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UNITED STATES OF AMERICA
FEDERAL AVIATION AGENCY
WASHINGTON, D. C.

Civil Air Regulations Amendment 13-3
Effective: October 1, 1959
Issued: August 24, 1959

PART 13—AIRCRAFT ENGINE AIRWORTHINESS

Miscellaneous Amendments Resulting From the 1958 Annual Airworthiness Review

There are contained herein amendments as a result of the 1958 Annual Airworthiness Review.

A provision is being added to § 13.110 to require that the induction system be self-draining in static attitudes to prevent liquid locks and later malfunctioning of the engine.

A provision is being added to § 13.112 to require venting of the crankcase to the atmosphere to prevent pressurization of the crankcase high enough to cause oil leaks which present fire hazards.

A provision is being added to § 13.155 to require that for engines incorporating a multispeed supercharger drive the supercharger be shifted from operation at the lower speed to the higher and the appropriate power be obtained at the higher supercharger speed within 5 seconds. This capability is necessary to prevent supercharger drive system damage resulting from prolonging the time to shift speeds and to assure that the appropriate power can be obtained.

A provision is being added to § 13.210 to require means to indicate functioning of the compressor air bleed system for protection of the engine during icing conditions. This will permit the flight crew to know that the engine portion of the ice protection system is available for use.

Section 13.211 is being amended to require for turbine engines that an electric ignition system (if used) shall have at least two igniters and two separate secondary electric circuits. This will afford reliability similar to that obtained with reciprocating engines employing dual electric ignition systems.

Section 13.217 is being added to provide that the power or thrust of turbine engines can be increased under static conditions from flight idle to 95 percent of the takeoff rating in not over 5 seconds.

Section 13.259 is being added to specify criteria which are intended to assure that engine-actuated propeller controls function without detrimental effect on either the engine or the propeller.

Section 13.260 is being added to establish the airworthiness standard for thrust reversers. Detailed test provisions are specified for reversing systems intended for ground use only. For inflight reversing systems, these basic provisions are intended to be applied together with such other tests as are found necessary by the Administrator to assure the airworthiness of the device. A note is appended to this requirement to clarify the applicability of § 4b.407 to portions of reverser systems which are also integral parts of the engine.

Amendments which were proposed to establish fail safe criteria for automatic engine control systems, to provide that compressor rotors be designed and constructed to provide sufficient strength to withstand damage-inducing factors associated with engine operation, and to provide additional design considerations to assure the structural integrity of turbine rotors, are deferred pending the results of further study of the problems which are involved in these issues. For the same reason, a proposal to add a requirement establishing criteria to prevent unsafe conditions in the event of a single probable failure or malfunction of any single element in the engine, is also deferred.

Interested persons have been afforded an opportunity to participate in the mak-

ing of this amendment (24 F.R. 128), and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, Part 13 of the Civil Air Regulations (14 CFR Part 13, as amended) is hereby amended as follows, effective October 1, 1959:

1. By amending § 13.110 by adding a new paragraph (d) to read as follows:

§ 13.110 Fuel and induction system.

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(d) All passages in the induction system which conduct a mixture of fuel and air shall be self-draining, so as to prevent a liquid lock in the cylinders, in all attitudes which the applicant establishes as those the engine can have when the aircraft in which it is installed is in the static ground attitude.

2. By amending § 13.112 by adding a new paragraph (d) to read as follows:

§ 13.112 Lubrication system.

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(d) The engine shall be designed and constructed in such a manner that the crankcase is vented to the atmosphere so as to preclude leakage of oil resulting from excessive pressure within the crankcase.

§ 13.155 [Amendment]

3. By amending § 13.155 by adding a new sentence at the end thereof to read as follows: "If the engine incorporates a multispeed supercharger drive, the design and construction shall be such that the supercharger can be shifted from operation at the lower speed ratio to the higher and the power appropriate to the manifold pressure and speed settings for maximum continuous power at the higher supercharger speed ratio can be obtained within 5 seconds."

4. By amending § 13.210 by adding a new paragraph (e) to read as follows:

§ 13.210 Fuel and induction system.

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(e) If air is bled from the compressor for protection of the engine in icing conditions, provision shall be made for positive indication that air is being directed to the proper passages.

5. By amending § 13.211 to read as follows:

§ 13.211 Ignition system.

All engines shall be equipped with an ignition system for starting the engine on the ground and in flight. An electric ignition system shall have at least two igniters and two separate secondary electric circuits.

6. By adding a new § 13.217 to read as follows:

§ 13.217 Power or thrust response.

The design and construction of the engine shall be such as to enable an increase, under static conditions, from flight idle power or trust to 95 percent of takeoff power or thrust in not over 5 seconds.

7. By adding a new § 13.259 to read as follows:

§ 13.259 Engine-propeller systems tests.

The following tests shall be conducted, where applicable, with a propeller installed which will be representative of the type used on a typical aircraft installation. They may be included in the endurance run or otherwise performed in a manner acceptable to the Administrator.

(a) Feathering operation: 25 cycles.

(b) Negative torque and/or thrust system operation: 25 cycles from maximum continuous power.

(c) Automatic decoupler operation: 25 cycles from maximum continuous power (if repeated decoupling and recoupling in service is the intended function of the device).

(d) Reverse thrust operation: 175 cycles from the flight-idle position to full reverse and 25 cycles at maximum continuous power from full forward to full reverse thrust. At the end of each cycle the propeller shall be operated in reverse pitch for a period of 30 seconds at the maximum rotational speed [illegible] power declared by the applicant for verse pitch operation.

8. By adding a new § 13.260 and a note to read as follows:

§ 13.260 Thrust reversers.

If the engine incorporates a reverser, the endurance, calibration, operation, and vibration tests prescribed in this part shall be run with the reverser installed. In complying with the provisions of this section, the power control lever shall be moved from one extreme position to the other in not more than one second except, where regimes of control operations are incorporated necessitating scheduling of the power control lever motion in going from one extreme position to the other, a longer period of time shall be acceptable but in no case shall this time exceed 3 seconds. In addition, the tests prescribed in paragraphs (a) and (b) of this section shall be applicable. These tests may be scheduled as part of the endurance run.

(a) If the reverser is intended for use only as a braking means on the ground, 175 reversals shall be made from flight-idle forward thrust to maximum reverse thrust and 25 reversals shall be made from maximum forward to maximum reverse thrust. After each reversal, the reverser shall be operated at full reverse thrust for a period of one minute.

(b) If the reverser is intended for use in flight, the provisions of paragraph (of this section shall apply, together w such other tests as are found necessary by the Administrator to assure the airworthiness of the device.

NOTE: The provisions of § 4b.407 apply to the complete reverser system, including that portion which is an integral part of the engine.

(Secs. 313(a), 601, 603, 72 Stat. 752, 775, 776; 49 U.S.C. 1354(a), 1421, 1423)

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E. R. QUESADA,
Administrator.

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