European Aviation Safety Agency

Comment Response Document (CRD) on Consultation paper nr. 5 of 29 July 2003

CS-E
Certification Specifications for Engines

Foreword to the Comment Response document (CRD)

To give a rapid overview of the CRD, the following keywords were used in responding to comments:

- "Carried": The proposed amendment is wholly transferred to the revised text.

- "Noted": The comment is acknowledged and where needed the text has been improved.

- "Deferred": The comment requires further assessment by the Agency under its future rulemaking programme.

- "Disagreed": The comment is not shared by the Agency.

CRD - Explanatory Note CS - E

I.General

Para. *(6)*

36 / CAA UK

Comment

The General Explanatory memorandum, in its paragraph 6, makes a wildly inaccurate statement with regard to the issue of tolerances. (It is stated that the figure of 4 inches actually means 4 ± 0.5 inch: this is a wholly inaccurate assumption as tolerances are specified for each specific part on the relevant drawing). It is therefore proposed that the paragraph be shortened and simplified by retaining only the first sentence, which is factual.

Response

Noted.
The comments received on this issue can be split up in four categories:
a.The non-SI alternative units knot, nautical mile and foot, allowed by ICAO Annex 5, should not be converted in SI units;
b.The conversions made, are not accurate enough;
c.Not all units are converted;
d.correcting of mistakes.

With regard to these comments the following remarks can be made:
a.The comment is agreed in principle, however it should be noted that ICAO Annex 5 allows the use of these non-SI alternatives, but lists the SI units as the “primary units” (see table 3-4 of Annex 5). Therefore the conversion to SI units in these cases is still valid, bearing in mind that the non-SI alternative units, quoted between brackets, may continue to be used.
b.As explained under 2. above the units were converted using the “equivalent tolerance” principle, which is believed to be the right approach in general. It is however noted that some of the figures in the airworthiness codes serve only as an input to calculations and do not reflect an actual requirement to be met (e.g. CS 25.415(a)). In such case the figure has to be treated as a figure with no tolerance, and the conversion should be as accurate as possible.
From some of the comments it is also clear that people have used the figures with “old” units with a tolerance that was not reflected in the figure. There may have been a good reason to do so, but it may also have been for no good reason. It will be necessary to review all the figures to check if the tolerance as implied by the figure is sufficient for the purpose of the requirement.
c.It is acknowledged that due to lack of time and resources it was not possible to convert the units in certain formula’s and in graphics. This is a task which needs to be taken up by the Agency.
d.The necessary corrections are made.

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24 / Rolls-Royce

Comment

Propose different text:
The text from JAR E 70(d) on changes to material source etc. has not been transferred to this CS-E draft. To assure consistency within the engine community, this requirement should be retained.

Response

Disagreed. Covered by Part 21, Subparts D and E. A change to material sources may be considered as a change to a type-design which requires investigation.

24 / Rolls-Royce

Comment

The 85th meeting of the Engine Steering Group (ESG) completed work on several NPAs by agreeing new and modified text which differs from that contained in CS-E Issue 1 (draft). The agreed text will have been forwarded as a comment by the Chairman of the ESG on behalf of the ESG. Rolls-Royce support the inclusion of the modified text in CS-E.

The NPAs concerned are:

NPA E 47 – New Sub-section F – Environmental and Operational Design Requirements

NPA E 49 – Miscellaneous Changes

NPA E 42 – Terminology

NPA E 44 – Critical Parts

NPA E 33 – Engine Control System

Response

Noted.

27 / GE

Comment

There are a number of rule changes in CS-E relative to the JAR-E regulation that it was based on. Some of these rules have not had the opportunity to be fully reviewed by interested parties. There must be a process to allow consideration of these comments on these changes and allow appropriate revisions to the revised text.

Response

Noted.
Further review may be carried out by the Agency. However, it should be noted that all technical texts have been published by the JAA in accordance with JAR-11 for the standard 3 month comment period. All interested parties had the opportunity to provide comments. The CRD associated with NPAs are attached to this CRD. The Agency may decide to provide extra time for interested parties to react after publication of the decision.

27 / GE

Comment

Agree with the ESG proposed changes in NPA-E44, except for the deletion of the last sentence in the second paragraph of AMC CS-E 515 Paragraph 6(a). This is described more fully in the first comment on CS-E

Response

Noted. See response to AMC CS-E 515 Paragraph 6(a).

29 / Europe Air Sports

Comment

It is the intention of CoreGroup-10 to transfer the requirements for engines in JAR-22 Subpart H to CS-E. According to the Explanatory Memorandum the agency will make the decision on the final location of these requirements after getting all the comments.
Europe Air Sports endorses strongly the recommendation of the Recreational Aviation Steering Group (RASG) as written down in attachment one, Explanatory Memorandum to CS 22, page 6. In paragraph 5 the statements by Core Group 9 and 11 recommend to keep the engine and propeller requirements in CS 22 and leave them out of CS P and CS E.

It is of the greatest concern to Europe Air Sports if JAR-22 is split up into various documents in the EASA domain. JAR-22 has been a very comprehensive document where the requirements for gliders are well interconnected.

Europe Air Sports finds that the actual technical requirements for engines (and propellers) provide a satisfactory level of safety as they are today.
The powered sailplane is a glider. If something is wrong with the engine, it is still a glider, hence we do not need the same requirements as for powered aircraft, but a very simple installation and simple management of the engine.

Some of the big differences to other aircraft is the weight-span problem of sailplanes, the need of "soarability" and the way of using them like landing in a field. This leads to special and sometimes lower requirements in order to maintain the present level of safety within gliding. This is an important argument to have the requirements for the engines together with the rest of the requirements.

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We are especially concerned, that being put in CS-E and CS-P the requirements will be influenced in future by the requirements for other aircraft developed by non-glider experts.

Therefore Europe Air Sports strongly recommends the Agency to have all glider requirements such as for the engines are put together in CS-22 and not split out over CS-22 and CS-E and CS-P.

Europe Air Sports appreciates the opportunity to comment on the draft CS-E rules and will be ready any time to elaborate on their arguments,

Response

Noted.
During the consultation for CS-E, CS-P, CS-22, CS-VLA, CS-VLR, the views of the commentators were requested on what is the most appropriate location for the certification specifications to be used for engine and propeller to be installed on powered sailplanes, very light aeroplanes (VLA) and very light rotorcraft(VLR)

The following points should be kept in mind:

The Basic Regulation 1592/2002 requires all products to have a Type Certificate. Engine and propeller of whatever size or design, are defined in the Regulation as products.
It is clear that the levels of safety intended by the current JAR-E (CS-E is based on JAR-E plus CS-22 subpart H plus appendix B of JAR-VLR) are higher than that intended by the engine requirements in JAR-22 and JAR-VLR (Used as the basis for CS-22 and CS-VLR).
It is important both that the Agency maintains this principle of the level of regulation being appropriate to the intended use of the product, and that this is clear to all interested parties.
It is important that the location of the requirements (whether in CS-E or CS-22 etc.) should not affect in any way the rigor with which compliance is both demonstrated and found.

Two solutions were offered:
1) To place such certification specifications in the certification specifications for engines (CS-E) and certification specifications for propellers (CS-P) (Consistency of engine and propeller texts being the main rationale).
2) To place such certification specifications in the aircraft certification specifications either directly (CS-22 and CS-VLR) or by cross-reference (CS-VLA) (Use of an aircraft system approach being the main rationale).

It should be noted that the issue was only related to the location : the texts were technically unchanged (only editorial changes).

A careful review of received comments does not show a clear majority in favour of one or the other solution. Both Authorities and Interested Parties are divided on the issue.

To find a solution for the first issue of all CS, the following was agreed:
-Solution 2 should be adopted because it complies with the general principle of transformation of JARs into CS (avoiding changes). Currently, the engine and propeller certification specifications for powered sailplane, VLA and VLR are included directly or by cross-reference in the corresponding JAR.

-However, the appendix B of JAR-VLR should be replaced by the corresponding text that was included into the draft CS-E circulated for comments. The latter is considered more adequate as specifications for a separate engine certification (imposed by EU Regulation 1592 and Part 21), avoiding the confusing numerous cross references to aircraft specifications.

29 / Europe Air Sports

Comment

Refer to Europe Air Sports document S3049 dated 9 September 2003, attached.

In CS E, dated 21.03.2003, issue 1, page 7 and 91, delete in the headline the words:
"Powered sailplanes and" to read:
Section H - Piston Engines for Very Light Aeroplanes.
Delete the boxed text in reference to JAR 22 on page 91

Response

Disagreed. If Section H is kept in CS-E then the heading should remain as proposed.

36 / CAA UK

Comment

The proposal to incorporate all engine requirements into this CS-E, including those previously to be found in JAR-22 sub-part H, is fully supported.

Response

Noted.
During the consultation for CS-E, CS-P, CS-22, CS-VLA, CS-VLR, the views of the commentators were requested on what is the most appropriate location for the certification specifications to be used for engine and propeller to be installed on powered sailplanes, very light aeroplanes (VLA) and very light rotorcraft(VLR)

The following points should be kept in mind:

The Basic Regulation 1592/2002 requires all products to have a Type Certificate. Engine and propeller of whatever size or design, are defined in the Regulation as products.

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It is clear that the levels of safety intended by the current JAR-E (CS-E is based on JAR-E plus CS-22 subpart H plus appendix B of JAR-VLR) are higher than that intended by the engine requirements in JAR-22 and JAR-VLR (Used as the basis for CS-22 and CS-VLR).
It is important both that the Agency maintains this principle of the level of regulation being appropriate to the intended use of the product, and that this is clear to all interested parties.
It is important that the location of the requirements (whether in CS-E or CS-22 etc.) should not affect in any way the rigor with which compliance is both demonstrated and found.

Two solutions were offered:
1) To place such certification specifications in the certification specifications for engines (CS-E) and certification specifications for propellers (CS-P) (Consistency of engine and propeller texts being the main rationale).
2) To place such certification specifications in the aircraft certification specifications either directly (CS-22 and CS-VLR) or by cross-reference (CS-VLA) (Use of an aircraft system approach being the main rationale).

It should be noted that the issue was only related to the location : the texts were technically unchanged (only editorial changes).

A careful review of received comments does not show a clear majority in favour of one or the other solution. Both Authorities and Interested Parties are divided on the issue.

To find a solution for the first issue of all CS, the following was agreed:
-Solution 2 should be adopted because it complies with the general principle of transformation of JARs into CS (avoiding changes). Currently, the engine and propeller certification specifications for powered sailplane, VLA and VLR are included directly or by cross-reference in the corresponding JAR.

-However, the appendix B of JAR-VLR should be replaced by the corresponding text that was included into the draft CS-E circulated for comments. The latter is considered more adequate as specifications for a separate engine certification (imposed by EU Regulation 1592 and Part 21), avoiding the confusing numerous cross references to aircraft specifications.

36 / CAA UK

Comment

General Explanatory Memorandum
The General Explanatory memorandum invites comments, in its paragraph 5, on the issue of the title of the document (Should Book 1 be called the “airworthiness code” or should Books 1 & 2 be called the "Certification Specification"). The current proposal, whereby Books 1 & 2 are contained in a single volume is considered to be preferable, and the current proposed title of "Certification Specification" is also considered to be a suitable descriptor.

Response

Noted. Art. 13 of the Basic Regulation states that the Agency shall, where appropriate, issue "certifications specifications, including airworthiness codes and acceptable means of compliance, …". The overall document is called Certification Specifications containing Book 1 which represents the airworthiness code and Book 2 with the associated acceptable means of compliance and guidance material.

36 / CAA UK

Comment

It is noted that there are no cross-references from Book 1 to related material in Book 2. It is considered that, where material exists in Book 2, the introduction of a cross-reference in Book 1 (As currently contained in the JAR-E text from which this CS-E is derived) would be of value.

Response

Noted. This issue is acknowledged and requires further work by the Agency to improve the link between Book 1 and Book 2 of the CS and the overall lay-out and presentation of the document.

41 / ACG

Comment

CS-E is acceptable for ACG

Response

Noted.

43 / CAA Sweden

Comment

With reference to the Consultation Papers concerning certification specifications (CS) mentioned above, we would like to make the following comments.

Since the proposed certification specifications contain regulatory material which, essentially, is identical to the content of the corresponding JARs, we are in favour of the proposed material.

However, should the proposals not have the same content as those JARs, there must be a possibility to rediscuss such items.

Response

Noted.
Further review may be carried out by the Agency. However, it should ne noted that all technical texts have been published by the JAA in accordance with JAR-11 for the standard 3 month comment period. All interested parties had the opportunity to provide comments. The CRD associated with NPAs are attached to this CRD. The Agency may decide to

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provide extra time for interested parties to react after publication of the decision.

Para. ***Appendix 2***

34 / DGAC France

Comment

Although we believe having the engine certified with the aircraft could be compatible with regulation 1592/2002 (the type certificate required being part of the aircraft type certificate), we agree that there are good rationales to have all engine requirements in one place and have no objection to the transfer of appropriate JAR 22 and JAR VLR requirements into the engine requirements.

Note: a final check should be done with the final text of 21A14 – Demonstration of capability – and the need for the engine manufacturer to hold a DOA or not.

Response

Noted.
During the consultation for CS-E, CS-P, CS-22, CS-VLA, CS-VLR, the views of the commentators were requested on what is the most appropriate location for the certification specifications to be used for engine and propeller to be installed on powered sailplanes, very light aeroplanes (VLA) and very light rotorcraft(VLR)

The following points should be kept in mind:

The Basic Regulation 1592/2002 requires all products to have a Type Certificate. Engine and propeller of whatever size or design, are defined in the Regulation as products.
It is clear that the levels of safety intended by the current JAR-E (CS-E is based on JAR-E plus CS-22 subpart H plus appendix B of JAR-VLR) are higher than that intended by the engine requirements in JAR-22 and JAR-VLR (Used as the basis for CS-22 and CS-VLR).
It is important both that the Agency maintains this principle of the level of regulation being appropriate to the intended use of the product, and that this is clear to all interested parties.
It is important that the location of the requirements (whether in CS-E or CS-22 etc.) should not affect in any way the rigor with which compliance is both demonstrated and found.

Two solutions were offered:
1) To place such certification specifications in the certification specifications for engines (CS-E) and certification specifications for propellers (CS-P) (Consistency of engine and propeller texts being the main rationale).
2) To place such certification specifications in the aircraft certification specifications either directly (CS-22 and CS-VLR) or by cross-reference (CS-VLA) (Use of an aircraft system approach being the main rationale).

It should be noted that the issue was only related to the location : the texts were technically unchanged (only editorial changes).

A careful review of received comments does not show a clear majority in favour of one or the other solution. Both Authorities and Interested Parties are divided on the issue.

To find a solution for the first issue of all CS, the following was agreed:
-Solution 2 should be adopted because it complies with the general principle of transformation of JARs into CS (avoiding changes). Currently, the engine and propeller certification specifications for powered sailplane, VLA and VLR are included directly or by cross-reference in the corresponding JAR.

-However, the appendix B of JAR-VLR should be replaced by the corresponding text that was included into the draft CS-E circulated for comments. The latter is considered more adequate as specifications for a separate engine certification (imposed by EU Regulation 1592 and Part 21), avoiding the confusing numerous cross references to aircraft specifications.

Moreover, consistency with 21A.14 has been checked.

Para. ***Book 2***

34 / DGAC France

Comment

In the explanatory note, Part 1 General, Background, Article 2 some explanation is given on the status of AMC. This is not sufficient. Such explanation should be given in a preamble or foreword to Book 2. This is particularly important as the proposed text may be confusing when an AMC (e.g. AMC CS-E.515) may contain both acceptable means of compliance and guidance material (which strictly speaking are not certification specifications).

Response

Noted. Please refer to the explanatory note.

Para.

20 / ESG

Comment

I - Affected paragraphs

In JAR-E Amendment 12:

In Section 1, JAR-E 20, -E 30, -E 40, -E 50, -E 60, -E 110, -E 230, -E 500, -E 560, -E 570, -E 740, -E 760 and -E 860 are modified.
In Section 1, JAR-E 15 and JAR-E 170 are created.
In Section 2, ACJ E 20, ACJ E 25, ACJ E 30, ACJ E 50 (f) and ACJ E 60 (h) are modified.
In Section 2, new ACJ E 50, ACJ E 60 and ACJ E 170 are created.

II - Proposal

A Requirements

A1. To create JAR-E 15 (a) to (e) as follows:

JAR-E 15 Terminology
(a)Reserved
(b)Reserved
(c)Reserved
(d)Reserved
(e)Engine Control System Definitions

Alternate Mode:
means any Control Mode, including Back-up Modes that are not the Primary Mode used for controlling the Engine.

Back-up Mode
means the Control Mode of the back-up system

Back-up System
means a part of the Engine Control System where the operating characteristics or capabilities of the Engine control are sufficiently different from the Primary System that the operating characteristics or capabilities of the aircraft, crew workload, or what constitutes appropriate crew procedures may be significantly impacted or changed

Engine Control System
means any system or device which is part of the Engine Type design, which controls, limits or monitors Engine operation and is necessary for continued airworthiness of the Engine.

Primary System
means the part of the Engine Control System used for controlling the Engine under normal operation.

Control Mode
means each defined operational state of the Engine Control System where satisfactory Engine control can be exercised by the crew.

Primary Mode
means the mode that is intended to be used for controlling the Engine under normal operation. This is often referred to as the 'normal mode'.

Aircraft-supplied data
means all information which is supplied by or via aircraft systems and is used by the Engine Control System.

Electronic Engine Control System (EECS)
means an Engine Control System in which the primary functions are provided using electronics. It includes all the components (e.g. electrical, electronic, hydromechanical and pneumatic) necessary for the control of the power or thrust output of the Engine, within the flight envelope and operating limitations.

Fault or Failure
means an occurrence which affects the operation of a component, part, or element such that it can no longer function as intended.

Fault or failure accommodation
means the capability to mitigate, either wholly or in part, the fault or failure.

Full-up Configuration
means an EECS that has no known faults or failures present.

Loss of Thrust Control (LOTC) or Loss of Power Control (LOPC)
means the loss of ability to modulate power or thrust between given values, or unacceptable thrust or power oscillations. These values are determined by the exact application.

Programmed Logic Device
means a component that is purchased as an electronic component and altered to perform an application specific function. PLDs include, but are not limited to, Programmable Array Logic components (PAL), Programmable Logic Array

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components, General Array Logic components (GAL), Field Programmable Gate Array components, and Erasable Programmable Logic Devices.

Response

Noted. The final version of the NPA has been used.

21 / esg

Comment

The CS-E version which is currently submitted to world-wide circulation for comments is based on a draft NPA-E-42.

The JAA ESG reviewed the comments received after world-wide circulation of this NPA and I am now pleased to give you the final version together with a response-to-comments document.

Please consider this letter as a comment against the current version of CS-E. This text should be amended to reflect the final version of NPA-E-42.

Response

Carried.

28 / Rolls Royce Germany

Comment

General comment against CS-E 15: The paragraph as contained in the consultative draft CS-E was developed under the assumption that there would not be a successor document to JAR-1. With AMC-1 now being available, there is a lot of duplication in AMC-1 and CS-E 15. This should be made consistent, and any definition should only be in one place.

Response

Noted.
CS-Definitions (formerly AMC-1) purports to contain definitions of a general nature applicable throughout all CS. Those definitions which are deemed engine-specific are to be found in CS-E for the purpose only of such material. This policy has been agreed but requires, due to obvious time constraints, further Agency consideration.

36 / CAA UK

Comment

CS-E 15, Terminology. The first sentence is not entirely clear in that it is not readily apparent to which document the phrase "existing at the date of issue." refers. It is suggested that the sentence be rewritten to read, "The Terminology of this CS-E 15 must be used in conjunction with the issue of CS-1 current at the date of issue of this CS-E."

Response

Noted. The proposed amendment will be slightly adapted.

Para. ***(a)***

28 / Rolls Royce Germany

Comment

2nd General comment against CS-E 15(a): The sub-paragraph states that "Where used in CS-E, the terms defined in this paragraph and in CS-1 (should be AMC-1) are identified by initial capital letters." It appears that this practice has not been followed consistently through the consultation draft of CS-E, this is apparent in numerous places. Sometimes, the same term is written with and without initial capital letters on one page. A proof-reading of the document to that extent is suggested.

Response

Noted. Inconsistencies are recognised. Terms with capital letters stand for a definition or a different dictionary meaning. It is agreed that the same term should be used consistently. In view of other comments received, AMC-1 is now labelled CS-Definitions. The Agency will further refine its policy on the matter.

Para. ***(b)***

28 / Rolls Royce Germany

Comment

Comments against CS-E 15(b):

The definition of Maximum Continuous Power and/or Thrust Rating should have the words "of series and newly overhauled engines" deleted.

The definitions of Maximum Engine Over-speed, Maximum Engine Over-torque, Maximum Exhaust Gas Over-temperature and Maximum Power-turbine Over-speed all contain the phrase "…not to require rejection of the Engine from service or maintenance action…", this is misleading as could be interpreted as "rejection from service or rejection from maintenance action".

Therefore it is suggested to turn this part of the sentence around to make the intent clearer: "...not to require maintenance action or rejection of the Engine from service..."

The definition of Take-off Power and/or Thrust, in its sub-paragraph ii. should read "For multi-engined aeroplanes only (when specifically requested), limited in use to a continuous period of not more than 10 minutes in the event of an engine having failed or been shut down."

Response

Noted. The final version of the NPA has been used.

Para. ***(c)***

28 / Rolls Royce Germany

Comment

Comments against CS-E 15(c):

In the definition of Abortive Start, the commas should be deleted.

In the definition of Continuous OEI Power and/or Thrust, the word power-unit should be replaced by engine.

Response

Noted. The final version of the NPA has been used.

Para. ***(e)***

28 / Rolls Royce Germany

Comment

Comments against CS-E 15(e):

In the definition of Back-up Mode, the word Back-up System should be with initial capitals.

Aircraft-supplied Data should have Data with an initial capital letter for consistency.

Fault or failure accommodation should have initial capital letters (Fault or Failure Accommodation), in the definition "...the Fault or Failure." should also be with capital initials.

Response

Carried.

Para. ***(f)***

28 / Rolls Royce Germany

Comment

Comments against CS-E 15(f):

The definition of Engine Critical Part should read " means a part that relies upon meeting the prescribed integrity requirements of CS-E 515 to avoid its Primary Failure, which is likely to result in a Hazardous Engine Effect."

The definition of Engine Flight Cycle should have its comma removed.

Response

Noted. The final version of the NPA has been used.

B1 - SECT A - CS-E 15

Para. *b*

7 / TURBOMECA

Comment

Some terms are now both in AMC-1 and in CS-E. When a term is defined in CS-E and in AMC-1, what will happen if definitions are different ? Is there any process to ensure appropriate consistency between AMC-1 and other codes ? This could lead to confusion. It is supported to keep in AMC-1 all definitions used in more than one code as all ratings and Maximum over-speed(s)/over-torque/over-temperature.

Therefore delete from CS-E 15 all definitions related to power/thrust or power/thrust ratings and related to Maximum over-speed(s)/over-torque/over-temperature as there are redundant with AMC-1.

Response

Noted.
CS-Definitions (formerly AMC-1) purports to contain definitions of a general nature applicable throughout all CS. Those definitions which are deemed engine-specific are to be found in CS-E for the purpose only of such material. This policy has been agreed but requires, due to obvious time constraints, further Agency consideration.

Para. *c*

7 / TURBOMECA

Comment

Some terms are now both in AMC-1 and in CS-E. When a term is defined in CS-E and in AMC-1, what will happen if definitions are different ? Is there any process to ensure appropriate consistency between AMC-1 and other codes ? This could lead to confusion. It is supported to keep in AMC-1 all definitions used in more than one code as all ratings and Maximum over-speed(s)/over-torque/over-temperature.
Therefore delete from CS-E 15 all definitions related to power/thrust or power/thrust ratings and related to Maximum over-speed(s)/over-torque/over-temperature as there are redundant with AMC-1.

Response

Noted.
CS-Definitions (formerly AMC-1) purports to contain definitions of a general nature applicable throughout all CS. Those definitions which are deemed engine-specific are to be found in CS-E for the purpose only of such material. This policy has been agreed but requires, due to obvious time constraints, further Agency consideration.

Para. *d*

7 / TURBOMECA

Comment

Some terms are now both in AMC-1 and in CS-E. When a term is defined in CS-E and in AMC-1, what will happen if definitions are different ? Is there any process to ensure appropriate consistency between AMC-1 and other codes ? This could lead to confusion. It is supported to keep in AMC-1 all definitions used in more than one code as all ratings and Maximum over-speed(s)/over-torque/over-temperature.
Therefore delete from CS-E 15 all definitions related to power/thrust or power/thrust ratings and related to Maximum over-speed(s)/over-torque/over-temperature as there are redundant with AMC-1.

Response

Noted.
CS-Definitions (formerly AMC-1) purports to contain definitions of a general nature applicable throughout all CS. Those definitions which are deemed engine-specific are to be found in CS-E for the purpose only of such material. This policy has been agreed but requires, due to obvious time constraints, further Agency consideration.

Para. *f*

7 / TURBOMECA

Comment

Modify definition of "Engine Critical Part" as written in final issue of NPA-E-44

Response

Carried.

B1 - SECT A - CS-E 15

Para. ***Terminology***

33 / SNECMA

Comment

Some definitions in CS-E 15 are also in AMC-1 and the conflict should be resolved.

Our proposal :

Maximum Continuous Power and/or Thrust --> AMC-1 (used in CS-25)
Maximum Continuous Power and/or Thrust Rating --> AMC-1 (goes with the previous definition)
Maximum Engine Over-speed(s) --> CS-E 15
Take-off Power and/or Thrust --> AMC-1 (used in CS-25)
Take-off Power and/or Thrust Rating --> AMC-1 (goes with the previous definition)
Continuous OEI Power and/or Thrust --> AMC-1 ("Continuous OEI Power" used in JAR-27)
Continuous OEI Power and/or Thrust Rating --> AMC-1 (goes with the previous definition)
Maximum Engine Over-torque --> CS-E 15
Maximum Exhaust Gas Over-temperature --> CS-E 15
Maximum Power-turbine Over-speed --> CS-E 15
Maximum Power-turbine Speed for Autorotation --> CS-E 15
2 1/2-Minute OEI Power and/or Thrust --> AMC-1 ("2 1/2-Minute OEI Power" used in JAR-27)
2 1/2-Minute OEI Power and/or Thrust Rating --> AMC-1 (goes with the previous definition)
30-Minute OEI Power --> AMC-1 (used in JAR-27)
30-Minute OEI Power Rating --> AMC-1 (goes with the previous definition)

Reason(s) for proposed text/comment:

self-explanatory

Response

Noted.
CS-Definitions (formerly AMC-1) purports to contain definitions of a general nature applicable throughout all CS. Those definitions which are deemed engine-specific are to be found in CS-E for the purpose only of such material. This policy has been agreed but requires, due to obvious time constraints, further Agency consideration.

B1 - SECT A - CS-E 20

Para. ***(a)***

28 / Rolls Royce Germany

Comment

CS-E 20(a) starts with "The list of all the parts and equipment, including..." Whereas it is understood that it is the manufacturer´s choice which pieces of the Engine he wishes to be regarded as equipment, it would be beneficial if at least the guidance material to CS-E 20 would provide some information about what is typically expected to be declared as equipment. As CS-E 80 specifically focuses on equipment, it would be helpful to introduce in the AMC to CS-E 20(a) some words about what typically constitutes "equipment".

Experience shows that even on variants of the same engine type, items have been declared as engine part on one variant and as equipment on the other variant, for no apparent reason. This indicates that guidance would be useful. Criteria for making the decision could be, for example,

- is the item in question a Line-replaceable Unit (LRU) ?
- is the item in question a self-contained functional device which is bought in and mounted on the engine ?
- is the qualification of the item done in its majority as an integrated part of the engine type substantiation tests of CE-E Section E, or does the item undergo a qualification programme "off-engine" ?

It appears that these are criteria applied as general working practice, but without a consistent understanding of the background.

Response

Disagreed. It is not the purpose of CS-E to define what constitutes the engine. This CS-E-20 paragraph asks the applicant for a description of the engine type design to be certified. As a result, the corresponding AMC will refer to the engine type design.

B1 - SECT A - CS-E 20

Para. ***(d)***

20 / ESG

Comment

A2. To modify JAR-E 20 (d) to read as follows:
JAR-E 20
(d)Manuals shall be provided containing instructions for installing and operating the Engine that are acceptable to the Authority. These instructions shall contain a definition of the physical and functional interfaces with the aircraft and aircraft equipment. They must also include a description of the Primary and all Alternate Modes, and any Back-up System, together with any associated limitations, of the Engine Control System and its interface with the aircraft systems, including the Propeller when applicable.

Response

Noted.

Text now reads as follows;

(d) Manus must be provided containing instructions for installing and operating the Engine. These instructions must contain a definition of the physical and functional interfaces with the aircraft and aircraft equipment. They must also include a description of the Primary and all Alternate Modes, and any Back-up System, together with any associated limitations, of the Engine Control System and its interface with the aircraft systems, including the Propeller when applicable.

B1 - SECT A - CS-E 25

Para.

28 / Rolls Royce Germany

Comment

- CS-E 25©(2) requires "Installation Instructions, including proper procedures for uncrating, de-inhibiting, acceptance checking, lifting and attaching accessories, with any necessary checks".
The use of the term "Installation instructions" in this context is most unfortunate, as it conflicts with the "instructions for installing the engine" required by CS-E 20(d) where the same words are used to identify a document with an entirely different meaning. As the Installation instructions required by E 20(d) constitute a central and vital part of the engine/aircraft interface, which forms part of the basis on which the engine certification rests, this confusing of different instructions is considered outright dangerous. It is strongly recommended therefore, that a different term be used in CS-E 25(c)(2). A proposal would be "Engine fitment instructions" or "Engine attachment to airframe instructions".

CS-E 30, for example, uses both "installation instructions" and "instructions for installation", in both cases what is meant is the document required by CS-E 20(d), although in the first instance literally the same word as in CS-E 25©(2) is used.

- CS-E 25(c)(5) requires scheduling information to be published. The paragraph is unclear as it states the periods are "recommended", and then requires cross-references to the Airworthiness Limitations Section. The last sentence, starting with "In addition..." and thereby indicating that the subject inspections are not supposed to be in the Airworthiness Limitations Section, refers to "frequency of the inspections necessary to provide for the continued airworthiness of the engine." . Any activity that is necessary to provide for the continued airworthiness of the engine should be compulsory and therefore in the Airworthiness Limitations Section. The paragraph is unclear about which of the scheduled activities are recommended and which are mandatory.

Response

- Noted. Now reads: "Handling Instructions, including proper procedures for uncrating, de-inhibiting, acceptance checking, lifting and attaching accessories, with any necessary checks".

- Disagreed. This last paragraph is deemed clear enough. The contents of the paragraph refer to both recommended and mandatory provisions, this being typical of instructions for continued airworthiness.

For consistency with Part 21, the reference to "approval by the Agency" has been withdrawn (see 21A.31(a)(3)) from CS-E-25 (b)(1). To be carried by FF and check with CS-APU and P.

B1 - SECT A - CS-E 30

Para. ***(b)***

20 / ESG

Comment

A3. To create a new paragraph (b) in JAR-E 30 to read as follows:
JAR-E 30
(b)Where an Engine system relies on components which are not part of the Engine Type Design, the interface conditions and reliability requirements for those components upon which the Engine certification is based must be specified in the Engine instructions for installation directly or by reference to appropriate documentation.

Response

Noted. However, the paragraph is already there.

B1 - SECT A - CS-E 40

Para. *(g)*

20 / ESG

Comment

A4. To create a new paragraph (g) in JAR-E 40 to read as follows:

JAR-E 40
(g)In determining the Engine performance and operating limitations, the overall limits of accuracy of the Engine Control System and of the necessary instrumentation as defined in JAR-E 60 (b) must be taken into account.

Response

Noted. However, the paragraph is already there.

Para. *(h)*

36 / CAA UK

Comment

CS-E 40 (h). The engine constructor should define the means by which the power on a piston engine is set and controlled. The second sentence of this requirement is very prescriptive and it is therefore suggested that it be deleted.

Response

Carried. Only the first sentence remains.

B1 - SECT A - CS-E 50

Para.

28 / Rolls Royce Germany

Comment

- Engine Control System should be with capital initials in the heading.

- In CS-E 50(b), Back-up System should be with capital initials.

- In the heading of CS-E 50(h), the writing "Aircraft Supplied Electrical power" appears peculiar - it should either be consistently with capital initials or without.

- In CS-E 50(h)(2), the first word should be "where" instead of "when".

Response

- Carried.

- Carried.

- All headings in this CS will be made consistent

- Disagreed. "When" is maintained for consistency with previous provisions. In English, "where" and "when" are equivalent in this context.

Para. *(b)*

20 / ESG

Comment

(b) Control Transitions. It must be demonstrated that, when a fault or failure results in a change from one Control Mode to another, or from one channel to another, or from the Primary System to the back-up system, the change occurs so that:

(1)The Engine does not exceed any of its operating limitations,
(2)The Engine does not surge, stall, flame-out or experience unacceptable thrust or power changes or oscillations, or other unacceptable characteristics, and
(3) If the flight crew is required to initiate, respond to or be aware of the Control Mode change, there must be provision for a means to alert the crew. This provision must be described in the Engine instructions for installation and the crew action described in the Engine instructions for operation.
The magnitude of any change in thrust or power and the associated transition time must be identified and described in the Engine instructions for installation and operation.

Response

Noted. This provision is identical to the existing one.

Para. *(c)*

20 / ESG

Comment

(c)Engine Control System failures. The Engine Control System must be designed and constructed so that:
(1)The rate for Loss of Thrust (or Power) Control (LOTC/LOPC) events, consistent with the safety objective associated with the intended aircraft application, can be achieved,
(2)In the Full-up Configuration, the system is essentially single fault tolerant for electrical and electronic failures with respect to LOTC/LOPC events.
(3)Single failures of Engine Control System components shall not result in a Hazardous Engine Effect,
(4)Foreseeable failures or malfunctions leading to local events in the intended aircraft installation, such as fire, overheat, or failures leading to damage to Engine Control System components must not result in a Hazardous Engine Effect due to Engine Control System failures or malfunctions.

Response

Noted. This provision is identical to the existing one.

Para. *(c)(1)*

36 / CAA UK

Comment

CS-E 50 (c)(1). It is suggested that guidance material be included in Book 2 on this subject to give an indication of the rate for LOTC/LOPC that might be expected for typical aircraft applications in the absence of any specific data from the aircraft constructor.

Response

Deferred for future review and inclusion in AMC-20 as a result of NPA-20-9.

Para. *(c)(3)*

36 / CAA UK

Comment

CS-E 50(c)(3). This requirement does not read well when taken in context with the introductory phrase of CS-E 50(c), which already contains the "must" clause. It is therefore suggested that CS-E 50(c)(3) be rewritten to read, "Single failures of Engine Control System components do not result in a Hazardous Engine Effect."

Response

Carried.

Para. *(d)*

20 / ESG

Comment

(d)System Safety Assessment. When complying with JAR-E 210 or JAR-E 510, a System Safety Assessment (SSA) must be completed for the Engine Control System. This assessment must identify faults or failures that result in a change in thrust or power, a transmission of erroneous data, or an effect on Engine operability together with the predicted frequency of occurrence of these faults or failures. (See also JAR-E 110(e))

Response

Noted. This provision is identical to the existing one.

Para. *(e)*

20 / ESG

Comment

(e)Protection systems.
(1)When electronic over-speed protection systems are provided, the design must include a means for testing the system to establish the availability of the protection function. The means must be such that a complete test of the system can be achieved in the minimum number of cycles. If the test is not fully automatic, the requirement for a manual test must be contained in the Engine instructions for operation.

(2)When over-speed protection is provided through hydromechanical or mechanical means, it must be demonstrated by test or other acceptable means that the over-speed function remains available between inspection and maintenance periods.

Response

Noted. This provision is identical to the existing one.

Para. *(f)*

20 / ESG

Comment

(f)Software and Programmed Logic Devices. All associated software and encoded logic must be designed, implemented and verified to minimise the existence of errors by using an approved method consistent with the criticality of the performed functions (see ACJ 20X1).

Response

Noted. This provision is identical to the existing one.

Para. *(g)*

20 / ESG

Comment

(g)Aircraft Supplied Data.
Single failures leading to loss, interruption or corruption of aircraft supplied data, or data shared between Engines must:
(1) not result in a Hazardous Engine Effect for any Engine.
(2) be detected and accommodated. The accommodation strategy must not result in an unacceptable change in thrust or power or an unacceptable change in Engine operating and starting characteristics. The effects of these failures on Engine power or thrust, Engine operability and starting characteristics throughout the flight envelope must be evaluated and documented.
The requirement of JAR-E 50(g)(2) does not apply to thrust or power command signals from the aircraft.

Response

Noted. This provision is identical to the existing one.

Para. *(h)*

20 / ESG

Comment

(h)Aircraft Supplied Electrical power.
(1)The Engine Control System must be designed so that the loss or interruption of electrical power supplied from the aircraft to the Engine Control System will not -
(i)Result in a Hazardous Engine Effect,
(ii)Cause the unacceptable transmission of erroneous data.
The effect of the loss or interruption of aircraft supplied electrical power must be taken into account in complying with JAR-E 50 (c)(1).
(2)When an Engine dedicated power source is required for compliance with JAR-E 50 (h)(1), its capacity should provide sufficient margin to account for Engine operation below idle where the Engine Control System is designed and expected to recover Engine operation automatically.
(3)The need for, and the characteristics of, any electrical power supplied from the aircraft to the Engine Control System for starting and operating the Engine, including transient and steady state voltage limits, must be identified and declared in the Engine instructions for installation.
(4)Low voltage transients outside of the power supply voltage limitations, declared under JAR-E 50 (h)(3), must meet the requirements of JAR-E 50 (h)(1). The Engine Control System must resume normal operation when aircraft supplied electrical power returns to within the declared limits.

Response

Noted. This provision is identical to the existing one.

Para. *(i)*

20 / ESG

Comment

(i)Air Pressure Signal.
The effects of blockage or leakage of the signal lines on the Engine Control System must be considered as part of the system safety assessment of JAR-E 50 (d) and the appropriate design precautions adopted.

Response

Noted. This provision is identical to the existing one.

Para. *(j)*

20 / ESG

Comment

(j)Engines having a 30-Second OEI Power rating must incorporate means or provision for means for automatic availability and automatic control of the 30-Second OEI power within its operating limitations (See ACJ E 50(j))

Response

Noted. This provision is identical to the existing one.

B1 - SECT A - CS-E 50

Para. *(k)*

20 / ESG

Comment

(k)Means for shutting down the Engine rapidly must be provided.

Response

Noted. This provision is identical to the existing one.

Para. *a*

20 / ESG

Comment

A5. To delete current text and title of JAR-E 50 and replace them by the following:

JAR-E 50 Engine Control System
(see ACJ E 50 and ACJ20X1)
(a)Engine Control System Operation. It must be substantiated by tests, analysis or a combination thereof that the Engine Control System performs the intended functions in a manner which -
(1)Enables selected values of relevant control parameters to be maintained and the Engine kept within the approved operating limits over changing atmospheric conditions in the declared flight envelope.
(2)Complies with the operability requirements of JAR-E 390, JAR-E 500 (a) and JAR-E 745, as appropriate, under all likely system inputs and allowable Engine power or thrust demands, unless it can be demonstrated that this is not required for non-despatchable specific Control Modes in the intended application. In such cases, the Engine approval will be endorsed accordingly.
(3)Allows modulation of Engine power or thrust with adequate sensitivity and accuracy over the declared range of Engine operating conditions, and
(4)Does not create unacceptable thrust or power oscillations.

Response

Noted. This provision is identical to the existing one.

B1 - SECT A - CS-E 60

Para.

20 / ESG

Comment

A6. To delete current text of JAR-E 60 and replace it by the following:

JAR-E-60 Provision for instruments
(see ACJ E 60)
(a)Provision must be made for the installation of instrumentation necessary to ensure operation in compliance with the Engine operating limitations. Where, in presenting the safety analysis, or complying with any other requirement, dependence is placed on instrumentation which is not otherwise mandatory in the assumed aircraft installation, then this instrumentation must be specified in the Engine instructions for installation and declared mandatory in the Engine approval documentation.
(b)A list of the instruments necessary for control of the Engine shall be provided in the Engine instructions for installation. The overall limits of accuracy and transient response required of such instruments for control of the operation of the Engine shall also be stated so that the suitability of the instruments as installed may be assessed.
(c)The sensors together with associated wiring and signal conditioning must be segregated, physically and electrically, to the extent necessary to ensure that the probability of faults propagating from instrumentation and monitoring functions to control functions or vice versa is consistent with the criticality of the performed functions.
(d)Rotorcraft turbine Engines having 30-Second and 2-Minute OEI Power ratings must:
(1) Have means, or provision for means, to alert the pilot when the Engine is at the 30-Second OEI and the 2-Minute OEI power levels, when the event begins, and when the time interval expires.
(2) Have means or provision for means, which cannot be reset in flight, to
(i)Automatically record each usage and duration of power at the 30-Second and 2-Minute OEI power levels.
(ii)Alert maintenance personnel in a positive manner, that the Engine has been operated at either or both of the 30-Second and 2-Minute OEI power levels and permit retrieval of recorded data; and
(3)Have means, or provision for means, to enable routine verification of the proper operation of the above means. (See ACJ E 60 (d))
(e)Instrumentation enabling the flight crew to monitor the functioning of the turbine cooling system must be provided unless evidence shows that:
(1)other existing instrumentation provides adequate warning of failure or impending failure, or
(2)failure of the cooling system would not lead to Hazardous Engine Effects before detection, or
(3)the probability of failure of the cooling system is Extremely Remote,
Appropriate inspections must be promulgated in the relevant manuals.

Response

Carried.

Para. *(a)*

33 / SNECMA

Comment

CS-E 60 (…)
(a) Provision must be made for the installation of instrumentation necessary to ensure operation in compliance with the Engine operating limitations. When Where, in presenting the safety analysis, or complying with any other requirement, if dependence is placed on instrumentation which is not otherwise mandatory in the assumed aircraft installation, then this instrumentation must be specified in the Engine instructions for installation and declared mandatory in the Engine approval documentation.

Reason(s) for proposed text/comment:

We looked at the last version of NPA-E-33 distributed after the ESG meeting of March 2003 (draft dated 19 May 2003) for paragraph JAR-E 60(a).

As a general rule, consideration should be given to the work accomplished by ESG and to the final version of NPA-E-33 to be issued by the ESG, if any other difference subsist.

Response

Noted. The final version of the NPA has been used.

Para. *(c)*

36 / CAA UK

Comment

CS-E 60 (c). The phrase used here "..is consistent with the criticality of the performed functions." is not considered to be appropriate in the specific context of failure effects. This would be appropriate if, for example, the requirement were specifying a software integrity level.

It is therefore suggested that the text be amended to read, "..to ensure that the probability of a fault propagating from instrumentation and monitoring functions to control functions or vice versa is consistent with the failure effect of the fault."

Response

Noted. The final version of the NPA has been used.

Para. *a*

7 / TURBOMECA

Comment

The second sentence of CS-E-60 (a) should be modified as in NPA-E-33 final issue as follows:

Provision must be made for the installation of instrumentation necessary to ensure operation in compliance with the Engine operating limitations. Where, in presenting the safety analysis, or complying with any other requirement, if dependence is placed on instrumentation which is not otherwise mandatory in the assumed aircraft installation, then this instrumentation must be specified in the Engine instructions for installation and declared mandatory in the Engine approval documentation.

Response

Carried.

Para. *d (3)*

7 / TURBOMECA

Comment

The last sentence of CS-E-60 (d)(3) should be modified as in NPA-E-33 final issue as follows:

Have means, or provision for means, to enable routine verification of the proper operation of the above means

Response

Carried.

Para. *e*

7 / TURBOMECA

Comment

Delete "is provided to" as in NPA-E-33 final issue as follows:

Instrumentation enabling the flight crew to monitor the functioning of the turbine cooling system must be provided unless evidence is provided to shows that:

Response

Carried.

B1 - SECT A - CS-E 70

Para. *c*

7 / TURBOMECA

Comment

Delete subparagraph (c) of CS-E 70

This subject is already covered adequately by IR 21A.31 (2).
In addition CS-E 70 (c) wording is not fully consistent with IR 21A.31 (2).
It is outside the scope of CS-E to define what is the content of the Engine type design, this is the purpose of IR 21.
Therefore such sort of redundancy should be deleted.

Response

Carried.

B1 - SECT A - CS-E 80

Para. *(b)*

28 / Rolls Royce Germany

Comment

In CS-E 80(b), "these equipment" should read "this equipment".

Response

Carried.

Para. *(d)(1)*

28 / Rolls Royce Germany

Comment

In CS-E 80(d)(1), it is suggested to delete the word "significant", as it is impossible to determine a threshold of "significance" in conjunction with high energy debris.

Response

Deferred. This matter requires further review by the Agency and a consistency check with AMC-20.

B1 - SECT A - CS-E 90

Para. *(a)*

28 / Rolls Royce Germany

Comment

In CS-E 90(a), it is not understood why "...in an Approved manner" has "Approved" with a capital initial, since the term appears neither in AMC-1 nor in CS-E 15.

Response

Noted. In lower case now.

B1 - SECT A - CS-E 110

Para.

20 / ESG

Comment

A7. To add a new sub paragraph (e) to JAR-E 110 to read as follows:

JAR-E 110
(e)As part of the System Safety Assessment of JAR-E 50(d), the possibility and subsequent effect of incorrect fitment of instruments, sensors or connectors must be assessed. Where necessary, design precautions must be taken to prevent incorrect configuration of the system.

Response

Noted. This provision however is identical to the existing one.

Para. *(d)*

24 / Rolls-Royce

Comment

Para should refer to Hazardous Engine Effect.

Response

Carried.

28 / Rolls Royce Germany

Comment

In CS-E 110(d), "Hazardous Effects" should be replaced by "Hazardous Engine Effects".

B1 - SECT A - CS-E 110

Para. ***(d)***

Response

Carried.

36 / CAA UK

Comment

CS-E 110 (d). It is suggested that the text be amended, to improve clarity, to read, " Turbine Engine parts, the incorrect assembly of which could result ..etc."

Response

Carried.

B1 - SECT A - CS-E 120

Para. ***(a)***

24 / Rolls-Royce

Comment

Should refer to IR 21A.801 (a) & (b)

Response

Noted. Reference to 21A.801 (a) and (b) and 21A.805 will be included. Additionally, for consistency, CS-P and CS-APU will be reviewed.

Para. ***a***

7 / TURBOMECA

Comment

Add reference to "IR 21A.801(b)" as follows:

The engine identification must comply with IR 21A.801 (a) and (b)

JAR - E 120 (a) and (b) are not fully covered by IR 21A.801 (a), others points concerning engine identification design as fire proofness or loss are covered by IR 21A.801 (b) and therefore reference to IR 21A.801 (b) should be added

Response

Noted. Reference to 21A.801 (a) and (b) and 21A.805 will be included. Additionally, for consistency, CS-P and CS-APU will be reviewed.

B1 - SECT A - CS-E 130

Para.

20 / ESG

Comment

In JAR-E 130(e), to amend the reference from "AMJ20X-1" to read "ACJ20X1".

Response

Noted. The correct reference is AMC 20-1.

B1 - SECT A - CS-E 140

Para. ***(e)***

28 / Rolls Royce Germany

Comment

In CS-E 140(e), the beginning should read either "Some of the features..." or "Certain features..." - the current form "Certain of the features..." is not considered appropriate.

Response

Carried. Changed to 'Certain features'.

Para. ***d***

7 / TURBOMECA

Comment

Title of CS-E 140 (d) has been omitted. It should be reintroduced as in JAR-E Amendment 12 as follows:

(d) Equipment Drives

(1) All equipment drives not essential to the satisfactory of the Engine shall be disconnected or off loaded during the Calibration tests of CS-E 350 or CS-E 730.

Response

Disagreed. Paragraph (d) (2) addresses mounting attachments, as well as drives.

B1 - SECT A - CS-E 160

Para. ***(a)***

28 / Rolls-Royce Germany

Comment

CS-E 160(a) first sentence should read "In order to enable compliance with IR 21A.21(c)(3), should a failure of an Engine part occur during the certification tests, the cause of the failure must be determined and the effect....be assessed."

Response

Noted. A comma will be added, after ''(3)", to improve readability. The other changes have been found unnecessary.

B1 - SECT A - CS-E 170

Para.

20 / ESG

Comment

A9. To create a new paragraph JAR-E 170 to read as follows:

JAR-E 170 Engine systems and component verification
(see ACJ E 170)
For those systems or components which cannot be adequately substantiated by other tests of JAR-E, additional tests or analyses must be conducted to demonstrate that the systems or components are able to perform the intended functions in all declared environmental and operating conditions.

Response

Noted. This provision is identical to the existing one.

B1 - SECT A - CS-E 180

Para. ***(a)***

28 / Rolls Royce Germany

Comment

CS-E 180(a) first sentence should read "If approval of the Engine for use with a Variable Pitch Propeller is sought by the Applicant, a sufficient portion of the tests prescribed in CS-P must be made either during or upon completion of the Endurance Test..."

Response

Carried.

Para. ***(b)(1)***

28 / Rolls Royce Germany

Comment

In CS-E 180(b)(1), the heading "Pitch changes cycles" should read "Pitch change cycles" ("change" in singular form), this form is used in the body text.

Response

Carried.

B1 - SECT B - CS-E 230

Para.

20 / ESG

Comment

A10. To renumber current text of JAR-E 230 as JAR-E 230 (a) and to create a new paragraph (b) so that JAR-E 230 reads as follows:

JAR-E 230 De-icing and anti-icing precautions
(a)The design of the Engine induction system shall be such as to minimise the risk of ice formation adversely affecting the functioning of the Engine and, if necessary, shall include provision for the use of a means for ice prevention.
(b)Where necessary, provision shall be made for the fitting of an induction thermometer or ice indicator, as appropriate for the control of the particular system.

Response

Noted. The current text reflects the intent and outcome of NPA consultation process.
Therefore, the text remains as it is.

B1 - SECT D - CS-E 500

Para.

20 / ESG

Comment

A11. To delete sub paragraph (b) of JAR-E 500 and to replace it by the following:

JAR-E 500
(b)[Reserved]

Response

Noted. This is the case.

B1 - SECT D - CS-E 510

Para.

28 / Rolls Royce Germany

Comment

With adoption NPA-E-38, the definition of Hazardous Engine Effects was revised and clarified. Resultant from this change, there is now a list of seven effects which are regarded as Hazardous. A Minor effect is defined as one whose only consequence is partial or complete loss of thrust or power and associated services from one engine. A Major effect is defined as one falling between the Minor and Hazardous category.

Where as the definition for a Minor Engine Effect appears adequate, the definitions for Major and Hazardous Engine Effects appear overly simplistic and too rigid. Depending on the intended installation, the list of Hazardous Engine Effects could be more or less exhaustive than the one listed in CS-E 510(g)(2).

In general, it is felt more appropriate that an effect should be analysed for its consequences, rather than be compared with a list to determine its severity. Therefore it is suggested that the approach taken by NPA-E-38 should be reconsidered and criteria should be established to enable classification of effects. Especially Major effects are difficult to identify with the current CS-E 510 text, as there may be effects which are not easy to "compare" with the threshold for Minor effects. In other words, there may be effects for which it is debatable whether their consequence is more or less severe than the complete loss of power from one engine - especially when the effect is unrelated to power output of the engine.

Response

Deferred to further Agency review, where appropriate.

Para. ***(a)(4)***

33 / SNECMA

Comment

CS-E 510 (a)(4) It shall be shown that Major Engine Effects are predicted to occur at a rate not in excess of that defined as Remote (probability less than 10-5 per Engine flight hour).

Reason(s) for proposed text/comment:

CS-E 510 (a)(3) says : « (3) It shall be shown that Hazardous Engine Effects are predicted to occur at a rate not in excess of that defined as Extremely Remote (probability less than 10-7 per Engine flight hour)… ». For coherence, it is better that both requirements (the one for Hazardous Effects and the one for Major effects) are labelled in the same way. Moreover, from a probabilistic point of view, being in the range 10-5 to 10-7 to comply with Major effects is not strictly necessary : if you are < 10-7, it is still acceptable.

Response

Carried.

B1 - SECT D - CS-E 515

Para.

28 / Rolls Royce Germany

Comment

CS-E 515 requires that for every Engine Critical Part identified under CS-E 510 an Approved Life must be established and published as required in CS-E 25(b). With static parts such as high pressure casings or single load path mount structures now being considered as Engine Critical Parts, it is not felt appropriate to mandate the publication of an Approved Life, i.e. a mandatory replacement life, for every Engine Critical Part. As there are parts which may be designed against loads so far in excess of the LCF load that fatigue can be demonstrated not to be a limiting factor, the part may well have an infinite life, solely relying on regular inspection rather than replacement at a fixed time. Whereas it is accepted that in this case the scheduled inspections necessary to ensure continued airworthiness of the part should be contained in the Airworthiness Limitations Section (see also CS-E 25(c)(5)), and thus be made mandatory, it is felt inappropriate to stipulate an "artificial" Approved Life for the part.

Note that in this context a calculated/demonstrated fatigue life of the part beyond the life of the whole engine is NOT considered an infinite life, and no objection is raised against publishing Approved Lives for such parts. The comment exclusively addresses parts whose integrity is maintained by regular inspection (like for example crack inspection at every C-Check) rather than replacement at a fixed time.

Response

Noted. This old issue was tackled through NPA-E-44 the outcome of which is reflected in CS-E. Any further amendment should be proposed to the Agency in accordance with its rulemaking procedures.

B1 - SECT D - CS-E 540

Para. ***(a)***

36 / CAA UK

Comment

CS-E 540 (a). Here it is required that the ingestion of foreign matter that is likely to affect only one engine in any one flight will not cause Hazardous Engine Effects at a rate in excess of Extremely Remote. This requirement is quite clear in its objective: no ingestion affecting only one engine in any one flight may (ever) result in a Hazardous Engine Effect. The term "Extremely remote" relates to an occurrence rate over several thousand flight hours, and it is therefore incorrect to include this probability in relation to the objective of the requirement. It is therefore proposed that the sentence finish after the word "..Effects."

Response

Noted. CS-E 540 (a) now reads as follows:

"The Engine must be designed so that the strike and ingestion of foreign matter that is likely to affect only one Engine in any one flight will not cause any Hazardous Engine Effects as defined in CS-E 510 (g), except that events with a probability of occurrence lower than Extremely Remote need not be considered."

B1 - SECT D - CS-E 560

Para.

20 / ESG

Comment

A12. To delete the text of sub paragraph (f) of JAR-E 560 and replace it by the following:

JAR-E 560
(f)Provision shall be made near each fuel pressure connection provided for instrumentation so as to limit the loss of fluid in the event of a pipe failure.

Response

Noted. This is already the case.

28 / Rolls Royce Germany

Comment

- In CS-E 560(b)(2), the use of the word "significant" is questioned - experience shows that it is almost impossible to define a common threshold of what is or is not "significant". It is acknowledged that this word may be difficult to replace "one to one" here, however maybe the text can be changed a bit more.

Proposal: "…any device whose failure or loss of function would have an unacceptable effect on control of thrust or power… "

- In CS-E 560(e), it is considered more appropriate to refer to CS-E 20(d) rather than CS-E 30.

Response

- Disagreed. This is existing JAR-E Amdt 12 text. The term "unacceptable" is open to interpretation.

- Disagreed. The correct reference is to the assumptions.

B1 - SECT D - CS-E 570

Para.

20 / ESG

Comment

A13. To create a sub paragraph (v) in JAR-E 570 (a)(2) to read as follows:

JAR-E 570
(a)(2)(v)Provision shall be made near each oil pressure connection provided for instrumentation so as to limit the loss of fluid in the event of a pipe failure.

Response

Noted. The text will be improved in the light of other comments received.

28 / Rolls Royce Germany

Comment

In CS-E 570(a)(2), the listing is of inconsistent format: Whereas (i) and (ii) start with "To", thus continuing the first sentence, (iii), (iv) and (v) do not fit in. Suggestion:

(iii) to ensure that Tank filler caps provide an oil tight seal and to prevent loosening of the filler caps in flight. (note that it is recognized that 100% certainty is not achievable, this is considered to be implied by the start of the sentence "There must be design precautions..").

(iv) should be removed from the list and become CS-E 570(a)(3).
(v) should be removed from the list and become CS-E 570(a)(4).

Response

Noted. Editorial changes will be made along these lines.

B1 - SECT D - CS-E 580

Para.

24 / Rolls-Royce

Comment

The text in CS-E 580(b) is different to that in JAR-E. The change has been proposed but has not been agreed. Since agreement has not been reached it is suggested to revert to the current JAR E words which have been shown to be adequate over many years

Response

Noted. This NPA E-54 is ongoing and therefore JAR-E is reverted to.

B1 - SECT E - CS-E 620

Para. ***b***

7 / TURBOMECA

Comment

First sentence of CS-E 620 (b) was modified compared to JAR-E 620 (b))
JAR-E 620 (b) let open the door for humidity correction when required. Now, humidity correction is forbidden. This also seems in contradiction with CS-E 620(a)(3). It is believed that the intent of the modification was not to modify the technical meaning nor to introduce a contradiction but only to delete reference to the Agency.

Therefore the following modification is proposed for CS-E 620(b):

""Correction of Humidity. No correction for humidity of the air supply is required to be made to the power obtained. Humidity corrections appropriate to high atmospheric temperatures, at altitudes up to 4 500 m must be established, however, for each type of turbine Engine, for use in the assessment of aircraft performance in these conditions."

Response

Noted. Text now reads as follows:

"Correction of Humidity. No correction for humidity of the air supply may be made to the power obtained. Humidity corrections appropriate to high atmospheric temperatures, at altitudes up to 4 500 m must be established, however, for each type of turbine Engine, for use in the assessment of aircraft performance in these conditions."

B1 - SECT E - CS-E 660

Para.

28 / Rolls Royce Germany

Comment

CS-E 660 has sometimes been misinterpreted in the sense that the substantiation is made the wrong way round, the argumentation being "these min. and max. pressures and temperatures are the ones to be approved because that is what we have qualified the fuel system units against", while the aspect of substantiating that these are indeed the max and min values which will be encountered in service is overlooked.

To make clear that the intent is to establish confidence that the maximum and minimum values to be approved are the "right" ones to serve as the basis for unit qualification, it is suggested to change the text as follows:

A substantiation must be made to establish the suitability of the minimum and maximum fuel pressure and fuel temperature limits which are proposed by the Applicant to be approved for the Engine. This substantiation must demonstrate that the limits to be approved will not be exceeded throughout the specified operating envelope. The details of the substantiation…

Response

Noted. However, the current text is considered to be adequate.

B1 - SECT E - CS-E 740

Para. ***(c)(3)***

24 / Rolls-Royce

Comment

Delete'(c)' from (c)(3) - editorial error.

Response

Carried.

Para. ***(f)***

20 / ESG

Comment

A14.To change the opening text of JAR-E 740 (f) to read as follows :

JAR-E 740
(f)Operating Limitations. The normal Engine operating limitations of power, rotational speed, turbine entry temperature, oil temperature, etc., to be established under JAR-E 40 (d) and JAR-E 40 (g), will be based on the mean values obtained during the appropriate periods of the Endurance Test, including, when applicable, the mean values obtained during the applications of the 30-Second and 2-Minute OEI Power conditions in the 2-hour additional endurance test sequence of JAR-E 740 (c)(3)(iii).
Similarly, the degrees of compressor and turbine bleed that may be approved are the percentages of the mass flow which have been demonstrated during the Endurance Test, except as provided by JAR-E 690 (a)(3)(ii).

Response

Carried.

Para. ***(h)(2)(i)***

7 / TURBOMECA

Comment

Replace "CS-E 150 (f)(2)" which doesn't exist in CS-E by "CS-E 740 (h)(1)" as follows:

If the Engine was not subject to a strip examination before commencing the additional endurance test then the strip inspection requirements of CS-E 740 (h)(1) apply on completion of the test.

Response

Carried.

Para. ***(h)(2)(iii)***

7 / TURBOMECA

Comment

Replace "CS-E 150 (f)(2)" which doesn't exist in CS-E by "CS-E 740 (h)(1)" as follows:
After this additional endurance test, the Engine may exhibit deterioration in excess of that permitted in CS-E 740 (h)(1), and it is accepted that some Engine parts may be unsuitable for further use.

Response

Carried.

B1 - SECT E - CS-E 740

Para. ***c (3)***

7 / TURBOMECA

Comment

There is a typo error.
Delete "(c)" in the paragraph number to be consistent with format used for subparagraphs of CS-E 740 as follows:

(3)For Engines with 30-Second and 2-Minute OEI Power rating

Response

Carried.

B1 - SECT E - CS-E 780

Para. ***(a)***

33 / SNECMA

Comment

CS-E 780 (…)

(a) It must be established by tests, unless alternative appropriate evidence is available, that the Engine will function satisfactorily when operated in the atmospheric icing conditions of AMC-1 without unacceptable…

Reason(s) for proposed text/comment:

The icing atmospheric conditions are defined in AMC-1.

Response

Noted. In view of other comments received, AMC-1 now reads CS-Definitions. The text is changed accordingly.

Para. ***c***

7 / TURBOMECA

Comment

For consistency with general format used in CS-E, write:

(c)During the tests CS-E 780 (a), all optional Engine bleeds permitted during icing conditions must be in the position assumed to be most critical.

Response

Carried.

B1 - SECT E - CS-E 800

Para.

28 / Rolls Royce Germany

Comment

The whole paragraph CS-E 800, with respect to engines for aeroplanes, is solely structured for turbofan engines. This is apparent in classification of engines by inlet throat area and pass/fail criteria mainly centered around fan blade integrity. Rotorcraft engines are covered in separate sub-paragraphs but it appears that CS-E 800 in its current form cannot be reasonably applied to turbo-propeller engines mounted on fixed-wing aircraft.

It is therefore suggested to amend CS-E 800 with specific requirements suitable for turbo-propeller engines mounted on Large Transport Aircraft.

Response

Disagreed. Turbo propellers have been addressed during the rulemaking process of the Agency as it can be seen from the AMC to CS-E 800.

33 / SNECMA

Comment

Proposal : in the CS-E 800 paragraphs, to replace all occurrences of « engine inlet area » with « engine inlet throat area ».

Reason(s) for proposed text/comment:

There is a possibility of confusion in CS-E 800 : CS-E 800(c) as introduced by NPA-E-45 uses "engine inlet throat area" while the other parts of CS-E 800 use the ambiguous "engine inlet area". A normal reader would conclude that it doesn't designate the same area.

It is clear, by comparing with the harmonised requirements of FAR 33.76, that the correct term is "engine inlet throat area" and that it should be used everywhere in CS-E 800.

Response

Carried.

B1 - SECT E - CS-E 800

Para. ***(f)(2)***

33 / SNECMA

Comment

CS-E 800
(f)(2) The Engine test described in CS-E 800 (b)(1), with regard to the single large bird, may be waived if it can be shown by test or analysis that the requirements of CS-E 810 (a) are more severe.

Reason : this change had been skipped after the March 2003 ESG review of NPA-E-45, when the final version had been sent to Hoofdorp (ESG letter 02/09, 28 June 2003). But the ESG realised later that this change should have been adopted.

Response

Carried.

Para. ***(f)(3)(ii)***

33 / SNECMA

Comment

(f)(3)(ii) Using a component test at the conditions of CS-E 800 (b)(1) or ©(1), subject to the following additional conditions:

Reason : this change had been skipped after the March 2003 ESG review of NPA-E-45, when the final version had been sent to Hoofdorp (ESG letter 02/09, 28 June 2003). But the ESG realised later that this change should have been adopted.

Response

Carried.

Para. ***c (1)***

7 / TURBOMECA

Comment

Typo error, shift on the right the title of subparagraph (c)(1) for format consistency (See CS-E 800(b)(1) above).

Response

Carried.

B1 - SECT E - CS-E 840

Para.

28 / Rolls Royce Germany

Comment

In CS-E 840(d)(1)(ii), the words "hazardous fragments" should be replaced by "high energy debris".

Response

Carried.

B1 - SECT E - CS-E 860

Para. ***(b)***

20 / ESG

Comment

A16. To change JAR-E 860 (b) to read as follows:

JAR-E 860
(b)Evidence to demonstrate that instrumentation is not required under JAR-E 60(e) may be obtained from endurance running in an Engine or on rigs, or where adequate margins can be demonstrated, by calculation. Where practicable, the duration of endurance running may be reduced by compensating increases in the test temperature.

Response

Carried.

B1 - SECT F - CS-E 1000

Para.

7 / TURBOMECA

Comment

This draft CS-E 1000 is based on text of draft NPA-E 47 which was not yet at that time the final text. Therefore CS-E 1000 has to be corrected in order to reflect the final text of NPA-E 47 as recently approved by the Engine Steering Group.

Response

Noted.

B1 - SECT F - CS-E 1020

Para.

7 / TURBOMECA

Comment

This draft CS-E 1020 is based on text of draft NPA-E 47 which was not yet at that time the final text. Therefore CS-E 1020 has to be corrected in order to reflect the final text of NPA-E 47 as recently approved by the Engine Steering Group.

Response

Noted.

B1 - SECT F - CS-E 1030

Para.

7 / TURBOMECA

Comment

This draft CS-E 1030 is based on text of draft NPA-E 47 which was not yet at that time the final text. Therefore CS-E 1030 has to be corrected in order to reflect the final text of NPA-E 47 as recently approved by the Engine Steering Group.

And please note that in the final issue of NPA-E-47 the spelling of the word “despatch” (or “dispatch”) is not consistent in the title and in the text of the paragraph.
Write CS-E 1030 as follows:

"CS-E 1030 Time Limited Despatch

If Time Limited Despatch (TLD) is requested, any despatchable configuration of the Engine, including its control system, must comply with the applicable requirements of CS-E. The length of time allowed prior to rectification of a fault resulting in degraded operation must be justified as part of the System Safety Assessment of CS-E 50(d) or the Safety Analysis of CS-E 510 and documented as part of the MMEL of the aircraft in which the Engine is installed."

Response

Disagreed as to the use of "despatch" with an "e". CS-E will take on board NPA-E 47.

33 / SNECMA

Comment

CS-E 1030 Time Limited Dispatch

If approval of time limited dispatch is requested, any dispatchable configuration of the Engine, including its control system, must comply with the applicable requirements of CS-E. The length of time allowed prior to rectification of a fault resulting in degraded operation must be justified as part of the System Safety Assessment of CS-E 50 (d) or the Safety Analysis of CS-E 510 and documented as part of the Instructions for Continued Airworthiness.

This modification was agreed at the June 2003 ESG meeting. When reviewing the comments on NPA-E-47.

As a general rule, consideration should be given to the work accomplished by the ESG and to the final version of NPA-E-47 issued by the ESG, if any other difference subsist.

Response

Carried.

B1 - APPENDIX A

Para.

24 / Rolls-Royce

Comment

Table A1. First line of table missing. (0 feet, 20.0 RWC)

Response

Noted. Changed accordingly.

33 / SNECMA

Comment

In appendix A :
Figure A1 is not incorporated
Table A1 : first line is missing

Response

Noted. Changed accordingly.

36 / CAA UK

Comment

Appendix A. Figure A1 has been omitted from this Appendix A.

Response

Noted. The figure will be introduced accordingly.

B1 - APPENDIX A

Para. ***Figure A1***

7 / TURBOMECA

Comment

Figure A1 is missing - To be added

Response

Noted. The table will be added.

Para. ***Table A1***

7 / TURBOMECA

Comment

First line of the figures is missing and "ALTITUDE (FEET)" is written twice. Therefore should be modified as follows: [table provided]

Response

Noted. The text will be corrected.

B2 - SECT A - AMC CS-E 20

Para.

24 / Rolls-Royce

Comment

AMC CS-E 20 contains 3 paragraphs (6, 7 & 8) that are duplicated in AMC CS-E 20(f). Those in AMC CS-E 20(f) should be deleted AND para. numbers changed in AMC CS-E 20 to 5, 6 &7.

Response

Carried.

28 / Rolls Royce Germany

Comment

As stated in the comment against CS-E 20, the AMC should contain guidance of what typically constitutes "equipment", and how equipment is differentiated from engine parts.

Response

Disagreed. See response to CS-E 20.

Para. ***(6)***

33 / SNECMA

Comment

(6) The Engine instructions (…). For example, the Electronic Engine Control System (EECS) power requirements and quality, including interrupt limitations, (…)

Response

Carried (order of words).

Para. ***(6)(7)(8)***

7 / TURBOMECA

Comment

Paragraph (5) does not exist, therefore renumber paragraphs (6)(7)(8) respectively as (5)(6)(7).

Response

Carried.

Para. ***(7)***

33 / SNECMA

Comment

(7) The trend toward system integration may lead to EECS that :
- Have other control functions integrated within the Engine Control System, such as an integrated Engine and Propeller Control System or, (...)

Response

Carried (capital letters).

B2 - SECT A - AMC CS-E 20

Para. ***(8)***

33 / SNECMA

Comment

(8) The Engine instructions (...) and including the Propeller when applicable.

Response

Carried.

Para. ***6***

7 / TURBOMECA

Comment

Replace "Engine electronic control system (EECS)"by "Electronic Engine Control System (EECS)" as NPA-E 33 final issue.

Response

Carried.

Para. ***7***

7 / TURBOMECA

Comment

last sentence
Typo error, change "EEC system" to "EECS" as in NPA-E 33 final issue.
"EEC" is never defined whereas "EECS" is defined in CS-E 15.

Response

Carried.

7 / TURBOMECA

Comment

Incorporate "Automatic power reserve" (NPA-E 33 final issue) in the following sentence:

Examples of these aircraft supplied resources include, recording of rotorcraft One Engine Inoperative data, automatic power reserve and aircraft central computers that perform some or all of the Engine control functions.

Response

Carried.

Para. ***f***

7 / TURBOMECA

Comment

Delete subparagraphs (6)(7)(8) of AMC CS-E 20(f) not relevant to the subject of this subparagraph and which are already included in AMC CS-E 20 just above

Response

Carried.

B2 - SECT A - AMC CS-E 20 (f)

Para.

24 / Rolls-Royce

Comment

AMC CS-E 20 contains 3 paragraphs (6, 7 & 8) that are duplicated in AMC CS-E 20(f). Those in AMC CS-E 20(f) should be deleted AND para. numbers changed in AMC CS-E 20 to 5, 6 &7.

Response

Carried.

33 / SNECMA

Comment

Our proposal is to delete paragraphs (6), (7) and (8) in AMC CS-E 20 (f).

These paragraphs are redundant, already in AMC CS-E 20.

Response

Carried.

B2 - SECT A - AMC CS-E 40(f)

Para.

24 / Rolls-Royce

Comment

ACJ E 40(f) has not been transferred to CS-E. Is this deliberate?

Response

Noted. The answer is yes, following legal review. It was felt that the ACJ was outside the scope of type-certification.

B2 - SECT A - AMC CS-E 50

Para. *2*

7 / TURBOMECA

Comment

In last paragraph there is a reference to "AMC 20X1",
AMC 20X1 doesn't exist in AMC-20.
Replace "AMC 20X1" by 'AMC 20-1.

Response

Carried.

Para. *4*

7 / TURBOMECA

Comment

There is a reference to "paragraph 13 of AMC 20X1" which doesn't exist in AMC-20.
This reference should be replaced by the appropriate subparagraph of "AMC-20-1".

Response

Noted. The final version of the NPA has been used.

B2 - SECT A - AMC CS-E 70

Para.

28 / Rolls Royce Germany

Comment

The current text of AMC CS-E 70 differentiates between Class 1, 2 and 3 forgings and Group 1,2 and 3 welds, and provides criteria for this classification. From there on, however, it appears to go nowhere, as this classification does not result in recommendations for specific techniques to be applied to each of these classes/groups.

At some instances hidden in the text reference is made to the classes for forgings (nothing for welds), but the general concept of classification for forgings and welds does not appear to have been followed through completely: Basically, it states that for each class / group "do what is appropriate". For this statement, no classification is needed.

The classification only makes sense if it results in specific instructions for each of the three classes / groups, i.e. "For a Class 1 forging, as a minimum the following should be applied...", "For a Class 2 forging, as a minimum the following should be applied...", "For a class 3 forging, no special requirements are necessary.." and the same for Group 1, 2 and 3 welds. AMC CS-E 70 should be re-structured and amended to fully establish this concept.

Response

Deferred. The Agency will consider the need for this classification in due time.

B2 - SECT A - AMC CS-E 80

Para.

28 / Rolls Royce Germany

Comment

AMC CS-E 80 in numerous places makes reference to EUROCAE ED-14 / RTCA/DO-160. Due to the version numbering convention for these documents, this could be misinterpreted as meaning "initial issue", because they are numbered ED-14 / DO-160 = initial issue, ED-14A / DO-160A = first revision, etc. -current version is ED-14D / DO-160D.

Therefore it should be made clear in the AMC introduction, that, wherever these are mentioned, this either means "latest issue", or "issue in force at the issue date of the coresponding CS-E", or a specific version should be cited - whatever the intent of the AMC is.

Response

Disagreed. This very subject was discussed during the review of NPA-E-36 (incorporated into amendment 12 of JAR-E). This might be reviewed in due time by the Agency.

33 / SNECMA

Comment

AMC CS-E 80 (...)
(2) (...)

B2 - SECT A - AMC CS-E 80

Para.

(b) General Environmental Conditions for Electrical /Electronic Equipment.

The following environmental conditions should be considered for all electrical / electronic equipment or equipment with electrical / electronic sub-components. Additional advisory material on EMI, HIRF and lightning strikes may be found in CS-20-1AMC 20-1.

Editorial comment.

Response

Carried.

Para. ***(2)(b) and (2)(d)***

7 / TURBOMECA

Comment

There are references to "CS-20-1", CS-20-1 doesn't exist and should be replace by "AMC 20-1" in the following locations:

AMC CS-E 80(2)(b): In the first subparagraph and in Table 2 item 18.
AMC CS-E 80(2)(d): In table 4 and in the subparagraph.

Response

Carried.

Para. ***(d)***

33 / SNECMA

Comment

AMC CS-E 80 (…)
(2) (…)

(d) Specialised Equipment Testing
(….)

Overheat

The purpose of this test or analysis is to verify that the electrical/electronic portions of the Engine Control System, when subjected to an overheat condition leading to failure, will not cause a hazardous Engine effect. See also AMC 20-1. If an overheat test/analysis is not completed, this should be declared as an installation limitation in the Engine installation instructions and the possibility of an overheat should be addressed at aircraft certification.

Editorial comment.

Response

Carried.

B2 - SECT A - AMC CS-E 130

Para.

33 / SNECMA

Comment

AMC CS-E 130
(1) Definitions
(…)
(d) Fire Resistant, Fireproof : the definitions of "Fire Resistant" and "Fireproof" are given in AMC-1; (…)

Reason(s) for proposed text/comment:

editorial : the correct location for these definitions is AMC-1.

Response

Noted. However, in view of other comments received, AMC-1 now reads CS-Definitions.

Para. ***1 , d***

7 / TURBOMECA

Comment

Replace "the definitions of "Fire Resistant" and "Fireproof"are given in CS-E15" to:
" the definitions of "Fire Resistant" and "Fireproof" are given in AMC-1".

Response

Noted. However, in view of other comments received, AMC-1 now reads CS-Definitions.

B2 - SECT A - AMC CS-E 170

Para.

7 / TURBOMECA

Comment

Write as NPA-E 33 final issue:

When a pressure relief valve in a turbo supercharger inlet manifold of a turbocharged Engine, and the effect of its operation on the Engine and turbocharger, are untested during the scheduled test of CS-E 440.

Response

Carried.

33 / SNECMA

Comment

At third paragraph from the end of AMC-CS E 170 :
« AMC CS-E 170 (…)
Additional guidance may be found in AMC CS-E 80 or in AMC 20-X1 for Electronic Engine Control Systems.(…) »

Reason(s) for proposed text/comment:

Editorial

Response

Noted. However, to avoid confusion with GM, "guidance" cannot be used in the context of an AMC. Text now reads:

"Additional means may be found in AMC to CS-E 80 or in AMC 20-1 for Electronic Engine Control Systems."

Para. *9*

7 / TURBOMECA

Comment

There is a reference to "AMC 20X1" which doesn't exist, therefore replace "AMC 20X1" by "AMC 20-1".

Response

Carried.

B2 - SECT D - AMC CS-E 510

Para. *6*

7 / TURBOMECA

Comment

Compare to JAR-E amendment 12, the definition of the term "Assessment" has been deleted. During establishment of NPA-E 38 (FAA/JAA harmonization process) it was considered necessary to have this definition.

Therefore this definition should be added as follows:

"Assessment:A general or broad evaluation of the Engine which may include the results of the safety analysis, as well as any other information."

Response

Disagreed. It is felt that the proposed definition is so broad that it is almost all encompassing and brings no added value.

B2 - SECT D - AMC CS-E 515

Para.

33 / SNECMA

Comment

Changes to AMC CS-E 515 were adopted at the June 2003 ESG meeting, when reviewing NPA-E-44 (Engine Critical Parts). They are not included in these draft of CS-E.
We don't reproduce the changes here, as they are already sent by another commenter as a final version of NPA-E-44. We support these changes.

Reason(s) for proposed text/comment:

As a general rule, consideration should be given to the work accomplished by ESG and to the final version of NPA-E-44, if any other difference subsist in other paragraphs.

Response

Noted.

B2 - SECT D - AMC CS-E 515

Para. ***(6)(a)***

7 / TURBOMECA

Comment

Delete the last sentence of the second paragraph as NPA-E 44 final issue as agreed by ESG:

" The following airworthiness limitations have been substantiated based on engineering analysis that assumes this product will be operated and maintained using the procedures and inspections provided in the Instructions for Continued Airworthiness supplied with this product by the Type Certificate holder, or its licensees. For Engine Critical Parts and parts that influence Engine Critical Parts, any repair, modification or maintenance procedures not approved by the Type Certificate holder, or its licensees, or any substantiation of such parts not supplied by the Type Certificate holder, or its licensees, may materially affect these limits. (last sentence deleted)

Response

Carried. To avoid deviating interpretations and to avoid holding accountable the TC holder for a repair, modification or substitute part proposed by a third party, the last sentence of 6(a) is deleted.

Para. ***6(a)***

27 / GE

Comment

Airworthiness Limitations Section

GEAE strongly supports the text of ACJ E 515 (6)(a). Engine Critical Parts are part of a complex system. Because the failure of one of these parts could result in a Hazardous Engine Effect, the calculation of the approved life is integral to the safety of these individual parts and the engine as a whole. Other parts of the engine can also have an impact on the Engine Critical Parts and their life capability. Therefore, changes to Engine Critical Parts themselves or to parts that can influence Engine Critical Parts must be evaluated for potential impact on Engine Critical Part approved life. Such changes can include (but are not limited to) repairs and alterations or substitution of non-OEM parts for either the Engine Critical Parts or other influencing parts.

GEAE has established a comprehensive, rigorous process for determining and validating life limits for Engine Critical Parts in order to avoid the occurrence of failure for these parts. This system-based process is applied throughout the engine life cycle by monitoring and updating Engine Critical Part life based upon changes to the engine, in-service experience, or technical advances in the science of life management. GEAE does not have the technical data or the analytical resources to calculate the impact on the life of Engine Critical Parts that is the result of a system, part, configuration or change not approved by GEAE.

The second paragraph in this section should remain unchanged

"The following airworthiness limitations have been substantiated based on engineering analysis that assumes this product will be operated and maintained using the procedures and inspections provided in the Instructions for Continued Airworthiness supplied with this product by the Type Certificate holder, or its licensees. For Engine Critical Parts and parts that influence Engine Critical Parts, any repair, modification or maintenance procedures not approved by the Type Certificate holder, or its licensees, or any substitution of such parts not supplied by the Type Certificate holder, or its licensees, may materially affect these limits. In such circumstances, appropriate airworthiness limitations should be obtained from the applicant responsible for the repair, modification or substitute parts."

Response

Disagreed. To avoid deviating interpretations and to avoid holding accountable the TC holder for a repair, modification or substitute part proposed by a third party, the last sentence of 6(a) is deleted.

B2 - SECT E - AMC CS-E 650

Para. ***7 final sentence***

7 / TURBOMECA

Comment

Write following sentence as defined in NPA-E 33 (final issue):

"components subjected to such resonant dwell testing must subsequently also meet the requirements of CS-E 740(h), Endurance Test Final Strip Inspection."

Response

Carried.

B2 - SECT E - AMC CS-E 670

Para.

33 / SNECMA

Comment

paragraph (1), (a) of AMC CS-E 670 has been changed by NPA-E-49. A table for contaminants was introduced. ESG reviewed the final version of NPA-E-49 in June 2003.
We don't reproduce the changes here, as they are already sent by another commenter as a final version of NPA-E-49. We support introduction of the final version of NPA-E-49.

Reason(s) for proposed text/comment:

As a general rule, consideration should be given to the work accomplished by ESG and to the final version of NPA-E-49, if any other difference subsist in other paragraphs.

Response

Noted.

B2 - SECT E - AMC CS-E 780

Para.

24 / Rolls-Royce

Comment

The sentence added at the end of para (2) includes a reference to Appendix B of CS-E. No such Appendix exists. The value of the sentence is questioned.

Response

Noted. Appendix B is now in CS-Definitions. The reference will be changed accordingly.

B2 - SECT E - AMC CS-E 800

Para.

33 / SNECMA

Comment

Editorial comment : return to the line at the end of (2)(c).

Response

Carried.

Para. ***2 (d)***

7 / TURBOMECA

Comment

Separate paragraphs (2)(c) and (2)(d) (as currently written, paragraph (2)(d) is inside paragraph (2)(c)).

Response

Carried.

B2 - SECT E - AMC CS-E 840

Para.

24 / Rolls-Royce

Comment

AMC CS-E 840(2)(f) is embedded in para (e).

Response

Noted. This is corrected now.

33 / SNECMA

Comment

Editorial : return to the line at the end of (2)(e).

Response

Carried.

Para. ***2 (f)***

7 / TURBOMECA

Comment

Separate paragraphs (2)(e) and (2)(f) (as currently written, paragraph (2)(f) is inside paragraph (2)(e)).

Response

Carried.

B2 - SECT E - AMC CS-E 850

Para. *3*

7 / TURBOMECA

Comment

Replace " - HCF failure of a spline" and "- Loss of lubrication of a spleen" by "- HCF failure from a stress concentration feature" and " - Loss of lubrication of a spline" as NPA-E 39 final issue.

Response

Carried.

7 / TURBOMECA

Comment

Replace last paragraph by :

"When the assessment for compliance with CS-E 850 (b)(2)(iii) is that a shaft failure due to the environment can be discounted, the ability to inspect the critical section of a shaft at the defined intervals and the appropriateness of the inspection method should be taken into account. For example, the failure of a section of a shaft, which could cause Hazardous Engine Effects, in an area which would make inspection of the critical section in accordance with the manual difficult, may not be acceptable".

Confer NPA-E 39 last issue.

Response

Carried.

B2 - SECT F - AMC CS-E 1000

Para.

7 / TURBOMECA

Comment

Replace in the last sentence "applicable environmental protection requirements" by "IR-34" to be consistent with NPA-E 47 final issue and with others AMCs of section F.

Response

Noted. Text now reads:

"…applicable environmental protection requirements of 21A.18."

B2 - SECT F - AMC CS-E 1020

Para.

7 / TURBOMECA

Comment

Modify the text of AMC CS-E 1020 in accordance with the final text of NPA-E 47.

Response

Noted. The text will be modified accordingly.

33 / SNECMA

Comment

AMC CS-E 1020(…)

(2) It should be noted that only the known Type Design at time of Engine certification will be assessed against the applicable environmental protection requirements. Any further change to the type design should address the effects on this compliance with the requirements of the applicable environmental protection requirements, which are linked to the date of production of the individual engines.

Reason(s) for proposed text/comment:

IR-34 doesn't exist. The rest of CS-E refers to "the applicable environmental protection requirements".

Response

Noted. The final version of the NPA E-47 has been used in relation to the existence of CS-34.

other

Para.

7 / TURBOMECA

Comment

Affected document paragraph or article: Paragraphs impacted by NPA-E47

This draft CS-E is based on text of draft NPA-E 47 which was not yet at that time the final text. Therefore CS-E has to be corrected in order to reflect the final text of NPA-E 47 as recently approved by the Engine Steering Group.

Response

Noted. The text will be modified accordingly.

7 / TURBOMECA

Comment

Paragraphs impacted by NPA-E33
This draft CS-E is based on text of draft NPA-E 33 which was not yet at that time the final text. Therefore CS-E has to be corrected in order to reflect the final text of NPA-E 33 as recently approved by the Engine Steering Group.

Response

Noted. The text will be modified accordingly.

18 / ESG

Comment

'Please use final version of NPA-E 49."

Response

Noted. The text will be modified accordingly.

19 / ESG

Comment

'Please use final version of NPA-E 44."

Response

Noted. The text will be modified accordingly.

19 / ESG

Comment

'Please use final version of NPA-E 42."

Response

Noted. The text will be modified accordingly.

19 / ESG

Comment

'Please use final version of NPA-E 46."

Response

Noted. The text will be modified accordingly.

20 / ESG

Comment

B - Advisory material

'Please use final version of NPA-E 33."

Response

Noted. The text will be modified accordingly.

22 / ESG

Comment

'Please use final version of NPA-E 47."

Response

Noted. The text will be modified accordingly.

36 / CAA UK

Comment

Appendix 2 and 3.
The consultation paper No. 5/2003-07-29 contains an Appendix 3 that repeats much of the text of Appendix 2. It would appear either that Appendix 3 is superfluous or has been presented with the incorrect text.

Response

other

Para.

Noted.

Para. ***AMC CS E 580 (b)***

24 / Rolls-Royce

Comment

The text in AMC CS-E 580(b) is different to that in JAR-E. The change has been proposed but has not been agreed. Since agreement has not been reached it is suggested to revert to the current JAR E words which have been shown to be adequate over many years.

Response

Noted. The NPA E-54 is ongoing and therefore JAR-E is reverted to.

Para. ***BOOK 1 APPENDIX B***

7 / TURBOMECA

Comment

Appendix B defining " Icing Atmospheric conditions" is missing.

Appendix B should be reintroduced as referenced by CS-E 780(a).

Response

Disagreed. The icing conditions are now in CS-Definitions.

Para. ***BOOK 2 SECTION A***

7 / TURBOMECA

Comment

It is understood that CS-20 doesn't exist but "AMC-20" is the correct document.
Therefore replace in the introduction of section A in book 2 "CS-20" by "AMC-20".

Response

Carried.

Para. ***CS E 760***

20 / ESG

Comment

A15. To delete JAR-E 760

Response

Carried.