CS-ETSO
EXPLANATORY NOTE[1]

I. General

Background

1. On 27 September 2002 Regulation (EC) No 1592/2002 of 15 July 2002 ("Basic Regulation") entered into force.[2] In addition the Commission has adopted the necessary rules (Commission Regulations) for the implementation of the Basic Regulation for the certification and the continuing airworthiness of products, parts and appliances.[3]

2. Pursuant to the Basic Regulation the Agency shall, where appropriate, issue certification specifications, including airworthiness codes and acceptable means of compliance, as well as guidance material for the application of the Basic Regulation and its implementing rules, as part of its regulatory framework. The Commission Regulations specify which certification specifications shall be issued.

Agency measures

3. CS are used to demonstrate compliance with the Basic Regulation and its implementing rules. These include, in particular:

- airworthiness codes, which are standard technical interpretations of the airworthiness essential requirements contained in Annex I to the Basic Regulation; and

- acceptable means of compliance, which are non-exclusive means of demonstrating compliance with airworthiness codes or implementing rules.

4. AMC have thus roughly the same meaning as under the JAA system. They illustrate a means, but not the only means, by which a specification contained in an airworthiness code or a requirement of an implementing rule can be met. Satisfactory demonstration of compliance using a published AMC shall provide for presumption of compliance with the related specification or requirement; it is a way to facilitate certification tasks for the applicant and the competent authority.

5. GM is issued by the Agency to assist in the understanding of the Basic Regulation, its implementing rules and CS.

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[1] This note is for information purposes only.

[2] Regulation (EC) No 1592/2002 of 15 July 2002 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, OJ L240/1 of 7 September 2002;

[3] Commission Regulation (EC) No 1702/2003 of 24 September 2003 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 243, 27.09.2003, p. 6 and Commission Regulation (EC) No xxx/2003 of <date> on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks, OJ L <number/date>. These Regulations include Part 21 and the Parts M, 145, 147, 66 respectively.

Consultation on draft proposals

6. This CS has been subject to consultation[4] in accordance with Article 43 of the Basic Regulation and Article 15 of the rulemaking procedure established by the Management Board.[5]

7. The Agency has addressed and responded to the comments received. The responses are contained in a comment-response document (CRD) which has been produced for each proposal and which is available on the Agency's web-site.

General structure and format applicable to all Certification Specifications

8. In general the Agency relied on existing Joint Aviation Requirements-codes in the development of all certification specifications. Where needed, these have been adapted to ensure consistency with Community law and European Union policies. These adaptations represent the minimum necessary to facilitate a timely consultation and adoption of the necessary measures.

9. In addition, JAA NPAs regarded as being mature by the Agency have been incorporated (see section II of this Foreword). Other JAA NPAs will be considered by the Agency at a later stage.

10. The Agency realises that the first issues of the certification specifications show some inconsistency where the structure, format and lay-out are concerned. These will be approved as soon as the Agency has developed its own "drafting convention". It is felt more important to have these CS (most of them in JAR-format) available without further delay.

11. Except for CS-ETSO, all certification specifications consist of two "Books". Book 1 is referred to as "airworthiness code" and contains the Agency's technical interpretation of the essential requirements. Book 2 contains means acceptable to the Agency for the applicant to show compliance with the code. Each Book is then subdivided into "Subparts".

12. Awaiting the establishment of its own drafting convention, the Agency has as much as possible retained in the CS the language applied in the Joint Aviation Requirements. The Agency will further review this matter at a later stage.

Units of Measurement Conversion

13. With regard to the use of SI units in Europe, the Agency applies the following policy:

- All units of measurement shall be converted into a "primary unit" listed in table 3-4 of ICAO Annex 5 (if necessary with a prefix for decimal multiples and sub-multiples).
- In general the principle of equivalent tolerance shall be used for rounding off the converted figures, except where the figure serves only as an input to calculations and does not reflect an actual requirement to be met. In such case the converted figure should not be rounded off.
  A review of all figures needs to be done to determine if the tolerance of the original figure as implied by the figure is sufficient for the purpose of the requirement. If necessary the tolerance can be defined by adding a particular tolerance. This will lead to a list of standard conversions to be used in all EASA measures (it should be noted that conversion of the same unit can lead to different results depending on the particular use).
- The "old" figure using the non-SI unit shall be kept between brackets after the converted figure/unit:
  (i) for the ICAO accepted non-SI alternatives until ICAO has established a termination date for the use of these units;

[4] See Consultation paper no. 12 of 4 August 2003;

[5] Decision concerning the Rulemaking procedure, adopted by the Management Board on 17 June 2003;

(ii) for all the other units during a transition period of 5 years. After this date the units between brackets will have to be removed.

- As a result of the above policy the use of the units between brackets is felt acceptable.

Explanation

14. EC Directive 80/181/EEC mandates the use of SI units in Europe except where international conventions say otherwise. An example of such international convention is ICAO Annex 5, which in principle also mandates the use of SI units, but allows for the use of certain non-SI alternative units (knot, nautical mile and foot).

15. During the initial transposition from JARs into CS, it was decided to convert all units of measurement into S.I. units (or accepted derived units such as km/h for speed). The reasons for converting all units was to retain internal consistency of the airworthiness codes and the notion that safety problems should not be expected knowing that the CS are only used to certify the product, and have no direct implication on the operation.

16. During the consultation on the draft CS, no comments were received objecting to the general idea of converting the units. 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 unit.* 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 is still valid in these cases, bearing in mind that the non-SI alternative units, quoted between brackets, may continue to be used.

b. *The conversions made are not accurate enough*. 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 the opposite might be true as well. 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. *Not all units have been converted*; 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. *Correction of mistakes*; The necessary corrections have been made.

Publication

17. The full text of certification specifications, including airworthiness code and acceptable means of compliance as well as guidance material are for the time being only available in PDF format at "www.easa.eu.int". For more information, contact the Agency :

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II. Certification Specifications for European Technical Standard Orders (CS-ETSO)

Introduction

18. The showing of compliance with applicable Certification Specifications for parts and appliance must be made in accordance with Part 21 A.303. This paragraph identifies 3 possible ways. One of the ways is to obtain a European Technical Standard Order (ETSO) Authorisation.

19. The procedural requirements applicable to the applicant for the issuance of an ETSO authorisation are contained in EASA Part 21-Subpart O. Part 21A.606 states that the applicant is entitled to an ETSO authorisation, issued by the Agency, after demonstrating that the article complies with the technical conditions of the applicable European Technical Standard Order.

20. A European Technical Standard Order (ETSO) is a minimum performance standard for specified articles (i.e. any part and appliance to be used on civil aircraft). It is a detailed airworthiness specification issued by the Agency to ensure compliance with the essential requirements of the Basic Regulations (EASA Part 21A.601 (b)).

21. The standards for each ETSO are contained in this CS-ETSO, subpart B. The Agency may establish additional technical standard orders.

22. Part 21, Subpart O contains in addition provisions on the rights (e.g. the holder may make minor design changes without further authorisation by the Agency) and obligations (including record keeping requirements) of the holder of a TSO authorisation and on the duration, continued validity and transferability of an ETSO authorisation.

23. The holder of an ETSO-authorisation is entitled to produce and to mark the article with appropriate ETSO marking. The marking-requirements are contained in Part 21, Section A, Subpart Q.

The concept of the ETSO-authorisation

24. An ETSO authorisation contains two elements: an approval of the design and an approval for production. In the particular case of an APU (Auxiliary Power Unit), the holder of the ETSO Authorisation is required by Part 21A.604 to comply with additional requirements such as holding a Design Organisation Approval.

25. It should be clear that an ETSO authorisation is not compulsory for installation. It is only one of the three ways identified by Part 21 A.303. In addition, even when a Technical Specification such as CS-25 requires explicitly that specific equipment must be approved, this is to be understood as specified in Part 21A.305: compliance with the applicable ETSO or with the specifications recognised as equivalent by the Agency in the particular case.
Furthermore the ETSO authorisation, as such, does not mean that the article can be installed on aircraft without further showing: the installation of the article may have to comply with further requirements defined in the appropriate CS.

26. Usually the following criteria are used to identify which parts and appliance may warrant the development of an ETSO:

- Design independent from aircraft design
- Impact of the equipment on safety
- Request from Industry
- Harmonisation with FAA
- Equipment is not a standard part.

27. The concept of ETSO Authorisation described above is very comparable to the one underlying the Joint TSO Authorisation of the JAA and to the concept of TSO Authorisation used by FAA.
Relative to the FAA systems two differences can be highlighted:

- The FAA issues letters of TSO design approvals for imported article when EASA (and JAA before EASA) issues ETSO Authorisations (JTSO Authorisations for JAA) to domestic and imported articles.
- When procedural requirements are included into FAR Part-21, the TSO are published separately and not grouped in a CS-ETSO (or a JAR-TSO before).

Structure and content of CS-ETSO
28. The structure of CS-ETSO is different from the structure of other CS because there is no need here to define acceptable means of compliance.
The CS-ETSO consists of two Subparts.
Subpart A addresses the applicability and general requirements. It provides a link with the requirements included into Part 21-Subpart O and clarifies what are the revisions of applicable environmental and software standards that should be used.
Subpart B consists of two indexes and contains the technical standard orders that an article should comply with. These ETSO's are based on those currently contained in JAR-TSO (Amendment 5) and includes in addition the final text of JAA NPA TSO-6 and 7. The differences between CS-ETSO and the JAR-TSO are minimal. These differences relate to the deletion of obsolete standard orders and the updating of the environmental standard orders. Further differences are detailed below.

29. Subpart B, index 1 contains those technical standard orders similar to those used by the FAA and using the same numbering and numerical order. Index 2 contains the standard orders that are *technically not similar* to an FAA-TSO. In such case compliance with an FAA TSO would not be sufficient to obtain an ETSO Authorisation unless an approval for deviation has been granted in accordance with Part 21A.610.

30. Each ETSO is presented using a standard template, including technical conditions (i.e. minimum performance standard, sometimes with exceptions, environmental standard, computer software and specific.) Such templates are used to ensure consistency between the various ETSO

31. The proposed ETSO's have not changed fundamentally –and is therefore very close to- the concept currently applied under the JTSO.

EASA, 20 October 2003