

NOT MEASUREMENT SENSITIVE

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 SUPERSEDING
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MILITARY SPECIFICATION

COMPRESSORS, ROTARY, POWER-DRIVEN; AND COMPRESSORS,
 RECIPROCATING, POWER-DRIVEN: AIR AND GAS
 (EXCEPT OXYGEN AND REFRIGERANT), PACKAGING OF

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements for methods, materials, and procedures for the preservation, packing, and marking of reciprocating and rotary type compressors for air and gas (except oxygen and refrigerants).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

TT-P-664	- Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant.
UU-T-81	- Tags, Shipping and Stock.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: USA Belvoir Research, Development, and Engineering Center, ATTN: SIRBE-TSE, Fort Belvoir, VA 22060-5606 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

AREA PACK

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

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- PPP-B-601 - Boxes, Wood, Cleated-Plywood.
- PPP-B-636 - Boxes, Shipping, Fiberboard.
- PPP-P-40 - Packaging and Packing of Hand Tools.

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- MIL-C-104 - Crates, Wood; Lumber and Plywood Sheathed, Nailed and Bolted.
- MIL-P-116 - Preservation, Methods of.
- MIL-B-121 - Barrier Material, Greaseproofed, Waterproofed, Flexible.
- MIL-H-775 - Hose Assemblies; (Including Tubing); and Fittings, Nozzles, and Strainers, Packaging of Hose.
- MIL-L-2105 - Lubricating Oil, Gear, Multipurpose.
- MIL-C-3774 - Crates, Wood; Open, 12,000- and 16,000-Pound Capacity.
- MIL-E-10062 - Engines; Preparation for Shipment and Storage of.
- MIL-E-16298 - Electric Machines Having Rotating Parts and Associated Repair Parts: Packaging of.
- MIL-T-22085 - Tapes, Adhesive, Preservation and Sealing.
- MIL-B-26195 - Boxes, Wood-Cleated, Skidded, Load-Bearing Base.
- MIL-C-52950 - Crates, Wood, Open and Covered.
- MIL-V-62038 - Vehicle, Wheeled, Preparation for Shipment and Storage.

STANDARDS

FEDERAL

- FED-STD-101 - Test Procedures for Packaging Materials.

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- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.
- MIL-STD-1186 - Cushioning, Anchoring, Bracing, Blocking, and Waterproofing; with Appropriate Test Methods.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- D 3953 - Strapping, Flat Steel and Seals.
- D 4675 - Selection and Use of Flat Strapping Materials.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia PA 19103.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Associations, Inc., ATTN: Traffic Order Section, 2200 Mill Road, Alexandria, VA 22314.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Plaza, Chicago, IL 60606).

3. REQUIREMENTS

3.1 Materials. Materials shall be as specified herein and in applicable specifications and standards. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification. Materials shall be free of defects.

3.2 First article pack. The contractor shall furnish a first article pack for examination and test within the time frame specified (see 6.2), to prove, prior to starting production packaging that the applied preservation, packing, and marking comply with the requirements of this specification. Examination and test shall be as specified in section 4 and shall be subject to surveillance and approval by the Government (see 6.3). The first article pack may be accomplished utilizing either the first article model or a production model. When the production 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 between the first article model and the production model.

3.3 Preservation. Preservation shall be level A, B, or C as specified (see 6.2).

3.3.1 Level A.

3.3.1.1 Disassembly and matchmarking.

3.3.1.1.1 Disassembly. Disassembly of the compressors shall be the minimum necessary to safeguard parts vulnerable to damage, pilferage, and loss, and to the removal of protruding parts such as exhaust stacks, air cleaners, and standpipes that extend outside the housings and that would otherwise increase cubage; however, disassembly shall be limited to those parts that can be removed

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and reinstalled without special tools. Removed bolts, nuts, pins, screws, and washers shall be reinstalled in mating parts and secured to prevent their loss. Keys removed shall be secured in the key way of the shaft.

3.3.1.1.2 Matchmarking. Removed parts and mating parts on the compressors shall be matchmarked when necessary to facilitate reassembly. Removed parts and mating parts on the compressors shall be identified by cloth shipping tags conforming to UU-T-81, type A, and the marked tags shall be attached to mating parts. The information on the tags shall be applied with waterproof ink.

3.3.1.2 Preservatives. Preservatives specified herein shall conform to the applicable specifications listed in and shall be applied in accordance with MIL-P-116.

3.3.1.3 Unprotected surfaces. Unpainted exterior metal surfaces requiring the application of a contact preservative in accordance with MIL-P-116 and not specifically specified herein or in the end item specification shall be coated with preservative as follows.

3.3.1.3.1 Unfinished surfaces. Unfinished exterior metal surfaces shall be coated with type P-1 preservative.

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

3.3.1.4 Engine. The engine and engine accessories shall be preserved in accordance with the level A requirements of MIL-E-10062, using type II, method I for compressors packed in containers and type I, method I for compressors shipped uncrated (mobile).

3.3.1.5 Reciprocating compressors.

3.3.1.5.1 Lubricating system. The compressor crankcase shall be filled to the operating level with type P-10 preservative, type I, grade 10 and the compressor shall be operated at a speed of and for a period of time sufficient to insure coating of all interior surfaces of the system with the preservative and to accomplish the valve preservative specified in 3.3.1.5.2. After the preservative is accomplished, for boxed or crated compressors (see 3.4.1.1), the preservative shall be drained, and a cloth tag conforming to UU-T-81, type A, shall be attached to the operating controls, indicating: "The crankcase has been drained. Fill to the operating level with the approved operating oil before operating the compressor." For unboxed (mobile) shipment of the compressor (see 3.4.1.2 and 3.4.1.3), the preservative oil shall remain in the crankcase. A cloth tag specified herein shall be attached to the operating controls, indicating: "For compressors operating on engine lubricating oil (SAE 10), the preservative oil contained in the crankcase is good for operation until the first required lubricant change. For compressors not operating on engine lubricating oil (SAE 10), the preservative lubricating oil shall be drained and the crankcase filled to the operating level with the approved operating oil before the compressor is operated." The marking on the tags shall be applied with waterproof ink. NOTE: The drained preservative oil used for processing boxed

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and crated compressors may be reused for processing other compressor lubricating systems but shall be discarded when contamination exceeds 1 percent by volume (see 6.4).

3.3.1.5.2 Valves. Before the compressor is operated as specified in 3.3.1.5.1, the air cleaners shall be removed, and 4 or 5 ounces of type P-10 preservative, type I, grade 10 shall be sprayed into each air cleaner connection. An adequate amount of the preservative lubricating oil specified herein, shall be fogged or sprayed into the first stage discharge. The excess preservative oil is observed in the final stage discharge. The excess preservative oil in the condensate separators shall be drained while the compressor is still operating. The compressor shall then be stopped. The air cleaners shall be reinstalled unless reinstallation will substantially increase cubage.

3.3.1.6 Rotary compressors.

3.3.1.6.1 Lubricating system. The oil reservoir shall be filled to the operating level with type P-10 preservative, type I, grade 10. The compressor shall be operated at normal speed until it reaches its normal operating temperature. The speed shall then be decreased to a slow idle, and the compressor shall be operated at slow idle for approximately 3 minutes and then stopped. For boxed or crated compressors (see 3.4.1.1), the preservative shall be drained. A cloth tag conforming to UU-T-81, type a, shall be attached to the operating controls indicating: "The lubricating oil reservoir is drained. Fill to the operating level with the approved operating oil prior to operating the compressor." For unboxed (mobile) shipment of compressors (see 3.4.1.2 and 3.4.1.3), the preservative oil shall be remain in the oil reservoir. A cloth tag specified herein shall be attached to the compressor operating controls indicating: "The lubricating oil reservoir is filled to the operating level with type P-10 preservative, type I, grade 10. For compressors operating on engine lubricating oil (SAE 10) the preservative oil contained in the reservoir is good for operation until the first required lubricant change. For compressors not operating on engine lubricating oil (SAE 10), drain the oil from the reservoir and fill to the operating level with the approved operating oil prior to operating the compressor." The marking on the tags shall be applied with waterproof ink. **NOTE:** The drained preservative oil used for processing boxed and crated compressors may be reused for processing other compressors but shall be discarded when contamination exceeds 1 percent by volume (see 6.4).

3.3.1.7 Air receivers. Interior surfaces of air receivers, if not corrosion resistant, except receivers to be used for containing air for breathing and respiratory purposes, and located downstream on the dry side from the air-oil separators, shall be fogged with type P-10 preservative, type I, grade 10. Excess preservative shall be drained. Drain cocks on all air receivers shall be left open.

3.3.1.8 Air cleaners.

3.3.1.8.1 Oil-bath types. Oil-bath-type air cleaners shall be filled to the operating level with type P-10 preservative, type I, grade 10. Unpainted surfaces above the operating level shall be coated with the preservative lubricating oil specified herein. The air cleaner shall remain installed unless removal will result in a reduction in cubage. Installed air cleaners for boxed shipment of compressors (see 3.4.1.1) shall be drained. Air cleaners removed for

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cube reduction of unboxed (mobile) shipment of compressors (see 3.4.1.2 and 3.4.1.3), shall be drained. For unboxed (mobile) shipment of compressors, installed air cleaners need not be drained; however, openings into the installed air cleaner shall be sealed with tape conforming to MIL-T-22085, type I or II. Air cleaners not installed shall be individually placed in boxes conforming to PPP-B-636, W5c, style optional. The boxes shall be closed and sealed as specified for method V in the appendix to the box specification. Resultant openings into air intakes shall be sealed with tape specified herein.

3.3.1.8.2 Dry-type. After compressor preservation has been completed, if the air cleaner is equipped with a removable element, the element shall be removed and the interior surfaces of the air cleaner (if not painted) shall be coated with type P-10 preservative, type I, grade 10. Excess preservative shall be drained. Metallic elements shall be dipped in the preservative lubricating oil specified herein and the excess preservative shall be drained. The elements shall be reinstalled. Care shall be exercised to prevent contamination of nonmetallic elements during reinstallation. Openings into air cleaners installed on unboxed (mobile) compressors shall be sealed with tape as specified in 3.3.1.8.1. Air cleaners not installed, when a reduction in cube is realized, shall be boxed as specified in 3.3.1.8.1, and the resultant openings into air intakes shall be sealed as specified therein.

3.3.1.9 Openings. Large openings into the interior of the compressors shall be covered with barrier material conforming to MIL-B-121, type I, grade A, class 2, and the cover secured in place with tape conforming to MIL-T-22085, type I or II. Small openings, except drain valves and drain cocks shall be sealed with tape specified herein.

3.3.1.10 Pressure-regulation system. Interior surfaces of the pressure regulation system requiring a contact preservative in accordance with MIL-P-116, shall be coated with type P-10 preservative, type I, grade 10. Openings into the system shall be sealed with tape conforming to MIL-T-22085, type I or II.

3.3.1.11 Pumps. Interior surfaces of pumps requiring the application of a contact preservative in accordance with MIL-P-116, shall be coated with type P-10 preservative, type I, grade 10. Excess preservative shall be drained and any openings into the pumps shall be sealed with tape conforming to MIL-T-22085, type I or II.

3.3.1.12 Liquid coolant systems. Liquid coolant systems shall be preserved as specified for engine coolant systems in accordance with the level A requirements of MIL-E-10062, using type II, method I for compressors packed in containers and type I, method I for compressors shipped uncrated (mobile).

3.3.1.13 Hose and hose fittings. Hose and hose fittings removed from the compressors shall be preserved in accordance with MIL-H-775, level A. Openings into ends of hoses and into fittings not removed from the compressors shall be sealed with tape conforming to MIL-T-22085, type I or II. Hose on reels shall be secured to prevent the hose from unwinding. Hose not on reels, attached to compressors, shall be coiled to the minimum safe diameter and the coils secured to the compressor with tape specified herein.

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3.3.1.14 Clutches.

3.3.1.14.1 Disk-type (dry). With the cover plates removed and the clutch engaged, all accessible metal interior component of the clutch shall be sprayed with primer conforming to TT-P-664. Cover plates shall be reinstalled. Spring-loaded-type clutches shall be secured in a partially disengaged position. Snap-over-center and toggle-in-type clutches shall be completely disengaged.

3.3.1.14.2 Wet-type. Wet-type clutches, running in oil, shall be disengaged.

3.3.1.15 Enclosed gears. Gears operating on lubricating oil (SAE 10, 30, or 50) shall have the housings filled to the operating level with type P-10 preservative, type I, grade as applicable and the gear controls tagged to indicate: "The preservative oil contained in the gear housing is adequate for operation. Do not drain until the first required lubricant change." Gears operating on gear lubricant (SAE 80 or 90) shall have the housings filled to the operating level with lubricant conforming to MIL-L-2105, grade as applicable, and the gear controls tagged to indicate: "The lubricant contained in the gear housing is adequate for operation. Do not drain until the first required lubricant change." Gears not operating on lubricating oil (SAE 10, 30, or 50) or gear lubricant (SAE 80 or 90) shall have the housings filled to the operating level with the approved lubricant or operating oil, and the gear controls tagged to indicate: "The gear housing is filled with the approved lubricant. Do not drain." Tags specified herein shall conform to UU-T-81, type A, and the information on the tags shall be applied with waterproof ink.

3.3.1.16 Drivebelts and pulleys. Drivebelts shall be removed or released from tension. Unpainted surfaces of pulley grooves shall be coated with a thin film of primer conforming to TT-P-664. Belts removed shall be preserved in accordance with MIL-P-116, method IC-1 or IC-3.

3.3.1.17 Electric motors. Electric motors shall be preserved in accordance with MIL-E-16298, level A, using the alternate method specified for assembled machines, except tape used for sealing openings shall conform to MIL-T-22085, type I or II.

3.3.1.18 Electric wiring systems. Exposed ends of wires, plug openings, sockets, coupling plugs, terminals, and openings into switches and junction boxes shall be covered and sealed with tape conforming to MIL-T-22085, type I or II.

3.3.1.19 Conductor cables. Plugs and receptacles shall be covered and sealed with tape conforming to MIL-T-22085, type I or II. Each cable shall be coiled to not less than 10 times the diameter of the cable and the coils secured with not less than four evenly spaced wraps of tape specified herein.

3.3.1.20 Winterization system. The fuel tank shall be fogged with type P-10 preservative, type I, grade 10 and the excess preservative drained. The threads of the fill caps and drain plugs shall be coated with the preservative specified herein, and the caps and plugs reinstalled. Unpainted exterior metal surfaces of the system, including the burner, that requires the application of a contact preservative in accordance with MIL-P-116, shall be coated with type P-1 preservative. Openings into the system including electric motors and blowers

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shall be covered with barrier material conforming to MIL-B-121, type I, grade A, class 2, and the cover secured in place with tape conforming to MIL-T-22085, type I or II.

3.3.1.21 Instrument panels. All openings into equipment mounted on instrument panels shall be sealed with tape conforming to MIL-T-22085, type I or II. For unboxed (mobile) shipment of compressors (see 3.4.1.2 and 3.4.1.3), compressor instrument panels not protected by a metal housing or cover, shall be protected with a fitted piece of hardboard or plywood and secured in place with tape specified herein.

3.3.1.22 Meters and gages. Meters and gages removed from the compressors shall be individually preserved in accordance with MIL-P-116, method IC-2, using the contractors commercial carton or a close-fitting box conforming to PPP-B-636, class domestic, variety and grade as applicable. Openings into installed meters and gages shall be sealed with tape conforming to MIL-T-22085, type I or II. For unboxed (mobile) shipment of compressors, the dial glass of installed meters and gages shall be protected as specified in 3.3.1.21.

3.3.1.23 Trailer chassis, wheel mountings, and truck chassis. Trailer chassis and wheel mountings shall be preserved in accordance with MIL-STD-281, level A, for boxed shipment (see 3.4.1.1) or for unboxed (mobile) shipment (see 3.4.1.2), as specified. Truck chassis shall be preserved as specified in MIL-STD-281, level A, for unboxed (mobile) shipment (see 3.4.1.3).

3.3.1.24 Fire extinguishers. Unpainted exterior metal surfaces of fire extinguishers requiring the application of a contact preservative in accordance with MIL-P-116 shall be coated with type P-1 preservative. For boxed shipment of the compressors (see 3.4.1.1) the extinguishers shall be placed and secured in their mounting brackets. For unboxed (mobile) shipment of the compressors (see 3.4.1.2 and 3.4.1.3), each fire extinguisher shall be placed in a box conforming to PPP-B-636, W5c. Each box shall be closed and sealed as specified for method V in the appendix to the box specification.

3.3.1.25 Repair parts. The preservative application criteria and applicable method(s) of preservation contained in MIL-P-116 shall be used to preserve the repair parts, unless detailed requirements are specified by the procuring activity.

3.3.1.26 Technical publications. Technical publications shall be preserved in accordance with MIL-P-116, method IC-1 or IC-3.

3.3.1.27 Maintenance tools. Maintenance tools shall be preserved in accordance with the level A preservation and packaging requirements of PPP-P-40.

3.3.1.28 Consolidation.

3.3.1.28.1 Compressor components. For compressors to be packed in wood boxes (see 3.4.1.1), loose components, including those removed during disassembly, shall be consolidated in boxes conforming to PPP-B-636, W5c, W6c or V3c, as applicable to the weight of the components. Each box shall be closed and sealed, as specified for method V in the appendix to the box specification. For compressors to be packed in crates (see 3.4.1.1), and for compressors to be prepared for unboxed (mobile) shipment (see 3.4.1.2 and 3.4.1.3), the loose

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components, the components placed in fiber boxes, and components placed in other containers for unit protection, shall be consolidated in close-fitting boxes conforming to PPP-B-601, domestic type, style optional for crated compressors; and overseas type, style optional, for unboxed (mobile) compressors. For crated shipment of compressors, the boxes shall not be required to be strapped. For unboxed (mobile) shipment of compressors, the boxes shall be closed and strapped in accordance with the appendix to the box specification. Strapping shall conform to ASTM D 3953, type 1 or 2, zinc-coated, size as applicable and ASTM D 4675.

3.3.1.28.2 Repair parts. The repair parts for each compressor shall be consolidated in a container as specified in 3.3.1.28.1

3.3.1.28.3 Maintenance tools. Maintenance tools shall be placed in the toolbox on the compressor when adequate space is available, otherwise the tools shall be consolidated in the container with the repair parts specified in 3.3.1.28.2.

3.3.1.28.4 Technical publications. Technical publications shall be placed in the toolbox on the compressor when adequate space is available, otherwise, the technical publications shall be consolidated in the container with the repair parts specified in 3.3.1.28.2.

3.3.2 Level B. Preservation shall be as specified for level A with the following exceptions:

3.3.2.1 Enclosed gears. The gear housings shall be filled to the operating level with the lubricant recommended for operation and the gears actuated to insure coverage of all interior surfaces with the lubricant. A cloth tag conforming to UU-T-81, type A, shall be attached to the gear controls indicating: "The gear housing is filled to the operating level with the required operating oil."

3.3.2.2 Drivebelts. Drivebelts shall be released from tension.

3.3.2.3 Electric motors. Openings into electric motors shall be sealed with tape conforming to MIL-T-22085, type I or II.

3.3.2.4 Trailer chassis, wheel mountings, and truck chassis. Trailer chassis and wheel mountings shall be preserved in accordance with MIL-V-62038, as level B, for boxed shipment (see 3.4.2.1) or for unboxed (mobile) shipment (see 3.4.2.2), as specified. Truck chassis shall be preserved as specified in MIL-V-62038, level B, for unboxed (mobile) shipment (see 3.4.2.3).

3.3.2.5 Fire extinguishers. For boxed shipment of the compressors (see 3.4.2.1) the fire extinguishers shall be secured in their mounting brackets. For unboxed (mobile) shipment of the compressors (see 3.4.2.2 and 3.4.2.3) the fire extinguishers shall be individually placed in boxed conforming to PPP-B-636, type CF, class domestic, variety SW, grade 125.

3.3.2.6 Consolidation. Consolidation shall be as specified for level A except fiberboard boxes shall be type CF, class domestic, variety SW, grade 175

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and plywood boxes for unboxed (mobile) shipment shall be domestic type, style optional. Box closure shall be in accordance with the appendix to the box specification and strapping may be zinc-coated.

3.3.3 Level C. Each complete compressor and all items issued with the compressor shall be preserved to afford protection against mechanical and physical damage as follows. Items with critical surfaces required for fit or function shall be provided protection by the use of preservatives coatings, volatile corrosion inhibitors, or desiccated packs. Items requiring protecting from physical damage shall be protected by wrapping, pack compartmentalization, or cartonizing of the individual item. Liquid cooling systems shall be filled with a fresh clean solution of 50 percent water and 50 percent ethylene glycol type antifreeze with rust inhibitor, and a tag attached indicating the temperature to which the cooling system can be subjected before damage. All lubrication reservoirs, sumps, etc., shall be filled to the operating level with the grade of military lubricant designated for use in the temperature range at the shipping destination. A tag shall be attached in a conspicuous location to indicate which military lubricant has been used, the temperature range of lubricant used and grade of lubricant used. A deprocessing guide shall be finished indicating in detail the preservation materials to be removed and any other servicing required prior to placing the compressor in operation.

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

3.4.1 Level A.

3.4.1.1 Boxed and crated compressors. Unless otherwise specified (see 3.4.1.2) each complete compressor, components, repair parts, and tools (except truck-mounted compressors), preserved as specified in 3.3, not to exceed the weight limitation of the box shall be packed in a box conforming to PPP-B-601, overseas type, grade B, style optional or MIL-B-26195, type II, style and class optional with cleated plywood superstructure. The contents shall be blocked, braced, and anchored within the box in a manner to prevent free movement or damage, in accordance MIL-STD-1186. Box closure and strapping shall be in accordance with the applicable box specification. Each complete compressor as defined herein, exceeding the weight limitation of the boxes, shall be packed in a crate conforming to MIL-C-104, type I, class 1 or 2, style A. Blocking, bracing, anchoring, closure, and strapping shall be in accordance with crate specification and in accordance with MIL-STD-1186. Strapping for the boxes or the crate shall conform to ASTM D 3953, type 1 or 2, zinc-coated, size as applicable and ASTM D 4675.

3.4.1.2 Wheel-mounted and trailer-mounted compressors. When specified (see 6.2) each complete wheel-mounted and each complete trailer-mounted compressor, with components, repair parts, and tools preserved as specified in 3.3, shall be prepared for unboxed (mobile) shipment. Wheels shall be free to rotate. Consolidated containers shall be positioned on the unit in a manner not to increase cubage or interfere with towing or lifting the unit with slings. Consolidated containers shall be secured to the unit in a manner to prevent separation during handling, shipment, and storage in accordance with the material requirements and anchoring provisions of MIL-STD-1186. Support legs (landing gears) shall be utilized for parking and storage purposes only. For shipment, the trailer front shall be secured and supported by the use of wood cribbing or blocking as applicable.

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3.4.1.3 Truck-mounted compressors. Truck-mounted compressors, components, repair parts and tools preserved as specified in 3.3, shall be prepared for unboxed (mobile) shipment as specified in 3.4.1.2.

3.4.2 Level B.

3.4.2.1 Boxed and crated compressors. Unless otherwise specified (see 3.4.2.2), each complete compressor, components, repair parts, and tools (except truck-mounted compressors), preserved as specified in 3.3, not to exceed the weight limitation of the box shall be packed in a box conforming to PPP-B-601, domestic type, style optional or MIL-B-26195, type I, style and class optional with cleated plywood superstructure. The contents shall be blocked, braced, and anchored within the box in a manner to prevent free movement or damage, in accordance with MIL-STD-1186. Box closure and strapping shall be in accordance with the applicable box specification. Each complete compressor, as defined herein, exceeding the weight limitation of the boxes shall be packed in a crate conforming to MIL-C-3774, nailed assembly, or a crate conforming to MIL-C-52950, type V, style A, class 1. Blocking, bracing, anchoring, closure, and strapping shall be in accordance with the applicable crate specification and appendices thereto and in accordance with MIL-STD-1186.

3.4.2.2 Wheel-mounted and trailer-mounted compressors. When specified (see 6.2), each complete wheel-mounted and each complete trailer-mounted compressor, with repair parts and tools preserved as specified in 3.3, shall be prepared for unboxed (mobile) shipment as specified for level A.

3.4.2.3 Truck-mounted compressors. Each complete truck-mounted compressor, repair parts, and tools, preserved as specified in 3.3, shall be prepared for unboxed (mobile) shipment as specified for level A.

3.4.3 Level C. Each complete compressor and all items issued with the compressor, preserved as specified in 3.3, shall be packed to assure carrier acceptance and safe delivery to destination at lowest ratings in compliance with Uniform Freight Classification rules or National Motor Freight Classification rules; and as a minimum compressors shipped loose or mounted on skids in lieu of being boxed or crated shall be protected with a minimum 6 mil waterproof plastic shroud. The shroud shall be placed over the compressor and secured to the compressor base. Openings in skids shall be a minimum of 3 inches in height to provide access for forklift tines. Support legs of trailer-mounted compressors shall be utilized for packing and storage only and shall not be used for support of the trailer during shipment.

3.5 Marking. In addition to any special marking specified in the contract or purchase order (see 6.2), marking shall be in accordance with MIL-STD-129.

3.6 Depreservation guides. Two depreservation guides shall be prepared. One copy shall be placed in a waterproof envelope marked "Depreservation Guide", and the envelope secured to the compressor in a conspicuous location. The other copy shall be packed with other instructional material and marked to indicate: "A depreservation guide is inside". Unless otherwise specified, "DA Form 2258 - Depreservation Guide for Vehicles and Equipment shall be used (see 6.6).

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3.7 Workmanship. Workmanship shall be such as to provide maximum protection to the compressors by application of the requirements specified herein, 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 or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, 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 supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification 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 acceptance of defective material.

4.1.2 Material inspection. The contractor is responsible for insuring that supplies and materials used are manufactured, examined, and tested in accordance with referenced specifications and standards.

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.

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

4.3.2 Tests. The first article pack of boxed or crated compressors for level A or B shall be tested in accordance with 4.3.2.1 or 4.3.2.2 as applicable to the gross weight of the box or crate. Failure of the applicable test shall be cause for rejection (see 4.3.3).

4.3.2.1 Boxed compressors. Boxed compressors not exceeding 200 pounds gross weight shall be subjected to the free-fall drop test in accordance with FED-STD-101. Boxed compressors exceeding 200 pounds shall be subjected to the pendulum-impact test in accordance with FED-STD-101, except the vertical height of drop shall be 18 inches.

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4.3.2.2 Crated compressors. Crated compressors shall be subjected to the guided-impact test (railroad-car) in MIL-STD-1186, appendix A. The test car shall strike a string of five empty cars with draft gear extended and brakes set, at a speed of not less than 10 miles per hour and not more than 11 miles per hour.

4.3.3 Basis for rejection. Any shifting of contents, visible damage to the contents, or any loose, broken, or displaced anchoring, blocking, or bracing within the container shall be cause for rejection. Rendering of the interior containers, wraps, liners, barriers, or cushioning ineffectual in providing adequate protection to the contents shall be cause for rejection. In addition, when deemed necessary, the compressor shall be subjected to the operational test(s) specified in the compressor and item specification. Any malfunction of the compressor resulting from the first article pack test shall be cause for rejection.

4.4 Quality conformance inspection.

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

- a. The first stage shall include inspection of procedures, methods, materials, containers and interior marking prior to placing in the consolidated containers.
- b. The second stage shall include inspection of closure and marking of the consolidated containers.
- c. The third stage shall include inspection of the arrangement, blocking, bracing, and anchoring of the compressor and consolidated containers in the shipping container.
- d. The fourth stage shall include strapping of shipping containers and the blocking, bracing, anchoring, and securing of the consolidated containers on the unboxed (mobile) units.
- e. The fifth stage shall include inspection of marking on closed shipping containers and marking on unboxed (mobile) units as prepared for shipment.

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

4.4.3 Sampling. Sampling for examination shall be in accordance with MIL-STD-105.

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. Presence of 1 or more defects shall be cause for rejection.

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TABLE I. Classification of defects.

No.	Defect	Level		
		A	B	C
101.	Materials, methods, or containers not as specified. Each incorrect material, method, or container shall constitute one defect (see 3.1, 3.3, 3.4).	X	X	X
102.	Disassembly not as specified (see 3.3.1.1.1, 3.3.2.1).	X	X	-
103.	Matchmarking not as specified (see 3.3.1.1.2, 3.3.2.1).	X	X	-
104.	Marking information on tags not applied with waterproof ink (see 3.3.1.1.2, 3.3.1.5.1, 3.3.1.6.1, 3.3.1.15, 3.3.2.1).	X	X	-
105.	Exterior surfaces not coated with preservative as specified (see 3.3.1.3, 3.3.2.3).	X	X	-
106.	Coated machined surfaces not wrapped or covered (see 3.3.1.3, 3.3.2.3).	X	X	-
107.	Engine and engine accessories not preserved in accordance with the referenced document (see 3.3.1.4, 3.3.2.12).	X	X	-
108.	Compressor lubricating systems not preserved as specified (see 3.3.1.5.1, 3.3.1.6.1, 3.3.2.4).	X	X	-
109.	Compressors valves not preserved as specified (see 3.3.1.5.2).	X	X	-
110.	Air receivers not preserved as specified or drain cocks not left open as specified (see 3.3.1.7, 3.3.2.5).	X	X	-
111.	Air cleaners not preserved as specified (see 3.3.1.8.1, 3.3.1.8.2, 3.3.2.7).	X	X	-
112.	Boxes not closed and sealed as specified (see 3.3.1.8.1, 3.3.1.8.2, 3.3.1.24, 3.3.1.28.1).	X	-	-
113.	Openings into compressors not sealed as specified (see 3.3.1.9, 3.3.2.6).	X	X	-
114.	Pressure-regulation systems not preserved as specified (see 3.3.1.10, 3.3.2.8).	X	X	-
115.	Pumps not preserved as specified or openings into pumps not sealed as specified (see 3.3.1.11, 3.3.2.8).	X	X	-
116.	Liquid coolant systems not preserved in accordance with the referenced document (see 3.3.1.12, 3.3.2.9).	X	X	-
117.	Hoses and fittings remaining on compressors not sealed with tape as specified (see 3.3.1.13).	X	-	-
118.	Hose on reels not secured to prevent unwinding and hose not on reels not coiled as specified (see 3.3.1.13).	X	-	-
119.	Clutches not preserved and clutches not disengaged as specified (see 3.3.1.14.1, 3.3.1.14.2).	X	-	-
120.	Enclosed gears not preserved as specified or not tagged as specified (see 3.3.1.15, 3.3.2.10).	X	X	-
121.	Drivebelts not removed or not released from tension (see 3.3.1.16, 3.3.2.11).	X	X	-
122.	Openings into electric motors not sealed with tape as specified (see 3.3.1.7, 3.3.2.13).	X	X	-
123.	Electric wiring system not protected as specified (see 3.3.1.18).	X	-	-
124.	Plugs and receptacles on conductor cables not covered and sealed with tape as specified (see 3.3.1.19).	X	-	-
125.	Winterization system not preserved as specified (see 3.3.1.20, 3.3.2.14).	X	X	-

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TABLE I. Classification of defects. (continued)

No.	Defect	Level		
		A	B	C
126.	Openings into instrument panels not sealed with tape as specified (see 3.3.1.21, 3.3.2.15).	X	X	-
127.	Instrument glass, meter, or gage glass not protected for unboxed (mobile) compressors as specified (see 3.3.1.21, 3.3.1.22).	X	-	-
128.	Trailer and truck chassis and wheel mountings not preserved in accordance with the referenced document (see 3.3.1.23, 3.3.2.16).	X	X	-
129.	Fire extinguishers not removed and placed in a box for unboxed (mobile) compressors as specified (see 3.3.1.24, 3.3.2.17).	X	X	-
130.	Consolidation not as specified (see 3.3.1.28.1, 3.3.1.28.2, 3.3.1.28.3, 3.3.2.19).	X	X	-
131.	Strapping not as specified (see 3.3.1.28.1, 3.4.1.1).	X	-	-
132.	Wheels not free to rotate on unboxed (mobile) compressors as specified (see 3.4.1.2, 3.4.1.3, 3.4.2.2, 3.4.2.3).	X	X	-
133.	Packing not as specified for level C (see 3.4.3).	-	-	X
134.	Marking illegible, incomplete, missing, or incorrect (see 3.5.1).	X	X	X
135.	Depreservation guides not prepared as specified (see 3.6).	X	X	X
136.	Workmanship not as specified (see 3.7).	X	X	X

5. PACKAGING

(This section not applicable to this specification.)

6. NOTES

6.1 Intended use. It is intended that this specification cover the preservation, packing, and marking requirements of compressors and shall be used for reference in section 5 of commodity and equipment specifications or for direct reference in contracts or orders, or as a guide for the preparation of packaging data sheets to be used in procurement.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- c. Time frame required for submittal of first article pack (see 3.2).
- d. Level of preservation and level of packing required (see 3.3 and 3.4).
- e. Any special marking required (see 3.5).
- f. When wheel-mounted and trailer-mounted compressors are to be shipped unboxed (mobile) (see 3.4.1.2 and 3.4.2.2).
- g. When other than DA Form 2258 is to be used (see 3.6).

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6.3 First article pack. Any changes or deviations of production packs from the approved first article pack will be subject to the approval of the contracting officer. Approval of the first article pack will not relieve the contractor of his obligation to preserve, pack, and mark the compressors in accordance with this specification.

6.4 Degree of contamination of preservative oil. The percentage of contamination contained in preservative lubricating oil which has been used to process lubricating systems of compressors may be determined within practicable limits by use of American Petroleum Institute hydrometers and control specimens of known dilution.

6.5 Depreservation guides. The contracting officer should arrange to furnish the necessary copies of DA Form 2258, when requested by the contractor (see 3.6).

6.6 Environmental. Environmental pollution prevention measures are contained in the material specifications referenced herein. Refer to material specification or preparing activity for recommended disposability methods.

6.7 Subject term (key word) listing.

Marking
Packing
Preservation

6.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:
Army - ME
Navy - YD
Air Force - 99

Preparing activity:
Army - ME
Project 4310-0178

Review activities:
Army - SM
Navy - SH
Air Force - 84

User activity:
Navy - MC

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

RECOMMEND A CHANGE		1. DOCUMENT NUMBER MIL-C-3600E	2. DOCUMENT DATE (YYMMDD) 910115
3. DOCUMENT TITLE Compressors, Rotary, Power-Driven; and Compressors, Reciprocating, Power-Driven: Air and Gas (Except Oxygen and Refrigerant), Packaging Of			
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)			
5. REASON FOR RECOMMENDATION			
6. SUBMITTER		7. DATE SUBMITTED (YYMMDD)	
a. NAME (Do not fill in)		b. ORGANIZATION	
c. ADDRESS (Include Zip Code)		d. TELEPHONE (Include Area Code)	(1) Commercial
		(2) AUTOVON (If applicable)	
8. PREPARING ACTIVITY		b. TELEPHONE (Include Area Code)	
a. NAME		(1) Commercial	(2) AUTOVON
		(703) 664-5717	354-5717
c. ADDRESS (Include Zip Code)		IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:	
US Army Belvoir RDE Center		Defense Quality and Standardization Office	
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Ft. Belvoir, VA 22		AUTOVON 289-2340	