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May 4, 1988

Revision pages for

**STANDARD FOR
MARINE NAVIGATION LIGHTS**

UL 1104, FIRST EDITION

Attached is a revision of the first edition of UL 1104.

THE CHANGES ON PAGES DATED MAY 4, 1988 ARE EDITORIAL CORRECTIONS AND ARE NOT MARKED.

THESE REVISED REQUIREMENTS ARE NOW IN EFFECT.

The corrections to the requirements are substantially in accordance with UL's bulletin on this subject dated February 11, 1986.

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 1104—1983.

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 check list:

Page	Date
1	January 12, 1984
2,3	October 20, 1986
4	October 27, 1981
5,6,6A,7	October 20, 1986
8	May 4, 1988
8A,9,10,10A,11,12	October 20, 1986
13	October 27, 1981
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17	May 4, 1988
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(4)

UL 1104

STANDARD *for* SAFETY

**MARINE
NAVIGATION LIGHTS**



**UNDERWRITERS
LABORATORIES
INC.®**



Northbrook, Illinois Testing Station



Melville, N.Y. Testing Station



Santa Clara, Calif. Testing Station



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*JANUARY 12, 1984

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ANSI/UL 1104—1983

UL 1104
STANDARD FOR
MARINE NAVIGATION LIGHTS

FIRST EDITION

First Impression October 27, 1981

Approval as an American National Standard covers the numbered paragraphs on pages dated October 27, 1981. These pages should not be discarded when revised or additional pages are issued if it is desired to retain the approved text. Revisions of this standard will be made by issuing revised or additional pages bearing their dates of issue.

Approved as ANSI/UL 1104—1983, November 18, 1983

**Replaces page 1 dated October 27, 1981*

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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 navigation light fixtures intended for use in accordance with the applicable U. S. Coast Guard (USCG) Regulations as specified in the International Regulations for Preventing Collisions at Sea, 1972 (72 COLREGS) and the Inland Navigation Rules, COMDTINST M16672.2A.

Paragraph 1.1 revised October 20, 1986

1.2 *Paragraph 1.2 revised and relocated as paragraph 3A.2 October 20, 1986*

1.3 These requirements do not cover navigation light fixtures for use in hazardous locations as defined in the U. S. Coast Guard Electrical Engineering Regulations.

2. General

2.1 Marine navigation light fixtures shall employ materials that are acceptable for the particular use.

2.2 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. SI units are in accordance with the American National Standard for Metric Practice, ANSI/ASTM E380.

2.3 A component of a product 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 the product covered by this standard, or

B. Is superseded by a requirement in this standard.

3. Glossary

3.1 For the purpose of this standard, the following definitions apply.

3.2 **ALL ROUND LIGHT** — A light showing an unbroken light over an arc of the horizon of 360 degrees.

3.2A **DESIGN VOLTAGE** — The input voltage necessary for a lamp to operate at rated candlepower, or a rated wattage if rated candlepower is not specified.

Paragraph 3.2A added October 20, 1986

3.2B **FIXTURE (NAVIGATION LIGHT)** — The completely assembled navigation light, including the lamp, lampholder, housing, lens, and other components necessary for the light to function as intended.

Paragraph 3.2B added October 20, 1986

3.3 **FLASHING LIGHT** — A light flashing at regular intervals at a frequency of 120 flashes or more per minute.

3.3A **LAMP** — That component of a navigation light that produces light when energized.

Paragraph 3.3A added October 20, 1986

3.3B **LAMPHOLDER** — That component of a navigation light that supports the lamp in the operating position and provides the electrical connections to the lamp.

Paragraph 3.3B added October 20, 1986

3.4 **MASTHEAD LIGHT** — A white light placed over the fore and aft center line of the vessel, showing an unbroken light over an arc of the horizon of 225 degrees, and fixed to show the light from right ahead to 22.5 degrees abaft the beam on either side of the vessel.

3.4A **NOMINAL SYSTEM VOLTAGES:**

A. For alternating-current systems — 110, 115, 120, 220, 230, and 240 volts.

B. For direct-current systems — 12, 24, 32, and 120 volts.

Paragraph 3.4A added October 20, 1986

3.5 **PREFOCUS LAMP BASE** — A light bulb whose filament(s) is (are) precisely positioned with respect to its lampholder.

**Replaces page 5 dated October 27, 1981*

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3.6 **SIDELIGHTS** — A green light on the starboard side and a red light on the port side, each showing an unbroken light over an arc of the horizon of 112.5 degrees and fixed to show the light from right ahead to 22.5 degrees abaft the beam on its respective side.

3.7 **STERN LIGHT** — A white light placed as nearly as practicable at the stern, showing an unbroken light over an arc of the horizon of 135 degrees, and fixed to show the light 67.5 degrees from right aft on each side of the vessel.

3.8 **TOWING LIGHT** — A yellow light having the same characteristics as the stern light.

3.9 **WATERTIGHT FIXTURE** — An enclosed navigation light constructed to prevent water from entering any part of the housing that contains wiring devices, wiring or lamps, under any condition of exposure other than submersion.

PART I — NAVIGATION LIGHTS FOR USE ON VESSELS 65 FEET OR MORE IN LENGTH

GENERAL

3A. Scope

3A.1 The requirements of Sections 4-33 apply to navigation lights intended for use on vessels 65 feet (20 m) or more in length.

Paragraph 3A.1 added October 20, 1986

3A.2 A navigation light complying with these requirements of Sections 4-20, 22-33, 42, 43, and 46 may also be used on vessels or boats subject to the Federal Boat Safety Act of 1971.

Paragraph 1.2 revised and relocated as paragraph 3A.2 October 20, 1986

CONSTRUCTION — MECHANICAL

4. General

4.1 The enclosure of a navigation light shall completely house all current-carrying parts, lamps, and lamp adjustments so that the components will maintain a fixed relationship when the navigation light is subjected to vibration and motion in service.

4.2 All edges, projections, and corners of the enclosure shall be smooth and rounded and not sufficiently sharp to constitute a risk of injury to persons during intended use and maintenance of the navigation light.

4.3 Whenever referee measurements are necessary to determine that a part as described in paragraph 4.2 is not sufficiently sharp to constitute a risk of injury to persons, the method described in the requirements for determination of sharpness of edges on equipment, UL 1439, is to be employed.

4.4 The enclosure shall be of a watertight construction. See Watertight Thermal Shock Test, Section 24.

4.5 A wiring compartment, such as one used for field wiring, shall have no sharp edges, exposed edge of screws, or the like, which may abrade, cut, or otherwise damage the insulation of electrical conductors.

4.6 A screw fastener shall be locked by solder, a setscrew, sealing, or equivalent means.

4.7 A machine screw shall engage no fewer than two full threads in a securing nut or a tapped hole.

5. Enclosure

5.1 The frame and enclosure shall be sufficiently strong and rigid to resist the abuses likely to be encountered during intended installation and use. The degree of resistance inherent in the unit shall preclude total or partial collapse and subsequent reduction of spacings, loosening or displacement of parts, and other malfunctions that alone or in combination will affect their arcs of visibility or the watertight construction. See paragraphs 5.3-5.5, and Table 5.1 for metal enclosure requirements, and paragraphs 5.6 and 5.7 for nonmetallic enclosure requirements.

5.2 The enclosure or enclosure part shall reduce the risk of electric shock, and shall not create or contribute to a risk of fire, electric shock, or injury to persons.

**Replaces page 6 dated October 27, 1981*

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TABLE 5.1
ALUMINUM ALLOYS

Sand-Cast	Permanent-Mold Cast	Die-Cast	Machined Bar and Rod Stock
G4A	GM70B	G8A	5052
G10A	GS42A	GS31A	5053
GM70B	S5A	S5C	5056
GS42A	S5B	S12A	5456
S5A	SG70A	S12B	6061
S5B	SG70B	SG100A	6086
SG70A	SG71A	SG100B	
SG70B			
SG71A			
ZG61B			

5.6 A nonmetallic enclosure, or enclosure part, shall have mechanical strength and durability and be formed so that operating parts will be protected against damage and the enclosure will be resistant to the abuses likely to be encountered during installation, intended use, and service. In any case, the mechanical strength shall be at least equivalent to a 0.032-inch (0.81-mm) thick sheet brass enclosure.

Paragraph 5.6 revised October 20, 1986

5.3 An overall metallic enclosure of a navigation light shall be formed of (1) a sheet or plate aluminum alloy of the 5000 series as given in the Standard Specification for Aluminum-Alloy Sheet and Plate, ANSI/ASTM B209-80; (2) an aluminum alloy described in Table 5.1; or (3) a corrosion-resistant alloy or a metal alloy with a corrosion-resistant finish having resistance to corrosion equivalent to the metals in item (1) or (2) when tested as described in the Salt Spray Corrosion Test, Section 23. See paragraphs 5.4 and 5.5 for acceptable metals.

5.4 Silver, copper, brass with less than 35 percent zinc, bronze, corrosion-resistant steel, stainless steel of the 300 series, certain nickel-copper alloys, aluminum-base alloys with a copper content of 0.2 percent or less, copper silicon, and steel with a hot-dipped galvanized finish, are acceptable without the addition of a corrosion-resistant finish.

5.5 Metals other than those specified in paragraph 5.4 are acceptable if the metal alloys and combinations comply with the requirements of the Salt Spray Corrosion Test, Section 23.

†Additional page

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5.7 Among the factors that are to be taken into consideration when judging the acceptability of a nonmetallic enclosure or frame are:

A. Mechanical strength.

B. Resistance to impact.

C. Moisture absorptive properties of parts in contact with energized components; see Exposure to Humid Atmosphere Test, Section 27.

D. The flammability of the material; the material shall be classified 94V-0 in accordance with the requirements for tests for flammability of plastic materials for parts in devices and appliances, UL 94.

E. Resistance to arcing.

F. Resistance to temperatures to which the material might be subjected under all anticipated conditions of use; see Watertight Thermal Shock Test, Section 24, and Temperature Test, Section 25, as applicable.

G. Aging characteristics.

H. Resistance to sunlight (ultraviolet radiation) as determined by the Light and Water Test, Section 26.

6. Means for Mounting

6.1 The means for mounting shall be arranged and constructed so that the navigation light can be secured to the vessel in a manner that will maintain the vertical and horizontal arcs of visibility specified in the Performance section of this standard.

6.2 Arms and supports, if fastened to the enclosure, shall provide strength and rigidity and shall prevent turning or changes in the position of the lamp(s) or light source, and movement of wires or wiring devices after installation.

7. Servicing and Installation

7.1 Provision shall be made for the replacement or servicing of lamps or other light sources while at sea. The servicing provisions shall be constructed and arranged so that the assembly will retain its

watertight integrity (see Watertight Thermal Shock Test, Section 24), and the arcs of visibility (see Visibility Test, Section 20) will not be altered by the servicing operations.

7.2 If it is necessary to remove the lamp socket to make field connections, the method of mounting shall maintain intended alignment or the socket and mounting means shall be marked to permit intended alignment. If the method of mounting cannot maintain alignment, the socket shall be installed and sealed in position and the method of wiring shall be so that it is not necessary to remove the socket.

7.3 If the cut-off angles of a navigation light depend on the installation of removable shields, the method of mounting the shields shall maintain intended alignment of the cut-off angles or the shield and navigation light fixture shall be marked with permanent alignment marks.

7.4 If the navigation light requires the installation of external screens to attain the intended cut-off angles, the manufacturer shall provide construction prints, templates and other information as necessary so that the lights in the field will comply with the cut-off angle requirements during intended installation and operation.

8. Lenses and Globes

8.1 Lenses and globes shall be of an impact-resistant glass or plastic capable of withstanding thermal shock, temperatures between minus 30°C and 60°C, and exposure to sunlight and salt atmosphere without cracking, crazing or degradation of the color of the lens or globes. See Watertight Thermal Shock Test, Section 24; Temperature Test, Section 25; and Light and Water Test, Section 26.

8.2 A lens or globe shall have permanent chromaticity characteristics so that the color characteristics of the light outside the lens or globe will fall within the corner coordinates of the International Commission of Illumination (CIE) diagram specified for each color (see Table 8.1). See the International Regulations for Preventing Collisions at Sea, 1972 (72 COLREGS) — and the Inland Navigation Rules, as contained in COMDTINST M16672.2A. Chromaticity shall be determined in accordance with the requirements of paragraph 8.3.

Paragraph 8.2 revised October 20, 1986

**Replaces page 7 dated October 27, 1981*

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