SAE Aerospace
An SAE International Group

AEROSPACE RECOMMENDED PRACTICE

SAE ARP1282 REV. B

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Superseding ARP1282A

(R) Survival Kit - Life Rafts and Slide/Rafts

RATIONALE

This revision is prompted by the advent of improved signaling and locator devices, as well as inclusion of ergonomic test methods for package opening and equipment operation.

1. SCOPE

This SAE Aerospace Recommended Practice (ARP) applies to survival kits to be carried with life rafts or slide/rafts on transport category airplanes flying extended over-water routes and equipped with approved satellite alerting devices (e.g., 406 MHz Emergency Locator Transmitter (ELT)), available for deployment after an emergency landing.

1.1 Purpose

The purpose of this document is to establish the minimum contents for survival kits so as to enhance health and survivability of airplane occupants after a planned or unplanned landing on open water or a remote land environment.

2. REFERENCES

2.1 Applicable Documents

The following documents form a part of this document, as listed below. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of publication of this document, unless otherwise specified. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org

AIR5690 Considerations for the Carriage and Use of Visual Distress Signals in Airline Overwater Survival Kits

ARP1356 Life Rafts

AS5134 Aviation Distress Signal

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

2.1.2 Canadian Government Publications

Available from Publishing and Depository Services, Public Works and Government Services, Ottawa ON K1A 0S5, Canada, www.publications.gc.ca

Canadian Aviation Regulations, Part V, § 525.1415, Ditching equipment

Canadian Aviation Regulations, Part VI, § 602.63, Life rafts and survival equipment – Flights over water

Canadian Aviation Regulations, Part VII, § 705.95, Survival equipment

2.1.3 Code of Federal Regulations (CFR)

Available from the U.S. Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, www.gpoaccess.gov

14 CFR 25.1415(c), Ditching equipment

14 CFR 91.509, Survival equipment for overwater operations

14 CFR 121.339, Emergency equipment for extended overwater operations

14 CFR 125.209, 135.167 Emergency equipment: Extended overwater operations

2.1.4 European Aviation Regulations

Available from European Aviation Safety Agency, Otto Platz 1, Kiln Deulz, Postfach 101253, D-50452 Cologne, Germany, www.easa.eu.int

Certification Specifications for Large Aeroplanes, Book 1, Subpart F, § 25.1415, Ditching Equipment

2.1.5 Federal Aviation Administration (FAA) Publications

Available from FAA, 800 Independence Avenue SW, Washington, DC 20591, www.faa.gov

Technical Standard Order C12c, Life Rafts (Twin Tube) (Cancelled)

Technical Standard Order C69c, Emergency Evacuation Slides, Ramps, Ramp/Slides, and Slide/Rafts

Technical Standard Order C70a, Liferafts (Reversible and Nonreversible)

Technical Standard Order C142a, Non-Rechargeable Lithium Cells and Batteries

Advisory Circular 120-47, Survival Equipment for Overwater use

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Aerospace Recommended Practice.

American National Standards Institute (ANSI) z535.3-2002. Criteria for safety symbols (Annex A: Principles and guidelines for graphical design of hazard symbols). Rosslyn, VA: National Electrical Manufacturers Association.

Brajkovic, D. & Ducharme, M. (2003). Finger dexterity, skin temperature, and blood flow during auxiliary heating in the cold. *Journal of Applied Physiology, 95,* 758-770.

Cheung, S, Montie, D., White, M. & Behm, D. (2003). Changes in manual dexterity following short-term hand and forearm immersion in 10°C Water. *Aviation, Space, and Environmental Medicine, 74,* 990-993.

Havenith, G., Heus, R. & Daanen, H.A.M. (1995). The hand in the cold, performance and risk. *Arctic Medical Research, 54 (Suppl. 2)*, 37-47.

2.3 Definitions

APPROVED: Refers to equipment that meets design and/or performance standards established by the FAA, other national aviation authorities, the U.S. Coast Guard, SOLAS (Safety of Life at Sea), SAE, or internationally recognized Search and Rescue organizations.

CHILLED HANDS TEST: A technique to simulate the reduced dexterity of chilled hands that may occur during an emergency in a cold environment. A naïve test participant simultaneously submerges left and right forearms and hands in 50 °F (10 °C) water for 2 min, quickly dries, and immediately (within 5 s following immersion) attempts to open/operate designated packaging/equipment. The participant should be healthy, and wear a loose-fitting, sleeveless upper garment that does not inhibit blood-flow to the arms and hands.

EXTENDED OVER-WATER ROUTE: A route or operation over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline.

GLOVED HANDS TEST: A technique to simulate the reduced dexterity of chilled hands that may occur during an emergency in a cold environment. A naïve test participant wears 2 mm thick (minimum), smooth-surfaced, neoprene gloves to open/operate designated packaging/equipment.

2.3.1 Mandating and Recommending Words

SHALL: Indicates a mandatory criterion.

SHOULD: Indicates a criterion for which an alternative, including non-compliance, may be applied if it is documented and justified.

3. GENERAL

3.1 Survival kits are designed to aid survivors of a water or remote, over-land, emergency landing, by providing signaling devices, information, supplies, and tools used to enhance survivability and aid rescue.

3.2 The recommended survival kit contents supplement the accessory equipment required on approved life rafts or slide/rafts. Duplication of items already provided on the raft for which the survival kit is supplied is not necessary. (See Applicable Documents paragraphs 2.1.1 through 2.1.5.)

3.3 Tactile sensitivity and manual dexterity of the hands are extremely important for many survival tasks, and have been shown to be significantly impaired during immersion in cold water and exposure to cold air (Brajkovic and Ducharme, 2003; Cheung, et al., 2003; Havenith, et al., 1995). The mitigation of the effects of such impairment is crucial in the design of survival equipment (e.g., designs that do not depend on fine motor skills to operate). Therefore, where designated, it shall be demonstrated successfully that the survival kit and its contents are openable and/or operable, in one attempt, using the Chilled Hands or Gloved Hands Test, as defined in 2.3.

3.4 Quantities per person are based on the rated capacity of the raft.

3.5 Metallic items shall be constructed entirely of materials resistant to salt-water corrosion.

4. RESCUE MODEL FOR SURVIVAL KIT PROVISIONS:

4.1 The contents of a survival kit should be appropriate for the period of time anticipated between the water landing event and the location, on-site support, and rescue of survivors. The items and quantities listed in Section 5 assume a rescue model that anticipates first rescuers are on scene within 12 h after ditching/landing.

4.2 If detection and rescue parameters are likely to exceed those described in 4.1, then appropriate supplemental items from Section 6 should be included. The appropriate supplemental items should also be included if the airplane is equipped with fewer than one approved satellite alerting device (e.g., 406 MHz ELT) for every four life rafts and/or slide/rafts on board.

5. RECOMMENDATIONS FOR MINIMUM KIT CONTENTS:

5.1 General

Multi-purpose tools and/or equipment may be substituted for one or more items listed in this section as long as the full functionality of the specified equipment is retained.

If a lithium battery pack (i.e., containing 2 or more cells that are permanently joined) is used in any equipment, it shall be TSO-C142a approved.

5.2 Packaging/Use/Security

The survival kit shall be packaged and sealed to protect the contents from water and crushing and to prevent damage to the life raft or slide/raft.

Successful opening of the survival kit packaging shall be demonstrated in accordance with the Chilled Hands or Gloved Hands Test.

A means for preventing items from accidental loss overboard shall be provided. A lanyard of non-abrasive, rot-resistant material at least 30 in (76.2 cm) in length, with a minimum breaking strength of at least 50 lb (22.68 kg), should be attached to each package that contains survival equipment.

5.3 Survival Instructions and Operating Information

5.3.1 Survival Manual, 1 each

The survival manual should provide information to survivors on raft management and survival, helping them to recognize, organize, and use the resources available to them. The manual shall be constructed of waterproof materials and shall provide survival information for the environment in which it is designed to be used. The manual should provide information that is clear, simple and as brief as possible to enhance communication. Pictographs should be used wherever possible, but those not already in widespread use shall be tested for 85% comprehension at the high school graduate level, using standard test methods (e.g., ANSI z535.3-2002).

The survival manual shall provide information about the raft it accompanies and how to maintain flotation. The manual should cover equipment operation, signaling, recovery, survival, and water procurement.

The survival manual should be organized to cover actions to be taken by the survivors immediately, in the first few hours, and beyond (e.g., 4 h, 12 h, 24 h, etc.). The manual should address life preservers, clothing, medical problems, sanitation and hygiene, deceased passengers, and organizing the raft occupants into a team.

5.3.2 Instructions/Operating Information, as required

Detailed operating instructions for equipment included in the survival kit shall be provided. If the equipment is likely to be used prior to survivors reading the survival manual, or instructions are not included in the manual, waterproof operating instructions shall be printed on or permanently attached to the equipment.

5.4 Signaling Devices

5.4.1 Signaling Mirror, 1 each

An approved mirror or heliograph capable of being operated and aimed with a single chilled hand, as demonstrated with the Chilled Hands or Gloved Hands Test, and able to signal surface or airborne rescuers visually, by reflecting direct sunlight or moonlight.

5.4.2 Whistle, 1 each

An approved, waterproof, corrosion-resistant whistle suitable for aural signaling of rescuers.

5.4.3 Visual Aviation Distress Signal, 1 each

A high-intensity flashing light source, meeting the requirements of AS5134, capable of signaling rescuers visually, during dusk or dark-of-night conditions.

5.4.4 High-visibility, water surface signaling device (e.g., dye marker, floating signal ribbon), 1 each.

5.5 Other Equipment

5.5.1 Repair Kit, 1 each

A minimum of two approved repair clamps of different sizes (e.g., 2, 4, and/or 6-in; 5, 10, and/or 15 cm). Other approved means suitable for sealing small and large holes under wet conditions may be substituted.

5.5.2 Bailing means, 1 each

A minimum 1 qt (0.95 L) capacity container, or an automatically- operating device, for removing water from the raft. Container shall be structured so as to facilitate its use to empty the life raft of water or to temporarily retain liquid without leakage. Its design and construction shall maintain a useable opening for scooping water and shall resist closure of the open end while in use.

5.5.3 Flashlight, 1 each

A water-resistant, buoyant flashlight suitable for supplemental lighting and signaling, having a minimum output of 30 lm over a runtime of at least 8 h. A spare set of batteries or an additional flashlight may be provided to meet the run-time requirement. A spare bulb shall be provided for flashlights using an incandescent bulb.