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AEROSPACE RECOMMENDED PRACTICE

SAE ARP1146 REV. B

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COMBINATION EVACUATION SLIDE/RAFT - CIVIL AIR TRANSPORT

1. SCOPE:

1.1 This Aerospace Recommended Practice (ARP) is to establish criteria for design and installation of combination evacuation slide/raft devices for use both as ground and water escape devices in the event of emergency.

NOTE: This document is not intended to specify design methods, mechanisms, or equipment to be used in accomplishment of the objectives set forth herein.

2. REFERENCES:

2.1 Applicable Documents:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

SAE ARP495	Passenger Evacuation Devices - Civil Air Transport
SAE ARP496	Stowage of Cabin Emergency Flotation Equipment
SAE ARP503	Emergency Evacuation Illumination
SAE ARP577	Emergency Placarding - Internal and External
SAE ARP1282	Survival Kit - Liferafts and Slide/Rafts
SAE ARP1356	Liferafts
MIL-T-16396	Military Standard, Textiles

Federal Test Method Standard No. 191, Method 5136 and 5970

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3. TECHNICAL REQUIREMENTS:

3.1 General:

3.1.1 The passenger evacuation device, including any inflation system it may be provided with, shall be capable of functioning at all temperatures throughout the temperature range of -40 to +160°F (-40 to +70°C) after a temperature exposure for 24 h or until thermal equilibrium is achieved within the stowed device.

In addition, if the device is intended to be stowed outside the pressurized cabin, the device must be capable of being stowed at -65°F without damage.

3.1.2 Materials and processes used in the construction of the evacuation device shall be resistant to flame (self-extinguishing), ozone, fungus, blocking and air holding deterioration.[1] Exposure to salt spray, sand and dust and spillage of beverages, aircraft cleaning agents, jet engine fuel, and hydraulic fluid shall not impair the operation and use of the device.

3.1.3 The device shall be so constructed that resistance to degradation from ultraviolet radiation is provided.

3.1.4 The evacuation device and its fastening shall be so constructed that static electricity will not be generated in sufficient quantity to cause a spark, which could ignite a fuel/air mixture. The surface resistivity of any sliding surface shall not exceed 1 mΩ when measured on any square sample not less than 5 in (12.7 cm^2).

3.1.5 The device shall be installed in such a manner that in the event of any emergency, it will be available for immediate deployment.

3.1.6 The device shall be capable of providing for the evacuation rate consistent with the maximum flow potential of the exit.

3.1.7 The device shall have a minimum of two independent air holding chambers each designed to function and provide support in both the evacuation slide and raft modes with one chamber deflated.

3.1.8 The device shall be capable of being actuated by untrained evacuees. The method of operation shall be conspicuously and clearly indicated by brief instruction placards. Placards and emergency lighting shall be in conformity with ARP577 and ARP503, respectively.

3.1.9 If the evacuation device is equipped with pressure relief, it shall be set at an acceptable pressure to ensure satisfactory operation.

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[1]For test methods refer to Appendix A.

3.1.10 The evacuation device shall be designed and constructed to be highly resistant to catastrophic failure of the structural members or sliding surface(s) as a result of evacuees jumping on the device in normal street attire with shoes on. The sliding surface shall be puncture and tear resistant and shall comply with the following:

a. Puncture resistance: (MIL-T-16396E)-48 lbf (21.4 daN)
b. Tear resistance: (Method 5136)-50 x 50 lbf (22.2 daN)

3.1.11 The pressure holding envelope shall be resistant to a radiant heat level of 1.5 Btu/ft^2 (17 kW/m^2) for 180 s.

3.1.12 The automatic inflation system shall have a manually activated backup handle. The static location of the manual inflation handle, following extraction of the uninflated device from the aircraft stowage location, shall be on the right hand side of the girt assembly as viewed from within the aircraft. The center of the handle shall be located not more than 6 in (15.2 cm) from the right edge of the girt assembly and readily accessible from within the aircraft. The manual inflation handle shall represent no trip hazard to evacuees.

3.1.13 The inflation system of the device shall not actuate until the device has fallen at least 12 in (30 cm) below the exit sill during extraction from the aircraft stowage location. This requirement does not apply for wing to ground devices.

3.1.14 Use of the device after inflation shall be self-evident.

3.1.15 The device shall be suitable for assisting occupants evacuating from the exit under all combinations of landing gear conditions.

3.1.16 The device shall permit occupants, including young children, aged persons, and ambulatory persons to evacuate with a minimum probability of incurring injury.

3.1.17 The inflated device shall provide a means for reentry of the aircraft.

3.1.18 The device shall be designed as part of the total evacuation system of the aircraft.

3.2 Attachment to the Aircraft:

3.2.1 The attachment of the deployed passenger evacuation device to the aircraft shall have a minimum strength equal to at least 1.5 times the highest load imposed on the device during use in the maximum loaded condition in either the slide or raft mode.

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3.2.2 The device shall have a means to readily disconnect it from the aircraft for use in the raft mode. The method of release in the raft mode must be readily apparent, capable of being operated by untrained persons from inside the raft, and covered until ready for use. The release handle shall be located on the opposite side of the girt assembly from the manual inflation handle and such that the handle is not readily visible or susceptible to inadvertent activation during passenger evacuation. The release means shall not require more than 35 lbf (15.5 daN) to actuate from within a fully loaded raft.

3.2.3 A static line with a means of disconnect shall be provided in such a manner that the device shall remain secured to the aircraft when it is used in the raft mode but can be readily disconnected by a person in the device. The static line shall be a minimum length of 25 ft (7.62 m) and have a knotted breaking strength of 500 to 1000 lbf (222.4 to 444.8 daN) depending on the buoyancy of the device. The attachment to the evacuation device shall be 1.5 times stronger than the static line. The static line shall not interfere with the operation of the device. A knife shall be provided as a backup means for detachment.

3.3 Use in the Slide Mode:

3.3.1 The device, when used in the evacuation slide mode, shall meet the detail recommendations of ARP495 for passenger evacuation devices - civil air transport.

3.3.2 The device shall not depend upon persons on the ground for operation; however, the device shall provide a means whereby two or more persons on the ground may provide support for use should the device fail to inflate or erect properly.

3.3.3 The device shall inflate to a useable configuration under wind conditions of 25 knots from any direction.

3.3.4 The inflation time, measured from the point of activation of the inflation system until the device is in its useable condition, shall be a maximum of 6 s in still air at a temperature of 70°F (21°C). If the system is a wing to ground device, the inflation time shall be no greater than 10 s.

3.4 Use in the Raft Mode:

3.4.1 The device, when used in the raft mode, shall meet the detail recommendations of ARP1356 for life rafts.

3.4.2 If it is necessary to use a second operation to convert the device from the evacuation slide mode to the raft mode, this operation shall be self-evident to untrained evacuees and require no more than 35 lbf (15.5 daN) to actuate.

3.4.3 The method of conversion to the raft mode shall be well protected against accidental activation while the device is being used as an evacuation slide.

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3.4.4 The device shall be designed so that when inflated and in the inverted position, it will support its rated capacity with visible freeboard.

3.4.5 The device, while attached to the aircraft, shall be capable of being deployed and inflated properly with the water at door sill height. Activation with the manual inflation handle is an acceptable means of compliance.

3.4.6 The device shall be capable of being moved to another doorway by two people and launched as a raft. Instructions for removing and relocating shall be clearly visible from within the passenger cabin.

3.4.7 The rated capacity of the device in the raft mode may be determined by the number of occupant seating spaces that can be accommodated within the designated area, exclusive of the perimeter structure (such as buoyancy tubes) and without overlapping of the occupant seating spaces.

3.4.7.1 The rated capacity may be based on a useable sitting area of not less than 3.6 ft^2 per person with no demonstration.

3.4.7.2 The rated capacity may also be based on a useable sitting area of not less than 3.0 ft^2 per person when demonstrated in fresh water with participants wearing inflated life vests.

3.4.8 The overload capacity of the device in the raft mode may be determined by the useable seating area based on 2.4 ft^2 per person and shall be demonstrated in fresh water with participants wearing inflated life vests.

3.4.9 Buoyancy shall be provided by two independent buoyancy tubes each of which, in conjunction with the slide/raft floor, must be capable of supporting the rated and overload capacities in fresh water with visible freeboard if the other tube is deflated and the remaining tube is at minimum raft mode pressure.

3.4.9.1 The device in fresh water loaded to rated capacity and using an average weight of at least 170 lb (77.3 kg) per person must provide a minimum freeboard of 12 in (30.5 cm) with both chambers inflated and 6 in (15.2 cm) minimum freeboard with the critical chamber deflated. Supplemental ballast in the form of sand bags or equivalent may be used to achieve the 170 lb average provided appropriate weight distribution is maintained.

3.4.9.2 The device in fresh water loaded to overload capacity and using an average weight of at least 170 lb (77.3 kg) per person must provide a measurable freeboard with the critical chamber deflated. Supplemental ballast in the form of sand bags or equivalent may be used to achieve the 170 lb average provided appropriate weight distribution is maintained.

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