

DEPARTMENT OF TRANSPORTATION**Federal Aviation Administration****14 CFR Part 25**

[Docket No. 27704, Amdt. No. 25-89]

RIN 2120-AD47

Allowable Carbon Dioxide Concentration in Transport Category Airplane Cabins**AGENCY:** Federal Aviation Administration (FAA), DOT.**ACTION:** Final rule.

SUMMARY: This amendment revises the standards for maximum allowable carbon dioxide (CO₂) concentration in occupied areas of transport category airplanes by reducing the maximum allowable concentration from 3 percent to 0.5 percent. This action is in response to a recommendation from the National Academy of Sciences to review the CO₂ limit in airplane cabins, and provides a cabin CO₂ concentration level representative of that recommended by some authorities for buildings.

EFFECTIVE DATE: January 2, 1997.**FOR FURTHER INFORMATION CONTACT:**

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SUPPLEMENTARY INFORMATION:**Background**

This amendment is based on Notice of Proposed Rulemaking No. 94-14, published in the Federal Register on May 2, 1994 (59 FR 22718). As discussed in that notice, this action reduces the maximum allowable carbon dioxide concentration level from 3 percent to 0.5 percent.

In October 1984, the Department of Transportation was directed by Congress (Public Law 98-466) to commission the National Academy of Sciences (NAS) to conduct an independent study on the cabin air quality in transport category airplanes. The NAS formed the Committee on Airliner Cabin Air Quality to study all safety aspects of airliner cabin air quality, and submitted its report, "The Airliner Cabin Environment—Air Quality And Safety," to the FAA on August 12, 1986. One of the recommendations in the report relates to the allowable carbon dioxide (CO₂) concentration in the airplane cabin. This action is a result of that recommendation. For the purposes of

this rule, the term "cabin" is meant to include the passenger cabin, the flight deck, lower lobe galleys, crew rest areas, and any other areas occupied by passengers or crew members in a transport category airplane.

Discussion

Carbon dioxide is the product of normal human metabolism, which is the predominant source in airplane cabins. The CO₂ concentration in the cabin depends on the ventilation rate, the number of people present, and their individual rates of CO₂ production, which varies with activity and (to a smaller degree) with diet and health. Carbon dioxide is also generated by sublimation of dry ice used to cool food in the galleys, and to preserve certain cargo carried in the cargo compartments. The carbon dioxide concentration level is frequently used as an indication of general air quality. At concentrations above a given level, complaints of poor air quality or "stiffness" begin to appear.

The maximum CO₂ limit of § 25.831(b)(2) of the Federal Aviation Regulations (FAR) is 3 percent by volume, sea level equivalent. This 3 percent limit was incorporated into § 4b.371 of the Civil Air Regulations (CAR) by Amendment 4b6 on March 5, 1952. This limit was carried over into 14 CFR part 25 when this part was codified in 1965. This high limit was established to allow for increases in the carbon dioxide levels in the crew compartment to ensure that, in airplanes with built-in carbon dioxide fire extinguishing systems, safe carbon dioxide concentration levels would not be exceeded in the occupied areas when combating fires in cargo compartments.

The American Conference of Governmental Industrial Hygienists (ACGIH) has adopted a short-term exposure limit (STEL) for CO₂ of 30,000 parts per million (3 percent). The 3 percent limit specified in part 25 may therefore be satisfactory as a short-term limit, but is inappropriate for a steady-state condition. However, the NAS Committee notes in their report that this 3 percent limit is much higher than the limits adopted by the air conditioning industry for buildings and other types of interior environments, and recommends that the limit specified in part 25 be revised to more closely match the currently acceptable limits. The FAA concurs.

In contrast to the 3 percent limit specified in part 25, the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), in their Standard 62-1989, recommends an outside air ventilation rate of 15

cubic feet per minute for vehicles. Based on the ASHRAE calculations, this equates to a CO₂ limit of 1,000 parts per million (PPM), or 0.1 percent, if the occupants have a low physical activity level. As most of the airplane occupants are passengers who are not active, this is a reasonable parallel. ASHRAE standards such as the 0.1 percent CO₂ limit are frequently quoted in magazine and newspaper articles when reporting on airliner cabin air quality.

As CO₂ concentration in the air increases, there is an increase in both the rate and the depth of breathing, reaching twice the normal rate at 3 percent concentration. At 3 percent concentration, there is some discomfort; at higher concentrations, headache, malaise, and, occasionally, fatigue occur, and the air is reported by those affected as being stale. People can function for long periods of time at levels of CO₂ as high as 1 percent (as in nuclear submarines), but it is generally felt by ASHRAE that 0.1 percent is a better limit. This value, however, is based on the dissipation of smoke and odors and not on health considerations. As noted above, according to ASHRAE Standard 62-1989, a steady-state CO₂ concentration of 0.1 percent would require a fresh-air ventilation rate of 15 cubic feet per minute (cfm) per person. In the previous edition of the standard (62-1981), ASHRAE recommended a limit of 0.5 percent for office buildings and other occupied spaces, but suggested that 0.25 percent would provide an additional safety factor. The ASHRAE standard is intended to be used as a comfort standard rather than a health and safety standard. ASHRAE has recognized that the 0.1 percent CO₂ concentration limit may not be appropriate for airliner cabins, and has formed an aviation subcommittee, the charter of which is to develop a transport airplane cabin air quality standard. While this subcommittee is not an FAA advisory committee, industry often uses ASHRAE standards in designing systems. The subcommittee will sponsor research studies to determine the quality of the ambient air and quantify the correlation between measurable contaminants and passenger perception of air quality. As noted above, ASHRAE standards were intended to be used for buildings rather than vehicles such as airplanes, and they consider it appropriate to establish a new standard for airplanes at this time.

The Occupational Safety and Health Administration (OSHA), in § 1910.1000 of part 1910 (CFR 29), sets an interim (transitional) limit for CO₂ at 5,000 ppm or 0.5 percent, with a final rule limit of

10,000 ppm or 1 percent, effective December 31, 1993. The increase to 1 percent is apparently in deference to operators of commercial bakeries and breweries, both of which generate a significant amount of CO₂ in their processes. The FAA does not believe it is appropriate to base the allowable CO₂ concentration in transport category airplanes on the needs of specific manufacturing processes. Other commercial enterprises have no difficulty in meeting the existing OSHA limit of 0.5 percent.

The American Conference of Governmental Industrial Hygienists, in its "Documentation of the Threshold Limit Values and Biological Exposure Indices—Sixth Edition," also recommends 0.5 percent as a limit, but ACGIH recommends this value as a time-weighted average limit for repeated daily exposure by workers. The FAA is adopting this value as a limit. A concentration limit of 0.5 percent is considered to be appropriate because there are no documented safety or health benefits associated with the establishment of a lower value.

Copies of the pertinent documents from ASHRAE, OSHA, and ACGIH have been placed in the public docket for this rulemaking.

Cabin ventilation provides air for dilution of airborne contaminants, and supplies oxygen for passengers and crew. Oxygen requirements for sedentary adults can be met with a fresh-air ventilation rate of only 0.24 cubic feet per minute (CFM) per person. Ventilation rates for current transport category airplanes vary from a low of approximately 7 cfm per person (with one or more air conditioning packs turned off for economy), to over 20 cfm per person (which includes up to 50 percent filtered, recirculated air). Thus, even at the lowest ventilation rates available on current airplanes, there is no significant reduction in the percentage of oxygen, or increase in the amount of water vapor in the cabin due to respiration. However, the design parameters for the ventilation systems are driven by operation on the ground during hot days. Contamination of air with CO₂ varies inversely with the ventilation rate, because CO₂ production by sedentary people is nearly constant.

In order to bring the maximum allowable carbon dioxide concentration into concert with accepted modern limits, this rule adopts a new maximum allowable carbon dioxide concentration of 0.5 percent. According to ASHRAE, for sedentary people this concentration can be maintained by a fresh air flow rate of 2.25 cfm per person, which is

lower than that currently measured in transport category airplanes.

Section 25.831(b)(2) currently reads, "Carbon dioxide in excess of three percent . . . is considered hazardous in the case of crewmembers." The health and comfort considerations discussed earlier are equally valid for passengers. Therefore, the FAA has removed the reference to crewmembers. In addition, § 25.831(b)(2) also specifies that, "Higher concentrations of carbon dioxide may be allowed in crew compartments if appropriate protective breathing equipment is available." This sentence was incorporated when the 3 percent limit was established in CAR 4b.371 in 1952. As noted above, the origins of the 3 percent limit are unclear, but it is likely that the limit was set at this high level to account for the discharge of CO₂ fire extinguishers in the flight deck, cabin, or cargo compartment. This thesis is supported by the mention of protective breathing in the existing rule. However, most CO₂ extinguishers have been replaced by Halon or other types of fire extinguishers. Further, the rule is not intended to cover the short-duration rise in CO₂ concentration that would accompany discharge of a fire extinguisher. Therefore, that sentence in § 25.831(b)(2) is removed because it is no longer considered necessary or appropriate.

Section 25.831(b)(1) specifies a limit for carbon monoxide (CO) concentration of 1 part in 20,000 parts air (0.005 percent). This limit is the same as currently recommended by ASHRAE and the Occupational Safety and Health Administration (OSHA), and therefore this action does not change this limit.

Discussion of Comments

Comments were received from foreign and domestic airplane manufacturers through their respective trade associations, foreign airworthiness authorities, trade organizations representing flight attendants and US and Canadian pilots, one US operator, an organization representing airline passengers, and several individuals.

Two commenters support the proposed change as it appears in the notice. Five commenters wrote to register dissatisfaction with the air quality on airplanes, mentioning both comfort for passengers and illnesses believed to be associated with inadequate fresh air flow. One commenter urges the FAA to "make the changes necessary so that we can fly in reasonable health." Another commenter is of the opinion that "very poor recirculation of air in planes is costing a lot of money in medical terms, not to

mention suffering." Two commenters state that the FAA should perform tests on existing airplanes. The FAA infers from these comments that the commenters are in favor of revising the requirements to ensure acceptable air quality. Studies conducted by the FAA and others do not indicate that there is a health hazard associated with cabin air quality. As none of these commenters suggest specific changes to the proposal, there are no changes to the final rule in response to the comments.

One commenter misread the proposal as to the allowable concentration currently in the regulations and that proposed in the notice. This commenter states that the standards for cabin air quality should be better than the standard set for buildings, because the population density is higher in an airplane, and in an office building people may exit periodically. While the commenter made no specific recommendations, the FAA infers that the commenter advocates lower limits than proposed in the notice. The FAA does not concur that these factors justify a requirement for a lower carbon dioxide concentration. The existing standards are all based on a ventilation rate per occupant. To meet the same requirements with a higher population density, a greater volume of fresh air ventilation is required. It is not clear how this concern can be addressed by the airline industry or the FAA when the studies conducted indicate that the air quality in airplanes does not present a hazard to the health of the travelers.

Two commenters state that the proposed 0.5 percent carbon dioxide concentration limit is too high. One commenter suggests that the FAA "set a limit of 800 parts per million (ppm), the same level proposed by the Occupational Safety and Health Administration for indoor air quality," which is 0.08 percent. Another commenter recommends that the FAA adopt an airplane cabin carbon dioxide maximum concentration of 0.1 percent. Both commenters express concerns about the effect of higher carbon dioxide levels and increased recirculation on the spread of disease and on people with respiratory difficulties. One commenter notes that concentrations above 0.1 percent may result in complications for persons with an existing respiratory difficulty, noting that 12.4 million Americans have asthma.

Another commenter states that flight attendants who are repeatedly exposed to carbon dioxide levels above 0.1 percent develop a tolerance, while passengers do not. Another commenter states that flight attendants are at a greater risk because of this same

repeated exposure. The FAA does not concur with these views. The documented studies contained in the docket for this rule indicate that the air quality currently present in the airliner cabins is comparable to that found in other indoor environments. The OSHA recommendation proposed in the Federal Register on April 5, 1994 (59 FR 16035), which has not been adopted at this time, addresses the carbon dioxide concentration as a comfort factor to be used in determining the need to verify proper operation of heating and ventilating equipment. Further, this proposal addresses non-industrial work environments and specifically excludes vehicles. A copy of the OSHA proposed amendment has been included in the docket for this rulemaking. There is no evidence that concentrations up to 0.5 percent present any health hazard in terms of general health or the spread of disease. In the economic evaluation conducted by the FAA, the higher costs associated with requiring a carbon dioxide concentration limit below 0.5 percent do not present a favorable cost/benefit ratio and cannot be justified. Further, there appears to be no specific concentration level, even at levels down to 0.1 percent, at which at least some passengers might not be affected. This rule, which will be contained in the airworthiness requirements of part 25, is intended to provide safe flight and landing for transport category airplanes. Because carbon dioxide in concentrations below 0.5 percent do not have adverse safety effects, the FAA has determined that a concentration limit of 0.5 percent provides a reasonable balance between cost and benefit, and provides a significant improvement over the existing allowable concentration.

Several commenters note that the OSHA and ACGIH standards are for an average concentration over a specific time period. ACGIH, for instance, recommends 5,000 ppm (0.5 percent) as a time-weighted average for a normal 8-hour workday or a 40-hour workweek. They note in their 1991 report that Australia, Germany, Sweden, and the United Kingdom all recommend a time-weighted value of 0.5 percent for carbon dioxide concentration. OSHA's limits also reflect the average airborne exposure in any 8-hour work shift of a 40-hour workweek. The FAA infers that the commenters advocate providing both a time weighted and a short term concentration limit. The FAA does not concur that the carbon dioxide level should be averaged over the entire flight for several reasons. Many flights exceed eight hours in duration, and the occupants are not able to leave the

airplane as are workers in an office. Also, there are added stresses involved in being in an airplane cabin. The cabin pressure altitude is significantly above sea level, usually at 6,000 to 8,000 feet. The relative humidity is lower than is usually found in ground-based environments. There are unquantified stresses associated with being in a crowded airplane cabin. Many people experience anxiety from the mere fact that they are aloft. While most of these factors cannot be controlled, the FAA has determined that the present part 25 limit on carbon dioxide concentration does not reflect industry standards and should be reduced accordingly.

One commenter suggests that the average concentration should be limited to 0.5 percent, but "a limit of 3 percent by volume (sea level concentration) may be allowed for short term durations." The commenter points out that the 3 percent limit for short term durations corresponds to the short term exposure limit (STEL) adopted by the ACGIH, and having two limits should be similar to the two limits on cabin ozone concentration specified in § 25.832. Again, the FAA does not concur. The adverse health and safety effects of ozone are defined in available literature and § 25.832 of the FAR addresses that concern. There appears to be no reason to phrase the two requirements similarly.

The FAA has determined, however, that some short term excursions to values higher than 0.5 percent at some locations in the airplane may occur during normal, inflight operations when airplane pressurization and air conditioning systems are controlling the environment in the cabin. One commenter notes that the area in close proximity to the galley may experience higher carbon dioxide levels because meals are often cooled by dry ice, which releases gaseous carbon dioxide. Another commenter states that cabin air can be contaminated on the ground by exhaust ingestion or self ingestion during certain wind conditions. The FAA does not agree that this presents a problem. In one survey, conducted by the Harvard University School of Public Health, carbon dioxide levels were measured during boarding and deboarding operations. The typical levels reported were 2,000 to 2,550 ppm, or 0.2 to 0.25 percent, well below the 0.5 percent proposed by the FAA. However, the FAA does concur that it is not appropriate for the certification standards to apply to operations on the ground when the airplane systems are not operating (e.g., at the gate or during "push-back"). The final rule is changed to reflect this determination.

The same commenter expresses concern that the use of carbon dioxide hand-held fire extinguishers in the cabin could result in local concentrations exceeding 0.5 percent, noting that the present Halon extinguishers might be replaced by carbon dioxide devices now that production of Halon is banned, and suggests a higher short-term exposure limit. The FAA does not concur that this is a justification for a higher limit. The use of carbon dioxide fire extinguishers is not envisioned, although there are no prohibitions against their use in airplanes. When Halon is no longer available, the replacement extinguishers will be required to be safe in the concentrations predicted for use in occupied areas. Further, the use of fire extinguishers in the cabin is, by its nature, an emergency situation. This is not, in the context of the previous paragraph, normal in-flight operations. Therefore, there appears to be no need for the higher limit on carbon dioxide.

Two commenters state that the utilization of building criteria for establishing carbon dioxide concentration limits for airplane cabins is not appropriate. Both commenters add that the statement in the proposal that concentrations above 0.5 percent are hazardous is not justifiable. The FAA concurs with the general statement that carbon dioxide concentrations above 0.5 percent may not be hazardous for most people. Many standards in use today allow higher concentrations. As noted by one commenter, the World Health Organization considers 12,000 ppm (1.2 percent) to be a safe level. In any case, the final rule has been changed and no longer contains the word "hazardous." Both of these commenters note that the rule, as proposed, would limit carbon dioxide concentrations in lower lobe galleys, accessible cargo compartments where animals are carried, cockpits, and other occupied areas. They express concern that local carbon dioxide concentrations in the galley areas where food is cooled with dry ice might exceed 0.5 percent. The FAA concurs in part with these comments. The ventilation requirements associated with this rule change are intended to address areas that are normally occupied. Cargo compartments accessible in flight, whether in all cargo or "combi" airplanes with main deck cargo compartments, are not "normally occupied." The final rule has been changed to reflect this determination.

One commenter disagrees with the statement in the preamble of the proposed rule that "This low ventilation rate is also sufficient to dissipate the water vapor * * *," noting that water

buildup in insulation blankets is significant with present airplane fresh air inflow rates, especially in hot day ground conditions. The FAA concurs and the statement has been removed from the preamble. In stating this view, the commenter did not recommend any changes in the rule.

One commenter states that the term "sea level equivalent" should be clarified. The commenter suggests that the clarification include technical and/or medical rationale, including referenced sources, and provide an explanation of the methodology by which this value is to be calculated. If this rationale is not provided, the commenter states that the FAA should delete the phrase. The FAA does not concur that the term "sea level equivalent" is not defined, although the definition appears in reference to another gas. In FAA Advisory Circular 120-38, "Transport Category Airplanes Cabin Ozone Concentrations," sea level equivalent is defined as " * * * concentration in ppmv referenced to standard conditions of 25° C and 760 millimeters of mercury pressure." Based on this definition, and calculations provided in the AC, the maximum measured concentration, sea level equivalent, for a cabin altitude of 8,000 feet would be 0.5 percent multiplied by 0.74 (the ratio of air pressure at 8,000 feet to air pressure at sea level), or 0.37 percent. Values of this ratio for other cabin altitudes are provided in the AC. As the term sea level equivalent is defined, the rule is adopted as proposed.

The same commenter also notes that the statement in the preamble that control of carbon dioxide buildup due to respiration is the factor that dictates the design parameters for ventilation systems is incorrect. Operation on the ground during high ambient temperatures generally dictates the ventilation system design parameters. The FAA concurs and the preamble has been changed accordingly.

One commenter recommends that the new standards for carbon dioxide concentration not be applied to all-cargo airplanes. The commenter notes that measured carbon dioxide levels on the flight decks of these airplanes are well below both the current standard and that proposed in Notice 94-14. The commenter goes on to state that lowering the limit on carbon dioxide is a comfort issue, and would place a burden on the manufacturers of transport category airplanes that is not commensurate with any safety benefit that might result. The FAA does not concur. As noted elsewhere in this preamble, the FAA has determined that

the existing concentration limit of 3 percent for carbon dioxide is not appropriate because many passengers and crewmembers are adversely affected at that level. The lower levels adopted by this amendment will provide a standard that, when met, will ensure that passengers and crewmembers, including those on all-cargo airplanes, will not be subjected to levels of carbon dioxide that would reduce their ability to perform their assigned duties. There are no costs associated with lowering the limit as proposed.

With the exception of the changes noted above, this final rule is adopted as proposed in Notice 94-14.

Regulatory Evaluation

Changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs Federal agencies to promulgate new regulations or modify existing regulations only if the potential benefits to society justify its costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic impact of regulatory changes on small entities. Finally, the Office of Management and Budget directs agencies to assess the effects of regulatory changes on international trade. In conducting these assessments, the FAA has determined that this rule: (1) will generate benefits exceeding its costs and is not "significant" as defined in Executive Order 12866; (2) is not "significant" as defined in DOT's Policies and Procedures; (3) will not have a significant impact on a substantial number of small entities; and (4) will not constitute a barrier to international trade. These analyses, available in the docket, are summarized below, following FAA's disposition of comments on the economic aspects of the NPRM.

Response to Comments

One commenter calculates that it would cost about \$0.076 per person per hour to provide 100 percent fresh air in the cabin of a typical 300-seat widebody airplane. The FAA disagrees with this commenter and estimates that the cost of 100 percent fresh air would be \$0.095 per person per hour.

Another commenter states that the FAA did not account for the potential costs of applying the rule to all occupiable sections of the airplane because it evaluated only the passenger cabin area and ignored the flight deck and lower lobe galleys. The FAA concurs in part with this comment. The carbon dioxide concentration requirements are intended to apply to areas that are normally occupied. The

final rule has been changed to reflect this intent. Thus, the commenter's statement does not alter the FAA's economic analysis.

Another commenter states that the FAA did not evaluate the possibility that ground-air contamination (ingestion of other airplanes' exhausts) may temporarily push the CO₂ level above the 0.5 percent limit. The FAA does not agree that this presents a problem. In one survey, conducted by the Harvard University School of Public Health, CO₂ levels were measured during boarding and deboarding operations. The typical levels reported were 0.2 percent to 0.25 percent, well below the 0.5 percent in this rule. However, the FAA does concur that it is not appropriate for the certification standards to apply to ground operations when the airplane systems are not functioning. As a result, the final rule has been changed to reflect this determination. Consequently, there is no economic impact as a result of this remote possibility.

Two commenters state that if live animal cargo areas are included under the definition of "inhabited" areas, there would be considerable potential costs. The FAA partly concurs with these comments in that cargo compartments accessible in flight, whether in all cargo or "combi" airplanes with main deck cargo compartments, are not normally occupied and the final rule has been changed to reflect this determination. As a result, there is no economic impact from excluding live animal cargo areas from this rule.

Costs

Airplane cabin CO₂ levels can be reliably calculated from the number of passengers and the ventilation rate. In addition, engineering analyses have determined the amount of fuel used to provide a unit ventilation rate. These functional relationships allow the calculation of the costs to maintain a given cabin CO₂ level. The FAA estimates that the 3 percent CO₂ limit under the current rule costs about 0.27 cents per person per hour while the new 0.5 percent limit will cost about 1.7 cents per person per hour. Thus, the amended limit constitutes a 1.43 cent increase per person per hour, or about \$4,475 per (newly certificated) airplane per year.

In point of fact, however, the ventilation rates in current transport category airplanes currently maintain cabin CO₂ levels below 0.5 percent. As the FAA expects that the minimum ventilation rates of future aircraft designs will also maintain CO₂ levels below 0.5 percent in order to control

odors, temperature, water vapor, etc., no actual incremental costs or benefits will result from the rule change. However, codification of this limit will ensure that future designs maintain the 0.5 percent level.

Benefits

Although outdoor air contains CO₂ at the 0.03 percent level, CO₂ may produce respiratory center stimulation, mild narcotic effects, and asphyxiation under high levels and high exposure duration. At concentrations of 2 to 3 percent, CO₂ can produce headaches, breathing difficulty, and increases in blood pressure and pulse. By comparison, no ill-effects have been observed at the 0.5 percent level.

Cost-Benefit Comparison

From a strict cost-benefit evaluation of the rule change itself, isolated from actual practice, the FAA concludes that it would cost about 1.43 cents per person per hour to increase the ventilation to reduce cabin CO₂ levels from 3 percent to 0.5 percent. By comparison, this reduction eliminates the cabin CO₂ levels known to produce headaches, breathing difficulty, and increases in blood pressure and pulse. While no precise economic value has been assigned to the benefit from avoiding these ill effects, the FAA has determined that they are worth more than 1.43 cents per person per hour.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily or disproportionately burdened by Government regulations. The RFA requires a Regulatory Flexibility Analysis if a proposed or final rule would have a significant economic impact, either detrimental or beneficial, on a substantial number of small entities. FAA Order 2100.14A, Regulatory Flexibility Criteria and Guidance, prescribes standards for complying with RFA review requirements in FAA rulemaking actions. The Order defines "small entities" in terms of size, "significant economic impact" in terms of annualized costs, and "substantial number" as eleven or more and which is more than one-third of the small entities subject to the proposed or final rule.

The final rule would affect manufacturers of transport category airplanes produced under future new airplane type certificates. For manufacturers, Order 2100.14A defines a small entity as one with 75 or fewer employees. Since no part 25 airplane manufacturer has 75 or fewer employees, the rule would not have a significant economic impact on a substantial number of small entities.

International Trade Impact Assessment

As the certification rules apply to both foreign and domestic manufacturers that market airplanes in the United States, neither group will receive a competitive advantage. As no incremental compliance costs are expected, there will be no competitive trade disadvantage or advantage for U.S. manufacturers in foreign markets or for foreign manufacturers in the United States.

Federalism Implications

The regulations adopted herein will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this final rule will not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

International Civil Aviation Organization (ICAO) and Joint Aviation Regulations

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to comply with ICAO Standards and Recommended Practices to the maximum extent practicable. The FAA has determined that this rule does not conflict with any international agreement of the United States.

Paperwork Reduction Act

In accordance with the Paperwork Reduction Act of 1990 (44 U.S.C. 3501 et seq.), there are no reporting or recordkeeping requirements associated with this rule.

Conclusion

Because the revised standards for maximum allowable carbon dioxide concentration are not expected to result in a substantial economic cost or have

a significant adverse effect on competition, the FAA has determined that this final rule is not significant under Executive Order 12866. In addition, the FAA has determined that this action is not significant as defined in Department of Transportation Regulatory Policies and Procedures (44 FR 11034, February 26, 1979). Since no actual incremental costs are expected to be incurred to comply with the requirements of this rule, the FAA certifies, under the criteria of the Regulatory Flexibility Act, that this regulation will not have a significant economic impact, positive or negative, on a substantial number of small entities. A copy of the regulatory evaluation prepared for this final rule has been placed in the public docket. A copy may be obtained from the person identified under the caption. **FOR FURTHER INFORMATION CONTACT.**

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

Adoption of the Amendment

In consideration of the foregoing, the Federal Aviation Administration (FAA) amends 14 CFR part 25 of the Federal Aviation Regulations (FAR) as follows:

PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

1. The authority citation for part 25 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701–44702, 44704.

2. Section 25.831 is amended by revising paragraph (b)(2) to read as follows:

§ 25.831 Ventilation.

* * * * *

(b) * * *

(2) Carbon dioxide concentration during flight must be shown not to exceed 0.5 percent by volume (sea level equivalent) in compartments normally occupied by passengers or crewmembers.

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Issued in Washington, D.C., on November 21, 1996.
Linda Hall Daschle,
Acting Administrator.
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