European Aviation Safety Agency

Explanatory Note to Decision 2016/010/R

CS-25 – Amendment 18

RELATED NPA/CRD 2015-07 (RMT.0572) AND NPA/CRD 2015-11 (RMT.0673) — 22.6.2016

EXECUTIVE SUMMARY

This Decision introduces the following changes to CS-25:

1) New provisions supporting the use of comparative analysis when showing compliance with Supercooled Large Drop (SLD) icing specifications. This is the outcome of rulemaking task RMT.0572.

2) Various improvements/clarifications, as well as the content of a Certification Memorandum (CM), introduced through rulemaking task RMT.0673 'Regular update of CS-25', affecting the following topics: emergency egress assisting means, electronic flight control systems, limit pilot forces for aeroplanes equipped with side stick controls, respecting brake energy qualification limits, retracting and extending mechanisms of the landing gear.

The changes contribute to an updated CS-25 reflecting the available state of the art and acceptable means of compliance, facilitate the certification process, and improve harmonisation with the Federal Aviation Administration (FAA). It is expected that this amendment will increase safety, will create no social or environmental impacts, and may provide a slight economic benefit by streamlining the certification process.

Applicability	
Affected regulations and decisions:	CS-25; ED Decision 2003/2/RM (CS-25)
Affected stakeholders:	Large aeroplane manufacturers/STC applicants
Driver/origin:	Safety; EASA Management Board Decision No 18-2015 (Article 3.2(h) on 'effectiveness of aviation safety requirements' and Article 3.5 on 'systematic rulemaking projects')
Reference:	N/A

Process map	
Concept Paper:	No
Rulemaking group:	No
Terms of Reference:	28.1.2013 (RMT.0572) & 27.4.2015 (RMT.0673)
RIA type:	Light (RMT.0572) None (RMT.0673)
Technical consultation during NPA drafting:	No
Publication date of — NPA 2015-07 (RMT.0572) — NPA 2015-11 (RMT.0673):	 12.6.2015 & 13.8.2015
Duration of consultations: — NPA 2015-07 — NPA 2015-11:	 4 months 2 months
Review group:	Yes (RMT.0572)
Focussed consultation:	No
Publication date of Opinion:	N/A

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1. Procedural information

1.1. The rule development procedure

The European Aviation Safety Agency (hereinafter referred to as the 'Agency') developed ED Decision 2016/010/R in line with Regulation (EC) No 216/2008[1] (hereinafter referred to as the 'Basic Regulation') and the Rulemaking Procedure[2].

This rulemaking activity is included in the Agency's 5-year Rulemaking Programme under RMT.0572 and RMT.0673[3]. The scope and timescale of the task were defined in the related Terms of Reference (ToR) (see 'process map' on the title page and the ToRs webpage).

The draft text of this Decision has been developed by the Agency for RMT.0673, and based on the input of the Rulemaking Group for the part related to RMT.0572. All interested parties were consulted through NPA 2015-07 and NPA 2015-11[4]. During the consultation of NPA 2015-07, 100 comments were received from 13 interested parties, including national aviation authorities, trade unions and industry. For NPA 2015-11, 11 comments were received from 7 interested parties, including national aviation authorities and industry.

The Agency has reviewed the comments received during the consultations. The comments received and the Agency's responses thereto are presented in the Comment-Response Documents (CRDs) 2015-07 and 2015-11[5].

The final text of this Decision with the Certification Specifications (CS) and Acceptable Means of Compliance (AMC) has been developed by the Agency, and based on the input of the Review Group for the part related to RMT.0572.

The process map on the title page summarises the major milestones of this rulemaking activity.

1.2. Structure of the related documents

Chapter 1 contains the procedural information related to this task. Chapter 2 explains the core technical content. Chapter 2.4 summarises the findings from the Regulatory Impact Assessment. The text of the CS/AMC is annexed to the ED Decision.

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1 Regulation (EC) No 216/2008 of the European Parliament and the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19.3.2008, p. 1).

2 The Agency is bound to follow a structured rulemaking process as required by Article 52(1) of the Basic Regulation. Such process has been adopted by the Agency's Management Board and is referred to as the 'Rulemaking Procedure'. See Management Board Decision concerning the procedure to be applied by the Agency for the issuing of opinions, certification specifications, acceptable means of compliance and guidance material ('Rulemaking Procedure'), EASA MB Decision No 18-2015 of 15 December 2015.

3 https://www.easa.europa.eu/document-library/rulemaking-programmes

4 In accordance with Article 52 of the Basic Regulation and Articles 6(3) and 7 of the Rulemaking Procedure.

5 https://www.easa.europa.eu/document-library/comment-response-documents

2. Explanatory Note

2.1. Overview of the issues to be addressed

a) Use of comparative analysis when showing compliance with SLD icing specifications (RMT.0572)

Within the frame of rulemaking task RMT.0058, new certification specifications (CSs) and acceptable means of compliance (AMC) have been created for certification of large aeroplanes for flight in icing conditions. These new provisions, introduced through Amendment 16 of CS-25, include the introduction of Supercooled Large Drop (SLD) icing conditions in various paragraphs of Book 1.
Some provisions have been included in AMC 25.1420 enable the applicant to use and take credit from a previous similar type design that has been proven to safely operate in SLD icing conditions. However, the details of the method and the acceptance criteria to be used when conducting a comparative analysis are not provided, therefore, the Agency decided to create a new rulemaking task to further develop the application of comparative analysis.

b) Regular update of CS-25 (RMT.0673)

Emergency egress assisting means (CS 25.810(a)(1)(iv)): The intent of CS 25.810(a)(1)(iv) with regard to the demonstration of performance with the engine running at ground idle needs to be clarified;

Flight Test Guide (references to FAA AC 25-7A): Federal Aviation Authority (FAA) Advisory Circular (AC) 25-7A has the status 'Cancelled', therefore, the existing Book 2 references need to be updated to refer to the current AC 25-7C;

Electronic flight control systems (CS 25.143(l)): There is a need to clarify the applicability of the lead-in condition ('which embody … aerodynamic limitation') of CS 25.143(l);

Limit pilot forces for aeroplanes equipped with side stick controls (CS 25.397(d)): There is a need to correct an inaccuracy in the tables of CS 25.397(d);

Respecting Brake Energy Qualification Limits: A Certification Memorandum (CM) has been applied on several projects and is considered mature enough to be introduced in AMC 25.735(a): brake assemblies are qualified against the minimum performance standard of ETSO-C135 – it is necessary to ensure that the ETSO C135 demonstrated brake kinetic energy (KE) absorption capability is not exceeded when the brake is installed on the aeroplane;

Retracting mechanism (CS 25.729): There is a need to clarify the applicability of CS 25.729 to both retracting and extending mechanisms of the landing gear;

Missing or wrong cross references in the CSs (Book 1) to specific AMCs (Book 2): There is a need to review the consistency between the existing AMCs and the corresponding references in Book 1 in order to ensure that all existing AMCs are always and correctly referenced; and

Correction of typos: Several corrections of typos are proposed.

2.2. Objectives

The overall objectives of the EASA system are defined in Article 2 of the Basic Regulation. This proposal will contribute to the achievement of the overall objectives by addressing the issues outlined in Chapter 2.1. The specific objective of this proposal is, therefore, to:

a) introduce new provisions to support the use of comparative analysis when showing compliance with SLD icing specifications; and

b) make various improvements/clarifications based on the topics selected for the regular update of CS-25 for 2015 (see list in 2.1(b)).

2.3. Outcome of the consultation

NPA 2015-07 (RMT.0572): 100 comments were received from 13 organisations.
Overall, the comments received were of a technical natural and were useful to improve the explanatory note of the NPA, as well as the proposed regulatory text, but did not result in major changes to the proposed regulatory text.

NPA 2015-11 (RMT.0673): 11 comments were received from 7 organisations.

A few clarifications and improvements were made to the regulatory text proposal.
The most substantial comments addressed the topic 'Respecting Brake Energy Qualification Limits' and the related amendment to AMC 25.735. The AMC text has been amended to avoid misinterpretation that a new requirement has been raised. It merely emphasises that any limits established during qualification testing should not be exceeded during normal service. Paragraph 4.f.(2)(d) of AMC 25.735 has also been revised to clarify that the applicant may decide to demonstrate a temperature limit above the ETSO C135 test temperature.

2.4. Summary of the Regulatory Impact Assessment (RIA)

NPA 2015-07 (RMT.0572): It has been recommended to amend CS-25 to introduce AMC based on comparative analysis when showing compliance with SLD-related specifications. This would provide a benefit in terms of safety level harmonisation, and would ease the certification process for both the applicant and the Agency when the eligibility criteria are met for using the comparative analysis, with an associated overall economic benefit. It would also meet the request made by several large aeroplane manufacturers within the frame of the development of the new icing certification specifications (RMT.0058).

NPA 2015-11 (RMT.0673): This NPA did not propose new requirements for applicants. Some clarifications of existing certification specifications were proposed, as well as new or updated AMCs based on common certification practices agreed with applicants. There was no need to develop a RIA.

2.5. Overview of the amendments

The main changes introduced by this CS-25 amendment are summarised hereafter.

NPA 2015-07 (RMT.0572):

CS 25.21 Proof of compliance

CS 25.21(g)(2) and (g)(3) are amended by adding a statement at the end of these two subparagraphs such that, if applicable, a comparative analysis may be used to show compliance as an alternative to using the ice accretions defined in Part II of Appendix O.

CS 25.1420 Supercooled large drop icing conditions

A new subparagraph (d) provides for the possibility to use a comparative analysis as a means of compliance, as an alternative to what is required in subparagraphs (b) and (c).

AMC 25.21(g) Performance and Handling Characteristics in Icing Conditions

References to the comparative analysis (provided in AMC 25.1420(f)) as a potential means of compliance have been added in several paragraphs of the AMC.

When a comparative analysis is used, the AFM information may be based on the reference fleet AFM(s) or the content of the operating manual(s).

AMC 25.629 Aeroelastic stability requirements

At the end of the subparagraph dealing with ice accumulation, a reference to the comparative analysis of AMC 25.1420(f) as a potential means of compliance is created.

AMC 25.773(b)(1)(ii) Pilot compartment view in icing conditions

A reference to the comparative analysis of AMC 25.1420(f) as a potential means of compliance is created.

AMC 25.773(b)(4) Pilot compartment non-openable windows

A reference to the comparative analysis of AMC 25.1420(f) as a potential means of compliance is created in paragraph 1. Ice and heavy rain.

AMC 25.929(a) Propeller De-icing

A reference to the comparative analysis of AMC 25.1420(f) as a potential means of compliance is created in paragraph 1. Analysis.

AMC 25.1093(b) Powerplant Icing

References to the comparative analysis of AMC 25.1420(f) as a potential means of compliance are created in paragraphs (a) Compliance with CS 25.1093(b)(1) and (b) Compliance with CS 25.1093(b)(2).

AMC 25.1324 Flight instrument external probes

A reference to the comparative analysis of AMC 25.1420(f) as a potential means of compliance is created in paragraph 11. Supercooled Large Drop Liquid Conditions.

AMC No 1 to CS 25.1329 Flight Guidance System

A reference to the comparative analysis of AMC 25.1420(f) as a potential means of compliance is created in paragraph 10.1. Normal Performance (bullet 'Icing').

AMC 25.1403 Wing icing detection lights

A reference to the comparative analysis of AMC 25.1420(f) as a potential means of compliance is created at the end of the introductory paragraph.

AMC 25.1420 Supercooled large drop icing conditions

A new subparagraph (f) Comparative analysis, is created to introduce this alternative means of compliance. Different elements must be established in order to be able to use this means of compliance, i.e. a reference fleet with adequately safe history in icing conditions, an analysis of aeroplane features and/or margins contributing to the reference fleet safe history, an analysis showing comparable design features and/or margins between the new or derivative aeroplane model and the reference fleet, and the compliance of the new or derivative aeroplane with certification specifications relative to Appendix C (icing conditions).

Additionally, the reference to a comparative analysis is added at various parts of the text in AMC 25.1420.

NPA 2015-11 (RMT.0673):

AMC 25.810(a)(1)(iv) Capability of assisting means in wind conditions

This AMC is created to clarify that the applicability of the combined effect of a 25-knot wind and the engine(s) running at ground idle should be only to escape slides positioned forward of the engine(s) and in proximity to the engine air intake(s).

AMC 25.729, AMC 25.735, AMC 25.1322 and AMC No. 1 to CS 25.1329

The Flight Test Guide references are updated to the last revision which is AC 25-7C.

CS 25.143(l) Electronic flight control systems

The structure of CS 25.143(l) is amended so that the lead-in condition is applicable to all subparagraphs.

CS 25.397(d) Limit pilot forces for aeroplanes equipped with side stick controls

The tables are amended to provide clear values and terminology.

AMC 25.735 Brakes and Braking Systems Certification Tests and Analysis

The AMC is amended to reflect the content of the Certification Memorandum on 'Respecting Brake Energy Qualification Limits' (EASA CM-HS-001, Issue 1, 24.8.2010).

It emphasises the need to ensure that the demonstrated brake KE absorption capability is not exceeded when the brake is installed on the aeroplane. Applicants should demonstrate how the threshold temperatures are to be respected.

CS 25.729 and AMC 25.729 on landing gear extending and retracting mechanisms

The title, as well as several subparagraphs, are amended to designate both retracting and extending mechanisms. This removes the ambiguity of the current designation 'retracting mechanisms'.

Various CSs paragraphs (Book 1)

Amendments are made to ensure correct and harmonised AMC references in the different CS paragraphs.

Correction of typos

At the end of AMC 25.1593, and at the end of AMC to Appendix Q: the indications of the last amendment '[Amdt No: 25/2013]' should read '[Amdt No: 25/13]'. The digits '13' refer to the amendment number, not the year of publication.

AMC to Appendix Q should not appear on a page numbered 2-App N, but on a page numbered 2-App Q.

3. References

3.1. Related regulations

N/A

3.2. Affected decisions

ED Decision No. 2003/2/RM of the Executive Director of the Agency of 17 October 2003 (CS-25 initial issue) on certification specifications, including airworthiness codes and acceptable means of compliance, for large aeroplanes ('CS-25')

3.3. Reference documents

N/A