



Advisory Circular

Subject: SAE DOCUMENTS TO
SUPPORT AIRCRAFT LIGHTNING
PROTECTION CERTIFICATION

Date: 4/28/06
Initiated by: AIR-100

AC No: 20-155

1. PURPOSE.

a. This advisory circular (AC) will show you how to gain Federal Aviation Administration (FAA) approval of aircraft lightning protection. We at the FAA recommend you use two Society of Automotive Engineers (SAE) International documents to help you show compliance with the regulatory requirements of your type or supplemental type certification program. The documents supplement the engineering and operational judgment used to form the basis of any compliance findings on lightning protection.

b. This AC is not mandatory and does not constitute a regulation. It describes an acceptable means, but is not the only means, to show you how to gain certification for lightning protection. However, if you use the means described in this AC, you must follow it in all important respects.

2. SAE DOCUMENTS ON LIGHTNING. SAE Aerospace Recommended Practice (ARP) 5412A, *Aircraft Lightning Environment and Related Test Waveforms*, dated February 2005 and ARP 5414A, *Aircraft Lightning Zoning*, dated February 2005, define the characteristics of lightning flashes and how lightning attaches to aircraft. Aircraft and aircraft equipment designers need this information to develop lightning protection for aircraft structure and fuel, electrical, and avionics systems.

a. **SAE ARP 5412A** 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 ARP 5414A** describes aircraft lightning attachment zones used in defining where lightning will attach to the aircraft. (We call this "lightning zoning.") Zoning information and hazard assessments may be used to determine how to protect a given aircraft part or a specific location.

3. ADDITIONAL HELPFUL REFERENCES.

a. Other ACs offering means of compliance for lightning protection are: AC 20-53, *Protection of Aircraft Fuel Systems Against Fuel Vapor Ignition Caused by Lightning*, and AC 20-136, *Protection of Aircraft Electrical / Electronic Systems Against the Indirect Effects of Lightning*.

b. You may use SAE ARP 5412A and ARP 5414A with these ACs to show compliance for aircraft lightning protection.

4. RELATED DOCUMENTS AND HOW TO GET THEM.

a. **Title 14 of the Code of Federal Regulations (14 CFR).** Order copies of the 14 CFR Parts listed below 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) Internet website at www.access.gpo.gov/.

(1) Part 23, Airworthiness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes

(2) Part 25, Airworthiness Standards: Transport Category Airplanes

(3) Part 27, Airworthiness Standards: Normal Category Rotorcraft

(4) Part 29, Airworthiness Standards: Transport Category Rotorcraft

(5) Part 33, Airworthiness Standards: Aircraft Engines

(6) Part 35, Airworthiness Standards: Propellers

b. **SAE Documents.** Order SAE ARP 5412A and ARP 5414A 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.

c. **FAA ACs.** Order copies of ACs 20-53B and AC 20-136A from the U.S. Department of Transportation, Subsequent Distribution Office, M-30, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20795. Telephone 301-322-5377, fax 301-386-5394. You can also view and download copies from our web based Regulatory and Guidance library (RGL) at www.airweb.faa.gov/rgl. On the RGL website, select "Advisory Circulars," then select "By Number."

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