



Advisory Circular

Subject: Carriage of Medical Oxygen Cylinders or Portable Oxygen Concentrators for Passenger Use on Board Aircraft

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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 air operators with recommended procedures for the carriage of medical oxygen cylinders or portable oxygen concentrators for passenger use on board aircraft.

1.2 Applicability

- (1) This document applies to commercial air operators conducting operations pursuant to Subparts 3, 4 or 5 of Part VII of the *Canadian Aviation Regulations* (CARs).

1.3 Description of changes

- (1) This document is being updated to reflect regulatory changes made by the United States regarding the acceptance of portable oxygen concentrators for use on board aircraft.
- (2) With the exception of minor editorial changes and updated references, the remainder of the content is unaltered.

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.C., 1985, c. A-2)
 - (b) Part VI, Subpart 02 of the *Canadian Aviation Regulations* (CARs) — Operating and Flight Rules
 - (c) Part VII, Subpart 03 of the CARs — Air Taxi Operations
 - (d) Part VII, Subpart 04 of the CARs — Commuter Operations
 - (e) Part VII, Subpart 05 of the CARs — Airline Operations
 - (f) Part V, Chapter 551 of the *Airworthiness Manual* — Aircraft Equipment and Installation
 - (g) *Transportation of Dangerous Goods Regulations* (TDGRs)
 - (h) International Civil Aviation Organization Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO TIs)
 - (i) Paragraph 148(5)(b) of the *Air Transportation Regulations* — Terms and Conditions of Carriage of Persons: Services
 - (j) Section 49 of the *Accessible Transportation for Persons with Disabilities Regulations* — Small assistive devices
 - (k) Canadian Transportation Agency, Decision no. 720-AT-A-2005, 2005-12-13 — Accessible transportation complaints by various complainants against Air Canada and

one complaint against WestJet regarding persons who require that medical oxygen be available to them when travelling by air

- (l) Canadian Transportation Agency, Decision no. 336-AT-A-2008, 2008-06-26 — Applications filed pursuant to subsections 172(1) and (3) of the Canada Transportation Act, S.C., 1996, c. 10, as amended regarding persons who require that medical oxygen be available to them when travelling by air
- (m) Canadian Transportation Agency, Decision no. 337-AT-A-2008, 2008-06-26 — Applications filed pursuant to subsections 172(1) and (3) of the Canada Transportation Act, S.C., 1996, c. 10, as amended regarding the reliability of the oxygen service provided by Air Canada
- (n) Canadian Transportation Agency, Decision no. 411-AT-A-2009, 2009-09-30 — Applications filed pursuant to subsections 172(1) and (3) of the Canada Transportation Act, S.C., 1996, c. 10, as amended regarding persons who require that medical oxygen be available to them when travelling by air
- (o) Canadian Transportation Agency, Decision no. 164-AT-A-2010, 2010-05-05 — Application by Air Canada, pursuant to section 32 of the Canada Transportation Act, S.C., 1996, c. 10, as amended
- (p) Canadian Transportation Agency, Decision no. 333-AT-A-2012, 2012-08-21 — Application by Air Canada for review, pursuant to section 32 of the Canada Transportation Act, S.C., 1996, c. 10, as amended
- (q) United States Title 14 Code of Federal Regulations (CFR) 121 — Operating Requirements: Domestic, Flag, and Supplemental Operations
- (r) United States Title 14 CFR 125 — Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 Pounds or More; and Rules Governing Persons On Board Such Aircraft
- (s) United States Title 14 CFR 135 — Operating Requirements: Commuter and On Demand Operations and Rules Governing Persons On Board Such Aircraft
- (t) United States Title 14 CFR 382 — Non-Discrimination on the Basis of Disability in Air Travel
- (u) United States Title 49 CFR 175 — Carriage by Aircraft
- (v) United States Federal Aviation Administration (FAA) Advisory Circular (AC) 91.21-1D, 2017-10-17 — Use of Portable Electronic Devices Aboard Aircraft
- (w) United States FAA AC 120-95A, 2016-05-24 — Portable Oxygen Concentrators
- (x) United States FAA Information for Operators (InFO) 09006, 2009-05-01 — Department of Transportation (DOT) Final Rule “Nondiscrimination on the Basis of Disability in Air Travel” and the Use of Respiratory Assistive Devices on Aircraft; and
- (y) United States FAA InFO 13005, 2013-04-22 — Acceptance of Passenger Supplied Medical Oxygen Onboard Aircraft

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 **definitions** are used in this document:
 - (a) **Medical oxygen** means a gaseous oxygen cylinder or a portable oxygen concentrator that would be carried on board an aircraft by a passenger, rather than an oxygen cylinder that is furnished to the passenger by the air operator.
 - (b) **Portable oxygen concentrator** means a medical portable electronic device that separates oxygen from other gasses in ambient air and dispenses this concentrated oxygen to the user.
- (2) The following **abbreviations** are used in this document:
 - (a) **ATPDRs:** *Accessible Transportation for Persons with Disabilities Regulations*
 - (b) **CARs:** *Canadian Aviation Regulations*
 - (c) **CFR:** *Code of Federal Regulations* is the codification of the general and permanent rules published in the United States Federal Register by the executive departments and agencies of the United States Federal Government
 - (d) **CTA:** Canadian Transportation Agency
 - (e) **ICAO TIs:** International Civil Aviation Organization Technical Instructions for the Safe Transport of Dangerous Goods by Air
 - (f) **LPM:** litres per minute
 - (g) **POC:** portable oxygen concentrator
 - (h) **RTCA:** Radio Technical Commission for Aeronautics, Inc
 - (i) **TCCA:** Transport Canada Civil Aviation
 - (j) **TDGRs:** *Transportation of Dangerous Goods Regulations*

3.0 Background

- (1) Passengers who require medical oxygen are dependent upon the oxygen for medical reasons, are under a physician's care, and require prescribed oxygen similar to a person requiring a prescribed drug.
- (2) The CARs requirement to carry oxygen on an aircraft is for use during a decompression event, for supplemental oxygen supply, and for first aid purposes. There are no operational regulations pertaining to passenger use of oxygen for medical reasons or prohibiting the use of medical oxygen.
- (3) In the absence of any CARs addressing operational requirements, there are variances amongst individual Canadian air operator policies regarding the carriage and operation of medical oxygen equipment for passenger use.
- (4) A number of concerns have been expressed by passengers who require the use of medical oxygen on board an aircraft:
 - (a) Passengers who require medical oxygen can experience difficulty in respiration due to such illnesses as chronic bronchitis, severe anaemia, chronic obstructive pulmonary disease, cardiac disease, emphysema, etc.;
 - (b) It is important that the oxygen equipment be capable of providing a variable flow rate as the passenger prescription is established for the individual's medical condition. Air operator provided oxygen flow rates are generally a fixed flow rate of 2 or 4 litres per

- minute (LPM), versus the variable flow capability of the passenger's own oxygen equipment;
- (c) Passengers requiring medical oxygen may encounter physical and physiological problems when their prescribed flow rate is not available on air operator provided oxygen equipment;
 - (d) Further respiratory difficulties may also be encountered due to the environmental change from ground level to the lower partial pressure of oxygen present at cabin pressure altitudes of up to 8,000 feet (2,400 metres);
 - (e) Many air operators do not provide a medical oxygen service for passengers and those that do provide the service often charge a fee; and
 - (f) It can be difficult to coordinate the provision of a medical oxygen service between the air operator and an oxygen supplier to ensure that the service is available both on board the aircraft and while the passenger is on the ground at enroute stops. This can result in the passenger travelling without medical oxygen due to service-related problems.
- (5) The Canadian Transportation Agency (CTA) has received complaints from Canadian medical oxygen users regarding the lack of standardization amongst Canadian air operators related to the acceptance and use of medical oxygen on board aircraft. This lack of standardization may be seen as an obstacle to the mobility of persons who are dependent upon medical oxygen.
 - (6) In 2005, the CTA determined, through Decision no. 720-AT-A-2005, that persons who may require medical oxygen when they travel by air do encounter obstacles to their mobility. The CTA conducted a further review to determine whether or not those obstacles are "undue" under the *Canada Transportation Act* and, if so, what corrective measures may be appropriate to address them. Through Decision no. 336-AT-A-2008, dated June 26th, 2008, the CTA published its findings in respect of two air operators.
 - (7) In Canada, air operators are not required to permit the use of medical oxygen on board but may elect to either provide a medical oxygen service or permit the carriage of medical oxygen for passenger use. An air operator that does choose to permit the use of medical oxygen may accept it for carriage on board aircraft in two forms:
 - (a) Contained within a compressed oxygen cylinder (either supplied by the air operator or supplied by the passenger as further described in Section 4.0 of this AC); or
 - (b) Provided by a portable oxygen concentrator.

4.0 Medical oxygen cylinders

- (1) The Canadian TDGRs and the International Civil Aviation Organization's (ICAO) TIs regulate the transport of oxygen to, from and within Canada and on board Canadian registered aircraft outside Canada.
- (2) Oxygen comes in two forms:
 - (a) Refrigerated liquid; or
 - (b) Compressed gas.
- (3) Oxygen as a refrigerated liquid is forbidden for air transport at all times.
- (4) Compressed oxygen may be transported by air if in compliance with the packaging, marking, documentation and handling requirements specified in the TDGRs and the ICAO TIs.
- (5) However, the air operator may transport compressed oxygen for medical use by a passenger under specified exemptions:

- (a) In Canada and on board Canadian registered aircraft outside Canada, under section 1.27 of the TDGRs; and
 - (b) Internationally and domestically, small cylinders of compressed oxygen required for medical use are exempt from the TDGRs and ICAO TIs with the prior approval of the air operator. Each cylinder must not exceed 5 kg gross mass.
- (6) Although the carriage of medical oxygen cylinders may be permitted by dangerous goods exemption, authority to use the oxygen in flight depends upon the approval of the air operator. Consideration must be given to the integrity of the cylinder and regulator, maintenance and conditions of carriage including restraint of the cylinder in the cabin. Consequently, the air operator must determine whether they will permit the carriage of medical oxygen cylinders and, if so, whether they will supply the medical oxygen or permit the passenger to use their own.
- (7) In addition, Transport Canada, the United States' Department of Transportation, and other regulatory bodies are attempting to harmonize regulations and policies to the greatest extent possible. Currently the United States' aviation and hazardous materials regulations forbid the use of passenger-supplied medical oxygen cylinders and the changing of a regulator on board an aircraft for reasons of safety.
- (8) TCCA has safety concerns regarding the carriage and use of passenger-supplied medical oxygen cylinders without restrictions. These concerns include maintenance of the equipment, passenger handling of equipment until it is boarded, the quantity of oxygen boarded, stowage and restraint of equipment and in-flight operational concerns, particularly the changing of the regulator in-flight.
- (9) As noted, the CARs do not address the operational requirements for the use of passenger-supplied medical oxygen cylinders on board aircraft. However, the United States authorities only permit the carriage of oxygen cylinders for medical use by passengers where the air operator provides the equipment. Therefore, any Canadian air operator operating into the United States would not be permitted to allow the passenger to use their own medical oxygen cylinder on board the aircraft.
- (10) Where an air operator permits the carriage and use of medical oxygen cylinders, whether passenger-supplied or supplied by the air operator, the onus is on the air operator to develop safety procedures to ensure the collective safety of all occupants.

4.1 Safety considerations of passenger-supplied medical oxygen cylinders

- (1) There are three readily identifiable areas affecting safety regarding the use of passenger-supplied medical oxygen cylinders on board aircraft. These fall within the areas of equipment, training and operational considerations.

4.1.1 Equipment considerations

- (1) Medical oxygen equipment that is supplied by the air operator is maintained as per the air operator's approved maintenance program, in accordance with the manufacturer's instructions for equipment maintenance and includes rigorous testing of the equipment. The air operator has no assurance the passenger-supplied medical oxygen cylinder has been maintained in accordance with prescribed standards or that all required cylinder testing has actually been carried out.
- (2) There is no assurance that the exterior of the passenger-supplied medical oxygen cylinder is free of flammable contaminants and has not been handled by a person with grease, butter, etc., on their hands. Contamination of the regulator by a greasy substance (from salad dressing, butter on hands from a roll, grease on hands from a croissant or cheese, petroleum-based cosmetics, etc.) can cause a fire during flight.
- (3) Currently, there is no method to verify that the passenger-supplied medical oxygen cylinder and regulator were protected from damage between the time they left the supplier, up to and including

the time of use on the aircraft. The weak spot of the cylinder/regulator is the connection point of the regulator on the cylinder. The cylinder could become a projectile on board the aircraft if the regulator was knocked against a solid object. There may also be differences in the sizes of connections on the cylinders and regulators, the materials used to construct the cylinders (e.g. metal or composite) as well as the handling and maintenance of these cylinders although the same manufacturers produce them.

4.1.2 Training considerations

- (1) The passenger may be using oxygen equipment at home that may not be acceptable for carriage on board aircraft and be required to obtain equipment from a supplier for on board use. The passenger may be unfamiliar with the use of equipment obtained for flight, especially if it is different from the type used at home. There is no method to verify the adequacy and consistency of training provided to the passenger by respiratory therapists respecting the use of the passenger-supplied medical oxygen cylinder. The content of training relating to safety precautions and the physical hands-on operation of the specific equipment being used during the flight are unknown.
- (2) Another concern involves the transfer of the regulator during flight. The instructions from manufacturers often require training on the proper use of the regulator or that the person is to be under competent supervision. The "competent supervision" may fall upon a crew member if a person who has been trained on the use of this equipment does not accompany the passenger. However, crew members would not be trained on passenger-supplied equipment due to the large variety of equipment types and configurations that are available.

4.1.3 Operational considerations

- (1) There are no assurances a passenger-supplied medical oxygen cylinder can be adequately restrained or that there will be adequate restraint systems provided with the equipment as oxygen suppliers do not normally furnish a protective carrying case for the safe transport of cylinders that will be carried and used on board an aircraft. A means of restraint must be provided that has been designed for the restraint of each oxygen cylinder to prevent it from shifting during the taxi, take-off, descent and landing phases of flight, during periods of in-flight turbulence and an emergency landing. This means of restraint should be approved by TCCA aircraft certification engineering prior to use on board an aircraft.
- (2) There is no method to verify that the same level of safety is maintained when a passenger-supplied medical oxygen cylinder is replenished by a supplier outside of Canada for passenger use when returning to Canada on aircraft operated by a Canadian air operator.
- (3) The size of the medical oxygen cylinder must permit it to be stowed and restrained in an approved location on board the aircraft. While medical oxygen may be available in cylinders of different dimensions, the ICAO TIs require that each cylinder must not exceed 5 kg gross mass.
- (4) Subpart 705 air operators, those utilizing aircraft with 20 or more passenger seats, have indicated that "D" size cylinders will be the maximum size of oxygen cylinder permitted on board. However, the "D" size cylinder may not be suitable for acceptance on smaller aircraft where approved stowage areas are limited in size and quantity. In addition to the issue of acceptable cylinder size on smaller aircraft, there are safety concerns about the transfer of the regulator in-flight. The flight crew cannot leave the aircraft controls to supervise the transfer of the regulator to any additional cylinders.

4.2 Air operator procedures

- (1) Passengers requiring the use of medical oxygen on board the aircraft may carry and use their own medical oxygen cylinder provided the air operator approves and has established appropriate procedures.

4.2.1 Acceptance and maintenance of the equipment when oxygen is provided by the passenger

- (1) The air operator should establish procedures for the acceptance of gaseous medical oxygen cylinders required for medical use that include:
 - (a) Verification of the content of the cylinder (type of oxygen and confirmation that liquid oxygen is not accepted);
 - (b) Verification that each medical oxygen cylinder conforms with the manufacturing, packaging, marking and labelling requirements of the TDGRs;
 - (c) Verification that each medical oxygen cylinder provided by the passenger has been maintained by a Canadian supplier in accordance with applicable standards, or the oxygen equipment has been maintained by the air operator in accordance with the air operator's approved maintenance program;
 - (d) Verification that each medical oxygen cylinder provided by the passenger has been hydrostatic tested by a Canadian supplier in accordance with applicable standards;
 - (e) Verification that each medical oxygen cylinder was not filled above its rated service pressure at reference temperature;
 - (f) Visually checking the cylinders, valves, fittings and gauges for signs of damage;
 - (g) Verification that all exterior surfaces of the cylinder are free of flammable contaminants; and
 - (h) Verification that the size of the oxygen cylinder can be stowed on the aircraft type and configuration, or combination of aircraft types and configurations on which it will be transported.
- (2) The air operator should notify the passenger that the regulator on a gaseous medical oxygen cylinder should not be changed while any passenger is on board the aircraft. This may require that each additional cylinder will require its own regulator.

4.2.2 The quantity of oxygen boarded

- (1) The air operator should establish procedures to ensure that:
 - (a) The oxygen equipment is capable of providing a variable flow rate of oxygen that meets the passenger's prescription;
 - (b) The oxygen equipment provided by the passenger is capable of providing the total quantity of oxygen required for the duration of the flight at the prescribed flow rate; and
 - (c) The amount of oxygen to be boarded in the passenger cabin is required for use by the passenger during flight.
- (2) Additional medical oxygen cylinders, required by the passenger at their destination or for the return flight, should be transported as checked baggage in the cargo area only and in accordance with the restrictions and limitations of the TDGRs.

4.2.3 Documentation

- (1) Passengers requiring the use of medical oxygen cylinders should be requested to provide documentation signed by a licensed physician or other licensed health professional such as a respiratory therapist that indicates the maximum flow rate, maximum quantity of oxygen per hour and the maximum quantity of oxygen required for the flight(s).
- (2) Factors that should be taken into consideration to determine the adequacy of oxygen supply are the prescribed flow rate of litres per minute (LPM), impact of cabin pressure altitude on the flow rate, duration of flight(s), ground time, connecting flights, and an appropriate reserve in the event of unforeseen operational circumstances.

- (3) Where applicable, confirmation of medical clearance with the air operator's medical advisor, in consultation with the passenger's licensed physician or other licensed health professional such as a respiratory therapist may be sought.

4.2.4 Operational procedures

- (1) The air operator should establish operational procedures:
- (a) To confirm that the passenger has been trained on the operation and proper use of the passenger-supplied medical oxygen cylinder;
 - (b) That permits a passenger to use a nasal cannula rather than an oxygen mask, if applicable;
 - (c) That permits a passenger to use a humidifier that is attached to the medical oxygen cylinder, if applicable;
 - (d) To verify that passengers, who require additional medical oxygen cylinders enroute, have made arrangements with an oxygen supplier to have the additional oxygen equipment delivered to the passenger;
 - (e) To verify the passenger requiring medical oxygen is seated in a location:
 - (i) Where the oxygen equipment will not restrict access to, or use of, any emergency/safety equipment, or access to any aisle or exit; and
 - (ii) That in the event of an emergency landing requiring an evacuation, access to an aisle would not be obstructed by the hose of the medical oxygen cylinder in use;
 - (f) To advise the pilot-in-command and cabin crew prior to flight that medical oxygen will be in use during the flight, the number of medical oxygen cylinders that have been boarded and their stowage location; and
 - (g) To provide the passenger with an individual pre-flight safety briefing that includes the following:
 - (i) In the event of an on-board fire within 3 meters of the passenger using oxygen, or the location of additional medical oxygen cylinders, the passenger and additional cylinders should be moved to a location away from the fire, and
 - (ii) In the event of an emergency requiring an evacuation, the oxygen equipment should remain on board the aircraft.

4.2.5 Boarding, stowage and restraint of oxygen equipment

- (1) The air operator should specify who is responsible for the boarding of passenger-supplied medical oxygen cylinders, including any additional medical oxygen cylinders that may be required by the passenger during the flight.
- (2) The air operator should establish procedures to verify the restraint of passenger-supplied medical oxygen cylinders reflects the following:
- (a) Each medical oxygen cylinder provided by the passenger should be protected in a rigid carrying case that is lined by a means that ensures the cylinder does not shift during movement of the aircraft. The means of restraint should be designed for the restraint of medical oxygen cylinders and be approved or accepted for use on board an aircraft; or
 - (b) The air operator should provide a means of restraint for each medical oxygen cylinder that has been designed for the restraint of that equipment to prevent it from shifting during the taxi, take-off, descent and landing phases of flight, during periods of in-flight turbulence and an emergency landing. The means of restraint for each medical oxygen

cylinder should be approved by TCCA aircraft certification engineering and used to restrain each oxygen cylinder.

- (3) The medical oxygen cylinder for use during flight and any oxygen accessories should be stowed under a passenger seat equipped with a forward and sideward means of restraint in accordance with section 551.500 of the CARs, and restrained by the means referred to in 4.2.5(2) of this AC.
- (4) Oxygen cylinder carts should not be accepted for use on board unless the oxygen cylinder and cart is secured to the fuselage wall or a bulkhead that is not located in an emergency exit row. The means of restraint used to secure the oxygen cylinder and cart should be approved by TCCA aircraft certification engineering.
- (5) Only the medical oxygen cylinders needed for the duration of the flight, or duration of the flight and a connecting flight, in conjunction with the stowage and restraint capacity on that particular aircraft, should be carried on board.
- (6) Additional medical oxygen cylinders intended for use during the flight should be restrained under a passenger seat equipped with a forward and sideward means of restraint in accordance with section 551.500 of the CARs. Alternatively, the medical oxygen cylinders may be transported within a compartment that has been approved for the stowage of carry-on baggage if restrained with a supplementary means to prevent the medical oxygen cylinder from shifting during the taxi, take-off, descent and landing phases of flight, during periods of in-flight turbulence and in an emergency landing.
- (7) The air operator should verify that the medical oxygen cylinder(s) and equipment does not exceed the maximum weight limitations approved for the area where the equipment is stowed.
- (8) Where applicable, the air operator's carry-on baggage control program, required pursuant to section 705.42 of the CARs, should contain provisions for oxygen equipment and accessories that are provided by the passenger and acceptance of such equipment is within the parameters of the air operator's approved carry-on baggage control program.
- (9) The air operator should have procedures to ensure that any additional medical oxygen cylinders or equipment delivered to the passenger enroute is boarded, stowed and restrained in accordance with the requirements specified in this section.

4.2.6 Publication of Established Procedures

- (1) The air operator should publish established procedures in its company operations manual, flight attendant manual and any other appropriate location that will provide information to persons who require such information for the performance of their assigned duties.
- (2) The air operator should make available to the public information on the process for acceptance, limitations or restrictions related to the carriage of passenger-supplied medical oxygen cylinders on board their aircraft.

5.0 Portable oxygen concentrators

- (1) A portable oxygen concentrator (POC) is an electronic device used to provide oxygen at a substantially higher concentration than that of ambient air and is an alternative to using compressed oxygen cylinders. POCs do not have the safety concerns associated with the use of medical oxygen cylinders on board aircraft, as there is no oxygen present in the device itself.
- (2) POCs function by filtering nitrogen from ambient air and delivering oxygen in concentrated form to the user. The simplest oxygen concentrator is capable of continuous delivery of oxygen using internal containers filled with a zeolite material, which selectively adsorb the nitrogen in the air.

- (3) Section 49 of the *Accessible Transportation for Persons with Disabilities Regulations* (ATPDRs) requires that an air operator permit a person with a disability to bring on board and to retain any small assistive device that the person needs during travel, including a POC.
- (4) POCs are categorized as a medical portable electronic device (M-PED).
 - (a) To be acceptable for use on board aircraft, they should be designed and tested by the manufacturer to verify that use of the POC does not adversely affect the operation of the aircraft or the functioning of the aircraft's systems or equipment. Those POCs that have been tested by the manufacturer should bear a label on its exterior containing the following certification statement in red lettering: "The manufacturer of this POC has determined this device conforms to all applicable FAA acceptance criteria for POC carriage and use on board aircraft."
 - (b) A POC that has not been certified by the manufacturer should be evaluated by the air operator to determine that the unit will not adversely affect the operation of the aircraft or the functioning of the aircraft's systems or equipment during any phase of the flight.
- (5) The United States permits passengers to use POC units on board commercial aircraft, with the approval of the aircraft operator. The acceptable devices are identified in 14 CFR 121.574, 125.219, and 135.91. It should be noted that these regulations do not require an aircraft operator to allow passengers to use these devices on board. However, if an aircraft operator chooses to grant approval for a passenger to operate these devices on board an aircraft, then the conditions of the regulation must be met. FAA AC 120-95A is a resource for United States operators to use during the development, implementation, and revision of procedures and training programs regarding the use of POCs on board aircraft.
- (6) Section 14 CFR 382.133 does impose a requirement on Canadian air operators to permit any individual with a disability to use a ventilator, respirator, continuous positive airway pressure machine, or a POC in the passenger cabin during air transportation to, from or within the United States, on all aircraft originally designed to have a maximum passenger capacity of more than 19 seats, subject to certain exceptions. It is recommended that Canadian air operators familiarize themselves with the requirements of 14 CFR 382. Appendix A to this advisory circular describes the POCs that must be accepted by a Canadian air operator to comply with the United States regulatory requirements.

5.1 Safety considerations of spare batteries

- (1) POCs typically operate using either rechargeable batteries or AC/DC electrical power via an external power cord. As it may be necessary for passengers to carry a number of spare batteries to provide power to the POC for the duration of the flight(s), precautions are necessary to address emerging safety issues associated with the carriage of batteries.
- (2) Incident data and safety studies related to the potential hazard posed by battery abuse and short circuits during the transportation of batteries indicate that preventive measures are necessary to mitigate the potential risk of injury and on board fire posed by damaged batteries.
- (3) The POC units that contain lithium metal or lithium ion batteries are considered dangerous goods. Therefore, when transported as cargo with the battery installed, the POC is fully regulated and is to be transported in compliance with the packaging, marking, documentation and handling requirements specified in the TDGRs and ICAO TIs.
- (4) However, when carried by passengers in the cabin of the aircraft or as checked baggage, the POC units are exempt from the TDGRs and ICAO TIs with the prior approval of the air operator under specified quantity limitations.
- (5) Spare batteries must be individually protected to prevent short-circuits by insulating the terminals (e.g., placement in original retail packaging, taping over exposed terminals, or placing each

battery in a separate plastic bag or protective pouch). Spare batteries must be carried in the cabin of the aircraft.

5.2 Air operator procedures

- (1) Passengers requiring the use of medical oxygen on board the aircraft may carry and use their own POC unit as described in this document provided the air operator approves and has established appropriate procedures.
- (2) The air operator procedures should normally include the following:
 - (a) An evaluation to determine that the POC does not adversely affect the operation of the aircraft or the functioning of the aircraft's systems or equipment;
 - (b) Where applicable, confirmation of medical clearance with the air operator's medical advisor, in consultation with the passenger's licensed physician or other licensed health professional such as a respiratory therapist;
 - (c) A process for the acceptance of POC containing lithium batteries (as carry-on or checked baggage) and for the carriage of spare lithium batteries;
 - (d) The boarding, stowage and restraint of the POC conforms with the following:
 - (i) The POC and any accessories are stowed under a passenger seat equipped with a forward and sideward means of restraint in accordance with section 551.500 of the CARs, or in another approved stowage location, during movement on the surface, take off, landing and at other times carry-on baggage is required to be stowed;
 - (ii) The POC and any accessories do not exceed the maximum weight restrictions approved for the area where the equipment is required to be stowed; and
 - (iii) Where applicable, the air operator's carry-on baggage control program, required pursuant to section 705.42 of the CARs, contains provisions for oxygen equipment and accessories that are provided by the passenger and such equipment is within the parameters of the approved air operator carry-on baggage control program;
 - (e) The passenger requiring medical oxygen is seated in a location:
 - (i) Where the POC will not restrict access to, or use of, any emergency/safety equipment, or access to any aisle or exit; and
 - (ii) That in the event of an emergency landing requiring an evacuation, access to an aisle would not be obstructed by the hose of the POC; and
 - (f) The passenger is provided with an individual pre-flight safety briefing that includes the following:
 - (i) In the event of an on-board fire, the passenger and POC should be moved to a location away from the fire; and
 - (ii) In the event of an emergency requiring an evacuation, the POC should be left on board the aircraft.
- (3) Prior to travelling, the air operator should inform passengers requiring the use of a POC while on board the aircraft of their responsibilities as follows:
 - (a) The passenger should ensure that the unit is in good condition, free from contamination (such as oil and grease) and has no visible signs of damage or abuse;

- (b) The passenger should have the cognitive and sensory capacity to detect any alarm indications associated with the operation of their POC and be capable of responding to problems with the operation of the unit;
 - (c) The passenger should ensure that they have sufficient battery power to provide an adequate supply of oxygen for the duration of their travel time (e.g., 150% of the expected maximum flight duration). Factors to take into consideration to determine the adequacy of oxygen supply are whether oxygen is medically necessary for all or a portion of the travel time, the duration of the flight (including connecting flights), the duration of time spent on the ground (prior to departure, during enroute stops and following arrival at destination) as well as an appropriate reserve in case of unforeseen operational circumstances; and
 - (d) The passenger should ensure that spare batteries for the POC are carried as carry-on baggage and are individually packaged to protect them from damage or short-circuit.
- (4) The air operator should publish established procedures in its company operations manual, flight attendant manual and any other appropriate location that will provide information to persons who require such information for the performance of their assigned duties.
 - (5) The air operator should make available to the public information on the process for acceptance, limitations or restrictions related to the carriage of POCs and lithium batteries on board their aircraft.

5.3 Documentation

- (1) In accordance with section 33 of the ATPDRs, an air operator may request that the POC user provide information or documents, including a medical certificate, to permit an assessment of a request to use a POC. However, the air operator must make every reasonable effort to permit the use of a POC even if the person does not provide any information or documents.
- (2) In order to conform with the United States regulatory requirement specified in section 14 CFR 382.23, air operators may request the POC user to provide a medical certificate consisting of a written statement from the passenger's physician saying that the passenger is capable of completing the flight safely, without requiring extraordinary medical assistance during the flight. The medical certificate should be dated within 10 days of the scheduled date of the passenger's initial departing flight.

6.0 Document history

- (1) Advisory Circular (AC) 700-002 **Issue 03**, RDIMS 7942252 (E), 8008238 (F), dated 2013-01-22 — Carriage of Medical Oxygen Cylinders or Portable Oxygen Concentrators for Passenger Use on Board Aircraft.
- (2) Advisory Circular (AC) 700-002 **Issue 02**, RDIMS 5536874 (E), 5766646 (F), dated 2011-06-29 — Carriage of Medical Oxygen Cylinders or Portable Oxygen Concentrators for Passenger Use on Board Aircraft.
- (3) Advisory Circular (AC) 700-002 **Issue 01**, RDIMS 2128776 (E), 2249054 (F), dated 2007-05-07, — Carriage of Portable Oxygen Concentrators for Passenger Use on Board Aircraft.
- (4) Commercial and Business Aviation Advisory Circular (CBAAC) 0257, RDIMS 4444 (E), 4444 (F), dated 2006-12-11 — Carriage of Medical Oxygen Cylinders for Passenger Use on Board Aircraft.

7.0 Contact us

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Civil Aviation

Appendix A — Identification of POCs authorized for use in aircraft

- (1) In the United States, sections 14 CFR 121.574, 125.219, and 135.91 specify the conditions under which an American air operator may permit the carriage or operation of a POC for personal use on board an aircraft. These regulations specify acceptance criteria and labelling requirements, including provisions for POCs with and without a manufacturer label.
- (2) 14 CFR 382.133 requires that Canadian air operators permit any person with a disability to use a POC in the passenger cabin during air transportation to, from or within the United States. Subject to certain exceptions listed in 14 CFR 382.133, the POCs that must be accepted for use include:
 - (a) Those with a label on the exterior of the device containing the following certification statement in red lettering: “The manufacturer of this POC has determined this device conforms to all applicable FAA acceptance criteria for POC carriage and use on board aircraft.”; and
 - (b) The following models, whether they are labelled or not:
 - (i) AirSep Focus
 - (ii) AirSep FreeStyle
 - (iii) AirSep FreeStyle 5
 - (iv) AirSep LifeStyle
 - (v) Delphi RS-00400
 - (vi) DeVilbiss Healthcare iGo
 - (vii) Inogen One
 - (viii) Inogen One G2
 - (ix) Inogen One G3
 - (x) Inova Labs LifeChoice
 - (xi) Inova Labs LifeChoice Activox
 - (xii) International Biophysics LifeChoice
 - (xiii) Invacare Solo2
 - (xiv) Invacare XPO2
 - (xv) Oxlife Independence Oxygen Concentrator
 - (xvi) Oxus RS-00400
 - (xvii) Precision Medical EasyPulse
 - (xviii) Respiroics EverGo
 - (xix) Respiroics SimplyGo
 - (xx) SeQual Eclipse
 - (xxi) SeQual eQuinox Oxygen System (model 4000)
 - (xxii) SeQual Oxywell Oxygen System (model 4000)
 - (xxiii) SeQual SAROS; and
 - (xxiv) VBox Trooper Oxygen Concentrator.