

Subject 1175

July 10, 2017

SUMMARY OF TOPICS

The following changes in requirements to the Standard for Buoyant Cushions, UL 1175, are being proposed for preliminary review and comment only:

1. For Preliminary Review Only: Inflatable Throwable proposal

COMMENTS DUE: AUGUST 24, 2017

This proposal is for review and comment only (no ballot at this time). Please note that comments on a preliminary review document will not receive a response from the proposal author through CSDS. Instead, the proposal author will be asked to review the comments and adjust the proposals and/or supporting rationale as the author determines to be appropriate. The preliminary review process is an informal mechanism that provides authors with the opportunity to refine their proposals before they advance to the next stage in UL's standards development process.

In some cases, the author of the proposals may choose to discontinue them. In this case, the author need not do anything after preliminary review has ended. Normally, the next step in the process is the more formal STP ballot and stakeholder review process. Only comments posted during the STP ballot and stakeholder review process will be provided with a response in CSDS.

For your convenience in review, proposed additions to existing requirements are shown underlined and proposed deletions are shown ~~lined-out~~.

1. For Preliminary Review Only: Inflatable Throwable proposal

RATIONALE

Proposal submitted by: Troy Faletra, Custom Captains, Inc.

This proposal is to address the inflatable throwable standard that is not currently addressed in UL 1175.

PROPOSAL

SUPPLEMENT SA - INFLATABLE THROWABLE DEVICE

GENERAL

SA1 Scope

1.1 The requirements in this supplement cover inflatable devices intended to be thrown and intended to be grasped in such a manner that the face is out of the water without the necessity of constant use of either hand. The buoyancy of these flotation devices shall be provided by gas. These devices shall have single point cylinder status indication viewable in the packed condition without the necessity of unpacking the device.

1.2 Inflatable buoyant cushions covered by these requirements are intended for USCG approval under 46 CFR 160.049.

1.3 An inflatable throwable device shall have both an oral inflation system and an automatic inflation system with manual backup and single point status indication.

1.4 These devices shall comply with requirements specified in Sections 2 – 23.

SA2 Components

2.1 Structural components and inflation systems used in the inflatable throwable shall have a Use Code of 1F.

2.2 Components used in a device covered by this supplement shall comply with the applicable requirements in the Standard for Components for Personal Flotation Devices, UL 1191.

2.3 Unless its function is such that failure of the component will not affect the ability of the device to meet the requirements of this standard, a nonmetallic component of an inflatable device which is permanently covered shall retain at least 60 percent of its as-received strength after being subjected to 100 hours of light and water exposure in accordance with Method I of the Standard Practice for Operating Light Exposure Apparatus (Carbon-Arc Type) With or Without Water for Exposure of Nonmetallic Materials, ASTM G23-93, using apparatus designated Type E. The lower arcs are to be No. 15 copper clad carbon. The black panel temperature is to be 68 ±5°C (155±10°F) per Federal Standard 191A, Method 5804-90. The arcs are to be replaced and the Corex D glass cleaned every 24 hours.

2.4 Unless its function is such that failure of the component will not affect the ability of the device to meet the requirements of this standard, a nonmetallic component of an inflatable device which may be exposed to sun light when in service shall retain at least 40 percent of its asreceived strength after being subjected to 300 hours of light and water exposure in accordance with Method I of the Standard Practice for Operating Light Exposure Apparatus (Carbon-Arc Type) With or Without Water for Exposure of Nonmetallic Materials, ASTM G23- 93, using apparatus designated Type E as specified in 6.2.

2.5 Inflation chamber compartment material shall retain at least 90 percent of its strength and the rate of transmission of CO₂ gas through the material shall not be increased by more than ten percent after being subjected to the mildew resistance test specified in Federal Test Method, Standard 191, Method 5762-78, when untreated cotton is used as the control specimen.

2.6 Unless it is expendable, or if failure of the component will not affect the ability of the device to meet the requirements of this standard, a metallic component of an inflatable device shall have salt water and salt air corrosion characteristics equal or superior to 410 stainless steel, or perform its intended function and have no visible pitting or other damage on any surface after 720 hours of salt spray testing in accordance with ASTM B117-94.

Exception: An expendable component need not be of corrosion-resistant material, provided that the component is provided with a durable zinc or cadmium plating, or is equivalently protected against corrosion.

2.7 Metals shall be used in combinations that are galvanically compatible.

2.8 An exposed edge or projection of a component shall not be sufficiently sharp to damage the material of an inflatable compartment or constitute a risk of injury to persons during intended use. Referee measurements necessary to determine compliance with this requirement are to be those described in the Standard for Tests for Sharpness of Edges on Equipment, UL 1439.

2.9 Window material used as a non-load bearing component for viewing the indicator(s) of the inflation system, shall comply with the requirements of the Standard for Components for Personal Flotation Devices, UL 1191, Window Material.

2.10 All inflatable devices shall be provided with both an oral inflator and a manual-auto inflator for each compartment whose presence is required for the device to meet the in-water performance requirements of this standard.

2.11 Inflation systems shall be located in a manner which permits servicing equivalent in ease to that performed in the Standard for Components for Personal Flotation Devices, UL 1191.

2.12 The construction and assembly of an inflatable device shall be designed to minimize the likelihood of inflation compartments, and other device components whose positioning within the device are critical to the performance of the device, from becoming bunched, knotted, tangled, dislocated, or otherwise rendered inoperative.

2.13 The construction and assembly of an inflatable device shall be designed to minimize the likelihood of inflation compartments being abraded or otherwise damaged by adjacent components such as the inflation system.

2.14 The arrangement of an inflatable device shall acceptably reduce the likelihood of snagging, such as by providing means to secure the free ends of body straps and the like.

2.15 Inflation systems shall be located in a manner which permits servicing equivalent in ease to that performed in the Standard for Components for Personal Flotation Devices, UL 1191.

2.16 An inflatable compartment shall be provided with means to be deflated, which may be integral with or separate from any inflation system provided for the compartment. The deflation means shall be located and arranged to:

- a) Be easily operated by either hand without the use of tools;
- b) Reduce the likelihood of unintentional operation;
- c) Self-seal after operation and permit reinflation of the compartment; and

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d) Not be lockable in an open position.

2.17 For tests involving inflation of sample compartments to specific pressures, the inflation systems provided on the device may be modified to permit external pressurization, measurement of pressure, and the like.

2.18 If one or more compartments experience significant dimensional changes between the minimum and maximum pressure values of the design inflation range, the tests specified in Section SA3.3 are to be repeated with the inflation compartment(s) inflated to a sufficient number of buoyancy/pressure values within the design inflation range to demonstrate compliance with these requirements over the entire design pressure range.

SA3 General

SA3.1 Buoyancy

3.1.1 The total buoyancy of an inflatable throwable device shall not be less than 20 lbf (89 N).

SA3.2 Inherently buoyant material

3.2.1 Inherently buoyant foam, when used to meet the Uninflated Buoyancy test, shall not be counted towards the total buoyancy provided by the device.

SA3.3 Inflatable buoyancy

SA3.3.1 Inflatable buoyancy chambers shall withstand an overpressure without damage or evidence of leakage when tested in accordance with Clause SA9.

SA3.3.2 An automatic inflatable device shall inflate within 10 s when tested in accordance with Clause SA12. The manual head shall not fire below 3 lbf (13 N) and shall fire between 3 and 15 lbf (13 and 67 N) when tested in accordance with Clause SA11.

SA3.3.3 Each inflatable compartment shall not be punctured when tested in accordance with Clause SA11.

SA3.3.4 The device shall have the ability to float when deployed into the water uninflated when tested in accordance with Clause SA6.

SA3.4 Strength

SA3.4.1 The tensile strength of the device shall be no less than 150 lbs (655 N) when tested in accordance with Clause SA18.

SA3.4.2 For an inflatable, each connection to the inflatable compartment and each joint or coupling other than at the connection to the compartment, shall support the specified load without losing its function when tested in accordance with Clause SA17.

SA3.4.3 For an inflatable, device shall provide a minimum resistance against wear and tear when tested in accordance with Clause SA16.

SA3.5 Performance

SA3.5.1 A device shall not sustain damage after a 2 second exposure to flames that may affect the intended performance when tested in accordance with Clause SA15.19.

Exception: Fabrics which would be exposed to flame that have uncoated faces of either:

a) Plain surface fabrics, regardless of fiber content, weighing 2.6 oz. (74 g) or more per square yard; or

b) Plain and raised surface fabrics made of acrylic, modacrylic, nylon, olefin, polyester, wool, or

c) Any combinations of these fibers, regardless of weight are not required to comply with this requirement.

SA3.5.2 A device shall have a minimum resistance against extreme temperatures when tested in accordance with Clause SA13.

SA3.5.3 An inflatable device shall not inadvertently inflate when exposed to a water spray for 1 hour when tested in accordance with Clause SA12.

SA3.5.4 A device shall be capable of being thrown accurately to a person in the water with the same or greater degree of accuracy as an applicable reference device when tested in accordance with Clause 22.

SA3.5.5 A device shall allow a swimmer to grasp and provide stability without the need for constant adjusting to maintain stability when tested in accordance with Clause 23.

SA4 Glossary

SA4.1 For the purpose of this Standard, the following definitions apply in addition to the definitions found in Glossary, Item 6.

SA4.2 DESIGN INFLATION RANGE – The range of buoyancy and pressure, as specified by the manufacturer, to which a compartment may be inflated to provide the intended in-water performance.

Exception: Where galvanic compatibility cannot be provided, an expendable component may be utilized as a sacrificial anode.

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SA4.3 An exposed edge or projection of a component shall not be sufficiently sharp to damage the material of an inflatable compartment or constitute a risk of injury to persons during intended use. Referee measurements necessary to determine compliance with this requirement are to be those described in the Standard for Tests for Sharpness of Edges on Equipment, UL 1439.

SA4.4 INFLATABLE COMPARTMENT – A container that is inflated by a gas or other medium through an automatic, manual-auto, manual, or oral inflation system.

SA4.5 INFLATION SYSTEM – A means of inflating one or more compartments to make the device buoyant or more buoyant on demand, either actively or passively of the wearer's action, dependent on its type as follows:

a) AUTOMATIC INFLATION SYSTEM – A system that activates to inflate one or more compartments upon immersion in water without any action by the user (a passive system), and which has no provision for manually actuated inflation.

b) MANUAL-AUTO INFLATION SYSTEM – A system that activates to inflate one or more compartments upon immersion in water without any action by the user (a passive system) but which also has provision for being activated by a single deliberate user action, such as by the pulling of a lanyard.

SA4.6 ORAL INFLATION SYSTEM – A means for a user to blow air into a compartment by mouth.

SA4.7 SERVICEABILITY – The ease with which the inflation system mechanism can be properly rearmed. Use Code 1F inflation systems have the most stringent serviceability requirements, with Use Code 2F and 3F systems having correspondingly less stringent requirements.

SA4.8 SERVICEABLE – Acceptable for continued use (e.g. exhibits no signs of functional deterioration such as deformation of hardware, a rip or tear, a loose seam, indicators not functional, oral inflation tube blocked or detached, manual inflator trigger detached, or the like).

SA4.9 STATUS INDICATOR – The part or parts of an inflation system which provide user feedback to assist in keeping an inflatable PFD in an armed and ready condition. Use Code 1F inflation systems have the most stringent status indicator user recognition requirements, with Use Code 2F and 3F systems having correspondingly less stringent requirements.

SA4.10 UNINFLATED – A device with the chamber(s) deflated and in the packed condition.

MECHANICAL PERFORMANCE TESTS

SA5 Buoyancy Test

SA5.1 Principle

SA5.1.1 This test is to demonstrate if the device has adequate buoyancy.

SA5.2 Apparatus

SA5.2.1 The equipment required shall be a test basket made of wire mesh or equivalent material and of sufficient size to hold the sample without unduly compressing the device and ballasted with sufficient weight to permit the complete submergence of basket and sample, which when submerged, maintains the device at a depth of 2 to 4 inches (50 mm to 100 mm) below the water surface. The movement of the cage shall not be restricted by contact with the side or bottom of the tank. The buoyancy shall be measured using a calibrated load cell or scale.

SA5.3 Procedure – Oral inflation

SA5.3.1 The inflatable device shall be inflated with air through the oral inflation tube to the pressure reached by the primary means of inflation.

SA5.3.2 The device shall be enclosed in the cage and submerged in water to a depth of 2 to 4 inches (50 mm to 100 mm). The device shall then be manipulated while submerged to remove any entrapped air on the outside of the device.

SA5.3.3 Once the buoyancy has stabilized, the device shall then remain submerged for 24 ± 0.5 h.

SA5.3.4 At the conclusion of the 24 hours, the buoyancy of the device shall be measured and recorded.

SA5.3.5 The water temperature, air temperature, and atmospheric pressure shall be recorded at the start of each test and then after completion of each test.

SA5.4 Basis for acceptability

SA5.4.1 The buoyancy values shall be corrected to a temperature of 68°F (20°C) and pressure of 14.7 psi (101.325 kPa) and recorded.

SA5.4.2 The total buoyancy provided shall be not less than 20 pounds-force (89 N).

SA5.5 Procedure – CO₂ inflation

SA5.5.1 The device shall be inflated with CO₂ through the inflation manifold assembly. SA5.5.2 The

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SA5.6.1 The buoyancy values shall be corrected to a temperature of 68°F (20°C) and pressure of 14.7 psi (101.325 kPa) and recorded.

SA5.6.2 The total buoyancy provided shall be not less than 20 pounds-force (89 N).

SA6 Uninflated Buoyancy Test**SA6.1 Principle**

SA6.1.1 To avoid being lost overboard if dropped in the water uninflated, inflatable throwables shall demonstrate their ability to float when dropped into water uninflated.

SA6.2 Procedure

SA6.2.1 An inflatable device, packed in its ready to use condition with full gas cylinder (or equivalent in-water weight), shall be released from a height of 6.5 ± 0.3 ft (2000 ± 100 mm) into water such that the inflator is closest to the water. Auto inflation shall be disabled prior to the test.

SA6.3 Basis for acceptability

SA.6.3.1 After 15 minutes observe and record whether the device floats at the surface of the water.

SA7 Over-Pressure Test**SA7.1 Principle**

SA.7.1.1 The inflatable buoyancy chambers shall be capable of withstanding an internal over-pressure at ambient temperature.

SA7.2 Procedure

SA.7.2.1 If provided, an over-pressure-relief valve is to be blocked or otherwise rendered inoperative. Prior to being submerged in water, the device shall be inflated to whichever of the following pressures is greatest for a period of 5 minutes:

- a) Twice the maximum pressure of the design inflation range;
- b) 8 psig (55 kPa); or
- c) 1.2 times the pressure attained after oral inflation to 0.6 psig (4.1 kPa) followed by actuation of all automatic, manual-auto, and manual inflation systems.

SA.7.2.2 After the 5 minute over-pressurization period, the device shall be submerged in water and leakage shall be monitored by evidence of streaming air bubbles.

SA7.3 Basis for acceptability

SA.7.3.1 There shall be no signs of leakage

SA8 Air Retention Test**SA8.1 General**

SA.8.1.1 Either Method 1 or Method 2 is to be used. Samples tested using Method 2 may be retested using Method 1 and accepted if the results of the Method 1 test are acceptable. For PFDs having more than one inflatable compartment, the Air Retention Test is to be repeated on each inflatable compartment.

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