



Designation: **F3174/F3174M – 15 F3174/F3174M – 18**

# Standard Specification for Establishing Operating Limitations and Information for Aeroplanes<sup>1</sup>

This standard is issued under the fixed designation F3174/F3174M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 ~~This specification establishes the airworthiness design requirements associated with the establishment of operating limitations and information for the operation of aeroplanes. It covers the need~~covers airworthiness requirements for establishing general limitations and information to be contained in the aeroplane flight manual. This specification specifies what information shall be provided and does not state how such information shall be presented unless this is necessary for the clarity of the purpose of the specification. Refer to Specification **F3117** for means and methods of presentation. 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 specification are: Limitations for Airspeed, Weight and Center of Gravity, Auxiliary Power Units, Minimum Flight Crew, Maximum Passenger Seating Configuration, Kinds of Operation, and Maximum Operating Altitude.

1.2 ~~The applicant~~An applicant intending to propose this information as Means of Compliance for a design approval shall~~must seek the individual guidance offrom~~seek the individual guidance from their respective civil aviation authority (CAA) body concerning the use of this specification as ~~part of a certification plan~~oversight authority (for example, published guidance from applicable CAAs) concerning the acceptable use and application thereof. For information on which CAA regulatory bodies oversight authorities have accepted this specification (in whole or in part) as a means of compliance to their small aeroplane airworthiness regulations (hereinafter referred to as an acceptable Means of Compliance to their regulatory requirements (hereinafter “the Rules”), refer to the ASTM Committee F44 webpage (www.ASTM.org/COMMITTEE/F44.htm), which includes CAA website links~~web page (www.astm.org/COMMITTEE/F44.htm).~~

1.3 ~~This specification is applicable to small aeroplanes.~~

1.3 ~~Units—The values stated~~This specification may present information in either SI units or inch-pound units are to be regarded separately as standard. The units, English Engineering units, or both; the values stated in each system may not be exact equivalents; therefore, each equivalent. Each system shall be used independently of the other. Combining~~other; combining~~ values from the two systems may result in ~~non-conformance~~nonconformance with the standard.

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 health~~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:*<sup>2</sup>

**F3060** Terminology for Aircraft

**F3082** Specification for Weights and Centers of Gravity of Aircraft

**F3114** Specification for Structures

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee **F44** on General Aviation Aircraft and is the direct responsibility of Subcommittee **F44.20** on Flight. Current edition approved Dec. 1, 2015/May 1, 2018. Published January 2016/May 2018. Originally approved in 2015. Last previous edition approved in 2015 as F3174/F3174M – 15. DOI: 10.1520/F3174\_F3174M-15-10.1520/F3174\_F3174M-18.

<sup>2</sup> 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.

~~F3116/F3116M~~ Specification for Design Loads and Conditions

F3117 Specification for Crew Interface in Aircraft

~~F3173/F3173M~~ Specification for Aircraft Handling Characteristics of Aeroplanes

~~2.2 European Aviation Safety Agency Regulations:~~<sup>3</sup>

~~CS-23 Certification Specifications for Normal, Utility, Aerobatic, and Commuter Category Aeroplanes (Amendment 3)~~

~~CS-VLA Certification Specifications for Very Light Aeroplanes (Amendment 1)~~

~~2.3 U.S. Code of Federal Regulations:~~<sup>4</sup>

~~14 CFR Part 23 Airworthiness Standards: Normal, Utility, Aerobatic and Commuter Category Airplanes (Amendment 62)~~

### 3. Terminology

3.1 See Terminology **F3060** for definitions and abbreviations.

### 4. Establishing Operating Limitations and Information

4.1 *General*—Each applicable operating limitation specified in ~~4.2 – 4.84.H~~ and other limitations and information necessary for safe operation shall be established.

4.1.1 The operating limitations and other information necessary for safe operation shall be made available to the crewmembers as prescribed in Specification **F3117**.

4.2 *Airspeed Limitations:*

4.2.1 The never-exceed speed,  $V_{NE}$ , shall be established as an operating limitation and shall be so that it is:

4.2.1.1 Not less than 0.9 times the minimum value of  $V_D$  allowed under Specification ~~F3116/F3116M~~, and

4.2.1.2 Not more than the lesser of:

(1)  $0.9 V_D$  established under Specification ~~F3116/F3116M~~, or

(2) 0.9 times the maximum speed shown under Specification ~~F3173/F3173M~~, Section 8: Vibration and Buffering.

4.2.2 The maximum structural cruising speed,  $V_{NO}$ , shall be established as an  $V_{Cmin} \leq V_{operating} \leq V_{NO}$  and shall be with  $V$  be  $V_{Cmin}$  and  $V$  that it  $V_{C}$  established as under Specification is: ~~F3116~~.

4.2.2.1 Not less than the minimum value of  $V_C$  allowed under Specification ~~F3116/F3116M~~, and

4.2.2.2 Not more than the lesser of:

(1)  $V_C$  established under Specification ~~F3116/F3116M~~, or

(2)  $0.89 V_{NE}$  established under ~~4.2.1~~.

4.2.3 Subsections ~~4.2.1~~ and ~~4.2.2~~ do not apply when to turbine aeroplanes or to aeroplanes for which a  $V_D/M_D$  is established under Specification ~~F3116/F3116M~~. For those aeroplanes:

(1) A maximum operating limit speed ( $V_{MO}/M_{MO}$  airspeed or Mach number, whichever is critical at a particular altitude) shall be established as a speed that may shall not be deliberately exceeded in any regime of flight (climb, cruise, or descent) unless a higher speed is authorized for flight test or pilot training operations.

(2) The value,  $V_{MO}/M_{MO}$ , shall be established so that it is not greater than the design cruising speed,  $V_C/M_C$ , and so that it is sufficiently below  $V_D/M_D$ , or  $V_{DF}/M_{DF}$ , for jets, and the maximum speed shown under Specification ~~F3173/F3173M~~, Section 8: Vibration and Buffering, to make it highly improbable that the latter speeds will be inadvertently exceeded in operations.

(3) The speed margin between  $V_{MO}/M_{MO}$  and  $V_D/M_D$ , or  $V_{DF}/M_{DF}$ , may for jets, shall not be less than that determined under Specification ~~F3116/F3116M~~, subsection 5.1.2 Design Dive Speed, or the speed margin found necessary in the flight tests conducted under Specification ~~F3173/F3173M~~, subsection 9.1: speed increase and recovery characteristics.

4.2.4 The maximum operating maneuvering speed,  $V_O$ , shall be established as an operating limitation and is a selected speed that is not greater than  $V_{\sqrt{n}}$  established in Specification ~~F3116/F3116M~~, Design Maneuvering Speed.

4.2.5 The flap extended speed,  $V_{FE}$ , shall be established as an operating limitation and shall be so that it is:

4.2.5.1 Not less than the minimum value of  $V_F$  allowed in Specification ~~F3116/F3116M~~, High Lift Devices, and

4.2.5.2 Not more than  $V_F$  established under Specification ~~F3116/F3116M~~, High Lift Devices.

4.2.5.3 Additional combinations of flap setting, airspeed, and engine power may be established if the structure has been proven for the corresponding design conditions.

4.2.6 The minimum control speed,  $V_{MC}$ , determined under Specification ~~F3173/F3173M~~ shall be established as an operating limitation.

~~4.3 Operating Maneuvering Speed~~—The maximum operating maneuvering speed,  $V_O$ , shall be established as an operating limitation. The value,  $V_O$ , is a selected speed that is not greater than  $V_A$  established in Specification ~~F3116~~.

4.4 *Flap Extended Speed:*

4.4.1 The flap extended speed,  $V_{FE}$ , shall be established so that it is:

4.4.1.1 Not less than the minimum value of  $V_F$  allowed in Specification ~~F3116~~, subsection 4.8.2, and

4.4.1.2 Not more than  $V_F$  established under Specification ~~F3116~~, subsections 4.8.1, 4.8.3, and 4.8.4.

4.4.2 Additional combinations of flap setting, airspeed, and engine power may be established if the structure has been proven for the corresponding design conditions.