



Advisory Circular

Subject: Standardization of Portable Emergency Equipment and Emergency Procedures Pursuant to Sections 604.243 and 705.227 of the *Canadian Aviation Regulations*

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1.0 INTRODUCTION

- (1) This Advisory Circular (AC) is provided for information and guidance purposes. It describes an example of an acceptable means, but not the only means, of demonstrating compliance with regulations and standards. This AC on its own does not change, create, amend or permit deviations from regulatory requirements, nor does it establish minimum standards.

1.1 Purpose

- (1) The purpose of this document is to provide guidance regarding the objectives of the fleet standardization requirement of sections 604.243 and 705.227 of the *Canadian Aviation Regulations* (CARs) with regards to the type and stowage locations of portable emergency equipment and emergency procedures.

1.2 Applicability

- (1) This document applies to Transport Canada Civil Aviation (TCCA) personnel, to private operators conducting operations with aeroplanes configured to carry 20 or more passengers pursuant to Part VI, Subpart 4 of the CARs, and to commercial air operators conducting passenger-carrying operations pursuant to Part VII, Subpart 5 of the CARs.

1.3 Description of Changes

- (1) Not applicable.

2.0 REFERENCES AND REQUIREMENTS

2.1 Reference Documents

- (1) It is intended that the following reference materials be used in conjunction with this document:
- (a) *Aeronautics Act* (R.S., 1985, c. A-2);
 - (b) Part V, Subpart 21 of the *Canadian Aviation Regulations* (CARs) — Approval of the Type Design or a Change to the Type Design of an Aeronautical Product;
 - (c) Part VI, Subpart 2 of the CARs — Operating and Flight Rules;
 - (d) Part VI, Subpart 4 of the CARs — Private Operators;
 - (e) Part VII, Subpart 5 of the CARs — Airline Operations;
 - (f) Standard 725 of the CARs — Airline Operations;
 - (g) Chapter 525 of the *Airworthiness Manual* (AWM) — Transport Category Aeroplanes;
 - (h) Chapter 551 of the AWM — Aircraft Equipment and Installation;
 - (i) Transport Canada Publication (TP) 12295, Issue 03, 2000-01-31 — *Flight Attendant Manual Standard*;
 - (j) TP 12296, Edition 02, 2008-04-01 — *Flight Attendant Training Standard*;
 - (k) Transport Canada Civil Aviation Directive (CAD) No. REG-003, 2009-10-01 — *Exemptions from Regulatory Requirements*;
 - (l) Transport Canada Advisory Circular (AC) SUR-004, Issue 1, 2015-11-19 — *Civil Aviation Surveillance Program*;

- (m) Commercial and Business Aviation Advisory Circular (CBAAC) 0127, 1997-06-24 — *Manual Cross-Referencing List*;
- (n) Government of Canada, 1995 — *Final Response to the Commission of Inquiry Into the Air Ontario Crash at Dryden, Ontario*;
- (o) International Civil Aviation Organization (ICAO) Doc 10002, First Edition, 2014 — *Cabin Crew Safety Training Manual*;
- (p) Federal Aviation Administration DOT/FAA/AR-TN99/99, April 1999 — *Effectiveness of Flight Attendants Attempting to Extinguish Fires in an Accessible Cargo Compartment*;
- (q) National Transportation Safety Board (NTSB) Special Investigation Report 92/02, 1992-06-09 — *Flight Attendant Training and Performance During Emergency Situations*;
- (r) SAE International, Aerospace Recommended Practice (ARP) 583, Revision J, 2017-01 — *Cabin Crew Stations*;
- (s) SAE International ARP997, Revision D, 2012-08-30 — *Installation and Stowage Provisions for Emergency Equipment in the Transport Aircraft Passenger Cabin*; and
- (t) University of Southern California, Second Annual International Aircraft Cabin Safety Symposium Proceedings, 1985-02-12 — *Emergency Procedures and Equipment Standardization, Lufthansa German Airlines*.

2.2 Cancelled Documents

- (1) Not applicable.
- (2) By default, it is understood that the publication of a new issue of a document automatically renders any earlier issues of the same document null and void.

2.3 Definitions and Abbreviations

- (1) The following **abbreviations** are used in this document:
 - (a) **AC**: Advisory Circular;
 - (b) **ARP**: Aerospace Recommended Practice;
 - (c) **AWM**: *Airworthiness Manual*;
 - (d) **CAD**: Civil Aviation Directive;
 - (e) **CARs**: *Canadian Aviation Regulations*;
 - (f) **NTSB**: National Transportation Safety Board;
 - (g) **PBE**: protective breathing equipment;
 - (h) **TCCA**: Transport Canada Civil Aviation;
 - (i) **TP**: Transport Publication.

3.0 BACKGROUND

- (1) The United States (U.S.) National Transportation Safety Board (NTSB) identified risks associated with flight attendants being qualified on numerous aeroplane types and the lack of equipment standardization in a Special Investigation Report relating to *Flight Attendant Training and Performance During Emergency Situations*.

- (2) The report noted that in several accident investigations, the NTSB found that although flight attendants provided valuable assistance to passengers during emergency situations, they did not always follow their air operator's approved emergency procedures or perform their duties in accordance with their training. The NTSB reviewed its investigations of accidents and incidents where information was available on flight attendant performance during emergency situations. There were many examples of flight attendants who have performed extremely well, even heroically, during life-threatening emergencies and who were responsible for preventing or minimizing injuries to passengers.
- (3) However, there had been examples of flight attendants who lacked knowledge about emergency equipment and procedures, or who acted otherwise contrary to their training. In two of the twenty four evacuation cases cited in the NTSB report, the actions of some flight attendants contributed to an increase in the number of passenger injuries. In some of the other cases, flight attendant actions came very close to increasing the number of injuries. The NTSB expressed concern that these same actions in other situations could have disastrous results and that flight attendant training may not adequately prepare flight attendants for actions that they may be required to take.
- (4) Specifically, the NTSB noted the following.
 - (a) Knowledge and Skill Deficiencies:
 - (i) "...The Safety Board believes that some flight attendants may not have been given enough information about and/or practice with equipment and situations to master the skills they need in an emergency. Or conversely, they may be given so much information, such as multiple locations of equipment on several types of airplanes, that these locations cannot be readily recalled during an emergency..."
 - (b) Location of Equipment:
 - (i) "...Three accidents demonstrated that some flight attendants were unsure of, or could not recall without assistance, the location of emergency equipment. In two accidents, the flight attendants reacted immediately to the situations and sought but could not find the needed equipment..."
 - (ii) "...In the B-747 decompression... the flight attendant, who was qualified on seven airplane types, went to a location where she believed she would find an oxygen bottle; however, the accident aircraft was not among the B-747 models that had an oxygen bottle at that location..."
 - (iii) "... The stress of an emergency situation, and the infrequent use of emergency equipment, may cause a flight attendant to become confused about the location of equipment. Therefore, the more aircraft types for which flight attendants are qualified, the greater the need for standardized equipment location within aircraft types..."
 - (iv) "...The Safety Board believes that each operator should strive for the standardization of equipment location in order to facilitate flight attendant recall of emergency equipment location..."
- (5) In the 1980's, Lufthansa and its subsidiaries undertook a program to rationalize and standardize procedures and the types and location of portable emergency equipment within their aeroplane fleet. At the time, Lufthansa consisted of several companies: Lufthansa itself, Condor and German Cargo Services. These three divisions were operating over 130 aeroplanes from three different manufacturers, including: Boeing 707, 727, 737, 747; McDonnell Douglas DC10; and Airbus A300, A310 and A320.

- (6) The result of Lufthansa's Emergency Standardization Activities were:
 - (a) Three aeroplane qualification for flight attendants to comply with European aviation regulations applicable to commercial air transport operations;
 - (b) The standardization of procedures for all types of aeroplanes within the fleet, applicable to both cabin and flight deck crews;
 - (c) The installation of emergency equipment inside the aeroplane according to standard locations, regardless of aeroplane type or manufacturer;
 - (d) Reduced training effort and time through the standardization of procedures and equipment; and
 - (e) The realization of additional cost savings through a reduction in the storage and maintenance of different kinds of equipment.
- (7) The SAE International, Cabin Safety Provisions Committee published an aerospace recommended practice (ARP) relating to the installation and stowage provisions for emergency equipment in the transport aeroplane passenger cabin. ARP997 is intended to establish criteria for the installation and stowage of emergency equipment in the cabin to ensure its effective use in routine as well as emergency situations.
- (8) Similarly, ARP583 provides guidance for the design and location of cabin crew stations, including emergency equipment installations at or near such stations, so as to enable the cabin crew to function effectively in emergency situations, including emergency evacuations.
- (9) The goal is to promote expedient access to equipment in normal and emergency situations by encouraging standardization and reducing reorientation of crew members to alternate stowage provisions when changing type, series and model of aeroplane within an operator's fleet.
- (10) In its Special Investigation Report, the NTSB stated that it believed that each operator should strive for the standardization of equipment location in order to facilitate flight attendant recall of emergency equipment location. The NTSB recognized that a standardization program such as the one undertaken by Lufthansa may represent a major expense. However, as was noted by Lufthansa at the time, the initial costs were compensated for by long-term savings.
- (11) To address these issues, the standardization requirement of section 705.227 of the *Canadian Aviation Regulations* (CARs) has been introduced as a means to mitigate a residual risk where there could be a lack of familiarity with aeroplane systems as there is no restriction in Canada on the number of aeroplanes on which a flight attendant may be qualified. While training may be capable of addressing this issue in part, the standardization of equipment types, locations and procedures better satisfies the intent of the mitigation.
- (12) In order to give operators time to prepare, the coming into force of this requirement was delayed from August 1, 2015 until September 15, 2017.

4.0 STANDARDIZATION

4.1 Applicability

- (1) Section 604.243 of the CARs requires that no private operator shall operate an aeroplane that is configured to carry 20 or more passengers unless the emergency equipment, the stowage locations for emergency equipment and the emergency procedures are standardized for all aeroplanes in the private operator's fleet that are configured to carry 20 or more passengers.
- (2) Section 705.227 of the CARs requires that no air operator shall operate an aeroplane to carry passengers unless the emergency equipment, the stowage locations for emergency equipment

and the emergency procedures are standardized for all aeroplanes in the air operator's fleet that are operated to carry passengers under Subpart 5 to Part VII of the CARs.

- (3) The standardization requirement is applicable to all aeroplanes across the operator's fleet, regardless of model or manufacturer. However, it is not applicable to an air operator's aeroplanes that may be operated solely under other subparts of Part VII of the CARs.
- (4) The following subsections of this Advisory Circular (AC) provide additional guidance regarding the objectives of this standardization requirement so that both industry and Transport Canada Civil Aviation TCCA may have a common understanding of the expectations.

4.2 Emergency Equipment

- (1) An air operator is required to identify in its flight attendant manual and include in its flight attendant training program each item of emergency equipment onboard each aircraft. This information is to include a description of its use and the procedures associated with its operation.
- (2) The focus for the standardization of emergency equipment should be those items of portable equipment that are required by the CARs. Equipment not specifically subject to the standardization requirement may include optional items such as an automatic external defibrillator, which is not required by regulation. However, operators may elect to include this equipment in their standardization activities.
- (3) The emergency equipment that is subject to the standardization requirement includes those items listed below that are required to comply with the sections of the CARs in brackets:
 - (a) first aid kits (602.60, 604.117 and 705.90);
 - (b) flashlights (602.60, 705.79 and 705.97);
 - (c) hand-held fire extinguishers (602.60, 604.119 and 705.93);
 - (d) life preservers and flotation devices, as applicable (602.62);
 - (e) protective breathing equipment (604.118 and 705.71);
 - (f) portable first aid oxygen (705.72);
 - (g) megaphones (705.89);
 - (h) emergency medical kit (705.91);
 - (i) crash axe (705.92); and
 - (j) portable oxygen (705.94).
- (4) Other portable emergency equipment that an operator may consider standardizing includes, but is not limited to, the following:
 - (a) automatic external defibrillator;
 - (b) firefighting gloves;
 - (c) fire containment device (e.g. for personal electronic devices powered by lithium batteries that have gone into thermal runaway); and
 - (d) other personal protective equipment not specifically required by the CARs.
- (5) When considering the standardization of emergency equipment, the operator should conduct a comparative analysis of each item of portable emergency equipment in their fleet to identify similarities and differences. Such an analysis would enable the operator in making a determination that certain items of equipment are standardized, while other items are non-standard, based on the following points:

- (a) general description;
 - (b) uses;
 - (c) location(s);
 - (d) removal from stowage;
 - (e) how to operate;
 - (f) conditions for operation;
 - (g) operational limitations and duration of use;
 - (h) operation under adverse conditions; and
 - (i) precautions for use.
- (6) It may not be necessary for each item of equipment to be identical across the air operator's fleet. For example, an air operator might have two configurations of a megaphone, where one is all red and has a push-to-talk activation and another is white and red with a squeeze-to-talk activation. The comparative analysis of the two items should be used to determine if the variations are acceptable.
- (7) Conversely, items of protective breathing equipment (PBE) often have significant differences in configuration and operation. For example, PBE may consist of a full face mask, a face mask and hood, hood only, etc. Their method of activation may also vary. While PBE all perform the same basic function, the differences between the items of equipment would result in their not being standardized and could impact the effectiveness of their use. Fire safety research conducted in the U.S. identified difficulties associated with PBE used by flight attendants while attempting to extinguish a fire in a small Class B cargo compartment. Having a standard PBE across the fleet would reduce the likelihood of experiencing difficulties in accessing, activating and effectively utilizing the equipment.

4.3 Stowage Locations for Emergency Equipment

- (1) As noted in subsection 4.2 of this AC, the focus of the regulatory requirement is on portable emergency equipment as it is not possible to change the emergency exits or escape slides on all of the aeroplanes in an air operator's fleet to achieve one standard.
- (2) With respect to the stowage locations of portable emergency equipment, it is understood that it may not be possible to install each piece of equipment in identical locations across all aeroplane models as a result of various interior configurations (e.g. all passenger or combi), cabin monuments (e.g. bulkheads, closets, galleys, etc.) and aeroplane sizes (e.g. single-aisle and twin-aisle).
- (3) The intent is not to require or expect that operators will reconfigure their aeroplanes in order to have all equipment in identical locations across all aeroplane models. The regulatory requirement also does not specify prescriptive criteria to be met. This was intentional in order to avoid issues similar to those associated with subparagraph 705.71(3)(b)(iv) of the CARs, where a prescriptive location is specified for PBE (i.e. within one metre of each hand-held fire extinguisher required in the passenger compartment by section 705.93). As a result of the requirement in subparagraph 705.71(3)(b)(iv), authorizations are regularly issued by the Minister to deviate from this prescriptive location.
- (4) Rather, each operator should consider a performance-based approach when analysing emergency equipment locations across their fleet to meet the intent of the requirement, which is to facilitate access to equipment in an emergency and to reduce reorientation of crew members to alternate stowage locations when moving between aeroplane models within an operator's fleet. A

crew member should be able to go to a given area on board an aeroplane and find the piece of equipment that they need to respond to an emergency.

- (5) When considering the standardization of stowage locations for emergency equipment, the air operator should analyze the location of each item of portable emergency equipment in their fleet to identify similarities and differences. Such an analysis would enable the air operator in making a determination that certain locations of equipment may be standardized across all aeroplanes in the fleet.
- (6) For example, an operator may have some aeroplane models with an emergency equipment stowage compartment in a forward starboard location and other models without such an emergency equipment stowage compartment. The analysis conducted by the air operator should identify this configuration difference and identify possible mitigations (e.g. all of the emergency equipment found in the stowage compartment on some models will be installed in the same area on other models, such as a forward starboard overhead bin).
- (7) With respect to each flight attendant station, the air operator should standardize the location of portable emergency equipment that is intended to be readily accessible to a flight attendant while they are seated.
- (8) Where the location of items of emergency equipment has been specified by the type certificate, any change in location would have to address the AWM standards for that aeroplane model.

4.4 Emergency Procedures

- (1) As noted by the NTSB in its Special Investigation Report, most flight attendants never encounter life-threatening emergencies during their careers. Other professionals that deal with life-threatening emergency situations, such as fire fighters, hone their skills during hands-on training, drills, and participation in actual emergencies.
- (2) Conversely, flight attendants receive training to manage emergency situations but rarely have the opportunity to use the skills acquired during training. For most flight attendants, the only opportunity to practice skills needed in an emergency is during initial and annual training. These skills are perishable, and continuing and effective training is essential for maintaining them.
- (3) Emergency procedures, such as those required to prepare an aeroplane for an evacuation or a ditching, extinguish an in-flight fire, supervise the cabin following a decompression, or manage passengers during an emergency evacuation, are rarely, if ever, used. Flight attendants must immediately change from passenger service-oriented roles to their critical safety-related roles in an emergency.
- (4) As emergency situations typically require quick, assertive, and decisive action with little time for analysis of the situation, having consistent and standardized emergency procedures will enhance the crew member response to an emergency situation by reducing decision making during emergencies and the subsequent likelihood of error.
- (5) With respect to the standardization of flight attendant emergency procedures, examples to be considered for all aeroplanes in an air operator's fleet may be found in the following:
 - (a) TP12295 *Flight Attendant Manual Standard* — Part A — Section 2 — Emergency Procedures;
 - (b) TP12296 *Flight Attendant Training Standard* — Initial Part Four — Emergency Procedures; and
 - (c) TP12296 *Flight Attendant Training Standard* — Annual Part Four — Emergency Procedures.

- (6) These emergency procedures should be cross-referenced between the company operations manual, standard operating procedures and the flight attendant manual when they are established and during any subsequent amendment process to verify that the information is standardized. This will contribute to effective communication among crew members and help to enable coordinated and consistent safety and emergency procedures for flight attendants and flight crew members.
- (7) The guidance contained in Commercial and Business Advisory Circular (CBAAC) 0127 — *Manual Cross-Referencing List* is also available to assist air operators in establishing a complete, consistent and cross-referenced company operations manual, standard operating procedures and flight attendant manual.

5.0 OTHER CONSIDERATIONS

5.1 Considerations for Seasonal Leased Aeroplanes

- (1) Some air operators make use of seasonal aeroplane leases, adopting a so-called “accordion fleet” strategy, which enables the air operator to adjust the number of aeroplanes it operates to the seasonal needs of the market. These leases are of a short duration, typically no longer than six months.
- (2) These air operators may face unique challenges with respect to standardizing the portable emergency equipment and stowage locations for emergency equipment on the leased aeroplanes. As the leased aeroplanes are configured to meet the operational requirements of the lessor, the lease agreement itself may contain limitations or prohibitions that restrict the ability of the lessee to reconfigure or reequip the aeroplane. This may prevent the air operator from being able to fully meet section 705.227 of the CARs.
- (3) In such a circumstance, the air operator may consider submitting a request for exemption as outlined in Civil Aviation Directive (CAD) REG 003 — *Exemptions from Regulatory Requirements*. It is the responsibility of the air operator to demonstrate that the granting of an exemption is in the public interest and is not likely to adversely affect aviation safety. To accomplish this, the air operator must demonstrate how the granting of the exemption would be in the public interest and propose conditions that would establish an acceptable level of safety and mitigate any risk that could be created by the exemption.
- (4) Each request for exemption will be assessed to determine if the applicant has made a compelling argument and that the granting of an exemption is in the public interest and is not likely to adversely affect aviation safety. This assessment is used to decide whether to grant or refuse the exemption request.

5.2 Considerations for Transitional Plans

- (1) The standardization requirement should not be seen as preventing an operator from replacing older equipment, upgrading their portable emergency equipment with newer technology, or relocating their portable emergency equipment.
- (2) An operator may identify the need to make these changes and wish to replace existing equipment or implement changes through a transitional or phased-in approach.
- (3) This may be necessary as a result of the fleet size, planning of aeroplane interior configuration changes to align with scheduled maintenance, availability of equipment from suppliers, introduction of new aeroplanes not meeting existing configurations or other considerations. The operator may choose such a process as part of a fleet upgrade or modernization program establish a timeline for completing the changeover.

- (4) The operator should conduct an assessment in accordance with its safety management system to document the proposed timeline to meet the standardization objective, identifying both short-term and long-term actions. The timelines for the implementation of each proposed action should be aimed at implementing the changes in the shortest reasonable time period. For example, an operator may decide to standardize the protective breathing equipment on board the aeroplane in its fleet with a single model on a time expiry basis. That is, as the service life of individual units comes to an end, the operator will replace each with the standard model.
- (5) When considering the acquisition of new aeroplanes, the operator should plan to standardize the portable emergency equipment and the stowage locations for the portable emergency equipment at the time of purchase, particularly when ordering newly manufactured aeroplanes.
- (6) It will be the responsibility of each operator to demonstrate through their safety management system in the course of safety oversight activities that they meet the standardization objective. While there is no requirement for the operator to submit their transitional plan to their principal inspector, the operator may inform their principal inspector of the timeline for completing the changeover and the plan may be monitored as part of regular safety oversight activities associated with assessing the effectiveness of the operator's safety management system.

6.0 INFORMATION MANAGEMENT

- (1) Not applicable.

7.0 DOCUMENT HISTORY

- (1) Not applicable.

8.0 CONTACT OFFICE

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Suggestions for amendment to this document are invited, and should be submitted via:

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