Exemption No. 16970

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, DC 20591

In the matter of the petition of

CIRRUS DESIGN CORPORATION

for an exemption from § 23.1419(a) of Title 14, Code of Federal Regulations

Regulatory Docket No. FAA-2015-0534

GRANT OF EXEMPTION

By letter dated February 27, 2015, Mr. Tom Engelmann, Airworthiness Lead, Cirrus Design Corporation, (Cirrus), 4515 Taylor Circle, Duluth, MN 55811 petitioned the Federal Aviation Administration (FAA) on behalf of Cirrus for an exemption from § 23.1419(a) of Title 14, Code of Federal Regulations (14 CFR). This exemption, if granted, would exempt the model SF50 airplane from the 61-knot stall speed with critical ice accretions.

The petitioner requests relief from the following regulation:

Section 23.1419, "Ice Protection", prescribes, in pertinent part, that—

"If certification with ice protection provisions is desired, compliance with the requirements of this section and other applicable sections of this part must be shown:

(a) An analysis must be performed to establish, on the basis of the airplane's operational needs, the adequacy of the ice protection system for the various components of the airplane. In addition, tests of the ice protection system must be conducted to demonstrate that the airplane is capable of operating safely in continuous maximum and intermittent maximum icing conditions, as described in appendix C of part 25 of this chapter. As used in this section, "Capable of operating safely" means that airplane performance, controllability, maneuverability, and stability must not be less than that required in part 23, subpart B."

The petitioner supports its request with the following information:

Public Interest

"The SF50 is primarily used for cross-country travel and has a high probability of encountering inclement weather—including icing conditions. Increasing the flight envelope of the SF50 to include flight in icing conditions provides a significant increase in safety for SF50 operators—especially those who inadvertently encounter icing conditions. The associated design features required to make flight in icing operations possible adds a significant level of redundancy and increased system capability over the existing design. Also, the flight testing required for this design change will fully prove out the capability of this system and shown that operational safety will have been increased.

Thus, granting this exemption would be in the public interest due to the increased safety associated with the operational envelope expansion without negatively impacting aircraft utility."

Safety Affect

"The following compensating features, as described in AC 23.1419-2D, will ensure the level of safety will not be adversely affected by this exemption.

1. The airplane with critical ice accretions as defined in paragraph 13.b. of this AC complies with the stall warning requirements of § 23.207.

The SF50 maintains the required stall margin and does not cause nuisance warnings as required by § 23.207. This will be shown by flight test and documented in the flight test reports submitted to the FAA.

2. The AFM performance data in icing conditions reflects the higher stall and operating speeds.

The AFM supplement for flight in icing equipped airplanes includes the performance data to be used when flying in icing conditions and/or with known aircraft ice accretions. These speeds have been determined by flight test and documented in the flight test reports submitted to the FAA.

3. The airplane with critical ice accretions has acceptable stall characteristics and is safely controllable with normal piloting skill as required by § 23.201 and § 23.203.

Flight testing with simulated critical ice accretions was accomplished showing acceptable stall characteristics as required by § 23.201 and § 23.203 and accounting for normal piloting skill as required by § 23.141. This was documented in the flight test reports submitted to the FAA.

4. The tire requirements of § 23.733 and brake requirements of § 23.735 are met with the higher stall and operating speeds.

Cirrus has shown that the existing tires and brake system will meet the requirements of § 23.733 and § 23.735, respectively. This was shown by analysis and documented in the design report submitted to the FAA.

5. The ground handling requirements of § 23.231, § 23.233 and § 23.235 are met with higher landing speeds.

Cirrus conducted ground handling tests during the simulated ice shape flight tests and found no adverse handling characteristics.

6. All other airplane system or testing requirements that could be affected by higher operating speeds, such as autopilot and flight director gains are evaluated.

The autopilot and flight director were evaluated during the flight test program and documented in the natural icing flight test report submitted to the FAA.

7. Each seat/restraint system would have to include a safety belt and shoulder harness with a metal-to-metal latching device.

The SF50 utilizes a seat restraint system that includes safety belts and shoulder harnesses with metal-to-metal latching devices for all seven pilot/occupant seats.

8. The airplane certification basis would have to include § 23.1091 at amendment 23-51 and § 23.1093 at amendment 23-51 to provide the latest regulations for engine operation in icing conditions.

The certification basis for the SF50 was established at amendment 23-62 and includes § 23.1091 and § 23.1093 at amendment 23-51. Compliance for each of these regulations will be addressed as part of this type certification project and documented in the design report submitted to the FAA.

9. The airplane certification basis would have to include § 23.995 at amendment 23-29.

The certification basis for the SF50 was established at amendment 23-62 and includes § 23.995 at amendment 23-29. The existing compliance shown for this regulation was not affected by this type design change."

A summary of the petition was published in the Federal Register on April 12, 2016 (81 FR 21646). No comments were received.

The FAA's analysis is as follows:

The FAA finds that the model SF50 incorporates the compensating features listed in Advisory Circular 23.1419-2D, Certification of Part 23 Airplanes for Flight in Icing

Conditions, with the exception that the airplane with no ice accretions does not meet the 61 knot stall speed requirement of § 23.49, Stalling speed, paragraph (c). This is acceptable, since the most critical compensating feature of stall warning with critical ice accretions is provided. The FAA also finds that pilot type rating training per § 61.31, Type rating requirements, additional training, and authorization requirements, paragraph (h), must address the pertinent aspects of the higher stall warning, stall, and operating speeds in icing conditions.

The FAA's Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 106(f), 40113 and 44701, delegated to me by the Administrator, Cirrus Design Corporation is granted an exemption from 14 CFR § 23.1419(a) to the extent necessary to allow Cirrus to exempt the model SF50 airplane from the 61-knot stall speed with critical ice accretions, subject to the conditions and limitations listed below.

Conditions and Limitations

1. Cirrus Design Corporation must ensure that type rating training includes the following:

   a) AFM Limitations/Procedures for Activation of Ice Protection

   b) Stall Warning/Stick Pusher

      i. Why activating ice protection system is important—ice has significant increase in stall speed, stall warning speed needs to be increased.

      ii. Increased icing speeds, and stall warning and stick pusher schedule.

   c) Icing encounter on approach

      i. Cirrus must determine a procedure if icing is encountered on approach or landing phase of flight.

      ii. For airplanes with large stall warning/stick pusher schedule change for icing or single pilot airplanes, if icing conditions are anticipated or possible at destination, activate ice protection prior to configuring for approach.

   d) Performance

      i. Landing distance required with increased icing speeds

      ii. Weight limits in icing (if applicable)

iii. If icing conditions are anticipated or possible at destination, consider performance in pre-flight planning.

Issued in Kansas City, MO, on June 23, 2016.

//SIGNED//

William Schinstock
Acting Manager, Small Airplane Directorate
Aircraft Certification Service

Project No.: ACE-16-0001-E

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