



This document is scheduled to be published in the Federal Register on 02/15/2013 and available online at <http://federalregister.gov/a/2013-03590>, and on FDsys.gov

[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2012-1236; Special Conditions No. 25-477-SC]

Special Conditions: Bombardier Aerospace, Model BD-500-1A10 and BD-500-1A11 Airplanes;
Sidestick Controllers

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Bombardier Aerospace Model BD-500-1A10 and BD-500-1A11 airplanes. These airplanes will have a novel or unusual design feature, specifically sidestick controllers designed to be operated with only one hand. 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 December 10, 2009, Bombardier Aerospace applied for a type certificate for their new Model BD-500-1A10 and BD-500-1A11 airplanes. The Model BD-500-1A10 and BD-500-1A11 airplanes are swept-wing monoplanes with pressurized cabins, and they share an identical supplier base and significant common design elements. The fuselages are aluminum alloy material, blended double-bubble fuselages, sized for nominal five-abreast seating. Each airplane's powerplant includes two under-wing Pratt and Whitney PW1524G ultra-high bypass, geared turbofan engines. The flight controls are fly-by-wire flight with two passive/uncoupled sidesticks. Avionics include five landscape primary cockpit displays. The dimension of the aircraft encompasses a wingspan of 115 feet; height of 37.75 feet; and length of 114.75 feet for the Model BD-500-1A10 and length of 127 feet for the Model BD-500-1A11. Passenger capacity is designated as 110 for the Model BD-500-1A10 and 125 for the Model BD-500-1A11. Maximum takeoff weight is 131,000 pounds for the Model BD-500-1A10 and 144,000 pounds for the Model BD-500-1A11. Maximum takeoff thrust is 21,000 pounds for the Model BD-500-1A10 and 23,300 pounds for the Model BD-500-1A11. The range is 5,463 kilometres for both model airplanes. The maximum operating altitude is 41,000 feet for both model airplanes.

Bombardier Model BD-500-1A10 and BD-500-1A11 airplanes will be equipped with a sidestick controller instead of a conventional control column and wheel. This kind of controller is designed for only one-hand operation.

The requirement of Title 14, Code of Federal Regulations (14 CFR) 25.397(c), which defines limit pilot forces and torques for conventional wheel or stick controls, is not adequate for

a sidestick controller. A special condition is necessary to specify the appropriate loading conditions for this kind of controller.

Type Certification Basis

Under the provisions of 14 CFR 21.17, Bombardier Aerospace must show that the Model BD-500-1A10 and BD-500-1A11 airplanes meet the applicable provisions of part 25, as amended by Amendments 25-1 through 25-129 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 Bombardier Aerospace Model BD-500-1A10 and BD-500-1A11 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 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 Bombardier Aerospace Model BD-500-1A10 and BD-500-1A11 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 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 Bombardier Aerospace Model BD-500-1A10 and BD-500-1A11 airplanes will incorporate the following novel or unusual design feature: a sidestick controller instead of a conventional control column and wheel. This kind of controller is designed for one-hand operation.

Discussion

The Bombardier Aerospace Model BD-500-1A10 and BD-500-1A11 airplanes are equipped with a sidestick controller instead of a conventional wheel or control stick. This kind of controller is designed to be operated using only one hand. The requirement of 14 CFR 25.397(c), which defines limit pilot forces and torques for conventional wheel or stick controls, is not adequate for a sidestick controller, because pilot forces are applied to sidestick controllers with only the wrist, not arms. A special condition is necessary to specify the appropriate loading conditions for a sidestick controller. 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.

Discussion of Comments

Notice of proposed special conditions No. 25-12-14-SC for the Bombardier Aerospace Model BD-500-1A10 and BD-500-1A11 airplanes was published in the *Federal Register* on November 20, 2012 (77 FR 69568). No comments were received, and the special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions are applicable to the Bombardier Aerospace Model BD-500-1A10 and BD-500-1A11 airplanes. Should Bombardier Aerospace 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 Bombardier Aerospace Model BD-500-1A10 and BD-500-1A11 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 Model BD-500-1A10 and BD-500-1A11 airplanes by Bombardier Aerospace:

Limit Pilot Forces for Sidestick Control

In lieu of the pilot forces specified in § 25.397(c), for the Bombardier Model BD-500-1A10 and BD-500-1A11 airplanes equipped with sidestick controls designed for forces to be applied by one wrist and not arms, the limit pilot forces are as follows:

1. For all components between and including the handle and its control stops.

Pitch	Roll
Nose up 200 pounds force (Lbf)	Nose Left 100 Lbf
Nose down 200 Lbf	Nose Right 100 Lbf

2. For all other components of the sidestick control assembly, excluding the internal components of the electrical sensor assemblies, to avoid damage as a result of an in-flight jam.

Pitch	Roll
Nose up 125 lbf	Nose Left 50 lbf
Nose down 125 lbf	Nose Right 50 lbf

Issued in Renton, Washington, on February 12, 2013.

Ali Bahrami
Manager, Transport Airplane Directorate
Aircraft Certification Service

[FR Doc. 2013-03590 Filed 02/14/2013 at 8:45 am; Publication Date: 02/15/2013]