

NOTICE  
OF VALIDATION

INCH POUND  
MIL-H-43895B  
NOTICE 1  
18 DECEMBER 1992

MILITARY SPECIFICATION

HEATERS, HOT WATER BOOSTER, ELECTRIC; SINK, SANITIZING

MIL-H-43895B, dated 24 June, 1986, has been reviewed and determined to be valid for use in acquisition.

Custodians:

Army - GL  
Navy - YD  
Air Force - 99

Preparing activity:

Navy - SA

AMSC N/A

FSC 7320

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

MIL-H-43895B  
 INT. AMENDMENT 2(SH)  
 18 August 1992  
 USED IN LIEU OF  
 AMENDMENT 1  
 21 March 1988

## MILITARY SPECIFICATION

### HEATERS, HOT WATER BOOSTER, ELECTRIC; SINK, SANITIZING

This amendment forms a part of Military Specification MIL-H-43895B, dated 24 June 1986, and is approved for use by all Departments and Agencies of the Department of Defense.

#### PAGE 2

2.1, under "Standards/Military": add the following:

"MIL-STD-167/1 - Mechanical Vibration of Shipboard Equipment Type I - Environmental and Type II - Internally Excited.

MIL-STD-461 - Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference.

MIL-STD-462 - Electromagnetic Interference Characteristics, Measurement of

MIL-STD-1472 - Human Engineering Design Criteria for Military Systems, Equipment and Facilities."

#### PAGE 3

Add the following new paragraph:

"3.1.1 Human Factors Criteria (for Navy use only). Human factors engineering criteria, principles and practices, as defined in MIL-STD-1472, shall be incorporated into the design of the hot water booster heaters. The equipment shall be designed such that all maintenance and operational tasks shall permit safe and efficient performance by the 5th percentile female through the 95th percentile male as defined in MIL-STD-1472. Particular attention shall be given to the ease of access for the removal and replacement of the heating elements. All controls, valves, gauges, and indicator lights shall be selected and integrated into the design of the heaters so as to meet the application requirements of MIL-STD-1472 and be clearly and appropriately labeled to identify function. Warning plates, where specified shall have a white inscription on a red background and shall clearly identify the hazard at hand. The clearance or free area required around an item shall permit an individual with the applicable 5th to 95th percentile body dimensions and physical capabilities as defined in MIL-STD-1472, to safely operate, maintain, remove or replace that item. When establishing accessibility requirements, both physical and visual access must be provided, along with access for any tools, test equipment needed and parts replacement. While inspecting for defects and performing tests, the equipment shall adhere to the human factors engineering considerations listed herein."

MIL-H-43895B  
INT. AMENDMENT 2(SH)

PAGE 3

3.4, line 10, after "long": add "8".

PAGE 5

3.4.3.3.1, line 2: Delete "yellow" and substitute "green".

PAGE 6

Add the following new paragraph:

\* "3.6.2 High voltage labels. When specified for shipboard use (see 6.2), a Danger High Voltage label shall be affixed to the equipments outer case assembly, on or adjacent to each service access cover and adjacent to one of the fasteners which secures the cover. A high voltage warning label shall also be placed near the high voltage components inside the equipment. The label shall include but is not limited to the following warnings:

- a. A warning of high voltage.
- b. Power supply must be disconnected before using.
- c. Access covers must be in place during use.
- d. Servicing should be done by authorized individuals."

PAGE 7

Add the following new paragraphs:

"3.9 Environmental suitability. When specified for shipboard use (see 6.2), hot water booster heaters shall be capable of withstanding ship's vibration and motion. Controls, switches, moving parts and electrical circuits shall operate under shipboard conditions without malfunction, binding, excessive looseness, or damage when tested as specified in 4.4.2.

3.10 Electromagnetic compatibility. When specified (see 6.2), the units shall be designed and equipped for electromagnetic compatibility in accordance with the requirements of MIL-STD-461, class A4 for surface ships and class A5 for submarines. The equipment shall meet the emission and susceptibility requirements for CE01, CE03, and RE02. (see 4.4.3)."

PAGE 9

4.2.4, line 1, after "4.4.1": Add ", and when required for shipboard use, 4.4.2 and 4.4.3".

line 5, after "4.4.1": Add ", and when applicable 4.4.2 and 4.4.3".

PAGE 10

4.4.1, last line on the page: Delete "yellow" and substitute "green".

MIL-H-43895B  
INT. AMENDMENT 2(SH)

PAGE 11

Add the following new paragraphs:

"4.4.2 Shipboard environmental tests. The following tests are required for hot water booster heaters for shipboard use. Failure to operate satisfactorily during or at the conclusion of the tests, or evidence of breakage or excessive looseness of parts shall constitute failure of the test.

(a) Inclined test. The hot water booster heater shall be attached to a sink and shall be operated with the sink inclined at an angle of 15 degrees each side of the vertical in each of two vertical planes at right angles to each other. The sink shall be filled and heater energized to heat water to a minimum of 180°F. The heater shall be operated for 30 minutes in each inclined direction. The temperature shall be monitored to determine conformance to the requirements of 3.4.3.5. The sink and waste collector reservoir shall then be drained. The waste reservoir discharge valve, operating handle, indicator lights and empty reservoir cutout shall be checked for proper operation and conformance to 3.4.2.1, 3.4.3.2.1, and 3.4.3.3.1. Observations shall be made to determine conformance with leak tightness requirements of 3.4. Failure to meet these requirements shall constitute failure of the test.

(b) Vibration test. The hot water booster heater shall be attached to a sink in accordance with manufacturer's instructions. The sink shall be filled with water and the heater, under normal operating conditions, shall be tested in accordance with requirements for MIL-STD-167/1, Type I equipment. Failure of the heater to perform its function during and after testing shall constitute failure of this test.

4.4.3 Electromagnetic Interference Tests. When required, the unit shall be tested by the contractor in accordance with test methods CE01, CE03 and RE02 of MIL-STD-462. The contractor shall furnish written certification that the equipment meets MIL-STD-461 requirements. Nonconformance with requirements specified shall constitute failure of this test."

PAGE 12

6.2d Delete "and 3.7" and substitute ",3.7, 3.9 and 3.10".

"6.4 Technical manuals. The requirement for technical manuals should be considered when this document is cited on a contract. If technical manuals are required, a contract exhibit must be prepared to fully describe statement of work criteria and delivery instructions, and cite the applicable technical manual. The technical manuals must be acquired by separate Contract Line Item Number (CLIN) in the contract."

MIL-H-43895B  
INT. AMENDMENT 2(SH)

"The margins of this amendment are marked with an asterisk or vertical lines to indicate where changes (additions, modifications, corrections, deletions) from the previous amendment were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous amendment."

Preparing Activity:  
Navy - SH  
(Project No. 7320-N896)

MIL-H-43895B  
AMENDMENT-1  
21 March 1988

MILITARY SPECIFICATION

HEATERS, HOT WATER BOOSTER, ELECTRIC; SINK, SANITIZING

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PAGE 2

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- MIL-STD-461 - Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference.
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- MIL-STD-1472 - Human Engineering Design Criteria for Military Systems, Equipment and Facilities."

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MIL-H-43895B  
Amendment-1

PAGE 3 (cont'd)

tools, test equipment needed and parts replacement. While inspecting for defects and performing tests, the equipment shall adhere to the human factors engineering considerations listed herein."

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3.10 Electromagnetic compatibility. When specified (see 6.2), the units shall be designed and equipped for electromagnetic compatibility in accordance with the requirements of MIL-STD-461, class A4 for surface ships and class A5 for submarines. The equipment shall meet the emission and susceptibility requirements for CE01, CE03, and RE02. (see 4.4.3)."

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PAGE 11 (cont'd)

The heater shall be operated for 30 minutes in each inclined direction. The temperature shall be monitored to determine conformance to the requirements of 3.4.3.5. The sink and waste collector reservoir shall then be drained. The waste reservoir discharge valve, operating handle, indicator lights and empty reservoir cutout shall be checked for proper operation and conformance to 3.4.2.1, 3.4.3.2.1, and 3.4.3.3.1. Observations shall be made to determine conformance with leak tightness requirements of 3.4. Failure to meet these requirements shall constitute failure of the test.

b. Vibration test. The hot water booster heater shall be attached to a sink in accordance with manufacturer's instructions. The sink shall be filled with water and the heater, under normal operating conditions, shall be tested in accordance with requirements for MIL-STD-167/1, type I equipment. Failure of the heater to perform its function during and after testing shall constitute failure of this test.

4.4.3 Electromagnetic interference tests. When required for shipboard use, the unit shall be tested by the contractor in accordance with test methods CE01, CE03 and RE02 of MIL-STD-462. The contractor shall furnish written certification that the equipment meets MIL-STD-461 requirements. Nonconformance with requirements specified shall constitute failure of this test."

6.2d Delete "and 3.7" and substitute ", 3.7, 3.9 and 3.10".

## Custodians:

Army - GL  
Navy YD  
Air Force - 99

## Preparing activity:

Army - GL  
Project No. 7320-0839

## Review activities:

Army - MD, TS  
Navy - SA, SH  
Air Force - 84  
DLA - GS



MIL-H-43895B  
24 June 1986  
SUPERSEDING  
MIL-H-43895A  
25 August 1976

## MILITARY SPECIFICATION

### HEATERS, HOT WATER BOOSTER, ELECTRIC; SINK, SANITIZING

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

#### 1. SCOPE

1.1 Scope. This document covers electric water heaters designed to increase a sinks hot water temperature to 180 deg. F.

1.2 Classification. Heaters shall be of the following types and power ratings (see 6.1 and 6.2).

<u>Type</u>	<u>Power rating (kilowatts)</u>
Direct current (dc)	6
Alternating current (ac)	3, 4.5, 6, 9

#### 2. APPLICABLE DOCUMENTS

2.1 Government documents. Unless otherwise specified, the following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this document to the extent specified herein.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S Army Natick Research, Development and Engineering Center, Natick, MA 01760-5014 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 7320

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MIL-H-43895B

## SPECIFICATIONS

### FEDERAL

PPP-B-636 - Boxes, Shipping, Fiberboard

### MILITARY

MIL-L-35078 - Loads, Unit: Preparation of Semiperishable  
Subsistence Items; Clothing, Personal Equipment  
and Equipage: General Specification For

## STANDARDS

### MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by  
Attributes  
MIL-STD-129 - Marking for Shipment and Storage  
MIL-STD-130 - Identification Marking of US Military Property  
MIL-STD-255 - Electric Voltages Alternating and Direct Current

(Copies of documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

- \* 2.2 Other publications. Unless otherwise specified, the following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this document to the extent specified herein.

### AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 167 - Stainless and Heat-Resisting Chromium-Nickel Steel  
Plate, Sheet and Strip  
D 3951 - Standard Practice for Commercial Packaging

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

### UNDERWRITERS LABORATORIES, INC. (UL)

UL 174 - Household Electric Storage-Tank Water Heaters  
UL 499 - Electric Heating Appliances

(Application for copies should be addressed to the Underwriters Laboratories, Inc., 333 Pfingsten Rd., Northbrook, IL 60062.)

MIL-H-43895B

(Technical society and technical association documents are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

- \* 2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this document shall take precedence. Nothing in this document, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 Standard product. The heaters shall, as a minimum, be in accordance with the requirements of this document and shall be the manufacturer's standard commercial product with any added features needed to comply with the requirements of this document. Modifications to add features shall not incorporate different parts unless such parts are used on other current commercial models. Standard or modified commercial products furnished in accordance with this document shall be identifiable by all regular manufacturer's or commercial service organizations servicing the brand involved. Service organizations shall be capable of providing complete parts and repair services on models furnished to the Government consistent with their normal commercial practices.

- \* 3.2 Codes and standards. The heaters shall comply with the applicable requirements of UL 174 or UL 499 (see 4.1.2.1).

- \* 3.3 Materials. Materials shall be as specified herein. Materials not definitely specified shall be of the quality normally used by the manufacturer in his standard heater provided the completed item complies with all provisions of this document. Recycled material may be used (see 6.3).

3.3.1 Stainless and heat-resisting steel sheet, plate, and strip. Stainless and heat-resisting steel sheet, plate, and strip shall conform to type 302 or 304 of ASTM A 167.

3.4 Design and construction. The sink heater shall consist of a water heating reservoir, a waste collecting reservoir, controls, safety device(s), and intake and outlet sink plumbing connections. The heater shall be designed to be securely mounted to the underside of the sink. The heater shall be designed to boost the temperature of 140 deg. F water to a minimum of 180 deg. F and shall function by means of the sink water circulating through the heating reservoir and back to the sink by convection currents. The water heating reservoir shall be filled with water, even when the sink is drained, and there shall not be any leakage when tested as specified in 4.4.1. Maximum overall dimensions, excluding plumbing fittings, shall be 18 inches long, inches wide, and 10 1/4 inches high.

3.4.1 Sink connections. Intake and outlet sink plumbing connections shall be provided for attaching the heater to the sink. Overall height of connections

MIL-H-43895B

shall not exceed 2 7/8 inches when installation to the sink is completed. Connections shall be along the center top of the unit.

3.4.2 Waste collecting reservoir. A waste collecting reservoir, adjacent to the water heating reservoir, shall be provided to remove and trap waste particles from the main stream of the circulating water.

- \* 3.4.2.1 Waste outlet. The waste reservoir shall be fitted with a quick opening discharge valve for the purpose of draining the waste reservoir without draining the heater reservoir. The valve operating handle shall be readily accessible to the operator when facing the front of the heater. If the point of discharge of the discharge valve is a floor drain, there shall be an air gap or other backflow prevention device between the valve and drain.
- \* 3.4.3 Electrical characteristics. Unless otherwise specified (see 6.2), the heaters shall operate on specified nominal system voltages of 120/208, 120/240 or 450-480 volts, 50/60 hertz (Hz), except that for dc operation the heater shall be 6 kW, with minimum 230 volts dc (vdc). The heater control system shall operate on nominal system voltages of 120, 208-240 volt ratings in ac. For line voltages over 240 volts ac (vac), the control circuit transformer shall be used to reduce the control voltage to 240 volts or 120 volts. Heaters designed for use on utilization equipment having nominal voltages of 230 or 115 vdc ratings shall have a 120 vac, 50/60 Hz control circuit. Nominal system voltages and utilization equipment nominal voltages shall be as specified in MIL-STD-255. When specified for shipboard installation (see 6.2), all electrical equipment shall be designed for operation on an ungrounded electrical system, but shall operate satisfactorily in accordance with this document without hazard to personnel or equipment in event of an accidental ground on any conductor. When specified for Naval shipboard installation (see 6.2), and except direct current applications, the heater shall operate on 440 vac, 3 phase, with the load balanced between phases.

3.4.3.1 Control system. The control system shall consist of the contactors, relays, thermostats, and indicators necessary to provide temperature control and indication of operation.

3.4.3.2 Heating elements. The heating elements shall be of the type and power rating specified (see 1.2 and 6.2). Heating elements shall be the sheathed corrosion-resistant type installed in the heating reservoir and shall be removable for replacement.

- \* 3.4.3.2.1 Empty waste collector reservoir cutout. An electrical cutout, with manual reset, shall be provided to prevent heating element damage when the waste collecting reservoir is partially or completely empty of water.

3.4.3.3 Controls. The ON-OFF switch and indicator lights shall be mounted on the front of the heater, while the contactors, relays, and electrical terminal block shall be located in the base of the heater.

## MIL-H-43895B

3.4.3.3.1 Temperature indicator. The sink heater shall be provided with two indicator lights and an integral temperature indicator. A yellow indicator light shall indicate when the unit is energized, and a red indicator light shall indicate that the sink or reservoir is dry or that water temperature has exceeded 205 deg. F, when tested as specified in 4.4.1. A label describing the function of the indicator lights shall be mounted next to the lights. The integral temperature indicator shall indicate when the water in the sink is at or above a temperature of 180 deg. F.

3.4.3.3.2 ON-OFF switch and warning plate. An ON-OFF switch for energizing the unit shall be provided except for shipboard dc operation (see 3.4.3.3.3). The switch shall break all legs of the control circuit when in the "OFF" position. A warning plate, positioned adjacent to the ON-OFF switch, shall warn against turning the unit on without water in the sink. The warning plate shall be marked and attached in a permanent manner.

3.4.3.3.3 Control box. For shipboard dc operation (see 6.2), a separate control box shall be provided for installation near the sink where the heating unit is mounted. The control box shall contain a water-resistant, circuit breaker type ON-OFF switch and a warning plate as specified in 3.4.3.3.2, indicator lights and labels as specified in 3.4.3.3.1, contactor, relay, and electrical terminal block. An electrical cable not less than 8 feet long shall connect the control box with the sink heater.

3.4.3.4 High temperature cutout. A high temperature cutout, with manual reset, shall be provided that, when tested as specified in 4.4.1, shall open the power circuit to the heaters and prevent overheating damage when the water temperature has reached 205 deg. F, or when the sink is dry (without water). This cutout may be combined with the cutout specified in 3.4.3.2.1, provided that both functions can be accomplished.

\* 3.4.3.5 Thermostat. The thermostat installed on the unit shall be capable of automatically controlling the temperature of the water in the sink between 180 deg. F and 195 deg. F. When tested as specified in 4.4.1, the sink water shall be maintained in this temperature range for 4 hours. A means shall be provided for adjusting the thermostat setting from the front of the heater unit.

3.5 Operation. Unless otherwise specified (see 6.2), the heater when attached to a sink (see Table I) shall be capable of heating 140 deg. F water to 170 deg. F in 45 minutes or less when tested as specified in 4.4.1.

MIL-H-43895B

TABLE I. Heater rating - water volume

Heater rating	Volume of water to be heated
3 kW	Up to 5,000 cubic inches
4.5 kW	5,001 to 6,500 cubic inches
6 kW	6,501 to 11,500 cubic inches
9 kW	11,501 to 18,000 cubic inches

- \* 3.6 Data name plate. The heaters shall be furnished with a data name plate in accordance with the applicable requirements of MIL-STD-130 except the requirements for (a) methods of applying, (b) identification tags, (c) information not required, and (d) optional marking information shall not apply. The data name plate shall be made of minimum 20 gage corrosion-resisting metal, and attached to heaters by rivets, screws, or by welding in such a manner as to meet the applicable National Sanitation Foundation requirements for this equipment. The plate shall bear the following information which shall be stamped, engraved, or applied by photosensitive means:

National stock number  
 Acquisition instrument identification number  
 Document data  
 Manufacturer's name, address, and telephone number  
 Supplier's name, address, and telephone number (list only if different from manufacturer)  
 Manufacturer's model number  
 Government approved manual number (see 6.2)

Each data name plate and precaution plate (see 3.6.1) shall be placed so as to be readily visible to the operator during normal generation and use and so as not to adversely affect the life utility of the heater.

3.6.1 Precaution plate. The precaution plate shall be fastened to the outside front of the heater. The plate shall be of sufficient overall size to contain, in legible characters, the following:

WARNING

180 deg. F WATER TEMPERATURE

- \* 3.7 Finish. Heaters shall be smooth on all surfaces and edges and shall be free from discoloration, rust, or stains. The heater shall be finished in accordance with the manufacturer's standard practice. For Naval shipboard use (see 6.2), heaters shall be constructed with stainless steel body and base.

MIL-H-43895B

3.8 Workmanship. All components and assemblies of the heater shall be free from dirt and other harmful extraneous material, burrs, slivers, rough die marks, tool and grind marks, dents, and cracks. Castings, molded parts, and stampings, if used, shall be free of sand, fins, pits, blow holes, and sprues. External surfaces shall be free from sharp edges and sharp corners.

3.8.1 Metal fabrication. Metal used in the fabrication of the heater shall be free from kinks. Forming and shearing shall not cause damage to the metal.

3.8.2 Welding. The surfaces of parts to be welded shall be free from rust, scale, paint, grease, and other foreign matter. Welds shall be smooth and free of cracks, burn holes, undercuts, and incomplete fusion. All scale shall be removed from the finish weld area.

3.8.3 Fastening devices. Holes shall have burrs removed. Threaded fasteners shall not be broken, cracked, or stripped and shall be drawn tight. A locking device shall be used on all bolts. Rivets shall fill the hole completely, and the heads shall be in full contact with the surface of the member and concentric with the hole, when applicable.

#### 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 as specified herein. Except as otherwise specified in the contract or 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 assure that supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must 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 assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance 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 Code and standard compliance. Prior to commencing production, the contractor shall submit to the contracting officer or his authorized representative satisfactory evidence that the heaters he proposes to furnish under this document meet the applicable requirements of UL as specified in 4.1.2.1.

4.1.2.1 UL. Acceptable evidence of meeting the applicable requirements of UL 174 or UL 499 shall be the UL label, the UL listing mark, or a certified test

## MIL-H-43895B

report from a recognized independent testing laboratory acceptable to the Government, indicating that the offered heater conforms to UL 174 or UL 499

4.2 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

4.2.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this document or applicable purchase document.

- \* 4.2.2 End item visual examination. The end item shall be examined for the defects listed in Table II. The lot size shall be expressed in units of heaters of one type offered for inspection at one time. The sample unit shall be one completely assembled sink heater. The inspection level shall be S-2 and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 6.5.

TABLE II. End item visual defects

Examine	Defect
Finish	Evidence of discoloration, rust, pits, or stains
Construction and workmanship (general)	Any rough or sharp edges, burrs, slivers, scratches, rough die marks, gouges, pits, rust, or scale Any component missing Any component fractured, buckled, bent, punctured, malformed, or damaged Plumbing connections not as specified Waste outlet and valve operated device not as specified
Controls	Missing or defective switches, lights, thermostats, or controls Indicator lights not as specified, not labeled Control box not remotely mountable with 8-foot cord (Navy use) Warning plate missing, not marked and attached permanently Thermostat not provided or means for adjustment from front of heater unit not provided
Welding and brazing (when applicable)	Missing; burn holes, cracked, severe undercut, porous, fractured or otherwise not fused, not ground and polished smooth, does not blend smoothly with adjacent surfaces Scale or flux not removed



MIL-H-43895B

TABLE II. End item visual defects (cont'd)

Examine	Defect
Threaded components	Missing, broken, stripped, or fractured Loose, not seated properly Lockwashers or other types of locking devices not used with bolts Missing or defective fittings, piping valves, or hardware
Data name and precaution plates	Omitted or not a specified Information incomplete or illegible Not located so as to be readily visible to the operator

4.2.3 End item dimensional examination. The end item shall be examined for the dimensions specified in 3.4. Any dimension not within the specified tolerance shall be classified as a defect. The lot size shall be expressed in units of heaters of one type. The sample unit shall be one completely assembled sink heater. The inspection level shall be S-2 and the AQL, expressed as defects per hundred units, shall be 4.0.

4.2.4 End item testing. The heaters shall be tested as specified in 4.4.1. The lot size shall be expressed in units of heaters of one type. The sample unit shall be one completely assembled sink heater. Sampling for tests shall be performed on each lot using an inspection level of S-2. Failure of a sample unit to pass any test in 4.4.1 shall be cause for rejection of the lot.

4.2.5 Packaging examination. The fully packaged end items shall be examined for the defects listed in Table III. The lot size shall be expressed in units of containers. The sample unit shall be one shipping container fully packaged. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

TABLE III. Packaging defects

Examine	Defect
Marking (exterior and interior)	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application
Materials	Any component missing, damaged, or not as specified

MIL-H-43895B

TABLE III. Packaging defects (cont'd)

Examine	Defect
Workmanship	Inadequate application of components, such as incomplete sealing or closure of flap, improper taping, loose strapping, or inadequate stapling Bulged or distorted container

4.3 Certification compliance examination. Certifications, certified test reports, or listing marks for codes and standards, as applicable, that are submitted as proof of compliance with the document requirements shall be examined and validated.

4.4 Methods of inspection. Tests shall be conducted with the heater connected to the appropriate power source (see 3.4.3 and 6.2).

- \* 4.4.1 Functional test. A heater unit shall be attached to a sink (see table I) or tank in accordance with the manufacturer's instructions. The sink connections shall be measured for conformance to 3.4.1. Nonconformance with 3.4.1 shall constitute failure of this test. Three thermocouples shall be located in the sink to be tested, one to be located at a random location near the back of the sink and approximately 2 inches below the water surface; one to be geometrically centered in the sink at a distance of half the depth; and one to be located at random near the front of the sink and approximately 2 to 4 inches above the sink bottom. The sink shall then be filled with 140 deg. F water to within 2 inches of the sink top and the heating unit turned on. The maximum time required for the temperature of any one of the three thermocouples to reach 170 deg. F shall not exceed 45 minutes. The unit shall continue to heat until the water in the sink reaches a temperature of 180 deg. F or more. The thermostat may be adjusted at this time to effect a minimum temperature of 180 deg. F. when this temperature is reached, the unit shall be operated for an additional 4 hours, and the temperature shall be monitored to determine conformance with the requirements 3.4.3.5. The sink shall be drained until the water is approximately 6 inches deep, the thermostat bypassed so the heating element is constantly on, and the remaining immersed thermocouples monitored to check that the high temperature cutout shuts off the unit at a water temperature of 205 deg. to 210 deg. F to determine conformance with 3.4.3.4. The sink and the waste collector reservoir shall then be drained, the high temperature cutout reset, and the unit energized to test the empty reservoir cutout to determine conformance with 3.4.3.2.1. When the waste reservoir is being drained to test the high temperature cutout, proper operation of the waste reservoir discharge valve and its operating handle shall be checked to determine conformance with 3.4.2.1. During this test, the indicator lights shall be checked for proper operation, and observations shall be made to determine conformance with leak tightness requirements of 3.4. To determine conformance with 3.4.3.3.1, the following checks shall be made: the yellow indicator light energizes when the unit is on,

## MIL-H-43895B

integral temperature indicator indicates the water rinse temperature, the red indicator light energizes, and the unit shuts off before the water reaches a heavy boil. Nonconformance with 3.4.3.3.1 shall constitute failure of this test.

## 5. PACKAGING

5.1 Preservation. Each heater shall be cleaned, preserved, and cushioned to protect against corrosion, deterioration, and physical damage.

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

5.2.1 Level A packing. Each water heater shall be packed in a fiberboard shipping container conforming to style RSC, type SF, grade V2s of PPP-B-636. Cushioning shall be used to provide a minimum 1-inch clearance between the top, ends, and sides of the container and the protruding parts of the heater. Each shipping container shall be closed in accordance with method III, waterproofed in accordance with method V, and reinforced as specified in the appendix of PPP-B-636. Shipping containers shall be arranged in unit loads in accordance with MIL-L-35078 for the type and class of load specified (see 6.2). Strapping shall be limited to nonmetallic strapping, except for type II, class F loads.

5.2.2 Level B packing. Each water heater shall be packed in fiberboard shipping container conforming to style RSC, type CF or SF, class weather-resistant, variety and grade optional, of PPP-B-636. Cushioning shall be used to provide a minimum 1-inch clearance between the top, ends, and sides of the container and the protruding parts of the heater. Each shipping container shall be closed in accordance with method II of the appendix of PPP-B-636.

\* 5.2.3 Commercial packing. Refrigerator components shall be packed in accordance with ASTM D 3951.

5.3 Marking. In addition to any special marking required by the contract, or purchase order, shipping containers shall be marked in accordance with MIL-STD-129 or ASTM D 3951, as applicable.

## 6. NOTES

6.1 Intended use. The heater is intended for use in kitchen areas for the last (rinse) sink of a three or four compartment sink or utensil washing operation to maintain sanitizing rinse water at a minimum of 180 deg. F. The following may be used as a guide in sizing heaters for a particular sink:

MIL-H-43895B

<u>Sink size</u>	<u>Heater recommended</u>
Under 20 gallons	3 kW
20 to 30 gallons	4.5 kW
31 to 50 gallons	6 kW
51 to 80 gallons	9 kW

\* 6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type and kilowatt rating required (see 1.2 and 3.4.3.2).
- c. Electrical characteristics when other than specified (see 3.4.3).
- d. When heater is for Naval shipboard installation (see 3.4.3 and 3.7).
- e. When heater is required for dc operation (see 3.4.3.3.3).
- f. When heating capability is other than specified (see 3.5).
- g. Government approved manual number (see 3.6).
- h. Selection of the applicable level of packing (see 5.2).
- i. Type and class of unit load required (see 5.2.1).

\* 6.3 Recycled material. The contractor is encouraged to use recycled material, provided that it meets the requirements of this document (see 3.3).

6.4 Changes from previous issue. The margins of this document are marked with an asterisk (\*) to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only, and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content, as written, irrespective of the marginal notations and relationship to the last previous issue.

Custodians:

Army - GL  
Navy - YD  
Air Force - 99

Preparing activity:

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