

**AC 20-155A, Industry Documents To Support Aircraft Lightning Protection Certification
(Public Coordination) Comment Matrix**

Para	Commenter/ Organization	Comment Summary	Proposed Resolution	Disposition
§ 1.a	Marc Ponçon / Eurocopter	To our understanding, the purpose of AC 20-155 has always been to identify industry standards (SAE / Eurocae) in support of AC 20-53 and AC 20-136. This is at least what is reflected in the title of AC 20-155 (Industry Documents To Support Aircraft Lightning Protection Certification).	<p>Suggestion is to state that this AC references the industry documents to be used in conjunction with AC 20-53 and AC 20-136, respectively applicable to compliance demonstration of protection against direct and indirect effects of lightning.</p> <p>Present text:</p> <p><i>a. This advisory circular (AC) will show you how to obtain Federal Aviation Administration (FAA) approval of aircraft lightning protection.</i></p> <p>Suggested text:</p> <p><i>a. This advisory circular (AC) will show you how to use the various SAE and Eurocae common technical documentation , typically in support of AC 20-53 and AC 20 136 methodologies, when applying for Federal Aviation Administration (FAA) approval of aircraft lightning protection.</i></p>	<p>Partially accepted.</p> <p>This AC references the industry documents to help with aircraft lightning protection certification, including electrical/electronic systems and fuel systems addressed by AC 20-136B, AC 20-53B, and help with compliance demonstration of other requirements. For example, the referenced ARP5416/ED-105 describe test methods and test procedures that can be used for compliance with lightning protection of § 23.867, Electrical bonding and protection against lightning and static electricity, and § 25.581, Lightning protection, etc., where there is no FAA AC for these regulations.</p> <p>Action: Clarify § 1.a as:</p> <p>a. This 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.</p>

§ 5.a	Marc Ponçon / Eurocopter	Although already present in the current issue of AC 20-155, we don't understand the logic which identifies in § 5 a. AC 20-53 and AC 20 136 as alternative means of compliance.	Suggestion is to introduce AC 20-53 and AC 20-136 as the primary acceptable means of compliance for the direct / indirect effects of lightning, instead of introducing them as "Additional references".	<p>Partially accepted.</p> <p>Using the same format in AC 20-155, this AC identifies AC 20-53 and AC 20-136B as providing acceptable means (not alternative means) of compliance for lightning protection of aircraft fuel, electrical and electronics systems.</p> <p>Action: Clarify § 5 as:</p> <p>5. AC 20-53 AC 20-136B. AC 20-136B describes an acceptable means of compliance to 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 describes an acceptable means of compliance to 14 CFR §§ 23.954, 25.954, 27.954, and 29.954 concerning fuel system lightning protection.</p>
§ 4	Marc Ponçon / Eurocopter	Whereas SAE ARP5577 is referenced for direct effects of lightning, no equivalent is given for indirect effects.	<p>Suggestion is to reference additional document(s) in support of indirect effects of lightning, for example:</p> <ul style="list-style-type: none"> - SAE ARP 5415A (User's Manual for Certification of Aircraft Electrical/Electronic Systems for the Indirect Effects of Lightning), - Eurocae ED-81 (Certification of Aircraft Electrical/Electronic Systems for the Indirect Effects of Lightning). <p>If those standards are considered obsolete (for example, SAE ARP5413A, equivalent of ED-81, has been cancelled), updates should probably be launched.</p>	<p>Not accepted.</p> <p>When AC 20-136A was published, it superseded the information in SAE ARP5413A, so the ARP was declared cancelled by the SAE as of March 2007. EUROCAE ED-81 was equivalent to SAE ARP5413A. While EUROCAE did not cancel ED-81, this document should not be referenced in AC 20-136A or AC 20-155A because it conflicts with information in the ACs.</p> <p>SAE ARP5415A is guidance that directly relates to AC 20-136B. This ARP is already referenced in AC 20-136B, so referring to this ARP in AC 20-155A is not required.</p> <p>No change to § 4.</p>

§ 4	Gilles Loopuyt / Eurocopter	<p>As stated in interim update of AC 20-155, dated 4/28/06, FAA was waiting for amendments of ED-84 and ED-81 before referencing them as equivalent to respectively ARP 5412A and ARP 5414A.</p> <p>Now, the explicit revisions of these ARP standards have been removed and replaced by sentence “<i>The industry documents referenced in this AC refer to the current revisions and amendments</i>”.</p> <p>This induces the risk that, if SAE and Eurocae document updates are not synchronized in the future, using the SAE or Eurocae standards may not be equivalent.</p>	Suggestion is to reference the documents with explicit revisions and amendments.	<p>Accepted.</p> <p>Action: Revised the AC and referenced industry documents (SAE ARPs and EUROCAE EDs) with explicit revisions and amendments.</p>
	Billy M. Martin Cessna Aircraft Company	The document should also include reference to ARP5415, User’s Guide for AC 20-136B; This document is currently scheduled to be revised by the SAE AE-2 / Eurocae WG-31 committees. It, similar to ARP5416 will provide excellent information concerning the development and testing for the effects of lightning for electrical/electronic systems	Include ARP 5415 within the AC	<p>Not Accepted.</p> <p>ARP5415 is referenced in AC 20-136B. This ARP is specifically related to AC 20-136B, so it is most appropriately referenced there.</p> <p>No change to the document.</p>

<p>Billy M. Martin Cessna Aircraft Company</p>	<p>Reference to the current revision letter is fine, however there might be concern about the usage of a previous revision of these documents during the certification of a system and then have to re-access the system at a later date, due to the revision of the document.</p>	<p>Use wording similar to the AC for DO-160 that allows for the usage of previous revisions.</p>	<p>Not accepted.</p> <p>The changes for the current revision of the SAE ARPs and EUROCAE EDs referenced in the AC 20-155A fix incorrect/inadequate methods/procedures, clarify guidance, and in some cases adopt improved and accepted methods/procedures. AC 20-155A was revised to reference industry documents with explicit current revisions and amendments. Also, AC 20-136B references current revisions of the industry documents (e.g., ARP5416a, etc.). AC 21-16G allows use of current and previous applicable revisions of DO-160.</p> <p>The FAA encourages use of current versions of the industry standards referenced in AC 20-155A for all certification efforts. Aircraft and systems approved using previous revisions to the industry standards undergoing subsequent change to type design may be able to continue using the previous revisions of these industry standards. Work with your ACO to determine appropriate plan for your specific application.</p>
<p>Billy M. Martin Cessna Aircraft Company</p>	<p>Though not directly a part of this AC, I highly recommend that the FAA release a policy letter allowing for the usage of ARP 5672 / ED 152 "Aircraft Precipitation Static Certification" as a means of compliance to 14 CFR 23.867, 25.899, 27.610 and 29.610.</p>	<p>Provide a FAA Policy Letter referencing acceptance of the ARP for compliance to the applicable FAR's</p>	<p>Acknowledged.</p> <p>The FAA reviewed SAE ARP 5672 for inclusion in future policy or advisory guidance on acceptable means of compliance to protection against static electricity of Title 14 of the Code of Federal Regulations (14 CFR) §§ 23.867, 25.899, 27.610(d), and 29.610(d).</p>
<p>Zaki Mahroof Rolls-Royce plc, PO Box 31</p>	<p>Rolls Royce plc has no objection to AC 20-155A.</p>		<p>Acknowledged</p>

n/a	Clay Barber Garmin International	Garmin reviewed and has no comments.	n/a	Acknowledged
	Laura Niles Universal Avionics	Universal Avionics does not have any comments		Acknowledged

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