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.

Designation: F3063/F3063M − 21

Standard Specification for Aircraft Fuel Storage and Delivery[1]

This standard is issued under the fixed designation F3063/F3063M; 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 minimum requirements for the design and integration of Fuel Storage and Delivery system installations for aeroplanes.

1.2 This specification is applicable to aeroplanes as defined in the F44 terminology standard.

1.3 The applicant for a design approval must seek the individual guidance to their respective CAA body concerning the use of this standard as part of a certification plan. For information on which CAA regulatory bodies have accepted this standard (in whole or in part) as a means of compliance to their Aeroplane Airworthiness regulations (Hereinafter referred to as "the Rules"), refer to ASTM F44 webpage (www.ASTM.org/COMITTEE/F44.htm), which includes CAA website links. Annex A1 maps the Means of Compliance described in this specification to EASA CS-23, amendment 5, or later, and FAA 14 CFR Part 23, amendment 64, or later.

1.4 *Units*—The values stated are SI units followed by imperial units in brackets. 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.

1.5 *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.*

1.6 *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]

F3060 Terminology for Aircraft

F3083/F3083M Specification for Emergency Conditions, Occupant Safety and Accommodations

F3116/F3116M Specification for Design Loads and Conditions

F3117/F3117M Specification for Crew Interface in Aircraft

F3179/F3179M Specification for Performance of Aircraft

F3397/F3397M Practice for Aeroplane Turbine Fuel System Hot Weather Operations

2.2 *EASA Standards:*[3]

CS-23 Normal, Utility, Aerobatic and Commuter Aeroplanes

CS-34 Easy Access Rules for Aircraft Engine Emissions and Fuel Venting

2.3 *FAA Standards:*[4]

14 CFR Part 23 Airworthiness Standards: Normal Category Airplanes

14 CFR Part 34 Fuel Venting and Exhaust Emission Requirements for Turbine Engine Powered Airplanes

3. Terminology

3.1 The following are a selection of relevant terms. See Terminology F3060 for more definitions and abbreviations.

3.2 *Definitions:*

3.2.1 *main pump, n*—a pump that supplies sufficient fuel to sustain the engine during normal operations.

3.2.2 *emergency pump, n*—a pump that can sustain engine operation at full power in the event the main pump fails.

3.2.3 *auxiliary pump, n*—a pump that can provide some fuel flow during emergency operations but not enough to sustain engine operation at full power. Its function is to aid in priming the engine and suppressing fuel vapors.

3.3 *Abbreviations:*

[1] This specification is under the jurisdiction of ASTM Committee F44 on General Aviation Aircraft and is the direct responsibility of Subcommittee F44.40 on Powerplant.

Current edition approved Sept. 1, 2021. Published October 2021. Originally approved in 2015. Last previous edition approved in 2020 as F3063/F3063M–20. DOI: 10.1520/F3063_F3063M-21.

[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 European Union Aviation Safety Agency (EASA), Konrad-Adenauer-Ufer 3, D-50668 Cologne, Germany, https://www.easa.europa.eu.

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

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. United States

3.3.1 *cc*—cubic centimetre

3.3.2 *CFR*—Code of Federal Regulations

3.3.3 *RPM*—rotation per minute

4. Fuel System

4.1 *General:*

4.1.1 Each fuel system must be constructed and arranged to ensure fuel flow at a rate and pressure established for proper engine and auxiliary power unit functioning under each likely operating condition, including any maneuver for which certification is requested and during which the engine or auxiliary power unit is permitted to be in operation.

4.1.2 Each fuel system for a turbine engine and compression ignition engine must be capable of sustained operation throughout its flow and pressure range with fuel initially saturated with water at 27 °C [80 °F] and having 0.75 cc of free water per 3.8 L [1 US gal] added and cooled to the most critical condition for icing likely to be encountered in operation.

4.1.3 Each fuel system for a turbine engine powered aeroplane must meet the applicable fuel venting requirements of 14 CFR Part 34 for the United States or the applicable fuel venting requirements as contained in the rules specified by the applicant's local civil aviation authority.

4.1.4 Each fuel system must be arranged so that it meets the requirement of 4.1.4.1 or 4.1.4.2.

4.1.4.1 No fuel pump can draw fuel from more than one tank at a time.

4.1.4.2 There are means to prevent introducing air into the system.

4.1.5 Fuel system components in an engine nacelle or in the fuselage must be protected from damage which could result in spillage of enough fuel to constitute a fire hazard as a result of a wheels-up landing on a paved runway.

4.1.6 Each check valve must be constructed, or otherwise incorporate provisions, to preclude incorrect assembly or connection of the valve.

4.2 *Independence:*

4.2.1 Each fuel system for a multiengine aeroplane must be arranged so that, in at least one system configuration, the failure of any one component will not result in the loss of power of more than one engine or require immediate action by the pilot to prevent the loss of power of more than one engine.

4.2.2 If a single fuel tank (or series of fuel tanks interconnected to function as a single fuel tank) is used on a multiengine aeroplane, the provision of 4.2.2.1 through 4.2.2.4 and 5.7.7 must be met.

4.2.2.1 There shall be an independent tank outlet for each engine.

4.2.2.2 There shall be a shut-off valve at each tank outlet. This shutoff valve may also serve as the fire wall shutoff valve required if the line between the valve and the engine compartment does not contain more than 1 L [1 US qt] of fuel (or any greater amount shown to be safe) that can escape into the engine compartment.

4.2.2.3 At least two vents arranged to minimize the probability of both vents becoming obstructed simultaneously must be provided.

4.2.2.4 A fuel system in which those parts of the system from each tank outlet to any engine are independent of each part of the system supplying fuel to any other engine must be provided.

4.3 *Drains:*

4.3.1 There must be at least one drain to allow safe drainage of the entire fuel system with the aeroplane in its normal ground attitude.

4.3.2 Each drain installed for the purpose of draining hazardous quantities of water, as required by 5.6, must meet the provision of 4.3.2.1 through 4.3.2.2.

4.3.2.1 Discharge clear of all parts of the aeroplane.

4.3.2.2 Have a drain valve that meets 4.3.2.2*(1)* through *(6)*.

(1) That has manual or automatic means for positive locking in the closed position.

(2) That is readily accessible.

(3) That can be easily opened and closed.

(4) That is either located or protected to prevent fuel spillage in the event of a landing with landing gear retracted.

(5) That allows the fuel to be caught for examination.

(6) That can be observed for proper closing.

5. Fuel Tanks

5.1 *General:*

5.1.1 Each fuel tank must be able to withstand, without failure, the vibration, inertia, fluid, and structural loads that it may be subjected to in operation.

5.1.2 Each flexible fuel tank liner must be shown to be suitable for the particular application.

5.1.3 The total usable capacity of the fuel tanks must be enough for at least 30 min of operation at maximum continuous power.

5.2 *Installation:*

5.2.1 Each fuel tank must be supported so that tank loads are not concentrated.

5.2.1.1 There must be pads, if necessary, to prevent chafing between each tank and its supports.

5.2.1.2 Padding must be nonabsorbent or treated to prevent the absorption of fuel.

5.2.1.3 If a flexible tank liner is used, it must be supported so that it is not required to withstand fluid loads.

5.2.1.4 Interior surfaces adjacent to the liner must be smooth and free from projections that could cause wear, unless provisions are made for protection of the liner at those points; or the construction of the liner itself provides such protection.

5.2.1.5 A positive pressure must be maintained within the vapor space of each bladder cell under any condition of operation, except for a particular condition for which it is shown that a zero or negative pressure will not cause the bladder cell to collapse.

5.2.1.6 Siphoning of fuel (other than minor spillage) or collapse of bladder fuel cells may not result from improper securing or loss of the fuel filler cap.

5.2.2 Fuel tanks must be designed, located, and installed so as to retain fuel when subjected to the inertia loads resulting from the ultimate static load factors prescribed in Specification F3083/F3083M; and under conditions likely to occur when the