(3) The factor with wing flaps extended as specified in CS–VLA 345.

(f) *Kinds of operation.* The kinds of operation (day VFR or day and night VFR, whichever is applicable) in which the aeroplane may be used, must be stated. The minimum equipment required for the operation must be listed.

(g) Powerplant limitations. The following information must be furnished:

(1) Limitation required by CS–VLA 1521.

(2) Information necessary for marking the instruments required by CS–VLA 1549 to 1553.

(3) Fuel and oil designation.

(4) For two-stroke engines, fuel/oil ratio.

(h) Placards. Placards required by CS–VLA 1555 to 1561 must be presented.

Issued in Kansas City, Missouri, on August 12, 2013.

Earl Lawrence,

Manager, Small Airplane Directorate, Aircraft Certification Service.

[FR Doc. 2013–20151 Filed 8–16–13; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. FAA–2013–0413; Special Conditions No. 23–259–SC]

Special Conditions: Cessna Aircraft Company, Model J182T; Diesel Cycle Engine Installation

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Cessna Aircraft Company (Cessna) Model J182T airplane. This airplane will have a novel or unusual design feature(s) associated with the installation of an aircraft diesel engine (ADE). 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.

DATES: *Effective Date:* August 19, 2013.

FOR FURTHER INFORMATION CONTACT: Mr. Peter Rouse, Federal Aviation Administration, Small Airplane Directorate, Aircraft Certification Service, 901 Locust, Room 301, Kansas City, MO 64106; telephone (816) 329–4135; facsimile (816) 329–4090.

SUPPLEMENTARY INFORMATION:

Background

On April 2, 2012, Cessna applied for an amendment to Type Certificate No. 3A13 to include the new Model J182T with the Societe de Motorisation Aeronautiques (SMA) Engines, Inc. SR305–230E–C1 which is a four-stroke, air cooled, diesel cycle engine that uses turbine (jet) fuel. The Model No. J182T, which is a derivative of the T182 currently approved under Type Certificate No. 3A13, is an aluminum, four place, single engine airplane with a cantilever high wing, with the SMA SR305–230E–C1 diesel cycle engine and associated systems installed.

In anticipation of the reintroduction of diesel engine technology into the small airplane fleet, the FAA issued Policy Statement PS–ACE100–2002–004 on May 15, 2004, which identified areas of technological concern. Refer to this policy for a detailed summary of the FAA's development of diesel engine requirements.

The general areas of concern involving the application of a diesel cycle engine are:

- The power characteristics of the engine,
- the use of turbine fuel in an airplane class that is typically powered by gasoline fueled engines,
- the vibration characteristics, both normal and with an inoperative cylinder,
- anticipated use of an electronic engine control system,
- the appropriate limitations and indications for a diesel cycle engine, and
- the failure modes of a diesel cycle engine.

A historical record review of diesel engine use in aircraft and part 23 identified these concerns. The review identified specific regulatory areas requiring evaluation for applicability to diesel engine installations. These concerns are not considered universally applicable to all types of possible diesel engines and diesel engine installations. However, after reviewing the Cessna installation, the SMA engine type, the SMA engine requirements, and Policy Statement PS–ACE100–2002–004, the FAA proposes engine installation and fuel system special conditions. The SMA engine has a Full Authority Digital Engine Control (FADEC), which also requires special conditions. The FADEC special conditions will be issued in a separate notice.

Type Certification Basis

Under the provisions of § 21.101, Cessna must show that the J182T meets the applicable provisions of the regulations incorporated by reference in Type Certificate No. 3A13 or the applicable regulations in effect on the date of application for the change to the model T182T. The regulations incorporated by reference in the type certificate are commonly referred to as the ''original type certification basis.'' In addition, the J182T certification basis includes special conditions and equivalent levels of safety.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 23) do not contain adequate or appropriate safety standards for the J182T 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 J182T 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.

The FAA issues special conditions, as defined in § 11.19, under § 11.38 and they become part of the type certification basis under § 21.101.

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.

Novel or Unusual Design Features

The J182T will incorporate the following novel or unusual design features: The installation of an ADE.

Discussion

Several major concerns were identified in developing FAA policy. These include installing the diesel engine and noting its vibration levels under both normal operating conditions and when one cylinder is inoperative. The concerns also include accommodating turbine fuels in airplane systems that have generally evolved based on gasoline requirements, anticipated use of a FADEC to control the engine, and appropriate limitations and indications for a diesel engine powered airplane. The general concerns associated with the aircraft diesel engine installation are as follows:

Installation and Vibration Requirements
Fuel and Fuel System Related Requirements
Limitations and Indications

Installation and Vibration Requirements: These special conditions include requirements similar to the

requirements of § 23.901(d)(1) for turbine engines. In addition to the requirements of § 23.901 applied to reciprocating engines, the applicant will be required to construct and arrange each diesel engine installation to result in vibration characteristics that do not exceed those established during the type certification of the engine. These vibration levels must not exceed vibration characteristics that a previously certificated airframe structure has been approved for, unless such vibration characteristics are shown to have no effect on safety or continued airworthiness. The engine installation must be shown to be free of whirl mode flutter and also any one cylinder inoperative flutter effects. The engine limit torque design requirements as specified in § 23.361 are also modified.

An additional requirement to consider vibration levels and/or effects of an inoperative cylinder was imposed. Also, a requirement to evaluate the engine design for the possibility of, or effect of, liberating high-energy engine fragments, in the event of a catastrophic engine failure, requirements was added.

Fuel and Fuel System Related Requirements: Due to the use of turbine fuel, this airplane must comply with the requirements in § 23.951(c). In addition, the fuel flow requirements of § 23.955(c) are modified to be reflective of the diesel engine operating characteristics.

Section 23.961 will be complied with using the turbine fuel requirements. These requirements will be substantiated by flight-testing as described in Advisory Circular (AC) 23–8C, Flight Test Guide for Certification of Part 23 Airplanes.

This special condition specifically requires testing to show compliance to § 23.961 and adds the possibility of testing non-aviation diesel fuels.

To ensure fuel system compatibility and reduce the possibility of misfueling, and discounting the first clause of § 23.973(f) referring to turbine engines, the applicant will comply with § 23.973(f).

Due to the use of turbine fuel, the applicant will comply with § 23.977(a)(2), and § 23.977(a)(1) will not apply. ''Turbine engines'' will be interpreted to mean ''aircraft diesel engine'' for this requirement. An additional requirement to consider the possibility of fuel freezing was imposed.

Due to the use of turbine fuel, the applicant will comply with § 23.1305(c)(8).

Due to the use of turbine fuel, the applicant must comply with § 23.1557(c)(1)(ii). Section 23.1557(c)(1)(ii) will not apply. ''Turbine engine'' is interpreted to mean ''aircraft diesel engine'' for this requirement.

Limitations and Indications

Section 23.1305 will apply, except that the critical engine parameters for this installation that will be displayed include:

(1) Power setting, in percentage, and

(2) Fuel temperature.

Due to the use of turbine fuel, the requirements for § 23.1521(d), as applicable to fuel designation for turbine engines, as well as compliance to § 23.1557(c)(1)(ii) will be in lieu of § 23.1557(c)(1)(i).

Discussion of Comments

Notice of final special conditions No. 23–259–SC, with request for comments, for Cessna Aircraft Company, Model J182T was published in the **Federal Register** on May 16, 2013 (78 FR 28719). One comment was received from Cessna Aircraft Company indicating AC–23–8B is referenced in the ''Discussion'' section of this special condition; however, AC 23–8C is used in ''The Special Conditions'' section. It was the FAA's intent to reference the current advisory circular, AC 23–8C, throughout this document. Compliance with the current AC 23–8, regardless of revision version, is required. These final special conditions corrects this oversight by changing the reference to AC 23–8B to AC 23–8C in the ''Discussion'' section above.

Applicability

As discussed above, these special conditions are applicable to the Model J182T. Should Cessna 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 airplane. It is not a rule of general applicability and 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 21.101; 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 Model J182T airplanes.

1. Engine Torque (Provisions Similar to § 23.361(b)(1) and (c)(3))

a. For diesel engine installations, the engine mounts and supporting structure must be designed to withstand the following:

(1) A limit engine torque load imposed by sudden engine stoppage due to malfunction or structural failure.

(2) The effects of sudden engine stoppage may alternatively be mitigated to an acceptable level by utilization of isolators, dampers clutches, and similar provisions, so unacceptable load levels are not imposed on the previously certificated structure.

b. The limit engine torque to be considered under § 23.361(a) must be obtained by multiplying the mean torque by a factor of four for diesel cycle engines.

(1) If a factor of less than four is used, it must be shown that the limit torque imposed on the engine mount is consistent with the provisions of § 23.361(c). In other words, it must be shown that the use of the factors listed in § 23.361(c)(3) will result in limit torques on the mount that are equivalent to or less than those imposed by a conventional gasoline reciprocating engine.

2. Flutter—(Compliance With § 23.629(e)(1) and (e)(2) Requirements)

The flutter evaluation of the airplane done in accordance with § 23.629 must include—

(a) Whirl mode degree of freedom which takes into account the stability of the plane of rotation of the propeller and significant elastic, inertial, and aerodynamic forces, and

(b) Propeller, engine, engine mount and airplane structure stiffness and damping variations appropriate to the particular configuration, and

(c) The flutter investigation will include showing the airplane is free from flutter with one cylinder inoperative.

3. Powerplant—Installation (Provisions Similar to § 23.901(d)(1) for Turbine Engines)

Considering the vibration characteristics of diesel engines, the applicant must comply with the following:

a. Each diesel engine installation must be constructed and arranged to result in vibration characteristics that—

(1) Do not exceed those established during the type certification of the engine; and

(2) Do not exceed vibration characteristics that a previously certificated airframe structure has been approved for—

(i) Unless such vibration characteristics are shown to have no effect on safety or continued airworthiness, or

(ii) Unless mitigated to an acceptable level by utilization of isolators, dampers clutches, and similar provisions, so that unacceptable vibration levels are not imposed on the previously certificated structure.

4. Powerplant—Fuel System—Fuel System With Water Saturated Fuel (Compliance With § 23.951(c) Requirements)

Considering the fuel types used by diesel engines, the applicant must comply with the following:

a. Each fuel system for a diesel engine must be capable of sustained operation throughout its flow and pressure range with fuel initially saturated with water at 80 °F and having 0.75cc of free water per gallon added and cooled to the most critical condition for icing likely to be encountered in operation.

b. Methods of compliance that are acceptable for turbine engine fuel systems requirements of § 23.951(c) are also considered acceptable for this requirement.

5. Powerplant—Fuel System—Fuel Flow (Compliance With § 23.955 Requirements)

In place of § 23.955(c), the engine fuel system must provide at least 100 percent of the fuel flow required by the engine, or the fuel flow required to prevent engine damage, if that flow is greater than 100 percent. The fuel flow rate must be available to the engine under each intended operating condition and maneuver. The conditions may be simulated in a suitable mockup. This flow must be shown in the most adverse fuel feed condition with respect to altitudes, attitudes, and any other condition that is expected in operation.

6. Powerplant—Fuel System—Fuel System Hot Weather Operation (Compliance With § 23.961 Requirements)

In place of compliance with § 23.961, the applicant must comply with the following:

a. 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, or for aircraft equipped with diesel cycle engines that use turbine or diesel type fuels, the initial temperature must be 110 °F, −0°, +5° or the maximum outside air temperature for which approval is requested, whichever is more critical.

b. The fuel system must be in an operational configuration that will yield the most adverse, that is, conservative results.

c. To comply with this requirement, the applicant must use the turbine fuel requirements and must substantiate these by flight-testing, as described in Advisory Circular (AC) 23–8C, Flight Test Guide for Certification of Part 23 Airplanes.

7. Powerplant—Fuel System—Fuel Tank Filler Connection (Compliance With § 23.973(f) Requirements)

In place of compliance with § 23.973(e), the applicant must comply with the following:

For airplanes that operate on turbine or diesel type fuels, the inside diameter of the fuel filler opening must be no smaller than 2.95 inches.

8. Powerplant—Fuel System—Fuel Tank Outlet (Compliance With § 23.977(a)(2) Requirements)

In place of compliance with § 23.977(a)(1), the applicant will comply with the following:

There must be a fuel strainer for the fuel tank outlet or for the booster pump. This strainer must, for diesel engine powered airplanes, prevent the passage of any object that could restrict fuel flow or damage any fuel system component.

9. Equipment—General—Powerplant Instruments (Compliance With § 23.1305 and § 91.205 Requirements)

In place of compliance with § 23.1305, the applicant will comply with the following:

Below are required powerplant instruments:

(a) A fuel quantity indicator for each fuel tank, installed in accordance with § 23.1337(b).

(b) An oil pressure indicator.

(c) An oil temperature indicator.

(d) An oil quantity measuring device for each oil tank which meets the requirements of § 23.1337(d).

(e) A tachometer indicating propeller speed.

(f) An indicating means for the fuel strainer or filter required by § 23.997 to indicate the occurrence of contamination of the strainer or filter before it reaches the capacity established in accordance with § 23.997(d).

Alternately, no indicator is required if the engine can operate normally for a specified period with the fuel strainer exposed to the maximum fuel contamination as specified in MIL–5007D. Additionally, provisions for replacing the fuel filter at this specified period (or a shorter period) are included in the maintenance schedule for the engine installation.

(g) Power setting either in percentage power, or through the use of manifold pressure.

(h) Fuel temperature indicator.

(i) Fuel flow indicator (engine fuel consumption) or fuel pressure.

If percentage power is used in place of manifold pressure, compliance to § 91.205 will be accomplished with the following:

The diesel engine has no manifold pressure gauge as required by § 91.205, in its place, the engine instrumentation as installed is to be approved as equivalent. The Type Certification Data Sheet (TCDS) is to be modified to show power indication will be accepted to be equivalent to the manifold pressure indication.

10. Operating Limitations and Information—Powerplant Limitations—Fuel Grade or Designation (Compliance With § 23.1521 Requirements)

All engine parameters that have limits specified by the engine manufacturer for takeoff or continuous operation must be investigated to ensure they remain within those limits throughout the expected flight and ground envelopes (e.g. maximum and minimum fuel temperatures, ambient temperatures, as applicable, etc.). This is in addition to the existing requirements specified by § 23.1521(b) and (c). If any of those limits can be exceeded, there must be continuous indication to the flight crew of the status of that parameter with appropriate limitation markings.

Instead of compliance with § 23.1521(d), the applicant must comply with the following:

The minimum fuel designation (for diesel engines) must be established so it is not less than required for the operation of the engine within the limitations in paragraphs (b) and (c) of § 23.1521.

11. Markings and Placards—Miscellaneous Markings and Placards—Fuel, and Oil, Filler Openings (Compliance With § 23.1557(c)(1)(ii) Requirements)

Instead of compliance with § 23.1557(c)(1)(i), the applicant must comply with the following:

Fuel filler openings must be marked at or near the filler cover with—

For diesel engine-powered airplanes—

(a) The words ''Jet Fuel''; and

(b) The permissible fuel designations, or references to the Airplane Flight Manual (AFM) for permissible fuel designations.

(c) A warning placard or note that states the following or similar:

''Warning—this airplane is equipped with an aircraft diesel engine; service with approved fuels only.''

The colors of this warning placard should be black and white.

12. Powerplant—Fuel System—Fuel-Freezing

If the fuel in the tanks cannot be shown to flow suitably under all possible temperature conditions, then fuel temperature limitations are required. These limitations will be considered as part of the essential operating parameters for the aircraft. Limitations will be determined as follows:

(a) The takeoff temperature limitation must be determined by testing or analysis to define the minimum fuel cold-soaked temperature that the airplane can operate on.

(b) The minimum operating temperature limitation must be determined by testing to define the minimum acceptable operating temperature after takeoff (with minimum takeoff temperature established in (1) above).

13. Powerplant Installation—Vibration Levels

Vibration levels throughout the engine operating range must be evaluated and:

(a) Vibration levels imposed on the airframe must be less than or equivalent to those of the gasoline engine; or

(b) Any vibration level higher than that imposed on the airframe by the replaced gasoline engine must be considered in the modification and the effects on the technical areas covered by the following paragraphs must be investigated:

14 CFR part 23, §§ 23.251; 23.613; 23.627; 23.629 (or CAR 3.159, as applicable to various models); 23.572; 23.573; 23.574 and 23.901.

Vibration levels imposed on the airframe can be mitigated to an acceptable level by utilization of isolators, damper clutches, and similar provisions so that unacceptable vibration levels are not imposed on the previously certificated structure.

14. Powerplant Installation—One Cylinder Inoperative

Tests or analysis, or a combination of methods, must show that the airframe can withstand the shaking or vibratory forces imposed by the engine if a cylinder becomes inoperative. Diesel engines of conventional design typically have extremely high levels of vibration when a cylinder becomes inoperative. Data must be provided to the airframe installer/modifier so either appropriate design considerations or operating procedures, or both, can be developed to prevent airframe and propeller damage.

15. Powerplant Installation—High Energy Engine Fragments

It may be possible for diesel engine cylinders (or portions thereof) to fail and physically separate from the engine at high velocity (due to the high internal pressures). This failure mode will be considered possible in engine designs with removable cylinders or other non-integral block designs. The following is required:

(a) It must be shown that the engine construction type (massive or integral block with non-removable cylinders) is inherently resistant to liberating high energy fragments in the event of a catastrophic engine failure; or

(b) It must be shown by the design of the engine, that engine cylinders, other engine components or portions thereof (fragments) cannot be shed or blown off of the engine in the event of a catastrophic engine failure; or

(c) It must be shown that all possible liberated engine parts or components do not have adequate energy to penetrate engine cowlings; or

(d) Assuming infinite fragment energy, and analyzing the trajectory of the probable fragments and components, any hazard due to liberated engine parts or components will be minimized and the possibility of crew injury is eliminated. Minimization must be considered during initial design and not presented as an analysis after design completion.

Issued in Kansas City, Missouri, on August 12, 2013.

Earl Lawrence,

Manager, Small Airplane Directorate, Aircraft Certification Service.

[FR Doc. 2013–20152 Filed 8–16–13; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA–2013–0195; Directorate Identifier 2013–NE–08–AD; Amendment 39–17553; AD 2013–16–15]

RIN 2120–AA64

Airworthiness Directives; General Electric Company Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: We are adopting a new airworthiness directive (AD) for all General Electric Company (GE) model GEnx–2B67B turbofan engines with booster anti-ice (BAI) air duct, part number (P/N) 2469M32G01, and support bracket, P/N 2469M46G01, installed. This AD was prompted by reports of cracks in the BAI air duct. This AD requires initial and repetitive visual inspections of the BAI air duct, removal from service of the BAI air duct if it fails inspection and, as a mandatory terminating action, the installation of new BAI air duct support brackets. We are issuing this AD to prevent failure of the BAI air duct, resulting in an in-flight shutdown of one or more engines, loss of thrust control, and damage to the airplane.

DATES: This AD is effective September 23, 2013.

ADDRESSES: For service information identified in this AD, contact General Electric Company, GE Aviation, Room 285, One Neumann Way, Cincinnati, OH; phone: 513–552–3272; email: *geae.aoc@ge.com*. You may view this service information at the FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781–238–7125.

Examining the AD Docket

You may examine the AD docket on the Internet at *http://www.regulations.gov*; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and other information. The address for the Docket Office (phone: 800–647–5527) is Document Management Facility, U.S. Department of Transportation, Docket Operations, M–30, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC 20590.