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F-B-2835
April 28, 1995
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SUPERSEDING
MIL-B-16220F
25 August 1988

FEDERAL SPECIFICATION

# BOILER, STEAM, LOW PRESSURE, FIRETUBE

This specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

## 1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the requirements of light-oil fired, low pressure steam, vertical firetube boilers.

1.2 Classification. The boilers covered by this specification shall be of the following sizes as specified (see 6.2):

Sizes.

Size 1 - Up to 320,000 British thermal units per hour (Btu/hr) (93,782.75 watt (W)), output capacity.

Size 2 - 320,001 to 2,000,000 Btu/hr (93,783.05 to 586,142.2 W), output capacity.

1.2.1 Part numbers. The specification number and size are combined to form the specification part numbers for the firetube steam boilers covered by this specification (see 6.6). The part numbers for the firetube steam boilers are established as follows:

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                                FB2835       X         XXX
Specification number------------*            *          *
Size ------------------------------------------*          *
Output capacity in 1000 Btu/h (293 W) ---------------*
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AMSC N/A FSC 4520

## 2. APPLICABLE DOCUMENTS

### 2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks 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).

Federal Specification

VV-F-800 - Fuel Oil, Diesel.
F-R-2864 - Regulators, Boiler-Feed Water, Automatic.

Military Specifications

MIL-V-173 - Varnish, Moisture and Fungus Resistant (For Treatment of Communications, Electronics and Associated Equipment)
MIL-P-551 - Pipes and Elbows, Air Conditioning-Heating.
MIL-B-3180 - Boilers and Related Equipment, Packaging of.
MIL-T-5624 - Turbine Fuel, Aviation, Grades JP-4 and JP-5.
F-R-2864 - Regulators, Boiler-Feed-Water, Automatic
MIL-B-18796 - Burners, Single: Oil, Gas, and Gas-Oil Combination for Packaged Boilers (320,001 to 125,000,000 Btu/hr Thermal Output Capacity).
MIL-B-18797 - Burners, Single: Light Oil, Gas, and Light Oil-Gas Combination for Packaged Heating Boilers (Up to 320,000 Btu/hr Thermal Output Capacity).

Federal Standard

FED-STD-123 - Marking for Shipment (Civil Agencies)

Military Standards

MIL-STD-209 - Slinging and Tiedown Provisions for Lifting and Tying Down Military Equipment
MIL-STD-461 - Control of Electromagnetic Interference Emissions and Susceptibility, Requirements for the
MIL-STD-462 - Electromagnetic Interference Characteristics, Measurement of
MIL-STD-129 - Marking for Shipment and Storage

(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 Other publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR MECHANICAL ENGINEERS (ASME)

Boiler and Pressure Vessel Code.
Section II - Ferrous Materials.
Section IV - Heating Boilers.

(Application for copies should be addressed to the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

C24 - Pyrometric Cone Equivalent (PCE) of Fireclay and High Alumina Refractory Materials.
D396 - Fuel Oils.

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

FACTORY MUTUAL ENGINEERING CORPORATION (FM)

Factory Mutual Approval Guide.

(Application for copies should be addressed to the Factory Mutual Engineering Corporation, 1151 Boston-Providence Turnpike, Norwood, MA 02062.)

HYDRONICS INSTITUTE (HI)

Testing and Rating Standard for Heating Boilers.

(Application for copies should be addressed to the Hydronics Institute, 35 Russo Place, Berkeley Heights, NJ 07922.)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

70 - National Electrical Code.

(Application for copies should be addressed to the National Fire Protection Association, Battery March Park, Quincy, MA 02269.)

UNDERWRITERS LABORATORIES INC. (UL)

UL-353 - Limit Controls.
UL-726 - Standard for Safety Oil-Fired Burner Assemblies.

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

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

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 specification takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Description. The boiler shall be a light-oil fired, vertical firetube, packaged-type low pressure steam boiler.

3.2 Codes and standards. The boiler shall conform to the requirements of UL-726 and of the ASME Boiler and Pressure Vessel Code (hereinafter referred to as the ASME Code), Section IV as applicable.

3.3 Applicability. Details for equipment construction, design, and performance covered by this specification shall be supplementary to the requirements of the standards cited in 3.2 and compliance with the approval under the UL or ASME standard shall not relieve the supplier of the responsibility for meeting the requirements of this specification.

3.4 First article. When specified in the contract or purchase order (see 6.2), the contractor shall furnish one boiler of the size specified for first article inspection and approval (see 4.2.1 and 6.2).

3.5 Standard commercial product. The boiler shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification but which are a part of the manufacturer's standard commercial product, shall be included in the boiler being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs or brochures, and represents the latest production model.

3.5.1 System of measurement. The dimensions used in this specification are not intended to preclude the use of the metric system of measurement in the fabrication and production of the material, individual parts, and the finished product, provided form, fit, and function requirements are satisfied.

3.6 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 of 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.

3.7 Interchangeability. All units of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to insure interchangeability of component parts, assemblies, accessories, and spare parts.

3.8 Design. The Size 1 boiler shall be designed to produce steam up to 320,000 Btu/hr (93,782.75 W) as specified (see 6.2), at an output pressure not greater than 15 psig (103.42 kPa (gage)) in accordance with the ASME Code. The Size 2 boiler shall be designed to produce steam from 320,001 to 2,000,000 Btu/hr (93,782.70 to 586,140 W) as specified (see 6.2), at an output pressure not greater than 15 psig (103.42 kPa (gage)) in accordance with the ASME Code.

3.9 Construction. The boilers shall be constructed to withstand the normal strains, jars, and vibrations incidental to shipping, storage, and installation.

3.9.1 Combustion chamber. The boiler shall be furnished with a combustion chamber that is water-cooled on the top and sides. The combustion chamber shall be of all-welded, pressure-tight, steel construction. Refractory lined fireboxes shall be lined with a preformed, castable, or plastic refractory having a Pyrometric Cone Equivalent of not less than 32, as determined by ASTM C24. Refractory brick shall not be acceptable. Adequate access to the combustion chamber shall be provided to permit replacement of the refractory in cleaning of the lower tube sheet. Unlined furnaces will be acceptable on wet-base boilers provided they are constructed of stainless steel having a chromium content of not less than 22 percent such as Types 309 or 310 stainless steel as specified in the ASME Code, Section II.

3.9.2 Tubes. Firetubes shall be steel and shall be in accordance with the ASME Code.

3.9.3 Jacket and insulation. All exterior surfaces of the boiler including the floor of the boiler but excluding doors, drumheads, hand holes, manholes, vents, and appurtenances shall be insulated and jacketed. The average surface temperature of the outer casing shall be not greater than 60 degrees Fahrenheit (oF) (15.56 degrees Celsius (oC)) above ambient temperature with a surface air velocity of not greater than 2 miles per hour (3.22 km per hour) while the boiler is operating at full capacity. The insulation shall be weatherproofed with a sheet metal jacket made of steel having a thickness of not less than 0.020 inch (.51 mm) or of nonferrous sheet metal having a thickness of not less than 0.029 inch (.74 mm). The jacket and insulation on top of the boiler shall be designed and installed to allow ready removal for cleaning and replacement of the tubes.

3.9.4 Base. Refractory lined boilers shall be mounted to provide an air space of not less than 2 inches (50.80 mm) between the bottom of the boiler and the floor. Wet-base boilers shall be mounted to provide an air space of not less than 0.5 inch (12.70 mm) between the bottom of the boiler and the floor.

3.9.5 Flue gas outlet. The flue gas discharge outlet shall be located on the top or the rear of the boiler. Unless otherwise specified (see 6.2), the diameter of the flue outlets shall be as follows:

a. Size 1 - 8 inches (203.20 mm).
b. Size 2 - 12 inches (304.80 mm).

3.9.6 Boiler openings. The steam connection for size 1 boilers shall be not less than 2-inch (50.80 mm) Nominal Pipe Size (NPS). The steam connection for size 2 boilers shall be not less than 3-inch (76.20 mm) NPS. An observation port and cover shall be provided to permit visual examination of the flame.

3.9.7 Safety valve(s). Safety valve(s) shall be in accordance with the ASME Code.

3.10 Performance characteristics. Boilers shall meet the following performance criteria:

a. Flue gas outlet temperature shall be not less than 300oF (148.89oC).
b. Smoke in flue gas shall be not greater than No. 1 on Shell Bacharach scale.
c. Heat transfer rate per square foot of heating surface shall be not greater than 6,610 Btu/hr (1,937.19 W) (see 6.5.1).
d. Efficiency at specified output conditions shall be not less than 80 percent.

3.10.1 Steam output. Steam output for size 1 and size 2 boilers shall be as specified (see 3.8 and 6.2). Boiler steam output shall be based on the following conditions:

a. Feedwater temperature not less than 60oF (15.56oC).
b. Nominal fuel oil heating value - 140,000 Btu per gallon (39 020.10 kilojoule (Kj) per liter (l)).
c. Sea level atmospheric pressure.

3.11 Feedwater regulator and water level switches. The boiler water level shall be controlled and monitored by a feedwater regulator and three water level switches. The feedwater regulator and water level switches shall meet the requirements of UL-353 or the FM.

3.11.1 Feedwater regulator. The feedwater regulator shall be of the float-valve type or of the pump-controller type as specified (see 6.2). Float-valve type shall conform to F-R-2864 for type I, class 1, style 1 feedwater regulators. Pump-controller type shall conform to F-R-2864 for type II feedwater regulators.

3.11.2 Water level switches. The water level switches shall be of the float or electrode type. Two of the three water level switches shall be low water level cutoffs and the third shall be for high water level cutoff.

3.11.2.1 Low water level cutoff switches. The two low water level cutoff switches shall provide for the following:

a. One low water level cutoff switch shall be of the automatic reset type and, upon low water level in the boiler, shall cause shutdown of the boiler and activate the feedwater regulator. After the water level has risen to a safe level, the switch shall activate the burner.
b. The second low water level cutoff switch shall be of the manual reset type. Upon an unsafe low water level in the boiler the switch shall cause shutdown of the boiler, activate the feedwater regulator, and activate a red indicating light and sound an alarm.

3.11.2.2 High water level cutoff switch. The high water level cutoff switch shall be of the manual reset type. Upon an unsafe high water level in the

boiler the switch shall cause shutdown of the boiler, deactivate the feedwater regulator, and activate a red indicating light and sound an alarm.

3.12 Pressure limit control. Two pressure limit controls shall be provided as required by the ASME Code and shall be UL approved. One of the pressure limit controls shall be adjustable in the range of 2 to 15 psig (13.79 to 103.42 kPa (gage)).

3.13 Controls.

3.13.1 Size 1. Controls for size 1 boilers shall conform to MIL-B-18797.

3.13.2 Size 2. Controls and control systems for the size 2 boilers shall conform to MIL-B-18796. Size 2 boilers shall be furnished with the following small burner control systems:

a. Single point positioning control system in accordance with MIL-B-18796.
b. Three position high-low-off control system in accordance with MIL-B-18796.
c. Fixed rate, on-off control system in accordance with MIL-B-18796.

3.14 Burners. The burner provided with the size 1 boiler shall conform to MIL-B-18797, class 2. The burner provided with the size 2 boiler shall conform to MIL-B-18796, class 2. The burners shall be designed and adjusted for firing the following light oils as specified (see 6.2):

a. Fuel oil, grade No. 2 conforming to ASTM D396.
b. Diesel fuel, grades DF-1 and DF-2 conforming to VV-F-800.
c. Turbine fuel, aviation, grade JP-5 conforming to MIL-T-5624.

3.15 Accessories.

3.15.1 Smoke pipe. When specified (see 6.2), a smoke pipe (stack) shall be provided. The stack shall consist of seven sections of flue pipe, one tee, and an umbrella collar and cap. Each of the seven sections of flue pipe shall be 24 inches (609.60 mm) long. The stack diameter shall be as specified in 3.9.5 for the flue outlets. The pipe, tee, and umbrella collar and cap shall be zinc-coated steel. The pipe sections shall conform in other respects to MIL-P-551.

3.15.2 Draft regulator. When specified (see 6.2), a draft regulator shall be provided. When a draft regulator is required, the smoke pipe specified in 3.15.1 shall also be provided. The draft regulator shall be of the automatic, barometric type, designed for installation in the tee furnished with the smoke pipe. The draft regulator shall be adjustable to encompass a range of settings from 0.02 to 0.08 inches (.51 to 2.03 mm) of water.

3.16 Environmental requirements. The emission requirements shall be met at the maximum required continuous output. The steam boiler or hot water generator, as applicable, shall meet the legal emission requirements required by the local, state, and Federal environmental rules and regulations. The emission requirements for opacity, particulates, nitrogen oxides, carbon monoxide, and sulfur dioxide shall be as specified (see 6.2).

3.17 Electrical requirements. Electrical equipment shall be installed in accordance with the applicable requirements of NFPA 70 and UL-726. The boilers shall be rated for operation on 115 volts, 60 Hertz, alternating current. The boiler shall be furnished with a single service disconnect switch to the interconnecting electrical wiring for motors and boiler mounted controls.

3.18 Fungus resistance. When specified (see 6.2), electrical components and circuit elements, including terminal and circuit connections, shall be coated with varnish conforming to MIL-V-173, except that:

a. Components and elements inherently inert to fungi or in hermetically sealed enclosures need not be coated.
b. Current-carrying contact surfaces, such as relay contact points, shall not be coated.

3.19 Electromagnetic interference (EMI) suppression. When specified (see 6.2), the boiler shall meet the UM05 requirements for conducted emissions (CE) and radiated emissions (RE) as specified in MIL-STD-461 for class C3, group I equipment.

3.20 Treatment and painting. Unless otherwise specified (see 6.2), the boiler shall be treated and painted in accordance with the manufacturer's standard practice. All surfaces of the boiler other than corrosion-resisting steel shall be protected against corrosion and present a neat appearance.

3.21 Identification marking. Identification shall be permanently and legibly marked directly on the boiler or on a corrosion-resisting metal plate in accordance with the requirements of UL-726 and the ASME Code.

3.22 Technical manuals. The manufacturer shall provide two commercial technical manuals normally prepared and supplied with the boiler.

3.23 Spare parts. When specified (see 6.2), spare parts shall be furnished and shipped with each boiler. The spare parts required and the quantity thereof shall be determined in accordance with the provisioning procedures of the contract.

3.24 Lifting and tiedown attachments. The boiler shall be equipped with lifting and tiedown attachments. Lifting and tiedown attachments shall conform to type II or type III of MIL-STD-209. A nonferrous transportation plate shall be provided and mechanically attached to the boiler. Transportation plates shall be inscribed with a diagram showing the lifting attachments and lifting slings, the capacity of each attachment, and the required length and size of each sling cable. A silhouette of the item furnished showing the center of gravity shall be provided on the transportation plate. Tiedown attachments may be identified by stenciling or other suitable marking. Tiedown marking shall clearly indicate that the attachments are intended for the tie down of the boiler on the carrier when shipped.

3.25 Workmanship. Workmanship shall be in accordance with the ASME Code and shall be of such quality as to produce boilers that meet the standards prevalent among manufacturers who normally produce equipment of the type specified herein.

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 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 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 Material inspection. The contractor is responsible for ensuring that supplies and materials are inspected for compliance 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 inspection (see 4.2.1).
b. Quality conformance inspection (see 4.2.2).

4.2.1 First article inspection. The first article inspection shall be performed on one boiler when a first article is required (see 3.4 and 6.4). This inspection shall include the examination of 4.3, the tests of 4.4, and, when specified, the preproduction pack inspection of 4.5 (see 4.5 and 6.2). The first article may be either a 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 representative of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

4.2.2 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.3, the tests of 4.4, and the packaging inspection of 4.5.

4.3 Examination. Each boiler shall be examined for compliance with the requirements specified in section 3 of this specification. Any redesign or modification of the contractor's standard product to comply with specified requirements, or any necessary redesign or modification following failure to meet specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirements or

presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.4 Tests.

4.4.1 Insulation test. The boiler shall be tested to determine compliance with the requirements of 3.9.3 during the performance test required in 4.4.2. Failure of the boiler to pass the test shall be cause for rejection of the boiler.

4.4.2 Performance test. The boiler shall be tested to verify compliance with the output and efficiency requirements of 3.10 by testing in accordance with the HI Testing and Rating Standard for Heating Boilers test. Failure of the boiler to pass the test shall be cause for rejection of the boiler.

4.4.3 Operational test. The boiler shall be tested to verify compliance with the water level requirements of 3.11 and the control requirements of 3.12 and 3.13. Steam output shall be determined by the applicable test methods and procedures of HI Testing and Rating Standard for Heating Boilers. Conditions of excess steam pressure, flame failure, and low water level shall be initiated during the test run to verify that the applicable safety control acts to initiate shutdown. Failure of the controls to initiate shutdown shall be cause for rejection of the boiler.

4.4.4 Safety valve test. The pressure limit controls shall be locked out or otherwise made inoperative and the boiler safety valves shall be lifted by steam. The relieving capacity, popping pressure, blowdown, and reseating pressure shall be determined by observation and measurement in accordance with the ASME Code. This test shall be made in the presence of the Government inspector. The ASME standard symbol shall be accepted only as indicating compliance with the design and material requirements of the ASME code. Failure of the boiler safety valves to relieve at the set pressure in accordance with the ASME code shall be cause for rejection of the boiler.

4.4.5 EMI suppression tests. When EMI suppression is required (see 3.19), the boiler shall be subjected to test methods CE03 and RE02 as specified in MIL-STD-462.

4.5 Preparation for delivery inspection. The preservation, packaging, packing, and marking of the item shall be inspected to verify conformance to the requirements of section 5.

5. PREPARATION FOR DELIVERY

5.1 Preservation, packaging, and packing. Preservation, packaging, and packing shall be in accordance with the requirements of MIL-B-3180 with the levels of preservation, and level of packing as specified (see 6.2).

5.2 Marking.

5.2.1 Military agencies. Shipments to military agencies shall be marked in accordance with MIL-STD-129.

5.2.2 Civil agencies. Shipments to civil agencies shall be marked in accordance with FED-STD-123.

6. NOTES

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

6.1 Intended use. Boilers covered by this specification are intended primarily for use at overseas installations to supply low pressure steam for heating purposes.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Size of boiler required (see 1.2).
c. Issue of DoDISS to be cited on the solicitation, and if required, the specific issue of individuals documents referenced (see 2.1.1 and 2.2).
d. When first article is required for inspection and approval (see 3.4, 4.2.1, and 6.4).
e. Output capacity of boiler in Btu/hr (W) units (see 3.8 and 3.10.1).
f. Diameter of the flue outlet, if other than as specified (see 3.9.5).
g. Type of feedwater regulator required (see 3.11.1).
h. Type of fuel burner to be designed and adjusted for firing (see 3.14).
i. When smoke pipe is required (see 3.15.1).
j. When a draft regulator with a smoke pipe is to be provided (see 3.15.2).
k. Emission requirements for opacity, particulates, nitrogen oxides, carbon monoxide, and sulfur dioxide (see 3.16).
l. When fungus and moisture resistance is required (see 3.18).
m. When EMI suppression is required (See 3.19).
n. When treatment and painting is other than specified (see 3.20).
o. When spare parts are to be furnished and shipped with each boiler (see 3.23).
q. When first article is to receive the preproduction pack inspection and time frame required (see 4.2.1 and 4.5).
r. Level of preservation and level of packing required (see 5.1).

6.3 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (DD Form 1423) incorporated into the contract. When the provisions of DoD Federal Acquisition Regulations (FAR) Supplement, Part 27, Sub-Part 27.475-1 are invoked and the DD Form 1423 is not used, the data should be delivered by the contractor in accordance with the contract or purchase order requirements.

6.3.1 Compliance. Prior to approval of the first shipment, the contractor should submit to the contracting officer, or his authorized representative, satisfactory evidence that the boilers he proposes to furnish under this specification meet the requirements of UL-726 and the ASME Code, as applicable.

6.3.1.1 UL-726 requirements. Acceptable evidence of meeting the requirements of UL-726 should be the UL-726 certification symbol or label, or a certified test report from a recognized independent testing laboratory indicating the boiler has been tested and conforms to UL-726.

6.3.1.2 ASME requirements. Acceptable evidence of meeting the requirements of the ASME Code should be the ASME Code symbol.

6.4 First article. When a first article is required, the item will be tested and should be a first production item or it may be a standard production item from the contractor's current inventory as specified in 4.2.1. The first article should consist of one unit. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, test and approval of the first article.

6.5 Definitions.

6.5.1 Heat transfer rate. The heat transfer rate shall be determined by dividing the steam output change of enthalpy by the heating surface.

6.6 Part or Identifying Numbers (PINs). The specification number and size are combined to form PINs for the low pressure steam boilers covered by this document (see 1.2). PINs for the low pressure steam boilers are established as follows:

```
                                        FB468     X      XXX
        Federal Specification Number--------*       *       *
        Size (see 1.2) ------------------------------*       *
        Output capacity in 1000 btu/h (293 W) --------------*
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6.7 Subject term (key word) listing.

Combustion chamber
Feedwater regulator
Firebox
Float valve
Low pressure steam
Pump-controller
Refractory
Vertical firetube

6.8 Supersession data. This specification replaces military specification MIL-B-16220F, dated 25 August 1988.

6.9 Classification cross-reference. Classifications used in this specification (see 1.2) are identical to those found in the superseded military specification, MIL-B-16220F.

MILITARY INTERESTS:

Custodians
Navy - YD1

Review Activities
Army - CE
DLA - CS

CIVIL AGENCY
COORDINATING ACTIVITIES:

GSA - FSS

PREPARING ACTIVITY:
Navy - YD1

(Project 4520-0364)