FEDERAL AVIATION AGENCY

FLIGHT STANDARDS SERVICE

[14 CFR 514]

[Regulatory Docket No. 1892; Notice No. 63-31]

TECHNICAL STANDARD ORDERS FOR AIRCRAFT MATERIALS, PARTS AND APPLIANCES

NOTICE OF PROPOSED RULE MAKING

Life Preservers—TSO-C13d

The Federal Aviation Agency has under consideration a proposal to revise Section 514.23 of Part 514 of the Regulations of the Administrator by amending the Technical Standard Order. This Technical Standard Order contains minimum performance requirements for life preservers for use on civil aircraft of the United States engaged in operation over water.

The amendment is proposed to clarify the existing Technical Standard Order and to include standards for survivor locator lights. Flotation is the primary and most important requirement for survival after escape from a ditched aircraft. The possibility of survival is greatly increased if the survivor expeditiously boards one of the airplanes life rafts or a rescue vessel. To insure and facilitate the location of all survivors at night a means of illumination on the life preservers must be provided. A review of aircraft ditchings confirms that where lights on life preservers were provided, persons in the water who might otherwise not have been saved were sighted and picked up in life rafts or rescue vessels.

Under this proposal the requirements would now be incorporated into an FAA Standard instead of referring to an industry specification as was done in the previous TSO. The proposed TSO primarily incorporates those standards set forth in the previous TSO. The main substantive change is the new requirement for survivor locator lights. Survivor locator lights which meet the standards prescribed in this TSO may be mounted on previously approved life preservers.

Interested persons are invited to participate in the making of the proposed rule by submitting such written data, views or arguments as they may desire. Communications should identify the regulatory docket number and be submitted in duplicate to the Federal Aviation Agency, Office of the General Counsel: Attention Rules Docket, Room A-103, 1711 New York Avenue, N.W., Washington, D.C. 20553. All communications received on or before October 9, 1963, will be considered by the Administrator before taking action upon the proposed rule. The proposals contained in this notice may be changed in the light of comments received. All comments submitted will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons.

This amendment is proposed under the authority of Sections 313(a) and 601 of the Federal Aviation Act of 1958 (72 Stat. 752, 775; 49 U.S.C. 1354(a), 1421).

In consideration of the foregoing it is proposed to amend Part 514 by revising Section 514.23 to read as follows:

§ 514.23 *Life preservers—TSO-C13d.*

(a) *Applicability.* Minimum performance standards are hereby established for life preservers (adult and child) including survivor locator lights which specifically are required to be approved for use on civil aircraft of the United States. New models of life preservers manufactured on or after the effective date of this section shall meet the requirements specified in Federal Aviation Standard "Life Preservers", dated July 26, 1963.[1] Survivor locator lights which meet the requirements of this TSO may be mounted on previously approved life preservers.

(b) *Markings.*

(1) The life preservers shall be permanently marked in accordance with the provisions of § 514.3 (d) except for the following:

(i) The weight of the life preserver assembly may be omitted;

(ii) The date of manufacture of fabric (month and year) shall be shown; and

(iii) The intended user, i.e., "adult", "child", or "adult and child" shall be shown.

(2) The survivor locator light shall be permanently marked in accordance with provisions of § 514.3(d) except for the following:

(i) The weight of the survivor locator light may be omitted.

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[1] Copies may be obtained upon request addressed to Publishing and Graphics Branch, Inquiry Section, HQ-440, Federal Aviation Agency, Washington, D.C. 20553

(c) *Data requirements.* In accordance with the provisions of § 514.2, as applicable, manufacturers of life preservers and the survivor locator lights shall furnish to the Chief, Engineering and Manufacturing Branch, Flight Standards Division, Federal Aviation Agency in the region in which the manufacturer is located, the following technical data:

(1) Six copies of an instruction manual describing the products and containing information for the maintenance, overhaul and installation of the life preserver and the survivor locator light;

(2) Six copies of the necessary data detailing the mounting of the survivor locator light on the life preserver.

Acting Director
Flight Standards Service

Issued in Washington, D.C., on August 5, 1963.

Federal Aviation Agency Standard For Life Preservers

1.0 ***Purpose.*** To establish minimum performance requirements for life preservers including survivor locator lights for use on civil aircraft of the United States engaged in operation over water.

1.1 ***Scope.*** This standard covers life preservers (adult and child and a combination of both) and survivor locator lights intended for the use of occupants of civil aircraft operating over water in the event of a ditching. Each life preserver shall be provided with a survivor locator light. Hereinafter, the term "life preserver" will include the survivor locator light as well as the life preserver. Special requirements for child life preservers are contained in paragraph 6.0 of this standard.

2.0 ***Applicable Specifications.*** The following specifications, as applicable, shall form a part of this standard and shall include the latest revisions at the time of manufacture or, in the event that any are canceled or superseded, the revision of the specification last in effect shall apply.

2.1 ***Military Specifications.***

MIL-C-5540 Adhesive Neoprene
MIL-T-7807 Thread Nylon
MIL-V-6077 Vest, Life Preserver, Pneumatic
MIL-C-19002 Cloth and Cloth Tape, Coated, Pneumatic Life Preserver
MIL-C-00601 Cylinder, Carbon Dioxide Filled (For Pneumatic Life Vests and Similar Uses)
MIL-W-21733 Webbing, Textile Nylon Pneumatic Life Preserver
MIL-W-530 Webbing, Cotton, Natural or in Colors

2.2 ***Federal Specifications.***

FED-STD-601 Federal Test Method, Rubber sampling and testing
CCC-T-191 Textile Test Methods
QQ-M-151 Metals, general specification for inspection of
FED-STD-595 Colors for ready mixed paints

2.3 ***American Society for Testing Materials.***

ASTM-D573-53 Method of test for accelerated aging of vulcanized rubber, by the oven method
ASTM-D751-52T Methods of testing rubber coated fabrics

3.0 ***Materials and Workmanship.***

3.1 ***Workmanship.*** Life preservers shall be constructed in a thorough workmanship manner. The finished items shall be free from any defects that might affect function or appearance.

3.2 ***Age of Nonmetallic Materials.*** All nonmetallic fabricated raw materials and components used in the manufacture of the life preservers shall have been manufactured not more than 12 months prior to the date of delivery of the finished product.

3.3 ***Coated Fabrics.*** All coated fabrics used in the manufacture of life preservers shall, except as otherwise provided, possess 90 percent of the physical properties called for under their applicable specifications after these coated fabrics have been subjected to an accelerated aging test in accordance with ASTM-D573-53.

3.3.1 ***Flotation Chambers.*** Coated fabrics used for this application shall conform to the following minimum test specifications per ASTM-C751-52T:

a. Tensile Strength—(Grab Test)
   Warp 210 lbs./inch minimum
   Fill 180 lbs./inch minimum
b. Tear Strength—(Tongue or Strip Method—Raw Cloth)
   10 x 10 lbs./inch minimum
c. Permeability—Permeability to helium of not more than 5 liters per square meter per 24 hrs. at 77° F. (maximum)
d. Coat Adhension—10.0 lbs./inch width

3.3.2 ***Seam Tape.*** Tape used for the purpose of reinforcement of seams shall be suitable for the intended purpose.

3.4 ***Other Fabrics*** and Materials.

3.4.1 ***Webbing.*** Webbing used for the purpose of attaching the life preserver to the wearer shall be suitable for the intended purpose.

3.4.2 ***Thread.*** Thread used in the manufacture of life preservers shall be suitable for the intended purpose.

3.5 ***Seam Strength and Adhesives.*** Adhesives used in the manufacture of life preservers shall conform to appropriate specifications and shall develop minimum strength values specified therein.

3.6 ***Fungus Protection.*** All fabrics, threads and webbing used in the finished product which contain nutrient which will support fungus growth shall be suitably treated to prevent such growth.

3.7 ***Corrosion Protection.*** Metallic parts exposed to the atmosphere shall be corrosion resistant or protected against corrosion.

3.8 ***Flame Resistance.*** All material used in the life preserver shall be at least flame resistant.

3.9 ***Color.*** The life preserver color (except the locator light) shall be Spanish Yellow, No. 70068, conforming to MIL–C–19002 or a color of equivalent high intensity.

NOTE.—Crewmember life preservers, for the purpose of conspicuousness during an emergency, may be of a high intensity Red Color.

3.10 ***Temperature Limits.*** Materials used in the manufacture of life preservers and survivor locator lights shall not be affected by exposure to temperatures from −40° F. to −160° F.

4.0 ***Detail Requirements.***

4.1 ***Reversibility.*** The life preserver shall either be reversible or so designed as to preclude the probability of improper donning. If of the reversible type, the survivor locator light installation shall be suitable for its intended purpose when donned in either manner.

4.2 ***Compartmentation.*** The life preserver shall have a minimum of two gas-tight compartments.

4.3 ***Inflation.*** Each compartment of the life preserver shall have separate individual means for both mechanical and oral inflation.

4.3.1 ***Oral Inflation.*** Means for orally inflating the life preserver shall be available for immediate use and readily recognizable by persons not having previous instructions in its use. The oral inflation device shall be located so as not to interfere with the face or body of the wearer. To inflate the life preserver compartment orally, it shall be necessary only to blow into the mouthpiece of the oral inflation means.

4.3.2 ***Oral Inflation Valve.*** The oral inflation valves shall have an opening pressure of 0.6 p.s.i.g. maximum when no back pressure is present and shall not leak under back pressures between zero p.s.i.g. to 10 p.s.i.g.

4.3.3 ***Mechanical Inflation.*** Mechanical inflation of the preserver shall be accomplished by CO_2 unless it can be demonstrated that some other means of inflation is equally suitable.

4.3.3.1 ***CO_2 System.*** One cylinder shall be provided to inflate fully each flotation compartment of the life preserver. Each inflation device shall consist of an inflator assembly. The inflator shall permit insertion of a cylinder, meeting specification MIL–C–00601 Type 1, into one end and shall contain the discharging device in the opposite end. The design of the inflator shall be such that the installed cylinder shall be punctured with a travel of the lever arm of not more than 90° F. The inflator shall have provisions for safetying the lever. The lever of each inflator shall be provided with a pull cord assembly extending between 1½ and 3 inches below the edge of the life preserver. The end of the pull cord assembly shall be attached to a red pull knob or tab which shall be used to activate the inflator.

4.3.3.2 ***Inflator.*** The inflator shall withstand a hydrostatic pressure of 1,500 p.s.i. without deformation or leakage. The inflator shall not leak when subjected to 2 and 40 p.s.i. air pressure, respectively, with the lever at any position in its normal cycle of operation. The inflator shall have an opening pressure of 25 to 35 p.s.i. and shall allow a minimum flow of 4 liters of air per minute at 40 p.s.i. inlet pressure. The inflator shall not leak when subjected to a negative pressure of 12 inches of water applied so as to reduce the seating spring pressure and with atmospheric pressure on the opposite side.

4.4 ***Buoyancy.*** The life preserver (both compartments after inflation by the mechanical inflation means) shall provide a minimum of 23 pounds of buoyance in fresh water at 85° F.

5.0 ***Adaptability for Wearer.***

5.1 ***Flotation Attitude.*** The life preserver shall support the wearer in an upright position face up not less than 15 degrees nor more than 30 degrees from the vertical. The head shall be so supported that the wearer's face shall be out of the water when he is unconscious or completely relaxed.

5.2 ***Donning Life Preserver.*** The life preserver shall be easily donned by a person with a minimum amount of instruction and shall be reasonably comfortable. It shall be capable of being donned by the wearer without assistance while in a sitting position. The life preserver shall be so attached to the wearer that it shall not slip off when jumping into the water from a height of 5 feet; however, straps which pass between the wearer's legs are not permissible. The life preserver shall not chafe the wearer's legs, neck or restrict breathing or blood circulation.

5.3 ***Fastenings and Attachments.*** The means of attachment of the life preserver by straps or fasteners shall be conveniently located and easily operated by the wearer under emergency lighting conditions. There shall be a means of adjustment of the life preserver attaching means when inflated, to fit the wearer. Attachment fastening devices shall develop at least 80 percent of the tensile strength of the straps to which they are fastened without loosening, slipping or causing tearing of straps.

6.0 ***Child Life Preserver.*** All provisions of this standard apply to child life preservers with the exception of the changes indicated in the subparagraph of this paragraph. For purposes of this standard, a child is considered to be in the age bracket of 2 to 6 years.

6.1 ***Flotation Attitude.*** The child life preserver shall support the wearer in a face up attitude so that the wearer's face will be supported above the water line even when he is unconscious or completely relaxed.

6.2 ***Compartmentation.*** The child life preserver shall have a minimum of one gastight compartment.

6.3 ***Buoyancy.*** The child life preserver shall provide a minimum of 9 pounds of buoyancy in fresh water at 70° F.

6.4 ***Donning Life Preserver.*** For the child life preserver, it is acceptable to incorporate straps which pass between the child's legs.

7.0 ***Survivor Locator Light.***

7.1 ***Survivor Locator Light.*** Each life preserver shall be provided with a white survivor locator light complying with the provisions of this standard.

7.1.1 ***Survivor Locator Light Intensity.*** The survivor locator light shall provide a minimum effective intensity of 3 candles in the direction specified in paragraph 7.1.2 for a period of 8 hours. Effective intensity is that intensity which will give the same visual range as would a fixed light of the same color under identical conditions of operation. If a flashing light is used, effective intensity shall be computed from the following formula:

$$Ie = \frac{\int_{T_1}^{T_2} I(t)\,dt}{0.2 + (T_2 - T_1)}$$

where: Ie = effective intensity (candles)

$I(t)$ = instantaneous intensity as a function of time

$T_2 - T_1$ = flash interval in seconds

7.1.2 ***Light Distribution.*** The light shall be mounted on the life preserver so as to provide illumination in all directions in the horizontal plane.

7.1.3 ***Attachment.*** The light shall incorporate a device to enable it to be easily attached to and detached from the life preserver.

7.1.4 ***Waterproofing.*** The light shall be waterproofed to the extent that prolonged immersion in fresh or salt water will not affect its operation.

7.1.5 ***Switch.*** Means for turning the light on and off shall be provided. Such means shall be readily available to the user.

8.0 ***Required Tests.***

8.1 ***Initial Qualification Tests.*** The tests indicated in the following subparagraphs shall be conducted for initial qualification. These tests shall be conducted on a minimum of three samples. Each test article shall be representative of production units and shall be individually identified.

8.1.1 ***Buoyancy.*** When mechanically inflated and placed in fresh water at a temperature of 70° F. the life preserver shall support a 20 pound steel weight without becoming submerged. (In the case of a child life preserver, it shall support a 9 pound weight.)

8.1.2 ***Salt Spray.*** All metal parts shall operate satisfactorily and shall not corrode when subjected to a salt spray in accordance with Federal Specification QQ–M–151 for a period of 100 hours.

8.1.3 ***Rubber Goods.*** A sample of rubber goods shall be tested in accordance with specification FED–STD–601.

8.1.4 ***Textiles.*** A sample of textile goods shall be tested in accordance with specification CCC–T–191.

8.1.5 ***Survivor Locator Light Intensity.*** It shall be demonstrated that the survivor locator light provides a minimum effective intensity of 3 candles for a period of 8 hours.

8.1.6 ***Flame Resistance.*** All nonmetallic materials shall be tested for flame resistance in accordance with Federal Specification CCC–T–191, Method 5906.

8.1.7 ***Pressure Test.*** Each compartment of each test sample life preserver shall withstand separately without failure an air pressure of 10 p.s.i.g. for 5 minutes.

8.1.8 ***Survivor Locator Light Watertightness.*** Each test sample light shall be submerged for a period of 8 hours in fresh water at 70° F. to such a depth that the highest point of the light is under a three foot head. After removal from the water, the light shall be examined to determine that no leakage has taken place.

8.2 ***Individual Performance.***

8.2.1 ***Life Preserver.*** Each compartment of each life preserver manufactured shall be inflated with oil free air at 70° F. to a pressure of 2 p.s.i.g. After a 12 hour period, the pressure loss shall not be in excess of ½ p.s.i.g.

8.2.2 ***Survivor Locator Light.*** Each survivor locator light shall be operated to demonstrate that the assembly is in an operating condition by lighting the light with the means provided.