Automatic Controls (Cont'd)A. Automatic Temperature Controls for Winter Operation (Cont'd)

Provide for each unit heater, as located on plans, a room type thermostat Johnson Service Co., T400, or equal, to control a pneumatic steam valve in steam supply line. Steam valve to be type V185, or equal.

All cooper tubing and capillaries shall be properly fastened in a neat manner with copper clips or half straps. Air will be furnished by existing air compressor on vessel. Automatic Temperature Control contractor shall furnish a 12" x 60" ASME galvanized air tank, air line filter and reducing valve station with necessary pop safety valves, etc., to maintain constant pressure required for temperature control system, and shall connect tank to air compressor main line and run all other air piping of copper tubing to thermostats and valves.

Furnish and install, where directed, a suitable size air line after cooler to remove any moisture in compressed air to control system. This cooler to be located near air tank and connected to chilled water lines.

The complete installation shall be performed under supervision of the control manufacturer on the job.

B. Automatic Temperature Controls for Air Conditioned Spaces
(Units 1-40 incl.)(1) Zones Without Summer Reheat

Summer Operation: Dry bulb temperature within each zone shall be maintained automatically by a room type dry bulb thermostat mounted on an interior bulkhead near the air conditioning unit. This thermostat shall be the two-position type, closing the automatic chilled water valve when the thermostat is satisfied and opening the automatic chilled water valve to a fully open position when the zone requires additional cooling. The chilled water valve shall be a normally closed valve. To limit the temperature of the supply air, a duct type thermostat, with its sensing bulb in the supply air duct near the unit, shall modulate the automatic chilled water valve so that the supply air does not drop below 58 degrees F. The necessary accessories shall be installed to provide two-position action of the automatic chilled water valve when actuated by the room thermostat and modulating action of this valve when actuated by the duct thermostat. The room thermostat shall override the duct thermostat in all cases. Each air conditioning unit fan shall be started by a normally open pneumatic-electric switch in place of the starter pushbutton. An automatic damper motor shall set the normally closed fresh air damper to admit the summer design volume of fresh air at the same time compensating the setting of the normally closed return air damper to obtain the summer design volume of fresh air. Simultaneously, where indicated

(continued)

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)(1) Zones Without Summer Reheat(Cont'd)

on contract drawings, an automatic damper (normally in "winter" position) shall reduce the volume of exhaust air leaving the zone so that the total exhaust air matches the fresh air volume. As long as the "summer-Winter" Switch is on the "Summer" setting, the damper motors will remain inoperative.

(2) Zones with Summer Reheat

Air conditioning units 16, 17, 22, 23, 25 & 26 shall employ the following method of control in lieu of that described above. The normally closed chilled water valve on the cooling coil shall be controlled by a dew-point thermostat with bulb in cooling coil discharge air. The reheat coil steam valve (normally open) shall be controlled by a duct type sub-master thermostat reset by a summer room thermostat. The submaster thermostat bulb shall be located six feet downstream from the reheat coil. Operation of the fan motor and the automatic dampers shall be similar to that hereinbefore specified for zones without summer reheat. Duct type dial thermometers shall be installed adjacent to the bulbs of each dew-point and submaster thermostat.

(3) Winter Operation:

Dry bulb temperature within each zone shall be maintained automatically by a thermostat with bulb in exhaust air, modulating the automatic normally open steam valve supplying steam to the reheater within the zone. Fresh air supplied to each zone shall be preheated to 60 degrees F. at all times, as described elsewhere in this specification. The automatic damper motors shall set the normally open unit bypass dampers to admit the winter design volume of fresh air, at the same time closing off entirely the normally closed fresh air-return air dampers at the units. The exhaust automatic dampers where indicated on the drawing, will reset in order that the exhaust will equal the supply. The exhaust dampers shall be normally in the "winter" position. As long as the "Summer-Winter" switch is on the "Winter" setting, these damper motors will remain inoperative.

4. Summer and Winter switches controlling air conditioned spaces shall be located on the control panel (properly labeled) in the air conditioning machinery space. The units on each of the switches shall be as follows:

<u>Switch</u>	<u>A.C. Units</u>
A	2,3
B	4,5,6
C	1,7,8,9,10,11
D	12,13,14,15,20,21,22,23,27, 28,39,30,31,32,33
E	16,17,18,19,24,25,26,34,35, 36,37,38,39,40

The operation and function of the summer-winter switches shall be as shown on the temperature control diagrams on the drawings.

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)

In addition to the summer-winter switches, an "auto-emergency ventilate" switch shall be placed in the pneumatic control lines at each zone as shown on the temperature control diagrams.

5. A control diagram, showing all zones and all controls therein, shall be made on a single drawing, and a word description of the sequence of operation shall be included on the drawing. A photostat print of the drawing, reduced in size but clearly legible, shall be installed in a wood picture frame with glass cover and mounted in the air conditioning refrigeration machinery space. In addition, blueprint copies of this control diagram shall be furnished the ship and a CB reproducible furnished the Contracting Officer.

6. An automatic bypass modulating valve shall be located near the chilled water circulating pump to maintain a constant head on the pump. This valve will bypass water from the discharge side of the chiller to the suction side of the pump, and shall be actuated by a pressure switch in the chilled water discharge line. Spring loaded bypass valves are not acceptable.

7. Controls required for the operation of the air conditioning refrigeration plant are specified under the refrigeration machinery section of this specification.

8. In the event of breakdown of an individual unit in any zone, emergency ventilation will be provided the compartment served by manually operating the "auto-emergency ventilate" switch at the unit.

9. All controls shall be installed under the direct supervision of a representative of the control manufacturer.

10. All controls shall be equipped with tamperproof covers or enclosures. Dial thermometers, damper motors and linkage, etc., shall be suitably protected against tampering by means of expanded metal or similar approved metal guards.

11. Thermostats shall have adjustable ranges calibrated in actual degrees. The use of general terms, such as "warmer", "cooler", etc., in lieu of actual figure values will not be acceptable.

12. Thermostat covers shall be tamperproof, and shall not have indicating thermometers.

13. Automatic dampers installed in duct work shall be multi-blade opposed type, equipped with adjustable operating linkage. Shaft bearings shall be bronze.

(continued)

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)

14. On the ventilation and air conditioning deck plans drawings as issued for bidding only, delete automatic temperature control dampers No. 2, 4, 6, 8, 11, 15, 19, 22, 23, 26, 37, 41, 43, 46, 52, 55, 57, 59, 63, 66, 69, 72, 78, 79, 81, 82, 82, 93, 96, 98, 101, 107, 110, 112, 115.

The numbers of the remaining dampers, where shown on the deck plans only, shall be revised as shown on the corrected schedule on drawing No. T-AP 119-S3803-1171327 Alt 1.

The new guidance plans which will be issued to the successful bidder will have been altered to include the aforementioned corrections.

5. REFRIGERATION PLANTGeneral

The U.S. Government will furnish a refrigeration plant which will consist of a turbine drive centrifugal type compressor, designed for the use of Freon-11, two-stage impulse type turbine, refrigerant condenser, water cooler, interstage liquid cooler, and purge unit all mounted on a structural steel base. The unit will also include all necessary refrigerant piping to properly inter-connect component parts of the equipment and a set of indicators, gauges, thermometers and controls. The equipment shall be installed by the Contractor as specified below. All additional required equipment, accessories, piping, etc., shall be provided and installed by the Contractor.

The Contractor shall provide and install a condenser circulating water pump and a chilled water circulating pump in locations as shown. The pumps shall be equipped with motors and controllers as specified herein-after.

The unit will be capable of producing a capacity of not less than 500 tons of refrigeration in cooling approximately 1500 gpm of water through the cooler from an entering temperature of 53° F. to a leaving temperature of 45° F. when the condenser is supplied with approximately 2250 gpm of water at an entering temperature of 90° F.

(a) Compressor

The compressor will be of the multi-stage centrifugal type designed for use with Freon-11 refrigerant.

Compressor speed will be about 5250 rpm for two-stage compressors or about 4300 rpm for three-stage compressors. The compressor speed will be properly matched with turbine speed to deliver the above specified tons of refrigeration.

(continued)

Refrigerant condenser will be coil type, horizontal end of the shell and finned tube type. The overall length of the condenser will be approximately 16'-3".

When supplied with 2250 GPM of water, the water pressure loss through the condenser will not exceed 7 psi. and the water velocity through the tubes shall not exceed 8 ft./sec.

(c) Water Cycle

Water cooler will be of the same type construction as outlined for the refrigerant condenser. The overall length of the cooler will be approximately 161-3". When supplied with 1600 GPM of water, the water pressure loss through the water cooler will not exceed 9 ft. of head, and the water velocity through the tubes will not exceed 8 ft./sec.

100% Teflon-coated Coating

An inter-stage refrigerant cooler will be provided, either integral with or external to the water cooler for the purpose of cooling the condensed refrigerant liquid at the intermediate stage pressure.

(3) chilled water temperature control

The Chilled water temperature control will consist of a pneumatically operated, indicating temperature controller with automatic reset feature. This controller will have the sensitive bulb located in the outlet of the water cooler and will automatically control the speed of the steam turbine.

(E) Forge and Recovery System

Purge and recovery system will consist of a manually started and stopped purge system with a motor driven reciprocating purge compressor, the suction of which is piped to a tap off the main system condenser. Purge system will be assembled as a compact unit in an enclosing metal housing, and mounted on brackets on the main system. Purge compressor motor will be 1/2 H.P., 340 D.C. marine type, with push button start-stop switch. Unit will be complete with necessary purge shell, oil separator, relief valves, gauges, valves, strainers, drains, liquid indicator and accessories.

8) Gauge and Control Board

The unit will have the following panel mounted gauges and protective devices:

Low Refrigerant Temperature Cutout
Low Chilled Water Temperature Cutout
High Condenser Pressure Cutout

(continued)

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)(g) Gauge and Control Board (Cont'd)

Low Oil Pressure Cutout
Pushbuttons and Indicating Light for Purge Unit
Pushbuttons and Indicating Light for Oil Heater
Turbine Low Oil Pressure Cutout
Cooler Pressure Gauge
Condensing Pressure Gauge
Seal Chamber Pressure Gauge
Back of Seal Pressure Gauge
Vibrating Reed Tachometer
Taylor Fulscope Recorder

(h) Piping and Coupling Refrigerant, Oil and Water

The system will consist of necessary refrigerant piping, valves and fittings to interconnect the compressor, condenser, inter-stage cooler, purge unit and water cooler. A rupture disc will be furnished in a relief line from the cooler.

Also necessary external oil lines for the lubrication system of the compressor and turbine.

All small water piping within the limits of the system foundation for cooling water supply and drain lines for oil coolers and any drain lines required by bearings, seals, safety devices and gauges. The necessary couplings to connect the compressor and steam turbine will also be furnished.

(i) Refrigerant and Oil Charge

Centrifugal plant will be provided with a complete Government furnished initial charge of Freon-11, and one complete charge of Freon-11 as spare. The initial and spare charges will be furnished in standard commercial containers.

A complete initial and spare charge of lubricating oil for compressor will be Government furnished as required.

(j) Thermometers

The following thermometers will be provided:

Two (2) Condenser Water Thermometers
Two (2) Chilled Water Thermometers
Two (2) Bearing Thermometers
One (1) Refrigerant Thermometer

(continued)

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)(k) (1) Spare Parts and Special ToolsCompressor Spares will Consist of the Following Items:

- 2 - Shaft labyrinth, either end
- 1 - Shaft end labyrinth
- 1 - Stationary seal seat
- 1 - Rotating seal seat
- 2 - Seal bellows gaskets
- 1 - Seal bellows assembly
- 1 - Inner floating seal ring
- 1 - Outer floating seal ring
- 1 - Bearing felt ring
- 1 - Seal housing gasket
- 1 - Seal housing cover gasket
- 1 - Oil reservoir cover gasket
- 2 - Kingsbury thrust bearing shoes
- 1 - Thrust disc
- 2 - Oil strainer screens
- 2 - Upper bearing liners
- 2 - Lower bearing liners
- 2 - Oil ring assemblies
- 1 - Oil pump assembly
- 1 - Worm gear wheel
- 1 - Oil pump worm
- 1 - Oil pump shaft bushing
- 1 - Oil pressure regulating valve assembly
- 4 - Oil filter cartridges
- 1 - Atmospheric float valve assembly
- 1 - Oil stop valve bellows assembly
- 1 - Oil pump chamber relief valve
- 1 - Seal end bearing thermometer
- 1 - Thrust end bearing thermometer
- 2 - Manifold gaskets
- 2 - Compressor shell gaskets
- 1 - Set of compressor flexible coupling spares
- 1 - Oil cooler core

(2) Cooler Spares will Consist of the Following Items:

- 10% spare 1c-fin copper tubes
- 6 - Tube sheet or water box gaskets
- 4 - Inspection cover gaskets
- 2 - Float chamber cover gaskets
- 2 - Division plate gaskets
- 1 - Sight glass and gasket assembly
- 1 - Float valve assembly including ball
- 1 - Water box pressure gauge
- 2 - Rupture valve discs

(continued)

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)(k) (3) Condenser Spares shall Consist of the Following Items:

- 10% Spare lo-fin Cupro-Nickel tubes
- 8 - Tube sheet or water box gaskets
- 2 - Purge outlet gaskets
- 6 - Zinc protectors

(4) One Complete retubing set for Condenser and Cooler

- 1 - Complete retubing set including:

- 1 - Tube expander
- 1 - Tube end reamer
- 1 - Tube facing cutter
- 1 - Support sheet expander swedge

(5) One Set of Purge Recovery Compressor Spares will be Furnished
Consisting of:

- 1 - Crankshaft
- 2 - Connecting rod assemblies
- 2 - Piston and pin assemblies
- 2 - Sets of piston rings
- 2 - Discharge valve plate assemblies
- 4 - Suction valves
- 2 - Sets of gaskets
- 2 - Shaft seal assemblies
- 6 - Sets of V-belts
- 1 - Suction strainer screen
- 1 - Check valve body and disc

(6) Purge Unit Miscellaneous Spares will be Furnished Consisting
of:

- 1 - Pressure reducing valve assembly
- 1 - Check valve seat
- 1 - Suction pressure gauge
- 1 - Discharge pressure gauge
- 1 - High pressure cutout switch
- 1 - Automatic relief valve assembly
- 6 - Relief valve seats
- 1 - Purge chamber sight glass
- 3 - Line valve assemblies
- 1 - Set of $\frac{1}{2}$ H.P. marine motor spares
- 1 - Float valve assembly
- 1 - Oil separator assembly
- 1 - Oil level sight glass assembly

(continued)

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)(k) (7) Thermometer Spares will be Furnished Consisting of:

- 1 - Condenser water thermometer, less socket
- 1 - Ccooler water thermometer, less socket
- 1 - Refrigerant thermometer, less socket

(l) Steam Turbine

The air conditioning steam turbine will be a multi-stage unit suitable for non-condensing service and direct connection to a centrifugal compressor.

Steam Conditions

440#PSIG - Inlet Pressure
740° FTT - Inlet Temperature

The turbine will exhaust into a 15# PSIG back pressure line. The turbine water rate will not exceed 20# per hour/BHP and the specific volume of the exhaust steam will not exceed 17.4 cubic feet per pound.

The unit will be constructed in accordance with current requirements of ABS and U.S. Coast Guard.

Mechanically or hydraulically operated trip and throttle valve to provide positive shutdown of turbine upon operation of emergency controls will be provided.

The turbine will be provided with and/or fitted with the following equipment and accessories:

1. Hydraulic orifice governor with hand speed changer for 3 to 1 range.
2. Overspeed trip device to close the separate trip valve.
3. Single governor controlled steam inlet valve.
4. Stainless steel steam strainer.
5. Rotor protected by corrosion resistant paint.
6. Shaft rust protected at the gland zones.
7. Forced feed lubrication of bearings.
8. Collar type thrust bearing.
9. Sentinel relief valve on turbine casing.
10. Inlet flange of raised face type with smooth finish and conforming to ASA standards for 600#, 750°FTT operation.
11. Exhaust flange of flat face type with smooth finish and conforming to 125# ASA standard.
12. Special oil reservoir in base plats.
13. Vibrating reed tachometer.
14. Provision for mounting speed control valve in governor oil circuit.
15. Three steam pressure gauges, mounted on gauge board on turbine.
16. Two-hand valves for part load operation.
17. External oil strainer.
18. External shell and tube oil cooler with removable tube bundle and Cupro-Nickel tubes.
19. Starting hand oil pump.
20. Two (2) oil pressure gauges and two (2) oil thermometers.
21. Control panel for all turbine controls.

(continued)

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)(1) Steam Turbine(Cont'd)

22. Low oil pressure switch to trip solenoid on emergency governor.
23. Provide for gland seal piping drain line.

Spare Parts

Turbine spares will consist of the following items:

- 1/2 - Set packing rings with springs for each gland
- 5% - Bolts, or studs, and nuts of each size fitted in casing joints.
- 1 - Set bolts and nuts of each size for turbine bearings.
- 2 - Bearing bushings for each bearing.
- 1 - Set thrust rings.
- 1 - Set a assorted shims and liners where fitted.
- 1 - Set coupling bolts of each size, for one coupling (when coupling is included)
- 1 - Set of Springs for Governor and Relief Valve
- 1 - Box of special tools and gages

(m) Installation Supervision

The unit shall be disassembled as required to facilitate installation in the ship and reassembled upon installation. Disassembly and re-assembly of the unit shall be under the direct supervision of a factory engineer of the manufacturer.

All component parts of the refrigerant unit shall also be assembled under the supervision of the factory engineer. Installation of auxiliaries and connections to refrigeration plant shall be approved by this factory engineer, and he shall further supervise all testing and start-up of the plant. The Contractor shall bear the cost of the above supervisory work.

6. Refrigerant Condenser Water Circulating Pump

Condensing water circulating pump shall be vertical, centrifugal and vertically split case type. The pump shall be Worthington type 10 LV-15, or equal. The pump capacity shall be 2400 gpm and head shall be as required to overcome piping and equipment friction losses, but in no case shall the head be less than 100 feet. The casing and impeller shall be copper silicon or Composition "G" copper alloy. The shaft shall be of monel metal. Packing shall be asbestos graphite or metallic.

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**140 ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)****6. Refrigerant Condenser Water Circulating Pump Cont'd**

The refrigeration condenser water circulating pump shall take its suction from an existing 12" sea chest, as indicated on the above mentioned drawing. The pump motor shall be marine type totally enclosed 40° C. rise over 50° C. ambient, continuous duty compound wound ball bearing and designed to operate on 240 volts D.C. power. A magnetic two-step starter and fused disconnect switch shall be installed.

Chilled Water Circulating Pump

The chilled water circulating pump shall be horizontal centrifugal split casing type, suitable for pumping cold fresh water. The pump shall be Worthington type 6 LG-1, or equal. The pump capacity shall be 1500 gpm and the head shall be as required to overcome piping and equipment friction losses, but in no case shall the head be less than 100 feet. This pump shall be located on the inlet side of the water chiller, as shown on the drawings.

The casing shall be cast steel and the impeller shall be copper silicon or Composition "G" copper alloy. The shaft shall be of monel metal. Packing shall be asbestos graphite or soft metallic. The pump motor characteristics shall be similar to the condenser water circulating pump. A magnetic two-step starter and fused disconnect switch shall be installed.

7. Installation of Air Conditioning Equipment

The air conditioning refrigeration plant shall be installed in way of forward engine room, lower level, port side, between frs. 103 and 110, as shown on the drawings.

The existing contaminated evaporator, pump, control panel salinity indicator, test tank, inspection tank, and associated equipment and piping between frs. 102 and 106 portside shall be relocated to provide access around air conditioning equipment.

The floor plates in way of the refrigeration machinery and condenser water circulating pump shall be dropped approximately 12". The floor plates in way of the chilled water circulating pump shall also be modified as required.

Suitable foundations shall be provided for the turbine, compressor condensing unit and circulating pumps, for contaminated evaporator and pump. Foundations shall be secured to inner bottom ship's structure. Double bottom tank shall be properly freed in way of all hot work.

The refrigeration plant shall be located so that the condenser and chiller tubes may be drawn between the inboard auxiliary condenser and the stanchion at frame 110, approximately 26'-6" port of centerline. Lifting pads shall be installed at the deckhead to facilitate tube and casing removals.

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140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)7. Installation of Air Conditioning Equipment (Cont'd)

Provide and install piping to the new air conditioning sea suction chest valve, overboard discharge valve and steam clean-out line valve, which were installed prior to delivery of ship to Contractor's plant. Blanks installed in valves shall be removed.

A log desk with light over shall be provided on the forward bulkhead. Piping, wiring, ventilation ductwork, light fixtures, equipment, etc., in area disturbed by installation and alterations shall be satisfactorily repaired, relocated or replaced as necessary.

All materials and workmanship shall conform to American Bureau of Shipping and U.S. Coast Guard requirements.

8. Water Piping

All water piping, including condenser water lines, chilled water lines and cooling coil condensate lines shall be Genuine Byers wrought iron, installed generally as shown on the drawings. Flanged fittings shall be used in way of all mechanical equipment and valves, and other fittings may be welded or flanged. All valves unless otherwise specified shall have cast steel or bronze bodies and shall be U.S. Coast Guard approved for the service intended.

The refrigeration condenser water circulating pump shall be located on the inlet side of the condenser and take its suction from the existing 12" sea chest, as shown on the drawings. The discharge side shall be tied into the condenser inlet. Piping shall be led beneath the floor plates from the sea chest to the pump inlet with the strainer cover dogs accessible from above the floor plates.

Condenser salt water piping shall be tied into the ship's fire main system and lube oil cooler, and shall be complete with all necessary check valves, relief valves, pressure reducing valve, 12" cast steel duplex strainer, gate valves, globe valves, thermometer and pressure gauge. All valves shall have brass nameplates clearly stating their function.

9. Insulation of Refrigeration plant

The insulation shall be applied after the refrigeration plant has been pressure tested and dehydrated and is found tight. Replaceable insulation covers are required for the cooler water boxes and the economizer float chamber cover. Any "nameplates" on the shell should be covered with a removable plug, properly marked on the outside, to permit later access to the information.

Insulation shall be two-inch thickness cork board with cement finish.

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140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)9. Insulation of Refrigeration plant (Cont'd)

It is required that the machine be pressure tested and made vacuum tight before insulation is applied. All surfaces which are to be insulated should first be cleaned - the dirt and dust removed - the surface perfectly dry. Cork shall be applied with hot asphalt, and an asphaltum base primer paint shall be applied to the cooler surfaces before applying the asphalt.

The entire body of the cooler up to the flanges at each end, including the small chamber welded to the side near one end flange - the sump on the bottom, with its connection to the float chamber - the float chamber itself - the cooler suction connection up to the flange connecting to the compressor - the supports at the top of the cooler, to the point where they contact the refrigerant condenser feet - the bottom cooler supports, down to the wood spaces - the sight glass body - the end sheets of the cooler above the water boxes - should all be insulated.

The use of hot asphalt is a fire hazard over and above hazards normally present and the Contractor shall use all precautions necessary, consistent with the magnitude of the hazard.

The insulation should consist of 2" thick cork board or lags. If cork board is used, it should be fitted to the curvature of the shell by scoring. If lags are used, they should be of the proper curvature. The sheets, or lags, should be held in place by either hot asphalt, Metro Glue or Acoustic Cement. In addition, the insulation should be further fastened by 14 gauge copper clad wire or 22 gauge steel bands 3/4" wide - on 12" centers. The insulation should be brought up tight and sealed to the flanges at the end of the cooler shell and these flanges should be fully insulated. Where the insulation comes up to the connecting flange of the compressor, allowance should be made for removal of the flange bolts by beveling the cork and the finish. Proper allowances should be made for any connections or piping to insure proper access to fittings, sight glass, instrument, refrigerant drain, etc.

The cooler may have a nozzle water box on each end or on one end only. Water boxes, together with the nozzles, should be insulated with the cork board. All voids formed by ribs, bolts, etc., shall be filled with granulated cork, packed in and sealed. This insulation shall be tightly sealed against the cooler end sheet and against the nozzle flanges. This insulation must not extend beyond the line of the bolt heads in the outer flange in order to allow access for removal of the water box cover. The ends of the cooler, above the water boxes should be insulated similarly to the body of the cooler and no allowance need be made for its removal.

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140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)9. Insulation of Refrigeration Plant (Cont'd)

Removable insulation covers must be provided for the water box covers on each end of the cooler and the economizer float chamber cover. Patching plaster may be used to cover securing nuts after assembly in order to prevent condensation. Cooler water box covers shall be provided with a sheet steel plate across the top surface in order to prevent damage to the insulation while cleaning or replacing the condenser tubes. The covers should be made with a flange of cork board all around to allow it to slip over the water box flange itself to meet the water box insulation at the line of the bolt heads. A 1/4" felt gasket should be provided on the cooler insulated shoulder where the cover seats.

All cork covered surfaces should be finished with at least a 1/2" thick layer of asbestos and Portland cement applied in two 1/4" layers. The mixture should be one part of Portland cement and two parts of asbestos. All edges should be sharp and true and all surfaces as level and smooth as possible. One and one-half hexagonal wire netting should be stapled over the entire outside surface of all removable covers to act as a bond for the cement.

Cork and finish should be neatly formed around sight glass, piping connections, and at other points where it does not terminate against a flange or other projection.

Insulation of Steam Turbine

The steam turbine shall be covered with 4" of insulation, the inner layer being 2" of high temperature insulation and the outer layer 2" of 85% magnesia. The insulation shall then be covered with a hard cement finish or coating, the insulation first being covered with a $\frac{1}{2}$ " mesh #20 gage galvanized hardware cloth. A coating consisting of a mixture of four (4) parts insulating cement tampered with one (1) part of Portland cement, shall then be applied to a thickness of $\frac{1}{2}$ " and trowel rubbed to a smooth finish. After drying 24 hours, an insulation cement shall be applied to the hard finish cement and allowed to dry for one (1) hour, after which a second coat of the same cement shall be applied and allowed to dry. The insulation shall then be covered with asbestos cloth, which is coated on the underside with insulation cement. After drying, the surface shall be given two (2) coats of an approved paint.

Insulation of Chilled Water Piping and Chilled Water Pump

All chilled water piping shall be insulated with ice water thickness molded cork insulation secured with "Bandits" and covered with 4" wide fiber glass tape and painted in accordance with requirements of interior painting section of this specification. The pump shall be provided with a drip pan and drain line beneath the pump base to handle moisture condensation on pump casing. The pump and pan shall be given a coat of Apextor No. 1. Where chilled water piping passes through watertight

140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)Insulation of Chilled Water Piping and Chilled Water Pump (Cont'd)

bulkheads, the water tight fitting shall also be designed to prevent the bulkhead in the vicinity of the fitting from sweating. When chilled water piping passes through other than watertight bulkheads, the piping insulation shall continue through the bulkhead without interruption.

10. High Pressure Steam and Exhaust Steam Piping

The existing high pressure steam distribution and back pressure exhaust steam piping shall be modified and new piping furnished and installed as hereinafter specified and as shown diagrammatically on the drawings.

Disconnect all piping and mountings from the 5" pipe spools between superheater outlets and main stop valves on piping from each boiler. Disconnect the spools at the superheater outlets and the main stop valves and remove spools from the ship. Care shall be taken to identify each spool with the boiler from which removed. This existing 1/2" vent connection shall be removed and in place thereof a 3" welding neck flange shall be installed. The new 3" welding neck flange shall be 600# carbon-moly long neck $8\frac{1}{4}$ " O.D. - $1\frac{1}{4}$ " thick raised face 5" diameter. The 1/2" vent connection shall be relocated as shown on the drawings, using $1\frac{1}{2}$ " x 3/4" carbon-moly bosses drilled and tapped 1/2" I.P.S.

The pipe spool shall be preheated before welding and the connections welded to the spools using U.S. Coast Guard approved welders, and backing rings. After welding, backing rings shall be machined flush with the inside of the piping and the welds radiographed and properly stress relieved. The 5" pipe spools shall be returned to the ship and be reinstalled with the same cold draw as when removed and be reconnected to all mountings without stress from mis-alignment.

New piping shall be run from each main steam line to the compressor turbine in the forward machinery space complete with necessary fittings, valves, etc., as shown on plan. In way of connection to main steam line, machinery casing bulkhead shall be recessed as required. A thermometer, pressure gauge and drain line shall be provided in line before turbine throttle valve. For high pressure steam, piping shall be 3" and 4" nominal pipe size, seamless drawn carbon-moly tubing - type A per ND spec 44-T-33 or equal. Flanges, fittings and bolts shall be carbon-moly steel, approved by U.S.C.G. for 600# service. Valves shall be 600# cast carbon-moly steel, globe non-return type for Class I piping.

New piping complete with necessary fittings, valves, etc., shall be run from the compressor turbine exhaust to the existing 6"-15# exhaust steam line in the forward machinery space. Piping size shall gradually reduce from the turbine exhaust diameter to 6" nominal pipe size, with a 3" relief valve piped to bilges, connected off 6" exhaust line. The

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140. ALTERATION AND INSTALLATION OF VENTILATION SYSTEM AND
INSTALLATION OF NEW AIR CONDITIONING SYSTEM (CONT'D)10. High Pressure Steam and Exhaust Steam Piping (Cont'd)

existing 3" x 4# x 15 PSI pressure regulating valves, stop valves and piping at Bulkheads 118, Forward Engine Room and 146, After Engine Room, shall be removed and replaced by 6" pressure regulating valves, stop valves and piping between the 15 PSI exhaust line and the auxiliary condensers. The 4" branch line to the main condensers shall remain and be connected to the new 6" line to auxiliary condenser. Two 4" connections through a 6" stop valve shall be made to each auxiliary condenser using existing connections on condensers. The pressure regulating valves shall be "Leslie" type D.L. or equal, complete with control pilot, control valves, self-cleaning strainer, gauges, etc., set to open for full flow at pressure exceeding 15 PSIG and remain closed at 15 PSIG and below. For exhaust steam, piping shall be seamless drawn steel pipe ASTM. Specification A53-47 with welded flanges, fittings and bolts of carbon steel approved by U.S. Coast Guard for 150# service. Valves shall be 150# cast steel, with nameplates as shown on the drawings.

All piping shall be run as directly as practicable with a minimum number of bends and with sufficient joints for ready accessibility and removal. The piping shall be arranged and suitably designed to allow for stresses of thermal expansion and stresses due to deflections of the ship structure. Particular attention shall be paid to the high pressure steam piping and on this piping the contractor shall submit a summary of expansion and stress calculations for approval of the Contracting Officer.

Piping shall be securely supported and braced to prevent damaging vibrations, and where subject to movement from expansions or similar causes, especially designed spring hangers or supports shall be installed.

Pockets in pipe lines shall be avoided wherever practicable, and all lines shall be provided with fittings and valves at low points for drainage purposes.

Welding on all steam piping shall be performed by certified welders using U.S.C.G. approved welding rods and approved welding and backing procedures. High pressure steam piping shall be preheated for welding and all welds shall be radiographed and stress relieved after welding, to the approval of the U.S.C.G. All valves, fittings, flanges, materials, etc., used shall be U.S.C.G. approved.

Completed piping including new piping and altered main steam lines shall be given a test witnessed by and to the approval of the U.S. Coast Guard. High pressure piping shall be tested to 930 psig with the exhaust steam piping tested to 150 psig.

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