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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM-112; Special Conditions No. 25-ANM-108]

Special Condition: Gulfstream Aerospace Corporation, Model Gulfstream V, High Altitude Operations

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are for the Gulfstream Model Gulfstream V airplane. This new airplane will be capable of operating at a maximum altitude of 51,000 feet. The applicable regulations do not contain adequate or appropriate safety standards for the protection of the fuselage structure or passengers and crew from the effects of high altitude operations. 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: November 16, 1995.

FOR FURTHER INFORMATION CONTACT: Gerald Lakin, FAA, Standardization Branch, ANM-113, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington, 98055-4056, (206) 227-1187.

SUPPLEMENTARY INFORMATION:

Background

On February 26, 1992, Gulfstream Aerospace Corporation, P.O. Box 2206, Savannah, GA 31402-2206, applied for an amended type certificate in the transport airplane category for the Model Gulfstream V airplane. The Gulfstream V is a T-tail, low swept wing, business jet airplane powered by two BMW Rolls-Royce BR700-710A1-

10 turbofan engines mounted on pylons extending from the aft fuselage. Each engine will be capable of delivering 14,750 pounds thrust. The controls will be powered and capable of manual reversion. The airplane has a seating capacity of up to nineteen passengers, and a maximum takeoff weight of 89,000 pounds. Gulfstream has requested certification for operations up to 51,000 feet.

Type Certification Basis

Under the provisions of § 21.101 of the FAR, Gulfstream must show, except as provided in § 25.2, that the Model Gulfstream V meets the applicable provisions of part 25, effective February 1, 1995, as amended by Amendments 25-1 through 25-81. In addition, the proposed certification basis for the Model Gulfstream V includes part 34, effective September 10, 1990, plus any amendments in effect at the time of certification; part 36, effective December 1, 1969, as amended by Amendment 36-1 through the amendment in effect at the time of certification; and certain exceptions and special conditions that are not relevant to these special conditions. No exemptions are anticipated. These special conditions form an additional part of the type certification basis.

If the Administrator finds that the applicable airworthiness regulations (i.e., part 25, as amended) do not contain adequate or appropriate safety standards for the Gulfstream V because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16 to establish a level of safety equivalent to that established in the regulations.

Special conditions, as appropriate, are issued in accordance with § 11.49 of the FAR after public notice, as required by §§ 11.28 and 11.29, and become part of the type certification basis in accordance with § 21.101(b)(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 feature, or should any other model already included on the same type certificate be modified to incorporate the same novel or unusual design feature, the special conditions would also apply to the other model under the provisions of § 21.101(a)(1).

Novel or Unusual Design Features

The Model Gulfstream V will be certificated for operations at a maximum altitude of 51,000 feet. This unusually high operating altitude constitutes a novel or unusual design feature for which the applicable airworthiness regulations do not contain adequate or appropriate safety standards.

There are no specific regulations that address protection requirements for the airplane fuselage pressure vessel or passengers and crew, in the event of a rapid decompression, during high altitude operations. The potential adverse impact from rapid decompression at high altitudes has made it necessary to provide adequate protection.

To ensure that a level of safety is achieved equivalent to that intended by the regulations incorporated by reference, these special conditions require compliance with additional requirements to provide protection from the direct and indirect effects of high altitude operations.

Damage tolerance methods are proposed to be used to ensure pressure vessel integrity while operating at the higher altitudes. Crack grown data are used to prescribe an inspection program which will detect cracks before an opening in the pressure vessel would allow rapid decompression. Initial crack sizes for detection are determined under § 25.571, Amendment 25-72. The cabin altitude after failure may not exceed the limits specified in Figures 3 and 4.

In order to ensure that there is adequate fresh air to crewmembers to perform their duties, to provide reasonable passenger comfort, and to enable occupants to better withstand the effects of decompression at high altitudes, the ventilation system must be designed to provide 10 cubic feet of fresh air per minute per person during normal operations. Therefore, these special conditions require that crewmembers and passengers be provided with 10 cubic feet of fresh air per minute per person. In addition, during the development of the supersonic transport special conditions, it was noted that certain pressurization failures resulted in hot ram or bleed air being used to maintain pressurization. Such a measure can lead to cabin temperatures that exceed human tolerance. Therefore, these special conditions require airplane interior