CS-23 AMENDMENT 2 - CHANGE INFORMATION

Certification Specifications (CS) are used for establishing the certification basis for applications made after the date of entry into force of a CS, including any amendments. Since the complete text of a CS, including any amendments to it, is relevant for establishing the certification basis, the Agency has decided to issue and publish all amendments to CS's as consolidated documents instead of issuing and publishing only the amended text.

Consequently, except for a note "[Amdt No: 23/2]" under the amended paragraph, the consolidated text of CS-23 does not allow readers to see the detailed changes introduced by the new amendment. This Change Information document has been created to allow readers to see these detailed changes. The same format as for publication of Notices of Proposed Amendments has been used to show the changes:

1. text not affected by the new amendment remains the same: unchanged
2. deleted text is shown with a strike through: ~~deleted~~
3. new text is highlighted with grey shading: new
4. ... indicates that remaining text is unchanged in front of or following the reflected amendment.
   ...

CS-23 BOOK 1 – AIRWORTHINESS CODE

SUBPART B Flight

1. Amend CS 23.221, as follows:

CS 23.221 Spinning

…

(b) *Utility category aeroplanes*. A utility category aeroplane must meet the requirements of subparagraph (a). In addition, the requirements of subparagraph (c) and CS 23.807 (b) (~~7~~6) must be met if approval for spinning is requested.

(c) *Aerobatic category aeroplanes*. An aerobatic category aeroplane must meet the requirements of subparagraph (a) and CS 23.807 (b) (~~6~~5). In addition, the following requirements must be met in each configuration for which approval for spinning is requested –

...

SUBPART D Design and Construction

2. Amend CS 23.603 by deleting reference to AMC 23.603 and adding a reference to AMC 20-29, as follows:

CS 23.603 Materials and workmanship
(~~See AMC 23.603~~ For composite materials see AMC 20-29)

3. Amend CS 23.813(b)(4) to correct an editorial error, as follows:

(4) No door may be installed in any partition between ~~passageway~~ passenger compartments unless that door has a means to latch it in the open position. The latching means must be able to withstand the loads imposed upon it by the door when the door is subjected to the inertia loads resulting from the ultimate static load factors prescribed in CS 23.561(b)(2).

SUBPART E Powerplant

4. Amend CS 23.909 by correcting the reference to AMC as follows:

CS 23.909 Turbo charger systems
(See AMC 23.909 (~~a~~d) (1))

…

5. Delete page 1-E-26, which is a repeat of the previous page.

APPENDICES

6. Amend Appendix D, paragraph D23.1 to correct an editorial error, as follows:

….

Iw = rotation mass moment of inertia of rolling assembly (in slug feet^2);

….

CS-23 BOOK 2 – ACCEPTABLE MEANS OF COMPLIANCE (AMC)

SUBPART C STRUCTURE

7. Amend AMC 23.573(a)(1)&(3) to replace the reference to AMC 23.603 with a reference to AMC 20-29 and to incorporate minor editorial changes, as follows:

AMC 23.573(a)(1)&(3)
Damage tolerance and fatigue evaluation of structure – composite airframe structure

In addition to the acceptable means of compliance and guidance material described in ~~AMC 23.603~~ AMC 20-29 the following procedure may be adopted for residual strength tests of structure with built-in barely visible impact damage~~s~~ (BVID) and visible damage~~s~~. Tests should be performed up to limit load level, then the visible damage~~s~~ may be repaired without substantially exceeding the original strength or characteristics of the type design and the test should be continued up to at least* ultimate load level in order to validate the BVID in the unrepaired structure.

* Experience has shown that continuation of testing to rupture should be considered in order to identify failure modes. Extrapolation by analysis of residual strength tests would not normally be acceptable for further development of the aeroplane.

SUBPART D Design and Construction

8. Delete AMC 23.603 Material and workmanship Composite Aeroplane Structure (Acceptable Means of Compliance)

9. Amend the title of AMC 23.613 and replace the existing text as follows:

AMC 23.613
~~Metallic~~ Material strength properties and design values

1. Purpose. This AMC sets forth an acceptable means, but not the only means, of demonstrating compliance with the provisions of CS-23 related to material strength properties and material design values.

2. Related Certification Specifications.
CS 23.603 "Materials"
CS 23.613 "Material strength properties and material design values"

For wooden structures, ANC-18 'Design of Wooden Aircraft Structures' has been used for design guidance.

3. General.
CS 23.613 contains the requirements for material strength properties and material design values.

4. Material Strength Properties and Design Values.

4.1. Definitions.

Material strength properties. Material properties that define the strength related characteristics of any given material. Typical examples of material strength properties are: ultimate and yield values for compression, tension, bearing, shear, etc.

Material design values. Material strength properties that have been established based on the requirements of CS 23.613(b) or other means as defined in this AMC. These values are generally statistically determined based on enough data that when used for design, the probability of structural failure due to material variability will be minimised. Typical values for moduli can be used.

Aeroplane operating envelope. The operating limitations defined for the product under Subpart G of CS-23.

4.2. Statistically Based Design Values.

Design values required by CS 23.613(b) must be based on sufficient testing to assure a high degree of confidence in the values. In all cases, a statistical analysis of the test data must be performed.

The "A" and "B" properties published in "The Metallic Materials Properties Development and Standardization (MMPDS) handbook" or ESDU 00932 "Metallic Materials Data Handbook" are acceptable, as are the statistical methods specified in the applicable chapters/sections of these handbooks. Other methods of developing material design values may be acceptable to the Agency.

The test specimens used for material property certification testing should be made from material produced using production processes. Test specimen design, test methods and testing should:

(i) conform to universally accepted standards such as those of the American Society for Testing Materials (ASTM), European Aerospace Series Standards (EN), International Standard Organisation (ISO), or other national standards acceptable to the Agency, or:

(ii) conform to those detailed in the applicable chapters/sections of "The Metallic Materials Properties Development and Standardization (MMPDS) handbook", "The Composite Materials Handbook" CMH-17, ESDU 00932 "Metallic Materials Data Handbook" or other accepted equivalent material data handbooks, or:

(iii) be accomplished in accordance with an approved test plan which includes definition of test specimens and test methods. This provision would be used, for example, when the material design values are to be based on tests that include effects of specific geometry and design features as well as material.

The Agency may approve the use of other material test data after review of test specimen design, test methods, and test procedures that were used to generate the data.

4.3. Consideration of Environmental Conditions.

The material strength properties of a number of materials, such as non-metallic composites and adhesives, can be significantly affected by temperature as well as moisture absorption. For these materials, the effects of temperature and moisture should be accounted for in the determination and use of material design values. This determination should include the extremes of conditions encountered within the aeroplane operating envelope. For example, the maximum temperature of a control surface may include effects of direct and reflected solar radiation, convection and radiation from a black runway surface and the maximum ambient temperature. Environmental conditions other than those mentioned may also have significant effects on material design values for some materials and should be considered.

4.4. Use of Higher Design Values Based on Premium Selection.

Design values greater than those determined under CS 23.613(b) may be used if a premium selection process is employed in accordance with CS 23.613(e). In that process, individual specimens are tested to determine the actual strength properties of each part to be installed on the aircraft to assure that the strength will not be less than that used for design.

If the material is known to be anisotropic then testing should account for this condition.

If premium selection is to be used, the test procedures and acceptance criteria must be specified on the design drawing.

4.5. Other Material Design Values.

Previously used material design values, with consideration of the source, service experience and application, may be approved by the Agency on a case by case basis (e.g. "S" values of "The Metallic Materials Properties Development and Standardization (MMPDS) handbook" or ESDU 00932 "Metallic Materials Data Handbook").

4.6. Material Specifications and Processes. Materials should be produced using production specifications and processes accepted by the Agency.

For composite structure AMC 20-29 contains acceptable means of compliance and guidance material relevant to the requirements of CS 23.613.

10. Amend AMC 23.629 to replace the reference to AMC 23.603 with a reference to AMC 20-29, as follows:

AMC 23.629
Flutter

…

FAA Advisory Circular AC 23.629–1~~A~~B and in addition for composite structures ~~CS–23 AMC 23.603,~~ AMC 20-29 provide additional ~~information and guidance concerning an~~ acceptable means of ~~demonstrating~~ compliance and guidance material to ~~with the requirements of~~ CS 23.629.

CS-23 BOOK 2 – Flight Test Guide (FTG) CHAPTER 4 POWERPLANT

11. Amend Flight Test Guide, as follows:

192 PARAGRAPH 23.909 TURBO SUPERCHARGERS. ~~AC 23.909–1~~ AMC 23.909(d)(1) addresses this subject.

207 PARAGRAPH 23.959 UNUSABLE FUEL SUPPLY. This subject is covered in ~~AC 23.959–1~~AMC 23.959(a).

208 PARAGRAPH 23.961 FUEL SYSTEM HOT WEATHER OPERATION. This subject is covered in ~~AC 23.961–1~~ AMC 23.961.

CS-23 BOOK 2 – Flight Test Guide (FTG) CHAPTER 5 EQUIPMENT

307 PARAGRAPH 23.1329 AUTOMATIC PILOT SYSTEM. This subject is covered in AC ~~23.1329–2~~ 23.17B.