

MILITARY SEA TRANSPORTATION SERVICE, PACIFIC AREA
Naval Supply Center
Oakland, California 94625

SPECIFICATION NUMBER: MSTSP 67-9

29 July 1966

S P E C I F I C A T I O N S

For

DRYDOCKING

USNS EDWIN D. PATRICK (T-AP 124)
Principal Dimensions

Length - - - - - 608'-11"
Breadth - - - - - 75'-6"
Depth - - - - - 52'-6"
Gross Tonnage - - - - - 16039
US Maritime Commission Design - P2-SE2-R1

The General Conditions dated 15 July 1955 and Amendment No. 1 dated 23 November 1962 to the General Conditions for work under Department of Defense, Department of the Navy, Master Contract for Repair and Alteration of Vessels are a part of these specifications and any conflict between these specifications and the Master Contract for Repair and Alteration of Vessels shall be governed by the provisions of the Master Contract.

These specifications consist of 16 pages and General Conditions referenced above.

SUPT PORT ENGINEER:

Approved: Director, Transport/Tanker Engr. Div. *[Signature]*

Approved: Supt. Port Engineer *Geo. N. Harlan*

I N D E X

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PATRICK

INFORMATION REGARDING THE INVITATION FOR BIDS INCLUDING THESE SPECIFICATIONS

Prior to the time of bid opening and after award of job order, inquiries should be directed to one of the following:

Procurement and Contractual Matters
(Maintenance and Repair Office)

Title

Telephone

Director, Procurement & Control Division
Head, Contract Branch

Legal Matters
(Office of Counsel)

Title

Telephone

Assistant Counsel
Counsel

Engineering and Technical Matters
(Maintenance and Repair Office)

Title

Telephone

Deputy M & R Officer

Statement of Manufacturer's Representative

On any specification item which calls for supervision by the manufacturer's representative the following shall be strictly complied with:

Submit a statement of supervision exercised by the representative, prepared and signed by the representative. The statement shall include certification of work actually performed and certification either that work was performed to the satisfaction of the representative, or that work deficiencies, explicitly identified by the manufacturer's representative, exist. The original plus four copies of each statement shall be delivered to the MSTSP Inspector.

Overtime Policy

The Contracting Officer may require of the Contractor a statement in writing regarding the need for overtime in the performance of the contract in the event of the issuance of a Change Order or a Supplemental Agreement for extra work. No overtime premium pay shall be considered in the price or equitable adjustment to be paid by the Government on account of the Change Order or a Supplemental Agreement unless authorized by the Contracting Officer.

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ITEM 1 - SERVICES: (TC)

Upon arrival of the ship in the Contractor's Yard, the Contractor shall coordinate with the Chief Engineer the time required for services and provide the following:

Electric Power	400 Amps, 120/240 volts D.C. and 800 Amps, 440 volts, 3 phase, 60 cycle A.C.
Steam	5000 pounds an hour at 100 PSI
Fresh Water	60 PSI
Flushing Water	60 PSI
Fire Main Water	100 PSI
Air	500 CFM at 100 PSI

Any additional services required shall be furnished only upon the issuance of a Specification Change Order.

The cost of any additional services required for the Contractor's convenience shall be borne by the Contractor.

ITEM 2 - TELEPHONES AND GARBAGE: (TC)

While the ship is at the Contractor's Yard the Contractor shall furnish the following services:

Garbage and Debris Removal:

Remove on a daily basis all garbage and debris generated by the ship.

Note: Cleanliness of the ship shall be the Contractor's responsibility in accordance with Master Contract for repair and alteration of vessels, Clause 5, Sub-paragraph (j).

Telephone: Four (4)

- One (1) 24-hour telephone for official use only at Quarter-Deck.
- One (1) Pay telephone at Quarter-Deck.
- One (1) 24-hour telephone in MSTIS inspector's office on board ship.
- One (1) Telephone in Chief Engineer's Office.

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ITEM 3 - DELIVERY AND DRYDOCKING: (TC)

Upon arrival in the Contractor's Yard a suitable drydock shall be furnished by the Contractor and the ship placed in same for the accomplishment of all work specified in individual items of this specification or any additional work found necessary which can be accomplished during drydock availability.

The ship will proceed to and from the Contractor's Yard under its own power or with the assistance of tug boats without expense to the Contractor.

Ballast conditions, trim weights, draft, etc., shall be carefully checked by the Contractor prior to drydocking of the ship.

The Contractor shall remove material as necessary to bring the ship's displacement and trim to within the capacity of the drydock and shall replace same upon the completion of the drydocking.

Obtain the ship's keel block record for its last drydocking from ship. Do not duplicate the previous drydocking position.

Furnish a record sketch in quadruplicate showing the new locations and widths of the keel blocks to the MSTS inspector.

ITEM 4 - ANCHOR CHAINS: (AS)

Contractor shall, while ship is in drydock, roust out the port and starboard anchor chains, disconnect at bitter ends, and range chains on dock for examination, repair and painting. Examine carefully all chain links, detachable links, shackles and swivels in the presence of the MSTS inspector and the ship's 1st Officer. End for end both chains.

Sandblast chains and anchors to remove scale and rust. Upon completion of cleaning, inspection and repairs, if any, the chains shall be given one (1) coat of Federal Specification TT-V-51C, "Anchor Chain Black" paint, Formula 45 applied with air spray equipment. Apply two (2) coats of red lead primer and two (2) coats of haze gray, Formula 5H, to anchors.

After paint has thoroughly dried, all shots of chain shall be properly marked with paint and seizing wire, according to Merchant Marine practice. The black anchor chain paint in way of markings being removed prior to the application of marking paint.

Free up bitter end release devices and prove in proper working order. Chains shall be reassembled and properly stowed.

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ITEM 5 - ANCHOR CHAIN LOCKERS: (AS)

Chain lockers, including sumps, shall be thoroughly cleaned of all mud and dirt. All loose paint, rust, and scale shall be removed by scraping, scaling and wirebrushing. All drains shall be cleared of foreign matter and proven clear.

Open, clean, grind-in, and free-up suction line valves. After cleaning has been accomplished and accepted by the MSTSP inspector, all interior surfaces of chain lockers shall be given one (1) coat of bituminous emulsion coating, Specification MIL-C-15203B (ships).

ITEM 6 - SCATTERED WELDING REPAIRS OF EXTERIOR SHELL PLATING: (TC)

Chip out deteriorated welds to good metal and reweld scattered seams and butts of shell plating. Build-up designated pitted areas by welding.

NOTE: Quote on one-hundred (100) feet of seams and butts, not feet of bead.

Pitted areas not in seam or butt to be evaluated at one (1) foot of seam or butt for six (6) square inches of welding. Cost shall be in direct proportion to computed length actually welded.

ITEM 7 - RUDDER: (BK)

Pintles, bushings, post and carrier shall be checked for wear and tightness and pintle pin nut harden up. Remove drain plug and reinstall same to prove free of water. Air test rudder to 5 pounds pressure. Repair leaks and prove tight. Repack rudder post gland using square flax packing, Federal Specification HH-P-00106-C.

Renew fourteen (14) studs, fourteen (14) nuts and fourteen (14) half nuts, equal to original when new. Stud dimension is approximately five (5) inches long x 3/4 inch N.C.

Fill and drain rudder upon completion of repairs using U.S. Government furnished rust preventive compound.

The rudder pintle bearing clearance shall be taken at the athwartship and fore and aft positions.

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ITEM 8 - PAINTING UNDERWATER BODY: (AS)

Prepare surfaces and paint underwater body from keel to upper boottopping limits as follows:

Remove all marine growth, rust, scale, loosely adhering paint, grease, oil, salt and all other foreign matter to bare metal or a tight paint film by sweep blast.

Wash down all areas with fresh water prior to applying any paint or primer, clean and grease fathometer plates prior to painting of hull and wipe plates clean of grease prior to floating of ship. After surfaces have been prepared, prime bare metal surfaces with one (1) coat of International Paint Co., Silver Primcon No. 1744 anti-corrosive paint, except in stern areas listed in the following paragraphs.

Shell plating in way of propellers, rudder post, submerged portion of rudder and from the stern frame to a point 20-feet forward of the stern frame shall receive two (2) overall coats of Apexior No. 3 or equal as approved.

Apply two (2) overall coats of International Paint Co., Silver Primcon No. 1744 anti-corrosive paint to the entire underwater body and flat keel up to upper boottop limits except in stern area as specified in preceding paragraph.

On completion of the aforementioned, apply one (1) overall coat of International Paint Co Super-Trop No. 1609 anti-fouling paint to the entire under-water body, flat keel and surfaces which have been coated with Apexior No. 3 up to 6-inches below the light load line.

From six (6) inches below the light load line up to the upper boottop limits apply one (1) overall coat of dull black International Paint Co., No. 5242 boottopping, followed by one (1) overall full finish coat of glossy black International Paint Co., No. 5296 boottopping paint. Allow four (4) hours drying time between coats.

Paint in all ship's markings prior to floating of ship. Check load line markings (plimsol marks) port and starboard, recut markings and repaint as required and to the satisfaction of the ABS Surveyor.

Install spouts in way of overboard discharges to keep water and debris clear of ship's shell plating during aforementioned work.

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ITEM 9 - SEA CHESTS AND STRAINERS: (BK)

Remove all sea chest strainer plates, clean and paint as specified for underwater body. Thoroughly clean the interiors of the chests to clean metal. Examine the strainer securing lugs on the chests and furnish and install new lugs and studs as directed by the MSTS inspector to replace defective units as found. An estimated amount of ten (10) lugs and ten (10) studs.

Paint the interior of the sea chests with two (2) coats of Apexior No. 3 or equal as approved and reinstall the strainer plates replacing the holding nuts.

Individually thread a wire through cotter keyhole and around each lug to prevent loosening and loss.

All above work shall be performed to the satisfaction of Chief Engineer, A.B.S. and MSTS inspector.

ITEM 10 - HULL ZINC PROTECTORS: (BK)

Remove a total of ninety (90) 1-1/4-inch thick cast-in-strap zinc anodes from the ship's stern area shell plating and struts.

Install type ZHS, Spec. MIL-A-18001, 1-1/4 inch cast-in-strap anodes, to replace those removed. New zincs shall be left unpainted.

Ship's force will pump down fuel oil deep tank No. 23 to within limits of ship's pumps. The Contractor shall gas free tank or place a CO² blanket therein during welding. Certify tank gas free and safe for hot work.

Tank Capacity: 169 Tons

ITEM 11 - OVERHAUL SEA VALVES AND OVERBOARD DISCHARGE VALVES: (BK)

All sea valves, overboard discharge valves, sea chest blowing-out valves and boiler blow-down shell valves shall be opened up, cleaned, inspected and overhauled and shall be placed in first-class seaworthy and serviceable condition. All broken, missing or otherwise defective minor parts shall be repaired and/or renewed, using material similar to original when new.

(Continued)

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ITEM 11 - OVERHAUL SEA VALVES AND OVERBOARD DISCHARGE VALVES: (BK) (Cont'd)

All valve seats and discs shall be reseated and ground into a tight seat. All valve stems shall be freed up, cleaned and repacked.

All shell fastenings securing the various valves and their appurtenances, such as pads, nipples, spuds, spool pieces, studs, flanges, etc., shall be hammer-tested and examined. Paint interior surfaces of valves with one (1) coat of Apexior No. 3, or equal as approved.

Upon completion of all stipulated repairs, inspection and acceptance of all the above work, close up all valves ready-for-service, using all new bolting and jointing materials as required.

ITEM 12 - STERN GLANDS, PORT AND STARBOARD: (BK)

Repack the stern glands with new square flax packing, Federal Specification HH-P-00106 C in single turns with butt joints, each turn being pulled individually into the stuffing box with the gland. The butt joints shall be properly gapped and staggered. Each end of each piece of packing shall be served to prevent unraveling.

Prior to repacking stern glands prove all water service lines to same free and clear to the satisfaction of the MSTSP inspector.

Renew all securements for the port and starboard stern glands material to be monel. Studs are approximately nine (9) inches long of 7/8 inches OD N.C., a total of ninety-six (96) nuts.

ITEM 13 - PROPELLERS: (BK)

Clean and buff the port and starboard propellers to bright metal and examine for defects and grind leading edges free of burrs.

Remove the propeller fairwaters and propeller nut keepers.

Harden up on the propeller nuts in the presence of the MSTS representative and ship's Chief Engineer and install witness marks.

Reinstall fairwaters and fill with tallow.

Recement the fairwater bolt heads and leave propellers ready-for-use.

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ITEM 14 - ROPE GUARDS AND FAIRWATERS AND SHAFT WEARDOWN: (BK)

Remove the port and starboard rope guards and strut and stern tube fairwaters and tallow retainers.

Take and record wear-down on the starboard and port strut and stern tube bearings, using trammels or dial gauge in the presence of the ABS and MSTSP representatives.

Clean guards, fairwaters and retainers to bare metal and paint in accordance with underwater body painting item of this specification and reinstall as original, utilizing new securing studs, nuts and bolts.

ITEM 15 - FATHOMETER COFFERDAM: (BK)

Open cofferdam for inspection. Upon completion of inspection by the MSTSP representative accomplish the following:

Clean prime and paint cofferdam with two (2) coats of red lead, MSTSP Code 52, and one (1) coat of white enamel, MSTSP Code 49.

Close up cofferdam, renewing gaskets, missing and/or defective securing devices. Test to insure watertight integrity.

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ITEM 16 - RELOCATE BILGE AND BALLAST PUMP DISCHARGE LINE: (BK)

REF: A - 508 PAC "E" 578, new bilge and ballast overboard line - diagram.

Remove the existing 6-inch bilge and ballast pump overboard discharge line and hull connections and sea chest from the present location No. 2 engine room, frame 135 starboard.

Fabricate and install a new line complete with valves, fittings, hull connections and sea chest, from the bilge and ballast pump to a new overboard discharge located portside frame 138-139 in accordance with Ref "A".

Removed piping shall be blanked and hull connections shall be closed-up with an insert plate equal to existing hull plate slightly larger than existing opening and with radius corners in accordance with Governing ABS Regulations, MSTIS inspector and regulatory bodies.

New and disturbed surface areas shall be primed and painted as original.

ITEM 17 - RIVETS - RENEWAL OF: (AS)

Renew approximately one-hundred-five (105) deteriorated hull rivets at the following locations. Renewals for each location will be marked by the MSTIS inspector.

4th deck, frame 30 port. 6th deck, frame 100, 106, 185 port and frame 135, 140, 185 starboard.

Install new rivets in accordance with and to the satisfaction of the MSTIS inspector and regulatory bodies.

Tank cleaning for removal of any rivets in way of fuel oil or ballast tanks will be accomplished upon issuance of a specification change order.

ITEM 18 - HAWSE PIPES AND ANCHOR CHAIN PIPES - CLEANING OF: (AS)

Contractor shall, while the port and starboard anchor chains are out of hawse and chain pipes as specified in a separate item of this specification titled: Anchor chains. Sandblast (equivalent to commercial sandblast) the interior of the port and starboard hawse pipes and chain pipes to bare metal, free of all rust, scale, paint, etc.

Upon approval of cleaning by the MSTIS inspector, prime and finish paint the interior of hawse and chain pipes as follows:

To bare metal apply one (1) overall coat of wash primer, MSTIS Code 32 followed by one (1) coat of red lead primer, MSTIS Code 52. Apply two (2) overall finish coats of haze gray, MSTIS Code 45.

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ITEM 19 - FUEL OIL TANKS - REPAIRS TO HEATING COILS, VENTS, PIPING AND OTHER FITTINGS: (AT)

1. Clean, gas free and prepare for hot work and welding the fuel oil tanks listed below. Furnish the MSTSP Inspector a gas free certificate, issued by a certified marine chemist, prior to any repair work in tanks.

The following fuel oil tanks are to be dealt with.

- a. No. 4 double bottom center. Frames 78-98, S.W. Capacity 185 Tons
- b. No. 5 double bottom, port. Frames 98-112, S.W. Capacity 99 Tons
- c. No. 5 double bottom, center. Frames 98-112, S.W. Capacity 132 Tons
- d. No. 6 double bottom, port. Frames 112-128, S.W. Capacity 119 Tons
- e. No. 6 double bottom, center. Frames 112-128, S.W. Capacity 149 Tons
- f. No. 7 double bottom, port. Frames 128-142, S.W. Capacity 93 Tons
- g. No. 7 double bottom, stbd. Frames 128-142, S.W. Capacity 93 Tons
- h. No. 8 double bottom, stbd. Frames 142-158, S.W. Capacity 69 Tons
- i. No. 5 double bottom, stbd. Frames 98-112, S.W. Capacity 99 Tons
- j. No. 18 deep, port. Frames 120-128 F.O. Capacity 165 Tons
- k. No. 7 double bottom, center. Frames 128-142, S.W. Capacity 132 Tons
- l. No. 9 double bottom, stbd. Frames 158-172, S.W. Capacity 81 Tons

The ship will be delivered to the contractor's yard with all the fuel oil tanks listed above, chemically sea washed in a customary manner by the ship's force, and pumped down, as practicable with the ships pumps.

The contractor shall open out each tank and remove all remaining oil, sludge, solidified sediments, water and other debris; thoroughly clean interior of tanks and also all adjacent piping, tank tops, bulkheads and areas in way of all work specified in this item and issue gas free certificates as above.

2. (a) Suction and Filling Line - No. 2 Stbd. Fuel Oil Tank

Location: Forward Engine Room, Frame 6-98-1

The 5" suction and filling line serving the No. 2 stbd. fuel oil tank is deteriorated at the tank top penetration in way of the No. 5 center fuel oil tank.

Presently the deteriorated pipe is cement boxed.

Remove the cement box and cop-off approximately four (4) feet of the 5" suction and filling line, (two (2) feet above the tank top and two (2) feet inside the No. 5 center). Also crop-off the tank top plating at the penetration and install a suitable round or rectangular, radius corner insert, continuously welded both sides and of equal thickness. Renew the removed section of 5" fuel pipe, using welded sleeves on both ends. The new insert at the tank top penetration in way of the renewed piping section shall be fitted with an extra-heavy, all welded sleeve, extending approximately 5" above and below the tank top plating.

(b) Suction and Filling Line - No. 7 Stbd. Fuel Oil Tank

Location: Aft Engine Room, Frame 6-218-1

The 1 1/2" suction and filling line serving the No. 7 stbd. fuel oil double bottom tank is deteriorated above the tank top penetration in way of the No. 7 center

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ITEM 19 - FUEL OIL TANKS - REPAIRS TO HEATING COILS, VENTS, PIPING AND OTHER FITTINGS: (AT) (Cont'd)

2. (b) Suction and Filling Line - NO. 7 Stbd. Fuel Oil Tank (Cont'd)

double bottom tank, and is temporarily patched.

Crop-off tank top plating at the penetration and the deteriorated $1\frac{1}{2}$ " piping section approx. four (4) feet and repair piping and tank top in a manner similar to the repair specified in paragraph "2-a" above.

3. Fuel Oil Tank Heating Coils - Examination of

Hydro-test to 150 lbs the heating coils, steam piping and condensate return piping, from manifold to manifold, of all the fuel oil tanks listed in paragraph 1-a through 1-1 above.

Examine all coils and where practicable, the steam and condensate return piping; locate and mark any existing leaks or defects. Submit to the MSTSP Inspector a complete report of conditions found.

Examination shall be completed no later than 48 hours, following arrival of vessel in contractor's yard

4. Fuel Oil Tank Heating Coils - Renewals and Repairs

Crop-off and renew the known, deteriorated sections of heating coils and/or piping inside the fuel oil tanks as hereinafter specified.

(a) No. 2 Starboard F.O.D.B. Tank

Remove and renew approximately 60 ft. of $3/4$ " steam condensate piping serving the No. 2 stbd F.O.D.B.

This line is located inside the No. 4 center F.O.D.B.

(b) No. 4 Port F.O.D.B. Tank

Remove and renew approximately 10 feet of 1" steam piping serving the No. 4 Port F.O.D.B. tank.

This line is located inside the No. 5 port F.O.D.B.

(c) No. 5 Center F.O.D.B. Tank

Remove and renew all piping forming the entire steam heating coil of this tank, including the fuel suction coil and grid, all steam inlet piping, condensate return piping and all pipe hangers, bracketing and securements within the tanks.

The heating coil of this tank consists of approximately 226 feet of $1\frac{1}{2}$ " pipe. The 1" steam inlet and the $3/4$ " condensate return piping within the tank, shall be renewed in their entirety, from and including the penetration fittings.

(d) No. 6 Port F.O.D.B. Tank

Renew the entire heating coil of this tank and the steam and condensate piping as specified in the above paragraph "4-c".

The heating coil of this tank consists of approximately 209 feet of $1\frac{1}{2}$ " pipe.

ITEM 19 - FUEL OIL TANKS - REPAIRS TO HEATING COILS, VENTS, PIPING AND OTHER FITTINGS: (AT) (Cont'd)4. Fuel Oil Tank Heating Coils - Renewals and Repairs (Cont'd)(e) No. 6 Starboard F.O.D.B. Tank

Remove and renew approximately 10 feet of 1" steam piping serving the No. 6 starboard F.O.D.B.

This piping is located inside the No. 6 center F.O.D.B. tank.

(f) No. 7 Port and Starboard F.O.D.B. tanks

Remove and renew in their entirety and as specified in paragraph "4-c" above, the heating coils of the No. 7 P/S F.O.D.B. tanks, including steam inlet and condensate return piping.

The heating coils of these tanks consist of approx. 171 feet of 1½" pipe, each tank. A total of approx. 342 feet of 1½" heating coil piping to be dealt with.

(g) No. 8 Starboard F.O.D.B. Tank

Remove and renew approximately 60 feet of 1" steam piping serving the No. 8 starboard F.O.D.B.

This piping is located inside the No. 9 starboard F.O.D.B. tank.

(h) Tank Gauge Air Chamber Pipes - F.O.D.B. Tanks, Nos. 5 Center, 5 Starboard and 7 Port

Crop-off and eliminate the 1½" piping, air chambers etc., forming part of the obsolete tank level indicators. Blank-off tank plating penetrations with round doublers approximately 6" x 5/8". Doublers shall be continuously welded on both sides of the tank top plating.

Presently the deteriorated 1½" pipes of the level indicators are cement boxed in way of the tank top penetrations.

(i) No. 7 Starboard Vent Pipe

Crop-off and renew approximately ten (10) feet of 4" vent pipe.

Presently the vent pipe of this tank is cement boxed.

The tank top plating in way of the vent pipe penetration shall be fitted with an extra heavy sleeve welded on both sides. The upper part of the new 4" section shall be attached to the vent piping with suitable "Rollagrip"

(Continued)

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ITEM 19 - FUEL OIL TANKS - REPAIRS TO HEATING COILS, VENTS, PIPING AND OTHER FITTINGS: (AT) (Cont'd)

4. Fuel Oil Tank Heating Coils - Renewals and Repairs (Cont'd)

(j) Suction and Filling Line - No. 18 Deep F.O. Tank

Crop-off and renew the suction and filling line of the No. 18 deep F.O. tank as specified in paragraph "2-a" of this item. (That is, renew the suction and filling line section above and below the tank top penetration, insert tank top plating in way of penetration, install reinforcing sleeve, etc.)

The section of fuel piping is 4" and is flanged on one end.

(k) Suction and Filling Line - No. 4 Center F.O.D.B. Tank

Crop-off and renew approximately 10 feet of 6 $\frac{1}{2}$ " fuel oil piping using continuously welded pipe sleeves.

This section is located inside the No. 5 center F.O.D.B. tank.

5. All repair work specified in this item shall be accomplished in accordance with the ABS requirements and the USCG Rules and Regulations.

All removals and reinstallations in way of all work specified above, are included in this item.

The new fuel oil heating coils and steam and condensate return piping in tanks shall be seamless steel, extra heavy and shall be installed with welded sleeve joints. After installation hydrotest new piping to 250 lbs. and prove satisfactory.

Where renewals to steam and condensate return piping is specified in this item, new extra heavy sleeves shall be installed in way of all tank penetrations.

Pipe hangers, brackets etc., shall be renewed throughout in way of all new piping.

In way of renewals to F.O. suction and filling piping, where necessary, straight couplings, equal to "Smith-Blair Inc." #411 may be installed in lieu of welded sleeves.

Blank-off piping and/or otherwise isolate piping sections in way of work as found necessary.

Upon completion of all work in each tank, test new work as directed by and to the satisfaction of the ABS and MSTSP Representative, reinstall all manholes with new gasketing and new bolting throughout and leave each tank ready for service.

Coordinate tests and/or shifting of oil in tanks in way of repairs, with the ship's Chief Engineer.

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ITEM 20 - MISCELLANEOUS PIPING: (BK)

Remove all interferences, including paneling, tile and accomplish the following repairs and renewals to piping as specified.

Remove the deteriorated and leaking sections of the below listed piping.

Fabricate and install new sections, using removed sections as templates and material equal to original when new, complete with flanges, fittings and hangers.

Lengths and sizes specified are approximate and contractor shall take exact dimensions from installed locations aboard ship. The exact locations will be designated by the MSTIS inspector.

Provide the ship with sufficient temporary fire protection and sanitary flushing water in designated areas during accomplishment of repairs.

Apply shop hydro-test at $1 \frac{1}{2}$ times working pressure to new pipe sections, in the presence of the MSTIS inspector.

Install new piping aboard ship, using new gaskets, bolting and pipe hangers. Reinstall all removals.

Prove all work pressure tight under ship's load conditions.

Install new insulation of proper type and thickness for service intended, lagged and painted 2 coats of fire retardant paint to match existing areas.

Notify the MSTIS inspector prior to start and when ready for tests.

A. Sanitary Piping (WR-9)

Renew a total of one-hundred (100) feet of $1 \frac{1}{2}$ IPS galvanized pipe, one (1) $1 \frac{1}{2}$ inch valve, five (5) $1 \frac{1}{2}$ inch IPS offstickers, five (5) galvanized tees and five bootlegs welded on both sides, making five deck penetrations.

Piping is located in the passageway and troop mess hall, frame 132 to frame 155 3rd deck, making deckhead penetrations to the 2nd deck passengers staterooms.

B. Bottom and Surface Blow Piping (WR-12)

Renew six (6) feet of $1 \frac{1}{2}$ inch IPS flanged, two (2) bends, schedule 80, No. 2 boiler bottom and surface blow piping, with one (1) flanged, shaped offsticker, six (6) feet of 1 inch IPS schedule 80 piping.

Piping is located below floor plates, fwd engine room, frame 110, port side.

C. Fire Sanitary Pump Discharge Piping (WR-34)

Renew one section of fire pump flanged discharge piping with five (5) offstickers (Xmas Tree), located in the forward engine room, 6th deck frame 108 starboard side.

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ITEM 20 - MISCELLANEOUS PIPING: (BK) (Cont'd)

Piping dimensions are as follows:

One (1) foot of 3 inch IPS pump discharge, three (3) feet of 5 inch IPS to sanitary main, two (2) feet of four (4) inch IPS to fire main, six (6) feet of 3 inch IPS to relief valve and six (6) feet of 1 $\frac{1}{2}$ inch IPS to sawdust injection piping.

D. Fire Main Piping (WR-117)

Renew fifteen (15) feet of 6 inch IPS flanged fire main piping making one bulkhead penetration from the passageway third deck, frame 103, starboard side to the engine room. Section has two (2) 2 $\frac{1}{2}$ inch offstickers in the passage way one 6 inch offsticker in the engine room 1 foot long and one 2 $\frac{1}{2}$ inch offsticker one foot long.

Install additional companion flanges as directed by the Chief Engineer.