(g) Maintenance or Inspection Program Revision

Within 90 days after the effective date of this AD, do the actions specified in paragraph (g)(1) or (2) of this AD.

(1) Revise the existing maintenance or inspection program, as applicable, to incorporate the information specified in paragraph (g)(1)(i) and (ii) of this AD. The initial compliance time for doing the tasks is at the time specified in Bombardier Global 7500 Airworthiness Limitations, BD700–3AB48–11400–01, Issue No. 017, dated February 28, 2023, and in the ''Additional mandatory maintenance tasks—General'' section of Bombardier Global 7500/8000 Airworthiness limitations BD700–3AB48–11400–01, Issue No. 024, dated December 15, 2025, as applicable, or within 90 days after the effective date of this AD, whichever occurs later.

(i) Bombardier Global 7500 Airworthiness Limitations, BD700–3AB48–11400–01, Issue No. 017, dated February 28, 2023, except for the information specified in the ''Candidate CMR Limitations—General'' section.

(ii) The ''Additional mandatory maintenance tasks—General'' section of Bombardier Global 7500/8000 Airworthiness limitations BD700–3AB48–11400–01, Issue No. 024, dated December 15, 2025.

(2) Revise the existing maintenance or inspection program, as applicable, to incorporate the information specified in the Bombardier Global 7500/8000 Airworthiness limitations BD700–3AB48–11400–01, Issue No. 024, dated December 15, 2025. The initial compliance time for doing the tasks is at the time specified in Bombardier Global 7500/8000 Airworthiness limitations BD700–3AB48–11400–01, Issue No. 024, dated December 15, 2025, or within 90 days after the effective date of this AD, whichever occurs later.

(h) No Alternative Actions, Intervals, or Critical Design Configuration Control Limitations (CDCCLs)

After the existing maintenance or inspection program has been revised as required by paragraph (g) of this AD, no alternative actions (*e.g.,* inspections), intervals, or CDCCLs may be used unless the actions, intervals, and CDCCLs are approved as an alternative method of compliance (AMOC) in accordance with the procedures specified in paragraph (i)(1) of this AD.

(i) Additional AD Provisions

The following provisions also apply to this AD:

(1) *Alternative Methods of Compliance (AMOCs):* The Manager, International Validation Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or responsible Flight Standards Office, as appropriate. If sending information directly to the manager of the International Validation Branch, send it to the attention of the person identified in paragraph (j) of this AD and email to: *AMOC@faa.gov.* Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the responsible Flight Standards Office.

(2) *Contacting the Manufacturer:* For any requirement in this AD to obtain instructions from a manufacturer, the instructions must be accomplished using a method approved by the Manager, International Validation Branch, FAA; or Transport Canada; or Bombardier, Inc.'s Transport Canada Design Approval Organization (DAO). If approved by the DAO, the approval must include the DAO-authorized signature.

(j) Additional Information

For more information about this AD, contact Fatin Saumik, Aviation Safety Engineer, FAA, 1600 Stewart Avenue, Suite 410, Westbury, NY 11590; phone: 516–228–7300; email: *9-avs-nyaco-cos@faa.gov.*

(k) Material Incorporated by Reference

(1) The Director of the Federal Register approved the incorporation by reference of the material listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this material as applicable to do the actions required by this AD, unless this AD specifies otherwise.

(i) Bombardier Global 7500 Airworthiness Limitations, BD700–3AB48–11400–01, Issue No. 017, dated February 28, 2023.

(ii) Bombardier Global 7500/8000 Airworthiness limitations BD700–3AB48–11400–01, Issue No. 024, dated December 15, 2025.

(3) For Bombardier material identified in this AD, contact Bombardier Business Aircraft Customer Response Center, 400 Côte-Vertu Road West, Dorval, Québec H4S 1Y9, Canada; telephone 514–855–2999; email *ac.yul@aero.bombardier.com;* website *bombardier.com.*

(4) You may view this material at the FAA, Airworthiness Products Section, Operational Safety Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206–231–3195.

(5) You may view this material at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, visit *www.archives.gov/federal-register/cfr/ibr-locations* or email *fr.inspection@nara.gov.*

Issued on September 21, 2026.

Hollister B. Thorson,

Acting Deputy Director, Compliance & Airworthiness Division, Aircraft Certification Service.

[FR Doc. 2026–19561 Filed 9–23–26; 8:45 am]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 91 and 135

[Docket No. FAA–2026–12145; Notice No. 26–17]

RIN 2120–AM24

Flight Operations: Pilot requirements; Use of oxygen

AGENCY: Federal Aviation Administration (FAA), U.S. Department of Transportation (DOT).

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: FAA proposes to raise the altitudes at which a pilot is required to don an oxygen mask for commuter and on demand operations, as directed by the FAA Reauthorization Act of 2024, and revise the pilot oxygen mask requirements applicable to general aviation operations in pressurized aircraft. The proposed amendments would allow the operation of airplanes at higher altitudes without requiring at least one pilot at the controls to wear and use an oxygen mask. If adopted, these proposed changes would reduce regulatory and economic burdens on operators by changing certain requirements pertaining to pilots' use of oxygen masks.

DATES: Send comments on or before November 23, 2026.

ADDRESSES: Send comments identified by docket number FAA–2026–12145 using any of the following methods:

- *Federal eRulemaking Portal:* Go to *https://www.regulations.gov* and follow the online instructions for sending your comments electronically.
- *Mail:* Send comments to Docket Operations, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue SE, Room W58–213, West Building 5th Floor, Washington, DC 20590–0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W58–213 of the West Building 5th Floor at 1200 New Jersey Avenue SE, Washington, DC 20590 between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- *Fax:* Fax comments to Docket Operations at (202) 493–2251.

Docket: Background documents or comments received may be read at *https://www.regulations.gov* at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W58–213 of the West Building 5th Floor at 1200 New Jersey Avenue SE, Washington, DC

20590 between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT:

Part 135 information: Chris Morris, Air Transportation Division, AFS–200, Federal Aviation Administration, Room 834, 800 Independence Avenue SW, Washington, DC 20591; telephone (202) 267–8166; email *9-AFS-200-Correspondence@faa.gov.*

Part 91 information: Jamelle Poppe, General Aviation and Commercial Division, AFS–800, Federal Aviation Administration, 800 Independence Avenue SW, Washington, DC 20591; (202) 267–1100; email *9-AFS-800-Correspondence@faa.gov.*

SUPPLEMENTARY INFORMATION:

List of Abbreviations and Acronyms Frequently Used in This Document

AC: Advisory Circular
AD: Airworthiness Directive
AFM: Airplane Flight Manual
CAA: Civil Aviation Authority
FL: Flight Level
hPa: Hectopascals
ICAO: International Civil Aviation Organization
MSL: Mean Sea Level
NPRM: Notice of Proposed Rulemaking
NTSB: National Transportation Safety Board
PO_2: Partial Pressure of Oxygen
SARPs: Standards and Recommended Practices
S_PO_2: Blood Oxygen Saturation Level
TUC: Time of Useful Consciousness
USAF: United States Air Force
USN: United States Navy

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I. Executive Summary

As directed by section 834 of the FAA Reauthorization Act of 2024 (''the Act''), FAA is issuing this notice of proposed rulemaking (NPRM) to propose the amendment of 14 CFR 135.89(b)(3) to increase the flight level [1] at which at least one pilot at the controls must wear an oxygen mask in a pressurized aircraft from Flight Level (FL) 350 to FL410. As required by section 834 of the Act, FAA is proposing to revise § 135.89(b)(4) to increase the flight level at which a single pilot at the controls on the flightdeck must wear an oxygen mask in a pressurized aircraft, from current FL250 to FL350. This amendment would change the current altitude at which a pilot must wear an oxygen mask when the pilot is the only pilot at the controls and would clarify that § 135.89(b)(4) applies to operations when only a single pilot is assigned to the flight. Section 834 also directed FAA to consider applicable safety data, risks, and investigations and recommendations of the National Transportation Safety Board (NTSB) in its NPRM. Based on that evaluation, FAA is proposing to amend § 135.89(b)(4) to increase the flight level at which a single pilot on the flightdeck must wear an oxygen mask from current FL250 to FL350.

In addition to satisfying the statutory mandate to publish an NPRM proposing amendments to § 135.89(b)(3) and (4), FAA is proposing to amend part 91 supplemental oxygen requirements in this NPRM. Although assessing the risk associated with the proposed part 135 amendment, FAA found that at higher altitudes, pressurization events in modern business aircraft are rare. Given that operators may fly these aircraft in accordance with the requirements of either part 135 or part 91, FAA proposes revising the part 91 supplemental oxygen mask regulation to allow a pilot to operate at any altitude without donning a mask when a quick-donning mask is available to the pilot. The proposed change would align part 91 regulations with International Civil Aviation Organization (ICAO) Annex 6, Part II Standards and Recommended Practices (SARPs) more closely. In addition, the proposed changes to part 91 would uphold the Safety Continuum [2] by tolerating more risk in general aviation operations than in commercial operations.

Currently, § 91.211(b)(1)(ii) requires one pilot at the controls of a civil aircraft of U.S. registry with a pressurized cabin to wear an oxygen mask that is secured and sealed at all times when the aircraft is operated above FL410, and also requires that if the aircraft is operated above FL350 with only one pilot at the controls, that pilot must wear an oxygen mask that is secured and sealed. The proposal would amend § 91.211(b)(1) to state that, if quick-donning masks [3] are available to the pilot(s), then operations are allowed at any altitude for which the aircraft is certified without a pilot at the controls wearing an oxygen mask. In an aircraft without quick-donning masks, however, at flight altitudes above FL350, one pilot at the controls would be required to wear an oxygen mask that is secured and sealed.

FAA anticipates the effect from these changes would be reduced oxygen usage by aircraft flying between the current and proposed flight level thresholds, generating savings for operators needing less frequent oxygen tank servicing, which FAA estimates can cost between $100 to $400 per fill-up. Without exact data on the potential reduction in oxygen usage and subsequent need for service to estimate cost savings, FAA instead estimates that for every percentage point decrease of the roughly 4.7 million parts 91 and 135 turbojet and multiengine turboprop operations that no longer require servicing due to this rulemaking, applicable aircraft operators would save between $4.7

[1] Flight level is defined as a level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury. Flight levels are stated in three digits that represent hundreds of feet. For example, FL250 represents a barometric altimeter indication of 25,000 feet; FL255 indicates 25,500 feet. 14 CFR 1.1.

[2] *See* The Safety Continuum—A Doctrine for Application Sept. 2014, *https://downloads.regulations.gov/FAA-2015-1621-0018/attachment_1.pdf,* and Section III. 4. of this preamble for additional discussion about safety continuum application to parts 91 and 135 pilot oxygen mask requirements.

[3] 14 CFR 25.1447 (c)(2)(i) defines a quick-donning mask as one that can be placed on the face from its ready position, properly secured, sealed, and supplying oxygen upon demand, with one hand, within five seconds and without disturbing eyeglasses or causing delay in proceeding with emergency duties and allows, while in place, the performance of normal communication functions.

million to $18.6 million in oxygen servicing fees annually.

II. Authority for This Rulemaking

FAA's authority to issue rules on aviation safety is found in Title 49 of the United States Code (U.S.C.) Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of FAA's authority. FAA is issuing this NPRM under the authority described in 49 U.S.C. 106(f), which establishes the authority of the Administrator to promulgate regulations and rules, and 49 U.S.C. 44701(a)(5), which requires the Administrator to promote safe flight of civil aircraft in air commerce by prescribing regulations and setting minimum standards for cybersecurity and other practices, methods, and procedures necessary for safety in air commerce and national security. This NPRM is within the scope of that authority.

In addition, section 834 of the FAA Reauthorization Act of 2024 (Pub. L. 118–63) (the Act) directs the Administrator to issue an NPRM concerning whether to revise § 135.89(b)(3) and (4) to apply only to aircraft operating at altitudes above FL410.

III. Background

A. History

1. Regulatory History

In 1961, FAA published a final rule [4] that required one pilot of a two-pilot crew engaged in commercial operations to wear and use an oxygen mask above FL250.[5] However, if each crewmember on the flight deck was provided with a quick-donning oxygen mask, the one pilot did not need to wear and use an oxygen mask until the airplane was operated above FL350. FAA maintained these requirements in the 1964 rule establishing § 135.83, *Requirements for use of oxygen*.[6] In the 1964 final rule, FAA noted that many comments on the NPRM expressed that the minimum altitudes at which the use of oxygen was required should be increased. FAA disagreed, stating that increasing the minimum altitudes required for pilot supplemental oxygen would compromise safety. In 1978, § 135.83 was recodified as § 135.89 and remains unchanged.[7]

In 1967, FAA published an NPRM proposing requirements pertaining to the use of oxygen equipment in all aircraft operating under part 91.[8] Specifically, FAA proposed § 91.32, which, in pertinent part, would require a pilot operating a civil aircraft with a pressurized cabin to wear an oxygen mask, secured and sealed, at flight altitudes above FL350. Based on the comments received, the 1970 final rule instead required that on any aircraft having more than one pilot at the controls, it was not necessary that one pilot breathe supplemental oxygen at all times at flight levels at or below FL410 if each flight crewmember at the controls had a quick-donning type oxygen mask. If only one pilot was at the controls while operating above FL350, that pilot was required to wear an oxygen mask.[9] In 1989, part 91 was recodified and § 91.32 became § 91.211, but the content of the regulation remained the same and is unchanged to this day.[10]

2. Withdrawn Notice of Proposed Rulemaking 82–11

In 1982, FAA issued an NPRM, *Pilot Oxygen Mask Requirement,* (''the 1982 NPRM'') [11] proposing to amend the pilot oxygen mask requirements in parts 91, 121, and 135. The NPRM proposed not requiring one pilot to wear and use an oxygen mask on a pressurized aircraft with a total pressure volume of at least 20,000 cubic feet operating under parts 91 and 121 up to and including FL450, or the maximum certified altitude of the airplane, whichever was lower. The NPRM noted FAA had issued exemptions from § 135.89(b)(3) to permit operation of pressurized airplanes up to and including FL410 under part 135 without requiring one pilot at the controls to wear and use an oxygen mask.[12] The NPRM suggested the FL350 limitation in § 135.89(b) was unnecessarily restrictive and therefore proposed to remove the differences between part 91 and part 135 pilot oxygen mask requirements.

The 1982 NPRM received 16 public comments. Three commenters disagreed with the proposal. Several companies, labor organizations, and industry associations supported the proposal. However, the Aerospace Industries Association of America, an unnamed aeronautical consultant, and the United States Air Force (USAF) raised questions about the severe physiological consequences resulting from high altitude decompression and the potential for flightcrew incapacitation.

In 1986, FAA withdrew the 1982 NPRM, citing concerns regarding insufficient data related to rapid depressurization events.[13] Specifically, there was a lack of information on pilot reaction times, the interval before initiation of emergency descent procedures, the rate of increase in cabin altitude, the maximum cabin altitude reached, and the time required to descend to an altitude where supplemental oxygen was no longer necessary for the occupants. The withdrawal notice indicated that this lack of comprehensive data precluded a rational assessment of regulatory alternatives to the existing requirement for at least one pilot to wear and use an oxygen mask at altitudes above FL410.

FAA noted in the withdrawal of the NPRM that USAF opposed changes in the 1982 NPRM that would have relaxed the civil pilot oxygen requirements. Their objection was focused on USAF requirements for an oxygen mask to be worn by the pilot and available to all other crewmembers when flying pressurized aircraft above FL410 as a mitigation to the physiological effects caused by exposure to high altitude. At the time, most pressurized aircraft in USAF inventory, such as the VC–140 and CT–29,[14] were designed in the 1950s and lacked the robust design standards of modern business jets in operation today. FAA has learned that since at least 2010, USAF has permitted operations above FL410 without either pilot wearing an oxygen mask in certain aircraft such as the C–37, which is based on the Gulfstream V.[15]

Since that time, significant advancements have been made in data collection, processing, and interpretation. In addition,

[4] Oxygen Mask Requirements and Altitude Training for Flight Crewmembers Assigned to Duty on Turbine-Powered Airplanes Operated Above 25,000 Feet final rule, 26 FR 1055 (Feb. 3, 1961).

[5] The 1961 rule used both mean sea level (MSL) and FL when referring to the altitude at which pilots must use oxygen masks. This NPRM uses FL rather than MSL when referencing altitudes to match current regulatory notations.

[6] Miscellaneous Amendments to parts 1, 42, 47, 61, 91, and 135 final rule, 29 FR 2988 (Mar. 5, 1964).

[7] Regulatory Review Program; Air Taxi Operators and Commercial Operators final rule, 43 FR 46742 (Oct. 10, 1978).

[8] Installation and Operating Requirements for Oxygen Equipment and Supply NPRM, 32 FR 10602 (July 19, 1967).

[9] Installation and Operating Requirements for Oxygen Equipment and Supply final rule, 35 FR 6385 (Apr. 21, 1970).

[10] Revision of General Operating and Flight Rules final rule, 54 FR 34284 (Aug. 18, 1989).

[11] Pilot Oxygen Mask Requirement NPRM, 47 FR 35146 (Aug. 12, 1982).

[12] *See* 47 FR 35146.

[13] Pilot Oxygen Mask Requirements Withdrawal of Notice of Proposed Rulemaking, 51 FR 9432, 9433 (Mar. 18, 1986).

[14] *Air Force Magazine,* May 1982, pages 161 and 162 *https://www.airandspaceforces.com/app/uploads/2024/09/AFmag_1982_05.pdf.*

[15] Air Force Instruction 11–2VIP, Vol. 3. (Feb. 12, 2010), Supplement, Flight Operations (May 19, 2011).

improvements in aircraft design and manufacturing have resulted in more aircraft operating above FL410, thereby increasing opportunities to gather data on pressurization events at higher altitudes. Accordingly, FAA believes that sufficient data now exists to estimate the risks associated with the proposed changes to the regulations accurately.

3. Petitions for Exemption

Since 1979, there have been 46 petitions for exemption from § 135.89(b)(3) or (b)(4), or both. The exemption requests asked to permit one or both pilots at the controls to operate pressurized aircraft without utilizing supplemental oxygen above the levels required by the regulation. To support these exemption requests, petitioners included decision features of their aircraft. These included mitigators such as type certification resulting in a highly improbable decompression failure rate at altitude, automatic Emergency Descent Mode, dual pressure bulkheads, cabin pressure warning systems, and quick-donning masks. The petitioners noted that providing the relief the petitioner requested would save them money on oxygen servicing and enable more frequent or longer flights at high altitudes where greater fuel economy is achieved. FAA routinely issued grants or partial grants of exemption until 1986. Since 1986, following the withdrawal of the 1982 NPRM, FAA has denied 15 petitions for exemption from § 135.89.[16] Since the mid-1990s, six part 91 operators have petitioned for exemption from § 91.211(b)(1)(ii), which requires one pilot to wear and use an oxygen mask any time the aircraft is above FL410.[17] FAA denied all of these petitions for both § 91.211 and § 135.89 because the petitioners did not present safety mitigations unique to their operations. The mitigations the petitioners proposed—such as having certain aircraft design features and performance during depressurization—would apply to anyone operating that make and model of aircraft rather than just that particular operator. In its denials, FAA typically stated ''[s]hould the FAA determine that it is appropriate to allow the relief requested, it will take appropriate action to change the rules rather than issue an exemption so that all persons may benefit from such a change.''

In the years following the exemption denials for both parts 91 and 135, FAA gathered and analyzed millions of hours of flight data at high altitude. This information has significantly enhanced understanding of the effects and likelihood of decompression, crewmember best practices, improved design features, and common causes of decompression.[18] Despite these advancements, current regulations have not been updated to reflect this new information and improved practices. This improved understanding informed this proposed rulemaking to update the oxygen mask regulations.

4. Safety Continuum Application to Parts 91 and 135 Pilot Oxygen Mask Requirements

Since 2012, FAA has utilized the Safety Continuum to balance the needs of aircraft manufacturers, aircraft owners, and aircraft operators with the need for public safety. The Safety Continuum guides FAA in determining the proper level of safety for the type of operation. Under 49 U.S.C. 44701(d), FAA must consider both the duty of an air carrier to provide service with the highest possible degree of safety and the differences between air transportation and other air commerce when prescribing regulations and minimum standards. In accordance with the statute, the Safety Continuum provides that there is the need for a higher level of safety as the type of aircraft and operations become more complex and as occupants become further removed from understanding and managing risks.

One way FAA implements the Safety Continuum is by setting different aircraft design standards based on the intended use for those aircraft. The Safety Continuum also addresses differences in operational risks by promulgating different operating regulations such as part 91 and part 135. When considering regulatory changes, FAA employs the Safety Continuum to determine the appropriate regulatory level of safety for the intended operations. This balanced approach allows FAA to meet or exceed safety objectives while imposing appropriate requirements on the aviation industry and the public.[19]

Part 91 generally applies to general aviation operators, while part 135[20] generally applies to holders of an air carrier or operating certificate issued under part 119[21] who conduct commuter or on-demand operations or both. The two parts must account for, among other things, risk assumed by the pilot and flightcrew and risk assumed by passengers. Part 135 requires a higher level of safety due to the statutory requirement for an air carrier to provide service with the highest possible degree of safety in the public interest.[22] Therefore, FAA has imposed more stringent regulatory requirements under part 135 than part 91because there is a higher expectation of safety when carrying passengers or cargo for compensation. For example, FAA requires more extensive training programs with more frequent competency[23] and proficiency checks[24] under part 135 than it does under part 91. With a loosening of the oxygen mask requirements for part 135, part 135 requirements would now be more flexible and lenient than the requirements of part 91. This result would be inconsistent with FAA's safety continuum which would call for more stringent requirements for part 135 operations that involve the transportation of passengers and cargo for compensation. Therefore, FAA is proposing to revise part 91 supplemental oxygen mask usage requirements.

B. International Discrepancies in Mask Requirements

FAA oxygen mask regulations are currently more stringent than ICAO standards. This places a greater burden on part 91 and part 135 domestic operators as compared to their international peers, requiring domestic operators to perform additional maintenance and incur additional expenses due to increased oxygen usage.

ICAO is a specialized agency of the United Nations established in 1944 by the Convention on International Civil Aviation (Chicago Convention). The Chicago Convention established rules of airspace, aircraft registration, and safety, among other things, and remains in effect to this day. In accordance with Article 37 of the Chicago Convention, ICAO member states, including the United States, agree to collaborate to achieve the highest practicable degree of uniformity in aircraft and personnel regulations, and in all matters where it will facilitate and improve air navigation. To achieve this, ICAO

[16] FAA most recently denied Springfield Aircraft Charter and Sales, Inc.'s petition for exemption from § 135.89. In the denial, FAA stated that if it found it could grant relief from the current regulation, it would initiate a rulemaking rather than issue grants of exemption. FAA Denial of Exemption No. 11613, Docket No. FAA–2014–0315 (May 18, 2015).

[17] Exemption Nos. 21408, 11994, 8499, 8479, 6141, and 6817.

[18] *See* section III.C. of this preamble.

[19] *See* The Safety Continuum—A Doctrine for Application (Sept. 2014), *https://downloads.regulations.gov/FAA-2015-1621-0018/attachment_1.pdf.*

[20] 14 CFR 135.1.

[21] 14 CFR 119.1; 14 CFR 119.21(a).

[22] *See* 49 U.S.C. 44701(d).

[23] 14 CFR 135.293.

[24] 14 CFR 135.297.

adopts Standards and Recommended Practices (SARPs) for a variety of aviation issues.

SARPs are published in 19 Annexes to the Chicago Convention. FAA's policy is to meet its obligations under the Chicago Convention by conforming to ICAO SARPs to the maximum extent practicable.[25] Member States' Civil Aviation Authorities (CAAs) each integrate, to the maximum extent practicable,[26] the ICAO SARPs into their national legal frameworks and practices and are responsible for regulatory oversight.

Annex 6, Part I contains SARPs applicable to the operation of airplanes by operators authorized to conduct international commercial air transport operations. If adopted by FAA, these SARPs would be applicable to part 135 operations in the United States. Specifically, § 4.4.5.2 of Annex 6, Part I, requires that all flight crewmembers of pressurized airplanes at flight duty stations operating above an altitude where the atmospheric pressure is less than 376 Hectopascals (hPa) (FL250) shall have available a quick-donning type of oxygen mask which readily supplies oxygen on demand.

For part 91 operations, Annex 6, Part II establishes SARPs applicable to the operation of general aviation airplanes.[27] Attachment 2.A of Annex 6, Part II supplements § 2.2.3.8, and places the same requirements that would apply to part 135 operators by requiring quick-donning oxygen masks be accessible when operating above an altitude where the atmospheric pressure is less than 376 hPA (FL250).

Although ICAO requires quick-donning masks be available above FL250, there is no requirement for flight crewmembers to wear oxygen masks at any specified altitude in either commercial air transport or general aviation operations as currently exist in the United States.

TABLE 1—COMPARISON OF ICAO SARPS AND CURRENT FAA RULES

ICAO SARP	Current FAA rule
Annex 6, Part I, 4.4.5.2: All flight crew members of pressurized airplanes operating above an altitude where the atmospheric pressure is less than 376 hPa (FL250) shall have available at the flight duty station a quick-donning type of oxygen mask which will readily supply oxygen upon demand.	14 CFR 135.89(b)(3) Two pilots at the controls: Whenever a pressurized aircraft is operated at altitudes above 35,000 feet MSL, at least one pilot at the controls shall wear, secured and sealed, an oxygen mask required by paragraph (b)(2)(i). 14 CFR 135.89(b)(4) One pilot at the controls: If one pilot leaves a pilot duty station of an aircraft when operating at altitudes above 25,000 feet MSL, the remaining pilot at the controls shall put on and use an approved oxygen mask until the other pilot returns to the pilot duty station of the aircraft.
Annex 6, Part II, 3.4.4.2.2: All flight crew members of pressurized airplanes operating above an altitude where the atmospheric pressure is less than 376 hPa (FL250) shall have available at the flight duty station a quick-donning type of oxygen mask which will readily supply oxygen upon demand.	14 CFR 91.211(b)(1)(ii) Two pilots at the controls: No person may operate a civil aircraft of U.S. registry with a pressurized cabin at flight altitudes above FL350 unless one pilot at the controls of the airplane is wearing and using an oxygen mask that is secured and sealed and that either supplies oxygen at all times or automatically supplies oxygen whenever the cabin pressure altitude of the airplane exceeds 14,000 feet (MSL), except that the one pilot need not wear and use an oxygen mask while at or below FL410 if there are two pilots at the controls and each pilot has a quick-donning type of oxygen mask that can be placed on the face with one hand from the ready position within five seconds, supplying oxygen and properly secured and sealed. 14 CFR 91.211(b)(2) One pilot at the controls: Notwithstanding paragraph (b)(1)(ii), if for any reason at any time it is necessary for one pilot to leave the controls of the aircraft when operating at flight altitudes above FL350, the remaining pilot at the controls shall put on and use an oxygen mask until the other pilot has returned to that crewmember's station.

C. Safety Risk Analysis and NTSB Findings & Recommendations

1. Introduction

Section 834 of the Act mandated that, in issuing this proposal, FAA consider applicable safety data and risks, including pertinent incidents and accidents as well as the investigations and recommendations of the NTSB. FAA considered the physiological risks of higher altitude flights, the severity of those risks, data on decompression events, and the likely causes of decompression.

Modern advancements in aircraft design have reduced the likelihood of explosive decompression events, as discussed in III.D. of this NPRM. In addition, over the last fifty years FAA has gathered more data on decompression and the likely causes of decompression events from information sources that are both publicly available or information protected from public disclosure under 14 CFR 193, as discussed in III.C.2 of this NPRM. This, in conjunction with the ongoing industry interest in reducing the burden imposed by current oxygen mask requirements as expressed in the exemption requests noted in section III.A.3 of this preamble, discussions between FAA and industry, and the mandates of section 834, has led FAA to believe that raising the minimum altitude at which a pilot must don an oxygen mask will reduce regulatory burden on part 91 and part 135

[25] FAA Order 1240.11, *Assessing Compliance with ICAO Standards and Recommended Practices (SARPs) and Implementing their Provisions* (Nov. 6, 2007), available at: *https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/17693.*

[26] Although Article 37 of the Chicago Convention requires each contracting state to collaborate to achieve the highest practicable degree of uniformity in aircraft and personnel regulations with ICAO SARPs, Article 38 of the Chicago Convention provides member states the option to file a difference from the SARPs that notifies the ICAO Council of the differences between the member states' regulations and ICAO SARPs.

[27] ICAO Annex 6, Part II Applicability states ''The Standards and Recommended Practices of Annex 6, Part II, are applicable to international general aviation operations with aeroplanes.''

operators while maintaining an appropriate level of safety during high-altitude flight. These challenges include reduced oxygen availability in emergencies, impaired pilot communication, hygiene concerns, disease risk, and increased fatigue.

In addition to the changes to part 135 proposed by section 834 of the Act, FAA wanted to assess the risk associated with a possible change to part 91. Specifically, FAA was considering an amendment to § 91.211(b)(1)(ii), proposing that if two pilots are at the controls of an airplane that has been designed so that the occupants will not be exposed to cabin pressure altitude that exceeds 40,000 feet for any duration after decompression from any failure condition not shown to be extremely improbable, and each pilot has a quick-donning oxygen mask available, then one pilot need not wear and use an oxygen mask while at or below the aircraft's maximum certified altitude.

However, based on the data and analysis explained in section IV.C. of this preamble, FAA decided to propose a change to § 91.211(b)(1) to allow operations at any altitude provided quick donning masks are available to the pilots.

2. Likelihood Analysis of Decompression Events and NTSB Findings and Recommendations

In the FAA Safety Risk Management review process, risk is determined by considering both the likelihood of an event occurring and the severity of its potential consequences. These factors are incorporated into a safety risk matrix to determine the risk level for each severity-likelihood combination based on the operation's safety expectations.

To determine the risk associated with the proposed amendments, FAA assessed the likelihood of a decompression event occurring above FL250. FAA used data from the 2023 General Aviation Survey to estimate the number of flight hours flown above FL250 by part 91 and part 135 operators.[28] Considering significant factors over the past decade, such as the impact of the COVID–19 pandemic and advancements in modern aircraft capabilities, FAA adopted a conservative approach. Consequently, FAA estimated that between January 2015 and May 2025 part 91 and part 135 operators collectively logged over 20 million flight hours above FL250.

FAA then reviewed reported pressurization events that occurred during that 10-year period. Out of the over 20 million flight hours flown above FL250 by part 91 and part 135 operators, FAA found approximately 200 reports of decompression events. Of those reports, 75 percent occurred from FL260 up to and including FL410, while 25 percent took place above FL410. FAA categorized each event as ''explosive,'' ''rapid,'' or ''gradual.''[29] Among the 200 reported events, three were possible rapid decompressions and one was an explosive decompression. Of these four events, two rapid decompressions resulted in accidents (discussed below), while the remaining rapid decompression and the explosive decompression both landed safely without further incident.

Only one accident resulted in fatalities: an event involving a Cessna 560 on June 4, 2023, operated under part 91 by a single pilot.[30] NTSB concluded that the probable cause of this accident was pilot incapacitation due to loss of cabin pressure for undetermined reasons and that the owner/operator's decision to operate the airplane without supplemental oxygen onboard contributed to the outcome. FAA does not consider the accident relevant to the risk analysis because it was determined that the aircraft was not flown in an airworthy[31] condition. Furthermore, the pilot lost consciousness before reaching an altitude at which current regulations require the use of an oxygen mask.

In addition to the accident noted above, on May 23, 2016, a Cessna Citation 501SP experienced a complete decompression at FL430 due to multiple failures in the pressurization system.[32] Upon recognizing the depressurization, the pilot delayed the donning of his oxygen mask. Had he immediately donned his oxygen mask after noticing the depressurization, it is likely that the event would not have resulted in damage to the airplane.[33] There were no fatalities or serious injuries resulting from this accident; however, the pilot and two passengers sustained minor injuries. Consequently, NTSB did not issue any safety recommendations in response to this accident.

In summary, due to the rarity of decompressions occurring above FL250, combined with advances in aircraft design and safety standards, FAA finds that increasing the minimum altitude at which oxygen masks must be worn continuously will not adversely affect safety. The two accidents that occurred during the review period and within the operational parameters relevant to this NPRM occurred due to failure to follow required procedures and regulations. FAA concludes that the proposed rule would not have changed the outcome of either event. In all other cases, the aircraft that experienced a decompression event landed successfully without further incident, and in several cases, the pilots admitted they were not wearing their oxygen masks prior to the occurrence.

In addition to the two events discussed above, another accident FAA considered during its risk analysis was the crash of a Learjet 35 that occurred on October 25, 1999.[34] The accident resulted in the deaths of all six people on board, including golfer Payne Stewart. Though the accident did not occur within the 10-year review period, its notoriety and subsequent safety recommendations warranted inclusion in this analysis. The Learjet 35 lost cabin pressure for undetermined reasons. Air traffic control received the last communication from the aircraft while it was climbing through 23,200 feet. Subsequently, the aircraft continued climbing to more than 46,000 feet, flew on autopilot for nearly four hours, deviated from its intended course, and ultimately ran out of fuel and crashed in South Dakota. The NTSB determined that the probable cause of the accident was pilot incapacitation due to failure to receive supplemental oxygen.

Following the Learjet 35 accident, the NTSB issued 11 safety recommendations to FAA.[35] These

[28] The 2023 total landings data for parts 91 and 135 turbojets and multiengine turboprops is found in table 2.3 of the 2023 General Aviation and Part 135 Activity Surveys, *https://www.faa.gov/data_research/aviation_data_statistics/general_aviation/cy2023*.

[29] For purposes of the assessment, an explosive depressurization is defined as a loss of cabin pressure resulting in ambient pressure being reached within three seconds or less. A rapid depressurization is one in which ambient pressure is reached in more than three seconds, but less than 60 seconds and a gradual depressurization occurred when it took more than 60 seconds for cabin pressure to reach ambient pressure.

[30] NTSB Aviation Investigation Final Report ERA23FA256 (May 13, 2025), available at: *https://data.ntsb.gov/carol-repgen/api/Aviation/ReportMain/GenerateFinalReport/192300/pdf*.

[31] 14 CFR 3.5(a)—*Airworthy* means the aircraft conforms to its type design and is in a condition for safe operation.

[32] NTSB Aviation Accident Final Report CEN16LA197 (Jul. 5, 2018), available at: *https://www.faa.gov/sites/faa.gov/files/2023-12/CEN16LA197.pdf*.

[33] *See* Safety Risk Assessment for Use of Pilot Oxygen Masks in CFR parts 91 and 135 Operations, Section 3.

[34] NTSB Aviation Accident Final Report DCA00MA005 (Nov. 28, 2000).

[35] NTSB Safety Recommendation A–00–109 through –119 (Dec. 20, 000), available at: *https://www.google.com/goto?url=CAESagHuR6pNOk8H6P0_7pcGzmAcaJrM_-*

Continued

included: installing automatic emergency pressurization systems on aircraft to maintain safe cabin pressure if the primary system fails; the importance of thorough maintenance practices including improved documentation and follow-up on recurring pressurization issues; and improving pilot training to better recognize and respond to the early signs of hypoxia during cabin pressurization events. Of the 11 safety recommendations, NTSB closed 10 as acceptable, while one was found unacceptable. Two safety recommendations were due to an underlying issue that greatly exacerbated the problem created by depressurization.

Safety Recommendation A–00–113 proposed that FAA mandate clear and explicit emergency procedures for all pressurized aircraft approved to fly above FL250. These procedures should include instructions for flightcrews to don oxygen masks as the first and immediate action upon the onset of a cabin altitude warning, followed by steps to identify, to manage, and to resolve the condition that triggered the warning. This recommendation sought to ensure that pilots prioritize donning oxygen masks in the event of a pressurization problem.

FAA responded by reviewing Airplane Flight Manuals (AFMs) for all part 25 and part 23 aircraft certified to fly above FL250. The Learjet 35/36 Airplane Flight Manual (AFM) did not contain an emergency procedure requiring the flightcrew to don oxygen masks immediately after the cabin altitude warning activated. The AFM contained an abnormal procedures checklist allowing the flightcrew to troubleshoot the pressurization system before donning oxygen masks. FAA noted during a 1999 Special Certification Review that the flightcrew may become incapacitated due to this delayed practice. On June 8, 2000, FAA issued a final rule ''Airworthiness Directives; Learjet Model 35, 35A, 36, and 36A Series Airplanes,'' proposing to require revising the AFM to add emergency procedures instructing the flightcrew to first don oxygen masks prior to troubleshooting activities.[36] FAA issued the AD on November 6, 2000 and became effective on January 4, 2001.[37]

In addition, Airworthiness Directives (ADs) were issued to mandate all AFMs for part 25 and part 23 aircraft certified to fly above FL250 be revised to include donning oxygen masks as the first step following a cabin altitude warning. The NTSB closed Safety Recommendation A–00–113 as acceptable on January 28, 2004, recognizing the positive impact of these changes on aviation safety. By requiring checklists for Learjet airplanes and all other airplanes certified to fly above FL250 to include an immediate and explicit procedure for the flightcrew to don oxygen masks before troubleshooting the pressurization system, FAA mitigated risk associated with high altitude operations and the rule change being proposed today.

Similarly, Safety Recommendation A–00–112 also focused on the importance of flightcrew procedures in the event of a pressurization issue. The recommendation addressed the need for immediate action items to be explicitly included in checklists. It recommended FAA change FAA Order 8400.10, ''Air Transportation Operations Inspectors Handbook,''[38] which prior to the accident stated that immediate action items ''may be stated as policies rather than checklist items when appropriate.'' The order had provided an example of flightcrews donning oxygen masks in the event of a loss of cabin pressure. It stated, ''in this example the loss of cabin pressure checklist would contain subsequent items based on the assumption that the flight crew is on oxygen . . . .'' NTSB believed that FAA should remove this specific example and review the appropriateness of allowing policies to substitute for checklist items. On June 10, 2003, FAA made a change to Order 8400.10 that NTSB found acceptable, resulting in widespread improvements in checklist design and enhancing flight safety at high altitudes.

The unacceptable action was Safety Recommendation A–00–109, which recommended FAA update guidance on high altitude operations to reflect more accurately the time of useful consciousness (TUC) and rate of pilot performance degradation following a depressurization, and to highlight the effect of hypoxia on a pilot's ability to perform complex tasks in a changing environment. FAA responded to the recommendation by twice revising AC 61–107, ''Operations of Aircraft at Altitudes Above 25,000 Feet MSL and/or Mach numbers (Mmo) Greater than .75;'' however, the NTSB found both revisions inadequate and closed the recommendation as ''unacceptable'' on September 18, 2013.[39]

Even though the recommendation was officially closed, two years later, FAA revised AC 61–107 again, adding a CAUTION note to Figure 2–3, ''Times of Useful Consciousness Versus Altitude'' table. The note currently warns that many factors can affect a pilot's TUC, and pilots should use the lowest (*i.e.,* shortest) TUC value as their limit at a given flight altitude. Therefore, the table now indicates that at 43,000 feet or above, during a gradual decompression, TUC is less than 9 seconds, and after a rapid decompression there is only a very short ''nominal'' time to don an oxygen mask. By updating this guidance, FAA has helped to ensure that pilots are more aware of the risks associated with depressurization at altitude, understand the importance of immediately donning oxygen masks, and are better equipped to handle such situations.

Similar to the above discussion, FAA's review has shown that, due the numerous actions taken by FAA in response to this accident combined with the other advances discussed elsewhere in this NPRM, this proposed rule would not adversely affect the safety issues identified by NTSB.

3. Safety Risk: High Altitude Physiology

Though high altitude flight poses several physiological hazards, for the development of this proposed rule, FAA analyzed and focused upon the safety risk of hypoxia and the associated TUC. The proposed changes to parts 135 and 91 would require pilots to use oxygen masks at certain altitudes where time to don oxygen masks is measured in single-digit seconds before hypoxia causes unconsciousness. As for risks posed by other threats such as hyperventilation, barotrauma, and altitude decompression sickness, this proposal does not impact those risks and therefore they are not discussed further.

Hypoxia, discussed in detail below, is the most common threat following an aircraft decompression event. FAA

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[36] See 65 FR 36391.

[37] Airworthiness Directives; Learjet Model 35, 35A, 36, and 36A Series Airplanes, 65 FR 71239.

[38] FAA Order No. 8400.10 (Aug. 23, 1988), canceled by FAA Order No. 8900.1A ''Flight Standards Information Management System,'' (Sept. 13, 2007) available at *https://drs.faa.gov/browse/excelExternalWindow/869F1EB61A16C5ED852571AA005BE67A.0001.*

[39] AC 61–107B was revised to its current version (AC 61–107B Change 1) on September 9, 2015, after continued discussions between the NTSB's Chief Medical Officer and FAA's Office of Aerospace Medicine. The principal changes involved additional information about the reasons for individual variability in hypoxia tolerance, the considerable range in TUC at a given flight altitude, and a caution statement related to the TUC times presented in Figure 2–3 of the advisory circular. NTSB Safety Recommendation A–00–109 remains classified as ''Closed—Unacceptable Action.''

recognizes that hypoxia resulting from decompression is a catastrophic, time-sensitive physiological hazard for which preventive measures have traditionally provided robust risk mitigation. The proposed rule does not impact the underlying physiological risks associated with hypoxia and the inherent limits on pilot response time once impairment begins.

FAA therefore emphasizes the continued importance of preventive strategies to mitigate safety risk, including oxygen mask use and operator procedures, training, and risk awareness to address hypoxia-related hazards. Although the proposed amendments to existing regulations would permit operations at certain altitudes without a pilot continuously wearing an oxygen mask, thereby limiting the effectiveness of oxygen mask usage as a preventive strategy, the changes do not prohibit operators from requiring stricter oxygen masks at any altitude. Operators and air carriers, upon considering the risks to and effects on human physiology, may choose to require oxygen masks be donned at lower altitudes than the minimum requirements proposed in this NPRM.

i. Hypoxia/Hypoxic (Altitude) Hypoxia

Hypoxia is a state of oxygen deficiency in the blood, tissues, and cells sufficient to cause an impairment of body functions.[40] Though any tissue will die if deprived of oxygen long enough, the greatest concern regarding hypoxia during flight is lack of oxygen to the brain since it is particularly vulnerable to oxygen deprivation. Hypoxic hypoxia, which is related to altitude, is the only type of hypoxia discussed in this NPRM.

Hypoxic hypoxia refers to an insufficient oxygen supply due to the reduced partial pressure of oxygen (PO_2) in the inhaled air as barometric pressure decreases with increasing altitude. Though PO_2 in the inhaled air decreases with increasing altitude (*i.e.,* the gas molecules spread further apart), the percentage of oxygen remains unchanged at 21 percent. Hypoxia can result from the loss of cabin pressure due to an aircraft decompression and can significantly reduce mental and physical performance of aircraft occupants at altitude due to decreased blood oxygen saturation levels (S_pO_2). Hypoxia poses the greatest potential physiological threat during high altitude flight.

The human body is well-adapted to the Physiological Efficient Zone (*i.e.,* sea level to 10,000 feet) where pressure altitudes are sufficient to maintain S_pO_2 levels for normal cognitive and physical performance. Aircraft cabin pressurization creates and maintains this protective zone for cabin occupants in flight. Ten thousand feet is an important physiological threshold[41] where most healthy individuals start to display mild hypoxic symptoms, such as drowsiness/fatigue, dizziness, and mild headache. Between 10,000 and approximately 15,000 feet, the cardiopulmonary system compensates for reduced oxygen availability by increasing both heart rate and the rate and depth of breathing. Above 15,000 feet—the maximum cabin pressure altitude at which passenger oxygen masks automatically deploy—these reflexive cardiopulmonary responses are no longer sufficient to compensate fully, leading to a steady decline in brain oxygen saturation and more pronounced hypoxic symptoms, including cognitive and physical impairment.[42,43] At 25,000 feet most people become profoundly hypoxic and lose consciousness within three to five minutes unless given highly concentrated oxygen.[44,45,46] Brain cells cannot store oxygen and rapidly use the oxygen delivered to them.

If hypoxia is allowed to progress at 25,000 feet, objective signs of impairment begin to appear such as mental confusion, poor judgment, muscle incoordination, and, ultimately, unconsciousness. Subjectively, the hypoxic symptoms most frequently felt are fatigue, headache, dizziness, poor visual acuity, hot and cold flashes, numbness, and tingling. In most people, hypoxia induces a sense of euphoria, which makes it difficult to convince them to don the oxygen mask and treat themselves by breathing 100 percent supplemental oxygen.[47] If hypoxia occurs at 40,000 feet due to an explosive (one to three seconds) or rapid decompression (three to 60 seconds), unconsciousness is highly likely due to the sudden increase in cabin pressure altitude and administration of 100 percent oxygen under positive pressure is needed within seconds. Moreover, administration of 100 percent oxygen is needed within three to four minutes to prevent irreversible brain cell damage or death.[48,49]

ii. Time of Useful Consciousness

FAA considered the safety risk and data around the TUC,[50] which is the amount of time from the moment a person is deprived of adequate oxygen to when the person is no longer able to think clearly or take effective action to correct the situation prior to losing consciousness (*i.e.,* quickly don an oxygen mask in the event of a cabin depressurization). FAA analyzed results from altitude chamber studies conducted from the early 1940s[51] into the early 1970s.[52] These studies

[40] Federal Aviation Administration (2015), *Aircraft operations at altitudes above 25,000 feet mean sea level or Mach numbers greater than .75* (Advisory Circular [AC] 61–107B CHG 1), available at: *https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_61-107B_CHG_1_FAA.pdf.*

[41] This corresponds to the inflection point and sharp decrease in the sigmoid-shaped oxygen-hemoglobin dissociation curve at approximately 60 mmHg PO_2 and 87%–88% S_pO_2.

[42] Guyton, A.C., & Hall, J.E., Aviation, high-altitude, and space physiology. In A.C. Guyton & J.E. Hall (Eds.), *Textbook of medical physiology,* 11th ed., pp. 537–541, Elsevier (2006).

[43] McArdle, W.D., Katch, F.I., & Katch, V.L., *Exercise physiology, nutrition, energy, and human performance* (8th ed.), Wolters Kluwer (2015).

[44] Green, N., Gaydos, S., Hutchison, E., & Nicol, E., Acute hypoxia and hyperventilation, In N. Green, S. Gaydos, E. Hutchison, & E. Nicol (Eds.), *Handbook of aviation and space medicine,* pp. 51–60, CRC Press (2019).

[45] Pickard, J.S., & Gradwell, D.P., Respiratory physiology and protection against hypoxia, In J.R. Davis, R. Johnson, J. Stepanek, & J.A. Fogarty (Eds.), *Fundamentals of aerospace medicine,* 4th ed., pp. 20–45, Lippincott Williams & Wilkins (2008).

[46] Federal Aviation Administration, *Aircraft operations at altitudes above 25,000 feet mean sea level or Mach numbers greater than .75,* Advisory Circular 61–107B with Change 1 (2015), available at: *https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.list/?q=AC+61-107B&statusID=2.*

[47] Dart, T., Pilmanis, A., & Wurmstein, A., *High altitude physiology* [Symposium session], High Altitude Symposium, Medical University of South Carolina, Charleston, SC (Aug 12–14, 2024).

[48] Guyton, A.C., & Hall, J.E., Aviation, high-altitude, and space physiology, In A.C. Guyton & J.E. Hall (Eds.), *Textbook of medical physiology,* 11th ed., pp. 537–541, Elsevier (2006).

[49] Pickard, J.S., & Gradwell, D.P., Respiratory physiology and protection against hypoxia, In J.R. Davis, R. Johnson, J. Stepanek, & J.A. Fogarty (Eds.), *Fundamentals of aerospace medicine,* 4th ed., pp. 20–45, Lippincott Williams & Wilkins (2008).

[50] Time of Useful Consciousness (TUC) or Effective Performance Time (EPT). This is the period of time from interruption of the oxygen supply, or exposure to an oxygen-poor environment, to the time when an individual is no longer capable of taking proper corrective and protective action (*e.g.,* donning an oxygen mask) (AC 61–107B CHG 1). It is not the time to total unconsciousness.

The definition of ''Time of Useful Consciousness (TUC)'' and ''Effective Performance Time (EPT)'' is the same and the two terms are used interchangeably; however, EPT is used for pilots and flight attendants with assigned operational flight duties and TUC is used for passengers/individuals with no assigned operational flight duties. TUC is the more common term and will be used throughout the remainder of this document.

[51] Comfort, E., & Wilson, J.W., *Some factors affecting time consciousness at high altitudes* (U.S. Air Force Technical Report No. 5970), U.S. Air Force Air Materiel Command (1950).

[52] Ernsting, J., Denison, D.M., Byford, G.H., & Fryer, D.I., *Hypoxia induced by rapid decompression from 8,000 feet to 40,000 feet—the influence of rate of decompression* (Flying Personnel Research Committee Report No. AD–A009 006), Royal Air Force Institute of Aviation Medicine (1973).

provided experimental evidence for the TUC values listed in Table 2 and form the basis of the current pilot oxygen use rules.

Table 2 compares current rules, TUC, and the proposed rule changes for part 91 and part 135. As stated previously, TUC is the amount of time from the moment a person is deprived of adequate oxygen to when they are no longer able to think clearly or take effective corrective action (*e.g.,* don an oxygen mask). TUC does not mean the onset of unconsciousness. Impaired performance may be immediate, and the prompt use of 100 percent oxygen is critical.

TABLE 2—TIME OF USEFUL CONSCIOUSNESS & CURRENT AND PROPOSED RULES COMPARISON

Current rule	Altitude (feet)	Time of useful consciousness: following a gradual decompression	Time of useful consciousness: following a rapid decompression	Proposed rule
	18,000	20 to 30 minutes	10 to 15 minutes	
	22,000	10 minutes	5 to 6 minutes	
(FL250) Part 135: One Pilot	25,000	3 to 5 minutes	1.5 to 2.5 minutes	
	28,000	2.5 to 3 minutes	1 to 1.5 minutes	
	30,000	1 to 2 minutes	30 to 60 seconds	
(FL350) Part 135: Two Pilots Part 91: One pilot	35,000	30 to 60 seconds	15 to 30 seconds	(FL350) Part 135: One Pilot.
(FL410) Part 91: Two Pilots	40,000	15 to 20 seconds	Nominal/Likely immediate loss of consciousness.	(FL 410) Part 135: Two Pilots.
	43,000	9 to 12 seconds	Nominal/Likely immediate loss of consciousness.	
	50,000	9 to 12 seconds	Nominal/Likely immediate loss of consciousness.	(No Limit) Part 91: w/Quick Donning Masks.

** "nominal" = in name only, very short amount of time.

Importantly, the TUC times in Table 2 are based on altitude chamber research studies during which the subjects were at rest or performing very simple tasks, not the cognitively or physically demanding tasks associated with flying an aircraft at high altitude while managing an emergency situation. In research studies during which subjects performed more complex or physically demanding tasks, TUC was much shorter.[53] [54] [55] Therefore, it is strongly recommended that pilots assume the lesser TUC time at each flight level is limiting.

These studies were performed in anticipation that subsonic transport aircraft would fly at higher altitudes (*i.e.,* FL400–FL500) to take advantage of less congested airspace and there were concerns about the physiological protection and survival of pilots and passengers in the event of a high-altitude depressurization.[56] In the late 1960s to early 1970s, the focus of this work shifted to physiological protection in supersonic aircraft.

Important results from these studies include:

- TUC decreases with altitude, and a rapid decompression dramatically reduces TUC. In general, TUC is reduced by 50 percent following a rapid decompression to altitudes between 25,000 feet and 43,000 feet. Above 43,000 feet, TUC is reduced to the time it takes for blood to circulate from the lungs to the brain; approximately nine seconds from the start of a rapid decompression to the loss of functional capability.[57] [58]
- In chamber rapid decompressions to altitudes at and below 30,000 feet [59] [60] and controlled in-flight aircraft depressurizations where the cabin pressure altitude did not exceed 30,000 feet,[61] most pilots were able to don their oxygen mask and return their hands to the flight controls or initiate an emergency descent within the TUC of 30–60 seconds. Although these recognition reaction times and mask donning were fast enough to prevent severe hypoxic symptoms at 30,000 feet, similar reaction times at higher altitudes will lead to pilot incapacitation.[62] [63]
- In rapid decompressions (two to 12 seconds) from 8,000 feet to 40,000 feet, the oxygen mask must be donned, sealed, and supplying 100 percent oxygen within eight seconds before the onset of impairing hypoxia symptoms (*e.g.,* dimmed/blurry vision, mental confusion). If mask donning is delayed by 10 seconds or more, yet still accomplished, the pilot will become severely hypoxic and lose consciousness within 15 seconds and remain unconscious for an additional 20–40 seconds despite having the mask in place and supplying 100 percent

[53] Noble, J., Jones, J.G., & Davis, E.J., Cognitive function during moderate hypoxaemia, *Anesthesia and Intensive Care, 21*(2), pp. 180–184 (1993).

[54] Kelman, G.R., & Crow, T.J., Impairment of mental performance at a simulated altitude of 8,000 feet, *Aerospace Medicine,* 40(9), pp. 981–982 (1969).

[55] Harding, R.M. (revised by Gradwell, D.P.), Hypoxia and hyperventilation, In D.P. Gradwell & D.J. Rainford (Eds.), *Ernsting's aviation and space medicine,* 5th ed., pp. 59, CRC Press (2016).

[56] The Boeing 307 Stratoliner, the first commercial use aircraft with a pressurized cabin, entered revenue service in July 1940 with a cruising altitude of 15,000 to 20,000 feet. Pressurized jet aircraft in the 1960s could reach cruising altitudes of 30,000 to 40,000 feet. Grant, R.G., Flight: 100 years of aviation, DK Publishing, Inc. (2002).

[57] Guyton, A.C., & Hall, J.E., Aviation, high-altitude, and space physiology, In A.C. Guyton & J.E. Hall (Eds.), *Textbook of medical physiology,* 11th ed., pp. 537–541, Elsevier (2006).

[58] Luft, U.C., Clamann, H.G., & Optiz, E., The latency of hypoxia on exposure to altitude above 50,000 feet, *The Journal of Aviation Medicine*, 22(2), 117–136 (1951).

[59] O'Connor, W.F., & Pendergrass, G.E., *Effects of decompression on operator performance* (Federal Aviation Agency Report No. AM 66–10), Office of Aviation Medicine, Federal Aviation Agency (1966).

[60] Hoffler, G.W., Turner, H.S., Wick, R.L., & Billings, C.E., Behavior of naive subjects during rapid decompression from 8,000 to 30,000 feet, *Aerospace Medicine,* 45(2), pp. 117–122 (1974).

[61] Bennett, G., Reactions and performance of pilots following decompression, *Aerospace Medicine,* 32(2), pp. 134–136 (1961).

[62] Ernsting, J., The ideal relationship between inspired oxygen concentration and cabin altitude, *Aerospace Medicine,* 34(11), pp. 991–997 (1963).

[63] Donaldson, R.T., Carter, E.T., Billings, C.E., & Hitchcock, F.A., Acute hypoxia during rapid decompression and emergency descent in a commercial jet aircraft, *Aerospace Medicine,* 31(10), pp. 842–851 (1960).

oxygen.[64] The severe hypoxia and loss of consciousness are due to gas expansion of the 80 percent nitrogen in the lungs from breathing ambient cabin air prior to depressurization. The removal (*i.e.,* clearance) of this nitrogen takes time, during which the PO_2 in the lungs is too low to oxygenate the blood to support brain function. Even if the first breath post-depressurization is 100 percent oxygen, it still takes approximately 20–40 seconds to clear the nitrogen from the lungs to oxygenate the blood adequately.

• In rapid decompressions to 40,000 feet and above, breathing oxygen continuously for several minutes prior to decompression (to saturate the lungs and upper respiratory tract) is needed to prevent severe hypoxia and loss of consciousness. An air-oxygen mixture of at least 40 percent oxygen must be breathed at 8,000 feet cabin pressure altitude before decompression, with 100 percent oxygen supplied within two seconds (essentially the first breath immediately after depressurization) to prevent mental and physical performance decrements. This equates to breathing an air-oxygen mixture of at least 40 percent whenever the aircraft is above FL350.[65]

Although the majority of these studies were conducted in the 1960s, altitude chamber research continued in support of rulemaking activities similar to this NPRM. A 1990 study by Marotte *et al.*[66] evaluated the effect of decompression in transport aircraft from cabin pressure altitudes of 8,000 feet to final cabin pressure altitudes ranging from 16,000 feet to 45,000 feet. Their findings indicated that delays in mask donning times correlated with significant decreases in S_pO_2 and the onset of hypoxia symptoms. They concluded oxygen mask wear and use should be mandated below FL410 and recommended they be mandated at FL380 or above.

iii. Time of Useful Consciousness and the Proposed Oxygen Use Rule Changes

Mental and physical impairment and eventual incapacitation from hypoxia are the greatest physiological threats at high altitude in the event of an aircraft decompression, be it gradual, explosive, or rapid. Explosive and rapid decompressions are extremely rare events, but still possible.[67] Gradual decompressions are more frequent operationally but potentially more dangerous—a gradual decompression may go unnoticed and the resultant hypoxia unrecognized.

In the worst-case explosive decompression scenario at high altitude, for which FAA has found no recorded instances during the 10-year review period, if the cabin pressure altitude nearly instantly equalizes to the aircraft's current flight level, human physiology is the limiting factor. A significant advantage of wearing an oxygen mask at high altitude is to prevent severe hypoxia and loss of consciousness by facilitating nitrogen gas clearance from the lungs before exposure to explosive or rapid decompression. The proposed rules relax the requirement to wear an oxygen mask, thus negating this beneficial effect; however, explosive and rapid decompressions of an aircraft are extremely rare events. Commenters should be fully aware of the potential severe physiological consequences of depressurization events at high altitudes, as well as the unlikelihood of an occurrence when responding to this NPRM.

D. Other factors

i. United States Military Oxygen Mask Requirements and Pressurization Events

In addition to the safety risk assessment, FAA requested information from each branch of the U.S. military regarding their operating requirements and any data they could provide on pressurization events in aircraft used in both military and civilian operations (*e.g.,* Gulfstream V, known as the C–37), as the U.S. military uses several aircraft based on civilian designs.

The U.S. Army publishes Army Regulation 95–1, *Aviation Flight Regulations,* which specifies regulations for flightcrews in pressurized aircraft that mirror current FAA part 91 oxygen requirements.

The U.S. Navy (USN) NATOPS General Flight Operation Instructions Manual, CNAF M–3710.7, only requires one pilot to wear an oxygen mask above FL400 if quick-donning oxygen masks are installed.

Air Force Manual 11–202 Volume 3, *Flight Operations,* permits operations up to and including FL500 in pressurized airplanes without requiring at least one pilot wearing an oxygen mask, provided the airplane is equipped with an automatic emergency descent mode. Otherwise, one pilot is required to always wear an oxygen mask when operating above FL410. This marks a change from the Air Force's response to the 1982 proposal, where the Air Force opposed raising the altitudes at which oxygen masks would be required.

USN responded to FAA's request for data on pressurization events in aircraft used by both USN and civilian operators. USN provided data for 29 events in total over a 28-year period. Of those 29 events, seven were in aircraft that are like those used by civilian business aircraft operators, the Gulfstream IV designated as the C–20D and C–20G. In all events, there were no reported injuries or fatalities, and the aircraft landed safely.

ii. Aircraft Design Modernization for Safety Mitigations

In the 1986 withdrawal of the 1982 NPRM, FAA noted that advances in aircraft engines and airframe designs are only one component of high-altitude flight, citing the physiological limitations of the human body and the effects of low atmospheric pressure. At the time, FAA determined it was in the interest of public safety not to raise the minimum altitude at which at least one pilot at the controls was required to wear and use an oxygen mask in parts 91, 121, and 135. As part of that determination, FAA recognized the available data on decompression events was inadequate to justify a change to the minimum altitude requirements for supplemental oxygen masks. However, there have been advancements in design features since 1986 that help reduce the risk of high-altitude decompressions.

[64] Bryan, C.A., & Leach, W.G., Physiologic effects of cabin pressure failure in high altitude passenger aircraft, *Aerospace Medicine,* 31(4), pp. 267–275 (1960); Blockley, W.V., & Hanifan, D.T., *An analysis of the oxygen protection problem at flight altitudes between 40,000 and 50,000 feet,* Federal Aviation Agency Final Report on Contract No. FA–955, Psychological Research Associates (1961); Barron, C.I., & Cook, T.J., Effects of variable decompressions to 45,000 feet, *Aerospace Medicine,* 36(5), pp. 425–430 (1965); Ernsting, J., McHardy, G.J.R., & Roxburgh, H.L., *The choice of gas mixture for breathing in high performance aircraft* (Flying Personnel Research Committee Report No. FPRC/1142), Royal Air Force Institute of Aviation Medicine (1960); Ernsting, J., The ideal relationship between inspired oxygen and cabin altitude, *Aerospace Medicine,* 34(11), pp. 991–997 (1963); Ernsting, J., *The physiological effects of failure of the pressure cabins of passenger aircraft flying at altitudes between 35,000 feet and 65,000 feet* (Flying Personnel Research Committee Report No. FPRC/313), Royal Air Force Institute of Aviation Medicine (1965); and Ernsting, J., Denison, D.M., Byford, G.H., & Fryer, D.I., *Hypoxia Induced by rapid decompression from 8,000 to 40,000 feet—the influence of rate of decompression* (Flying Personnel Research Committee Report No. AD–A009 006), Royal Air Force Institute of Aviation Medicine (1973).

[65] Ernsting, J., *The physiological effects of failure of the pressure cabins of passenger aircraft flying at altitudes between 35,000 feet and 65,000 feet* (Flying Personnel Research Committee Report No. FPRC/313), Royal Air Force Institute of Aviation Medicine (1965).

[66] Marotte, H., Toure, C., Clere, J.M., & Vieillefond, H., Rapid decompression of a transport aircraft cabin: protection against hypoxia, *Aviation, Space, and Environmental Medicine,* 61(1), pp. 21–27 (1990).

[67] *See* Section III.C.8. See also Safety Risk Management report.

In 1996, FAA amended § 25.841(a), *Pressurized Cabins,* to require that cabin pressure altitude not exceed 40,000 feet [68] for any duration, or 25,000 feet for more than two minutes, after any failure that has not been shown to be extremely improbable.[69] This two-minute threshold at 25,000 feet is within the three to five minutes of TUC following a gradual decompression and within the median of TUC following a rapid decompression (see Table 2, Time of Useful Consciousness & Current and Proposed Rules Comparison). For transport category airplanes certified under § 25.841(a), it is very unlikely that the cabin pressure will ever go above 40,000 feet during the plane's lifetime.

For general aviation airplanes certified under part 23 prior to 2012, FAA established special conditions for those intended to operate above 40,000 feet. Although the special conditions were issued individually for each aircraft model, many of the requirements were common across multiple models and were documented in the Type Certification Data Sheet. In general, to gain FAA approval under these special conditions, design approval holders must have demonstrated that following any probable malfunction or failure of the pressurization system—combined with any undetected latent failures—the cabin pressure altitude would not exceed 25,000 feet. For other additional potential failures, design approval holders must have demonstrated that the cabin pressure altitude would not exceed 40,000 feet.

In 2012, FAA revised § 23.841, *Pressurized cabins,* to incorporate the minimum design standards that had been previously established via special conditions. Amendment 23–62 mandated that airplanes certificated to operate above 45,000 feet must ensure that the cabin pressure altitude would not exceed 40,000 feet after decompression from any failure condition not shown to be extremely improbable. In 2017, FAA replaced § 23.841 with § 23.2320, *Occupant physical environment,* and the means of compliance was detailed in American Society for Testing and Materials F3227, *Standard Specification for Environmental Systems in Aircraft.* FAA defines an ''extremely improbable'' failure condition for commuter airplanes as those failure conditions so unlikely that they are not anticipated to occur during the entire operational life of all airplanes of one type.[70] In commuter aircraft certified to § 23.841 at amendment 23–62, or § 23.2320 at amendment 23–64 or equivalent, cabin pressure altitudes exceeding 40,000 feet are unlikely to occur during the service life of the aircraft fleet.

Updated part 23 and part 25 design requirements serve as safety mitigations by maintaining a controlled cabin environment that protects passengers and crew from the risks associated with high-altitude flight, even if the minimum flight level for pilot supplemental oxygen is raised. By ensuring that cabin pressure altitude does not exceed critical thresholds, the regulations help prevent hypoxia and other altitude-related health issues, providing a vital safety net in scenarios where pilots may operate at higher altitudes without supplemental oxygen. This ensures a safe and breathable environment, reducing the risk of incapacitation due to insufficient oxygen levels.

In addition to the aircraft design itself, the standards governing pilot oxygen masks and regulators have become more robust since the 1982 rulemaking efforts and warrant consideration in this discussion. Aircraft certified to operate at high altitudes usually have quick-donning oxygen masks installed for the flightcrew on the flightdeck. The oxygen masks and regulators typically meet the minimum performance standards defined in Technical Standard Order TSOC78a and Technical Standard Order C89a. During normal operations, oxygen is delivered to the user at varying concentrations based on cabin pressure altitude. An oxygen mask regulator setting is also available to supply 100 percent oxygen regardless of altitude. Furthermore, aircraft that fly at altitudes where it is not extremely improbable for a decompression event to expose the flightcrew to cabin pressure altitudes exceeding 34,000 feet are typically equipped with pressure-demand oxygen systems on the flightdeck. Pressure-demand systems provide oxygen under pressure to force oxygen into the user's lungs and bloodstream, improving oxygen absorption and reducing the risk of hypoxia, even at high altitudes.

As discussed in section III.C. of this rulemaking, a thorough review of pressurization events in the last 10 years was conducted. During that review, the positive effects of these advancements in aircraft design were apparent. Most events occurred during climb-out, and the flightcrew identified the problem before reaching an altitude at which hypoxia would have become a significant concern. Although the exact cause of the pressurization problem was not always reported, often it was a door seal or other minor failure which resulted in a gradual decompression of the cabin. Even in events that occurred at high altitude, many of the reports reviewed noted that both flightcrew members donned their masks after the first indication of a problem, which was often after reaching altitudes at which oxygen mask use is required by current regulations. FAA attributes the rarity of catastrophic decompression events, in part, to the advances in aircraft design discussed previously.

E. Related Regulatory Actions

The FAA Reauthorization Act of 2018 [71] directed FAA to issue a final rule revising § 121.333(c)(3) to apply only to flight altitudes above FL410. At the time of the enactment of this Act, § 121.333(c)(3) required if for any reason it is necessary for one pilot to leave their station at the controls of an airplane when operating at flight altitudes above FL250, the remaining pilot at the controls must put on and use their oxygen mask until the other pilot has returned to their duty station. FAA published a final rule in response to the Congressional mandate amending the part 121 flight level threshold at which one pilot at the controls must put on and use an oxygen mask while the other pilot leaves their control station from FL250 to FL410.[72] The 2020 revision to § 121.333 rendered part 121 less restrictive than parts 91 and 135 pilot supplemental oxygen rules. Although the changes proposed in this NPRM to parts 91 and 135 would alleviate that incongruity, part 135 would still be more restrictive than part 121. This discrepancy is acceptable to FAA because the cabin volume of most airplanes operated under part 121 is significantly greater than that of those operated under part 135, and airplanes operated under part 121 are therefore less likely to experience a rapid decompression.

[68] At 40,000 feet, TUC is 15 to 20 seconds following a gradual decompression and is nominal following a rapid decompression. *See* Table 2, Time of Useful Consciousness & Current and Proposed Rules Comparison and the related discussion in section III.C.3.ii of this rulemaking.

[69] As described in 14 CFR 25.4(c)(4) and FAA AC 25.1309–1B, the term ''extremely improbable'' means a failure condition that is not anticipated to occur during the total operational life of all aircraft of a given type.

[70] FAA Advisory Circular (AC) 23.1309–1E, *Safety Analysis and Assessment for Part 23 Airplanes* (Nov. 17, 2011), available at: *https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_23_1309-1E.pdf.*

[71] Section 579 of Public Law 115–254.

[72] Oxygen Mask Requirement: Supplemental Oxygen for Emergency Descent and for First Aid Turbine Engine Powered Airplanes with Pressurized Cabins, 85 FR 16897 (Mar. 25, 2020).

IV. Proposal

As discussed in the Executive Summary, section 834(a) of the Act directs FAA to issue an NPRM on whether to revise the requirements for paragraphs (3) and (4) of § 135.89(b) to raise the required flight level at which pilots must don an oxygen mask to FL410. Section 834(b) of the Act further states that FAA shall consider applicable safety data and risks, including data from incidents and accidents and NTSB investigations and recommendations, as discussed in section III.C. of this preamble.

FAA has weighed the considerations for oxygen mask requirements in paragraphs (3) and (4) of § 135.89(b) based on the available data and the safety risk assessment. FAA has determined there is sufficient reason to raise the altitude requirement for donning a supplemental oxygen mask from FL350 to FL410 in § 135.89(b)(3), as directed by the Act. However, FAA has determined that the data and safety considerations when applied to § 135.89(b)(4) do not justify raising the minimum altitude at which a lone pilot must don a supplemental oxygen mask from FL250 to FL410.

Instead, FAA has determined that raising the minimum altitude in § 135.89(b)(4) to FL350 is acceptable based on safety data. FAA requests comments and pertinent information on whether the appropriate flight level for this requirement should be FL350 or FL410. In addition, in considering proposed changes to § 135.89(b), FAA also decided that § 91.211(b)(1)(ii) should be amended to align the supplemental oxygen mask requirements in part 91 with safety expectations, considering the proposed changes to part 135. These decisions are based on the limited TUC available above FL350, the available data on pressurization events, and the Safety Continuum's mandate to ensure part 135 certificate holders are held to a higher level of safety than general aviation flights conducted under part 91.

TABLE 3—COMPARISON OF CURRENT AND PROPOSED FAA RULES

Current FAA rule	Proposed FAA rule
14 CFR 135.89(b)(3) Two pilots at the controls: Whenever a pressurized aircraft is operated at altitudes above 35,000 feet MSL, at least one pilot at the controls shall wear, secured and sealed, an oxygen mask required by paragraph (b)(2)(i).	14 CFR 135.89 Two pilots at the controls: Whenever a pressurized aircraft is operated at altitudes above FL410, at least one pilot at the controls shall wear, secured and sealed, an oxygen mask required by paragraph (b)(2)(i).
14 CFR 135.89(b)(4) One pilot at the controls: If one pilot leaves a pilot duty station of an aircraft when operating at altitudes above 25,000 feet MSL, the remaining pilot at the controls shall put on and use an approved oxygen mask until the other pilot returns to the pilot duty station of the aircraft.	14 CFR 135.89 One pilot at the controls: Whenever only one pilot is at the controls of an aircraft when operating above FL350, that pilot shall put on and use an approved oxygen mask.
14 CFR 91.211(b)(1)(ii) Two pilots at the controls: At flight altitudes above FL350 unless one pilot at the controls of the airplane is wearing and using an oxygen mask that is secured and sealed and that either supplies oxygen at all times or automatically supplies oxygen whenever the cabin pressure altitude of the airplane exceeds 41,000 feet (MSL), except that the one pilot need not wear and use an oxygen mask while at or below FL410 if there are two pilots at the controls and each pilot has a quick-donning type of oxygen mask that can be placed on the face with one hand from the ready position within five seconds, supplying oxygen and properly secured and sealed.	14 CFR 91.211(b)(1)(ii) One or two pilots at the controls: At flight altitudes above FL350 unless one pilot at the controls of the aircraft is wearing and using an oxygen mask that is secured and sealed and that either supplies oxygen at all times or automatically supplies oxygen whenever the cabin pressure altitude of the aircraft exceeds 14,000 feet (MSL), except that the one pilot need not wear and use an oxygen mask if each pilot has a quick-donning type of oxygen mask that can be placed on the face with one hand from the ready position within five seconds, supplying oxygen and properly secured and sealed.
14 CFR 91.211(b)(2) One pilot at the controls: Notwithstanding paragraph (b)(1)(ii), if for any reason at any time it is necessary for one pilot to leave the controls of the aircraft when operating at flight altitudes above FL350, the remaining pilot at the controls shall put on and use an oxygen mask until the other pilot has returned to that crewmember's station.	

A. Revising Part 135 Oxygen Mask Requirements With More Than One Pilot on the Flightdeck

FAA is proposing to amend § 135.89(b)(3) to raise the altitude above which at least one pilot must wear a secured and sealed approved quick-donning type oxygen mask from FL350 to FL410. Part 135 prescribes the requirements for commuter and on-demand operations of each person who is required to hold an air carrier certificate or operating certificate under part 119. Section 135.89 outlines pilot requirements for use of oxygen when conducting commercial operations in pressurized and unpressurized aircraft. Currently, when a pressurized aircraft is operated at altitudes above FL350, § 135.89(b)(3) requires at least one pilot at the controls to wear a quick-donning oxygen mask. These FAA rules on pilot oxygen mask use are stricter than ICAO standards, as explained in section III.B. of this preamble. Safety data shows that revising these requirements will not have a noticeable negative impact on safety, as discussed in section III.C. of this preamble. FAA finds that with two pilots at the controls on the flightdeck, in the event of a depressurization at or below FL410, as quick-donning masks can be donned within five seconds as per regulatory requirements,[73] it is very likely that at least one pilot will be able to don an oxygen mask successfully before useful consciousness is lost.[74]

In addition, FAA recognizes that other CAAs and the U.S. Air Force currently have less restrictive regulations regarding donning oxygen masks. This, in conjunction with the expenses incurred through unnecessary oxygen tank servicing and concerns regarding effects on pilots and crew coordination including reduced oxygen availability in emergencies, disease transmission risk, difficulty in pilot communications, and increased fatigue have led FAA to consider raising the minimum altitudes

[73] *See* 14 CFR 25.1447(c)(2). For general aviation aircraft certified in accordance with 14 CFR part 23, similar guidance is provided in industry consensus standard American Society for Testing and Materials F3227 for aircraft certified for operation above FL410.

[74] See TUC table in Table 1.

for oxygen mask donning. Therefore, FAA is proposing to amend § 135.89(b)(3) to raise the altitude above which at least one pilot must wear a secured and sealed approved quick-donning type oxygen mask from FL350 to FL410.

B. Revising Part 135 Mask Requirement to Flight Level 350 if One Pilot Is on the Flightdeck

In addition to the proposed revision to § 135.89(b)(3), FAA is proposing to revise § 135.89(b)(4) so that if one pilot leaves a pilot duty station, the remaining pilot at the controls shall put on and use an approved oxygen mask when operating at altitudes above FL350 until the other pilot returns to the pilot duty station of the aircraft. Section § 135.89 contains requirements for pilots to use oxygen when there is only one crewmember at the controls of the aircraft. Currently, when a pressurized aircraft is operating at altitudes above FL250, § 135.89(b)(4) requires that if one pilot leaves a pilot duty station the remaining pilot at the controls shall put on and use an oxygen mask until the other pilot returns to the pilot duty station of the aircraft.

Section 834 of the Act directs FAA to issue an NPRM concerning whether to change § 135.89(b)(4) to require a pilot to wear an oxygen mask when one pilot leaves the pilot duty station when flying above FL410. The Act further directs FAA to consider applicable safety data, risks, and investigations and recommendations of NTSB. FAA identified risks associated with changing § 135.89(b)(4) to FL410. This is due to the very short TUC that a lone pilot at the controls would have to recognize the depressurization and take action to don an oxygen mask. AC 61–107B CHG1, *Aircraft Operations at Altitudes Above 25,000 feet Mean Sea Level or Mach Numbers Greater Than .75,* lists average TUC values in Figure 2–3. At 35,000 feet, the TUC is approximately 30 to 60 seconds. In the event of a rapid decompression, that time is cut in half, yielding a TUC of 15 to 30 seconds. Figure 2–3 does not list a value for 41,000 feet, but at 40,000 feet, the TUC is 15–20 seconds. A rapid decompression has a nominal TUC.

Due to the very brief time period available for the pilot to detect a decompression and don an oxygen mask, 15 to 20 seconds following gradual decompression and nominal or likely immediate loss of consciousness following rapid decompression (see Table 2), FAA considers an amendment to § 135.89(b)(4) allowing a single pilot on the flightdeck to not wear an oxygen mask until above FL410 would not provide an acceptable level of safety in part 135 operations. As such, FAA is proposing that if one pilot leaves a pilot duty station, the remaining pilot at the controls shall put on and use an approved oxygen mask when operating at altitudes above FL350 until the other pilot returns to the pilot duty station of the aircraft.

FAA further notes that operations in pressurized aircraft may occur when only one pilot is assigned to the flight. This is permissible in aircraft that are type certificated for single pilot operations, when the pilot-in-command is qualified for single pilot operations and the certificate holder has been issued the appropriate operations specifications. The current regulatory text only refers to situations when two flightcrew members are assigned to the flight. FAA is proposing to clarify that § 135.89(b)(4) is applicable when only one pilot is assigned to the flight and operating above FL350 in addition to when one pilot leaves the controls. Due to the risk of depressurization, if it is necessary for one pilot to use an oxygen mask when a second pilot leaves the controls, it stands to reason that in situations where only one pilot is assigned to a flight, that pilot must wear an oxygen mask whenever the aircraft is above FL350.

C. Revising Part 91 Oxygen Mask Requirements

Part 91 is the default set of flight rules for non-commercial and general aviation aircraft in the United States. FAA is proposing to revise § 91.211(b) in two substantive ways. First, it would amend § 91.211(b)(ii) to expand the current exception from the requirement that one pilot wear and use an oxygen mask. FAA proposes to eliminate the current FL410 altitude limitation for the exception, allowing pilots to fly above that previous altitude limit without donning an oxygen mask as long as each pilot has a quick-donning type of oxygen mask that can be placed on the face with one hand within five seconds. FAA would also delete paragraph (b)(2) from § 91.211 altogether, thereby removing the requirement that if one pilot leaves the controls while the aircraft is flying above FL350, the other pilot put on and use an oxygen mask. In other words, if the proposal is finalized, no pilot would be required to wear and use an oxygen mask above FL350 if quick-donning masks are available on the flight deck. If the aircraft does not have available quick-donning oxygen masks, then at least one pilot would need to wear and use an oxygen mask.

Although the proposed changes would not make § 91.211 identical to the corresponding ICAO standards, it would bring the regulation and the standards into closer alignment than they are at present. The proposed changes to part 91 would also uphold the Safety Continuum [75] by tolerating more risk in general aviation operations than in part 135 operations. Therefore, FAA has chosen to use this NPRM as an opportunity to propose changes to § 91.211(b)(1)(ii). Please see section III.A.4 for more details.

D. Terminology Changes

In addition to the changes described previously, FAA also proposes a few terminology changes. First, FAA proposes to change the term ''airplane'' to ''aircraft'' to remove ambiguity on whether the requirements of § 91.211 apply to all aircraft rather than only applying to airplanes. Second, FAA proposes to replace references to feet MSL when discussing altitude with the term ''flight level'' to align altitude terminology in parts 91 and 135 with other parts of title 14 where appropriate.

V. Regulatory Notices and Analyses

Executive Order (E.O.) 12866 (''Regulatory Planning and Review'') and E.O. 13563 (''Improving Regulation and Regulatory Review'') require agencies to regulate in the ''most cost-effective manner,'' to make a ''reasoned determination that the benefits of the intended regulation justify its costs,'' and to develop regulations that ''impose the least burden on society.'' The Office of Management and Budget has determined this proposed rule is not a significant regulatory action as defined in section 3(f) of E.O. 12866.

A. Regulatory Impact Analysis (RIA)

1. Introduction

FAA is proposing to update oxygen mask usage requirements for part 135 operations in compliance with the Act. Following a comprehensive safety risk analysis, FAA has determined it is feasible to raise the flight level for mandatory oxygen mask usage from FL250 to FL350 when a single pilot is at the controls, and to FL410 when two pilots are on the flightdeck at the controls with quick-donning masks available. In addition, FAA proposes to eliminate the requirement for oxygen mask usage above FL350 in part 91 operations, provided that quick-donning masks are readily accessible. These

[75] *See* The Safety Continuum—A Doctrine for Application (Sept. 2014), *https://downloads.regulations.gov/FAA-2015-1621-0018/attachment_1.pdf,* and Section III.4. of this preamble for additional discussion about safety continuum application to parts 91 and 135 pilot oxygen mask requirements.

amendments aim to enhance operational flexibility while maintaining safety standards.

2. Need for Regulation

The need for this proposed regulation stems from a congressional mandate included in the Act. Specifically, section 834 of the Act requires that FAA issue an NPRM on whether to revise the requirements of 14 CFR 135.89(b)(3) and (4) to apply only above FL410, while considering applicable safety data and risks. Although not required by statute, FAA is also proposing additional deregulatory actions for part 91 oxygen mask requirements, since the same aircraft flown under part 135 are frequently operated under part 91. This keeps part 91 operations and part 135 operations in the appropriate frame of reference with respect to the Safety Continuum and reduces the regulatory burden on operations that are conducted under part 91 by relaxing when oxygen masks need to be worn. Further information is discussed in Section III of this preamble.

3. Baseline for the Analysis

Currently, when only one pilot is at the controls of a part 135 flight, that pilot must wear and use an oxygen mask above FL250. Part 91 requires one pilot to wear and use an oxygen mask if the pilot is the only pilot at the controls above FL350. With two pilots at the controls, one of those pilots must wear and use an oxygen mask above FL350 if operating under part 135, and above FL410 in part 91 operations. Operators may choose to fly below these thresholds to avoid using pilot oxygen, but would miss out on competing benefits to flying higher such as decreased fuel burn and avoiding weather or turbulence.[76] FAA assumes for this analysis the benefits of flying above the thresholds outweigh the costs of oxygen usage to operators, and so the regulatory analysis baseline is that applicable aircraft are currently operating above the flight levels at which using an oxygen mask is required. FAA currently lacks data to assess the number of applicable operations above the flight level thresholds, or if aircraft are operating below the thresholds solely to conserve pilot oxygen, and requests comment with supporting data.

4. Cost Savings

Under the regulatory baseline that aircraft are currently operating above oxygen mask use altitude thresholds, the primary effect of the proposed rule would be reduced utilization of pilot oxygen during normal flights, having the resulting benefit of requiring less frequent refill servicing. Oxygen tank size and capacity vary by model, and are filled according to their pressure specification. By virtue of using pressure to measure the refill of oxygen, it is difficult to measure the exact amount of oxygen consumed, and so refill services are usually charged as a flat fee. Cost can vary significantly by location, FAA market research indicates it can range between $100 to $400 per recharge, regardless of how much oxygen is refilled.[77]

Based on these estimates, FAA calculates the annual cost savings range for operators by multiplying the servicing cost with the amount of reduced oxygen recharges due to no longer needing to consume as much oxygen during normal flight. Without data on the current total number of oxygen refills or roughly how many flights typically occur between servicing, FAA is unable to estimate the exact reduction in refills and resulting cost savings this rule could generate. Instead, FAA estimates what a percentage point reduction in affected operations no longer requiring oxygen servicing saves applicable aircraft operators.

As a proxy for operations, FAA uses the total landings data for turbojets and multiengine turboprops from the 2023 General Aviation and Part 135 Activity Surveys.[78] Although the 2023 landing counts are the most current survey data, FAA acknowledges that the number of operations, and resulting cost savings, varies from year-to-year and may change in the future. FAA also notes this landing data is potentially an overcount, as it may include two-engine turboprops that are not capable of operating above the flight level thresholds requiring oxygen use. Based on the landing data, each percentage point reduction of the roughly 4.7 million general aviation and part 135 turbojet and multiengine turboprop operations per year no longer requiring oxygen servicing would save operators $4.7 million to $18.6 million in oxygen servicing fees annually. FAA calculates this based on one percent of the total operations, or 46,589 operations, multiplied by the $100 to $400 servicing cost. FAA requests comment, with supporting documentation, on the estimated price of oxygen servicing, potential reduction in the frequency of oxygen servicing operators would realize due to the proposed rule, and any other assumption or estimate.

5. Costs

The proposed rule would enable operation of aircraft under parts 91 and 135 to higher altitudes before requiring use of an oxygen mask, provided there are quick-donning masks available to the pilots. As discussed in section III.C. of the preamble, the likelihood of depressurization is considered ‘‘extremely improbable’’ and therefore would have no expected impacts to safety from the changes proposed in this rule and no resulting costs. The only resulting estimated effect of the proposed rule would be cost savings from reduced oxygen use and frequency of refill servicing, as discussed in the benefits section. With no other major changes from the baseline, FAA anticipates no effects that would have notable costs and welcomes comment on this assessment, along with any other assumption or estimate presented in the RIA.

B. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) of 1980, Public Law 96–354 (5 U.S.C. 601–612), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (Pub. L. 104–121) and the Small Business Jobs Act of 2010 (Pub. L. 111–240), requires Federal agencies to consider the effects of the regulatory action on small business and other small entities and to minimize any significant economic impact. The term ‘‘small entities’’ comprises small businesses and not-for-profit organizations that are independently owned and operated and are not dominant in their fields, and governmental jurisdictions with populations of less than 50,000.

As described in the RIA above, FAA estimates the effect of this proposed rule would be cost savings for operators requiring less frequent oxygen refill servicing. If an agency determines that a rulemaking will not result in a significant economic impact on a substantial number of small entities, the head of the agency may so certify under section 605(b) of the RFA. Therefore, as

[76] An Aircraft Owners and Pilots Association (AOPA) article on some of the benefits of flying at higher altitudes for part 91 aircraft can be found at *https://www.aopa.org/news-and-media/all-news/2025/june/pilot/flying-smart-the-benefits-of-getting-high.*

[77] For example, the Cessna Owner Organization notes that oxygen refill pricing varies by location and often costs $150 or more, found at *https://cessnaowner.org/how-to-fill-your-own-oxygen-cylinder/.*

[78] The 2023 total landings data for parts 91 and 135 turbojets and multiengine turboprops is found in table 2.3 of the 2023 General Aviation and Part 135 Activity Surveys, available at: *https://www.faa.gov/data_research/aviation_data_statistics/general_aviation/cy2023.*

provided in section 605(b) and based on the foregoing, the head of FAA proposes certifying that this rulemaking will not result in a significant economic impact for small entities. FAA welcomes comments on the basis for this proposed certification.

C. International Trade Impact Assessment

The Trade Agreements Act of 1979 (Pub. L. 96–39), as amended by the Uruguay Round Agreements Act (Pub. L. 103–465), prohibits Federal agencies from establishing standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Pursuant to these Acts, the establishment of standards is not considered an unnecessary obstacle to the foreign commerce of the United States, so long as the standard has a legitimate domestic objective, such as the protection of safety and does not operate in a manner that excludes imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards.

FAA has assessed the potential effect of this proposed rule and determined that it brings its regulations in line with international practices and does not exclude imports that meet this objective. As a result, FAA does not consider this proposed rule as creating an unnecessary obstacle to foreign commerce.

D. Unfunded Mandates Assessment

The Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1531–1538) governs the issuance of Federal regulations that require unfunded mandates. An unfunded mandate is a regulation that requires a State, local, or Tribal government or the private sector to incur direct costs without the Federal Government having first provided the funds to pay those costs. FAA determined that the proposed rule would not result in the expenditure of $187 million or more by State, local, or Tribal governments, in the aggregate, or the private sector, in any one year.

E. Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) requires that FAA consider the impact of paperwork and other information collection burdens imposed on the public. FAA has determined that there would be no new requirement for information collection associated with this proposed rule.

F. International Compatibility

In compliance with U.S. obligations under the Chicago Convention, FAA policy is to conform to ICAO SARPs to the maximum extent practicable. Therefore, FAA is revising its regulations under parts 91 and 135 to better align with ICAO Annex 6 SARPs for oxygen use. Annex 6 mandates that flight crewmembers in pressurized airplanes above 25,000 feet (376 hPa) have access to an oxygen mask that supplies oxygen on demand, but it does not require the masks to be worn continuously at any altitude. Currently, § 135.89 is stricter than the SARP. The proposed amendment to § 135.89 would still be more restrictive but would bring FAA regulations closer in alignment to the SARP. The proposed changes to § 91.211 would fully align FAA requirements with the SARP regarding mask usage. However, similar to the existing § 91.211, the proposed rule would remain less restrictive than the SARP by not requiring the installation of quick-donning masks; instead, it specifies that if such masks are not installed, one pilot must wear a mask above FL350.

G. Environmental Analysis

The Department has analyzed the environmental impacts of this notice of proposed rulemaking pursuant to the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321, *et seq.*). FAA has determined this rule is categorically excluded pursuant to FAA Order 1050.1G. Categorical exclusions are categories of actions FAA has determined normally do not significantly affect the quality of the human environment and therefore do not require either an environmental assessment (EA) or environmental impact statement (EIS).[79] In analyzing the applicability of a categorical exclusion, FAA must also consider whether extraordinary circumstances are present that would warrant the preparation of an EA or EIS.[80] This rulemaking, which proposes to raise the altitudes at which a pilot is required to don an oxygen mask for commuter and on demand operations, is categorically excluded pursuant to FAA Order 1050.1G, Appendix B, Paragraph B–2.6(f), which categorically excludes issuance of regulatory documents. FAA does not anticipate any environmental impacts, and there are no extraordinary circumstances present in connection with this rulemaking.

[79] See DOT Order 5610.1D § 9.

[80] Id. § 9(b).

VI. Executive Order Determinations

A. Executive Order 13132, Federalism

FAA has analyzed this proposed rule under the principles and criteria of E.O. 13132, Federalism. FAA has determined that this action would not have a substantial direct effect on the States, or the relationship between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of government, and, therefore, would not have federalism implications.

B. Executive Order 13175, Consultation and Coordination With Indian Tribal Governments

Consistent with E.O. 13175, Consultation and Coordination with Indian Tribal Governments,[81] and FAA Order 1210.20, American Indian and Alaska Native Tribal Consultation Policy and Procedures,[82] FAA ensures that Federally Recognized Tribes (Tribes) are given the opportunity to provide meaningful and timely input regarding proposed Federal actions that have the potential to affect uniquely or significantly their respective Tribes. At this point, FAA has not identified any unique or significant effects, environmental or otherwise, on Tribes resulting from this proposed rule.

C. Executive Order 13211, Regulations That Significantly Affect Energy Supply, Distribution, or Use

FAA analyzed this proposed rule under E.O. 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use. FAA has determined the proposed rule change would not be a ''significant energy action'' under the Executive order and would be unlikely to have a significant adverse effect on the supply, distribution, or use of energy.

D. Executive Order 13609, Promoting International Regulatory Cooperation

E.O. 13609, Promoting International Regulatory Cooperation, promotes international regulatory cooperation to (1) meet shared challenges involving health, safety, labor, security, environmental, and other issues and reduce, eliminate, or (2) prevent unnecessary differences in regulatory requirements. FAA has analyzed this action under the policy and agency responsibilities of E.O. 13609. FAA has determined this action would reduce differences between U.S. aviation standards and those of other civil

[81] 65 FR 67249 (Nov. 6, 2000).

[82] FAA Order No. 1210.20 (Jan.28, 2004), available at *www.faa.gov/documentLibrary/media/1210.pdf.*

aviation authorities by aligning with the ICAO Standards for Use of Oxygen found in Annex 6, Part I, Section 4.4.5. Currently, § 135.89 is more restrictive than the ICAO standard. Amending § 135.89 as proposed would still be more restrictive than ICAO Annex 6, Part I, but would bring it closer to the ICAO standard. Similarly, § 91.211 is currently more restrictive than the ICAO Standards for general aviation outlined in Annex 6, Part II, Attachment 2.A. However, the proposed amendment would align it more closely with the ICAO Standard.

E. Executive Order 14192, Unleashing Prosperity Through Deregulation

This proposed rule, if finalized as proposed, is expected to be an E.O. 14192 deregulatory action.

VII. Additional Information

A. Comments Invited

FAA invites interested persons to participate in this rulemaking by submitting written comments, data, or views. FAA also invites comments relating to the economic, environmental, energy, or federalism impacts that might result from adopting the proposals in this document. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. To ensure the docket does not contain duplicate comments, commenters should submit only one time if comments are filed electronically, or commenters should send only one copy of written comments if comments are filed in writing.

FAA will file in the docket all comments it receives, as well as a report summarizing each substantive public contact with FAA personnel concerning this proposed rulemaking. Before acting on this proposal, FAA will consider all comments it receives on or before the closing date for comments. FAA will consider comments filed after the comment period has closed if it is possible to do so without incurring expense or delay. FAA may change this proposal in light of the comments it receives.

Privacy: In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its rulemaking process. DOT posts these comments, without edit, including any personal information the commenter provides, to *https://www.regulations.gov,* as described in the system of records notice (DOT/ALL–14 FDMS), which can be reviewed at *https://www.dot.gov/privacy.*

B. Confidential Business Information

Confidential Business Information (CBI) is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as ''PROPIN.'' FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this NPRM. Submissions containing CBI should be sent to the person in the **FOR FURTHER INFORMATION CONTACT** section of this document. Any commentary FAA receives which is not specifically designated as CBI will be placed in the public docket for this rulemaking.

C. Electronic Access and Filing

A copy of this NPRM, all comments received, any final rule, and all background material may be viewed online at *https://www.regulations.gov* using the docket number listed above. Electronic retrieval help and guidelines are available on the website. It is available 24 hours each day, 365 days each year. An electronic copy of this document may also be downloaded from the Office of the Federal Register's website at *https://www.federalregister.gov* and the Government Publishing Office's website at *https://www.govinfo.gov.* A copy may also be found at FAA's Regulations and Policies website at *https://www.faa.gov/regulations_policies.*

Copies may also be obtained by sending a request to the Federal Aviation Administration, Office of Rulemaking, ARM–1, 800 Independence Avenue SW, Washington, DC 20591, or by calling (202) 267–9677. Commenters must identify the docket or notice number of this rulemaking.

All documents FAA considered in developing this proposed rule, including economic analyses and technical reports, may be accessed in the electronic docket for this rulemaking.

D. Small Business Regulatory Enforcement Fairness Act

The Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 requires FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within its jurisdiction. A small entity with questions regarding this document may contact its local FAA official or the person listed under the **FOR FURTHER INFORMATION CONTACT** heading at the beginning of the preamble. To find out more about SBREFA on the internet, visit *https://www.faa.gov/regulations_policies/rulemaking/sbre_act/.*

List of Subjects

14 CFR Part 91

Air carriers, Aircraft, Air taxis, Airmen, Aviation safety, Charter flights.

14 CFR Part 135

Air taxis, Aircraft, Airmen, Aviation safety.

The Proposed Amendment

For the reasons discussed in the preamble, the Federal Aviation Administration proposes to amend 14 CFR chapter I as follows:

PART 91—GENERAL OPERATING AND FLIGHT RULES

■ 1. The authority citation for part 91 continues to read as follows:

Authority: 49 U.S.C. 106(f), 40101, 40103, 40105, 40113, 40120, 44101, 44111, 44701, 44704, 44709, 44711, 44712, 44715, 44716, 44717, 44722, 46306, 46315, 46316, 46504, 46506–46507, 47122, 47508, 47528–47531, 47534; Pub. L. 114–190, 130 Stat. 615 (49 U.S.C. 44703 note); sec. 828 of Pub. L. 118–63, 138 Stat. 1330 (49 U.S.C. 44703 note); articles 12 and 29 of the Convention on International Civil Aviation (61 Stat. 1180), (126 Stat. 11).

■ 2. Amend § 91.211 by revising paragraph (b) to read as follows:

§ 91.211 Supplemental oxygen.

* * * * *

(b) *Pressurized cabin aircraft.* (1) No person may operate a civil aircraft of U.S. registry with a pressurized cabin at flight altitudes above flight level 250 unless at least a 10-minute supply of supplemental oxygen, in addition to any oxygen required to satisfy paragraph (a) of this section, is available for each occupant of the aircraft for use in the event that a descent is necessitated by loss of cabin pressurization.

(2) No person may operate a civil aircraft of U.S. registry with a pressurized cabin at flight altitudes above flight level 350 unless one pilot at the controls of the aircraft is wearing and using an oxygen mask that is secured and sealed and that either supplies oxygen at all times or automatically supplies oxygen

whenever the cabin pressure altitude of the aircraft exceeds 14,000 feet (MSL), except that the one pilot need not wear and use an oxygen mask if each pilot has a quick-donning type of oxygen mask that can be placed on the face with one hand from the ready position within five seconds, supplying oxygen and properly secured and sealed.

PART 135—OPERATING REQUIREMENTS: COMMUTER AND ON-DEMAND OPERATIONS AND RULES GOVERNING PERSONS ON BOARD SUCH AIRCRAFT

■ 3. The authority citation for part 135 continues to read as follows:

Authority: 49 U.S.C. 106(f), 40113, 41706, 44701–44702, 44705, 44709, 44711–44713, 44715–44717, 44722, 44730, 45101–45105; Pub. L. 112–95, 126 Stat. 58 (49 U.S.C. 44730).

■ 4. Amend § 135.89 by revising paragraphs (b)(2) introductory text, (b)(3) and (b)(4) to read as follows:

§ 135.89 Pilot requirements: Use of oxygen.

* * * * *

(b) * * *

(2) Whenever a pressurized aircraft is operated at altitudes above flight level 250 through flight level 350, unless each pilot has an approved quick-donning type oxygen mask—

* * * * *

(3) Whenever a pressurized aircraft is operated at altitudes above flight level 410, at least one pilot at the controls must wear, secured and sealed, an oxygen mask required by paragraph (b)(2)(i) of this section.

(4) Whenever only one pilot is at the controls of an aircraft when operating above flight level 350, that pilot shall put on and use an approved oxygen mask.

Issued under authority provided by 49 U.S.C. 106(f), 44701(a), and section 834 of Public Law 118–63 in Washington, DC.

Hugh J. Thomas,

Executive Director, Flight Standards Service.

[FR Doc. 2026–19584 Filed 9–23–26; 8:45 am]

BILLING CODE 4910–13–P

CONSUMER PRODUCT SAFETY COMMISSION

16 CFR Part 1120

[CPSC Docket No. CPSC–2026–0463]

Substantial Product Hazard List: Amendments to Requirements for Window Covering Cords

AGENCY: Consumer Product Safety Commission.

ACTION: Notice of proposed rulemaking.

SUMMARY: To address window covering cord strangulation risks, the Commission proposes to designate certain window coverings a substantial product hazard. These include products with: accessible free hanging operating cords longer than 8 inches on custom window coverings; exposed continuous loops with and without tension devices on custom horizontal blinds; exposed continuous loops without tension devices on other custom window coverings; lack of a warning on exposed continuous loops and single retractable cords on custom window coverings; presence of stroke lengths longer than 36 inches on single retractable cord lift systems on custom window coverings; and a cord loop lift system on stock or custom roll up style shades.

DATES: Written comments must be received by November 23, 2026.

ADDRESSES: Submit comments, identified by Docket No. CPSC–2026–0463, by any of the following methods:

Electronic Submissions: Submit electronic comments to the Federal eRulemaking Portal at: *https://www.regulations.gov.* Follow the instructions for submitting comments. CPSC typically does not accept comments submitted by email, except through *www.regulations.gov.* CPSC encourages you to submit electronic comments by using the Federal eRulemaking Portal, as described above.

Confidential Written Submissions: If you wish to submit confidential business information, trade secret information, or other sensitive or protected information that you do not want to be available to the public, you may submit such comments by email to *cpsc-os@cpsc.gov.*

Instructions: All submissions must include the agency name and docket number. CPSC may post all comments without change, including any personal identifiers, contact information, or other personal information provided, to *https://www.regulations.gov.* Do not submit through this website: Confidential business information, trade secret information, or other sensitive or protected information that you do not want to be available to the public. If you wish to submit such information, please submit it according to the instructions for confidential written submissions.

Docket: For access to the docket to read background documents or comments received, go to: *https://www.regulations.gov,* and insert the docket number, CPSC–2026–0463, into the ''Search'' box, and follow the prompts.

FOR FURTHER INFORMATION CONTACT: Rana Balci-Sinha, Director, Division of Human Factors, Directorate for Engineering Sciences, Office of Risk Reduction, Consumer Product Safety Commission, National Product Testing and Evaluation Center, 5 Research Place, Rockville, MD 20850; Telephone: 301–987–2584; Email: *rbalcisinha@cpsc.gov.*

SUPPLEMENTARY INFORMATION:

I. Product Description

Window coverings include a wide range of products, such as shades, blinds, curtains, and draperies. Generally, the industry considers blinds as ''hard'' window coverings, made of slats or vanes, and considers shades as ''soft'' window coverings, typically made of a continuous roll of material. Window coverings are produced as either ''stock'' products or ''custom'' products. ''Stock'' window coverings are completely or substantially fabricated prior to being distributed in commerce, while a ''custom'' window covering does not meet this definition and is not substantially fabricated prior to being distributed in commerce. Types of window covering products include, but are not limited to, horizontal blinds and vertical blinds that are composed of ''hard'' slats or vanes that are raised and lowered or traversed; cellular shades, pleated shades, roll up style shades, roller shades, Roman style shades, and sheer shades, all of which are composed of a continuous roll of material that is raised and lowered.

A key hazard arises from accessible window covering cords that are longer than 8 inches because children can wrap such cords around their necks, or insert their heads into a looped cord, and strangle. A cord or loop that consumers use to manipulate a window covering, such as to lift and lower the window covering, is called an ''operating cord'' and may be in the form of a single cord, multiple cords, or continuous loops. ''Inner cords'' transfer forces from operating cords to the components during operation. Cord loop lift systems work to raise a roll up style shade with the assistance of an operating cord. Both blinds and shades may have inner cords to raise, lower, or rotate the window covering to achieve a consumer's desired level of light control.[1]

[1] Manufacturers use inner cords on window coverings to open and close blinds and shades, using a variety of mechanisms, including traditional operating cords, motors, or spring-loaded systems, to manipulate inner cords. Curtains and draperies do not contain inner cords, but consumers can operate curtains and draperies using a continuous loop operating cord or a wand.