



Underwriters Laboratories Inc.®

A not-for-profit organization dedicated to public safety
and committed to quality service

March 11, 1996

Revision pages for

Standard for

Marine Manually Operated Shutoff Valves For Flammable Liquids

UL 1106, First Edition

Attached to this transmittal notice is a revision of the First edition of UL 1106.

A CHANGE ON A PAGE DATED MARCH 11, 1996 IS INDICATED BY A SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEM, PRECEDED AND FOLLOWED BY AN ASTERISK.

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.

Attention is directed to the note on the title page of this standard outlining the procedure to be followed to retain the approved text of ANSI/UL 1106-1988.

Revised and/or additional pages may be issued from time to time.

With the inclusion of the accompanying material, the standard consists of pages dated as shown in the following checklist:

Page	Date
1	August 30, 1984 (Reprinted March 11, 1996)
2	—
3	March 11, 1996
4	August 30, 1984
5	March 11, 1996
6 — 8	October 24, 1991
9, 10	August 30, 1984
11	March 11, 1996
12	October 24, 1991
13	January 17, 1991

AUGUST 30, 1984
(Title Page Reprinted: March 11, 1996)



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UL 1106

Standard for

**Marine Manually Operated Shutoff Valves for
Flammable Liquids**

First Edition

August 30, 1984

Approval as an American National Standard (ANSI) covers the numbered paragraphs on pages dated August 30, 1984. These pages should not be discarded when revised or additional pages are issued if it is desired to retain the ANSI approved text.

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

Approved as ANSI 1106-1988, November 2, 1988

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.

GENERAL

1. Scope

1.1 These requirements cover marine manually operated shutoff valves intended for use with flammable liquids used to power internal combustion engines on boats.

1.2 The valves covered by these requirements are intended for installation and use in accordance with the applicable requirements of the U. S. Coast Guard (as specified in 33 CFR 183 Subpart J — Fuel Systems), the standards of the American Boat and Yacht Council, Inc., or the Standard for Fire Protection of Pleasure and Commercial Motorcraft, NFPA 302.

1.3 These requirements cover valves that are intended to operate only in the "open" and "closed" modes.

2. General

2.1 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 A component of a valve covered by this standard shall comply with the requirements for that component and shall be used in accordance with its recognized rating and other limitations of use. 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 a valve covered by this standard, or
- B. Is superseded by a requirement in this standard.

3. Installation and Operating Instructions

3.1 The installation and operating instructions that accompany each valve as produced are to be provided with, and used as a guide in the examination and testing of, the valve. For this purpose, a final, printed version of the instructions is not required.

3.2 The instructions shall include the necessary directions and information for the intended installation, maintenance, and operation of the valve, and shall specify (1) the rated maximum working pressure of the valve and (2) the liquid or liquids for which the valve is intended.

CONSTRUCTION

4. Assembly

General

4.1 A valve shall be constructed to withstand the stresses likely to be encountered in use.

4.2 An edge of an exposed part of a valve shall not be sufficiently sharp to constitute a risk of injury to persons during installation or servicing.

4.3 The body, bonnet, packing nut, and other exposed metallic parts of a valve shall be cast or forged bronze, cast brass, or formed of other material having at least equivalent resistance to corrosion. A valve employing material, or having a form of construction, 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 16. Also, see 10-Day Moist Ammonia-Air Stress Cracking Test, Section 17A.

Paragraph 4.3 revised March 11, 1996

Exception: An operating lever or wheel need not be formed of material having corrosion-resistance equivalent to brass or bronze, but shall be sufficiently corrosion resistant to withstand the exposure specified in Salt-Spray Corrosion Test, Section 16, without loss of structural integrity.

4.4 A cast valve body shall be at least 3/32 inch (2.4 mm) thick.

4.5 A casting shall be smooth and free from scale, lumps, cracks, blisters, sand holes and other defects of any nature that could impair the intended use. A casting shall not be plugged or filled.

Paragraph 4.5 revised May 10, 1988

4.6 The means of fastening for a packing nut, bonnet, plug, and the like shall reduce the likelihood of loosening and leakage.

4.7 Pipe threads and threaded openings shall be in accordance with the Standard for Pipe Threads, General Purpose (Inch), ANSI/ASME B1.20.1, 1983.

Paragraph 4.7 revised October 24, 1991

4.8 The packing nut shall be adjustable by means of a standard wrench. Knurling or any other provision intended to accommodate adjustment by hand or with pliers is not acceptable.

4.9 The construction of the valve stem shall prevent the stem from being inadvertently backed out of the valve.

Paragraph 4.9 revised October 24, 1991

4.10 Threaded portions of the valve stem shall not contact nonmetallic seals.

4.11 A nonmetallic material used to form a gasket, seal, or other part of a valve shall be resistant to deterioration from exposure to the liquids with which it may come in contact, such as gasoline, diesel fuel, engine oil, alcohol, and kerosene. See Resistance to Liquids Tests, Section 18.

5. Installation, Operation, and Servicing

5.1 A valve shall include all of the components necessary for the intended function and installation, and shall be constructed for installation as a single unit.

Paragraph 5.1 revised October 24, 1991

5.2 The intended installation of a valve shall not require drilling, tapping, welding, or other alteration of the valve.

5.3 A valve (1) intended for connection to tubing in fuel-line systems or for direct attachment to a fuel tank (or accessories) by pipe thread, and (2) whose operating torque exceeds 2.92 foot-pounds (0.40 kg-meter), shall have integral, independent mounting provisions.

Paragraph 5.3 revised October 24, 1991

5.4 The construction of a valve shall permit disassembly and reassembly to the degree necessary for intended servicing by means of ordinary tools, such as crescent or spanner wrenches, or tools that are provided with the device.

6. Operating Controls

6.1 A 1/4 turn valve employing a lever-type operating handle shall be constructed so that the axis of the handle is (1) parallel to the direction of fluid flow in the open position and (2) at an angle of 90 degrees relative to the direction of fluid flow in the closed position. Positive stops shall be provided for both the open and closed positions.

Paragraph 6.1 revised October 24, 1991

6.2 For a valve of the type described in paragraph 6.1, the construction of the valve stem shall positively index the operating handle to the stem.

6.3 A valve employing a wheel-type operating handle shall be constructed so that clockwise rotation closes the valve.

Exception: A counterclockwise rotation may be used to close the valve if the valve is clearly and permanently marked to indicate this direction. Also, see paragraph 22.3.

Paragraph 6.3 revised January 17, 1991

6.4 An operating handle shall be of sufficient length or diameter that not more than 4.2 foot-pounds (0.58 kg-meter), applied at the end or periphery, is required to operate the valve. See Operating Force Test, Section 9.

Paragraph 6.4 revised October 24, 1991

PERFORMANCE

7. General

7.1 Representative samples of a valve are to be subjected to the applicable tests described in Sections 8—17. Component samples are to be used for the tests described in Section 18.

7.2 For a valve having threaded inlet or outlet openings, the tests described in Sections 8—12 are to be conducted on samples fitted (in accordance with the manufacturer's instructions) with 1-foot (0.3-m) lengths of steel or brass pipe of the intended size and type, supported as intended in service.

7.3 For the tests specified in Sections 8, 10, and 11, the liquid used to pressurize the samples is to be Stoddard solvent or an equivalent liquid.

15.7 If the temperatures indicated by the thermocouples do not rise at least 648°C (1166°F) during the 2-1/2-minute test period, the test is to be repeated with a new sample.

15.8 Immediately after the fire is extinguished, the discharge valve is to be opened to allow the fuel to flow through the sample. When a steady stream of fuel is obtained, the sample is to be placed under a 3-foot (0.9-m) head of fuel by closing the discharge valve. The fuel level at the tank may be adjusted, if necessary, to obtain the pressure head.

16. Salt-Spray Corrosion Test

16.1 A valve employing materials or having a form of construction not known to provide acceptable resistance to corrosion, dezincification resistance, and galvanic compatibility between parts shall comply with the requirements in paragraph 13.2 and Mechanical Strength Test, Section 14, following the salt spray exposure specified in paragraph 16.2.

16.2 A sample is to be subjected to 1800 hours of salt spray exposure in accordance with the Standard Method for Salt Spray (Fog) Testing, ASTM B117-73(1979).

17. Mercurous-Nitrate-Immersion Test

Section 17 deleted March 11, 1996

17A. 10-Day Moist Ammonia Air Stress Cracking Test

17A.1. After being tested as described in 17A.2 — 17A.4, a brass part containing more than 15 percent zinc shall show no evidence of cracking or delamination when examined using 25X magnification.

Paragraph 17A.1 added March 11, 1996

17A.2. Prior to and during the immersion, the sample is to be subjected to the mechanical stresses generated on or within the part as a result of assembly with other components or piping. Female pipe-threaded ends are to be engaged with extra strong brass plugs, fittings, or pipe. Threaded parts are to be tightened to the degree necessary to produce a leaktight assembly. 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 17A.1. Teflon tape or pipe compound are not to be used on the threads.

Paragraph 17A.2 added March 11, 1996

TABLE 17A.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 17A.1 added March 11, 1996

17A.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 by 305 mm) having a glass cover.

Paragraph 17A.3 added March 11, 1996

17A.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 inches (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 with the temperature constant at approximately 93°F (34°C).

Paragraph 17A.4 added March 11, 1996

18. Resistance to Liquids Tests

18.1 The change of physical properties of a nonmetallic gasket or an elastomeric seal shall comply with the values specified in Table 18.1 when tested as described in paragraph 18.2.

Exception: A gasket or seal that cannot come in contact with the liquid to be handled need not comply with this requirement.

18.2 At least five as-received samples are to be tested in each representative fuel. Each sample is to be immersed for 70 hours in the fuel at a temperature of 23±2°C (73±4°F).

TABLE 18.1
PHYSICAL CHANGES OF GASKETS AND SEALS

Liquids that May be Contacted	Representative Test Fuel ^a	Maximum Physical Change		
		Percent of As-Received Volume		Weight Loss, Percent of As-Received Weight
		Swelling	Shrinkage	
Fuel Oils Nos. 2–6	Reference Oil No. 3	25	1	10
Gasoline	ASTM Reference Fuel A	25	1	10
	ASTM Reference Fuel C	40	1	10
Gasoline/alcohol	85 Percent Reference Fuel C and 15 percent ethyl alcohol (proportioned by volume)	40	1	10

^aThe composition of each reference fuel is to be as specified in the Standard Test method for Rubber Property — Effect of Liquids, ASTM D471 — 79.

MANUFACTURING AND PRODUCTION TESTS

19. General

19.1 To verify continued compliance with these requirements in production, the manufacturer shall provide the necessary production control, inspection, and tests. The program shall include the Leakage Test, Section 20, and the Strength Test, Section 21.

20. Leakage Test

20.1 Each valve shall withstand without leakage, the application of rated maximum working pressure to the valve using an aerostatic source for 10 seconds.

Paragraph 20.1 revised October 24, 1991

20.2 The valve is to be submerged under water or uniformly coated with a soapy water solution (soaps containing ammonia shall not be used), or the equivalent. Formation of bubbles is considered to be evidence of leakage.

21. Strength Test

21.1 Each valve body shall withstand, without rupture, the application of two times rated maximum working pressure. For a valve having a cast body, the test pressure shall be not less than 100 psig (690 kPa).

MARKING

22. General

22.1 Each valve shall be permanently and plainly marked with the following:

- A. Manufacturer's or private labeler's name or identifying symbol.
- B. Model designation.
- C. Installation and use instructions (may be provided on a separate sheet, a tag attached to the valve, or the smallest unit container in which the valve is packaged).

22.2 If a manufacturer produces valves at more than one factory, each valve shall have a distinctive marking to identify it as a product of a particular factory.

22.3 For a valve having a wheel-type handle which closes in a clockwise rotation, the handle may be marked with the words "open" and "closed" and an arrow, or arrows, indicating the direction, or the equivalent. If it does not close in a clockwise rotation, the valve shall be clearly and permanently marked to indicate the direction which the valve closes.

Paragraph 22.3 revised January 17, 1991



Underwriters Laboratories Inc.®

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

October 24, 1991

Revision pages for

STANDARD FOR

MANUALLY OPERATED SHUT-OFF VALVES FOR FLAMMABLE LIQUIDS

UL 1106, FIRST EDITION

Attached to this transmittal notice is a revision of the first edition of UL 1106.

A CHANGE IN REQUIREMENTS IS INDICATED BY A VERTICAL LINE IN THE MARGIN ON PAGES DATED OCTOBER 24, 1991. EDITORIAL CHANGES ARE NOT SO MARKED.

THESE NEW AND REVISED REQUIREMENTS ARE NOW IN EFFECT.

The new and revised requirements are substantially in accordance with UL's bulletin on this subject dated June 18, 1991. The bulletin is now obsolete and may be discarded.

Attention is directed to the note on the title page of this standard outlining the procedure to be followed to retain the approved text of ANSI/UL 1106-1988.

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(6)

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Exception: An operating lever or wheel need not be formed of material having corrosion-resistance equivalent to brass or bronze, but shall be sufficiently corrosion resistant to withstand the exposure specified in Salt-Spray Corrosion Test, Section 16, without loss of structural integrity.

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Paragraph 4.5 revised May 10, 1988

**Replaces page 5, dated August 30, 1984*

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Paragraph 4.7 revised October 24, 1991

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Paragraph 4.9 revised October 24, 1991

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Paragraph 5.3 revised October 24, 1991

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Paragraph 6.1 revised October 24, 1991

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Paragraph 6.3 revised January 17, 1991

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Paragraph 6.4 revised October 24, 1991

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**Replaces page 6 dated January 17, 1991*

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