

Executive Director Decision

2015/009/R

of 12 March 2015

**amending Certification Specifications and Acceptable Means of Compliance for Engines
(CS-E)**

‘CS-E — Amendment 4’

THE EXECUTIVE DIRECTOR OF THE EUROPEAN AVIATION SAFETY AGENCY,

Having regard to Regulation (EC) No 216/2008¹, and in particular Article 38(3)(a) thereof,

Having regard to Regulation (EU) No 748/2012², and in particular paragraph 21.A.16A of the Annex (Part-21) thereof,

Whereas:

- (1) The Agency shall, pursuant to Article 18(c) of Regulation (EC) No 216/2008, issue Certification Specifications and Acceptable Means of Compliance, as well as Guidance Material, for the application of Regulation (EC) No 216/2008 and its Implementing Rules.
- (2) Certification Specifications are technical standards adopted by the Agency which indicate the means to show compliance with Regulation (EC) No 216/2008 and its Implementing Rules and which can be used by organisations for the purpose of certification.
- (3) Acceptable Means of Compliance are non-binding standards adopted by the Agency which illustrate the means to establish compliance with Regulation (EC) No 216/2008 and its Implementing Rules.
- (4) Guidance Material is non-binding material developed by the Agency which helps to illustrate the meaning of a requirement or specification and is used to support the interpretation of

¹ Regulation (EC) No 216/2008 of the European Parliament and of 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 Regulation (EU) No 748/2012 of 03 August 2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations (OJ L 224, 21.8.2012, p. 1).



Regulation (EC) No 216/2008, its Implementing Rules, Certification Specifications and Acceptable Means of Compliance.

- (5) With Decision 2003/009/RM of 24 October 2003, the Executive Director adopted Certification Specifications including Airworthiness Codes and Acceptable Means of Compliance for Engines (CS-E — Initial issue).
- (6) The Agency shall, pursuant to Article 19(2) of Regulation (EC) No 216/2008, reflect the state of the art and the best practices in the fields concerned and update its Decisions taking into account worldwide aircraft experience in service, and scientific and technical progress.
- (7) Turbine engines installed on large aeroplanes operating in icing conditions can encounter environmental conditions which are not, or only partially, addressed by the current CS-E provisions. Ice crystals and mixed-phase icing conditions, ground freezing fog, as well as in-flight snow, have been identified as causal factors in large aeroplanes accidents or incidents because of the resulting engine thrust/power losses or engine flameouts.
- (8) The need to upgrade certification specifications and acceptable means of compliance of turbine engines for flight in icing conditions has been recognised by the aviation community already before the creation of the Agency. For this purpose, an Aviation Rulemaking Advisory Committee (ARAC) was tasked by the United States Federal Aviation Administration (FAA) in December 1997, through its Ice Protection Harmonization Working Group (IPHWG). The IPHWG, to which some European stakeholders from industry and authorities participated, issued its final report and recommendations in June 2009 (task 2 report including phase IV review). The Agency then reviewed the IPHWG report and, in 2010, initiated rulemaking task RMT.0179 (E.009) taking into account the recommendations of the IPHWG, in cooperation with the FAA. When drafting its proposal to amend CS-E, the Agency also considered the most recent reported incidents and the corresponding actions taken together with engine manufacturers, state-of-the-art research programmes related to the domain, and its own and most recent experience in the field of icing environment related issues, as well as for other weather conditions.
- (9) The outcome of RMT.0179 confirmed the need to amend CS-E to:
 - (a) introduce new environmental conditions (i.e. icing conditions and snow) along with a set of amended or new requirements for the applicant to demonstrate that turbine engines installed on large aeroplanes will safely operate after encountering any of the defined conditions; and
 - (b) provide new or revised acceptable means of compliance and guidance material supporting the demonstration of compliance with the new requirements.
- (10) The Agency has determined that, following experiences with volcanic activity and forecast widespread airspace contamination, there is a need to strengthen regulations in order to maintain a high level of safety while minimising the likelihood and severity of disruptions to normal flight operations in any future volcanic events.
- (11) A new approach to manage flight operations with known or forecast volcanic cloud contamination of the airspace has been developed by ICAO and published in ICAO Doc 9974 – Flight Safety and Volcanic Ash. According to this approach, the operator is accountable for



assessing the risks to flight operations and for determining and implementing appropriate procedures and mitigating measures. Central to this approach is the development of a Safety Risk Assessment (SRA) that is acceptable to the NAA of the State of the operator. In order to successfully produce such a SRA, it is essential that the operator is provided with, or has access to, specific technical data and information regarding the susceptibility of the aircraft they operate, including its engines, to volcanic cloud related effects and any precautions that need to be taken into account.

- (12) The Essential Requirements of Regulation (EC) No 216/2008 already place an obligation on design organisations to provide operators with limitations and other information necessary to ensure that no unsafe condition will occur from exposure to environmental hazards. While this can be understood as meaning all environmental hazards, detailed Certification Specifications related to volcanic cloud hazards have not been previously addressed in CS-E. This Decision will introduce a new Certification Specification (CS-E 1050) and related AMC into CS-E to ensure that design organisations conduct an assessment of their product's susceptibility to volcanic cloud hazards as part of type certification, and establish limitations and/or information for their safe operation. The applicability of CS-E 1050 is aligned with the operational need for a management system.
- (13) The Agency's RMT.0176 (E.004) addresses a clarity-of-rules/economic issue related to compliance with CS-E 650 Vibration Surveys.
- (14) There are practical difficulties related to compliance with CS-E 650. In accordance with AMC E 650, 'survey' has generally been interpreted to mean a full engine test. Recent certification experience is that the speed range defined for the surveys may not be achievable during test cell testing without modifying the test engine to an extent that makes it unrepresentative of the type design configuration.
- (15) The specific objective is to clarify the CS-E 650 and the corresponding AMC E 650 to reflect the current certification practice and to address practical difficulties related to showing of compliance.
- (16) This Decision amends CS-E 650 and AMC E 650 on vibration surveys to clarify the intent of the speed range requirement and the extent to which analysis may supplement test. While the scope and intent of the rule remain unchanged, certain prescriptive requirements in the rule have been moved to the AMC.
- (17) This Decision incorporates an editorial change to AMC E 510 to update the revision status of one of the documents listed in paragraph (5) 'Related documents' of this AMC as well as another editorial update of the CS-E 580 title under 'CONTENTS (General lay-out)' in CS-E.
- (18) The Agency, pursuant to Article 52(1)(c) of Regulation (EC) No 216/2008 and Articles 5(3), 6 and 7 of the Agency's Rulemaking Procedure³, has widely consulted interested parties on the

³ EASA MB Decision No 01-2012 of 13 March 2012 amending and replacing Decision 08-2007 concerning the procedure to be applied by the Agency for the issuing of Opinions, Certification Specifications and Guidance Material ('Rulemaking Procedure') (<https://www.easa.europa.eu/the-agency/facts-and-figures/easa-mb-decision-01-2012-amending-and-replacing-mb-decision-08-2007>).



matters which are the subject of this Decision and has provided thereafter a written response to the comments received⁴.

HAS DECIDED:

Article 1

The Annex to this Decision is adopted as Amendment 4 to the Certification Specifications and Acceptable Means of Compliance for Engines (CS-E).

Article 2

This Decision shall enter into force on the day following that of its publication in the Official Publication of the Agency.

Done at Cologne on 12 March 2015

*For the European Aviation Safety Agency
The Executive Director*

Patrick KY

⁴ Please refer to NPA 2011-04, NPA 2011-17, NPA 2012-23 and NPA 2014-03, (<http://easa.europa.eu/document-library/notices-of-proposed-amendment>); and to CRD to NPA 2011-04, CRD to NPA 2011-17, CRD to NPA 2012-23 and CRD to NPA 2014-03 (<http://easa.europa.eu/document-library/comment-response-documents>).

