Designation: F3093/F3093M – 19

Standard Specification for Aeroelasticity Requirements[1]

This standard is issued under the fixed designation F3093/F3093M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the aeroelasticity requirements of the aeroplane. The material was developed through open consensus of international experts in general aviation. This information was created by focusing on Level 1, 2, 3, and 4 Normal Category aeroplanes. The content may be more broadly applicable; it is the responsibility of the Applicant to substantiate broader applicability as a specific means of compliance. The topics covered within this document are: 2. Referenced Documents, 3. Terminology, 4. Flutter.

1.2 An applicant intending to propose this information as Means of Compliance for a design approval must seek guidance from their respective oversight authority (for example, published guidance from applicable CAAs) concerning the acceptable use and application thereof. For information on which oversight authorities have accepted this standard (in whole or in part) as an acceptable Means of Compliance to their regulatory requirements (hereinafter "the Rules"), refer to the ASTM Committee F44 web page (www.astm.org/COMMITTEE/F44.htm).

1.3 *Units*—This document may present information in either SI units, English Engineering units, or both. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F3061/F3061M Specification for Systems and Equipment in Small Aircraft

F3065/F3065M Specification for Aircraft Propeller System Installation

F3115/F3115M Specification for Structural Durability for Small Airplanes

2.2 *Federal Aviation Administration (FAA) Document:*[3]

Airframe and Equipment Engineering Report No. 45 (as corrected) "Simplified Flutter Prevention Criteria" 1955

2.3 *Federal Aviation Regulations:*[4]

14 CFR 23 Amendment 62

3. Terminology

3.1 *Definitions:*

3.1.1 *GVT*—ground vibration testing

3.1.2 *V-n*—velocity versus load factor

4. Flutter

4.1 It must be shown by the methods in 4.2, and either 4.3 or 4.4, that the aeroplane is free from flutter, control reversal, and divergence for any condition of operation within the limit V-n envelope and at all speeds up to the speed specified for the selected method. In addition:

4.1.1 Adequate tolerances must be established for quantities which affect flutter, including speed, damping, mass balance, and control system stiffness; and

4.1.2 The natural frequencies of main structural components must be determined by vibration tests or other approved methods. This determination is not required for Level 1 aeroplanes with V_D up to 260 kph [140 knots] CAS and maximum gross weight up to 750 kg [1650 lbm].

4.2 Flight flutter tests must be made to show that the aeroplane is free from flutter, control reversal, and divergence, and to show that:

[1] This specification is under the jurisdiction of ASTM Committee F44 on General Aviation Aircraft and is the direct responsibility of Subcommittee F44.30 on Structures.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from Federal Aviation Administration (FAA), 800 Independence Ave., SW, Washington, DC 20591, http://www.faa.gov.

[4] Available from U.S. Government Publishing Office, 732 N. Capitol St., NW, Washington, DC 20401, http://www.gpo.gov.