UL 1101

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Solidified Fuel Cooking Appliances for Marine Use

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UL Standard for Safety for Solidified Fuel Cooking Appliances for Marine Use, UL 1101

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New product submittals made prior to a specified future effective date will be judged under all of the requirements in this Standard including those requirements with a specified future effective date, unless the applicant specifically requests that the product be judged under the current requirements. However, if the applicant elects this option, it should be noted that compliance with all the requirements in this Standard will be required as a condition of continued Listing and Follow-Up Services after the effective date, and understanding of this should be signified in writing.

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This Standard consists of pages dated as shown in the following checklist:

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UL 1101

Standard for Solidified Fuel Cooking Appliances for Marine Use

First Edition – September, 1989

Second Edition

April 5, 1999

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 set of revised requirements.

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CONTENTS

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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 which conflict with specific requirements of the Standard cannot be judged to comply with the Standard. A product employing materials or having forms of construction not addressed by this Standard may be examined and tested according to the intent of the requirements and, if found to meet the intent of this Standard, 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.

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INTRODUCTION

1 Scope

1.1 The requirements in this standard apply to the construction and performance characteristics of solidified fuel cooking appliances for use on boats, including counter-top assemblies, insert surface assemblies, insert ovens, and ranges (surface cooking units and ovens included in the one appliance).

1.2 Solidified fuel cooking appliances covered in this standard are intended for installation in accordance with the applicable standards of the American Boat and Yacht Council, and with the Fire Protection Standard for Pleasure and Commercial Motor Craft, NFPA 302, and with the Code of Federal Regulations (CFR), Title 33.

1.3 These requirements do not cover cooking appliances using wood, coal, charcoal, or vapor or gaseous fuels.

1.4 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, 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 acceptable level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard cannot be judged to comply with this standard. Where considered appropriate, revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

2 General

2.1 Units of measurement

2.1.1 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.

2.2 Terminology

2.2.1 The term ″cooking appliance″ refers to all solidified fuel cooking appliances.

3 Components

3.1 Except as indicated in 3.2, a component of a cooking appliance covered by this standard shall comply with the requirements for that component.

3.2 A component need not comply with a specific requirement that:

a) Involves a feature or characteristic not needed in the application of the component in the product covered by this standard, or

b) Is superseded by a requirement in this standard.

3.3 A component shall be used in accordance with its recognized rating established for the intended conditions of use.

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3.4 Specific components are recognized as being incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions for which they have been recognized.

CONSTRUCTION

4 General

4.1 Means shall be provided for properly mounting the cooking appliance. The mounting means shall be of a type and located so that proper installation can be made using normal hand tools (any standard wrench or screwdriver) without dismantling any major part of the cooking appliance.

4.2 All cooking surfaces shall be enclosed by a guard rail, a lip, or have other equivalent means of holding cooking utensils in place during conditions of pitch and roll.

4.3 A removable or accessible liquid-tight metal drip pan(s), at least 3/4 inch (19.1 mm) deep and of adequate area to contain spillage, shall be provided under all burner assemblies.

4.4 Ventilating and air supply openings in the appliance enclosure shall be provided in only those surfaces which will be open to the free circulation of air after the cooking appliance is installed.

4.5 A heat-insulating material shall be noncombustible and electrically nonconductive and shall not make direct contact with uninsulated electrical parts.

4.6 A visual examination of the cooking appliance shall be made to determine whether any defect in the construction materials in the assembly could impair the intended use of the appliance.

4.7 Ovens shall be provided with a means of preventing opening due to force from sliding food and utensils during conditions of pitch and roll, as described in 15.1(d).

4.8 Automatic glow plugs or continuously lighted pilot lights are not acceptable for use in stoves.

Exception No. 1: A glow plug that operates only when the stove control is operated is acceptable.

Exception No. 2: Automatic glow plugs and continuously lighted pilot lights are acceptable for use in stoves using sealed combustion chambers.

5 Frame and Enclosure

5.1 An external edge, projection, and corner shall be smooth, rounded, and not sufficiently sharp to cause a laceration injury in intended use and maintenance of the cooking appliance.

5.2 The frame and its components shall be rigidly constructed of noncombustible materials acceptable for the maximum temperatures, stresses, and operating conditions likely to be encountered in service. The material weights and the methods of mounting components and joints shall be such that all parts will maintain a fixed relationship during the normal service life of the cooking appliance.

5.3 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. Examples of acceptable lock-seamed joints are shown in Figure 5.1.

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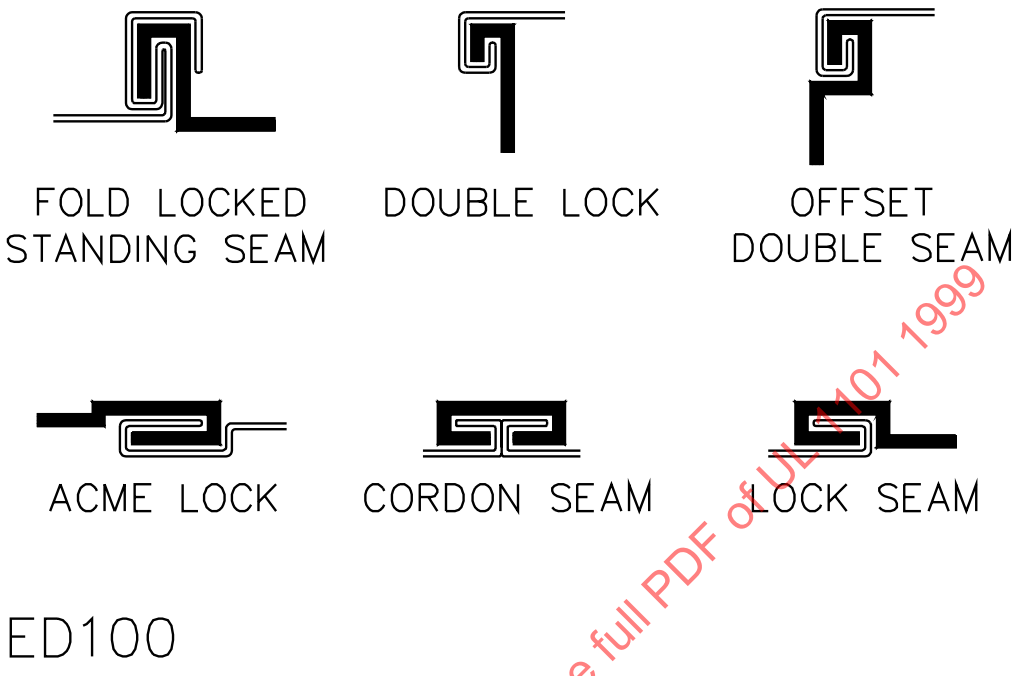
Figure 5.1
Types of acceptable lock seams



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5.4 A cooking appliance shall be constructed to provide access to all operating parts for normal servicing.

6 Operating Controls

6.1 An operating control, including service handle, shall be readily accessible from the front face and shall be made of a material that will not be adversely affected when subjected to increased temperatures, as indicated in Table 16.1.

6.2 An operating control handle in the closed or off position shall:

a) Completely stop the burner flame;

b) Be secured so as not to back out due to vibration and shock and other conditions likely to occur; and

c) Be provided with a positive means to prevent knob removal.

7 Burner Assembly

7.1 A burner shall be positioned in the stove frame so that the burner flame cannot be extinguished by utensils placed over the burner.

7.2 A burner and fuel supply arrangement shall not be affected by pitch or roll conditions so as to twist, slide, or drop out of position while in service.

7.3 A burner shall be provided with a clearance or other means to permit lighting the burner with a 1-1/2 inch (38.1 mm) long match.

8 Fuel Containment

8.1 A solidified fuel container shall be constructed in a manner acceptable for its intended use and properly labeled. The container shall be resistant to deterioration by the fuel contained and resistant to a marine atmosphere. The method of initial closure shall be such that it will not inadvertently open during shipping or the closure within the appliance will not open as a result of vibration, shock, or other conditions likely to be encountered in service.

8.2 A solidified fuel container shall be mounted on an acceptable base that is either fixed or locked in position so as to reduce the risk of sliding and overturning of the container due to sudden pitch or roll of the boat. The arrangement shall be such that the fuel container cannot be inadvertently removed from the stove while burning.

9 Corrosion Protection

9.1 Iron and steel parts shall be protected against corrosion by enameling, galvanizing, zinc or cadmium plating, or other equivalent means. The composition of metallic alloys shall provide corrosion resistance at least equivalent to stainless steel alloy 410.

9.2 Metal combinations shall be galvanically compatible.

9.3 A material not known to provide acceptable resistance to corrosion, dezincification resistance, and galvanic compatibility between parts shall be subjected to the Salt Spray Corrosion Test, Section 20.

9.4 A non-decorative brass fitting shall have less than 15 percent zinc content or include inhibitors to attain equivalent resistance to corrosion.

10 Gimbaled Units

10.1 Gimbals, if provided, shall comply with the following:

a) The relationship of the vertical center of gravity and the gimbal pivot points shall be such that the cooking surface will remain substantially level under any likely conditions of loading and operation in service. If free swing of the appliance is limited, an acceptable means shall be provided to preclude sudden impact against stops.

b) Means shall be provided to preclude movement of the appliance within the gimbals when the unit is not in use. A lock pin or similar means is acceptable for this purpose.

11 Electrical Components

11.1 Electric wiring and accessories which are integral parts of a cooking appliance shall comply with the requirements in the Standard for Commercial Electric Cooking Appliances, UL 197.

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11.2 Electrical connections to gimbaled appliances (if provided) shall be made in such a manner as to reduce the risk of shorting, chafing, or breaking of electrical conductors. The electrical connections shall not interfere with the movement of the appliance within the gimbals.

PERFORMANCE

12 General

12.1 The same sample of a cooking appliance shall be used for each test specified in Sections 13 – 20 and shall comply with the requirements therein.

13 Vibration Test

13.1 A cooking appliance shall function as intended without increasing the risk of uncontrolled flame or injury to persons following the vibration conditioning specified in 13.2 and 13.3. Also the burner controls shall not vibrate to an open position.

Exception: A cooking appliance marked in accordance with the requirement in 21.4 need not be subjected to the Vibration Test.

13.2 The sample specified in 13.1, including all necessary hardware specified in the manufacturer's instructions, is to be rigidly mounted directly to the surface of a vibration machine in its normal operating position.

13.3 The assembly specified in 13.2 is then to be subjected to variable frequency vibration along each of three rectilinear orientation axes (horizontal, lateral, and vertical) for 4 hours in each plane (12 hours total) at a peak-to-peak amplitude of 0.015 ±0.001 inches (0.38 ±0.025 mm). The frequency of vibration is to be continuously varied, at a uniform rate, from 10 to 60 to 10 Hz every 4 minutes.

13.4 The cooking appliance is to be operated as intended for the last 10 minutes in each plane of vibration.

14 Shock Test

14.1 The same cooking appliance used for the Vibration Test, Section 13, shall function as intended without increasing the risk of uncontrolled flame or injury to persons following the conditioning specified in 14.2 – 14.4.

Exception: A cooking appliance marked in accordance with the requirement in 21.4 need not be subjected to the Shock Test.

14.2 The cooking appliance is to be mounted on a shock machine in the same manner as described in 13.2. The sample is to be subjected to 1000 shock impacts of 10 g acceleration (98 m/s^2) and having a shock duration of 20 – 25 milliseconds as measured at the base of the half-sine shock envelope.

14.3 The machine used for this conditioning is to be of the automatic cycling type capable of producing a half-sine shock pulse at the acceleration level and duration specified in 14.2. The acceleration and shock pulse duration is to be measured by a piezoelectric accelerometer, or other measuring device with equivalent accuracy, mounted on the test machine platform on an axis parallel to the axis of motion.

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14.4 The test sample is to be mounted so that the center of gravity of the sample is as close as possible to the geometric center of the machine platform.

15 Operation Test

15.1 A cooking appliance is to be subjected to the following operation tests:

a) With the cooking appliance fueled and the burners set in operation in accordance with the manufacturer's operating instructions, the controls are to be checked:

1) For proper operation by adjusting the flame from the lowest position to maximum output; and

2) For total extinguishment of flame immediately upon closure.

b) With the cooking appliance operating at capacity, 2 quart and 5 quart pots of water, uncovered and filled to the brim, are to be placed on the surface burners, and a 5 quart uncovered pot of water is to be placed in the oven, if applicable. The water is to boil over for a period of five minutes and there shall be no physical damage to the cooking appliance and no increase in the risk of injury to persons.

c) The effectiveness of the guard rails, or equivalent provisions for utensil retention, is to be checked by the following. The guard rails, or equivalent means, shall confine the cooking utensils within the guard rails.

1) A smooth bottom, specially weighted cooking utensil is to be placed on each burner. These utensils are to have a two quart (1.9 L) capacity and be 6 pounds (2.7 kg) in total weight. See 16.2.2 for more details on the utensil configuration.

2) The cooking appliance is to be rocked through an arc of 60 degrees (30 degrees each side of the vertical) at a rate of approximately one cycle every 3 to 4 seconds for 30 seconds. For gimbal mounted appliances, the arc is to be increased to 90 degrees (45 degrees each side of the vertical).

3) This procedure is to be repeated for the horizontal plane.

d) The effectiveness of the oven door closure required in 4.7 is to be checked during the pitch and roll test of (c). The oven door shall remain closed during the test.

16 Temperature Test

16.1 General

16.1.1 A cooking appliance is to be installed according to the manufacturer's installation instructions in a hooded enclosure constructed as illustrated in Figure 16.1. The cooking appliance is to be subjected to the tests specified in 16.1.2 – 16.5.1 and shall comply with the requirements therein.

16.1.2 All vertical surfaces are to be metal sheathed plywood, adjusted to conform with the clearance indicated in Figure 16.1. The forward edge of the side panel is to be adjusted to project at least 1/2 inch (12.7 mm) beyond the appliance face plate. The lower edge of the sheet metal hood is to be 37 inches (940 mm) above and parallel to the counter top.

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