

A-A-50549

[INCH-POUND]

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June 13, 1996

SUPERSEDING

MIL-H-16451F

10 April 1992

COMMERCIAL ITEM DESCRIPTION

HEATERS, WATER, LIQUID FUEL
(OIL-FIRED, STORAGE TYPE, NOT EXCEEDING
280,000 BTU/H INPUT CAPACITY)

The General Services Administration has authorized the use of this commercial item description for all federal agencies.

1. SCOPE. This commercial item description covers vertical, light-oil fired, storage-type water heaters having thermal inputs not exceeding 280,000 British thermal units per hour (Btu/h) (82,040 Watts (W)) and storage capacities up to 100 gallons (gal) (379 liters (L)) and constructed to Underwriters Laboratories, Inc. (UL) or American Society of Mechanical Engineers (ASME) requirements. Heaters are intended primarily for use in military residences and similar facilities. The heaters may be used in galleys, mess halls, showers, laundries, or shops where thermal input up to 280,000 Btu/h (82,040 W) will satisfy the demand.

2. CLASSIFICATION. Tanks furnished on the water heaters shall be of the following types and sizes (see table I and 7.2):

- Type I - Glass-lined steel.
- Type II - Stainless steel.

- Size 30 - 30-gallon (114 L) nominal storage capacity, with 0.5 gallons per hour (gph) (1.89 liters per hour (L/h)) minimum firing rate.
- Size 30 - 30-gallon (114 L) nominal storage capacity, with 0.75 gph (2.84 L/h) minimum firing rate.
- Size 40 - 40-gallon (151 L) nominal storage capacity, with 0.85 gph (3.22 L/h) minimum firing rate.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data which may improve this document should be sent to: Commanding Officer (Code 156), Naval Construction Battalion Center, 1000 23rd Avenue, Port Hueneme, CA 93043-4301.

AMSC N/A

FSC 4520

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

- Size 50 - 50-gallon (189 L) nominal storage capacity, with 1.20 gph (4.54 L/h) minimum firing rate.
- Size 70 - 70-gallon (265 L) nominal storage capacity, with 1.35 gph (5.11 L/h) minimum firing rate.
- Size 85 - 85-gallon (322 L) nominal storage capacity, with 1.45 gph (5.49 L/h) minimum firing rate.
- Size 100 - 100-gallon (379 L) nominal storage capacity, with 1.45 gph (5.49 L/h) minimum firing rate.

3. SALIENT CHARACTERISTICS.

3.1 Description. The water heaters shall consist of an insulated vertical, steel, water storage tank, a light oil-fired combustion system not exceeding 280,000 Btu/h (82,040 W) input capacity, and the operating and safety controls specified herein for completely automatic operation of the heaters for use in application requiring potable water.

3.2 Standard commercial product. The heaters shall, as a minimum, be in accordance with the requirements of this commercial item description and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this commercial item description but which are a part of the manufacturer's standard commercial product, shall be included in the heaters 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 product model.

3.3 Codes and standards compliance. The water heaters shall comply with the requirements of UL732 or ASME Boiler and Pressure Vessel Code, Section IV. The burner shall comply with UL296 (see 5.2).

3.4 Design. Steel for fabrication of the storage tank shall be commercial quality sheet or plate, chemically constituted, and suitably processed to adapt the steel for application of glass (porcelain enamel) linings. Steel for tanks with glass (porcelain enamel) lining shall be suitable for exposure to fire and products of combustion to which the tank will be exposed. Material in contact with potable water shall be nontoxic, and shall not impart odor, color, or taste to the contained water. The water heater package shall include: flue(s) that terminates in a flue collar that permits attachment of a sheet metal smoke pipe; insulation which is held in place with a steel jacket; and a combustion chamber. The water heater shall be suitable for installation in an alcove or a closet as specified (see 7.2). The water heater shall be suitable for installation on non-combustible floors or combustible floors as specified (see 7.2). When the water heaters are required for installation on combustible floors, installation instructions shall be provided on the unit for such application. Water heaters shall meet the capacity and performance requirements as follows:

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- a. For heaters 105,000 Btu/h (30,765 W) or less firing 138,500 Btu/gal (496,924 kJ/L) oil (No. 1 oil) recovery capacity shall be based on DoE regulations, CFR Title 10, Chapter II, Part 430 - Energy Conservation Program for Appliances, as sole determination.
- b. For heaters firing 140,000 Btu/gal oil (No. 2 oil), see table I.

TABLE I. Capacity and performance based on 140,000 Btu/gal (502,306 kJ/L) of oil.

Efficiency Percent	Nominal Storage Capacity in US gallons (liters)	Permissible Deviation from Nominal Capacity (%)	Firing Rate Min gph (L/h)	Recovery Capacity, Minimum gph (L/h)		
				60° F (16° C) rise	80° F (27° C) rise	100° F (38° C) rise
75	30 (114)	±5	0.50 (1.89)	106 (401)	79 (299)	63 (238)
	30 (114)	±5	0.75 (2.84)	159 (602)	119 (450)	95 (360)
70	40 (151)	±10	0.85 (3.22)	168 (636)	126 (477)	101 (382)
	50 (189)	±10	1.20 (4.54)	237 (897)	178 (674)	142 (537)
	70 (265)	±10	1.35 (5.11)	267 (1011)	200 (757)	160 (606)
	85 (322)	±10	1.45 (5.49)	287 (1086)	215 (814)	172 (651)
	100 (379)	±10	1.45 (5.49)	287 (1086)	215 (814)	172 (651)

3.5 Performance. Performance and capacity requirements specified herein shall be based on firing light fuel oil having a heat content of 138,500 Btu/gal (496,924 kJ/L) for input 105,000 Btu/h (30,765 W) (No. 1 oil) or less water heaters, or 140,000 Btu/gal (502,306 kJ/L) (No. 2 oil) for all water heaters as specified (see 7.2). Operation of the heaters shall be under standard atmospheric conditions (60 degrees Fahrenheit (°F)) (16 degrees Celsius (°C)) and 14.7 pounds per square inch (psi) atmosphere with an inlet water supply temperature of 65-75°F (18-24°C) and nominal specific heat of water of 8.25 Btu/gal (29.6 kJ/L) at 120°F (49°C). The temperature rise at specific points on and adjacent to the heater shall not exceed the maximum allowable temperature rises specified in UL732.

3.5.1 Combustion. Observed smoke at all firing rates under steady-state-test conditions shall not exceed the limits indicated by No. 1 on the Shell-Bacharach Scale with the Model RDC Smokemeter.

3.5.2 Recovery efficiency.

3.5.2.1 For heaters with oil having heat content of 138,500 Btu/gal (496,924 kJ/L). The recovery efficiency for heaters of 105,000 Btu/h (30,765 W) or less shall be in accordance with

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DoE regulations, CFR Title 10, Chapter II, Part 430 - Energy Conservation for Appliances, and shall be the sole determination.

3.5.2.2 For heaters with oil having heat content of 140,000 Btu/gal (502,306 kJ/L). The minimum recovery efficiency for heaters with thermal input of 105,000 Btu/h (30,765 W) or less shall be 75 percent and for heaters with thermal input greater than 105,000 Btu/h (30,765 W) shall be 70 percent.

3.6 Tank. The water storage tank shall be of the vertical type and shall withstand the applicable working pressure and test pressures specified in table II. Tanks shall also withstand the proof test pressure specified in table II without damage or failure of the lining due to such defects as crazing, cracking, or spalling. The tank shall be constructed in accordance with ASME Boiler and Pressure Vessel Code, Section IV, Pressure Vessels. Tank shall be furnished with a handhole for inspection and cleaning. Type I glass-lined (porcelain-enameled) tanks shall be equipped with magnesium anodes for cathodic protection.

TABLE II. Design pressures.

Requirement	Standard pressures	
	(psig min)	(kPa [gage] min)
Working pressure	150	1,034
Proof test pressure	150	1,034
Hydrostatic test pressure	300	2,068

3.6.1 Tappings and fittings. Tappings and fittings for glass-lined tanks shall be furnished with insulating bushing with instructions on their use attached to the units. For stainless steel tanks, the tappings and fittings shall be manufacturer's standard commercial product for the service required. Tappings and fittings shall have tapered threads in accordance with ANSI B21.1. A separate tapping for a pressure relief valve shall be furnished in the tank.

3.6.2 Tank linings for Type I, glass-lined steel tank (porcelain enamel coating). The glass lining shall be applied to all interior surfaces that are exposed to hot water including handhole and handhole covers when applicable. The thickness of the glass lining shall be in accordance with industry practice.

3.6.3 Type II, stainless steel tank. Stainless steel shall be manufacturer's standard commercial product.

3.7 Oil burners. The oil burners shall be in accordance with UL296. The minimum firing rate for the burners shall be as specified in 2 when firing No. 1 or No. 2 oil per ASTM D396 without exceeding No. 1 smoke limit as indicated on the Shell-Bacharach Scale with Model RDC Smokemeter. Unless otherwise specified (see 7.2), the burners shall operate on 115 volts, single

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phase, 60 hertz. When specified (see 7.2), a motor starter shall be provided as a separate item with overload protection.

3.8 Controls. Unless otherwise specified (see 7.2), controls shall operate on 115 volts, single phase, 60 hertz.

3.8.1 Thermostat. The thermostat shall maintain control within ± 10 degrees of the thermostat setting, shall encompass a range from 100°F (38°C) to at least 160°F (71°C), and not allow the water to attain a temperature of more than 200°F (93°C).

3.8.2 Limit control cutout. The shutoff system shall be the manual reset type and shall interrupt the fuel supply to the heater before the water temperature exceeds 210°F (99°C).

3.9 Combination pressure-temperature relief valve. A combination pressure-temperature relief valve conforming to ANSI Z21.22 shall be installed on or supplied with the water heater. The pressure setting of the valve shall not exceed the working pressure of the water storage tank.

3.10 Accessories. When specified (see 7.2), one or more of the following accessories shall be furnished with each heater:

- | | |
|--|------------------------------------|
| a. Downdraft cap | 1 each |
| b. Storm collar | 1 each |
| c. Elbow 90°, adjustable for smoke pipe | 2 each |
| d. Smoke pipe, chimney or vent connector for heater | Sections as specified
(see 7.2) |
| e. Draft regulator, barometric for smoke pipe | 1 each |
| f. Insulating couplings for inlet and outlet water connections | 1 set |
| g. Electrodes, ignition for fuel oil burner | 2 each |
| h. Electrode lead, ignition for fuel oil burner | 2 each |

4. REGULATORY REQUIREMENTS.

4.1 Materials. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR). Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this commercial item description are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term “recovered materials” means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin, raw materials. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this commercial item description.

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4.2 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within specified tolerances using conversion tables contained in the latest version of Federal Standard 376, and all other requirements of this commercial item description including form, fit, and function are met. If a product is manufactured to metric dimensions and those dimensions exceed the tolerances specified in the inch-pound units, a request should be made to the contracting officer to determine if the product is acceptable. The contracting officer has the option of accepting or rejecting the product.

5. QUALITY ASSURANCE PROVISIONS.

5.1 Contractor certification. The contractor shall certify and maintain substantiating evidence that the product offered meets the salient characteristics of the commercial item description, and that the product conforms to the producer's own drawings, specifications, standards, and quality assurance practices, and is the same product offered for sale in the commercial marketplace. The government reserves the right to require proof of such conformance prior to first delivery and thereafter as may be otherwise provided for under the provisions of the contract. Contractor certifications shall include Underwriter Laboratory certification as follows:

5.2 Standards compliance.

5.2.1 UL requirements. Acceptable evidence of meeting the requirements of UL296 and UL732 shall be the UL certification symbol or label, listing in the Listing File, or a certified test report from a recognized independent testing laboratory indicating the components have been tested and conform to UL296 and UL732.

5.2.2 ASME requirements. Acceptable evidence of meeting the requirements of ASME Boiler and Pressure Vessel Code, Section IV, Pressure Vessels should be the receipt of a manufacturer's certificate of compliance, stating the equipment procured with this commercial item description is in compliance with the applicable requirements of ASME Boiler and Pressure Vessel Code, Section IV, Pressure Vessels.

6. PACKAGING. Preservation, packing, and marking shall be as specified in the contract or order (see 7.2).

7. NOTES.

7.1 Source of documents.

7.1.1 ANSI Standards are available from the American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036.

7.1.2 SAME Standards are available from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017.

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7.1.3 ASTM Standards are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19103.

7.1.4 UL Standards are available from the Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

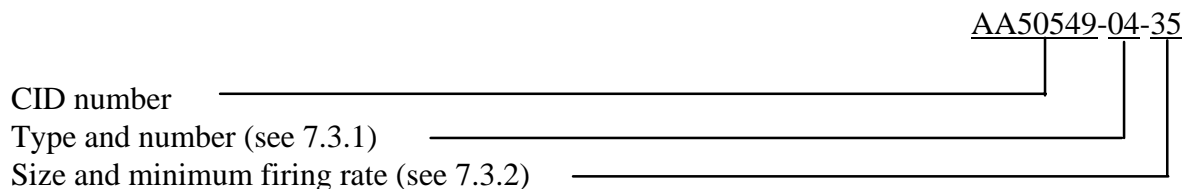
7.1.5 DoE/FEA standards may be obtained from the Superintendent of Documents, Government Printing Office, Washington, DC 20402.

7.1.6 The Federal Acquisition Regulation (FAR) may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

7.2 Ordering data. Acquisition documents should specify the following:

- a. Type and size required (see 2.).
- b. When water heater shall be suitable for installation in an alcove or closet (see 3.5).
- c. When water heater shall be suitable for installation on non-combustible floor or combustible floor (see 3.5).
- d. Whether heat content of fuel is 138,500 Btu/gal (496,924 kJ/L) or 140,000 Btu/gal (502,306 kJ/L) (see 3.6).
- e. When electrical characteristics are different (see 3.8).
- f. When motor starter is required (see 3.8).
- g. When voltage to controls shall be different (see 3.9).
- h. Accessories required (see 3.10).
- i. Level of preservation, packing and marking required (see 6.).

7.3 Part Identification Number (PIN). The following part identification numbering procedure is for government purposes and does not constitute a requirement for the contractor. The PINs to be used for items acquired to this description are created as follows:



7.3.1 Type. The type of the heater (see 2) is identified by a two-digit number (see table III).

TABLE III. Code number to type.

<u>Tank type</u>	<u>Code number</u>
I	04
II	09

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7.3.2 Size and minimum firing rate. The size and minimum firing rate of the heater (see 2.) are identified by a two-digit number (see table IV).

TABLE IV. Code number to size and minimum firing rate.

Tank size		Firing Rate		Code Number
US gallons	(Liters)	gph	(L/h)	
30	(114)	0.5	(1.89)	35
30	(114)	0.75	(2.84)	37
40	(151)	0.85	(3.22)	48
50	(189)	1.20	(4.54)	52
70	(265)	1.35	(5.11)	73
85	(322)	1.45	(5.49)	84
100	(379)	1.45	(5.49)	14

7.4 National Stock Numbers (NSNs). The following is a list of NSNs assigned which correspond to this CID. The list may not be indicative of all possible NSNs associated with the CID.

<u>NSN</u>	<u>Type</u>	<u>Size</u>
4520-00-203-3582	1	40
4520-00-203-3583	1	30
4520-00-232-7446	V	22

7.5 Classification cross reference. Cross reference of classification changes between this CID (see 2.) and the superseded military specification MIL-H-16451F, is as follows:

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Type IV
Type VII
Type VIII
Type IX
Type X
Type XI
Type XII

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Type I
Not included
Not included
Type II
Not included
Not included
Not included

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7.6 Subject term (key word) listing.

Water heaters
Light oil-fired

MILITARY INTERESTS:

Custodians

Army - ME
Navy - YD1
Air Force - 99

Review Activities

Army - CE
Air Force - 84
DLA - CS
Navy - MC

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

PREPARING ACTIVITY:

Navy YD1

(Project 4520-0380)