U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: Portable Oxygen Concentrators **Date:** 5/24/16 **AC No:** 120-95A
Initiated by: AFS-200 **Change:**

1 PURPOSE. This advisory circular (AC) explains Federal Aviation Administration (FAA) requirements for the use of portable oxygen concentrators (POC) on board aircraft. We intend for operators to use this AC as a resource during the development, implementation, and revision of standard operating procedures (SOP) and training programs regarding the use of POCs on board aircraft to increase the accessibility of air travel by passengers with disabilities.

2 CANCELLATION. AC 120-95, Portable Oxygen Concentrators, dated October 23, 2007, is cancelled.

3 CONTENT AND AUDIENCE. The FAA suggests that crewmembers and others associated with flight operations conducted under Title 14 of the Code of Federal Regulations (14 CFR) parts 121, 125, and 135 use the practices identified in this AC. In addition, the FAA suggests that the procedures for an operator's POC program be incorporated in the General Operations Manual (GOM) required by part 121, § 121.133; part 125, § 125.71; and part 135, § 135.21. This AC is also intended to be used as a resource for passengers who wish to use a POC on board an aircraft, as well as for POC providers and manufacturers.

4 RELATED REGULATIONS (TITLES 14 AND 49 CFR). These regulations are available online at http://www.ecfr.gov.

4.1 Title 14 CFR.

- Sections 121.285, 121.306, 121.333, 121.574, 121.585, and 121.589.
- Sections 125.183, 125.204, and 125.219.
- Sections 135.87, 135.91, 135.129, 135.144, and 135.157.
- Part 382.

4.2 Hazardous Materials Regulations (HMR) (49 CFR Parts 171-180).

5 RELATED FAA GUIDANCE (current editions). This AC provides information on effective practices regarding the use of POCs and expands on existing guidance including:

5.1 AC 91.21-1, Use of Portable Electronic Devices Aboard Aircraft. This document is available online at http://www.faa.gov/regulations_policies/advisory_circulars.

5.2 Safety Alerts for Operators (SAFO). Available online at https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo/all_safos.

- SAFO 09013, Fighting Fires Caused By Lithium Type Batteries in Portable Electronic Devices.
- SAFO 09018, Passenger/Crew DC Power Outlet Installations.
- SAFO 11007, Preflight Communication and Checks After a Cabin Decompression Event.
- SAFO 15010, Carriage of Spare Lithium Batteries in Carry-on and Checked Baggage.

5.3 Information for Operators (InFO). Available online at https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos.

- InFO 13005, Acceptance of Passenger Supplied Medical Oxygen Onboard Aircraft.
- InFO 13010, Expanding Use of Passenger Portable Electronic Devices (PED).
- InFO 10009, Passenger Compliance with Crewmember Safety Instructions Regarding the Use of Portable Electronic Devices (PED).
- InFO 09006, Department of Transportation (DOT) Final Rule: “Nondiscrimination on the Basis of Disability in Air Travel” and the Use of Respiratory Assistive Devices on Aircraft.
- InFO 07016, PHMSA Guidance on the Carriage of Batteries and Battery-Powered Devices.

6 POC DEFINED. POCs are small, portable electronic devices (PED) that work by separating ambient oxygen from nitrogen and other gasses in the air and provide the user with oxygen at a concentration of more than 90 percent. POCs briefly store a small quantity of oxygen until the POC either: 1) senses the user’s inhalation and dispenses the oxygen (pulse technology), or 2) delivers the oxygen in a continuous flow to the user. POCs do not contain compressed oxygen and thus do not require the same level of special handling as compressed oxygen and are safe for use on board aircraft if certain conditions for their use are met.

Note: Passengers are prohibited from carrying compressed oxygen and liquid oxygen on board aircraft. In accordance with the HMR, devices containing compressed or liquid oxygen must bear certain identifying labels (see Figure 1, Example of Hazmat Labeling).

Figure 1. Example of Hazmat Labeling

7 BACKGROUND.

7.1 Special Federal Aviation Regulation (SFAR) 106, Rules for the Use of Portable Oxygen Concentrator Systems On Board Aircraft. On July 12, 2005, the FAA published SFAR 106 to allow the use of two specific POC models on board aircraft, subject to certain conditions. The rule became effective on August 11, 2005. On January 12, 2007, the FAA amended SFAR 106 to include applicability of SFAR 106 operations conducted under parts 125 and 135. Under the SFAR, the FAA provided approval of POCs for use on aircraft on a case-by-case basis. During the time the SFAR was effective, the FAA amended the SFAR seven times, adding 22 more POC models to the list of FAA-approved POCs that could be used on aircraft.

Note: FAA regulations do not require operators to allow the use of POCs on their aircraft. FAA regulations simply allow operators to develop programs to accommodate passengers who have a medical need to use their own, or a medical oxygen service provider's, POC on flights if certain conditions are met. These conditions include a battery packaging standard, POC stowage requirements, and some specific user responsibilities.

7.2 DOT Part 382, Nondiscrimination on the Basis of Disability in Air Travel. Amendments to the Department of Transportation (DOT) final rule (73 FR 27614), effective May 13, 2009, require that, except for on-demand air taxi operators, any U.S. carrier conducting passenger service must permit any individual with a disability to use a POC in the passenger cabin on all flights operated on aircraft originally designed to have a maximum passenger capacity of more than 19 seats, unless the device does not meet applicable FAA safety standards.

8 ACCEPTANCE CRITERIA FOR POCs AUTHORIZED FOR USE ON AIRCRAFT.

8.1 POC Acceptance Criteria. Rather than continuing to approve POCs on a case-by-case basis, the FAA established acceptance criteria for POCs used on aircraft. The criteria are:

1. The POC is legally marketed in the United States in accordance with U.S. Food and Drug Administration (FDA) requirements as stated in Title 21 of the Code of Federal Regulations (21 CFR).

2. The POC does not radiate radio frequency emissions that interfere with aircraft systems.
3. The POC does not generate a compressed gas.
4. The POC does not contain any hazardous materials (hazmat), except as provided for in 49 CFR part 175, § 175.10 for batteries used to power PEDs, and that do not require aircraft operator approval for carriage as is the case for certain larger batteries.

8.2 Required POC Labeling. All POCs that satisfy the acceptance criteria and are not previously identified in SFAR 106 must also bear a label with the following 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."

Figure 2. Example of Required POC Labeling

Note: POCs identified in §§ 121.574, 125.219, and 135.91 (see paragraph 9.2) may be used on aircraft without bearing a label.

9 PASSENGER AND AIRCRAFT OPERATOR IDENTIFICATION OF POCs AUTHORIZED FOR USE ON AIRCRAFT. Prior to the flight, both a passenger intending to use a POC on an aircraft and the operator of the aircraft on which the POC is intended to be used are responsible for determining whether the POC satisfies the FAA acceptance criteria.

9.1 POCs With Manufacturer's Labels. The passenger and the aircraft operator can determine whether the POC conforms to the acceptance criteria through a visual inspection of the device to locate the manufacturer's label indicating such conformance.

9.2 POCs Without Manufacturer's Labels. If the device does not bear the required label, the passenger and the aircraft operator may determine compliance by identifying the manufacturer and model name and confirming that the POC appears on the list of devices contained in §§ 121.574, 125.219, and 135.91.

10 PASSENGER PRE-FLIGHT PREPARATION.

10.1 Healthcare Provider Consultation. The FAA does not require a passenger to consult with a healthcare provider prior to using a POC on board an aircraft. However, the passenger, together with his or her healthcare provider, may wish to discuss the following:

1. The effects of a pressurized cabin (cabin pressure altitude can reach 8,000 feet) on the passenger's oxygen needs.
    - Some POC users need higher liter flow or liter per minute (LPM) settings for the POC in the air because of cabin pressure altitude.
    - Some POC users who use a POC occasionally on the ground may need to use their POC for the entire flight because of cabin pressure altitude.
2. The passenger's POC needs at the time of travel and whether the passenger's needs have changed since the POC was first prescribed or during the most recent consultation with a healthcare professional.
3. Certain key provisions in the POC operating manual regarding oxygen delivery, indicators, warnings, and alerts, as well as setting/changing liter flow or LPM.
4. All crewmembers (pilots and flight attendants (F/A)) receive training regarding the handling of in-flight medical events. However, the FAA does not require that air carriers or crewmembers provide medical assistance to passengers.

Note: Additional information regarding passenger health and safety can be found at http://www.faa.gov/passengers/fly_safe/health/comprehensive/.

10.2 Determining a Sufficient Number of Batteries. The POC user is responsible for bringing a sufficient number of batteries to power the POC for the duration of the POC user's expected use of the device. The POC user should consider at least the following in determining a sufficient number of batteries:

1. Healthcare professional advice regarding duration of POC use.
2. Air carrier information regarding duration of expected flight as well as layovers and unanticipated delays.

Note: A POC user may be flying on multiple flights or multiple airlines, which could also involve extended periods of POC use on the ground between flights.

3. POC manual information regarding expected duration of battery power. Although in-seat electrical power is available on some aircraft, many aircraft do not have in-seat electrical power available.

Note: POC users should never rely upon available onboard aircraft electrical power during a flight.

4. Air carrier requirements to carry a certain amount of batteries are typically available on each air carrier's Web site.

Note: Pursuant to DOT requirements in part 382, air carriers may require an individual to bring enough batteries to power the device for at least 150% of the expected maximum flight duration.

10.3 Documentation. The POC user is responsible for the operation of the POC on board the aircraft. For this reason, the FAA recommends that passengers carry with them any POC operating instructions from the POC manufacturer or other written information provided by their healthcare professional regarding their POC use.

11 PHYSICIAN'S STATEMENT. In accordance with DOT regulations under part 382, an air carrier may require a medical certificate from a passenger with a disability if there is reasonable doubt that the individual can complete the flight safely without requiring extraordinary medical assistance during the flight. Also, an air carrier may require a medical certificate from a person who needs medical oxygen during a flight. The FAA does not require passengers to obtain a physician's statement and present such statement to the operator or pilot in command (PIC) prior to POC use on board the aircraft.

12 POC BATTERIES. Battery damage and battery short circuit can result in battery overheating and fire. These events, in turn, can result in personal injury to passengers, and in the worst case for certain types of batteries, a catastrophic passenger compartment fire. Thus, spare lithium batteries carried on board aircraft must be individually protected from short circuit by placement in original retail packaging, by otherwise insulating terminals by taping over exposed terminals, or by placing each battery in a separate plastic bag or protective pouch.

Note: Spare lithium batteries are prohibited from being carried in checked baggage on an aircraft. (Refer to SAFO 15010.)

12.1 Operator's Procedures. Consistent with the HMRs, to ensure that all POC batteries carried on board in carry-on baggage are protected from short circuit and physical damage, the procedures for an operator's POC program should be incorporated in the GOM required by §§ 121.133, 125.71, and 135.21. In addition to the applicable provisions of those sections, an operator's procedures should address the following:

1. Guidance on how to ensure that the POC user meets the battery short circuit and physical damage protection packaging requirements of the HMR, and instructions on what actions must be taken if the POC user fails to ensure that the battery packaging requirements of the HMR are met.
2. F/A procedures on where and how POC users should stow properly packaged batteries to preclude damage that can be caused by other baggage.

12.2 Proper Packaging. POC users are responsible for ensuring that all POC batteries carried in carry-on baggage are properly packaged. POC providers, some airlines, and freight forwarders specializing in small package shipments may provide this packaging service for POC users.

13 POCs AS CARRY-ON BAGGAGE. A POC is an assistive device. In this case, part 382, § 382.121 would apply, which states that carriers shall not, in implementing their carry-on baggage policies, count toward a limit on carry-on items any assistive device brought into the cabin by a qualified individual with a disability.

Note: A bag with additional batteries that is required to power the POC during the flight could also be considered an assistive device under part 382. However, the HMR places limitations on the carriage of batteries. For example, lithium ion batteries over 100 watt-hour (Wh) are prohibited unless aircraft operator approval is provided. Under all circumstances, passengers and air carriers should consult the HMR (49 CFR § 175.10(a)) requirements and Pipeline and Hazardous Materials Safety Administration (PHMSA) guidance regarding air travel with PEDs and lithium batteries (http://phmsa.dot.gov/safetravel/batteries), as well as FAA guidance regarding air travel with PEDs and lithium batteries at http://www.faa.gov/about/initiatives/hazmat_safety/.

14 POCs AS CHECKED BAGGAGE. POCs that satisfy the acceptance criteria and bear a label may be carried on aircraft as a carry-on or checked baggage. In accordance with the HMR, however, spare lithium batteries are prohibited from being carried in checked baggage on an aircraft and certain other installed lithium batteries are prohibited from checked baggage. Passengers and air carriers should consult the HMR (49 CFR § 175.10(a)) requirements and PHMSA guidance regarding air travel with PEDs and lithium batteries (http://phmsa.dot.gov/safetravel/batteries), as well as any FAA guidance regarding air travel with PEDs and lithium batteries at http://www.faa.gov/about/initiatives/hazmat_safety/.

15 CONSIDERATIONS REGARDING PLACEMENT AND STOWAGE OF A POC.

15.1 POC Air/Intake. In order for a POC to work efficiently, the air/intake filter must not be blocked during use. Therefore, the area around the POC should be clear of blankets, coats, and other pieces of carry-on baggage that may block the air/intake filter. If the air/intake filter is blocked, two things will occur. First, the POC user will be alerted by warning lights and/or audible alerts that the oxygen concentration in the POC output is insufficient. Second, when the temperature of the POC internal components increases to a certain limit because the POC is still trying to dispense oxygen, the POC will automatically shut down to prevent overheating of the POC and the POC user will be alerted by warning lights and/or audible alerts.

15.2 Placement of POCs. The POC should be placed underneath the seat in front of the POC user so that the user or the user's attendant can see the warning lights and/or hear the audible warning. Placement directly under the POC user's seat and placement in a closed compartment would prohibit the user from seeing the warning lights, as well as possibly prohibiting the user from hearing audible warnings. Other placement locations may be acceptable.

16 SEATING RESTRICTIONS FOR PASSENGERS WHO PLAN TO USE A POC ON BOARD THE AIRCRAFT.

16.1 Exit Row Seating. The FAA prohibits any person using a POC from occupying any seat in an exit row.

16.2 Stowage During Movement. During movement on the surface (pushback from the gate and taxi), takeoff, and landing, the POC must be stowed properly and in such a manner that it does not restrict passenger egress to any exit or the aisle in the passenger compartment. Additional seating restrictions may be necessary to comply with these FAA safety rules. For example:

1. Some seats on an aircraft, such as bulkhead seats, may or may not have approved stowage space to accommodate a POC during movement on the surface, takeoff, and landing. Therefore, the POC may not be able to be stowed properly during these phases of flight if the POC user occupies those seats. In this case, a seating restriction would be required to comply with an FAA safety rule.
2. During movement on the surface, takeoff, and landing, the tubing that is used to dispense oxygen from a properly stowed POC to the user's mask/nasal cannula may stretch across the row in such a way as to restrict passenger egress or become a tripping hazard in an evacuation. The POC user must not restrict another passenger's egress during these phases of flight. In this case, a seating restriction may be required to comply with an FAA safety rule. For example, if all seats in the row are occupied, the appropriate seat for the POC user would be a window seat. However, if there are no other passengers in the row, or if there is one other passenger in a row of three seats and that passenger is seated in the aisle seat, or if the POC is stowed in such a way that the tubing does not block another passenger's egress, then other seats in that row may be appropriate as long as no other passenger's egress is restricted by the tubing.
3. An operator can only establish seating restrictions based on an FAA safety rule. The examples above represent some, but not all, scenarios to consider. The operator must make a safety decision based on the specifics in an individual situation before establishing a seating restriction.

Note: A general airline policy that all passengers who board the aircraft with a POC must occupy a window seat, without regard to the specifics of the individual situation, would be inconsistent with the requirements of part 382 (refer to § 382.87(a)).

17 USE OF POCs DURING THE LOSS OF CABIN PRESSURE.

17.1 Cabin Depressurization. There is no danger posed by a POC that is operating during a loss of cabin pressure. However, in the case of loss of cabin pressure (rapid or slow), POCs typically will not continue to meet the oxygen needs of the user at cabin pressure altitudes above 8,000-10,000 feet. This is because the lower ambient air pressure at higher altitudes makes the concentration of the oxygen output of the POC too low to meet the POC user's oxygen needs. In cabin depressurization, the POC user should be instructed to discontinue use of the POC and use the oxygen masks that deploy to provide supplemental passenger oxygen until the aircraft descends below 10,000 feet cabin pressure altitude.

17.2 Limitations of POCs. Passenger briefing requirements require crewmembers to instruct passengers on the necessity of using oxygen in the event of cabin depressurization. Each POC user will receive this briefing with the rest of the passengers. However, POC users who are routinely dependent on their POC as their primary source of supplemental oxygen may not recognize the limitations of their POC or that the depressurization procedures in the standard passenger briefing also apply to them. Operators may wish to emphasize this important depressurization procedure to POC users.

17.3 F/A SOPs. Typical operator procedures require that the aircraft rapidly descend to an altitude where supplemental oxygen use is no longer needed after a loss of cabin pressurization. However, because of limiting factors such as high terrain, the aircraft's descent may have to be halted at a minimum en route altitude resulting in the aircraft's cabin pressure altitude staying above the cabin pressure altitude at which supplemental oxygen is needed for passengers, and above the cabin pressure altitudes below which POCs have demonstrated optimum performance (typically below 8,000-10,000 feet). In this case, F/As should follow SOPs regarding the use of decompression first aid oxygen when addressing the additional oxygen needs of POC users. F/As should also know that all POCs will again meet the oxygen needs of the user when the cabin pressure altitude reaches 8,000-10,000 feet or below.

18 USE OF AIRCRAFT ELECTRICAL POWER TO PROVIDE POWER TO A POC.

There is no requirement for operators to provide aircraft electrical power to a POC user. If an operator chooses to provide electrical power to a POC user, then the operator should consider the following:

18.1 Policy and Procedures. Operators should provide policy and procedures for F/As regarding the use of aircraft power outlets in the event of battery failure and/or the POC user having an insufficient number of batteries.

18.2 Installation and Cabling. Operators are required to ensure that the installation and cabling, up to the point where the passenger plugs in the POC, meet the airworthiness standards of 14 CFR part 23 and part 25, §§ 25.1301, 25.1309, 25.1353, 25.1357, and 25.1431. These sections ensure that the wiring and circuit protection are sufficient for the intended use. The sections also ensure that the use of the POC while charging will not negatively affect aircraft power and operation of other aircraft systems.

18.3 Power Supply Systems (PSS). In developing POC programs, operators should refer to ANM-01-111-165, Power Supply Systems for Portable Electronic Devices. This policy memorandum provides guidelines for the certification of PSSs installed in part 25 airplanes that are intended to be used with a PED. This policy does not cover the approval of the use of these devices or any interconnecting means (adapters, cords, etc.) used to power such equipment on board an airplane. This guidance covers low voltage (e.g., nominal 15 volt (V) direct current (DC)) and high voltage (e.g., 110 V alternating current, 60 hertz (Hz), 220 V alternating current, 50 Hz) systems. ANM-01-111-165 can be accessed at http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgPolicy.nsf/0/6283AF43DB9A694486256FD30077CA7D?OpenDocument&Highlight=01-111-160.

18.4 Electrical Outlets. Most electrical outlets on board aircraft are located in galleys, near emergency exits, and near F/A jump seats. The FAA does not prohibit a POC user from plugging a POC power cord into an aircraft electrical outlet nor does the FAA require operators to allow a POC user to plug a POC power cord into an aircraft electrical outlet. However, operators should ensure that if a POC is plugged into an outlet, the location of the outlet does not cause the POC cord to become a tripping hazard for F/As or passengers during any phase of flight operations, including en route operations.

18.5 Availability of Aircraft Electrical Power. Electrical outlets on board aircraft are considered nonessential equipment and are not required by the applicable certification or operational rules. In addition, electrical malfunctions in aircraft systems may require the power source to these outlets to be deactivated on the ground or in flight for the safety of the flight. If an electrical outlet is available, operable, and its location is appropriate for use as a POC power source, it may serve as a back up to POC batteries. In this case, the manufacturer's recommended procedures regarding the transition from battery to aircraft electrical power must be followed. POC users should never rely upon onboard aircraft electrical power being available during a flight.

19 SMOKING PROHIBITION. DOT regulations ban smoking on all flights, except for a very limited number of nonscheduled passenger flights for which an F/A is not required (refer to Federal Register document 81 FR 11415, Use of Electronic Cigarettes on Aircraft). However, if an aircraft operator permits smoking during one of these flights, smoking is prohibited within 10 feet of any seat row where a person is using a POC.

20 RADIO FREQUENCY EMISSIONS. An aircraft operator is no longer required to complete any assessment or testing to determine whether a POC would cause interference with the aircraft electrical, communication, or navigation equipment, because each POC permitted for use on aircraft must satisfy acceptance criteria, including non-interference with aircraft equipment. Each POC that bears a label or is identified in §§ 121.574, 125.219, and 135.91 has been assessed or tested and determined to not cause interference with the electrical, navigation, or communication equipment on the aircraft on which the device is to be used.

Note: Those POCs identified in §§ 121.574, 125.219, and 135.91 have been tested in accordance with RTCA DO-160, Environmental Conditions and Test Procedures for Airborne Equipment, Section 21, Category M during all modes of operation. For POCs that are not identified in 14 CFR, AC 91.21-1 provides information on additional acceptable methods to determine whether radio frequency emissions from a POC are considered safe for use on aircraft, as well as other considerations regarding the use of Medical-Portable Electronic Devices (M-PED) during all phases of flight.

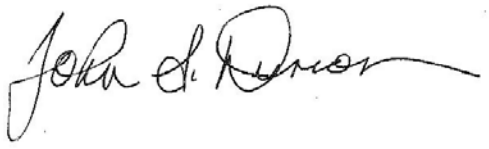
21 TRANSPORTATION SECURITY ADMINISTRATION (TSA) REQUIREMENTS.

21.1 Information. Detailed information that is pertinent to passengers using respiratory devices, including POCs, may be obtained from the TSA at https://www.tsa.gov/travel/special-procedures.

21.2 Security Screening. The following general security screening considerations apply to POCs:

1. The limit of one carry-on and one personal item (e.g., purse, briefcase, or computer case) does not apply to medical supplies, equipment, mobility aids, and/or assistive devices carried by and/or used by a person with a disability. Refer to paragraph 13 of this AC and § 382.121.
2. If a person has medical documentation regarding their medical condition or disability, they can present this information to the screener to help inform him or her of the person's situation. This documentation is not required and will not exempt a person from the security screening process.

22 AC FEEDBACK FORM. For your convenience, the AC Feedback Form is the last page of this AC. Note any deficiencies found, clarifications needed, or suggested improvements regarding the contents of this AC on the Feedback Form.



John S. Duncan
Director, Flight Standards Service

Advisory Circular Feedback Form

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by contacting the Air Transportation Division (AFS-200) at 9-AWA-AVS-AFS-200-Air-Transportation-Division@faa.gov or the Flight Standards Directives Management Officer at 9 AWA AFS 140-Directives@faa.gov.

Subject: AC 120-95A, Portable Oxygen Concentrators

Date: _____

Please check all appropriate line items:

☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____.

☐ Recommend paragraph _____ on page _____ be changed as follows:

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☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

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☐ Other comments:

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☐ I would like to discuss the above. Please contact me.

Submitted by: _____ Date: _____