From W-154

CIVIL AIR REGULATIONS

PART 35
FLIGHT ENGINEER CERTIFICATES

Effective November 15, 1958

CIVIL AERONAUTICS BOARD

WASHINGTON, D. C.

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TITLE 14—CIVIL AVIATION

Chapter I—Civil Aeronautics Board

Subchapter A—Civil Air Regulations

PART 35—FLIGHT ENGINEER CERTIFICATES

REVISION OF PART

Adopted by the Civil Aeronautics Board at its office in Washington, D. C., on the 20th day of August 1958.

Part 35 originally became effective on March 15, 1947, and established requirements for the issuance of flight engineer certificates. Since that time other airman parts have been revised and now differ from present Part 35 in format and terminology. It is, therefore, desirable to revise Part 35 to make it conform more closely to the newer airman parts.

Four Civil Air Regulations draft releases were issued proposing the revision of Part 35. These were Draft Releases 48–6 dated October 25, 1948; 49–5 dated October 5, 1949; 56–5 dated February 28, 1956; and 57–23 dated November 4, 1957.

All of the above-mentioned draft releases proposed that an additional requirement of 5 hours of flight training in the duties of a flight engineer be added to certain of the experience requirements. Current provisions of § 35.6 (a) and (b) of Part 35 permit an applicant with certain diversified practical experience or specialized aeronautical training in the maintenance and repair of aircraft and aircraft engines to meet the experience requirements for a flight engineer certificate even though such an applicant has had no flight experience in the duties of a flight engineer. The principal function of the flight engineer is to assist the pilot members of the crew in the mechanical operation of aircraft during flight. In view of this fact, it is the Board's opinion that an applicant having only practical experience or aeronautical training in the maintenance and repair of aircraft or aircraft engines should also have a minimum of 5 hours of training in flight in the duties of a flight engineer on multiengine aircraft having engines rated at least at 800 h. p. each. This revision contains such a requirement for inflight training. However, this flight experience is not a condition which need be met prior to the applicant's taking the written examination prescribed in § 35.32. Accordingly, a note to this effect is included in § 35.32. In addition, the experience requirements have been changed to permit experience gained on turbine-powered aircraft having thrust equivalent to at least 800 h. p. to be credited toward qualifying for a certificate.

Part 35 was amended on May 1, 1949, by amendment 35–1 which eliminated the requirement that an applicant hold an engineering degree plus one year of practical experience, and required in lieu thereof only that an applicant be a graduate of at least a 2-year specialized aeronautical training course of which at least 6 months shall have been in the maintenance and repair of multiengine aircraft having engines rated at least at 800 h. p. In that amendment the Board did not contemplate that persons holding certain engineering degrees would be precluded from qualifying for a flight engineer certificate. Therefore, because there has been some confusion as to whether such persons would be eligible, a new section is included which contains the provision that an applicant holding a degree in aeronautical, electrical, or mechanical engineering from a recognized college, university, or engineering school and having 6 months practical experience in the maintenance and repair of aircraft having engines rated at least at 800 h. p. each, may qualify for a flight engineer certificate. An applicant qualifying under this requirement is also required to have 5 hours of training in flight in the duties of a flight engineer as discussed above.

In the last draft release (57–23), a change was proposed in the experience requirements which would have permitted an applicant with 400 hours of copilot time on aircraft having 4 or more engines rated at least at 800 h. p. each, or the equivalent in the case of turbine-powered aircraft, to meet the experience requirements for a flight engineer certificate. After further study it is considered that the 400 hours of copilot time would not be the equivalent of the experience requirement of the 200 hours of pilot-in-command time presently required in Part 35. Therefore, no change is being made in the present requirements. In arriving at this decision, the Board has taken into consideration the fact that a copilot who does not meet the 200 hours of pilot-in-command time requirement can continue to qualify for a flight engineer certificate by completing an approved course for the training of a flight engineer.

Current provisions with respect to reexamination after failure require that an applicant produce evidence that he has received an additional 5 hours of instruction in each of the subjects failed where he does not elect to wait 30 days for re-examination. In certain situations, such as where an applicant has failed because of lack of proficiency in unfeathering an engine, it might be unnecessary and even detrimental to the equipment to require 5 hours of additional training. Hence, for the practical examination, this section is amended so that the Administrator may set the required number of hours of additional training required in lieu of the mandatory 5-hour additional instruction period now in effect.

During the past several years, industry has developed synthetic trainers which simulate flight characteristics and performance of corresponding aircraft through virtually all ranges of normal and emergency operations. In addition to the obvious economic advantages of the use of such aircraft simulators in lieu of aircraft, it is apparent that the practical examination of the applicant in certain emergency procedures can be more safely and perhaps more completely accomplished in the aircraft simulator rather than in the aircraft. Therefore, in recognition of the advanced state of design of the aircraft simulator for training purposes, demonstration of the emergency skill requirements in § 35.33 is permitted either by demonstration of proficiency in an aircraft simulator or in the corresponding aircraft. The use of the aircraft simulator for this purpose will, however, be limited to demonstration of competence with respect to emergency duties and procedures where malfunction in the aircraft is simulated. It is the Board's opinion that an applicant's capabilities cannot fully be determined without an actual demonstration of proficiency in flight. Therefore an applicant is still required to demonstrate competence with respect to his normal duties and procedures aboard an aircraft in flight. It was proposed in Draft Release 56–5 that the examination, in flight, with respect to normal duties, might be accomplished in air transportation, provided that the applicant is under the direct supervision of a fully qualified flight engineer assigned to the flight crew. No provision is made for this herein, as the Board considers that in the interest of safety it should not permit original airman certification in aircraft engaged in air transportation in view of the possible hazardous conditions which could be created or magnified because of the inexperience of the applicant.

Interested persons have been afforded an opportunity to participate in the making of this revison (22 F. R. 8958),

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and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, the Civil Aeronautics Board hereby revises Part 35 of the Civil Air Regulations (14 CFR Part 35, as amended) as follows, effective November 15, 1958:

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AUTHORITY: §§ 35.1 to 35.44 issued under sec. 205, 52 Stat. 984, as amended; 49 U. S. C. 425. Interpret or apply secs. 601, 602, 52 Stat. 1007, 1008, as amended; 49 U. S. C. 551, 552.

APPLICABILITY AND DEFINITIONS

§ 35.1 *Applicability of this part.* This part establishes certification and general operating rules for flight engineers.

§ 35.2 *Definitions.* As used in this part, terms are defined as follows:

Administrator. The Administrator is the Administrator of Civil Aeronautics.

Approved. Approved, when used alone or as modifying terms such as means, method, action, equipment, etc., means approved by the Administrator.

Authorized representative of the Administrator. An authorized representative of the Administrator is any employee of the Civil Aeronautics Administrator or any private person, authorized by the Administrator to perform particular duties of the Administrator under the provisions of this part.

Flight engineer. A flight engineer is an individual holding a valid flight engineer certificate issued by the Administrator and whose primary assigned duty during flight is to assist the pilots in the mechanical operation of an aircraft.

Flight time. Flight time is the time from the moment the aircraft first moves under its own power for the purpose of flight until it comes to rest at the next point of landing (block-to-block time).

Month. A month is that period of time extending from the first day of any month as delineated by the calendar through the last day thereof.

Pilot in command. The pilot in command is the pilot responsible for the operation and safety of the aircraft during the time defined as flight time.

CERTIFICATION RULES

§ 35.5 *Application for certificate.* An application for a certificate shall be made on a form and in a manner prescribed by the Administrator.

§ 35.6 *Issuance.* (a) A flight engineer certificate shall be issued by the Administrator to an applicant who meets the requirements of this part.

(b) Pending a review of the applicant's application and supplementary documents and the issuance of a certificate by the Administrator, an authorized representative of the Administrator may, subject to such conditions and limitations as the Administrator may prescribe, issue a temporary flight engineer certificate to an applicant who meets the requirements of this part.

§ 35.7 *Duration.* (a) A flight engineer certificate issued to a United States citizen shall remain in effect until surrendered, suspended, revoked, or otherwise terminated by order of the Board. A certificate issued to an applicant other than a United States citizen shall remain in effect for a period no longer than 12 months after the date of issuance; however, it may be reissued without further demonstration of technical competence.

(b) A temporary flight engineer certificate shall remain in effect for a period no longer than 90 days after the date of issuance.

(c) After revocation, and upon request after suspension, the certificate shall be returned to the Administrator.

§ 35.8 *Change of address.* Within 30 days after any change in the permanent mailing address of a certificated flight engineer, he shall notify the Administrator in writing of his new address. This notice shall be mailed to the Administrator of Civil Aeronautics, attention Airman Records Branch, Washington 25, D. C.

GENERAL CERTIFICATE REQUIREMENTS

§ 35.21 *Citizenship.* An applicant for a flight engineer certificate may be a citizen of any country or a person without nationality.

§ 35.22 *Age.* 21 years is the minimum age for the issuance of a flight engineer certificate.

§ 35.23 *Education.* An applicant shall be able to read, speak, and understand the English language, or an appropriate limitation shall be placed upon his flight engineer certificate.

§ 35.24 *Examinations and tests.* Examinations and tests shall be conducted by an authorized representative of the Administrator at such times and places as the Administrator may designate. The passing grade for such examinations and tests shall be at least 70 percent.

§ 35.25 *Re-examination after failure.* An applicant who has failed any prescribed written or practical examination or test may not apply for re-examination within a 30-day period from the date of such failure unless he presents a statement signed by a certificated flight engineer, an appropriately rated and certificated ground instructor, or an authorized representative of the Administrator, which attests that the applicant is considered competent for re-examination, and

(a) In the case of the written examination, that the applicant has received an additional 5 hours of instruction in each of the subjects failed; or

(b) In the case of the practical examination, that the applicant has received such additional instruction as may be required by the Administrator in each of the subjects failed.

§ 35.26 *Substantiation of experience.* An applicant shall present to the Administrator satisfactory documentary evidence to substantiate the experience qualifications for a flight engineer certificate.

§ 35.27 *Physical standards.* An applicant shall present evidence that he has, within the 12 months immediately preceding the date of application, met the physical standards of the second class prescribed in Part 29 of this chapter: *Provided*, That an applicant who is unable to distinguish aviation signal red, aviation signal green, and white shall be issued an airman certificate appropriately endorsed to prohibit the holder thereof from exercising the privileges of such certificate except under such conditions, or with the use of such equipment, which would not require the ability to distinguish such aviation signal colors.

QUALIFICATIONS FOR A CERTIFICATE

§ 35.31 *Experience.* An applicant shall:

(a) Have had at least 3 years of diversified practical experience in the maintenance and repair of aircraft and aircraft engines, of which one year shall have been in the maintenance and repair of multi-engine aircraft having engines rated at least at 800 h. p. each or the equivalent thereof in the case of turbine-powered aircraft, and have had at least 5 hours of training in flight in the duties of a flight engineer on multiengine aircraft having 4 or more engines rated at least at 800 h. p. each or the equivalent thereof in the case of turbine-powered aircraft; or

(b) Be a graduate of at least a 2-year specialized aeronautical training course in the maintenance, repair, and overhaul of aircraft and aircraft engines, of which at least 6 months shall have been in the maintenance and repair of multiengine aircraft having engines rated at least at 800 h. p. each or the equivalent thereof in the case of turbine-powered aircraft, and have had at least 5 hours of training in flight in the duties of a flight engineer on multiengine aircraft having 4 or more engines rated at least at 800 h. p. each or the equivalent thereof in the case of turbine-powered aircraft; or

(c) Hold a degree in aeronautical, electrical, or mechanical engineering from a recognized college, university, or

engineering school and have had 6 months practical experience in the maintenance and repair of multiengine aircraft having engines rated at least at 800 h. p. each or the equivalent thereof in the case of turbine-powered aircraft, and have had at least 5 hours of training in flight in the duties of a flight engineer on multiengine aircraft having 4 or more engines rated at least at 800 h. p. each or the equivalent thereof in the case of turbine-powered aircraft; or

(d) Have had at least 200 hours of flight time as pilot in command of aircraft having 4 or more engines rated at least at 800 h. p. each or the equivalent thereof in the case of turbine-powered aircraft; or

(e) Have had at least 100 hours of flight experience in the duties of a flight engineer; or

(f) Within 90 days immediately preceding the date of application, have completed successfully a course of instruction which the Administrator approves as adequate for the training of a flight engineer.

§ 35.32 *Knowledge.* An applicant shall satisfactorily pass a written examination on the following subjects with respect to aircraft having 4 or more engines and certificated in the transport category or an aircraft having 4 or more engines and incorporating a flight engineer station:

(a) The provisions of the Civil Air Regulations applicable to the duties of a flight engineer;

(b) Theory of flight and elementary aerodynamics;

(c) Aircraft performance and aircraft engine operation with respect to limitations;

(d) Mathematical computations of engine operation and fuel consumption;

(e) Basic meteorology with respect to engine operations;

(f) Aircraft loading and center of gravity computations;

(g) General aircraft maintenance and operating procedures; and

(h) Emergency procedures.

NOTE: The applicant need not have the 5 hours of training in flight in the duties of a flight engineer specified in § 35.31 (a), (b), and (c) prior to taking the written examination required by § 35.32.

§ 35.33 *Skill.* An applicant shall pass a practical examination in the duties of a flight engineer on an aircraft having 4 or more engines and certificated in the transport category or on an aircraft having 4 or more engines and incorporating a flight engineer station, with respect to pre-flight inspection of aircraft, servicing, starting, and pre-take-off run-up, and

(a) In flight, demonstrate competence with respect to normal duties and procedures relating to the aircraft, aircraft engines, propellers, and appliances; and

(b) In flight, or in an approved synthetic trainer which accurately simulates the flight characteristics and performance of the aircraft, demonstrate competence with respect to emergency duties, procedures, and recognition of and the taking of appropriate action with respect to the malfunctioning of aircraft, aircraft engines, propellers, and appliances.

§ 35.34 *Limited certificate.* (a) An applicant may be certificated as a flight engineer for an aircraft having less than 4 engines: *provided:* That

(1) The design of the aircraft incorporates a flight engineer station satisfactory to the Administrator,

(2) The applicant meets the requirements of §§ 35.21 through 35.32, except that experience need not include flight time in aircraft having more than 2 engines, and

(3) The applicant passes a practical examination as required in § 35.33 in aircraft having less than 4 engines.

(b) A certificate issued under the provisions of this section shall contain an appropriate limitation which may be removed at such time as the holder of the certificate passes the practical test prescribed in § 35.33 for an aircraft having 4 or more engines.

OPERATING RULES

§ 35.41 *Certificate required.* No individual shall serve as a flight engineer in air commerce on an aircraft of United States registry without, or in violation of the terms of, a certificate isued in accordance with the provisions of this part. He shall have his certificate in his personal possession when performing his duties.

§ 35.42 *Display.* A flight engineer shall, upon request, present his airman and medical certificates for examination by any authorized representative of the Civil Aeronautics Board or the Administrator, or by any State or local law enforcement officer.

§ 35.43 *Medical certificate.* No individual shall exercise the privileges accorded by a flight engineer certificate unless he has in his personal possession while so serving a medical certificate or other evidence satisfactory to the Administrator showing that he has met the physical requirements appropriate thereto within the preceding 12 months.

§ 35.44 *Operation during physical deficiency.* No individual shall exercise the privileges accorded by a flight engineer certificate during any period of known physical deficiency or increase in physical deficiency which would render him unable to meet the physical requirements prescribed for the issuance of his currently effective medical certificate.

By the Civil Aeronautics Board.

[SEAL] MABEL MCCART,
Acting Secretary.

[F. R. Doc. 58-6838; Filed, Aug. 22, 1958; 8:51 a. m.]

NOTICE

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