

[INCH-POUND]
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FEDERAL SPECIFICATION

BOILERS AND RELATED EQUIPMENT; PACKAGING OF

The General Services Administration has authorized the use of this specification by all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the requirements for preservation, packing, and marking of boilers and related equipment. There is no classification designations in this specification.

2. APPLICABLE DOCUMENTS

2.1 Government publications. The following documents, of the issues in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data which may improve this document should be sent to: Commanding Officer (Code 15E2), Naval Construction Battalion Center, 1000 23rd Avenue, Port Hueneme, CA 93043-4301, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.
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AMSC N/A

AREA PACK

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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Federal Specifications

- TT-P-664 - Primer Coating, Alkyl, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant.
- UU-S-48 - Sacks, Shipping, Paper.
- UU-T-81 - Tags, Shipping and Stock.
- PPP-B-601 - Boxes, Wood, Cleated-Plywood.
- PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
- PPP-C-96 - Cans, Metal, 28 Gage and Lighter.
- PPP-P-40 - Preservation and Packing of Hand Tools; Tools and Tool Accessories for Power Driven, Metal and Wood Working Machinery.

Federal Standards

- FED-STD-101 - Test Procedures for Packing Materials.
- FED-STD-123 - Marking for Shipment (Civil Agencies).

Commercial Item Description

- A-A-1898 - Cushioning Material, Cellulosic, Packing.

Military Specifications

- MIL-V-3 - Valves, Fittings, and Flanges (Except for Systems Indicated Herein): Packaging of.
- MIL-C-104 - Crates, Wood: Lumber and Plywood Sheathed, Nailed and Bolted.
- MIL-B-121 - Barrier Material, Greaseproofed, Waterproofed, Flexible.
- MIL-PRF-2105 - Lubricating Oil, Gear, Multipurpose.
- MIL-C-3774 - Crates, Wood; Open 12,000- and 16,000-Pound Capacity.
- MIL-C-5501 - Caps and Plugs, Protective, Dust and Moisture Seal.
- MIL-E-10062 - Engines: Preparation for Shipment and Storage of.
- MIL-E-16298 - Electric Machines Having Rotating Parts and Associated Support Items: Packaging of.
- MIL-D-16791 - Detergent, General Purpose (Liquid, Nonionic).
- MIL-E-17555 - Electronic and Electrical Equipment, Accessories, and Provisioned Items: Packing of.
- MIL-T-22085 - Tapes, Pressure-Sensitive, Adhesive, Preservation and Sealing.
- MIL-B-22191 - Barrier Materials, Transparent, Flexible, Heat Sealable.
- MIL-B-26195 - Boxes, Wood-Cleated, Skidded, Load-Bearing Base.
- MIL-C-52950 - Crates, Wood, Open and Covered.
- MIL-V-62038 - Vehicles, Wheeled: Preparation for Shipment and Storage of.

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Military Standards

- MIL-STD-129 - Marking for Shipment and Storage.
- MIL-STD-1186 - Cushioning, Anchoring, Bracing, Blocking and Waterproofing;
with Appropriate Test Methods.
- MIL-STD-2073 - DoD Material Procedures for Development and Application of Packaging.

(Copies of federal and military specifications and standards required by contractors in connection with specific procurement functions are obtained from Defense Automated Printing Services, Attn: DoDSSP, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI)

- ANSI-Z1.4 - Sampling Procedures and Tables for Inspection by Attributes.

(Private sector and civil agencies may purchase copies of this voluntary standard from the American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036.)

ASTM

- ASTM D 1974 - Standard Practice for Methods of Closing, Sealing, and Reinforcing
Fiberboard Boxes.
- ASTM D 3953 - Standard Specification for Strapping, Flat Steel and Seals.
- ASTM D 4675 - Selection and Use of Flat Strapping Materials..
- ASTM D 5118 - Standard Practice for Fabrication of Fiberboard Shipping Boxes.

(Private sector and civil agencies may purchase copies of these voluntary standards from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

(DoD activities may obtain copies of those adopted voluntary standards listed in the DoD Index of Specifications and Standards free of charge from the Defense Automated Printing Services, Attn: DoDSSP, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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3. REQUIREMENTS

3.1 Materials. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be on the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term “recovered materials” means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification.

3.2 Caution. Only type P-14 preservative (see 3.4.1.3) shall be used on metal surfaces that will contact potable water.

3.3 First article. Unless otherwise specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.4 Preservation. Preservation shall be level A.

3.4.1 Level A.

3.4.1.1 Disassembly. Disassembly of the boilers and related equipment shall be the minimum necessary to safeguard parts vulnerable to damage, pilferage, and loss. The extent of further disassembly shall be confined to the removal of protruding parts that would otherwise increase cubage. Disassembly shall be limited to those parts that can be removed and reinstalled without special tools and skilled personnel. Removed bolts, nuts, pins, screws, and washers shall be reinstalled in mating parts and secured to prevent their loss. Removed keys shall be secured in the keyway of the shaft.

3.4.1.2 Matchmarking. Removed parts and mating parts on the boilers and related equipment shall be matchmarked when necessary to facilitate reassembly. Matchmarking information shall be on tags conforming to UU-T-81, type A, and the tags attached to the mating parts. Waterproof ink shall be used for marking the information on the tags.

3.4.1.3 Cleaning, drying, and preservation. Surfaces to which a preservative is to be applied shall be cleaned and dried in accordance with MIL-STD-2073. Preservatives specified herein by “P” numbers shall conform to the applicable specifications listed in and shall be applied in accordance with MIL-STD-2073.

3.4.1.4 Unprotected surfaces. Unprotected exterior metal surfaces requiring the application of a contact preservative in accordance with MIL-STD-2073 and not specifically specified herein or in the end item specification shall be coated as follows.

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3.4.1.4.1 Unfinished (not machined) surfaces. Unfinished exterior metal surfaces shall be coated with type P-1 preservative.

3.4.1.4.2 Machined surfaces. Exposed machined surfaces shall be coated with P-6 or P-11 preservative. The exposed machined surfaces shall be wrapped or covered as applicable with barrier material conforming to MIL-B-121, type I or II, grade A, class 2, or MIL-B-22191, type II. The material shall be secured in place with tape conforming to MIL-T-22085, type II.

3.4.1.5 Pumps. Water pumps shall be drained and the interior surfaces coated with type P-3 preservative. Oil and fuel pumps shall be drained and the interior surfaces coated with P-10, type I, grade 30 preservative. The pumps shall be actuated during application of the preservatives to ensure coating of all interior surfaces. Excess preservative shall be drained and the drain and fill plugs coated with the applicable type of preservative (for water or oil) specified herein, and the plugs reinstalled. Openings into the pumps shall be sealed with caps or plugs as applicable conforming to MIL-C-5501 or with tape conforming to MIL-T-22085, type II. Unpainted exterior surfaces of pumps requiring a contact preservative in accordance with MIL-STD-2073 shall be coated with type P-1 preservative.

3.4.1.6 Drive belts and pulleys. Drive belts shall be removed from the equipment or released from tension. Pulley faces shall be coated with primer conforming to TT-P-664. Removed belts shall be preserved in accordance with MIL-STD-2073.

3.4.1.7 Gears.

3.4.1.7.1 Exposed gears. Exposed gears shall be coated with primer conforming to TT-P-664 or with type P-1 preservative.

3.4.1.7.2 Enclosed gears. Gears operating on lubricating oil (SAE 10, 30, or 50) shall have the housing filled to the operating level with P-10, type I, grade 10, 30, or 50 preservative as applicable. The gears shall be operated to ensure complete coverage. A tag shall be attached indicating: "The preservative contained in the gear housing is adequate for operating and shall remain in the housing until the first required lubrication change." Gears operating on lubricant (SAE 80 or 90) shall be filled to the operating level with lubricant conforming to MIL-PRF-2105, grade as applicable. A tag shall be attached indicating: "The lubricant contained in the gear housing is adequate for operation and shall remain in the housing until the first required lubricant change." Gears not operating on lubricating oil (SAE 10, 30, or 50) or lubricant (SAE 80 or 90) shall have the housing filled to the operating level with the approved lubricant required for operation. A tag shall be attached indicating: "The housing contains the lubricant required for operation and the lubricant shall remain in the housing until the first required lubricant change." Tags shall conform to UU-T-81, type A and shall be attached in a conspicuous location. Information on the tags shall be applied with waterproof ink.

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3.4.1.8 Chains.

3.4.1.8.1 Exposed roller chains. Exposed roller chains shall be coated with enough type P-3 or P-9 preservative to ensure penetration of the preservative to the inner surfaces of the rollers, pins, and bushings. After the excess preservative has drained, the entire chain and the sprockets shall be coated with type P-1 preservative. Chains, if removed from the equipment, shall be coated with preservatives specified herein. Removed chains shall be individually coiled and each coil wrapped with barrier material conforming to MIL-B-121, type II, grade A, class 2, or MIL-B-22191, type II. The barrier material shall be secured in place with tape conforming to MIL-T-22085, type II.

3.4.1.8.2 Enclosed roller chains. Enclosed roller chains and chain housings shall be preserved, filled, and tagged as specified in 3.4.1.7.2 for enclosed gears.

3.4.1.8.3 Nonprecision chains. Nonprecision chains shall be coated with primer conforming to TT-P-664 or with type P-1 preservative.

3.4.1.9 Rotating electrical equipment and components. Electrical equipment having rotating parts such as motors, fans, and blowers shall be preserved in accordance with MIL-E-16298, level A, using the alternate method specified for equipment assembled to machines. Electrical components removed from the equipment shall be preserved in accordance with MIL-E-17555, level A or in accordance with MIL-STD-2073. The submethod most applicable shall be used to provide the degree of protection required. Electrical components not removed from the equipment shall be wrapped or covered with barrier material conforming to MIL-B-121, type II, grade A, class 2, or MIL-B-22191, type II. The wraps or covers shall be secured in place with tape conforming to MIL-T-22085, type II.

3.4.1.10 Pressure gages, flow meters, and water column gages. Openings into the interior of the cases enclosing pressure gages, flow meters, and water column gages, installed on the equipment, shall be covered with barrier material conforming to MIL-B-121, type II, grade A, class 2. As an option, small openings shall be sealed with tape conforming to MIL-T-22085, type II. Barrier material shall be secured in place with tape specified herein. Glass surfaces of gages, meters, and water column glass not protected by a cover shall be protected against damage by a fitted bridge of hardboard secured in place with tape specified herein. Gages, meters, and water column glass not installed, or removed from the equipment shall be individually preserved in accordance with method III. Containers shall conform to ASTM D 5118. Closure shall be in accordance with ASTM D 1974.

3.4.1.11 Waterside of boilers. The waterside of boilers shall be drained and dried. Except for lined boilers, and unless otherwise treated to resist corrosion, all interior surfaces of the tanks shall be coated with type P-3 preservative. Coating shall be accomplished by spraying, fogging, or by completely filling the system with preservative and draining. As an option, the system shall be partially filled with preservative and rotating the boiler to ensure complete coverage of all interior surfaces with preservative. Excess preservative shall be drained. The boiler shall be tagged to indicate that the preservative shall be removed prior to placing the boiler in operation.

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and the method of removal. Tags shall conform to UU-T-81, type A and shall be attached in a conspicuous location. Information on the tags shall be applied with waterproof ink. Removal of the type P-3 or P-14 preservative (when applicable) from water contacting surfaces shall be accomplished by filling the waterside on the boiler or tank with 0.5-ounce (15 millilitre (mL)) of detergent conforming to MIL-D-16791, type I, to each 1-gallon (4 litre (L)) of water. This cleaning shall be followed by a rinse of clear hot water. The required quantity of detergent shall be furnished with each boiler or tank. Threads shall be coated with the preservative and the threaded openings shall be closed with plastic caps or plugs conforming to MIL-C-5501. Other openings shall be sealed with tape conforming to MIL-T-22085, type II. Large openings as an option shall be covered with barrier material conforming to MIL-B-121, type II, grade A, class 2 or MIL-B-22191, type II, secured in place with tape specified herein.

3.4.1.12 Surge, condensate, and hot water tanks. Interior surfaces of the tanks shall be drained and dried. Except for lined tanks, and unless otherwise treated to resist corrosion, all interior surfaces of the tanks shall be coated with type P-3 preservative. Tanks intended to be used for disbursement of potable water, such as those water tanks used in mess halls, hospitals, and housing facilities, the interior surfaces shall be coated with type P-14 preservative. Excess preservative shall be drained and the openings sealed as specified in 3.4.1.11. Metal surfaces of any equipment contained within the tanks requiring application of a contact preservative in accordance with MIL-STD-2073, shall be coated with the applicable type preservative specified herein. The tanks shall be tagged as specified in 3.4.1.11. A quantity of detergent as specified in 3.4.1.11 shall be included with each tank.

3.4.1.13 Steam injectors. Internal surfaces of the injectors shall be coated with type P-3 preservative. Injectors removed from the equipment shall be individually preserved in accordance with MIL-STD-2073.

3.4.1.14 Valves and fittings. Valves and fittings not installed on equipment and those removed during disassembly shall be preserved in accordance with MIL-V-3, level A.

3.4.1.15 Float-controlled valves. Float-controlled valves and mechanisms shall be removed from the equipment. Interior and exterior surfaces of the valves, if subject to corrosion, shall be coated with type P-3 preservative. The float-controlled valve and mechanism shall be preserved together, in accordance with MIL-STD-2073. If for any reason, the float-controlled valve and mechanism cannot be removed, the interior and exterior surfaces of the valves shall be coated with preservative as specified herein. Mechanisms, if liable to damage by vibration, shall be secured by blocking or with tape conforming to MIL-T-22085, type II.

3.4.1.16 Pipe and boiler tubes. Uncoated steel pipe, installed and not installed on the equipment, shall be coated on the inside and outside with type P-3 preservative. Pipe that is intended for use with hot water tanks for potable water as defined in 3.4.1.12 shall be coated with type P-14 preservative. Uncoated steel boiler tubes not installed on the equipment when the inside is the waterside, shall be coated on the waterside with type P-3 preservative. When the waterside is on the outside of the tube, the tube shall be coated both on the waterside and the fireside with type P-3 preservative. Each tube shall be wrapped with barrier material conforming to

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MIL-B-121, type II, grade A, class 2, or MIL-B-22191, type II, and secured in place with tape conforming to MIL-T-22085, type II. The ends into all pipe and tubes shall be sealed with plastic plugs or caps conforming to MIL-C-5501 or with barrier material as specified herein. The barrier material shall be secured with tape as specified herein.

3.4.1.17 Burners, blowers, and connecting piping. The interior surfaces of burners, blowers, and piping of equipment shall be coated with P-10, type I, grade 30 preservative. Nozzles and jets shall be sealed with tape conforming to MIL-T-22085, type II. Unpainted exterior surfaces of the burners, blowers, and piping requiring the application of a contact preservative in accordance with MIL-STD-2073 shall be coated with type P-1 preservative. Electric motors for burners or blowers installed on equipment shall be preserved in accordance with MIL-E-16298, level A. Alternate method specified shall be used for equipment assembled to machines. Electric motors removed from burners and blowers shall be preserved in accordance with MIL-E-16298, level A method as required by machine enclosure and weight in table I, therein.

3.4.1.18 Burner fuel tanks. Interior surfaces of burner fuel tanks, if unlined or otherwise not treated to resist corrosion, shall be coated with P-10, type I, grade 30 preservative. Coating shall be applied by fogging, spraying, or completely filling and draining, as applicable.

3.4.1.19 Ashpits, fireboxes, tube ends, smoke boxes, and stacks. Unpainted exposed surfaces of ashpits, fireboxes, exposed fireside of tube ends, smoke boxes, and stacks shall be coated with type P-1 preservative.

3.4.1.20 Refractories.

3.4.1.20.1 Installed linings. Linings that remain installed in the equipment shall be protected with blocking, bracing, and cushioning to prevent breaking or loosening due to shock and vibration encountered during shipment and handling.

3.4.1.20.2 Linings not installed. Refractory linings including brick, block, and shapes required for installation after delivery shall be placed in close-fitting boxes conforming to PPP-B-621, class 1, style optional or PPP-B-601, domestic type, style optional. To prevent damage to the linings, each piece of lining shall be separated from the others and from the inside faces of the boxes. Linings shall be cushioned with excelsior or with cushioning material conforming to A-A-1898. Cushioning shall be not less than 0.375-inch (10 millimetre (mm)) thick. Strapping shall not be required. The gross weight of each box shall be not greater than 200 pounds (91 kilograms (kg)). The boxes shall be packed with the basic unit of equipment. When specified (see 6.2), refractory linings required for each basic unit of equipment, in quantities as to prohibit packing with the basic unit, shall be placed in boxes as specified herein. Packaged weight shall be not greater than the weight limitation of the boxes. Boxes shall be class 2 or overseas type as applicable. Boxes shall be closed and strapped in accordance with ASTM D 1974. Strapping shall conform to ASTM D 3953, type 1 or 2, zinc-coated, size as applicable and ASTM D 4675. The boxes shall be shipped without overpacking at the same time as the basic unit of equipment for which intended.

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3.4.1.20.3 Dry refractory and Portland cement. Dry refractory (fire clay) shall be placed in paper sacks conforming to UU-S-48, 9-9X, in quantities of 60 pounds (27 kg). Portland cement shall be contained in quantities of 94 pounds (43 kg) (0.48 cubic foot (0.014 cubic metre (m³)) by absolute volume). When a lesser quantity of Portland cement is required for a single installation, paper sacks conforming to UU-S-48, 17-17X shall be used. The sacks shall be closed in accordance with UU-S-48.

3.4.1.20.4 Liquid paste and plastic cement. Wet-type pastes and cements shall be contained in the quantities required for the basic unit of equipment. Containment shall be in 1-gallon or 5-gallon (4 L or 19 L) cans as applicable, conforming to PPP-C-96, type V, class 1, plan B, or when applicable, in 55-gallon (208 L) metal drums.

3.4.1.20.5 Sand. Sand and similar materials shall be contained in quantities of 80 pounds (36 kg) in paper sacks conforming to UU-S-48, 13-13X, type II.

3.4.1.21 Insulation.

3.4.1.21.1 Blanket. Blanket insulation in rolls shall be individually placed in boxes conforming to ASTM D 5118, as applicable, style optional.

3.4.1.21.2 Board or block. Board or block insulation of like description shall be placed in boxes conforming to ASTM D 5118. Quantities shall be not greater than the weight limitation of the boxes.

3.4.1.21.3 Loose fill. Loose fill insulation shall be contained in paper sacks conforming to UU-S-48, type II, 6-6X.

3.4.1.22 Boiler type bitumen heaters. The components of boiler type bitumen heaters, with necessary appurtenances to make a complete installation shall be preserved as specified herein for similar components of other boilers.

3.4.1.23 Engines for boiler type bitumen heaters. Engines and engine accessories shall be preserved in accordance with MIL-E-10062, level A, method I, for type I classification. The cooling system shall be processed by the preservative and drain method.

3.4.1.24 Trailer chassis. Trailer chassis components shall be preserved in accordance with MIL-V-62038, level A (mobile).

3.4.1.25 Fire extinguishers. Unprotected metal surfaces of the fire extinguishers requiring a contact preservative in accordance with MIL-STD-2073, shall be coated with type P-1 preservative. Each fire extinguisher shall be placed in a close-fitting box conforming to ASTM D 1974 and ASTM D 5118, style optional.

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3.4.1.26 Repair parts. The preservative application and applicable method(s) of preservation of MIL-STD-2073 shall be used to preserve the repair parts. Only type P-14 preservative shall be applied to those parts that will contact potable water when placed in the equipment.

3.4.1.27 Maintenance tools. Maintenance tools shall be preserved in accordance with PPP-P-40, level A.

3.4.1.28 Technical publications. Technical publications for each basic unit of equipment shall be preserved together in accordance with MIL-STD-2073. The technical publications shall be secured in a conspicuous location to the unit for which intended.

3.4.1.29 Other components. Other components not specifically mentioned herein requiring protection from corrosion or physical or mechanical damage shall be preserved as specified for components of similar design and construction.

3.4.1.30 Consolidation. Components of the boilers and equipment removed by disassembly and requiring the protection of a consolidated container shall be consolidated as follows: For complete units such as water tanks and heaters that are to be packed in wood boxes, the components shall be consolidated in boxes conforming to ASTM D 1974 and ASTM D 5118, as applicable. For complete units that are to be packed in crates, the components shall be consolidated in boxes conforming to PPP-B-601, domestic type, style optional. Strapping shall not be required. For complete units to be shipped mobile, the components shall be consolidated in a minimum number of boxes conforming to PPP-B-601, overseas type, style I, or J. The number, size, weight, and configuration of the boxes shall be determined by the available space and convenience for securing on the unit.

3.4.2 Boilers and related equipment. The boilers and related equipment shall be preserved in accordance with the contractor's standard practice to prevent deterioration and damage during shipment. All equipment requiring lubrication for operation service shall be lubricated in accordance with the operator's manual.

3.4.2.1 Trailer chassis. Trailer chassis components shall be preserved in accordance with MIL-V-62038 (mobile) requirements.

3.5 Packing. Packing shall be level A or level B, as specified (see 6.2).

3.5.1 Level A.

3.5.1.1 Boxed equipment. Each complete boiler and equipment, including consolidation containers and disassembled components, shall be packed in a close-fitting box conforming to PPP-B-621, class 2, style optional; PPP-B-601, overseas type, style optional; or MIL-B-26195, type II, style and class optional, with rubbing strips and plywood superstructure. Blocking, bracing, and anchoring of the contents within the box to prevent movement or damage shall be in accordance with MIL-STD-1186. Box closure and strapping shall be in accordance with the box

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specification or appendix, as applicable. Strapping shall conform to ASTM D 4675 and ASTM D 3953, type 1 or 2, zinc-coated, size as applicable.

3.5.1.2 Crated equipment. Each complete boiler and equipment, including consolidation containers and disassembled components greater than the weight limitation of a wood box, shall be packed in a crate. Crate shall conform to MIL-C-104, style A, type and class optional. Blocking, bracing, and anchoring shall be in accordance with the appendix to the crate specification and in accordance with MIL-STD-1186. When specified (see 6.2), a crate conforming to MIL-C-104, type II, class optional shall be used for packing.

3.5.1.3 Mobile equipment. Each complete trailer-mounted boiler and equipment shall be shipped without packing. Consolidation containers and disassembled components shall be positioned on the unit in a manner not to interfere with lifting the unit with slings or with towing the unit. The containers and components shall be secured to the unit with steel strapping conforming to ASTM D 4675 and ASTM D 3953, type 1, or 2, zinc-coated. Strapping shall be sufficient in number and strength to retain the containers and components in their original position during routine handling, shipment, and storage.

3.5.2 Level B.

3.5.2.1 Boxed equipment. Each complete boiler and equipment, consolidation containers, and disassembled components shall be packed as specified in 3.5.1.1 for level A. Boxes shall be domestic type or class as applicable. Strapping may be zinc-coated.

3.5.2.2 Crated equipment. Each complete boiler and equipment, consolidation containers, and disassembled components shall be packed as specified in 3.5.1.2 for level A. Open crates conforming to MIL-C-3774, type I, style A or MIL-C-52950, type V, style optional, may be used as an alternate to the crate specified in 3.5.1.2. When an open crate is used, the contents shall be protected with a full waterproof shroud, fabricated and installed in accordance with the appendix to MIL-C-52950.

3.5.2.3 Mobil equipment. Each complete trailer-mounted boiler and equipment, consolidation containers, and disassembled components shall be prepared for mobile shipment as specified in 3.5.1.3 for level A. Strapping may be zinc-coated.

3.5.3 Boiler and supplemental equipment. Each complete boiler and all equipment shall be prepared for shipment in a manner which will ensure arrival at destination in a satisfactory condition. Preparation for delivery shall comply with applicable carrier rules and regulations.

3.6 Marking. In addition to any special marking specified in the contract or order (see 6.2), marking shall be in accordance with MIL-STD-129. For civil agencies markings shall be in accordance with FED-STD-123.

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3.7 Depreservation guide. A depreservation guide shall be prepared, placed in a waterproof envelope marked "Depreservation Guide." Depreservation guide shall be secured in a conspicuous location on the unit of equipment. Unless otherwise specified (see 6.2, and 6.4), DA Form 2258 - Depreservation Guide for Vehicles and Equipment shall be used.

3.8 Workmanship. Workmanship shall be such as to provide maximum protection to the boiler, components, and equipment. Requirements specified herein, shall be applied to prevent corrosion, deterioration, and mechanical or physical damage during handling, shipment, and storage.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification, where such inspections are deemed necessary to ensure that supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 4. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this document shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable referenced documents.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article pack inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

4.3 First article pack inspection. The first article pack inspection shall be performed on crated or boxed equipment for level A or B when first article pack inspection is required (see 3.3 and 6.2). This inspection shall include the examination of 4.3.1, and the tests of 4.3.2. The first article may be either first production item or a standard production item from the supplier's current inventory provided the item meets the requirements of the specification and is

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representative of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

4.3.1 Examination. The first article pack shall be examined as specified in 4.4.4. Presence of one or more defects shall be cause for rejection.

4.3.2 Tests. The first article pack of crated or boxed equipment for level A or B shall be tested as specified in 4.3.2.1 or 4.3.2.2, as applicable. Failure of the applicable test shall be cause for rejection.

4.3.2.1 Boxed equipment. Boxed equipment not greater than 200 pounds (91 kg) shall be subjected to the free-fall drop test in accordance with FED-STD-101, method 5007. Boxed equipment greater than 200 pounds (91 kg) shall be subjected to the pendulum impact test in accordance with FED-STD-101, method 5102, except the vertical height of drop shall be 18 inches (457 mm).

4.3.2.2 Crated equipment. Crated equipment shall be subjected to the guided-impact test (railroad car) in MIL-STD-1186, appendix A. Crates not greater than 9.5 feet (2 896 mm) in length shall be subject to tests on each end and each side, a total of four impacts.

4.3.2.3 Basis for rejection. Any shifting of contents, loosening or breaking of holddown ties, stays, blocking or bracing, or any visual damage to the contents shall constitute failure of the first article pack test and shall be cause for rejection.

4.4 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.4.4. This inspection shall be performed on the samples selected in accordance with 4.4.3.

4.4.1 Inspection stages. Inspection shall be in three stages as follows:

- a. The first stage shall include inspection of materials, methods, containers, and markings prior to consolidation.
- b. The second stage shall include inspection of the marking and closure of the consolidation containers.
- c. The third stage shall include inspection of materials, containers, and markings of the complete boiler or related materials as prepared for shipment. This stage shall include arrangement of consolidation containers and components required to be secured to trailers for shipment.

4.4.2 Unit of product. For the purpose of inspection, a complete unit prepared for any applicable inspection stage shall be considered a unit of product.

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4.4.3 Sampling. Sampling for examination shall be in accordance with ANSI-Z1.4. Samples shall be determined by using ANSI-Z1.4. Guidance for inspection level and an Acceptable Quality Level (AQL) is provided in 6.4.

4.4.4 Examination. Samples selected in accordance with 4.4.3 shall be examined for the defects marked "X" for the applicable level in table I.

TABLE I. Classification of defects.

No.	Defect	Level	
		A	B
101.	Materials, methods, and containers not as specified. Each incorrect material, method, and container shall constitute one defect (3.1, 3.4, and 3.5).	X	X
102.	Disassembly not as specified (see 3.4.1.1).	X	-
103.	Matchmarking not as specified (see 3.4.1.2).	X	-
104.	Information on tags not applied with waterproof ink (see 3.4.1.2, 3.4.1.7.2, 3.4.1.11, and 3.4.1.12).	X	-
105.	Cleaning, drying, and preservation not as specified (see 3.4.1.3).	X	-
106.	Unprotected surfaces not coated with preservative as specified (see 3.4.1.4).	X	-
107.	Coated surfaces not wrapped or covered as specified (see 3.4.1.4.2).	X	-
108.	Pumps (water or oil) not drained, preserved, and sealed as specified (see 3.4.1.5).	X	-
109.	Drive belts not removed or released from tension as applicable (see 3.4.1.6).	X	-
110.	Pulley faces not coated with primer as specified (see 3.4.1.6).	X	-
111.	Exposed gears not coated with primer or type P-1 preservative as specified (see 3.4.1.7.1).	X	-
112.	Enclosed gear housings not filled with applicable type preservative or operating oil as specified (see 3.4.1.7.2).	X	-
113.	Gear housings not tagged as specified (see 3.4.1.7.2).	X	-

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TABLE I. Classification of defects (Continued).

No.	Defect	Level	
		A	B
114.	Exposed roller chains not coated with preservative as specified (see 3.4.1.8.1).	X	-
115.	Removed roller chains not coiled and wrapped as specified (see 3.4.1.8.1).	X	-
116.	Enclosed chains not preserved as specified (see 3.4.1.8.2).	X	-
117.	Nonprecision chains not coated with primer or type P-1 preservative as specified (see 3.4.1.8.3).	X	-
118.	Rotating electrical equipment not preserved in accordance with the referenced document (see 3.4.1.9).	X	-
119.	Electrical components not preserved as specified when removed or not protected as specified when not removed (see 3.4.1.9).	X	-
120.	Pressure gages, flow meters, and water column gages not preserved as specified (see 3.4.1.10).	X	-
121.	The waterside of boilers not drained and dried as specified and interior surfaces not coated with preservative as specified, and not tagged to indicate removal of preservative as required (see 3.4.1.11).	X	-
122.	Threaded openings not sealed with plugs and caps and other openings not sealed with tape as specified (see 3.4.1.11).	X	-
123.	Interior surfaces of surge, condensate, and hot water tanks not drained, dried, preserved, sealed and tagged as specified (see 3.4.1.12).	X	-
124.	Internal surface of injectors not coated with type P-3 preservative (see 3.4.1.13).	X	-
125.	Removed valves and fittings not preserved as specified (see 3.4.1.14).	X	-
126.	Float controlled valves not preserved as specified (see 3.4.1.15).	X	-
127.	Pipe and boiler tubes not preserved as specified and the ends not sealed when applicable (see 3.4.1.16).	X	-

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TABLE I. Classification of defects (Continued).

No.	Defect	Level	
		A	B
128.	Burners, blowers, and piping components not preserved as specified and openings into nozzles and jets not sealed with tape as specified (see 3.4.1.17).	X	-
129.	Interior surfaces of burner fuel tanks not coated with preservative as specified (see 3.4.1.18).	X	-
130.	Ashpits, fireboxes, tube ends, smoke boxes, and stacks not coated with type P-1 preservative as specified (see 3.4.1.19).	X	-
131.	Refractories, linings, and insulation not blocked in place or not packaged as specified (see 3.4.1.20, 3.4.1.20.1, 3.4.1.20.2, 3.4.1.20.3, 3.4.1.20.4, 3.4.1.20.5, 3.4.1.21, 3.4.1.21.1, 3.4.1.21.2 and 3.4.1.21.3).	X	-
132.	Components of boiler type bitumen heaters not preserved in accordance with the applicable requirements for similar components as specified for other boilers (see 3.4.1.22).	X	-
133.	Components of engines for boiler type bitumen heaters not preserved as specified (see 3.4.1.23).	X	-
134.	Trailer chassis components not preserved in accordance with the referenced document (see 3.4.1.24, and 3.4.2.1).	X	-
135.	Fire extinguishers not preserved as specified (see 3.4.1.25).	X	-
136.	Repair parts, tools, and technical publications not preserved as specified (see 3.4.1.26, 3.4.1.27, and 3.4.1.28).	X	-
137.	Consolidation not as specified (see 3.4.1.30).	X	-
138.	Equipment requiring lubricant not lubricated in accordance with operator's manual (see 3.4.2).	-	-
139.	Boxed or crated equipment not blocked, braced, and anchored in accordance with the referenced document (see 3.5.1.1, 3.5.1.2, 3.5.2.1, and 3.5.2.2).	X	X
140.	Strapping not as specified (see 3.5.1.1, 3.5.1.3, and 3.5.2.1).	-	X

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TABLE I. Classification of defects (Continued).

No.	Defect	Level	
		A	B
141.	Contents not protected with a shroud when an open crate is used (see 3.5.2.2).	-	X
142.	Disassembled components and consolidation containers secured in a manner that will interfere with lifting or towing the unit (see 3.5.1.3 and 3.5.2.3).	X	X
143.	Strapping of components and consolidation containers on mobile equipment not of sufficient strength and number to retain their original position during handling and shipment (see 3.5.1.3, and 3.5.2.3).		X
144.	Packing for level C not as specified (see 3.5.3).	-	-
145.	Depreservation guide not prepared and attached in a conspicuous location the equipment (see 3.6).	X	X
146.	Workmanship not as specified (see 3.7).	X	X

5. PACKAGING

This section is not applicable to this specification.

6. NOTES

(This section contains information of a general or explanatory nature which is helpful, but is not mandatory.)

6.1 Intended use. It is intended that the requirements of this specification be used for preservation, packing, and marking of boilers and related equipment. Requirements shall be used for reference in section 5 of end item specifications or for direct reference in contracts or orders, or in the preparation of packaging data sheets.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. When a first article pack is not required (see 3.3, 4.3 and 6.3).
- c. Level of preservation and packing required (see 3.4, and 3.5).

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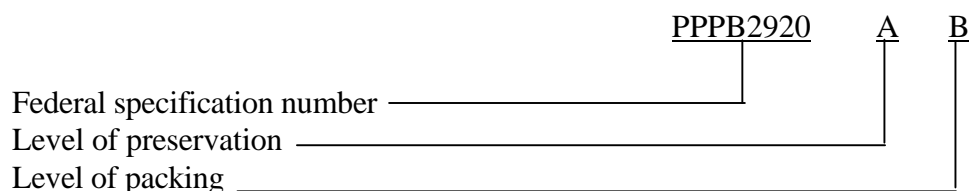
- d. When refractory linings are to be packed separately from the basic item of equipment (see 3.4.1.20.2).
- e. When a type II crate is required (see 3.5.1.2).
- f. When marking is required (see 3.6).
- g. When other than DA Form 2258 is to be used (see 3.7).

6.3 First article pack inspection. The first article pack shall be performed utilizing either the first preproduction model or a production model when first article pack is required (see 3.3, and 6.2). This inspection shall include the examination of 4.3.1, the tests of 4.3.2, and when specified, the preproduction pack inspection of 4.3 (see 3.3, and 6.2). If the preproduction model is utilized, any preservation and packing shall be removed by the contractor at no expense to the Government, when requested by the Government, to facilitate comparison of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

6.4 Sampling procedures. Recommended inspection level is II and AQL is 4.0 defects per hundred unit(s) (see 4.4.3).

6.5 Depreservation guide. The contracting officer should arrange to furnish DA Form 2258 when requested by the contractor.

6.6 Part or Identification Number (PINs). The specification number, level of preservation and level of packing are combined to form PINs for packing covered by this document (see 1.2). PINs for packing are established as follows:



The above PIN for level of preservation, and level of packing is designated by one code letter (see table II).

TABLE II. PIN designators.

Pin designator	Preservation level	Packing level	
	A	A	B

6.7 Supersession data. This specification replaces military specification MIL-B-3180E dated 18 December 1990.

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6.8 Subject term (key word) listing.

Marking
Packing
Preservation
Refrigeration equipment

MILITARY INTERESTS:

Custodians:

Army - GL
Navy - YD1
Air Force - 99

Review Activities:

Army - SM
Navy - SH
Air Force - 84
DLA - CS

CIVIL AGENCY COORDINATING ACTIVITY:

GSA-FSS

PREPARING ACTIVITY:

Navy - YD1

(Project PACK-1053)