

## **Response to comments on NPA-E-43**

### **1 - Justification of the NPA**

A revision of JAR-E 820 was introduced by means of NPA-E-34 in harmonisation with FAR 33.

The Engine Study Group had a long standing action (discussion paper n° 128) to change JAR-E 830 to make clear that the maximum engine overspeed is an applicant's option and not a mandatory essential operating limit.

The maximum engine overspeed is defined in JAR-1. It is an approved 20 second transient which does not require maintenance actions after occurrence (other than to correct the cause).

The reference to "non-standard" engine configuration, previously found in JAR-E 830 (b) (1) was deleted for two reasons. The first one is simply because "non-standard" is not a defined wording for engine certification. The second reason is the new requirement proposed by NPA-E-31 for all tests ("the configuration of the Engine or components or parts to be tested shall be sufficiently representative of the Type Design for the purpose of the test") : the engine configuration for all certification testing must be adequate, as a general rule.

JAR-E 830 wording was clarified using the work done for JAR-E 820 but the requirements were not fundamentally changed. Therefore, in relation to CPR rules of JAR 21.101 (b)(3) in Amendment 2 of JAR-21, this proposal has no effect on the safety level.

Wording to accommodate engines with 30 Second and 2 Minute OEI power ratings was previously introduced by NPA-E-19.

There is no direct equivalent requirement in FAR 33 : this NPA does not introduce a new difference.

### **2 - Economic impact analysis**

This proposal is an improvement and clarification of the current JAR-E 830. No economic impact is expected.

### **3 - Comments received during the circulation of the NPA**

Comments were received from the following organisations :

- Authorities of Denmark, France, United Kingdom and USA

## 4 - Response to comments

(001/002) Two commenters provided a « no comment » statement on the proposal.

### General comment

(004) One commenter questioned the deletion of reference to possibility of using a « non-standard » engine and requested a justification. It was agreed that the rationale should be recorded and therefore the justification of the NPA was improved accordingly.

### Comments on JAR-E 830 (b)

(006) One commenter proposed to change JAR-E 830 (b) to read “(b) *The test must run at the following conditions:*”. This was not accepted in order to keep JAR-E 830 similar to JAR-E 820 (as in amendment 11 of JAR-E).

### Comments on JAR-E 830 (b)(2)

(003) In JAR-E 830 (b)(2), one commenter suggested deletion of words “for the shaft system to be approved” arguing that the shaft system was not defined and that this added confusion. This commenter added that it is clear that the engine should always be tested at the maximum TET unless the condition of the last sentence apply. This comment was not accepted : [see comment below](#).

(005) One commenter suggested to modify the text of JAR-E 830 (b)(2) to read as follows: “(b)(2) *For the shaft system to be approved, **a turbine entry gas temperature equals to** the maximum steady state turbine-entry gas temperature for use during periods longer than 20 seconds and not associated with 30-Second or 2-Minute OEI Power ratings. ...*”. This commenter noted that the proposed text change was consistent with the 4<sup>th</sup> paragraph of the “Justification” of NPA-E-43, i.e., (a) "JAR-E 830 was clarified using the work done for JAR E-820 - - " and argued that the added wording "a turbine entry gas temperature equals to" was the same as that used in the harmonised text of FAR 33.84(b)(4)/JAR-E 820. The principle of this comment was accepted although the commenter’s counter proposal was not agreed : instead, wording of JAR-E 820 in JAR-E Amendment 11 was retained.

(007) One commenter proposed, for clarification, to change (b)(2) to read : “*The maximum steady state turbine entry gas temperature for use during periods greater than 20 seconds and not associated with 30 second or 2 minute OEI ratings is to be used for the test. However, for the shaft system to be approved, if the maximum overspeed cannot occur at the maximum turbine entry temperature, the highest temperature which could occur at the*

*conditions of maximum overspeed shall be used.*” This was ~~not~~ partially accepted : see comment above. ~~However, as a result of the various comments, the text was improved.~~

#### Comments on JAR-E 830 (b)(3)

~~(008)~~—One commenter proposed to change (b)(3) to read : “Maximum operating oil temperature”, by deleting « the ». This was not accepted to be consistent with the structure of the paragraph.

~~(009)~~—One commenter requested definition of the location of the oil temperature measurement. It was agreed that some improvement were necessary. This paragraph was consequently clarified to refer to the value recorded in the engine type certificate data sheet.

#### Comments on JAR-E 830 (c)

~~(010)~~—One commenter requested clarification of the intent of this paragraph which deals with the condition of the engine after an overspeed test. This commenter considered that the current wording could be open to misinterpretation, since the engine was supposed to remain fully operational after the overspeed. Therefore, it suggested that the text could be changed to read: “*On conclusion of the test, the stripped condition of the engine must demonstrate that the engine would have been capable of continued running, without restriction, following an overspeed event.*” This was not accepted. The proposed NPA text was the same as in JAR-E 820 (in amendment 11 of JAR-E). The counter proposal of the commenter could be misinterpreted as addressing engine condition after any overspeed “event” in service which is not at all the intent of this requirement which addresses pass / fail criteria after an overspeed “test” performed to demonstrate acceptability of a 20-second transient without maintenance action.