## CS-29 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 enact and publish all amendments to CS's as consolidated documents instead of enacting and publishing only the amended text.

Consequently, except for a note "Amdt. 29/2" under the amended paragraph, the consolidated text of CS-29 does not allow readers to see the detailed changes introduced by the new amendment. To allow readers to also see these detailed changes this document has been created. 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-29 BOOK 1 – AIRWORTHINESS CODE**

## 1. Amend CS 29.143 to correct a previous editorial error

### CS 29.143 Controllability and manoeuvrability

…

(c) Wind velocities from zero to at least 31 km/h (17 knots), from all azimuths, must be established in which the rotorcraft can be operated without loss of control on or near the ground in any manoeuvre ~~manner~~ appropriate to the type (such as crosswind take-offs, sideward flight, and rearward flight), with:

…

## 2. Amend CS 29.1305 to remove reference to AMC 29.1305 (a)(25) and (26)

### CS 29.1305 Powerplant instruments

The following are the required powerplant instruments:

…

(25) For rotorcraft for which a 30-second/2-minute OEI power rating is requested, a means must be provided to alert the pilot when the engine is at the 30-second and 2-minute OEI power levels, when the event begins, and when the time interval expires. ~~(See AMC 29.1305 (a)(25) and (26).)~~

(26) For each turbine engine utilising 30-second/2-minute OEI power, a device or system must be provided for use by ground personnel which:

(i) Automatically records each usage and duration of power in the 30-second and 2-minute OEI levels;

(ii) Permits retrieval of the recorded data;

(iii) Can be reset only by ground maintenance personnel; and

(iv) Has a means to verify proper operation of the system or device.

~~(See AMC 29.1305(a)(25) and (26).)~~

…

## 3. Amend CS 29.1587 to remove reference to AMC 29.1587

### CS 29.1587 Performance information

~~(See AMC 29.1587)~~

Flight manual performance information which exceeds any operating …

## 4. Amend Appendix A A29.3(b)(2) to remove reference to AMC Appendix A A29.3(b)(2)

### Appendix A – Instructions for Continued Airworthiness

…

**A29.3 Content**

(a) …

(b) *Maintenance instructions*

(1) …

(2) Trouble-shooting information describing probable malfunctions, how to recognise those malfunctions, and the remedial action for those malfunctions.

~~(See AMC to Appendix A, A29.3(b)(2).)~~

…

**CS-29 BOOK 2 - ACCEPTABLE MEANS OF COMPLIANCE (AMC)**

**5. Amend AMC 29 General to refer to AC 29-2C Change 2**

**AMC 29 General**

1. The AMC to CS–29 consists of FAA ~~AC 29-2C Change 1 dated 12 February 2003~~ AC 29-2C Change 2 dated 25 April 2006 with the changes/additions given in this Book 2 of CS–29.

2. The primary reference for each of these AMCs is the CS–29 paragraph. Where there is an appropriate paragraph in FAA AC 29-2C Change 2 dated 25 April 2006 ~~AC 29–2C Change 1 dated 12 February 2003~~ this is added as a secondary reference.

**6. Add a new AMC 29.351 to provide additional guidance for compliance with the EASA's interpretation of CS 29.351.**

**AMC 29.351**
**Yaw manoeuvre conditions**

**1. Introduction**

This AMC provides further guidance and acceptable means of compliance to supplement FAA AC 29-2C Change 2 (AC 29.351b. § 29.351 (Amendment 29-40) YAWING CONDITIONS), to meet the Agency's interpretation of CS 29.351. As such it should be used in conjunction with the FAA AC but take precedence over it, where stipulated, in the showing of compliance.

Specifically, this AMC addresses two areas where the FAA AC has been deemed by the Agency as being unclear or at variance to the Agency's interpretation. These areas are as follows:

a. Aerodynamic Loads

The certification specification CS 29.351 provides a minimum safety standard for the design of rotorcraft structural components that are subjected in flight to critical loads combinations of anti-torque system thrust (e.g. tail rotor), inertia and aerodynamics. A typical example of these structural components is the tailboom.

However, compliance with this standard according to FAA AC 29-2c Change 2 may not necessarily be adequate for the design of rotorcraft structural components that are principally subjected in flight to significant aerodynamic loads (e.g. vertical empennage, fins, cowlings and doors).

For these components and their supporting structure, suitable design criteria should be developed by the Applicant and agreed with the Agency.

In lieu of acceptable design criteria developed by the applicant, a suitable combination of sideslip angle and airspeed for the design of rotorcraft components subjected to aerodynamic loads may be obtained from a simulation of the yaw manoeuvre of CS 29.351, starting from the initial directional control input specified in CS 29.351(b)(1) and (c)(1), until the rotorcraft

reaches the maximum overswing sideslip angle resulting from its motion around the yaw axis.

b. Interaction of System and Structure

Maximum displacement of the directional control, except as limited by pilot effort (CS 29.397(a)), is required for the conditions cited in the certification specification. In the load evaluation credit may be taken for consideration of the effects of control system limiting devices.

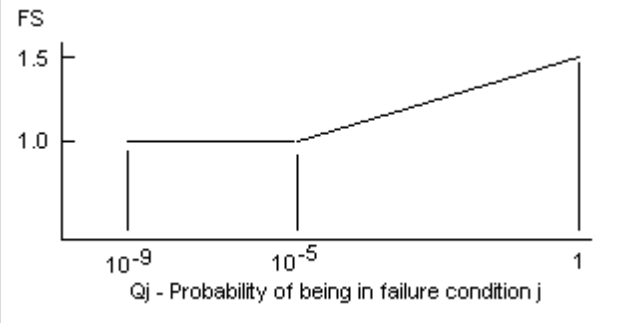
However, the probability of failure or malfunction of these system(s) should also be considered and if it is shown not to be extremely improbable then further load conditions with the system in the failed state should be evaluated. This evaluation may include Flight Manual Limitations, if failure of the system is reliably indicated to the crew.

A yaw limiting device is a typical example of a system whose failed condition should be investigated in the assessment of the loads requested by CS 29.351.

An acceptable methodology to investigate the effects of all system failures not shown to be extremely improbable on the loading conditions of CS 29.351 is as follows:

i) With the system in the failed state and considering any appropriate reconfiguration and flight limitations, it should be shown that the rotorcraft structure can withstand without failure the loading conditions of CS 29.351, when the manoeuvre is performed in accordance with the provisions of the this AMC.

ii) The factor of safety to apply to the above specified loading conditions to comply with CS 29.305 is defined in the figure below.




$Qj = (Tj)(Pj)$

where:

Tj = Average flight time spent with a failed limiting system j (in hours)
Pj = Probability of occurrence of failure of control limiting system j (per hour)

Note: If Pj is greater than $1x10^{-3}$ per flight hour then a 1.5 factor of safety should be applied to all limit load conditions evaluated for the system failure under consideration.

## 7. Remove AMC 29.602: Critical Parts

~~**AMC 29.602**~~
~~**Critical Parts**~~

~~1. Explanation. The objective of identifying critical parts is to ensure that critical parts are controlled during design, manufacture, and throughout their service life so that~~

~~the risk of failure in service is minimised by ensuring that the critical parts maintain the critical characteristics on which certification is based. Many rotorcraft manufacturers already have procedures in place within their companies for handling "critical parts". These may be required by their dealings with other customers, frequently military (e.g. US DoD, UK MoD, Italian MoD). Although these programmes may have slightly different definitions of "critical parts" and have sometimes been called "Flight Safety Parts", "Critical Parts", "Vital Parts", or "Identifiable Parts", they have in the past been accepted as meeting the intent of this requirement and providing the expected level of safety.~~

~~2. Procedures. A Critical Parts Plan should be established. The policies and procedures which constitute that plan should be such as to ensure that-~~

~~a. All critical parts of the rotorcraft are identified by means of a failure assessment and a Critical Parts List is established. The use of the word "could" in paragraph 29.602(a) of the rule means that this failure assessment should consider the effect of flight regime (i.e. forward flight, hover, etc.). The operational environment need not be considered. With respect to this rule, the term "catastrophic" means the inability to conduct an autorotation to a safe landing, without exceptional piloting skills, assuming a suitable landing surface.~~

~~b. Documentation draws the attention of the personnel involved in the design, manufacture, maintenance, inspection, and overhaul of a critical part to the special nature of the part and details the relevant special instructions. For example all drawings, work sheets, inspection documents, etc, could be prominently annotated with the words "Critical Part" or equivalent and the Instructions for Continued Airworthiness and Overhaul Manuals (if applicable) should clearly identify critical parts and include the needed maintenance and overhaul instructions. The documentation should:~~

~~(1) Contain comprehensive instructions for the maintenance, inspection and overhaul of critical parts and emphasise the importance of these special procedures;~~

~~(2) Indicate to operators and overhaulers that unauthorised repairs or modifications to critical parts may have hazardous consequences;~~

~~(3) Emphasise the need for careful handling and protection against damage or corrosion during maintenance, overhaul, storage, and transportation and the need for accurate recording and control of service life (if applicable).~~

~~(4) Require notification to the manufacturer of any unusual wear or deterioration of critical parts and the return of affected parts for investigation when appropriate;~~

~~c. To the extent needed for control of critical characteristics, procedures and processes for manufacturing critical parts (including test articles) are defined (for example material — source, forging procedures, machining operations and sequence, inspection techniques, and acceptance and rejection criteria)-. Procedures for changing these manufacturing procedures should also be established.~~

~~d. Any changes to the manufacturing procedures, to the design of a critical part, to the approved operating environment, or to the design loading spectrum are evaluated to establish the effects, if any, on the fatigue evaluation of the part.~~

~~e. Materials review procedures for critical parts (i.e. procedures for determining the disposition of parts having manufacturing errors or material flaws) are in accordance with paragraphs c. and d. above.~~

~~f. Critical parts are identified as required, and relevant records relating to the identification are maintained such that it is possible to establish the manufacturing history of the individual parts or batches of parts.~~

~~g. The critical characteristics of critical parts produced in whole or in part by suppliers are maintained.~~

## 8. Remove AMC 29.1305 (a)(25) and (26): 2-Minute and 30-Second OEI Power Level

~~**AMC 29.1305(a)(25) and (26)**~~
~~**2-Minute and 30-Second OEI Power Level**~~

~~For the purpose of complying with CS 29.1305(a)(25) and (26), the 2-minute OEI power level is considered to be achieved whenever one or more of the operating limitations applicable to the next lower OEI power rating is exceeded. The 30-second OEI power level is considered to be achieved whenever one or more of the operating limitations applicable to the 2-minute OEI power rating is exceeded.~~

## 9. Remove AMC to Appendix A, A29.3(b)(2): Maintenance Instructions

~~**AMC to Appendix A, A29.3(b)(2)**~~
~~**Maintenance Instructions**~~

~~Some malfunctions could be identified on the basis of a baseline vibration signature provided as follows in the maintenance manual:~~

~~The baseline vibration characteristics of the basic aircraft configuration to be used for maintenance or trouble-shooting purposes should be provided as the vibratory aircraft reference in the maintenance manual. These characteristics should be given for specified loading and flight conditions (speed, altitude) with vibration pickups at specified airframe locations decided by the manufacturer.~~

~~The characteristics should be given as a typical range of vibration levels at these locations and for the most representative frequencies and directions for the rotorcraft concerned (N Ω main rotor, n Ω tail rotor, ...).~~

~~The basic vibration data should be kept updated from field/service experience.~~

## 10. Add a new AMC MG4 to clarity EASA certification procedures for FADEC systems

**AMC MG4**
**Full Authority Digital Electronic Controls (FADEC)**

**Note:** Certification procedures identified in MG4 refer specifically to the FAA regulatory system. For guidance on EASA procedures, reference should be made to Commission Regulation (EC) No 1702/2003 (as amended) (Part-21), AMC-20 (and specifically AMC 20-1 and 20-3) and to EASA internal working procedures, all of which are available on EASA's web site: http://www.easa.europa.eu/