U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Industry Documents To Support Aircraft Lightning Protection Certification

Date: 7/16/13 **AC No:** 20-155A
Initiated by: AIR-130

1. Purpose.

a. This advisory circular (AC) recognizes several SAE Aerospace Recommended Practices (ARPs) and European Organization for Civil Aviation Equipment (EUROCAE) documents as acceptable methods for showing compliance with airworthiness regulations. These industry documents provide guidance on aircraft lightning environment and test waveforms, aircraft lightning zoning, aircraft lightning test methods, and aircraft lightning direct effects.

b. This AC is not mandatory and does not constitute a regulation. It describes an acceptable means, but is not the only means, to help you to obtain certification for lightning protection.

2. Applicability. This AC applies to all applicants for a new type certificate (TC) or a change to an existing TC when the certification basis requires you to address the certification requirements of aircraft lightning protection.

3. Cancellation. AC 20-155, *SAE Documents to Support Aircraft Lightning Protection Certification*, dated April 26, 2006, is cancelled.

4. Industry Documents on Lightning. The following industry documents define the characteristics of lightning flashes and how lightning attaches to aircraft. Aircraft and aircraft equipment designers should use these recommended practices when developing lightning protection for aircraft structures as well as fuel, and electrical and electronics systems.

a. SAE ARP 5412B (or EUROCAE ED-84A), *Aircraft Lightning Environment and Related Test Waveforms*, describes lightning waveforms that you may use for lightning tests and analysis to support aircraft certification. The standardized voltage and current waveforms in this document represent the lightning environment, and will help you assess the direct effects of lightning on your aircraft. You can use the standardized external current waveforms to derive standardized transient voltage and current waveforms that can appear on electrical cable bundles and at equipment interfaces.

b. SAE ARP5414B (or EUROCAE ED-91B), *Aircraft Lightning Zoning*, describes aircraft lightning attachment zones used in defining where lightning will attach to the aircraft (called "lightning zoning"). Zoning information and hazard assessments may be used to determine how to protect a given aircraft part or a specific location.

c. SAE ARP5416A (or EUROCAE ED-105A), *Aircraft Lightning Test Methods*, describes test methods and test procedures to evaluate lightning effects on aircraft structure, components, electrical and electronic systems, and fuel systems.

d. SAE ARP5577, *Aircraft Lightning Direct Effects Certification*, describes guidance on lightning certification associated with aircraft structure, mechanical systems, hydraulic systems, and external components and sensors.

5. AC 20-53B and AC 20-136B. AC 20-136B, *Aircraft Electrical and Electronic System Lightning Protection*, describes acceptable means of compliance to Title 14 of the Code of Federal Regulations (14 CFR) 23.1306, 25.1316, 27.1316, and 29.1316 concerning protection of aircraft electrical and electronic systems from the effects of lightning. AC 20-53B, *Protection of Aircraft Fuel Systems Against Fuel Vapor Ignition Due to Lightning*, describes acceptable means of compliance to 14 CFR 23.954, 25.954, 27.954, and 29.954 concerning fuel system lightning protection.

6. Additional Reference. You may use FAA Technical Report DOT/FAA/CT-89/22, *Aircraft Lightning Protection Handbook*, to help you show compliance for aircraft lightning protection.

7. Related Documents.

a. 14 CFR. Order copies of the 14 CFR parts 23, 25, 27, and 29 from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402-9325. Telephone 202-512-1800, fax 202-512-2250. You can also get copies from the Government Printing Office (GPO) website at www.access.gpo.gov.

b. FAA ACs. ACs are available on the FAA website at http://www.faa.gov/regulations_policies/advisory_circulars/. You can also view and download copies from our web based regulatory and Guidance Library (RGL) at www.airweb.faa.gov. On the RGL website, select "Advisory Circular", then select "By Number".

c. FAA Technical Report. Order copies of FAA Technical Report DOT/FAA/CT-89/22 from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402-9325. Telephone 202-512-1800, fax 202-512-2250. You can also get copies from the Government Printing Office (GPO) website at www.access.gpo.gov.

d. Industry Documents.

(1) SAE Documents. Order SAE ARP5412B, ARP5414B, ARP5416A, and ARP5577 from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001. Telephone 724-776-4970, fax 724-776-0790. You can also order online at www.sae.org.

(2) EUROCAE Documents. Order EUROCAE ED-84A, EUROCAE ED-91B, EUROCAE ED-105A from EUROCAE, 102 rue Etienne Dolet, 92240 Malakoff, France. Telephone +33 1 40 92 79 30, fax +33 1 46 55 62 65, website http://www.eurocae.net.



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