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AEROSPACE RECOMMENDED PRACTICE

SAE ARP1354 REV. A

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Submitted for recognition as an American National Standard

INDIVIDUAL INFLATABLE LIFE PRESERVERS

1. SCOPE:

1.1 This Aerospace Recommended Practice (ARP) provides criteria for operational characteristics to be considered in the design of individual, inflatable life preservers intended for air transport safety.

1.2 The characteristics outlined herein shall apply, where applicable, to the design of individual life preservers to be utilized by four basic classifications of users as follows:

a. Adults
b. Combination adult/child
c. Children
d. Infants/small child

1.3 This ARP does not intend to specify nor limit the designer as to particular configuration, material, hardware, attached equipment, or mode of operation of the life preserver except as required to fulfill the intent of the criteria established herein.

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2. REFERENCES:

TSO-C85

3. DETAILED RECOMMENDATIONS:

3.1 Buoyancy:

3.1.1 The following minimum buoyancy schedule in Table 1 shall apply to the particular user-type life preserver shown:

TABLE 1

User Type	Minimum Buoyancy in Fresh Water at 72°F (22.2°C) lb (kg)
Adult	35 (15.88)
Combination Adult/Child	35 (15.88)
Child	25 (11.34)
Infant/Small Child	20 (9.07)

NOTE: Users are defined as follows:

Infant: Small children unable to sit up by themselves, normally under 6 to 12 months.

Small Children: Able to sit up by themselves but under 24 months old and under 35 lb weight.

Child: Over 24 months old but under 13 years old with maximum weight of 90 lb.

Adult: 13 years of age or older and all weights.

3.1.2 The buoyancy of the life preserver shall be measured in terms of absolute buoyancy and be determined in a manner consistent with Archimedes' principle of displacement. If weights are used, the volume and specific gravity of that portion of the weight that is submerged must be considered. Determination of buoyancy by volume displacement must consider the weight and specific gravity of the jacket material and inflation systems.

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3.2 Flotation Attitude:

3.2.1 The life preserver shall be capable of righting, within 5 s, an unconscious person who has been forced into the water in a face down attitude. The life preserver shall provide lateral and occipital support to the wearer's head such that the mouth of an unconscious adult is held well clear of the water line with the trunk of the body inclined backward from the vertical at a minimum of 30°.

3.2.2 After being forced into a face-down attitude, and upon immediate return to the face-up attitude, the life preserver or flotation device shall not permit the unconscious wearer to return to the face-down attitude.

3.2.3 Life preservers for infants must demonstrate a capability to support the body in a stable attitude with the mouth and nose supported well clear of the surface of the water. Bassinets or flotation cots should demonstrate stability and seaworthiness and be capable of protecting the infants respiratory system from inspiration of water and drowning due to swell or wave action.

3.2.4 A tether line, not less than 72 in long, shall be attached to infant life preservers at a point that tension will not adversely change the buoyancy attitude when the line is attached to an adult in the water.

3.3 Donning of the Life Preserver:

3.3.1 The means of donning the life preserver shall be self-evident to the extent that the device may be readily donned or placed upon another user by an average adult assisted by pictorial instructions only. (See 3.11.1)

3.3.2 It shall be possible for an unassisted adult to don his/her life preserver in 25 s or less while seated with lap restraints fastened at the start of the timed-test interval. (See Appendix A for test procedure.)

3.3.3 It shall be possible for an unassisted adult to place upon another user, either adult, child, or infant, that user's particular life preserver in no more than 30 s.

3.3.4 It shall be possible for an adult to place a life preserver on an incapacitated adult at least to the extent that the device so placed will provide the incapacitated adult with sufficient flotation to prevent the inspiration or ingestion of water.

3.4 Comfort, Fit, and Adaptability:

3.4.1 After donning, inadvertent release of the life preserver from the body shall be precluded. The life preserver shall not inadvertently loosen so as to change the flotation characteristics.

3.4.2 The life preserver shall be designed so as to allow free, unobstructed vision along the horizontal forward/side direction.

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3.4.3 The life preserver shall be designed so as not to restrict blood circulation, especially in the areas of the neck, armpits, and groin.

3.4.4 The life preserver shall not restrict breathing.

3.4.5 The preserver shall be designed so as to allow for adjustment for fit and comfort while the user is in the water.

3.4.6 The life preserver shall be constructed to allow a maximum degree of head and neck movement consistent with the requirements of 3.2.1 regarding flotation attitude.

3.5 Freedom of Movement:

3.5.1 The adult and the adult/child life preserver shall be designed so that the user can swim, render assistance to others, and board a life raft or slide/raft.

3.5.2 The adult and the adult/child life preserver shall provide the user with sufficient freedom or arm movement to carry or support an infant in the water.

3.6 General Configuration:

3.6.1 The life preserver shall have at least two independent flotation chambers each of which is provided with a mechanical and an oral inflation means. When either of these chambers is inflated and the remaining chamber deflated, the inflated chamber shall be capable of supporting the wearer with mouth and nose clear of the water line.

3.6.2 All hardware and equipment attached to the life preserver shall be located and padded so as to preclude the possibility of chafing the material of the preserver either in the packaged or in-use condition.

3.6.3 It shall be possible for the adult or child user to jump feet first from a height of 5 ft (1.52 m) into the water wearing a fully inflated or deflated life preserver without injury to user caused by the preserver, and without damage to or loss of the life preserver.

3.6.4 Once orally inflated, a life preserver chamber will not burst upon subsequent discharge of the gas inflation system.

3.6.5 The infant flotation device tether (see 3.2.4) shall be of sufficient strength to permit lowering of the infant into the water to the proper buoyancy attitude.

3.7 Mechanical Inflation System (GAS):

3.7.1 A separate mechanical inflation system shall be provided for each flotation chamber.

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3.7.2 Mechanical inflation shall be achieved by one simple operation for each chamber. Positioning of the inflation means shall be such that it can be operated with either hand in or out of the water.

3.7.3 The mating of the inflation system to the material of the preserver shall be constructed so as to withstand static force of 250 lbf (11.12 N).

3.8 Oral Inflation System:

3.8.1 Each chamber shall be equipped with an oral-inflation device fitted with a nonreturn valve that will permit the user to fully inflate each chamber. Once the life jacket is orally inflated, the oral inflation device should return to such a position that it does not produce eye or other facial injuries during a jump into water as specified in 3.6.3.

3.8.2 The inflation device shall be located so as to be easily found and readily accessible to the user in and out of the water.

3.8.3 The inflation device shall incorporate some means of quickly deflating each chamber. This deflation operation shall be such that it requires a positive act by the user; i.e., it cannot happen inadvertently.

3.8.4 The joint between the oral inflation valve and the flotation chamber may not fail when a 100-lb tensile load is applied for at least 3 s outwardly from and perpendicular to the surface of the flotation chamber at the point of valve attachment.

3.9 Color:

3.9.1 The color of the life preserver shall be an approved international rescue color, except as modified in consideration of the area in which a particular air carrier operates.

3.9.2 Crew life preservers shall be readily distinguishable from passenger life preservers.

3.10 Equipment:

3.10.1 All life preservers shall incorporate a survivor locator light which meets the requirement of TSO-C85 and is located in such a manner as to provide maximum practical conspicuity in the water. If the survivor locator light is not automatically activated, the means for activation shall be readily accessible and self-evident. For increased conspicuity and enhancement of the effectiveness of searchlights or other directed light sources, retroreflective materials or devices may be affixed to the life preserver in accordance with 3.10.3.

3.10.2 Crew life preservers shall incorporate a whistle or other audio signaling device.

3.10.3 All equipment shall be configured and located so as not to interfere with donning, retention, or activation of the life preserver.

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