



AEROSPACE INFORMATION REPORT

AIR5690™**REV. A**

Issued 2006-08
Revised 2018-06
Reaffirmed 2023-11

Superseding AIR5690

(R) Rationale for Replacement of Pyrotechnic Signaling Devices
in Survival Kits on Transport Category Aircraft Life Rafts and Slide-Rafts

RATIONALE

Pyrotechnic signaling devices (flares) carried within transport category overwater survival kits represent a clear danger to survivors of aircraft ditching incidents and a flight security risk. AIR5690 is rewritten at this revision to better illustrate these risks and to establish a rationale for permitting the use of Aviation Visual Distress Signals authorized by FAA/TSO-C168 as an alternative to pyrotechnic devices in meeting applicable regulatory requirements. The term “aviation distress signal” and “ADS” have been revised to “aviation visual distress signal” and “AVDS” to harmonize with the nomenclature of FAA/TSO-C168. The title of the AIR is changed to more clearly identify the context of the information contained herein.

AIR5690A has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE

This SAE Aerospace Information Report (AIR) identifies the risks and dangers associated with the carriage and use of pyrotechnic signaling devices in transport category aircraft life rafts and slide/rafts, and provides a rationale for allowing the use of alternative non-pyrotechnic devices authorized by FAA/TSO-C168. These devices offer an equivalent level of safety while eliminating flight safety risks, enhancing survivability of aircraft ditching survivors, reducing costs, eliminating dangerous goods transportation and handling issues, and reducing environmental impact of dangerous goods disposal.

2. APPLICABLE DOCUMENTS

The following publications, documents, advisory material, and regulations are provided for reference only.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

ARP1282 Survival Kit - Life Rafts and Slide/Rafts

AS5134 Aviation Visual Distress Signal (AVDS)

SAE Technical Standards Board Rules provide that: “This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user.”

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2023 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

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
<http://www.sae.org>

SAE WEB ADDRESS:

Full document details: SAE AIR5690A

For more information on this standard, visit
<https://www.sae.org/standards/content/AIR5690A/>

Documents

Document Sharing Hub

2.2 United States Code of Federal Regulations (CFR)

Available from the United States Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, Tel: 202-512-1800, www.gpo.gov.

Title 14, § 25.1415, Ditching equipment

Title 14, § 121.339, Emergency equipment for extended over-water operations

Title 14, § 125.209, Emergency equipment: Extended overwater operations

Title 14, § 135.167, Emergency equipment: Extended overwater operations

Title 29, § 1910, Occupational Safety and Health Standards

Title 49, Parts 100-185, Transportation (Hazardous Materials Regulations)

2.3 FAA Publications

Available from Federal Aviation Administration, 800 Independence Avenue, SW, Washington, DC 20591, Tel: 866-835-5322, www.faa.gov.

FAA Technical Standard Order TSO-C168, Aviation Visual Distress Signals

FAA Advisory Circular 91-58A, Use of Pyrotechnic Visual Distress Signaling Devices in Aviation

FAA Advisory Circular 120-47, Survival Equipment for Use in Overwater Operations

2.4 ICAO Publications

Available from International Civil Aviation Organization, 999 University Street, Montreal, Quebec H3C 5H7, Canada, Tel: +1 514-954-8219, <http://www.icao.int/>

Annex 2 to the Convention on International Civil Aviation, Rules of the Air, Appendix 1

Annex 6 to the Convention on International Civil Aviation, Operation of Aircraft, Part I – International Commercial Air Transport, Section 6.5.3

Annex 18 to the Convention on International Civil Aviation, Safe Transport of Dangerous Goods by Air

Doc 9284 – Technical Instructions for the Safe Transport of Dangerous Goods by Air

International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual, Volume III – Mobile Facilities

2.5 United States Coast Guard Publications

Available from Department of Homeland Security, Acquisition Directorate, Research & Development Center, United States Coast Guard.

Report No. CG-D-06-12, "Suitability of Potential Alternatives to Pyrotechnic Distress Signals, Interim Report", dated February 2012

Report No. CG-D-04-15, "Alternatives to Pyrotechnic Distress Signals; Laboratory and Field Studies", dated March 2015

Report No. CG-D-17-15, "Alternatives to Pyrotechnic Distress Signals; Supplemental Report", dated August 2015

Report No. CG-D-06-17, "Alternatives to Pyrotechnic Distress Signals; Additional Signal Evaluation", dated June 2017

2.6 International Aviation Authorities

To meet the ICAO requirements, other national aviation authorities currently require the carriage of pyrotechnic signaling devices for overwater operations. A partial listing includes the following:

Available from the Australian Civil Aviation Safety Authority, <https://www.casa.gov.au>

- Australia – Civil Aviation Order 20.11, Section 6.1

Available from Transport Canada, <https://www.tc.gc.ca/eng/acts-regulations/menu.htm>

- Canada – Commercial Air Service Standards, Paragraph 725.95(2)(a)

Available from European Aviation Safety Agency (EASA), <https://www.easa.europa.eu>

- Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Part-SPO. Paragraph AMC2 SPO.IDE.A.195 (a)(7)

3. BACKGROUND

3.1 Pre-Existing Advisory Material Regarding Pyrotechnics

3.1.1 ICAO Rules of the Air

Annex 6 of the ICAO Rules of the Air requires that the pyrotechnics described in Annex 2 be carried for specified over water operations.

3.1.2 U.S. Code of Federal Regulations (CFR)

Title 14 of the CFR's requires the carriage of pyrotechnic signaling devices for overwater operations in parts 121.339, 125.209, and 135.167.

3.1.3 FAA Advisory Circular (AC) 120-47

This AC, issued in June, 1987, recommends carriage of at least one pyrotechnic signaling device, along with other equipment, as a "means, but not the only means for compliance with the pertinent regulations" regarding emergency equipment for extended overwater operations. The advisory circular offers a comprehensive listing of survival items that "should be carried during aircraft extended overwater operations" which include magnetic compass, radar reflector, desalination kit, fishing kit, and a 1000-calorie ration for each raft occupant. It is understood that none of these items are generally provisioned in airline extended overwater survival kits.

3.1.4 FAA Advisory Circular 91-58A

This AC, titled "Use of Pyrotechnic Visual Distress Signaling Devices in Aviation" was originally issued in May, 1982 and re-issued in February, 2000. The following cautionary statements about the carriage and use of pyrotechnic devices are excerpted from various sections of this advisory circular (underlining is added for emphasis):

3. BACKGROUND. The Federal Aviation Administration (FAA) recognizes that many pilots and operators of aircraft are utilizing some distress signaling devices that are inherently dangerous, as well as ineffective, when used in actual emergencies. Typical of the problem is the use of "railroad or highway flares," which produce an excessive amount of high temperature slag, usually burn the user when hand held, and are easily extinguished when used in open bodies of water. Further, the incendiary nature of these and other pyrotechnics presents problems for their safe and proper storage in the aircraft environment.

5. TYPES OF VISUAL DISTRESS SIGNALS.....Pyrotechnics make excellent distress signals and are universally accepted as such. However, one of the drawbacks of these devices is that they can only be used once.....