## DEPARTMENT OF TRANSPORTATION

#### Federal Aviation Administration

## Advisory Circular 25–7, Flight Test Guide for Certification of Transport Category Airplanes

# **AGENCY:** Federal Aviation Administration, DOT.

**ACTION:** Notice of changes to advisory circular.

**SUMMARY:** This notice describes the changes to Advisory Circular (AC) 25–7, "Flight Test Guide for Certification of Transport Category Airplanes," that accompany Amendment 25–84, published elsewhere in this issue of the **Federal Register**.

#### FOR FURTHER INFORMATION CONTACT:

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#### SUPPLEMENTARY INFORMATION:

#### Discussion

On May 22, 1990, the Aerospace Industries Association of America, Inc. (AIA) and the Association Europeenne des Constructeurs de Materiel Aerospatial (AECMA) jointly petitioned the FAA and the European Joint Aviation Authorities (JAA) to harmonize certain airworthiness requirements that apply to transport category airplanes. In their petition, a summary of which was published in the July 17, 1990, edition of the Federal Register (55 FR 137), AIA and AECMA also recommended changes to Advisory Circular (AC) 25-7, "Flight Test Guide for Certification of Transport Category Airplanes," to ensure that the harmonized standards would be interpreted and applied consistently.

Part 25 of the Federal Aviation Regulations (FAR) prescribes the United States airworthiness standards for transport category airplanes. Advisory Circular (AC) 25–7 provides guidelines that the FAA has found acceptable for flight testing transport category airplanes to demonstrate compliance with those airworthiness standards. Revisions to part 25, in response to the AIA/AECMA petition, were proposed by the FAA in Notice of Proposed Rulemaking (NPRM) 94–15, which was published in the Federal Register on April 22, 1994 (59 FR 19296). The proposed revisions to AC 25-7 were published in the same issue of the Federal Register as NPRM 94-15 (59 FR 19303).

Amendment 25–84, which resulted from publication of Notice 94–15, is published elsewhere in this issue of the **Federal Register**. The changes to AC 25–7 that accompany Amendment 25– 84 are detailed below. Copies of the affected pages will be available for distribution shortly after publication of this notice.

## Revisions to AC 25-7 to Accompany Amendment 25-84

# 1. Replace Paragraph 16.a With the Following

a. Section 25.119(a) states that the engines are to be set at the power or thrust that is available eight seconds after initiating movement of the power or thrust controls from the minimum flight idle position to the go-around power or thrust setting. The procedures given are for the determination of this maximum thrust for showing compliance with the climb requirements of § 25.119.

# 2. Replace Paragraph 16.b.(3) With the Following

(3) For the critical air bleed configuration, stabilize the airplane in level flight with symmetric power on all engines, landing gear down, flaps in the landing position, at a speed of  $1.3 V_{S0}$ , simulating the estimated minimum climb limiting landing weights at an altitude sufficiently above the selected test altitude so that the time to descend to the test altitude with the throttles closed equals the appropriate engine r.p.m. stabilization time determined in paragraph (2). Retard the throttles to the flight idle position and descend at 1.3 V<sub>s</sub> to approximately the test altitude; when the appropriate time has elapsed, rapidly advance the power or thrust controls to the go-around power or thrust setting. The power or thrust controls may first be advanced to the forward stop and then retarded to the go-around power or thrust setting. At the applicant's option, additional less critical bleed configurations may be tested.

## 3. Add the Following Sections to Paragraph 20.a

(1) The maximum forces given in the table in § 25.143(c) for pitch and roll control for short-term application are applicable to maneuvers in which the control force is only needed for a short period. Where the maneuver is such that the pilot will need to use one hand to operate other controls (such as during the landing flare or a go-around, or during changes of configuration or power resulting in a change of control force that must be trimmed out) the

single-handed maximum control forces will be applicable. In other cases (such as takeoff rotation, or maneuvering during en route flight), the two-handed maximum forces will apply.

(2) Short-term and long-term forces should be interpreted as follows:

(i) Short-term forces are the initial stabilized control forces that result from maintaining the intended flight path following configuration changes and normal transactions from one flight condition to another, or from regaining control following a failure. It is assumed that the pilot will take immediate action to reduce or eliminate such forces by retrimming or changing configuration or flight conditions, and consequently short-term forces are not considered to exist for any significant duration. They do not include transient force peaks that may occur during the configuration change, change of flight conditions, or recovery of control following a failure.

(ii) Long-term forces are those control forces that result from normal or failure conditions that cannot readily be trimmed out or eliminated.

# 4. Add the Following Sections to Paragraph 20

d. Acceptable Means of Compliance. An acceptable means of compliance with the requirement that stick forces may not be excessive when maneuvering the airplane is to demonstrate that, in a turn for 0.5g incremental normal acceleration (0.3g above 20,000 feet) at speeds up to  $V_{FC}$ / $M_{FC}$ , the average stick force gradient does not exceed 120 lbs/g.

e. Interpretive Material. (1) The objective of § 25.143(f) is to ensure that the limit strength of any critical component on the airplane would not be exceeded in maneuvering flight. In much of the structure, the load sustained in maneuvering flight can be assumed to be directly proportional of the load factor applied. However, this may not be the case for some parts of the structure, e.g., the tail and rear fuselage. Nevertheless, it is accepted that the airplane load factor will be a sufficient guide to the possibility of exceeding limit strength on any critical component if a structural investigation is undertaken whenever the design positive limit maneuvering load factor is closely approached. If flight testing indicates that the design positive limit maneuvering load factor could be exceeded in steady maneuvering flight with a 50-pound stick force, the airplane structure should be evaluated for the anticipated load at a 50-pound stick force. The airplane will be considered to have been overstressed if limit strength has been exceeded in any critical