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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. CE299; Special Conditions No. 23-239-SC]

Special Conditions: Cessna Aircraft Company, Model 525C; High Fuel Temperature

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Cessna Aircraft Company, model 525C airplane. This airplane will have a novel or unusual design feature(s) associated with high fuel

temperature. 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: *Effective Date:* December 16, 2009.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION:

Background

On August 9, 2006, Cessna Aircraft Company applied for an amendment to Type Certificate Number A1WI to include the new model 525C (CJ4). The model 525C (CJ4), which is a derivative of the model 525B (CJ3), currently approved under Type Certificate Number A1WI, is a commuter category, low-winged monoplane with "T" tailed vertical and horizontal stabilizers,

retractable tricycle type landing gear and twin turbofan engines mounted on the aircraft fuselage. The maximum takeoff weight is 16,950 pounds, the V_{MO}/M_{MO} is 305 KIAS/M 0.77 and the maximum altitude is 45,000 feet.

The Cessna model 525C (CJ4) fuel tank system is similar to other Cessna model 525 designs which use the Williams FJ44 series of engine. The fuel tank system is configured to reject engine heat through the airplane fuel tank system by using an engine oil/fuel heat exchanger. Certified as part of the engine, the engine oil/fuel heat exchanger cools the oil and heats the fuel. Over time, the engine manufacturers have optimized the design, size, placement, and space management of the oil/fuel heat exchanger such that today's engines now reject more heat back into the airplane fuel tank system than has existed in the past. As can be seen by the chart below, we are now exposing the fuel tank system and airplane to temperatures above the critical temperature test requirements of §§ 23.961 and 23.965(d), which has been the universal FAA standard for fuel system hot weather operations and fuel tank test and evaluation since 1950.

Aircraft model	Engine model	Motive flow (°F)	Fuel tank (°F)	Fuel pump inlet (°F)	IM Max. fuel pump inlet temp. (sea level)
525, CJ1+	FJ44-1AP	205	115	165	255 °F
525A, CJ2	FJ44-2C	230	140	188	200 °F
525B, CJ3	FJ44-3A	202	117	155	200 °F

14 CFR part 23 certification experience to date has shown that fuel system hot weather certification testing with 110 °F fuel temperatures is adequate for fuel system operations for fuel tank temperatures characterized by ambient air temperatures, including cooling, as a result of the atmospheric temperature lapse rate. Heating of the fuel that increases the airplane fuel tank system operational temperatures introduces a number of fuel tank system and airplane concerns. Each must be shown to be acceptable. Compliance by design (*i.e.*, lack of ability to shutoff the engine motive flow) may be utilized although associated type certificate data

sheet information may also be necessary to assure future system changes are compliant. The following are those concerns:

- Evaluation of engine, fuel tank system and airplane performance and engine compatibility with elevated fuel tank system temperatures. [§ 23.901, paragraphs (e)(1) and (e)(2); and §§ 23.939(a) and 23.951(a)]
- Evaluation of fuel tank system and airplane performance due to fuel degradation and resultant by-products at elevated fuel tank system temperatures. [§§ 23.961, 23.939(a), 23.993(e), 23.1301, and 23.1529]
- Evaluation of fuel tank system and airplane performance and engine

compatibility due to the higher vapor/liquid ratios with elevated fuel tank system temperatures. [§§ 23.903(f) and 23.951(a); § 23.955, paragraphs (a) and (f); and §§ 23.961 and 23.1301]

- Evaluation of fuel tank system and airplane performance and engine compatibility, due to the solubility of water and potential for greater microbial growth with elevated fuel tank system temperatures. [§§ 23.951(c) and 23.971]

- Evaluation of fuel tank system and airplane performance due to elevated fuel tank system material temperatures and surrounding structure compatibility. [§§ 23.613(c), 23.963(a), 23.965(d), and 23.993(e)]

○ Evaluation of fuel tank system component qualification as a result of elevated fuel tank system temperatures. [§§ 23.1301, and 23.1309]

○ Evaluation of service/maintenance instructions, activities, and personnel due to elevated fuel tank system temperatures. [§ 23.1529].

Type Certification Basis

Under the provisions of § 21.101, Cessna Aircraft Company must show that the model 525C meets the applicable provisions of the regulations incorporated by reference in Type Certificate Number A1WI or the applicable regulations in effect on the date of application for the change to the model 525C. The regulations incorporated by reference in the type certificate are commonly referred to as the "original type certification basis." In addition, the certification basis includes exemptions, if any; equivalent level of safety findings, if any; and the special condition adopted by this rulemaking action.

If the Administrator finds that the applicable airworthiness regulations in 14 CFR part 23 do not contain adequate or appropriate safety standards for the model 525C because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

In addition to the applicable airworthiness regulations and special conditions, the model 525C 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.

Special conditions, as appropriate, as defined in § 11.19, are issued in accordance with § 11.38, 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 525C will incorporate the following novel or unusual design features:

High Fuel Temperatures.

Discussion of Comments

A notice of proposed special conditions No. 23–09–03–SC for the Cessna Aircraft Company, model 525C airplanes was published on September 1, 2009, 74 FR 45133. No comments were received, and the special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions are applicable to the model 525C. Should Cessna Aircraft Company 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 under the provisions of § 21.101(a)(1).

Under standard practice, the effective date of final special conditions would be 30 days after the date of publication in the **Federal Register**; however, as the certification date for the Cessna Aircraft Company, model 525C is imminent, the FAA finds that good cause exists to make these special conditions effective upon issuance.

Conclusion

This action affects only certain novel or unusual design features on one model of airplanes. It is not a rule of general applicability, and it affects only the applicant who applied to the FAA for approval of these features on the airplane.

List of Subjects in 14 CFR Part 23

Aircraft, Aviation safety, Signs and symbols.

Citation

■ The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113 and 44701; 14 CFR 21.16 and 21.17; and 14 CFR 11.38 and 11.19.

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 Cessna Aircraft Company, model 525C airplanes.

1. *SC § 23.961:*

Instead of compliance with § 23.961, the following apply:

Each fuel system must be free from vapor lock when using fuel at its critical temperature, with respect to vapor formation, when operating the airplane in all critical operating and environmental conditions for which approval is requested. For turbine fuel, the initial temperature must be 110 °F,

– 0°, +5 °F or the maximum outside air temperature for which approval is requested or the fuel tank system temperature that is determined to be more critical.

Issued in Kansas City, Missouri on December 16, 2009.

Kim Smith,

Manager, Small Airplane Directorate, Aircraft Certification Service.

[FR Doc. E9–30436 Filed 12–22–09; 8:45 am]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA–2009–1196; Directorate Identifier 2009–NM–170–AD; Amendment 39–16146; AD 2008–09–12 R1]

RIN 2120–AA64

Airworthiness Directives; Bombardier, Inc. Model CL–600–2B19 (Regional Jet Series 100 & 440) Airplanes

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Final rule; request for comments.

SUMMARY: We are adopting a new airworthiness directive (AD) for the products listed above that would revise an existing AD. This AD results from mandatory continuing airworthiness information (MCAI) originated by an aviation authority of another country to identify and correct an unsafe condition on an aviation product. The MCAI describes the unsafe condition as:

Bombardier Aerospace has completed a system safety review of the aircraft fuel system against fuel tank safety standards introduced in Chapter 525 of the Airworthiness Manual through Notice of Proposed Amendment (NPA) 2002–043. The identified non-compliances were then assessed using Transport Canada Policy Letter No. 525–001, to determine if mandatory corrective action is required.

The assessment showed that it is necessary to introduce Critical Design Configuration Control Limitations (CDCCL), in order to preserve critical fuel tank system ignition source prevention features during configuration changes such as modifications and repairs, or during maintenance actions. Failure to preserve critical fuel tank system ignition source prevention features could result in a fuel tank explosion. * * *

This AD requires actions that are intended to address the unsafe condition described in the MCAI.

DATES: This AD becomes effective January 7, 2010.