



**[4910-13]**

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 25**

**[Docket No. FAA-2013-0148; Special Conditions No. 25-490-SC]**

**Special Conditions:** Embraer S.A., Model EMB-550 Airplane; Landing Pitchover Condition.

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

**ACTION:** Final special conditions.

**SUMMARY:** These special conditions are issued for the Embraer S.A. Model EMB-550 airplane. This airplane will have a novel or unusual design feature associated with landing loads due to the automatic braking system. 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.

**EFFECTIVE DATE:** [Insert date 30 days after date of publication in the *Federal Register*].

**FOR FURTHER INFORMATION CONTACT:** Todd Martin, FAA, Airframe and Cabin Safety Branch, ANM-115, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington, 98057-3356; telephone 425-227-1178; facsimile 425-227-1232.

**SUPPLEMENTARY INFORMATION:**

**Background**

On May 14, 2009, Embraer S.A. applied for a type certificate for their new Model EMB-550 airplane. The Model EMB-550 airplane is the first of a new family of jet airplanes

designed for corporate flight, fractional, charter, and private owner operations. The aircraft has a conventional configuration with low wing and T-tail empennage. The primary structure is metal with composite empennage and control surfaces. The Model EMB-550 airplane is designed for 8 passengers, with a maximum of 12 passengers. It is equipped with two Honeywell HTF7500-E medium bypass ratio turbofan engines mounted on aft fuselage pylons. Each engine produces approximately 6,540 pounds of thrust for normal takeoff. The primary flight controls consist of hydraulically powered fly-by-wire elevators, aileron and rudder, controlled by the pilot or copilot sidestick.

The Model EMB-550 airplane is equipped with an automatic braking system. This feature is a pilot-selectable function that allows earlier braking at landing without pilot pedal input. When the autobrake system is armed before landing, it automatically commands a pre-defined braking action after the main wheels touch down. This might cause a high nose gear sink rate, and potentially higher gear and airframe loads than would occur with a traditional braking system. Therefore, the FAA has determined special conditions are necessary.

### **Type Certification Basis**

Under the provisions of 14 CFR 21.17, Embraer S.A. must show that the Model EMB-550 airplane meets the applicable provisions of part 25, as amended by Amendments 25-1 through 25-127 thereto.

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 Model EMB-550 airplane 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 or similar novel or unusual design feature, the special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Embraer S.A. Model EMB-550 airplane 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 and the FAA must issue a finding of regulatory adequacy under § 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).

### **Novel or Unusual Design Features**

The Embraer S.A. Model EMB-550 airplane is equipped with an automatic braking system, which is a pilot-selectable function that allows earlier maximum braking at landing without pilot pedal input. When the autobrake system is armed before landing, it automatically commands maximum braking at main wheels touchdown. This will cause a high nose gear sink rate, and potentially higher gear and airframe loads than would occur with a traditional braking system.

### **Discussion**

These special conditions define a landing pitchover condition that accounts for the effects of the automatic braking system. The special conditions define the airplane configuration, speeds, and other parameters necessary to develop airframe and nose gear loads for this

condition. The special conditions require that the airplane be designed to support the resulting limit and ultimate loads as defined in § 25.305.

### **Discussion of Comments**

Notice of proposed special conditions No. 25-13-01-SC for the Embraer S.A. Model EMB-550 airplanes was published in the *Federal Register* on February 19, 2013 (78 FR 11609). No comments were received, and the special conditions are adopted as proposed.

### **Applicability**

As discussed above, these special conditions are applicable to the Embraer S.A. Model EMB-550 airplane. Should Embraer S.A. apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the special conditions would apply to that model as well.

### **Conclusion**

This action affects only certain novel or unusual design features on one model 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.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 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 Embraer S.A. Model EMB-550 airplanes.

## **Landing Pitchover Condition**

A landing pitchover condition must be addressed that takes into account the effect of the autobrake system. The airplane is assumed to be at the design maximum landing weight, or at the maximum weight allowed with the autobrake system on. The airplane is assumed to land in a tail-down attitude and at the speeds defined in § 25.481. Following main gear contact, the airplane is assumed to rotate about the main gear wheels at the highest pitch rate allowed by the autobrake system. This is considered a limit load condition from which ultimate loads must also be determined. Loads must be determined for critical fuel and payload distributions and centers of gravity. Nose gear loads, as well as airframe loads, must be determined. The airplane must support these loads as described in § 25.305.

Issued in Renton, Washington, on May 21, 2013.

Jeff Duven  
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Aircraft Certification Service

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