

MIL-H-52081A

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SUPERSEDING

MIL-H-52081

August 4, 1959

MILITARY SPECIFICATION
HEATERS; SPACE, ELECTRIC
(LOCKERS AND CLOTHING CLOSETS)

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

1. SCOPE

1.1 Scope. This specification covers electric heaters for use in confined enclosures, such as clothes closets, and in enlisted men's clothing lockers for shore establishments to reduce moisture and to prevent moisture damage to clothing housed therein.

1.2 Classification. Heaters shall be of the following types and sizes, as specified (see 6.2):

Type I - Inherently temperature limiting.

Type II - With temperature limit control.

Size 1 - For 10 to 25 cu. ft. space.

Size 2 - For 40 to 105 cu. ft. space.

Size 3 - For 106 to 150 cu. ft. space.

Size 4 - For 151 to 195 cu. ft. space.

2. APPLICABLE DOCUMENTS

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

FSC 4520

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* SPECIFICATIONS

Federal

QQ-R-175 - Resistance Wire
PPP-B-566 - Boxes, Folding, Paperboard
PPP-B-601 - Boxes, Wood, Cleated-Plywood
PPP-B-636 - Boxes, Shipping, Fiberboard
PPP-B-665 - Boxes, Paperboard, Metal Stayed (Including Stay Material)
PPP-B-676 - Boxes, Set-up, Paperboard

* STANDARDS

Military

MIL-STD-105 - Sampling Procedure and Tables for Inspection by
Attributes
MIL-STD-109 - Inspection Terms and Definitions
MIL-STD-129 - Marking for Shipment and Storage
MIL-STD-130 - Identification Marking of U.S. Military Property

(Copies of specifications and standards required by contractors, in connection with specific procurement functions, should be obtained from the procuring agency or as directed by the contracting officer.)

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

National Motor Freight Traffic Association, Inc., Agent

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Association, Inc., Attn: Tariff Order Section, 1616 P Street, N.W., Washington, DC 20036.)

National Bureau of Standards (NBS)

Handbook H28 - Screw-Thread Standards for Federal Services

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402.)

Underwriters' Laboratories, Inc. (UL)

UL 50 - Standard for Cabinet and Boxes

UL 67 - Standard for Panelboards

UL 499- Standard for Electric Heating Appliance

(Application for copies should be addressed to the Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, IL 60611.)

Uniform Classification Committee, Agent

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 S. Riverside Plaza, Chicago, IL 60606.)

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

3. REQUIREMENTS

3.1 Standard Product. The electric space heaters shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard product. Additional features which are not specifically prohibited by this specification, but are a part of the manufacturer's standard product, shall be included in the space heaters being furnished. No change to the manufacturer's standard product shall be made.

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* 3.2 First article. When specified (see 6.2), the contractor shall furnish a heater unit for first article inspection and approval (see 4.2.1 and 6.3).

3.3 UL certification. Prior to approval of the first article, if one is specified, or prior to approval of the first shipment by the supplier, if a first article is not specified, the supplier shall submit to the contracting officer, or his authorized representative, satisfactory evidence that the electric space heaters he proposes to furnish under the specification meet the requirements of UL 499. Acceptable evidence of meeting the requirements of this standard will be the UL label or UL listing mark or a test report (see 6.2.2) from a recognized independent laboratory acceptable to the Government, indicating that the electric space heaters have been tested and conform to UL 499.

* 3.4 Material. Material used shall be as specified herein. Material not definitely specified shall be of the quality normally used in the manufacturer's commercial practice. All material shall be modern in design and shall not have been in prior service except as required by factory tests. Items performing the same functions shall be products of the same manufacturer.

3.5 Construction. The space heater shall be a completely assembled unit, consisting of a number of tubular heaters (horizontally spaced and parallel to each other, if more than one), junction box, shield, and temperature controls (for type I and type II, see 3.5.3), all supported within a stable frame. The maximum width of each heater shall be 13 inches and the maximum depth shall be 3 inches (see 3.7 for length). The heater shall be so formed and assembled that it will be tamperproof, durable, and have the strength and rigidity necessary to resist the abuses to which it is liable to be subjected. The unit shall be a riveted assembly, simple in shape and design, and safe for installation against or in close proximity to combustible materials. All screw threads shall conform to NBS H28. The heater elements, junction box, terminal board, controls, and accessories, of which the heater unit is comprised, shall meet the following requirements.

3.5.1 Heater element. The heater element shall consist of a nickel-chromium of nickel-chromium-iron alloy resistor properly and permanently centered in an aluminum sheath. The resistor shall be insulated from the metal sheath by a highly compacted vitrified or semi-vitrified refractory material, having good electrical insulation and heat conducting properties. The resistor and other materials comprising the current-carrying heating element, shall be permanently enclosed in the protective sheath so that the current-carrying element is inaccessible without virtual destruction of the heater element sheathing.

3.5.2 Junction box. The junction box and terminal board shall conform to the applicable requirements of UL 50 and UL 67. Terminals mounted on a phenolic-plastic, insulated, terminal block shall be provided with, and solidly attached to, the inside of a connection box. Four terminals of the screw-binding post type, for each side of the line, shall be provided. The junction box shall have a removable cover and shall be zinc-coated. Knockouts and wiring terminals shall be located so as to facilitate electrical connection to utility power.

3.5.3 Temperature controls.

3.5.3.1 Type I heaters. Type I heaters shall be constructed without temperature controls and shall be as specified (see 3.6.1.1).

3.5.3.2 Type II heaters. An automatic control for temperature limiting shall be provided for the type II unit. The control shall automatically limit the sheath surface temperature specified (see 3.6.1.2) for all normal and abnormal heating conditions. There shall be no electrical or mechanical failure of control nor undue burning, pitting, or welding of the contacts. Abnormal heating conditions, specified herein, shall be due to blanketing of the heater by combustible materials at rated conditions.

3.5.4 Shield. Except when otherwise specified (see 6.2), a perforated aluminum-alloy shield, not less than 16 gage (0.05 inches nominal thickness), shall enclose the heater unit.

3.5.5 Wire. The resistor wire shall conform to composition D or E of QQ-R-175.

3.5.6 Mounting.

3.5.6.1 Size 1 heater. The size 1 heater shall be designed and provided with mounting means for floor or sidewall application, or for under floor installation in steel lockers as specified (see 6.2).

3.5.6.2 Sizes 2,3, and 4 heaters. Sizes 2,3, and 4 heaters shall be designed and provided with mounting means for sidewall installation so that the lower edge of the heater will be tilted from the wall approximately 15 degrees.

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3.6 Performance.

3.6.1 Maximum surface temperature.

3.6.1.1 Type I heaters. Type I heaters shall be so designed and constructed that, after seven to eight hours of continuous operation in still air at an ambient temperature of 100° F and at rated voltage, the surface temperature of the heater unit shall not exceed 150° F, and the maximum temperature at any point shall not exceed 200° F, with the heater blanketed with insulating materials to cause abnormal heating conditions. The temperature of the heater surface shall be measured as the average of at least six simultaneous readings at scattered points on the heater surface, repeated at least six times during a one-hour period.

* 3.6.1.2 Type II heaters. Type II heaters shall be so designed and constructed that heater operations will not be affected by the temperature limit device until heater surface temperatures exceed the normal 150° F obtained in still air at 100° F ambient temperature and at rated voltage. The temperature limit device shall limit the average heater surface temperatures to a maximum of 150° F, with maximum temperature at any point not exceeding 200° F when the heater is operating at rated voltage in still air at 100° F ambient temperature and encased in an insulating material having a thermal resistance (R) of not less than 3.7. The temperature of the heater surface shall be measured as the average of at least six simultaneous readings at scattered points on the heater surface, repeated at least six times during a one-hour period.

3.7 Heater wattage and length. The wattage and length of the heaters shall be as follows:

<u>Size</u>	<u>Locker or closet volume (cu. ft.)</u>	<u>Nominal heater (watts)</u>	<u>Overall length, nominal (inches)</u>	<u>Overall length, maximum (inches)</u>
1	10-25	45	18	19
2	40-105	120	48	50
3	105-150	180	72	74
4	150-195	240	96	98

3.8 Rating. The heater shall operate satisfactorily on 115 or 230 volt direct-current or single-phase alternating current, as specified (see 6.2). The actual power input to the heating unit shall be not more than 105 percent or not less than 90 percent of its rating.

3.9 Dielectric strength. The heater shall satisfactorily pass the test specified (see 4.6.3.4).

3.10 Insulation resistance. The heater shall have an insulation resistance of not less than 50,000 ohms between live-metal parts and interconnected, dead-metal parts, when tested as specified (see 4.6.3.5).

3.11 Treatment and painting. Unless otherwise specified (see 6.2), the equipment shall be treated and painted in accordance with the manufacturer's best standard practice.

3.12 Identification marking. The heater and parts shall be marked in accordance with MIL-STD-130. Equipment shall bear the manufacturer's name, the voltage and wattage rating, the manufacturer's serial or catalog number, the date of acceptance, and the length of the warranty.

3.13 Workmanship. The quality of workmanship shall be such as to produce space heaters that are in accordance with the requirements of this specification and are so constructed as to insure proper functioning of all parts of the unit.

4. QUALITY ASSURANCE PROVISIONS

* 4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 the supplies and services conform to prescribed requirements.

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* 4.1.1 Inspection of materials and components. In accordance with 4.1, the supplier is responsible for insuring that materials and components used were manufactured, examined, and tested to the extent specified, in accordance with the requirements of referenced subsidiary specifications and standards. The terms and definitions of MIL-STD-109 shall apply.

* 4.2 Classification of inspections. The inspections 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. First article inspection shall be performed on one electric space heater when a first article sample is required (see 3.2). This inspection shall include the examination of 4.5 and the tests of 4.6. Failure of the first article to pass the examination or any of the tests shall be cause for rejection. The first article may be a standard production item from the supplier's current inventory provided the unit meets the requirements of the specification and is representative of the design, construction, and manufacturing techniques applicable to the remaining units to be furnished under the contract.

* 4.2.2 Quality conformance inspection. Quality conformance inspection shall be performed on the sample electric space heater selected in accordance with 4.4. This inspection shall include the examination of 4.5 and the tests of 4.6.

* 4.3 Inspection lot. All units of the same type, offered to the Government at one time, shall be considered a lot for purposes of inspection. The sample unit shall be one complete electric space heater.

4.4 Sampling.

* 4.4.1 Sampling for examination. A random sample of electric space heaters shall be selected from each lot offered to the Government in accordance with MIL-STD-105 at inspection level II. The acceptable quality level shall be 1.5 percent for major defects and 4.0 percent for minor defects.

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* 4.4.2 Sampling for tests. A random sample of electric space heaters shall be selected from each lot offered to the Government in accordance with MIL-STD-105 at inspection level S-4. The acceptable quality level shall be 1.5 percent.

4.5 Examination. Each unit shall be examined to verify compliance with this specification. Examination shall be conducted as specified in table I.

TABLE I. Classification of defects

Categories	Defects
Major:	
101	Shield not as specified
102	Mounting means not as specified
103	Operating and maintenance instructions not provided
Minor:	
201	Improper treatment and painting
202	Corners have sharp edges
203	Marking not as specified

4.6 Tests. Each electric space heater shall be tested and any unit failing to pass the following tests, as applicable, shall be rejected. Tests shall be conducted as outlined in the referenced documents as herein specified.

4.6.1 Test equipment calibration. All tests shall be performed with properly calibrated measuring equipment.

4.6.1.1 Temperature measuring equipment (recording or indicating). A water bath, equipped with a standard thermometer, shall be used for calibrating this equipment. The bath shall be well stirred and have a temperature differential of less than 1° C throughout the test. The standard thermometer shall have a National Bureau of Standards correction curve.

4.6.1.2 Wattmeter and voltmeter. Calibration of the wattmeter and voltmeter shall be certified for accuracy by a recognized testing laboratory. Meters may be checked for accuracy before making the tests specified.

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4.6.1.3 Thermometer for ambient temperature measurement. The thermometer shall be calibrated in air against a standard thermometer.

4.6.2 Initial conditions. Initial conditions shall consist of the following:

Ambient temperature, $100^{\circ}\text{ F} \pm 3^{\circ}\text{ F}$, still air.

Heater conditioned at this ambient temperature for at least 24 hours prior to test.

4.6.3 Test methods.

4.6.3.1 Heat distribution test. The heater, conditioned as specified (see 4.6.2), shall be tested, as follows, to satisfy the requirements (see 3.6). Rated voltage shall be applied to the heater throughout the test. Temperature readings shall be obtained by properly calibrated thermocouples placed at scattered points, six inches above the heater surface, when in a normal installed position. A temperature shall be considered constant when three successive readings, taken at intervals of 10 percent of the previously elapsed duration of the test, indicate no change. Temperature readings shall indicate that the requirements (see 3.6) have been met.

4.6.3.2 Operative test. The heater shall be operated at rated voltage for four hours, after which time the several parts shall be observed for possible defects of material and workmanship.

4.6.3.3 Performance test. With the heater unit mounted or supported as in service, and tested with rated voltage applied, the wattage shall conform to the requirements of 3.7 and 3.8 when measured with a suitable wattmeter having an accuracy within ± 1 percent.

4.6.3.4 Dielectric material test. The heater unit shall be capable of withstanding, for one minute, without breakdown, the application of a 60-cycle alternating potential of 1500 volts between all current-carrying parts and dead-metal parts. The dielectric material shall not be punctured nor shall there be any flashing of current over the material.

4.6.3.5 Insulation resistance test. Immediately after the dielectric test (see 4.6.3.4), insulation resistance shall be measured with the use of 250 volts dc and shall conform to 3.9 after exposure (for twenty-four hours) to moist air having a relative humidity of 85 ± 5 percent at a temperature of $95^{\circ}\text{ F} \pm 4^{\circ}\text{ F}$.

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4.6.3.6 Automatic temperature control test. Automatic temperature controls shall be tested for conformance with the requirements listed (see 3.5.3).

* 4.7 Inspection of preparation for delivery. Preparation for delivery requirements of the heaters shall be inspected to determine conformance with the applicable requirements of section 5 of this specification.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A or C as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Unit packaging. Each heater shall be packaged in a close-fitting, folding, metal-stayed, or set-up paperboard box conforming to the requirements of PPP-B-566, PPP-B-665, or PPP-B-676, respectively.

5.1.1.2 Intermediate packaging. Heaters packaged as described in 5.1.1.1, in quantities specified (see 6.2), shall be placed in a close-fitting, intermediate fiberboard container conforming to PPP-B-636, class weather resistant. Box shall be waterproofed with tape in accordance with the Appendix to PPP-B-636.

5.1.2 Level C. Packaging shall be in accordance with the supplier's standard practice.

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

5.2.1 Level A. Heaters, packaged as described in 5.1, shall be packed in a wood-cleated, plywood box conforming to the requirements of PPP-B-601, overseas type. The box shall be closed and strapped in accordance with the appendix of the applicable box specification, except that flat steel strapping shall be type I, class B.

5.2.2 Level B. Heaters, packaged as described in 5.1, shall be packed as specified for level A, except that the boxes shall be domestic class, and strapping need not be class B.

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5.2.3 Level C. The heaters shall be packed in a manner which will insure arrival at destination in satisfactory condition and be acceptable to the carrier at lowest rates. Containers and packing shall comply with Uniform Freight Classification rules or National Motor Freight Classification rules.

5.3 Marking. In addition to any special marking required by the contract or order (see 6.2), unit packages, intermediate packages, and shipping containers shall be marked in accordance with the requirements of MIL-STD-129.

6. NOTES

6.1 Intended use. The units are intended for use in semi-tropical or tropical regions, to serve as heaters in confined places such as clothes closets and lockers, to reduce moisture and prevent moisture damage to clothing housed therein.

6.2 Ordering data. Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type and size of heater (see 1.2 and 3.7).
- (c) When first article is required for inspection and approval (see 3.2).
- (d) When shield is not required (see 3.5.4).
- (e) Type of mounting required for size 1 heaters (see 3.5.6.1).
- (f) Electrical power requirements (see 3.8).
- (g) Treatment and painting, if other than specified (see 3.11).
- (h) Level of packaging and level of packing required (see 5.1 and 5.2).
- (i) Number of heaters in intermediate package (see 5.1.1.2).
- (j) Marking required (see 5.3).

6.2.2 Contract data requirements. Where this specification is used in a procurement which incorporates a DD Form 1423 and invokes the provisions of paragraph 7-104.9(n) of the Armed Services Procurement Regulation, the data requirements identified below will be developed as specified by an approved Data Items Description (DD Form 1423) incorporated into the contract. Where the provisions of ASPR 7-104.9(n) are not invoked, the data specified below shall be delivered in accordance with the contract requirement. Deliverable data required by this specification is cited in the following paragraph:

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<u>Paragraph</u>	<u>Data Requirements</u>	<u>Applicable DD 1664</u>
3.3	Certificate of Compliance	UDI-E-24007

(Copies of Data Items Description required by contractor in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

6.3 First article. When a first article is required it shall be tested and approved under the appropriate provisions of paragraph 7-104.55 of the Armed Services Procurement Regulation. The first article should be a preproduction item. The first article should consist of one unit. The contracting officer should include specific instructions in all procurement instruments regarding arrangements for examinations, test, and approval of the first article.

6.4 Asterisk. The margin of this specification is marked with asterisks 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, irrespective of the marginal notations and relationship to the last previous issue.

Custodians:
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Navy - YD
Air Force - 84

Preparing Activity:
Navy - YD
Project No. 4520-0200

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Naval Construction Battalion
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SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 22-R255
INSTRUCTIONS: This sheet is to be filled out by personnel, either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.		
SPECIFICATION Heaters; Space, Electric (Lockers & Clothing Closets) MIL-H-52081A		
ORGANIZATION		
CITY AND STATE	CONTRACT NUMBER	
MATERIAL PROCURED UNDER A <input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT		
1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? A. GIVE PARAGRAPH NUMBER AND WORDING.		
B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES		
2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID		
3. IS THE SPECIFICATION RESTRICTIVE? <input type="checkbox"/> YES <input type="checkbox"/> NO (If "yes", in what way?)		
4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)		
SUBMITTED BY (Printed or typed name and activity - Optional)		DATE