



Designation: F3367 – 23

Standard Practice for Simplified Methods for Addressing High-Intensity Radiated Fields (HIRF) and Indirect Effects of Lightning on Aircraft¹

This standard is issued under the fixed designation F3367; 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 practice covers simplified methods for addressing High-Intensity Radiated Fields (HIRF) and the Indirect Effects of Lightning (IEL) on aircraft. The material was developed through open consensus of international experts in general aviation. This information was created by focusing on Aircraft Certification Level 1, Level 2, and Level 3 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 practice are: Overview; Minimum Design Requirements; Aeroplane Assessment Level; HIRF and IEL Safety Analysis; HIRF Compliance; IEL Compliance.

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 CAA) concerning the acceptable use and application thereof. For information on which oversight authorities have accepted this practice (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*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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 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 Recom-*

mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 Following is a list of external standards referenced throughout this practice; the earliest revision acceptable for use is indicated. In all cases, later document revisions are acceptable if shown to be equivalent to the listed revision, or if otherwise formally accepted by the governing civil aviation authority; earlier revisions are not acceptable.

2.2 ASTM Standards:²

F3060 Terminology for Aircraft

F3230 Practice for Safety Assessment of Systems and Equipment in Small Aircraft

F3309/F3309M Practice for Simplified Safety Assessment of Systems and Equipment in Small Aircraft

2.3 EUROCAE Standards:³

ED-14E Environmental Conditions and Test Procedures for Airborne Equipment

ED-107 Guide to Certification of Aircraft in a High-Intensity Radiated Field (HIRF) Environment

2.4 European Aviation Safety Agency (EASA):⁴

CS-23 Amdt 5 Certification Specifications for Normal-Category Aeroplanes

AMC 20-136 Aircraft Electrical And Electronic System Lightning Protection

AMC 20-158 Aircraft Electrical And Electronic System High-Intensity Radiated Fields (HIRF) Protection

2.5 Federal Aviation Administration (FAA):⁵

AC 20-136B Aircraft Electrical and Electronic System Lightning Protection

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 EUROCAE, 9-23 rue Paul Lafargue, "Le Triangle" building, 93200 Saint-Denis, France, <https://eshop.eurocae.net/>.

⁴ Available from European Aviation Safety Agency (EASA), Postfach 10 12 53, D-50452 Cologne, Germany, <https://www.easa.europa.eu>.

⁵ Available from Federal Aviation Administration (FAA), 800 Independence Ave., SW, Washington, DC 20591, <http://rgl.faa.gov>.

¹ This practice is under the jurisdiction of ASTM Committee F44 on General Aviation Aircraft and is the direct responsibility of Subcommittee F44.50 on Systems and Equipment.

Current edition approved Oct. 1, 2023. Published October 2023. Originally approved in 2019. Last previous edition approved in 2021 as F3367–21a. DOI: 10.1520/F3367-23.

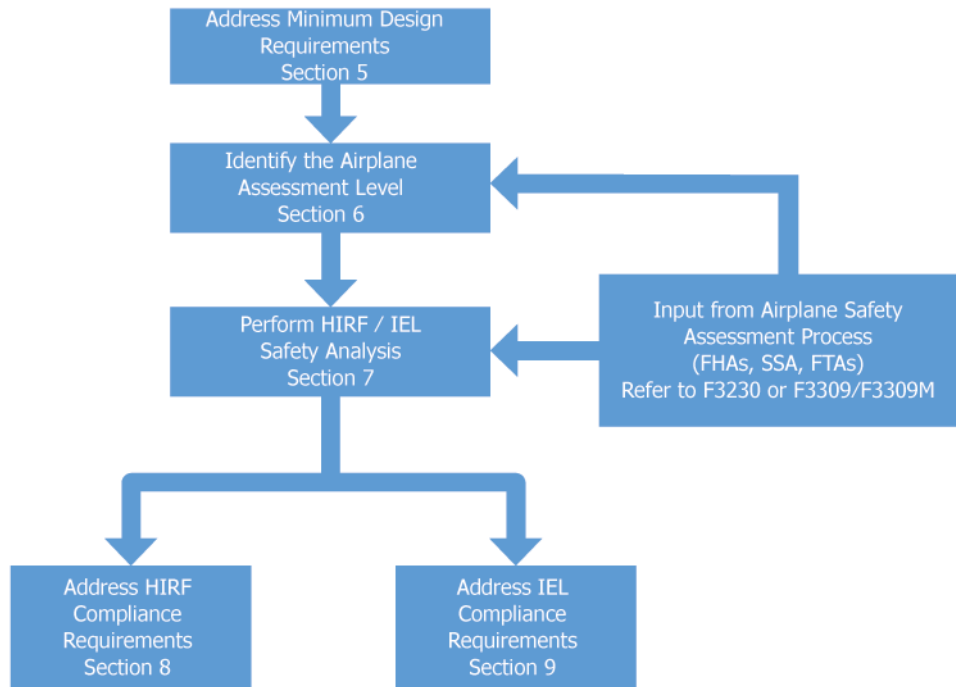


FIG. 1 Overview Flowchart

AC 20-158A The Certification of Aircraft Electrical and Electronic Systems for Operation in the High-Intensity Radiated Fields (HIRF) Environment

AC 23.1309-1E System Safety Analysis and Assessment for Part 23 Airplanes

AC 25.1309-1A System Design and Analysis

Part 25 Amdt 25-122 Airworthiness Standards: Transport Category Airplanes

Part 23 Amdt 23-64 Airworthiness Standards: Normal Category Aircraft

2.6 RTCA:⁶

DO-160E (or later when not specified) Environmental Conditions and Test Procedures for Airborne Equipment

2.7 SAE Recommended Practice:⁷

SAE ARP 5412B Aircraft Lightning Environment and Related Test Waveforms

mance aboard the aircraft that, by itself, provides a completely recognizable operational capability.

3.2.2.1 *Discussion*—For example, “display aircraft attitude to the pilot” is a function. One or more systems may perform a specific function or one system may perform multiple functions, or both.

3.2.3 *primary system*—a system that is the primary means of providing the function.

3.2.3.1 *Discussion*—For example, a primary flight display would have the primary display of attitude information to the pilot.

3.2.4 *redundant system*—a system that provides an identical function to one performed by another system.

3.2.5 *secondary system*—an independent system that can be used to accomplish the same function in addition to the primary system.

3.2.5.1 *Discussion*—For example, a standby attitude indicator provides a secondary means of presenting attitude information to the pilot in addition to the primary attitude indicator.

3.2.6 *system*—a combination of inter-related items arranged to accomplish a given function.

3.2.7 *V/m*—A measure of electrical field strength in volts per meter.

3.3 *Abbreviation:*

3.3.1 *IEL*—Indirect Effects of Lightning

4. Overview Flowchart

4.1 The flowchart in Fig. 1 provides an overview of the methods outlined in this practice.

⁶ Available from RTCA, 1150 18th NW, Suite 910, Washington DC 20036, <http://www.rtca.org>.

⁷ Available from SAE International (SAE), 400 Commonwealth Dr., Warrendale, PA 15096, <http://www.sae.org>.