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

April 4, 1962

CIVIL AIR REGULATIONS DRAFT RELEASE NO. 62-15

SUBJECT: 30-Minute Power Rating for Helicopter Turbine Engines

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The Flight Standards Service of the Federal Aviation Agency has under consideration amendments to Part 13 of the Civil Air Regulations to establish a new power rating and new test requirements for turbine engines certificated for use in helicopters. 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 should be received on or before June 11, 1962.

George C. Prill

Director,
Flight Standards Service

FEDERAL AVIATION AGENCY
FLIGHT STANDARDS SERVICE

[14 CFR Part 13]
[Regulatory Docket No. 1141; Draft Release No. 62–15]

NOTICE OF PROPOSED RULE MAKING

30-Minute Power Rating for Helicopter Turbine Engines

Pursuant to the authority delegated to me by the Administrator (14 CFR 405.27), notice is hereby given that there is under consideration a proposal to amend Part 13 of the Civil Air Regulations as hereinafter set forth.

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 June 11, 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 comments received. All comments submitted will be available in the Docket Section for examination by interested persons at any time.

The presently effective provisions of Part 7 of the Civil Air Regulations require that certain rotorcraft takeoff and en route climb performance determinations be made with one engine inoperative and remaining engines operating at maximum continuous power. Representations from the industry have been made that a higher power could be used in making these determinations without adversely affecting safety and that improved helicopter performance would result. It has been recommended that rated takeoff power, if used within practical limits, could be used in place of maximum continuous power.

In response to these representations, the Agency has recently authorized type certification of twin turbine-powered transport category helicopters using takeoff power, in lieu of maximum continuous power, in establishing climb performance. The use of such takeoff power is limited to periods not exceeding 30 minutes in duration.

At the same time the Agency indicated that this performance requirement as well as other more comprehensive requirements, presently under study, would be incorporated into existing Part 7 as soon as operating experience is obtained on the twin turbine-powered helicopters.

While the use of rated takeoff power by the helicopter manufacturers for the establishment of certain performance data for their twin turbine-powered helicopters results in the substantiation of such power for turbine engines installed in their helicopters, the Agency believes that in the future such substantiation should be accomplished prior to type certification and subsequent installation of the engine. While engine manufacturers may now substantiate their turbine engines for takeoff power for 30 minutes duration, they are not presently required to do so. Therefore, it is considered appropriate to amend the provisions of Part 13 to require that turbine engines used in helicopters be substantiated for this higher power during type certification of such engines. It is therefore proposed to introduce and define in Part 13 a new rating of "30-minute power," which would be limited to periods of use not exceeding 30 minutes duration. To insure reliable operation at this power, it is proposed to add to § 13.254 a new test schedule for substantiating such power for turbine engines used in helicopters.

In consideration of the foregoing, it is proposed to amend Part 13 of the Civil Air Regulations (14 CFR Part 13, as amended) as follows:

1. By amending § 13.1(b) by redesignating subparagraphs (4) through (7) as (5) through (8) and by inserting a new subparagraph (4) to read as follows:

13.1 *Definitions.* * * *

(b) *General design.* * * *

(4) *30-minute power for helicopter turbine engines.* 30-minute power for helicopter turbine engines is the maximum brake horsepower, developed under static conditions at specified altitudes and atmospheric temperatures, under the maximum conditions of rotor shaft rotational speed and gas temperature, and limited in use to periods of not over 30 minutes as shown on the engine data sheet.

2. By amending § 13.254 by deleting from the first sentence the words "this section" and inserting in lieu thereof "either paragraph (a) or (b) of this section, whichever is applicable", by inserting after the introductory paragraph a new paragraph heading titled "(a) *All engines except helicopter engines*", by redesignating present paragraphs (a) through (g) as subparagraphs (1) through (7) of the redesignated

paragraph (a), and by adding a new paragraph (b) to read as follows:

13.254 *Endurance test.* * * *

(a) *All engines except helicopter engines.* * * *

(b) *Helicopter engines.*

(1) *Takeoff and idling.* One hour of alternate 5-minute periods shall be conducted at takeoff power and thrust and at idling power and thrust. The developed powers and thrusts at takeoff and idling conditions and their corresponding rotor speed and gas temperature conditions shall be as established by the power control(s) in accordance with the schedule established by the manufacturer. It shall be permissible to control manually during any one period the rotor speed and power and thrust while taking data to check performance. For engines with augmented takeoff ratings which involve increases in turbine inlet temperature, rotor speed, or shaft power, this period of running at rated takeoff power shall be at the augmented rating. In changing the power setting after each period, the power-control level shall be moved in the manner prescribed in subparagraph (5) of this paragraph.

(2) *30-minute power.* Twenty-five periods each of 30 minutes duration shall be conducted at 30-minute power and thrust.

(3) *Maximum continuous power and thrust.* Two hours shall be conducted at the maximum continuous power and thrust.

(4) *Incremental cruise power and thrust.* Two hours shall be conducted at the successive power lever positions corresponding with not less than 12 approximately equal speed and time increments between maximum continuous engine rotational speed and ground or minimum idle rotational speed. For engines operating at constant speed, it shall be permissible to vary the thrust and power in lieu of speed. In the event significant peak vibrations exist anywhere between ground idle and maximum continuous conditions, the number of increments chosen shall be altered to increase the amount of running conducted while being subjected to the peak vibrations up to an amount not exceeding 50 percent of the total time spent in incremental running. (See also § 13.351.)

(5) *Acceleration and deceleration runs.* Thirty minutes shall be conducted of accelerations and decelerations consisting of 6 cycles from idling power and thrust to takeoff power and thrust and maintained at the takeoff power lever position for 30 seconds and at the idling power lever position for approximately 4½ minutes. In complying with the provisions of this subparagraph, the power-control lever shall be moved from one extreme position to the other in not more than one second except that, where different 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 2 seconds.

(6) *Starts.* One hundred starts shall be made, of which 25 starts shall be preceded by at least a 2-hour engine shutdown. Ten starts shall be false engine starts pausing for the applicant's specified minimum fuel drainage time before attempting a normal start. Ten starts shall be normal restarts, each performed not more than 15 minutes after engine shutdown. It shall be acceptable to make the remaining starts after completion of the 150 hours of endurance testing.

(7) *Maximum temperatures.* The limiting maximum hot gas and oil inlet temperatures shall be substantiated by operation at these limits during all the takeoff, 30-minute power, and maximum continuous running of the endurance test except where the test periods are not longer than 5 minutes and do not permit stabilization.

These amendments are proposed under the authority of sections 313(a), 601, and 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

Issued in Washington, D.C., on April 4, 1962.

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