



1. Summary of the outcome of the consultation

During the public consultation of the above referenced proposed Equivalent Safety Finding from 10 August to 29 September 2023, EASA has received:

- 30 comments
- from 6 different commenters.

2. CRD table of comments, responses and resulting text

In responding to the comments, the following terminology is applied to attest EASA’s position:

- (a) **Accepted** — it means that EASA agrees with the comment and any proposed change is incorporated into the text
- (b) **Partially accepted** — it means that EASA either partially agrees with the comment or agrees with it but the proposed change is partially incorporated into the text
- (c) **Noted** — EASA acknowledges the comment, but no change to the text is considered necessary
- (d) **Not accepted** — EASA does not agree with the comment or proposed change and the text will not be changed

(General Comments)

-

comment 1 comment by: DE-LBA

LBA has no comments.

response Noted.

comment 2 comment by: FOCA (Switzerland)

Thank you very much for the opportunity to comment. I can inform you that FOCA has no remarks to add to this document.

response Noted.

comment 3 comment by: DGAC FR (Mireille Chabroux)

DGAC France thanks EASA for the consultation.
DGAC France has no specific comment on the document.

response Noted.

comment 7 comment by: Airbus-Regulations-SRg

Airbus Commercial Aircraft is pleased to participate in this annotation on EASA proposed ESF-B25.251-01 issue 01.
Our matter specialists and experts have carefully reviewed the proposal.
The comments found are allocated to the dedicated section of the CRT review.

In case any question may occur, please contact regulations.policies@airbus.com for further Airbus internal coordination. Thank you.

Administrative notes:
Airbus Document Classification: Not applicable
Airbus Exp.Ctrl. Classification: Not technical

response Noted.

comment

18

comment by: *The Boeing Company*

The attached comprise comments from The Boeing Company submitted to EASA via the Comment Response Tool (CRT) in response to EASA Proposed Equivalent Safety Finding ref. ESF-B25.251-01 Issue 01 on "Vibration and Buffeting."

response

Noted.

SUBJECT

p. 1

comment

19

comment by: *The Boeing Company*

COMMENT #1 of 12

Non-Concur

X

Substantive

Editorial

Page:1

Paragraph: 1

THE PROPOSED TEXT STATES:

REQUIREMENTS incl. Amdt. : CS 25.251(b) and (d) at Amdt. 271

REQUESTED CHANGE:

REQUIREMENTS incl. Amdt. : CS 25.251(b) ~~and (d)~~ at Amdt. 271

JUSTIFICATION:

The inclusion of 25.251(d) in the ESF is unnecessary since the regulation does not preclude a method of compliance of analysis. This is in contrast to 25.251(b), which specifies in-flight demonstration in the regulation text. Much of the information in the proposed document regarding 25.251(d) is valuable, but an ESF to 25.251(d) is not necessary.

response

Not Accepted. The ESF was initially published including only CS 25.251 (b), but then it has been extended to include subparagraph (d) since the potential effects of the large antenna may also impact the original demonstration of compliance with CS 25.251 (d) which may not be valid anymore for the modified aeroplanes. For an unmodified aeroplane, compliance demonstration with CS 25.251 (d) is done by flight test, same as for CS 25.251 (b).

comment 20

comment by: *The Boeing Company***COMMENT #2 of 12****Non-Concur****Substantive****Editorial****X**

Page:2

Paragraph: 3

THE PROPOSED TEXT STATES:

Large aeroplane design changes that include the installation on the fuselage of a large2 radome or antenna covered by an aerodynamic fairing must comply with CS 25.251(b)...

REQUESTED CHANGE:

Large aeroplane Design changes **to large aeroplanes** that include ~~the installation on the fuselage of large2 radome or antenna covered by an aerodynamic fairing~~ **larger external modifications, like radome antennas and other protrusions** must comply with CS 25.251(b)...

JUSTIFICATION:

- Suggest rewording for clarification as the initial version can be read to mean *large design changes to aeroplanes* **or** *design changes to large aeroplanes*.
- Expanding definition to external modifications instead of limiting to “radome or antenna covered by an aerodynamic fairing” may allow use in other cases that would apply.

response

Partially accepted.

In response to the first part of the comment, the sentence will be changed accordingly in the final ESF.

EASA would like to focus the application of this ESF to large antenna (radome) installations mounted on the fuselage, although the ESF may be applied on a case-by-case basis to other externally mounted fairings or protrusions. A sentence to reflect this approach will be added to the Applicability statement of the final ESF.

comment 21

comment by: *The Boeing Company***COMMENT #3 of 12****Non-Concur****Substantive****Editorial****X**

Page:2

Paragraph:4

THE PROPOSED TEXT STATES:

Because of these potential effects, the original demonstration of compliance with CS 25.251(b) and (d) may not be valid for the modified aeroplanes. Normally, the demonstration of compliance must be based on flight tests only.

REQUESTED CHANGE:

Because of these potential effects, the original demonstration of compliance with CS 25.251(b) and (d) may not be valid for the modified aeroplanes. Normally, the demonstration of compliance **for 25.251(b)** must be based on flight tests only.

JUSTIFICATION:

While it is true that “normally” compliance with 25.251(d) is based on flight test for such changes, the regulation itself does not specify that requirement. Therefore “must” is not consistent.

response

Partially accepted. The word “Normally” will be deleted from the text of the final ESF.

comment

22

comment by: *The Boeing Company*

COMMENT #4 of 12

<i>Non-Concur</i>	<i>Substantive</i>	<i>Editorial</i>
X		

Page:3

Paragraph:1

THE PROPOSED TEXT STATES:

Nevertheless, an applicant may propose an Equivalent Safety Finding (ESF) based on an acceptable method (such as a similarity analysis to other EASA approved designs, computational fluid dynamics tools, vibrations analysis, partial flight tests) to substantiate that the original demonstration of compliance with CS 25.251(b), or CS 25.251(b) and (d), at time of TC remains valid with the design change applied.

REQUESTED CHANGE:

Nevertheless, an applicant may propose an Equivalent Safety Finding (ESF) based on an acceptable method (such as a similarity analysis to other EASA approved designs, computational fluid dynamics tools, vibrations analysis, partial flight tests) to substantiate that the original demonstration of compliance with CS 25.251(b), ~~or CS 25.251(b) and (d),~~ at time of TC remains valid with the design change applied.

JUSTIFICATION:

The inclusion of 25.251(d) in the ESF is unnecessary since the regulation does not preclude a method of compliance of analysis. This is in contrast to 25.251(b), which specifies in-flight demonstration in the regulation text.

response

Not accepted. It is true that 25.251 (d) does not preclude a method of compliance of analysis, but usually in the initial compliance demonstration, only flight test is used. See also response for comment no.19.

comment

23

comment by: *The Boeing Company*

COMMENT #5 of 12

Non-Concur

X

Substantive

Editorial

Page:3

Paragraph:4

THE PROPOSED TEXT STATES:

The present ESF aims at extending the scope of the formerly published ESF, which was limited to CS 25.251(b), to include CS 25.251(d). All changes introduced compared to the previously published ESF are tracked for traceability reasons.

Considering all the above, the following Equivalent Safety Finding to CS 25.251(b), or CS 25.251(b) and (d), at Amdt 27 is proposed.

REQUESTED CHANGE:

~~The present ESF aims at extending the scope of the formerly published ESF, which was limited to CS 25.251(b), to include CS 25.251(d). All changes introduced compared to the previously published ESF are tracked for traceability reasons.~~

Considering all the above, the following Equivalent Safety Finding to CS 25.251(b), ~~or CS 25.251(b) and (d),~~ at Amdt 27 is proposed.

JUSTIFICATION:

The inclusion of 25.251(d) in the ESF is unnecessary since the regulation does not preclude a method of compliance of analysis. This is in contrast to 25.251(b), which specifies in-flight demonstration in the regulation text.

response

Not accepted. See response for comment no.22.

1. APPLICABILITY

comment 24

comment by: *The Boeing Company*

COMMENT #6 of 12		
Non-Concur	Substantive	Editorial
	X	
Page:4 Paragraph: 1		
<p>THE PROPOSED TEXT STATES: This ESF is applicable to CS-25 Large Aeroplanes fitted with large radome or antenna fairing on the fuselage.</p> <p>REQUESTED CHANGE: This ESF is applicable to CS-25 Large Aeroplanes fitted with large radome or antenna fairing larger external modifications, like radome antennas and other protrusions. on the fuselage.</p> <p>JUSTIFICATION: Expanding definition to external modifications instead of limiting to “radome or antenna covered by an aerodynamic fairing” may allow use in other cases that would apply.</p>		
response Not accepted. See response to comment no. 20.		

1.1 AFFECTED CS

comment 25

comment by: *The Boeing Company*

COMMENT #7 of 12		
Non-Concur	Substantive	Editorial
X		
Page:4		

Paragraph: 1

THE PROPOSED TEXT STATES:

CS 25.251(b) and (d) at Amendment 27

REQUESTED CHANGE:

CS 25.251(b) ~~and (d)~~ at Amendment 27

JUSTIFICATION:

The inclusion of 25.251(d) in the ESF is unnecessary since the regulation does not preclude a method of compliance of analysis. This is in contrast to 25.251(b), which specifies in-flight demonstration in the regulation text. Much of the information in the proposed document regarding 25.251(d) is valuable, but an ESF to 25.251(d) is not necessary.

response

Not accepted. See response to previous comments no. 19 and 22.

2. SCOPE

p. 4

comment 8

comment by: Airbus-Regulations-SRg

Page 4, para. 2 - Scope, first sentence

PROPOSED TEXT:

It is suggested to replace the wording “[...] CS25.251(b), or CS25.251(b) and (d) [...]” by >>CS25.251(b) and/or (d)<< to read:
[...] aeroplane with CS 25.251(b) and/or (d), by using flight test [...]

RATIONALE:

This is to clarify that the ESF concerns both CS25 paragraphs 25.251(b) and 25.251(d) whenever they are applicable in case of installation of a large radome or antenna fairing on the fuselage.

response

Not accepted. The proposed wording “and/or” would include a situation where compliance with 25.251(d) would be shown without flight testing and compliance with 25.251(b) with flight testing, which seems irrational.

comment 9

comment by: Airbus-Regulations-SRg

Page 4, para. 2, sequence of bullets

AIRBUS COMMENT:

It is proposed to move the first bullet:

- *“there is no perceptible buffeting condition in the cruise configuration in straight flight at any speed up to VMO/MMO, except that the stall warning buffeting is allowable”*

after the second bullet:

- *“the aeroplane is free from excessive vibration under any appropriate speed and power conditions up to VDF/MDF”.*

RATIONALE:

The text related to the buffeting conditions corresponds to the requirement of CS25.251(d), whereas the text related to excessive vibrations comes from CS25.251(b). It would be more logical to keep them in the same order as the CS25 one.

response

Not accepted. See response to comment no. 8.

comment

10

comment by: Airbus-Regulations-SRg

Page 4, para. 2, chosen language

AIRBUS COMMENT :

The term “modeling” is present at three places in the ESF paragraph 2 with a single “l”, whereas it is also used at three places in the Interpretative material part (CFD Code Validation) but with a double “l” (modelling). It is suggested to harmonize the spelling in both parts of the document.

RATIONALE:

Spelling harmonization (US or UK).

response

Accepted. Modelling will be spelled consistently with a double “l”. Text will be amended accordingly.

comment

26

comment by: The Boeing Company

COMMENT #8 of 12

<i>Non-Concur</i>	<i>Substantive</i>	<i>Editorial</i>
X		

Page:4

Paragraph: 2

THE PROPOSED TEXT STATES:

In lieu of showing direct compliance for the modified large aeroplane with CS 25.251(b), or CS 25.251(b) and (d), by using flight test only, and provided that the below compensating factors are complied with, large radomes or antenna fairings might be installed on the fuselage of a large aeroplane without demonstrating in flight that:

REQUESTED CHANGE:

In lieu of showing direct compliance for the modified large aeroplane with CS 25.251(b), ~~or CS 25.251(b) and (d),~~ by using flight test only, and provided that the below compensating factors are complied with, large radomes or antenna fairings might be installed on the fuselage of a large aeroplane without demonstrating in flight that:

JUSTIFICATION:

The inclusion of 25.251(d) in the ESF is unnecessary since the regulation does not preclude a method of compliance of analysis. This is in contrast to 25.251(b), which specifies in-flight demonstration in the regulation text.

response

Not accepted. See response to previous comments no. 19 and 22.

comment

27

comment by: *The Boeing Company*

COMMENT #9 of 12

Non-Concur

Substantive

Editorial

X

Page:4

Paragraph: 2

THE PROPOSED TEXT STATES:

In lieu of showing direct compliance for the modified large aeroplane with CS 25.251(b), or CS 25.251(b) and (d), by using flight test only, and provided that the below compensating factors are complied with, large radomes or antenna fairings might be installed on the fuselage of a large aeroplane without demonstrating in flight that:

REQUESTED CHANGE:

In lieu of showing direct compliance for the modified large aeroplane with CS 25.251(b), or CS 25.251(b) and (d), by using flight test only, and provided that the below compensating factors are complied with, larger external modifications, like radome antennas and other protrusions ~~large radomes or antenna fairings~~ might be installed on the fuselage of a large aeroplane without demonstrating in flight that:

JUSTIFICATION:

Expanding definition to external modifications instead of limiting to “radome or antenna covered by an aerodynamic fairing” may allow use in other cases that would apply.

response Not accepted. See response to comment no. 20.

3. COMPENSATING FACTORS

p. 4

comment 4 comment by: *DLR Institute of Aeroelasticity*

2. (...) Validation using flight test data is preferred, but suitable wind tunnel data may be acceptable, if realistic Reynolds-Numbers are accomplished in such experiments. (...)

response Noted.

comment 5 comment by: *DLR Institute of Aeroelasticity*

2.d.
The trip point is an artifact from simulation and windtunnel testing with turbulators to fix the transition to a pre-selected position. In real flight conditions there is an intermittance area for laminar to turbulent flow transition due to non-constant freestream with distortions.

response Noted. See also response to comment no. 15

comment 6 comment by: *DLR Institute of Aeroelasticity*

3. 3.
A coupled vibration analysis, usually based on the aerodynamic model used for the flowfield analysis and the motion-induced unsteady airloads due to structural response.

response Noted.

comment 11 comment by: *Airbus-Regulations-SRg*

Page 4, para. 3 - first section

PROPOSED TEXT & RATIONALE:

Same proposal and rationale as comment #8 related to the listing “[...] CS25.251(b), or CS25.251(b) and (d) [...]”.

response

Noted. See response to comment no. 8.

comment

12

comment by: Airbus-Regulations-SRg

Page 4, para. 3 - second section

PROPOSED TEXT:

It is proposed to add “below mentioned” in the text to read:

[...]

*To evaluate whether the design change could affect the original compliance finding, the applicant may propose to use any suitable combination of the following **below mentioned** factors 1-4 to address CS25.251(b) or factors 1-3 to address CS25.251(b) and (d):*

RATIONALE:

This is to clarify that the factors 1 to 4 can be found below the text and to improve the overall readability of the document.

response

Accepted. Text will be amended accordingly.

comment

13

comment by: Airbus-Regulations-SRg

Page 4, para. 3 - second bullet

PROPOSED TEXT:

In §3.2, it is suggested to add “(CFD)” after “computational fluid dynamics”, to read:

...an acceptable computational fluid dynamics (CFD) tool...

RATIONALE:

The CFD acronym is used later on in the ESF and in the Interpretative material, but has not been associated yet with “computational fluid dynamics”.

response

Accepted. Text will be amended accordingly.

comment

14

comment by: Airbus-Regulations-SRg

Page 4, para. 3 - second bullet, 5th sentence

PROPOSED TEXT :

In §3.2, it is proposed to add “of the CFD tool” in the 5th sentence, to read:

[...] Validation **of the CFD tool** using flight test data is preferred, but suitable wind tunnel data may be acceptable. [...]

RATIONALE:

This is to reinforce that the validation concerns the CFD tool and to remove any ambiguity.

response

Accepted. Text will be amended accordingly.

comment

15

comment by: Airbus-Regulations-SRg

Page 5, para. 3 - Section 2.d

PROPOSED TEXT:

In §3.2(d), it is suggested to replace:

“Location of the ~~trip~~ point [...]”

with

“Location of the **transition** point [...]”.

RATIONALE:

This is a more common term to express the location at which the air flow is changing from laminar to turbulent.

response

Accepted. Text will be amended accordingly.

comment

16

comment by: Airbus-Regulations-SRg

Page 5, Chapter 3, bullet 3, quote:

3. A vibration analysis, usually based on the results of the flowfield analysis addressed in (2).

UNQUOTE

Proposed Text:

Please replace “A vibration analysis” by **A dynamic response analysis** to read:

3.A dynamic response analysis, usually based on the results of the flowfield analysis addressed in (2).

Rationale:

With the introduction of results from a flow-field analysis, the vibration analysis (usually comprising masses and stiffness of the system) is turned into a forced response calculation.

response

Accepted. Text will be amended accordingly.

comment

17

comment by: Airbus-Regulations-SRg

Associated Interpretative Material to Equivalent Safety Finding ESF-B25.251-01

Page 7, para: Aerodynamic Analysis, last section, sequencing

AIRBUS COMMENT :

Similarly to comment #9, it is proposed to invert the last two sentences (bullets), to read: [...] to perform:

- a flight test to VDF/MDF [...]
- a flight test to VMO/MMO [...]

RATIONALE:

Same rationale as for comment #9: to first address CS25.251(b) and then CS25.251(d).

response

Not accepted. See response to comment no. 8.

comment

28

comment by: The Boeing Company

COMMENT #10 of 12

Non-Concur

Substantive

Editorial

X

Page:4

Paragraph: 4

THE PROPOSED TEXT STATES:

The applicant must demonstrate, by using proposed method (taking into account the attached Interpretative Material), that the design change does not invalidate the original demonstration of compliance with CS 25.251(b), or CS 25.251(b) and (d).

REQUESTED CHANGE:

The applicant must **demonstrate show**, by using proposed method (taking into account the attached Interpretative Material), that the design change does not invalidate the original demonstration of compliance with CS 25.251(b), or CS 25.251(b) and (d).

JUSTIFICATION:

The use of “demonstrate” may imply flight testing, where “show” is more general.

response Accepted. Text will be amended accordingly.

comment 29

comment by: *The Boeing Company*

COMMENT #11 of 12

<i>Non-Concur</i>	<i>Substantive</i>	<i>Editorial</i>
		X

Page:4
Paragraph: 5

THE PROPOSED TEXT STATES:

1. Similarity to other EASA approved designs. (Consider the size, shape, and location of the respective fuselage modifications, the aeroplanes they are installed on, the respective VDF/MDF speeds, and the means of compliance used for the approved designs.)

REQUESTED CHANGE:

1. Similarity **analysis** to other EASA approved designs. . (Consider the size, shape, and location of the respective fuselage modifications, the aeroplanes they are installed on, the respective **V_{MO}/M_{MO} and** VDF/MDF speeds, and the means of compliance used for the approved designs.)

JUSTIFICATION:

- Similarity is an analysis method of compliance and “similarity analysis” is consistent with earlier use in the document.
- Adding Vmo/Mmo speeds as separate from Vdf/Mdf speeds.

response Accepted. Text will be amended accordingly.

comment 30

comment by: *The Boeing Company*

COMMENT #12 of 12

<i>Non-Concur</i>	<i>Substantive</i>	<i>Editorial</i>
		X

Page:4

Paragraph: 6

The proposed text states:

2. Flowfield analysis using an acceptable computational fluid dynamics tool.

REQUESTED CHANGE:

2. Flowfield analysis using an acceptable computational fluid dynamics **(CFD)** tool.

JUSTIFICATION: Adding definition of the acronym as it is used later.

response

Accepted. Text will be amended accordingly.