

TABLE 13—TEST OPERATING CONDITIONS FOR VARIABLE- OR MULTIPLE-CAPACITY LOW-TEMPERATURE OUTDOOR DEDICATED CONDENSING UNITS—Continued

Test title	Suction dew point, °F	Return gas, °F	Condenser air entering dry-bulb, °F	Condenser air entering wet-bulb, °F ¹	Compressor operating mode
Off-Cycle, Condition C	35	34	Compressor Off.

Notes:

¹ Required only for evaporative condensing units (e.g., incorporates a slinger ring).

TABLE 14—TEST OPERATING CONDITIONS FOR VARIABLE- OR MULTIPLE-CAPACITY LOW-TEMPERATURE INDOOR DEDICATED CONDENSING UNITS

Test title	Suction dew point, °F	Return gas, °F	Condenser air entering dry-bulb, °F	Condenser air entering wet-bulb, °F ¹	Compressor operating mode
Capacity, Condition A, Minimum Capacity.	-22	5	90	75	Minimum Capacity, k=1.
Capacity, Condition A, Intermediate Capacity.	-22	5	90	75	Intermediate Capacity, k=i.
Capacity, Condition A, Maximum Capacity.	-22	5	90	75	Maximum Capacity, k=2.
Off-Cycle, Condition A	90	75	Compressor Off.

Notes:

¹ Required only for evaporative condensing units (e.g., incorporates a slinger ring).

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2022-1740; Special Conditions No. 25-841-SC]

Special Conditions: The Boeing Company Model 777 Series Airplanes; Passenger Seats With Pretensioner Restraint Systems

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for The Boeing Company (Boeing) Model 777 series airplanes. These airplanes have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. This design feature is pretensioner restraint systems installed on passenger seats. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to

that established by the existing airworthiness standards.

DATES: Effective November 24, 2023.

FOR FURTHER INFORMATION CONTACT: Shannon Lennon, Cabin Safety, AIR-624, Technical Policy Branch, Policy and Standards Division, Aircraft Certification Service, Federal Aviation Administration, 2200 South 216th Street, Des Moines, Washington 98198; telephone and fax 206-231-3209; email shannon.lennon@faa.gov.

SUPPLEMENTARY INFORMATION:

Background

On September 30, 2021, Boeing applied for an amendment to Type Certificate No. T00001SE for Boeing Model 777 series airplanes. These airplanes, currently approved under Type Certificate No. T00001SE, are twin-engine, transport-category airplanes with maximum seating for 495 passengers and a maximum takeoff weight of 775,000 pounds.

Type Certification Basis

Under the provisions of 14 CFR 21.101, Boeing must show that Model 777 series airplanes meet the applicable provisions of the regulations listed in Type Certificate No. T00001SE, or the applicable regulations in effect on the date of application for the change, except for earlier amendments as agreed upon by the FAA.

If the Administrator finds that the applicable airworthiness regulations (e.g., 14 CFR part 25) do not contain

adequate or appropriate safety standards for Boeing Model 777 series airplanes because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same novel or unusual design feature, or should any other model already included on the same type certificate be modified to incorporate the same novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, Boeing Model 777 series airplanes must comply with the fuel-vent and exhaust-emission requirements of 14 CFR part 34, and the noise-certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type certification basis under § 21.101.

Novel or Unusual Design Features

Boeing Model 777 series airplanes will incorporate the following novel or unusual design feature:

Forward-facing seats incorporating a shoulder harness with pretensioner

device, otherwise known as a pretensioner restraint system, which is intended to protect the occupants from head injuries.

Discussion

Boeing will install, in Model 777 series airplanes, forward-facing seats that incorporate a shoulder harness with a pretensioner system, for head-injury protection, at each seat place.

Shoulder harnesses have been widely used on flight-attendant seats, flight-deck seats, in business jets, and in general-aviation airplanes to reduce occupant head injury in the event of an emergency landing. Special conditions, pertinent regulations, and published guidance relate to other restraint systems. However, the use of pretensioners in the restraint system on transport-airplane seats is a novel design.

The pretensioner restraint system utilizes a retractor that eliminates slack in the shoulder harness and pulls the occupant back into the seat prior to impact. This has the effect of reducing forward translation of the occupant, reducing head arc, and reducing loads in the shoulder harness.

Pretensioner technology involves a step-change in loading experienced by the occupant for impacts below and above that at which the device deploys, because activation of the shoulder harness, at the point at which the pretensioner engages, interrupts upper-torso excursion. Such excursion could result in the head-injury criteria (HIC) being higher at an intermediate impact condition than that resulting from the maximum impact condition corresponding to the test conditions specified in § 25.562. See condition 1 in these special conditions.

The ideal triangular maximum-severity pulse is defined in Advisory Circular (AC) 25.562-1B, "Dynamic Evaluation of Seat Restraint Systems and Occupant Protection on Transport Airplanes." For the evaluation and testing of less-severe pulses for purposes of assessing the effectiveness of the pretensioner setting, a similar triangular pulse should be used with acceleration, rise time, and velocity change scaled accordingly. The magnitude of the required pulse should not deviate below the ideal pulse by more than 0.5g until 1.33 t₁ is reached, where t₁ represents the time interval between 0 and t₁ on the referenced pulse shape, as shown in AC 25.562-1B. This is an acceptable method of compliance to the test requirements of the special conditions.

Additionally, the pretensioner might not provide protection, after actuation, during secondary impacts. Therefore,

the case where a small impact is followed by a large impact should be addressed. If the minimum deceleration severity at which the pretensioner is set to deploy is unnecessarily low, the protection offered by the pretensioner may be lost by the time a second, larger impact occurs.

Conditions 1 through 4 ensure that the pretensioner system activates when intended, to provide the necessary protection of occupants. This includes protection of a range of occupants under various accident conditions. Conditions 5 through 10 address maintenance and reliability of the pretensioner system, including any outside influences on the mechanism, to ensure it functions as intended.

The special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Discussion of Comments

The FAA issued Notice of Proposed Special Conditions No. 25-23-01-SC for Boeing Model 777 airplanes, which was published in the **Federal Register** on May 11, 2023 (88 FR 30262).

The FAA received one response, from the Air Line Pilots Association, International, in support of the special conditions. The special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions are applicable to Boeing Model 777 series airplanes. Should Boeing apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, these special conditions would apply to that model as well.

Conclusion

This action affects only a certain novel or unusual design feature on one model series of airplanes. It is not a rule of general applicability.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

Authority Citation

The authority citation for these special conditions is as follows:

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

The Special Conditions

■ Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are

issued as part of the type certification basis for Boeing Model 777 series airplanes.

In addition to the requirements of § 25.562, forward-facing passenger seats with pretensioner restraint systems must meet the following:

(1) Head Injury Criteria (HIC)

The HIC value must not exceed 1000 at any condition at which the pretensioner does or does not deploy, up to the maximum severity pulse that corresponds to the test conditions specified in § 25.562. Tests must be performed to demonstrate this, taking into account any necessary tolerances for deployment.

When an airbag device is present in addition to the pretensioner restraint system, and the anthropomorphic test device (ATD) has no apparent contact with the seat/structure but has contact with an airbag, a HIC unlimited score in excess of 1000 is acceptable, provided the HIC15 score (calculated in accordance with 49 CFR 571.208) for that contact is less than 700.

ATD head contact with the seat or other structure, through the airbag, or contact subsequent to contact with the airbag, requires a HIC value that does not exceed 1000.

(2) Protection During Secondary Impacts

The pretensioner activation setting must be demonstrated to maximize the probability of the protection being available when needed, considering secondary impacts.

(3) Protection of Occupants Other Than 50th Percentile

Protection of occupants for a range of stature from a 2-year-old child to a 95th percentile male must be shown. For shoulder harnesses that include pretensioners, protection of occupants other than a 50th percentile male may be shown by test or analysis. In addition, the pretensioner must not introduce a hazard to passengers due to the following seating configurations:

- (a) The seat occupant is holding an infant.
- (b) The seat occupant is a child in a child-restraint device.
- (c) The seat occupant is a pregnant woman.

(4) Occupants Adopting the Brace Position

Occupants in the traditional brace position when the pretensioner activates must not experience adverse effects from the pretensioner activation.

(5) Inadvertent Pretensioner Actuation

(a) The probability of inadvertent pretensioner actuation must be shown to be extremely remote (*i.e.*, average probability per flight hour of less than 10^{-7}).

(b) The system must be shown not to be susceptible to inadvertent pretensioner actuation as a result of wear and tear, nor inertia loads resulting from in-flight or ground maneuvers likely to be experienced in service.

(c) The seated occupant must not be seriously injured as a result of inadvertent pretensioner actuation.

(d) Inadvertent pretensioner actuation must not cause a hazard to the airplane, nor cause serious injury to anyone who may be positioned close to the retractor or belt (*e.g.*, seated in an adjacent seat or standing adjacent to the seat).

(6) Availability of the Pretensioner Function Prior to Flight

The design must provide means for a crewmember to verify the availability of the pretensioner function prior to each flight, or the probability of failure of the pretensioner function must be demonstrated to be extremely remote (*i.e.*, average probability per flight hour of less than 10^{-7}) between inspection intervals.

(7) Incorrect Seat Belt Orientation

The system design must ensure that any incorrect orientation (twisting) of the seat belt does not compromise the pretensioner protection function.

(8) Contamination Protection

The pretensioner mechanisms and controls must be protected from external contamination associated with that which could occur on or around passenger seating.

(9) Prevention of Hazards

The pretensioner system must not induce a hazard to passengers in case of fire, nor create a fire hazard, if activated.

(10) Functionality After Loss of Power

The system must function properly after loss of normal airplane electrical power and after a transverse separation in the fuselage at the most critical location. A separation at the location of the system does not have to be considered.

Issued in Kansas City, Missouri, on October 19, 2023.

Patrick R. Mullen,

Manager, Technical Policy Branch, Policy and Standards Division, Aircraft Certification Service.

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CONSUMER PRODUCT SAFETY COMMISSION**16 CFR Part 1610**

[Docket No. CPSC–2019–0008]

Standard for the Flammability of Clothing Textiles

AGENCY: Consumer Product Safety Commission.

ACTION: Final rule.

SUMMARY: The U.S. Consumer Product Safety Commission (Commission or CPSC) is amending the Standard for the Flammability of Clothing Textiles. The revisions clarify existing provisions, expand permissible equipment and materials for testing, and update equipment requirements that are outdated. The Commission issues this amendment under the authority of the Flammable Fabrics Act.

DATES: This rule is effective on April 22, 2024. The incorporation by reference of the publication listed in this rule is approved by the Director of the Federal Register as of April 22, 2024.

FOR FURTHER INFORMATION CONTACT: Will Cusey, Small Business Ombudsman, U.S. Consumer Product Safety Commission, 4330 East-West Highway, Bethesda, MD 20814; telephone (301) 504–7945 or (888) 531–9070; email: sbo@cpsc.gov.

SUPPLEMENTARY INFORMATION:**I. Background**

On September 14, 2022, the Commission published a notice of proposed rulemaking (NPR), proposing to amend the Standard for the Flammability of Clothing Textiles at 16 CFR part 1610 (Standard). 87 FR 56289. The Standard was codified under the Flammable Fabrics Act (FFA; 15 U.S.C. 1191–1204). The purpose of the FFA is to prohibit the importation, manufacture for sale, or sale in commerce of any fabric or article of wearing apparel that is “so highly flammable as to be dangerous when worn by individuals.” Public Law 83–88, 67 Stat. 111 (June 30, 1953). The Standard accomplishes this by providing a national standard for testing and rating the flammability of textiles and textile products used for clothing. The Standard specifies test equipment, materials, and procedures for testing the flammability of clothing textiles and prohibits the use of highly flammable textiles in clothing.

The amendments proposed in the NPR and adopted in this final rule¹ aim to clarify existing provisions in the

Standard and update the specifications for materials and equipment that have become outdated. The amendments do not alter the testing or criteria in the Standard for determining the flammability of a fabric or whether it is permissible for use in clothing; rather, they facilitate accurate testing and classifications by clarifying existing requirements and updating material and equipment specifications to reflect currently available materials, equipment, and technologies.

The amendments proposed in the NPR and adopted in this final rule address three areas of the Standard. First, they aim to clarify and streamline the provisions regarding test result codes (*i.e.*, burn codes), which help determine the classification of a textile and whether it may be used for clothing. The amendments remove an unnecessary code and revise wording in the provisions to clarify the existing requirements. Second, the amendments revise the stop thread specification, which indicates the thread that must be used in flammability testing. The description has become unclear, as threads matching the description in the Standard are no longer readily available. Third, amendments revise the refurbishing requirements in the Standard, which address dry cleaning and laundering specimens during the testing process. In recent years, there have been increasing restrictions on the use of the dry cleaning solvent specified in the Standard, and washing machines that meet the specifications required in the Standard are no longer made.

The NPR and CPSC staff’s briefing package supporting it included detailed information about the need for the amendments, the rationale for the revisions, and test results illustrating the comparability of the flammability classifications under the existing Standard and amendments. The NPR also included detailed information about 16 CFR 1610.40 of the Standard, which permits the use of alternative apparatus, procedures, or criteria for tests for guaranty purposes. This allowance permits the continued use of the dry cleaning solvent and laundering methods in the current Standard by relying on CPSC’s test results demonstrating the comparability of test results under the current Standard and the amendments.

This final rule adopts the amendments proposed in the NPR, with only minor modifications. Therefore, this notice focuses on comments received in response to the NPR and the minor modifications in the final rule. For detailed information about the amendments, the rationale for them, the

¹ The Commission voted 4–0 to approve this rule.