MIL-W-43896A
27 December 1983
SUPERSEDING
MIL-W-43896
12 June 1974

MILITARY SPECIFICATION

WELL, HOT FOOD STORAGE, ELECTRIC

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

1. SCOPE

1.1 Scope. This document covers an electrically heated hot food storage well of the drop-in type with temperature control and drain.

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:

SPECIFICATION

FEDERAL

PPP-B-636 - Boxes, Shipping, Fiberboard

STANDARDS

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 - Marking for Shipment and Storage

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

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

FSC 7310

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
A 312 - Seamless and Welded Austenitic Stainless Steel Pipe
B 43 - Seamless Red Brass Pipe, Standard Sizes
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.)

NATIONAL SANITATION FOUNDATION (NSF)

Standard No. 4 - Commercial Cooking and Hot Food Storage Equipment

Listing of Food Service Equipment

(Application for copies should be addressed to the National Sanitation Foundation, NSF Building, Ann Arbor, MI 48105.)

UNDERWRITERS LABORATORIES, INC.

Component Index

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

(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, the text of this document shall take precedence.

3. REQUIREMENTS

3.1 Standard product. The wells 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.

3.2 Codes and standards. Wells shall comply with the applicable requirements of NSF Standard No. 4 and shall be recognized under the component program of UL.

3.2.1 Compliance. Prior to commencing production, the contractor shall submit to the contracting officer or his authorized representative satisfactory evidence that the wells he proposes to furnish under this document meet the applicable requirements of UL and NSF as follows:

3.2.1.1 UL. The well shall be recognized under the component program of UL. Acceptable evidence of meeting this requirement shall be a photostatic copy of the manufacturer's Component Recognition Card, listing in the Component Index, or a certified test report from a recognized independent testing laboratory, acceptable to the Government, indicating that the wells have been tested and conform to the requirements of the UL component program.

3.2.1.2 NSF. Acceptable evidence of meeting the requirements of NSF shall be:

(1) A listing in the current edition of the NSF "Listing of Food Service Equipment" or display of the NSF seal on the finished well, or

(2) A certification for the wells issued by NSF under their special one-time contract evaluation/certification service, or

(3) A certified test report from a recognized independent testing laboratory acceptable to the medical department of the service for which the wells are being procured, indicating that the wells have been tested and conform to NSF.

3.3 Materials and components. Materials and components shall be as specified herein. Materials not definitely specified shall be of the quality normally used by the manufacturer in his standard commercial well provided the completed item complies with all provisions of this document (see 6.3).

3.3.1 Stainless steel sheet and strip. Stainless steel sheet and strip shall be any type in the 300 series of ASTM A 167.

3.3.2 Stainless steel pipe. Stainless steel pipe shall be any type in the 300 series of ASTM A 312.

3.3.3 Brass pipe. Brass pipe shall conform to ASTM B 43.

3.4 Design and construction. The well shall be designed as a drop-in type for counter or table installation and shall be suitable for wet or dry operation. The well shall consist of a seamless, drawn stainless steel pan including top perimeter supporting flanges, an integral drain, a means of attaching the pan into the counter, a counter gasket, a heat distributing plate, a heating element attached beneath the pan, insulation below the heating element and along the sides, all encased by an outer housing of galvanized steel or other corrosion-resistant metal, and a thermostatic control suitable for mounting in the counter front adjacent to

the well. Inside dimensions of the well pan, with plus 1/4, minus 0 inch tolerances, are: length 19-7/8 inches, width 11-7/8 inches, and depth 6-1/8 inches. The perimeter-flange shall be not less than 1/2 inch wide. The well pan shall be considered a food zone as defined by the National Sanitation Foundation and shall therefore conform to the applicable food contact surface requirements of NSF Standard No. 4. When tested as specified in 4.5.1, the well shall not leak around the drain pipe or the counter gasket, and the heating element and pilot light shall energize when the control is turned on.

3.4.1 Electrical characteristics. The well shall be operable from one of the following power supplies, as specified (see 6.2):

115 volt, 60 hertz, single phase
208 volt, 60 hertz, three phase
220/380 volt, 50 hertz, three phase
225 volt, DC

3.4.1.1 Heating system. A heat distributing plate, 1/8 ± 1/32 inch thick and of adequate size to cover the flat surface of the bottom of the well, shall be welded or securely clamped to the underside of the well. The heating element shall be the enclosed tubular type rated at not less than 1500 watts and shall be securely clamped to the underside of the heat distributing plate. The heating element shall be removable for replacement without the use of special tools.

3.4.1.2 Temperature controls. A thermostat of infinite temperature control type with a clearly marked "OFF" position shall be provided. The control shall provide temperature adjustment within a minimum range of 120° to 190°, and at an intermediate setting (approximately 150°F), the temperature control shall limit temperature variation to not more than ± 20°F when tested as specified in 4.4.1. The control unit shall be suitable for mounting in the counter front adjacent to the well pan. The control adjusting knob shall either be recessed or shall have a protective shield to prevent accidental breakage. An indicator light shall be provided on the control panel and shall be illuminated when the heating element is energized.

3.4.2 Gasket. A gasket shall be provided to seal the joint between the top perimeter flange of the well pan and the mounting surface. The gasket shall provide a positive moisture seal.

3.4.3 Thermal insulation. A minimum of 3/4 inch of thermal insulation shall be provided between the heating element and the base of the outer casing and between the sides of the well pan and outer casing. Insulation shall be the blanket type.

3.4.4 Drain. A drain shall be provided in the base of the well pan for the purpose of draining water when wet operation is required. The drain shall be a stainless steel pipe in accordance with 3.3.2 welded to the well pan, or a brass pipe in accordance with 3.3.3 brazed to the pan and shall have a standard 3/4 NPT minimum threads on the outlet end. The inlet end of the drain pipe shall be smooth and flush with the surface of the well pan. An integral stainless steel inlet strainer screen shall be provided.

3.5 Installation instructions. Installation instructions illustrating how to install the well shall be included with each well. Instructions shall reflect UL installation requirements.

3.6 Marking for identification. Each well shall be permanently and legibly marked with the manufacturer's name or trademark readily identificable with said manufacturer.

3.7 Workmanship. The finished wells shall be clean, free of scratches, dents, breaks, sharp edges, deformities, burrs and slivers. Rivets shall be tight and the rivet heads and peened ends shall be round and concentric and shall be in full contact with the joined metal surfaces. Fusion welds shall be clean, smooth, continuous, free of pits, scale, excess flux, slag, and splatter. Threaded fasteners shall be drawn tight, and lockwashers shall be used on all bolts. Electrical wiring shll have adequate slack to provide strain relief and shall not be cut, be abraded, have excess insulation stripped, or be poorly joined at terminals.

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 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 document where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be 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 In-process inspection. Examination shall be made of the following fabrication processes to establish conformance to the specified requirements. Whenever nonconformance is noted, correction shall be made to the process and all items processed.

a. Thermal insulation. Application of thermal insulation shall be checked for conformance to 3.4.3.

b. Heating element removability. Examination shall be made to assure that the heating element is removable as specified in 3.4.1.1.

4.2.3 End item visual examination. The end item shall be examined for the defects listed in table I. The lot size shall be expressed in units of wells. The sample unit shall be one well. The inspection level shall be S-2 and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 2.5 for major defects and 6.5 for total (major and minor combined) defects.

TABLE I. Visual defects

Examine	Defect	Classification Major	Classification Minor
Standard product	Item not in accordance with manufacturer's standard product	X	
Design and construction	Integral drain not provided	X	
	Control not as specified, not protected	X	
	Pilot light bulb missing		X
	Gasket not provided	X	
	Heat distributing plate not provided	X	
	Not drop-in type well	X	
	Top perimeter support flange not provided	X	
	Pan not seamless drawn	X	
Workmanship	Scratches, dents		X
	Breaks, deformities	X	
	Sharp edges, burrs, slivers	X	
	Rivets not tight, fully peened not in full contact with joined metal surfaces	X	
	Threaded fasteners loose		X
	Lockwashers not used on bolts		X
Identification marking	Missing, incomplete, not legible		X
Installation instructions	Missing, incomplete		X

4.2.4 End item dimensional examination. The end item shall be examined for conformance to the specified dimensions. Any measurement deviating from the specified dimension shall be classified as a defect. The lot size shall be expressed in units of wells. The sample unit shall be one well. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

4.2.5 End item testing.

4.2.5.1 Performance testing. The initial production well or a representative well selected at random from an existing production lot shall be tested as specified in 4.4.1. Any failure of the initial production well shall be cause for rejection of the well, for necessary design and construction changes, and for repetition of the above testing on the next produced well. The process shall be repeated until a well sucessfully passes the performance test. Any failure of a well selected from an existing production lot shall be cause for rejection of that lot.

4.2.5.2 Operation testing. Every well shall be energized for a sufficient period of time to determine that the heating element, thermostat, and pilot light are operational. Failure of any component to operate shall be cause for rejection of the well.

4.2.6 Packaging inspection. An examination shall be made to determine that preservation, packing, and marking comply with the section 5 requirements. Defects shall be scored in accordance with table II. The sample unit shall be one well, fully packaged. The lot shall be the number of containers offered for inspection at one time. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

TABLE II. Packaging defects

Examine	Defect
Marking	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application.
Materials	Any component missing, damaged, or otherwise defective.
Workmanship	Inadequate application of components, such as: incomplete closure of container flaps, loose strapping, improper taping or inadequate stapling. Bulged or distorted container.

4.3 Certification. Certificates of compliance, certified test reports, approval labels or listing marks for codes and standards, as applicable, that submitted as proof of compliance with the documents requirements shall be examined and validated.

4.4 Methods of inspection.

4.4.1 Performance test. Install the well into a flat, level sheet metal surface in accordance with the manufacturer's instructions. Plug the drain pipe and fill the well pan 2 inches deep with cold tap water. Set the temperature control to an

intermediate setting (approximtely 150°F), allow the temperature to stabilize, and check for conformance with the temperature variation specified in 3.4.1.2. Check that the pilot light operates, and check the drain area beneath the well for leaks to determine conformance with 3.4. Completely wet the well perimeter and check that the well gasket does not allow water to leak below the sheet metal surface to determine conformance with 3.4.2. Failure of the well to conform to the requirements of 3.4, 3.4.1.2, and 3.4.2 shall constitute failure of this test.

5. PACKAGING

5.1 Preservation. Preservation shall be level A or Commercial as specified (see 6.2).

5.1.1 Level A. The control panel shall be unit packed in a snug-fitting fiberboard box conforming to style RSC, type CF, variety SW, or type SF, class domestic of PPP-B-636. The contents shall be adequately cushioned to prevent movement or damage during transit. Box closure shall be in accordance with PPP-B-636.

5.1.2 Commercial. The hot food storage well shall be preserved in accordance with ASTM D 3951.

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

5.2.1 Level A packing. Each complete hot food storage well, preserved as specified in 5.1, shall be packed in a snug-fitting fiberboard shipping container conforming to style RSC, V3s of PPP-B-636. The box containing the control panel shall be placed inside the well of the unit. Cushioning shall be used as necessary to preclude movement or damage. Each shipping container shall be closed in accordance w ith method III, waterproofed in accordance with method V and reinforced as specified in the appendix of PPP-B-636.

5.2.2 Level B packing. Each complete hot food storage well, preserved as specified in 5.1, shall be packed in a snug-fitting fiberboard shipping container conforming to style RSC, type CF, variety SW, or type SF, class domestic of PPP-B-636. The box containing the control panel shall be placed inside the well of the unit. Cushioning shall be used as necessary to preclude movement or damage. Each shipping container shall be closed in accordance with method II of the appendix of PPP-B-636.

5.2.2.1 Weather-resistant fiberboard containers. When specified (see 6.2), the shipping container shall be V3c, V3s, or V4s, fabricated and closed in accordance with PPP-B-636.

5.2.3 Commercial packing. Hot food storage wells, preserved as specified in 5.1, 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, unit packs and shipping containers shall be marked in accordance with MIL-STD-129 or ASTM D 3951, as applicable.

6. NOTES

6.1 Intended use. The wells are intended for use in dining areas to keep food in 12 by 20 inch steamtable pans warm.

6.2 Ordering data. Purchasers should exercise any desired options offered herein, and acquisition documents should specify the following:

(a) Title, number and date of this document.
(b) Electrical characteristics required (see 3.4.1).
(c) Selection of the applicable levels of preservation and packing (see 5.1 and 5.2).
(d) When weather-resistant grade fiberboard shipping containers are required for level B packing (see 5.2.2.1).

6.3 Recycled material. It is encouraged that recycled material be used when practical as long as it meets the requirements of the document (see 3.3).

6.4 Changes from previous issue. Asterisks are not used in this revision to identify the changes with respect to the previous issues, due to the extensiveness of the changes.

Custodians:

Army - GL
Navy - YD
Air Force - 99

Review activities:

Army - MD, TS
Navy - SA
Air Force - 84

Preparing activity:

Army - GL

Project No. 7310-0503

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-W-43896A	Well, Hot Food Storage, Electric

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 82 MAR 1426 PREVIOUS EDITION IS OBSOLETE.

NATICK OP, 1 APR 83