FEDERAL AVIATION AGENCY
FLIGHT STANDARDS SERVICE
Washington 25, D. C.

May 18, 1962

CIVIL AIR REGULATIONS DRAFT RELEASE NO. 62-24

SUBJECT: Performance Requirements for Three-Engine Turbine-Powered Transport Category Airplanes - SR-422B

The Flight Standards Service of the Federal Aviation Agency has under consideration the amendment of Special Civil Air Regulation No. SR-422B to establish specific performance requirements for three-engine turbine-powered airplanes. The reasons therefor are set forth in the explanatory statement of the attached proposal which is being published in the Federal Register as a notice of proposed rule making.

The Flight Standards Service desires that all persons who will be affected by the requirements of this proposal be fully informed as to its effect upon them and is therefore circulating copies in order to afford interested persons ample opportunity to submit comments as they may desire.

Because of the large number of comments which we anticipate receiving in response to this draft release, we will be unable to acknowledge receipt of each reply. However, you may be assured that all comment will be given careful consideration.

It should be noted that comments should be submitted in duplicate to the Docket Section of the Federal Aviation Agency, and in order to insure consideration must be received on or before July 23, 1962.

George C. Gill

Director,
Flight Standards Service

FEDERAL AVIATION AGENCY

FLIGHT STANDARDS SERVICE

[14 CFR Parts 4b, 40, 41, 42, and SR–422B]

[Regulatory Docket No. 1220; Draft Release No. 62–24]

NOTICE OF PROPOSED RULE MAKING

Performance Requirements for Three-Engine Turbine-Powered Transport Category Airplanes

Pursuant to the authority delegated to me by the Administrator (14 CFR 405.27), notice is hereby given that there is under consideration amendments to Special Civil Air Regulation No. SR–422B establishing specific performance requirements for three-engine turbine-powered airplanes.

Interested persons may participate in the making of the proposed rules by submitting such written data, views, or arguments as they may desire. Communications should be submitted in duplicate to the Docket Section of the Federal Aviation Agency, Room C–226, 1711 New York Avenue, N.W., Washington 25, D.C. All communications received on or before July 23, 1962, will be considered by the Administrator before taking action upon the proposed rules. The proposals contained in this notice may be changed in the light of the comments received. All comments submitted will be available in the Docket Section for examination by interested persons at any time.

There has been considerable interest shown by airframe manufacturers in three-engine turbine-powered airplanes. As of this date, the Flight Standards Service has received two applications for type certification of such airplanes. Special Civil Air Regulation No. SR–422B, Turbine-Powered Transport Category Airplanes of Current Design, is not specifically applicable to three-engine airplanes. Therefore, in order to insure an adequate level of safety for three-engine airplanes, it is necessary to establish complete performance requirements for such airplanes prior to their type certification. Accordingly, it is proposed to amend SR–422B to make it fully applicable to three-engine turbine-powered airplanes.

There are eight provisions in SR–422B which contain specific climb gradients for only two-engine and four-engine airplanes. These are contained in §§ 4T.116g, 4T.117a(b), 4T.120(a) through (d), and 4T.121(a) and (b). Amendments to these provisions are proposed herein to set forth appropriate climb gradient values for three-engine airplanes.

In § 4T.114(b) there is a differentiation in the specified minimum takeoff safety speeds applicable to two-engine and four-engine propeller-driven airplanes. The only question involved in this provision is whether the minimum takeoff safety speed for three-engine airplanes with propellers should be 1.2 V_s or 1.15 V_s. Considering the likely configurations of three-engine propeller-equipped airplanes and the effects of engine failure, it appears that these airplanes would fit into the category of the two-engine propeller-driven airplane. Therefore, it is proposed that the prescription of the takeoff safety speeds for three-engine propeller-driven airplanes, in terms of the stall speed, be the same as is currently prescribed for two-engine propeller-driven airplanes.

In § 4T.121(b), the margin of climb gradient for four-engine airplanes with two-engines inoperative is prescribed to be 0.5 percent. Pursuant to the en route limitations of § 40T.83, airplanes are precluded from flying along an intended route if any place along the route is more than 90 minutes from a suitable airport unless compliance is shown with the two-engine-inoperative en route limitations of § 40T.83(b). These requirements automatically prohibit two-engine airplanes from flying such routes. To formulate appropriate standards for three-engine airplanes, it is necessary to consider the applicable engine power condition and performance level. Some manufacturers have indicated that the power condition for three-engine airplanes should be based on loss of 50 percent of engine power rather than on complete loss of power of two engines. The Flight Standards Service believes that the failure of two engines is more probable than loss of 50 percent of power and is sufficiently probable to require consideration of two engines becoming inoperative along routes where the airplane would be more than 90 minutes from an airport. In view of this and the probable variation of other operational factors along the critical portion of such routes, it is proposed that the minimum margin of climb gradient for three-engine airplanes be equal to 0.3 percent with two engines inoperative.

These proposals were discussion at the conference held in Septmber 1961, on proposed changes to Special Civil Air Regulation No. SR–422B. In general, there appeared to be no major issues involved in these proposals.

Systemworthiness of three-engine turbine-powered airplanes requires evaluation of other requirements of the Civil Air Regulations dealing with airman certification and with the operating rules not contained in SR–422B. The Agency intends to take the necessary regulatory action with respect to these matters prior to the introduction of three-engine turbine-powered airplanes into air carrier service.

In consideration of the foregoing, it is proposed to amend Special Civil Air Regulation No. SR–422B as follows:

1. By amending § 4T.114(b)(1) by inserting between the words "two-engine" and "propeller-driven" the words "and three-engine".

2. By amending § 4T.114(b)(2) by deleting the words "two engines" and inserting in lieu thereof the words "three engines".

3. By amending § 4T.116(g) by inserting after the words "two-engine airplanes" the following phrase "1.5 percent for three-engine airplanes".

4. By amending § 4T.117a(b) by inserting between the words "two-engine airplanes" and the word "and" the following phrase "equal to 0.9 percent for three-engine airplanes".

5. By amending § 4T.120(a) by inserting between the words "shall not be less than" and the numerals "0.5" the following phrase "0.3 percent for three-engine airplanes, and not less than".

6. By amending § 4T.120(b) by inserting between the words "two-engine airplanes" and the word "and" the following phrase "not less than 2.7 percent for three-engine airplanes".

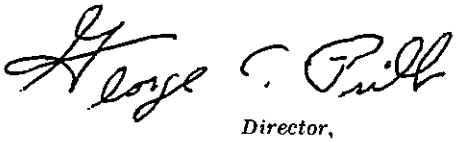
7. By amending § 4T.120(c) by inserting between the words "two-engine airplanes" and the word "and" the following phrase "not less than 1.5 percent for three-engine airplanes".

8. By amending § 4T.120(d) by inserting between the words "two-engine airplanes" and the word "and" the following phrase "not less than 2.4 percent for three-engine airplanes".

9. By amending § 4T.121(a) by inserting between the words "two-engine airplanes" and the word "and" the following phrase "1.4 percent for three-engine airplanes".

10. By amending § 4T.121(b) by deleting the first sentence and by inserting in lieu thereof the following new sentence "For airplanes with three or four engines, the two-engine-inoperative net flight path data shall be determined in such a manner that they represent the airplane's actual climb performance diminished by a gradient of climb equal to 0.3 percent for three-engine airplanes and equal to 0.5 percent for four-engine airplanes."

These amendments are proposed under the authority of sections 313(a), 601, 603, of the Federal Aviation Act of 1958 (72 Stat. 752, 775, 776; 49 U.S.C. 1354(a), 1421, 1423).



Director,
Flight Standards Service

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