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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 33

[Docket No. 95-ANE-46; 33-ANE-05]

Special Conditions: Turbomeca Model Arriel 2S1 Turboshift Engine

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Turbomeca Model Arriel 2S1 turboshift engine. This engine will have novel or unique engine ratings that are not defined by the applicable airworthiness regulations. These special conditions contain the additional safety standards which the Administrator considers necessary to establish a level of safety equivalent to that established by the airworthiness standards of part 33 of the Federal Aviation Regulations (FAR).

EFFECTIVE DATE: May 15, 1996.

FOR FURTHER INFORMATION CONTACT: Chung Hsieh, Engine and Propeller Standards Staff, ANE-110, Engine and Propeller Directorate, Aircraft Certification Service, FAA, New England Region, 12 New England Executive Park, Burlington, Massachusetts 01803-5229; (617) 238-7115; Fax (617) 238-7199.

SUPPLEMENTARY INFORMATION:

Background

On February 25, 1994, Turbomeca applied for an amendment to type certificate E19EU to include a new Model Arriel 2S1 turboshift engine. The Model Arriel 2S1 turboshift engine will be rated at 30-Second and 2-Minute one engine inoperative (OEI), 30-Minute OEI, Continuous OEI, Takeoff, and Maximum Continuous ratings.

The applicable airworthiness requirements do not contain 30-Second

OEI and 2-Minute OEI rating definitions, and do not contain adequate or appropriate safety standards for the type certification of these new and unusual engine ratings.

Type Certification Basis

Under the provisions of section 21.101 of the Federal Aviation Regulations (FAR), Turbomeca must show that the Model Arriel 2S1 turboshift engine meets the applicable provisions of the regulations as referenced in Type Certificate No. E19EU or the applicable regulations in effect on the date of the application. The regulations incorporated by reference in Type Certificate No. E19EU are Section 21.29 and part 33, effective February 1, 1965, as amended by Amendments 33-1 through 33-5, Turbomeca, however, has elected, under section 21.17, to comply with Amendments 33-1 through 33-14. The FAA has determined that the use of the airworthiness standards as amended by the later amendments for type certification of this derivative engine will enhance safety and therefore accepts the Turbomeca's proposal.

The Administrator finds that the applicable airworthiness regulations in part 33, as amended, do not contain adequate or appropriate safety standards for the Turbomeca Model Arriel 2S1 turboshift engine because of the new and unique engine ratings. Therefore, the Administrator prescribes special conditions under the provisions of section 21.16 to establish a level of safety equivalent to that established in the regulations.

Special conditions, as appropriate, are issued in accordance with section 11.49 of the FAR after public notice and opportunity for comment, as required by sections 11.28 and 11.29(b), and become part of the type certification basis in accordance with section 21.101(b)(2).

Discussion of Comments

Interested persons have been afforded the opportunity to participate in the making of these special conditions. No comments were received on the special conditions as proposed. However, comments addressing numerous issues were received in response to proposed special conditions for a similar engine program, Allison Engine Company (AE) Model 250 turboshift engine. These comments were discussed in Notice No. SC-95-04-NE published in the Federal Register on November 27, 1995 (FR 60

58204). As a result of those comments, changes to the proposals and for clarification in certain sections of the special conditions were made. The FAA has determined that those changes made to the special conditions for AE Model 250 engine are also applicable to Turbomeca Arriel Model 2S1 engine and therefore they are adopted in this Final special conditions. In addition, some editorial changes have also been made to section 33.27 of this Final special condition for clarification.

After careful review of the available data, the FAA determined that air safety and the public interest require the adoption of the special conditions with the changes described previously.

Conclusion

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

List of Subjects in 14 CFR Part 33

Air transportation, Aircraft, Aviation safety, Safety.

PART 33—[AMENDED]

The authority citation for these special conditions continues to read 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 the Turbomeca Model 2S1 turboshift engine:

§ 33.4 Instructions for Continued Airworthiness.

In addition to the requirements of section 33.4, the mandatory inspection and maintenance actions required following the use of the 30-Second or 2-Minute OEI rating must be included in the airworthiness limitations section of the appropriate engine manuals.

§ 33.7 Engine Ratings and Operating Limitations.

In addition to the requirements of section 33.7, the following ratings are defined as:

(a) Rated 30-Second one engine inoperative (OEI) power: The approved brake horsepower developed under static conditions at specified altitudes and temperatures within the operating limitations established for the engine under part 33 and this special conditions, for continued one-flight operation after the failure of one engine in multi-engine rotorcraft, limited to three periods of use, no longer than 30 seconds each, in any one flight, and followed by mandatory inspection and prescribed maintenance action.

(b) Rated 2-Minute OEI power: The approved brake horsepower, developed under static conditions at specified altitudes and temperatures, within the operating limitations established for the engine under part 33 and this special conditions, for continued one-flight operation after the failure of one engine in multi-engine rotorcraft, limited to three periods of use, of no longer than 2 minutes each in any one flight, and followed by mandatory inspection and prescribed maintenance action.

§ 33.27 Turbine, Compressor, Fan, and Turbo-supercharger Rotors.

For 2-minute and 30-second OEI ratings, in addition to the requirements of section 33.27(b), turbine and compressor rotors must have sufficient strength to withstand the conditions specified in one of the following tests for the most critically stressed rotor component of each turbine and compressor including integral drum rotors and centrifugal compressor, as determined by analysis or other acceptable means. The selection of the test from the following paragraph (a) or (b) of this section is determined by the speed defined in paragraph (a)(2) or (b)(2), whichever is higher.

(a) Test for a period of two and one-half minutes—

(1) At its maximum operating temperature except as provided in paragraph 33.27(c)(2)(iv); and

(2) At the highest speed determined, in accordance with section 33.27(c)(2)(i) through (iv).

(3) This test may be performed using a separate test vehicle as desired.

(b) Test for a period of 5 minutes—

(1) At its maximum operating temperature except as provided in paragraph 33.27(c)(2)(iv); and

(2) At 100 percent of the highest speed that would result from failure of the most critical component of each turbine and compressor or system in a representative installation of the engine when operating at 30-Second and 2-Minute OEI rating conditions, and

(3) The test speed must take into account minimum material properties,

maximum operating temperature, and the most adverse dimensional tolerances.

(4) This test may be performed using a separate test vehicle as desired.

Following the test, rotor growth and distress beyond dimensional limits for an overspeed condition is permitted for 30-Second and 2-Minute OEI rating only, provided the structural integrity of the rotor is maintained, as shown by a procedure acceptable to the Administrator.

§ 33.29 Instrument Connection.

In addition to the requirements of section 33.29, the engine must have a provision for a means to:

(a) Alert the pilot when the engine is at the 30-Second OEI and a 2-Minute OEI power levels;

(b) Determine, in a positive manner, that the engine has been operated at each rating; and

(c) Determine the elapsed time of operation of each rating.

§ 33.67 Fuel System.

In addition to the requirements of section 33.67, the engine must provide for a means for automatic availability and automatic control of the 30-Second OEI power; and engine test runs must be performed to demonstrate automatic functioning of both of these means.

§ 33.83 Vibration Test.

In addition to the requirements of section 33.83, the following additional test requirements must be considered under 33.83(a): For 30-Second and 2-Minute OEI rating conditions, the vibration survey shall cover the ranges of power, and both the physical and corrected rotational speeds for each rotor system, corresponding to operations throughout the range of ambient conditions in the declared flight envelope, from the minimum rotor speed up to 103 percent of the maximum rotor speed permitted for 2-Minute OEI rating, and up to 100 percent of the maximum rotor speed permitted for 30-Second OEI rating speed. If there is any indication of a stress peak arising at the highest physical or corrected rotational speeds, the surveys shall be extended sufficiently to reveal the maximum stress values present except that the extension needs not cover more than a further 2 percent beyond those speed.

§ 33.85 Calibration Test.

In addition to the requirements of section 33.85, tests performed at the 30-Second and 2-Minute OEI ratings, during the applicable additional endurance test prescribed in section

33.87 as amended by these special conditions, may be used to show compliance with the requirements of section 33.85.

§ 33.87 Endurance Test.

In addition to the requirements of section 33.87, an engine test must be conducted four times, using the following test sequence, for a total of not less than 120 minutes:

(a) Takeoff Power—three minutes at rated takeoff power.

(b) 30-Second OEI power—thirty seconds at rated 30-Second OEI power.

(c) 2-Minute OEI power—two minutes at rated 2-Minute OEI power.

(d) 30-Minute OEI, Continuous OEI, or Maximum Continuous power—five minutes at rated 30-Minute OEI power, or rated Continuous OEI power, or rated Maximum Continuous power, whichever is greatest, except that during the first test sequence this period shall be 65 minutes.

(e) 50 Percent takeoff power—one minute at 50 percent takeoff power.

(f) 30-Second OEI power—thirty seconds at rated 30-Second OEI power.

(g) 2-Minute OEI power—two minutes at rated 2-Minute OEI power.

(h) Idle power—one minute at idle power.

§ 33.88 Engine Overtemperature Test.

In addition to the requirements of section 33.88, the following must be performed:

(a) For engines that do not provide a means for temperature limiting; conduct a test for a period of five minutes at the maximum permissible power-on RPM, with the gas temperature at least 75 degrees Fahrenheit higher than the 30-Second OEI rating operating temperature limit.

(b) For engines that provide a means for temperature limiting; conduct a test for a period of four minutes at the maximum permissible power-on RPM, with the gas temperature at least 35 degrees Fahrenheit higher than the 30-Second OEI rating operating temperature limit.

(c) A separate test engine may be used for each test.

(d) Following the test, rotor assembly growth and distress beyond serviceable limits for an overtemperature condition is permitted, provided the structural integrity of the rotor assembly is maintained, as shown by a procedure that is acceptable to the Administrator.

§ 33.93 Teardown Inspection.

In addition to the requirements of section 33.93, this special condition requires that the engine be completely disassembled after completing the

additional testing of section 33.87. The engine must comply with section 33.93(a), but it may exhibit deterioration in excess of that permitted in section 33.93(b), and may include some engine parts and components that may be unsuitable for further use. It must be shown by procedures approved by the Administrator that the structural integrity of the engine, including mounts, cases, bearing supports, shafts and rotors, is maintained.

Issued in Burlington, Massachusetts, on April 3, 1996.

James C. Jones,

Acting Manager, Engine & Propeller Directorate, Aircraft Certification Service.

[FR Doc. 96-9252 Filed 4-12-96; 8:45 am]

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14 CFR Part 39

[Docket No. 95-NM-131-AD; Amendment 39-9565; AD 96-07-15]

Airworthiness Directives; McDonnell Douglas Model DC-9, DC-9-80, and MD-90-30 Series Airplanes, Model MD-88 Airplanes, and C-9 (Military) Series Airplanes

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule.

SUMMARY: This amendment supersedes an existing airworthiness directive (AD), applicable to certain McDonnell Douglas Model DC-9-80 series airplanes and Model MD-88 airplanes, that currently requires an inspection to detect chafing of or damage to the wire bundle in the overhead switch panel of the cockpit, application of spiral wrap to the wire bundle, and corrective actions, if necessary. That AD was prompted by reports of chafed and shorted wires that resulted in smoke emanating from the overhead switch panel of the cockpit. This amendment expands the applicability of the rule to include certain Model DC-9 and MD-90-30 series airplanes, and C-9 (military) series airplanes. This amendment also adds a requirement to reroute the wire bundle to preclude chafing and damage. The actions specified by this AD are intended to prevent the potential for fire and uncontrolled smoke throughout the cockpit as a result of chafing and shorting in the electrical wire bundles.

DATES: Effective May 15, 1996.

The incorporation by reference of certain publications, as listed in the regulations, is approved by the Director of the Federal Register as of May 15, 1996.

The incorporation by reference of McDonnell Douglas Alert Service Bulletin DC9-24A157, dated April 11, 1995, as listed in the regulations, was approved previously by the Director of the Federal Register as of May 19, 1995 (60 FR 21977, May 4, 1995).

ADDRESSES: The service information referenced in this AD may be obtained from McDonnell Douglas Corporation, 3855 Lakewood Boulevard, Long Beach, California 90846, Attention: Technical Publications Business Administration, Department C1-L51 (2-60). This information may be examined at the Federal Aviation Administration (FAA), Transport Airplane Directorate, Rules Docket, 1601 Lind Avenue, SW., Renton, Washington; or at the FAA, Los Angeles Aircraft Certification Office, Transport Airplane Directorate, 3960 Paramount Boulevard, Lakewood, California; or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

FOR FURTHER INFORMATION CONTACT: J. Kirk Baker, Aerospace Engineer, Systems and Equipment Branch, ANM-130L, FAA, Los Angeles Aircraft Certification Office, 3960 Paramount Boulevard, Lakewood, California 90712; telephone (310) 627-5345; fax (310) 627-5210.

SUPPLEMENTARY INFORMATION: A proposal to amend part 39 of the Federal Aviation Regulations (14 CFR part 39) by superseding AD 95-09-10, amendment 39-9213 (60 FR 21977, May 4, 1995), which currently is applicable to certain McDonnell Douglas Model DC-9-80 series airplanes and Model MD-88 airplanes, was published in the Federal Register on September 15, 1995 (60 FR 47901). The action proposed to supersede AD 95-09-10 to continue to require a one-time visual inspection to detect chafing of or damage to the wire bundle in the overhead switch panel of the cockpit, application of spiral wrap to the wire bundle, repair of chafed wire insulation, splicing of damaged wires, and rerouting the wire bundle. The action also proposed to expand the applicability of the rule to include certain Model DC-9 and MD-90-30 series airplanes, and C-9 (military) series airplanes. This amendment also adds a requirement to reroute the wire bundle to preclude chafing and damage.

Interested persons have been afforded an opportunity to participate in the making of this amendment. Due consideration has been given to the comments received.

One commenter supports the proposed rule.

Two commenters request that Model DC-9 series airplanes be excluded from

the applicability of the proposal. One of these commenters states that the FAA has not proven that the potential for chafing of wire bundles exists for Model DC-9 series airplanes. The other commenter states that it has inspected 35 in-service airplanes in its fleet and has found only one chafed wire bundle, and has never, in 25 years of service, found any damaged wire bundles.

The FAA does not concur. Although there have been no reported cases of damage to the wire bundle on any in-service Model DC-9 series airplane, the FAA has received reports of chafing found on the wire bundle on in-service Model DC-9 series airplanes. Therefore, the potential for damage still exists when the wire bundle is improperly routed in the overhead switch panel of the cockpit such that chafing occurs. The FAA has determined that rerouting the wire bundle will prevent the potential for chafing and thereby prevent the potential for a consequent fire and uncontrolled smoke throughout the cockpit.

Two commenters request a revision to paragraph (b) of the proposal to delete the requirement to apply spiral wrap to the wire bundle following findings of chafing or damage to the wire bundle on Model DC-9, MD-90-30, and C-9 (military) series airplanes. The commenters state that these airplanes should not be required to apply spiral wrap, since the proposal also requires rerouting of the wire bundles following application of spiral wrap.

The FAA concurs. Since issuance of the NPRM, the FAA has reviewed and approved McDonnell Douglas Service Bulletins DC9-24-157 and MD90-24-001, both dated November 9, 1995, which describe procedures for rerouting the electrical wiring in the overhead switch panel to clear the cabin temperature indicator housing. As explained in the preamble to AD 95-09-10, the FAA considers the application of spiral wrap to be only a temporary measure to protect against chafing of the wire bundle. The FAA's intent was to require, in AD 95-09-10, application of spiral wrap only for Model DC-9-80 series airplanes and Model MD-88 airplanes, since the procedures to reroute the wire bundles for these airplanes had not yet been developed at the time AD 95-09-10 was issued. Since procedures for rerouting the wire bundles have now been developed for all airplanes, the FAA finds that operators must reroute the wire bundles immediately following findings of chafed or damaged wire bundles on Model DC-9, MD-90-30, and C-9 (military) series airplanes. The FAA has determined that applying the spiral