DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM439 Special Conditions No. 25–10–04–SC]

Special Conditions: Gulfstream Model GVI Airplane; Single-Occupy Side-Facing Seats

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed special conditions.

SUMMARY: This action proposes special conditions for the Gulfstream GVI airplane. This airplane will have a novel or unusual design feature(s) associated with single-occupant side-facing seats. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These proposed 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: We must receive your comments by February 18, 2011.

ADDRESSES: You must mail two copies of your comments to: Federal Aviation Administration, Transport Airplane Directorate, Attn: Rules Docket (ANM–113), Docket No. NM439, 1601 Lind Avenue, SW., Renton, Washington 98057–3356. You may deliver two copies to the Transport Airplane Directorate at the above address. You must mark your comments: Docket No. NM439. You can inspect comments in the Rules Docket weekdays, except Federal holidays, between 7:30 a.m. and 4 p.m.


SUPPLEMENTARY INFORMATION:

Comments Invited

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data. We ask that you send us two copies of written comments.

We will file in the docket all comments we receive, as well as a report summarizing each substantive public contact with FAA personnel concerning these special conditions. You can inspect the docket before and after the comment closing date. If you wish to review the docket in person, go to the address in the ADDRESSES section of this preamble between 7:30 a.m. and 4 p.m., Monday through Friday, except Federal holidays.

We will consider all comments we receive on or before the closing date for comments. We will consider comments filed late if it is possible to do so without incurring expense or delay. We may change these special conditions based on the comments we receive.

If you want us to acknowledge receipt of your comments on this proposal, include with your comments a self-addressed, stamped postcard on which you have written the docket number. We will stamp the date on the postcard and mail it back to you.

Background

On September 28, 2006, Gulfstream Aerospace Corporation (hereafter referred to as “Gulfstream”) applied for an FAA type certificate for its new Gulfstream Model GVI passenger airplane. The Gulfstream Model GVI airplane will be an all-new, two-engine jet transport airplane with an executive cabin interior. The maximum takeoff weight will be 99,600 pounds, with a maximum passenger count of 19 passengers.

Type Certification Basis

Under provisions of Title 14, Code of Federal Regulations (14 CFR) 21.17, Gulfstream must show that the Gulfstream Model GVI airplane (hereafter referred to as “the GVI”) meets the applicable provisions of 14 CFR part 25, as amended by Amendments 25–1 through 25–119 and 25–122. If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the GVI because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

In addition to complying with the applicable airworthiness regulations and special conditions, the GVI 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 must also issue a finding of regulatory adequacy pursuant to section 611 of Public Law 92–574, the “Noise Control Act of 1972.”

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 § 21.17(a)(2).

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 features, the special conditions would also apply to the other model under provisions of § 21.101.

Novel or Unusual Design Features

The GVI offers interior arrangements, which include single-occupant side-facing seat installations. Dynamic testing of all seats approved for occupancy during takeoff and landing is required by § 25.562. The pass/fail criteria for the testing developed in Amendment 25–64 to § 25.562 focused primarily on fore/aft facing seats. Side-facing seat installations were not adequately addressed for transport category airplanes in this amendment.

Discussion of Proposed Special Conditions

Section 25.785(b), “Seats, berths, safety belts, and harnesses,” requires that “each seat * * * at each station” designated as occupiable during takeoff and landing must be designed so that a person making proper use of these facilities “will not suffer serious injury in an emergency landing as a result of the inertia forces specified in §§ 25.561 and 25.562.” Additionally, § 25.562, “Emergency landing dynamic conditions,” requires dynamic testing of all seats occupied during takeoff and landing. The relative forces and injury mechanisms affecting the occupants of side-facing seats during an emergency landing are different from those of standard forward- or aft-facing seats, or seats equipped with conventional restraint systems.
Although § 25.562 was written with forward- and aft-facing seats in mind, the orientation of the seat does not change the relevant test conditions, and the rule applies to all seats regardless of orientation.

The dynamic test conditions included in § 25.562 are directly applicable to side-facing seats. However, for injury pass/fail criteria, the orientation of the seat may be significant. For forward-, aft-, and side-facing seats the injury criteria are currently limited to head, spine, and femur loads. The head and lumbar loads are critical but the femur load is not critical. For a side-facing seat, additional injury parameters may be identified and evaluation of those parameters would be necessary to provide an acceptable level of safety.

When evaluating side-facing seats the following should be taken into consideration:

1. The isolation of one occupant from another. Occupants should not rely on impact with other occupants to provide energy absorption; body-to-body impacts are unacceptable.

2. The restraint system and the retention of occupants in the seat. Addressing this concern may necessitate providing a means of restraint for the lower limbs as well as the torso. Failure to limit the forward (in the airplane’s coordinate system) travel of the lower limbs may cause the occupant to come out of the restraint system or produce severe injuries due to the resulting position of the restraint system and/or twisting (torsional load) of the lower lumbar spinal column.

3. The load limit in the torso in the lateral direction. Human tolerance for side-facing seats differs from that for forward- or aft-facing seats.

The automotive industry has developed test procedures and occupant injury criteria appropriate for side impact conditions. The criteria include limiting lateral pelvic accelerations and using the "Thoracic Trauma Index," which is defined in 49 CFR 571.214. Use of the side impact dummy (SID) identified in 49 CFR part 572, subpart F, rather than the Hybrid II dummy identified in 49 CFR part 572, subpart B, is required to evaluate these parameters. The Hybrid II dummy is used in the current § 25.562 test. Testing with a SID is the best means available to assess the injury potential of a sideward impact condition. Such an evaluation is considered necessary to provide an acceptable level of safety for side-facing seats.

The side-facing seat proposed special conditions have been determined to result in a level of safety equivalent to that provided by the injury pass/fail criteria in § 25.562 for forward- or aft-facing seats.

**Applicability**

As discussed above, this proposed special condition is applicable to the GVI. Should Gulfstream apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design features, this proposed special condition would apply to that model as well.

**Conclusion**

This action affects only certain novel or unusual design features of the GVI. It is not a rule of general applicability.

**List of Subjects in 14 CFR Part 25**

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

**The Proposed Special Conditions**

Accordingly, the Federal Aviation Administration (FAA) proposes the following special conditions as part of the type certification basis for the GVI airplanes.

In addition to the airworthiness standards in §§ 25.562 and 25.785, the following proposed special conditions provide injury criteria and installation/testing guidelines that represent the minimum acceptable airworthiness standard for single-place side-facing seats:

**A. The Proposed Injury Criteria**

1. **Existing Criteria:** All injury protection criteria of § 25.562(c)(1) through (c)(6) apply to the occupant of a side-facing seat. Head injury criterion (HIC) assessments are only required for head contact with the seat and/or adjacent structures.

2. **Body-to-Wall/Furnishing Contact:** The seat must be installed aft of a structure such as an interior wall or furnishing that will support the pelvis, upper arm, chest, and head of an occupant seated next to the structure. A conservative representation of the structure and its stiffness must be included in the tests. It is recommended, but not required, that the contact surface of this structure be covered with at least two inches of energy absorbing protective padding (foam or equivalent), such as Ensolite.

3. **Thoracic Trauma:** Thoracic trauma index (TTI) injury criterion must be substantiated by dynamic test or by rational analysis based on previous test(s) of a similar seat installation. Testing must be conducted with a side impact dummy (SID), as defined by Title 49, Code of Federal Regulations (49 CFR) part 572, subpart F, or its equivalent. TTI must be less than 85, as defined in 49 CFR part 572, subpart F. SID TTI data must be processed as defined in Federal Motor Vehicle Safety Standard (FMVSS) part 571.214, section S6.135.

4. **Pelvis:** Pelvic lateral acceleration must be shown by dynamic test or by rational analysis based on previous test(s) of a similar seat installation not to exceed 130g. Pelvic acceleration data must be processed as defined in FMVSS part 571.214, section S6.135.

5. **Shoulder Strap Loads:** Where upper torso straps (shoulder straps) are used for occupants, tension loads in individual straps must not exceed 1,750 pounds. If dual straps are used for restraining the upper torso, the total strap tension loads must not exceed 2,000 pounds.

**B. General Test Guidelines**

1. One longitudinal test with the SID or its equivalent, undeformed floor, no yaw, and with all lateral structural supports (armrests/walls).

2. Pass/fail injury assessments: TTI and pelvic acceleration.

2. One longitudinal test with the Hybrid II anthropomorphic test dummy (ATD), deformed floor, with 10 degrees yaw, and with all lateral structural support (armrests/walls).

Pass/fail injury assessments: HIC; and upper torso restraint load, restraint system retention and pelvic acceleration.

3. Vertical (14g) test is to be conducted with modified Hybrid II ATDs with existing pass/fail criteria.

Issued in Renton, Washington, on December 22, 2010.

**Jeffrey E. Duven,**

**Acting Manager, Transport Airplane Directorate, Aircraft Certification Service.**

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**BILLING CODE 4910–13–P**

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**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

14 CFR Part 39

[Docket No. FAA–2006–24145; Directorate Identifier 2006–NE-06–AD]

**RIN 2120–AA64**

Airworthiness Directives; General Electric Company CF6–45 and CF6–50 Series Turbofan Engines

**AGENCY:** Federal Aviation Administration (FAA), DOT.