

**Underwriters Laboratories Inc.®**A not-for-profit organization dedicated to public safety
and committed to quality service**January 8, 1996****Revision pages for****Standard for****Oil-Burning Stoves****UL 896, Fifth Edition**

Attached to this transmittal notice is a revision of the Fifth edition of UL 896.

THIS REVISION IS CONSIDERED NON-SUBSTANTIVE AND IS BEING ISSUED TO ELIMINATE THE MERCUROUS NITRATE TEST AND REPLACE IT WITH A 10-DAY MOIST AMMONIA AIR STRESS CRACKING TEST. THE MERCUROUS NITRATE TEST IS BEING ELIMINATED DUE TO THE FACT THAT THE DISPOSAL OF MERCUROUS NITRATE COATED MATERIAL IS INCREASINGLY DIFFICULT. THE 10-DAY MOIST AMMONIA AIR STRESS CRACKING TEST IS AN EQUIVALENT TEST. THE REQUIREMENTS ARE NOW IN EFFECT.

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UL 896

Standard for

Oil-Burning Stoves

First Edition – October, 1936

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Fifth Edition

July 29, 1993

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc.

Revisions of this standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest published set of revision pages.

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FOREWORD

A. This Standard contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Standard. These requirements are based upon sound engineering principles, research, records of tests and field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product employing materials or having forms of construction differing from those detailed in the requirements of this Standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be judged to comply with the Standard.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed. UL shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

16 Draft Regulator

16.1 A stove equipped with a natural-draft burner shall be provided with a draft regulator designed to maintain the draft value for which the stove is intended to operate.

17 Fan Housing and Air Ducts

17.1 A fan housing and an air duct shall be made of noncombustible material and be strong and durable. Sheet metal shall be acceptably protected to resist corrosion.

18 Fittings and Piping

18.1 Pipe shall be standard full weight wrought iron or steel, or iron-pipe-size brass or copper pipe. Substantial malleable iron, steel, brass, or copper pipe fittings shall be used with pipe. Unions, if used, shall be the ground-joint type or the equivalent.

18.2 Tubing incorporated in the assembly of the stove at the factory shall be arranged to avoid being mechanically injured, such as by closely following the contour of the assembly. Seamless drawn aluminum or copper tubing employed in the fabrication of factory assembled equipment shall have a wall thickness in accordance with Table 18.1.

Table 18.1
Aluminum and copper tubing

Outside diameter, inches	Wall thickness, inches	Wall tolerance, plus or minus, inches
1/4	0.030	0.0035
5/16	0.030	0.0035
3/8	0.030	0.0035
1/2	0.035	0.0035
5/8	0.040	0.0035
3/4	0.042	0.0035

18.3 Steel tubing of the seamless, brazed, or welded type employed in the fabrication of factory assembled equipment shall have a wall thickness of not less than that shown in Table 18.2.

Table 18.2
Steel tubing

Outside diameter, inches	Wall thickness, inches
1/4	0.028
5/16	0.028
3/8	0.028
1/2	0.028
5/8	0.035
3/4	0.035

- 18.4 Steel tubing of the wall thickness specified in Table 18.2 shall be protected from corrosion.
- 18.5 Flexible metal hose, if used, shall be of a suitable type and be used in a manner to avoid damage to it.
- 18.6 All pipe ends and openings in fittings for pipe connections shall be threaded in accordance with the Standard for Pipe Threads, ANSI B2.1 — 1968, unless other acceptable forms of constructions are provided.
- 18.7 Proper care shall be observed to remove webs, shoulders, and other obstructions from the inner ends of internally threaded openings in fittings to permit making tight joints.
- 18.8 Fuel lines shall terminate in a manner which will permit ready connection to the stove.
- 18.9 Piping and tubing for oil lines shall be of size and arrangement to avoid air traps.
- 18.10 Openings into fuel-handling parts shall be suitably covered or encased to prevent entrance of foreign material prior to installation.
- 18.11 Drawn-brass tubing, floats, and other drawn-brass parts shall be capable of withstanding the 10-Day Moist Ammonia Air Stress Cracking Test in Section 50A.

18.11 revised January 8, 1996

19 Flue Collar

- 19.1 Flue collars shall be made of material not lighter than that required for the combustion chamber. See 12.1 and Table 12.1. A collar shall permit the secure attachment of the flue pipe thereto.
- 19.2 The flue collar shall not be in close proximity to, or directly above the fill opening of the supply tank.

20 Gaskets

- 20.1 A gasket for a joint in oil-handling parts shall be impervious to oil.

21 Heating Surface Joints

- 21.1 All joints of heating surfaces shall be reasonably tight and substantial, by being bolted, welded, lock-seamed, riveted, etc. A joint shall not depend primarily on cement for tightness. A slip or lap joint shall not depend solely upon friction of the joint itself for strength.

48.4 The stove is then to be fired at one-fourth the manufacturer's recommended high-fire input with draft conditions imposed as described in 48.3.

48.5 During the tests described in 48.3 – 48.4, no flames are to burn outside the stove, no smoke is to be expelled into the room, nor is the cheesecloth to ignite. The maximum temperature on walls adjacent to the stove or the flue pipe connected thereto, on the floor under the stove and within 3 feet of it, is not to exceed room temperature by more than 175°F (97°C). The maximum temperature rise on stove components is not to exceed the values indicated for such items by Column 2, Table 29.1.

49 Seepage and Burnoff Test

49.1 A stove shall be designed so that no hazardous seepage of oil shall occur under the following concurrent conditions:

- a) The integral supply tank is filled with oil,
- b) The oil-regulating device is open to maximum input position, and
- c) The burner is not ignited and the stove is allowed to stand for a period of not less than 48 hours in a room maintained within ± 10 degrees of a constant temperature.

When the burner is subsequently lighted, flames shall not flash back nor burn outside the stove, no excessive smoke shall be expelled into the room, nor shall light fabric on the floor beneath the stove become ignited. The maximum temperature shall not exceed room temperature by more than 175°F (97°C):

- a) On walls adjacent to the stove,
- b) On walls adjacent to the flue pipe connected to the stove,
- c) On the floor under the stove, and
- d) On the floor within 3 feet of the stove.

The maximum temperature rise on stove components shall not exceed the values indicated for such items by Column 2, Table 29.1.

49.2 The initial conditions for test are to be as described in 39.4 – 39.8, except that any draft regulator included as part of the stove assembly is to be made operative, in which case the draft regulator in the flue pipe is to be sealed closed. The draft regulator is to be set as adjusted for manufacturer's recommended high-fire draft, which is to be not more than 0.06 inch. Two layers of cheesecloth are to be placed on the floor beneath the stove and be extended 12 inches beyond the stove in all directions. An integral tank is to be filled with oil, or if the stove is intended for use with a separate tank, the stove is to be connected to a supply tank arranged to maintain an effective head of not less than 18 inches on the fuel-regulating device.

49.3 The fuel-regulating device is to be opened to its maximum input setting, the burner or burners to be unlighted. After the stove has stood for 48 hours, no oil is to have dripped onto the cheesecloth. If the stove is equipped with an air-circulating fan, this test is to be conducted with the fan idle. Then the stove is to be lighted and allowed to fire until equilibrium temperature conditions are attained. No flame is to burn outside the stove, no excessive smoke is to be expelled into the room, the cheesecloth is not to ignite, nor are the temperatures attained to exceed the limits specified. A stove equipped with an optional draft booster, the burner being a natural-draft burner as defined by 4.10, is to be tested for conformance with 49.1 with and without power supply to the draft booster.

50 Closed Dampers Test

50.1 A stove equipped with a damper in the stove flue, and a stove intended with a damper in the flue pipe, shall be capable of operating safely when fired at the maximum input allowed by the maximum input setting of the fuel-metering device, with the damper closed, while firing until a full tank, but not more than 10 gallons, of fuel is consumed.

50.2 The initial conditions for test are to be as described in 39.4 – 39.8, except that any draft regulator included as part of the stove assembly is to be made operative, in which case the draft regulator in the flue pipe is to be sealed closed. The damper, if intended to be installed in the flue pipe, is to be located in accordance with the instructions furnished with the stove. The draft regulator is to be set as adjusted for manufacturer's high-fire draft, but not more than 0.06 inch. Two layers of cheesecloth are to be placed on the floor beneath the stove and be extended 12 inches beyond the stove in all directions. An integral tank is to be filled with oil, or if the stove is intended for use with a separate tank, the stove is to be connected to a supply tank arranged to maintain an effective head of 18 inches on the fuel-regulating device.

50.3 The fuel-regulating device is to be opened to its maximum input setting, the burner lighted, the damper closed, and the stove is to be allowed to consume the quantity of fuel stated in 50.1. Flames are not to flash back nor burn outside the stove, no smoke is to be expelled into the room, and the cheesecloth is not to ignite. The maximum temperatures are to be in accordance with 49.1.

50A 10-Day Moist Ammonia Air Stress Cracking Test

50A.1 After being subjected to the conditions described in 50A.2 – 50A.4, a brass part containing more than 15 percent zinc shall show no evidence of cracking when examined using 25X magnification.

50A.1 added January 8, 1996

50A.2 Each test sample is to be subjected to the physical stresses normally imposed on or within a part as the result of assembly with other components. Such stresses are to be applied to the sample prior to and maintained during the test. Samples with threads, intended to be used for installing the product in the field, are to have the threads engaged and tightened to the torque specified in Table 50A.1. Teflon tape or pipe compound are not to be used on the threads.

50A.2 added January 8, 1996

Table 50A.1
Torque requirements for threaded connections

Nominal thread size, inches	Torque pound-inches (N · m)	
1	1200	(135.6)
1-1/4	1450	(163.8)
1-1/2	1550	(175.1)
2	1650	(186.4)
2-1/2	1750	(197.7)
3	1800	(203.4)

Table 50A.1 added January 8, 1996

50A.3 Three samples are to be degreased and then continuously exposed in a set position for ten days to a moist ammonia-air mixture maintained in a glass chamber approximately 12 by 12 by 12 inches (305 by 305 305 mm) having a glass cover.

50A.3 added January 8, 1996

50A.4 Approximately 600 ml of aqueous ammonia having a specific gravity of 0.94 is to be maintained at the bottom of the glass chamber below the samples. The samples are to be positioned 1-1/2 in. (38.1 mm) above the aqueous ammonia solution and supported by an inert tray. the moist ammonia-air mixture in the chamber is to be maintained at atmospheric pressure and at a temperature of 93°F (34°C).

50A.4 added January 8, 1996

MANUFACTURING AND PRODUCTION TESTS

51 General

51.1 In order to insure compliance with these requirements in production, the manufacturer shall inspect and/or test the components and the assembly of each unit.

51.2 The factory inspection and tests shall include at least the following:

- a) Inspection of all raw materials.
- b) Check of relationship between constant-level device or sump and the burner.
- c) Examination of all burners and sumps to determine that they are free from defects. If of cast-iron, the burner or sump may be tested for porosity and leakage by filling it with No. 1 oil and allowing it to stand for at least 1/2 hour; by filling it with mineral spirits and allowing it to stand for 5 minutes; by air pressure; or equivalent manner.
- d) Inspection of combustion chamber to determine conformance to manufacturing specifications.
- e) Test of at least 3 percent of each lot of listed tanks obtained from outside sources, and which have previously been tested 100 percent, for leakage.
 - 1) Barometric tanks shall be tested with air at a pressure of 3 psi while immersed in water.
 - 2) Gravity tanks shall be tested with air at 1 pound pressure while immersed in water. This may be accomplished by inverting the tank so as to trap air in it and submerging the tank in water to a depth of 30 inches, measured from the surface of the water to the surface of the tank.
- f) Test of all barometric or gravity tanks produced by the stove manufacturer. Tests shall be conducted as outlined in subitems (1) and (2) of item (e).
- g) Test of at least 3 percent of each lot of constant-level valves with integral metering stems, and of at least 3 percent of metering valves for bench-flow before being mounted on stoves to assure that, at maximum adjustment, the flow does not exceed that specified. The flow test shall be conducted as outlined under Instrumentation – Fuel Input. See 38.2.1 – 38.2.4 and Figures 38.1 and 38.2.
- h) Test of all metering valves produced by the stove manufacturer for bench-flow to assure that, at maximum adjustment, the flow does not exceed that specified. The flow test shall be conducted as outlined in 38.2.1 – 38.2.4. See also Figures 38.1 and 38.2.

MARKINGS

52 General

52.1 The following information shall appear on each stove:

- a) The manufacturer's or vendor's name and catalog designation.
- b) The electrical rating, if ratings on the individual current-utilizing components are not readily visible after installation.
- c) The minimum clearance to combustible construction to be provided when installed.
- d) Identification and directions for installation of individual subassemblies and parts not factory assembled on the stove.
- e) Marking, as applicable; "For use only with separate fuel tanks," "For use only with integral fuel tanks," or "For use with integral or separate fuel tanks."

52.2 The following permanent label shall appear on the front of a stove as normally installed:

"CAUTION: Hot While In Operation. Do Not Touch. Keep Children, Clothing, and Furniture Away."

The letters in the word "CAUTION" shall be not less than 1/4 inch high with the remaining letters of the label being not less than 1/8 inch high. This label shall be legible when viewed from a point 5 feet directly in front of the stove and 5 feet above the floor.

52.3 A separate component, such as an air-circulating fan, draft regulators, etc., covered by the scope of these requirements, furnished for use with stoves shall carry an identifying catalog designation.

52.4 All markings shall be at locations readily visible after the stove is installed. Locations within compartments provided with doors or panels readily opened or removed are considered visible.

52.5 The markings shall be reasonably permanent, as afforded by a metal nameplate or decalcomania transfer.

52.6 If a manufacturer produces oil-burning stoves at more than one factory, each stove shall have a distinctive marking to identify it as the product of a particular factory.

Standard for Safety

UL 896

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Oil Burning Stoves



Underwriters Laboratories Inc.®

Standard

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An independent, not-for-profit organization testing for public safety

July 29, 1993

Standard for

Oil-Burning Stoves

UL 896, Fifth Edition

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Subscribers to UL's services in the area covered by this standard will receive these revised and/or additional pages automatically. Others may receive such pages by subscribing to UL's subscription service for revisions. See UL's CATALOG OF STANDARDS FOR SAFETY for a description of the revision subscription service, the cost of the service for this standard, and ordering information.

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F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

INTRODUCTION

1 Scope

1.1 These requirements apply to oil-burning flue-connected room heaters and ranges as defined herein. They may be used where a competent attendant will not be constantly on duty in the room where the appliance is located, while the appliance is in operation. They are required to be equipped with automatic primary safety controls to prevent abnormal discharge of oil at the burner in case of ignition failure or flame failure. They are not intended for use in spaces in which flammable vapors or gases may be present.

1.2 Requirements for the installation and use of oil-burning equipment are included in the Standard of the National Fire Protection Association for the Installation of Oil-Burning Equipment, NFPA No. 31.

1.3 A product that contains features, characteristics, components, materials, or systems new or different from those in use when the standard was developed, and that involves a risk of fire, electric shock, or injury to persons, shall be evaluated using the appropriate additional component and end-product requirements as determined necessary to maintain the level of safety for the user of the product as originally anticipated by the intent of this standard.

2 Components

2.1 Components of an oil burner, except as specified herein, or a gas burner as well as burner and stove accessories such as constant-level oil valves, metering valves, fire pots, etc.; electrical components and materials such as attachment plugs, industrial control equipment, switches, transformers, electrically operated valves, wires, etc.; and other components or parts shall comply with the requirements for those components, except that such requirements may be modified if appropriate for the particular application.

3 Units of Measurement

3.1 If a value for measurement is followed by a value in other units in parentheses, the second value may be only approximate. The first stated value is the requirement.

4 Glossary

4.1 AIR SHUTTER — An adjustable device for varying the size of the air inlet or inlets regulating primary or secondary air.

4.2 ANTIFLOODING DEVICE — A primary safety control which causes the fuel flow to be shut off upon a rise in fuel level or upon receiving excess fuel, and which operates before the hazardous discharge of fuel can occur.

4.3 APPLIANCE FLUE — The flue passages within the appliance.

4.4 AUTOMATICALLY LIGHTED APPLIANCE — An appliance in which fuel to the main burner is normally turned on and ignited automatically.

4.5 BAFFLE — An object placed in an appliance to direct or to retard the flow of air or flue gases.

4.6 BASE — The main supporting frame or structure of an assembly.