

Formal FAA - Document Review Comment Log

Title of Document: AC 20-18B, Qualification Testing of Turbojet and Turbofan Engine Thrust Reversers	
Author:	Alan Strom, 781-238-7143
Technical Writer/Editor:	Judith Watson, 781-238-7196
Comments Disposition Date:	08/11/15

Reviewing Office	
Organization / Company address:	ANM-100
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#	Name of commenter	Page and Paragraph Number	Comment	Reason for Comment	Recommendation	Disposition/Response to Comment
1.		Page 1, paragraph 4.	General.		List related regulations in numerical order (still keeping the subpart regulations for part 23 and 25 together).	Agree. Change made.
2.		Page 4, paragraph 7.d.	Paragraph 7.d states that the vibration test requires actuation of the thrust reverser. However, the last sentence of the paragraph appears to allow an alternative method of compliance that is undefined if the thrust reverser is being certified under 14 CFR part 23 or part 25. The last sentence only requires that the method of compliance		Remove sentence or modify to make intent clear.	Agree. The purpose of this sentence was to relate the evaluation of the effects of thrust reverser actuation on the engine to §33.83 (f), which uses similar language. In this context, though, including such language in the AC does seem confusing. Agree to remove sentence. Changed AC to remove last sentence

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			is substantiated and defined in the engine installation instructions. If the thrust reverser is certified under the aircraft, how can we require the method of compliance be defined in the engine installation instructions under § 33.5? The thrust reverser would not be part of the type design for the engine and would not be subject to section 33.5. It is unclear what the intent of the current sentence is and implies that a part 23 or 25 certified component be defined			of paragraph 7.d

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			in a part 33 manual..			
3.		Page 4, paragraph 7.d.	Should an equivalent level of safety finding be necessary if the applicant develops an alternative approach and runs the vibration test of section 33.83 without actuating the thrust reverser?	If the thrust reverser is not actuated during the vibration test, and an alternative method of compliance is used, it may require an equivalent level of safety finding since sections 33.97 and 33.83 are prescriptive.	After the last sentence of the paragraph, state that the applicant must apply for an equivalent level of safety if they choose to use an alternative method.	Disagree. Section 33.83 does not explicitly require actuation of the thrust reverser. Section 33.83 (a) says, "Each engine must undergo vibration surveys to establish that the vibration characteristics of those components that may be subject to mechanically or aerodynamically induced vibratory excitations are acceptable throughout the declared flight envelope. The engine surveys shall be based upon an appropriate

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						combination of experience, analysis, and component test...." Section 33.83(c) requires evaluation of "The effects on vibration characteristics of operating with...the most adverse inlet air flow distortion pattern declared by the manufacturer, and the most adverse conditions in the exhaust duct(s)...." While engine tests are required, the method by which the effects of the thrust reverser is evaluated is not specified by §33.83. A statement saying that an ELOS must be used

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						is thus not necessary. No change made.
4.		Page 4, paragraph 8.	Is the intent to allow evaluation and/or acceptance of the thrust reverser when it is in a condition beyond the instructions of continued airworthiness after completion of the cyclic testing?	Stating the “thrust reverser must be in a condition for continued service after completion of the test” provides a less restrictive requirement than “...the thrust reverser must be serviceable according to the ICA” (as done in para 9). AC 20-177 defines continued in-service condition and allows a method for an article to be authorized to operate with wear or damage outside a specified	Use consistent language if the requirement is the same for paragraphs 8 and 9. Recommend using language “... the thrust reverser must be serviceable according to the ICA.”	Agree. Change incorporated as proposed.

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				limit, tolerance, or other parameter specified in a manufacturer's service document.		
5.		Page 4, paragraph 9.	Clarify that the cyclic conditions must represent the in-service operation.	Engine manufacturers often use test equipment as opposed to an EEC to deploy and stow the reverser. The resultant cycles are not representative of the actual operation.	Provide clarification that the intent of 33.97(b) is to perform representative TR endurance cycles.	Agree. Change incorporated. Even though there is already a sentence in paragraph 8 that says, "Any slave control hardware or software used must cause the thrust reverser to actuate in the same way as the type design control system," it is worth re-stating the same intent in paragraph 9.

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6.		Page 4, paragraph 9.	ICA acronym is not defined.		Define the ICA acronym.	Agree. Change made to define the ICA acronym upon its first use (now in paragraph 8).
7.		Page. 4, paragraph 10.	Cite the correct CFR reference for part 25.	First sentence of paragraph incorrectly cites § 23.934 for "Turbojet engine thrust reverser system tests" when it should cite § 25.934.	Revise first sentence of paragraph to read "Section 23.934, Turbojet and turbofan engine thrust reverser systems tests, and § 25.934, Turbojet engine thrust reverser system tests, require compliance with § 33.97."	Agree. Change incorporated.

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1.		Page 1, Header	" / / " and "AC 20-188"	Template formatting	Strike" / / " and "AC 20-188." It should not appear in the header of the first page	Agree. Corrected.
2		Page 1, title section.	"(Draft)" should not appear in the title section under AC No:	Template format	Strike "(Draft)" from the title section on p. 1	Agree. Corrected.
3.		Page 1, title section.	The 2nd solid line of the title section should be removed	Template format	Strike the 2nd solid line on page 1 -- the line just above the "Purpose" paragraph.	Agree. Corrected.
4.		Page 1, paragraph 1, Purpose.	At the first reference to "14 CFR" define the reference	To clarify for the reader	Spell out 'Title 14 of the Code of Federal Regulations (14 CFR).	Agree. Corrected.

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5.		Page 1, paragraph 1, Purpose	In the last sentence of Paragraph 1. Purpose section, add the word "it" after "...engine, and..."	The use of a comma calls for an independent clause to follow, and a noun (pronoun) is needed for smoother reading.	Change to:"...or turbofan engine, and it does not address aircraft- level..."	Agree. Revised as a separate sentence.
6.		Page 1, paragraph 2 & paragraph 3.	Paragraph 3, Applicability, should be moved up to become paragraph 2. Cancellation should become the new Paragraph 3	Formatting consistency	Move "Applicability" up from paragraph 3 to Paragraph 2, and move "Cancellation" down to paragraph 3.	Agree. Moved paragraph as suggested.
7.		Page 1, under "Applicability," (renumbered now as paragraph 2).	Consider adding a paragraph explaining differences from Rev A.	To clarify for the reader	Consider adding an explanation of differences from A.	Partially agree. The explanation of revision differences is being done as a separate document and will be posted with the final AC.

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8.		Page 2, paragraph 5c. Page 2, Paragraph 6. Page 3, paragraph 7a.	When this AC refers to Internal sections of this AC. It is inconsistent in its use of the terms "section" and "paragraph," which it uses synonymously, when directing the reader to sections of the AC.	To promote consistency in use of terminology.	To promote consistency. The references to "...section 9 of this AC" should be changed to "paragraph 9."	Agree. Corrected as suggested.
9.		Page 3, paragraph 7(a.)	On the 10 th line, at the reference to AC 33.90-1, add the title of the AC.	Define ACs upon first usage	Add the title of the AC after the reference to AC 33.90-1	Agree. Added AC title.
10.		Page 3, paragraph 7(a.)	In the 11 th line of Paragraph 7(a.), at the reference to "...for ETOPS,..." ETOPS needs to be defined.	To clarify for the reader.	Insert a definition of ETOPS in Paragraph 7(a.)	Agree. Change incorporated.

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11.		Page 3, paragraph 7a though 7d.	Is there any method to the Listing order/sequence of the 4 paragraphs listed in paragraph 7 -- or does it matter? Would it make more sense to list these four items in the order that corresponds to their numeric CFR section number: 83, 85, 87, 89?	To promote a well-ordered AC with a logical listing of information.	Change the order of the paragraphs to coincide with the CFR section number order: 83, 85, 87, 89.	Disagree. The subparagraphs are in the order that the tests are listed in §33.97(a) (endurance, calibration, operation, and vibration tests). Thus it is logical to show them in that order in the AC. No change made.
12.		Page 4, paragraph 9.	In the last line, at the reference to "...the ICA.", ICA needs to be defined at its first usage.	To clarify for the reader.	Define "ICA" at its first usage.	Agree. Change made to define the ICA acronym upon its first use (now in paragraph 8).
13.		Page 4, paragraph 10	In the second line of paragraph 10, the CFR reference is	We believe this is an error.	In the second line, change 23.934 to 25.934	Agree Change incorporated.

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			wrong. Line 1 references "Section 23.934," which is correct, but the second line also uses "23.934" when what is really meant is "25.934."			
14.		Page 5, in the main text of the AC.	Add narrative in main text above signature to refer to the Appendix	See 6/3/14 email from Jim Hansen	In the text of the AC, add a narrative referring to the Appendix.	Agree. Text added.
15.		Page 6, Appendix.	The titling of the page should be changed, and the page number should be A-1 instead of 6.	Formatting consistency	Label the Appendix (not "Appendix 1," as the number is not needed) and move the label to the center of the top of the page and make it BOLD like a title. Change	Agree. Corrected as suggested.

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					the page number of the Appendix to "A-1."	
16.		Page 5, END	"END" should not appear	Incorrect format	Delete "END" at the end of the AC. Replace with signature block.	Agree. Changed as suggested.
17.		Page 6, Appendix	In the first paragraph of the AC Feedback Info form, there is either an extra word ("about") or some missing words, but the current wording is awkward.	To eliminate awkward wording in the attached form.	Change "...you may let us know about by using..." to "you may let us know about it by using this page as a template..."	Agree. Change made. Deleted the word, "about."