



NOTICE OF PROPOSED AMENDMENT (NPA) No 2010-13

DRAFT DECISION OF THE EXECUTIVE DIRECTOR OF THE EUROPEAN AVIATION SAFETY AGENCY

amending Decision No. 2003/1/RM of the Executive Director of the European Aviation Safety Agency of 17 October 2003 on acceptable means of compliance and guidance material for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisation ('AMC and GM to Part-21')

"Environmental protection – classification of changes to a type design"

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A. Explanatory Note

I. General

1. The purpose of this Notice of Proposed Amendment (NPA) is to envisage amending Decision 2003/1/RM of the Executive Director of 17 October 2003¹ to develop Guidance Material for Appendix A to Paragraph GM 21A.91 of the AMC and GM to Part-21 concerning environmental protection issues. The scope of this rulemaking activity is described in more detail below.
2. The European Aviation Safety Agency (hereinafter referred to as 'the Agency') is directly involved in the rule-shaping process. It assists the Commission in its executive tasks by preparing draft regulations, and amendments thereof, for the implementation of the Basic Regulation² which are adopted as "Opinions" (Article 19(1)). It also adopts Certification Specifications, including Airworthiness Codes and Acceptable Means of Compliance and Guidance Material to be used in the certification process (Article 19(2)).
3. When developing rules, the Agency is bound to follow a structured 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"³. According to Articles 3(5) and 4(4) of this Rulemaking Procedure, a pre-Regulatory Impact Assessment (pre-RIA) and Terms of Reference (ToR) are not required to launch the drafting of new or amended Guidance Material if the Agency is drafting the text.
4. This rulemaking activity is included in the Agency's Rulemaking Programme 2011-2014. It implements the rulemaking task "Environmental protection – classification of changes to a type design (Task No. 21.059).
5. The text of this NPA has been developed by the Agency. It is submitted for consultation of all interested parties in accordance with Article 52 of the Basic Regulation and Articles 5(3) and 6 of the Rulemaking Procedure.
6. The proposed Guidance Material has taken into account the development of European Union and International law (ICAO), and the harmonisation with the rules of other authorities of the European Union main partners as set out in the objectives of Article 2 of the Basic Regulation. The proposed Guidance Material:
 - a. takes into account the developments of relevant European Union law;
 - b. is below ICAO Standards and Recommended Practices.

II. Consultation

7. To achieve optimal consultation, the Agency is publishing the draft Decision of the Executive Director on its Internet site. Comments should be provided within 3 months in accordance with Article 6(4) of the Rulemaking Procedure. Comments on this proposal should be submitted by one of the following methods:

¹ Decision No 2003/1/RM of the Executive Director of the European Aviation Safety Agency of 17 October 2003 on acceptable means of compliance and guidance material for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisation ('AMC and GM to Part-21'). Decision as last amended by Decision 2010/001/R of the Executive Director of the Agency of 23 March 2010.

² 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, 19.03.2008, p. 1). Regulation as last amended by Regulation (EC) 1108/2009 of the European Parliament and of the Council of 21 October 2009 (OJ L 309, 24.11.2009, p. 51).

³ Management Board Decision concerning the procedure to be applied by the Agency for the issuing of Opinions, Certification Specifications and Guidance Material ('Rulemaking Procedure'), EASA MB 08-2007, 13.6.2007.

CRT: Send your comments using the Comment-Response Tool (CRT) available at <http://hub.easa.europa.eu/crt/>.

E-mail: In case the use of CRT is prevented by technical problems, these should be reported to the [CRT webmaster](#) and comments should be sent by e-mail to NPA@easa.europa.eu.

Correspondence: If you do not have access to the Internet or e-mail, you can send your comment by mail to:

Process Support
Rulemaking Directorate
EASA
Postfach 10 12 53
D-50452 Cologne
Germany

Comments should be submitted by 23 February 2011. If received after this deadline, they might not be taken into account.

III. Comment response document

8. All comments received in time will be responded to and incorporated in a Comment Response Document (CRD). The CRD will be available on the Agency's website and in the Comment-Response Tool (CRT).

IV. Content of the draft Decision

9. Paragraph 21A.91 of Part-21 of Commission Regulation (EC) No 1702/2003⁴ defines the classification of changes in type design as being "minor" or "major". According to Paragraph 21A.91, a minor change is one that, as regards environmental protection, has no appreciable effect on noise, fuel venting and exhaust emissions. Further clarification is provided in Paragraph GM 21A.91 of AMC and GM to Part-21. In Appendix A to GM 21A.91 examples, per discipline, of changes which might result in a major change are given to support applicants when applying for a change to a type design. Concerning environmental protection, Paragraph 8 at this stage only contains the following statement: [A major change is] "a change that introduces an increase in noise and emissions".
10. This statement does not completely describe all major changes related to environmental protection. Concerning emissions (fuel venting and smoke and engine gaseous emissions), a major change is described as a change that introduces an appreciable increase in emissions levels. However, a **decrease in emissions levels** is also a major change. Concerning noise, a major change is a change that introduces an appreciable increase in noise levels. However, a change which introduces **an appreciable reduction in noise levels, for which the applicant wishes to take credit**, is also a major change.
11. Based on practical experience in the past years, when handling applications for a change to a type design, the Agency has come to the conclusion that it would be useful to provide specific examples. These examples of changes are intended to clarify and to illustrate what changes might cause an appreciable change in the product's environmental characteristics, i.e. lead to a change to the environmental protection certification levels. These specific examples are intended to support manufacturers and owners of aircraft when applying for the approval of a change to a type design. The list of

⁴ 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 ('Part-21') (OJ L 243, 27.9.2003, p. 6). Regulation as last amended by Regulation (EC) 1194/2009 of 30 November 2009 (OJ L 321, 8.12.2009, p. 5).

examples is not exhaustive, but rather is representative of what a competent Design Organisation should recognise as potentially impacting the environmental characteristics of a changed product, and therefore should take into account when considering the classification of a change. It has to be emphasised that the examples given do not introduce any new practice; they just describe current practice.

12. Consequently, this NPA in Part B (see below) provides proposals for amending Appendix A to GM 21A.91 in order to clarify which changes to the aircraft design or configuration might lead to an appreciable change in the noise or engine emission levels and might therefore be classified as a major change.

V. Regulatory Impact Assessment

13. Purpose and Intended Effect

- a. Issue which the NPA is intended to address

The purpose of this NPA is to amend Appendix A to Paragraph GM 21A.91 of the AMC and GM to Part-21 concerning No. 8 "Environment".

- b. Scale of the issue

The amendment of AMC and GM to Part-21, as described above, does not lead to a change of today's situation.

- c. Brief statement of the objectives of the NPA

The intended effect is that the Agency's guidance material is made clearer and more specific, and therefore minimise the risk of an incorrect change classification.

14. Options

The options identified are as follows:

Option 1: Do nothing.

Option 2: To adopt the amendment as proposed by the Agency.

15. Sectors concerned

The sectors concerned are mainly manufactures, owners and operators.

16. Impacts

- i. Safety

No safety impacts are expected for either of the two options.

- ii. Economic

Concerning Option 2, the economic impact for the industry is expected to be positive in some cases. The proposed Guidance Material provides clarification on the requirements to be fulfilled and might therefore reduce the administrative burden for the applicant.

- iii. Environmental

Option 1 has no major environmental impact. Option 2 on the other hand introduces technically sound and well-defined specifications. It is expected that Option 2 – to an extent – has some positive effect on the environment.

- iv. Social

No social impacts are expected from the options other than the indirect effect of the mitigation of negative environmental effects of aviation on the environment.

- v. Other aviation requirements outside EASA scope

It is expected that the proposals will be recognised by other aviation authorities around the world.

17. Summary and Final Assessment

a. Comparison of the positive and negative impacts for each option evaluated

Option 1 would not lead to any improvement of today's situation and would leave some potential loopholes open.

The lack of specific Guidance Material has led to misunderstandings in daily practice between applicants and the Agency. The amendment has been prepared in consequence and, by clarifying needed measures related to aircraft noise and engine emissions, the amendment – to an extent - further minimises the effects of aviation on the environment. Therefore, Option 2 is considered to be a needed and useful approach to clarify the environmental requirements concerning the classification of changes.

b. Final assessment and recommendation of a preferred option

Based on the above, it is recommended to adopt the amendment, i.e. to follow Option 2.

B. Draft Decision

The text of the amendment is arranged to show deleted text, new text or new paragraph as shown below:

1. deleted text is shown with a strike through: ~~deleted~~
2. new text is highlighted with grey shading: **new**
3. indicates that remaining text is unchanged in front of or following the reflected amendment.

I. Draft Decision for amending AMC and GM to Part-21

AMC and GM to Part-21

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Appendix A to GM 21A.91: Examples of Major Changes per discipline

....

8 Environment

~~A change that introduces an increase in noise or emissions.~~

Where a change is made to either an aircraft or aircraft engine, the effect of that change on the product's environmental characteristics should be taken into account. Examples of changes that might have an appreciable effect on the product's environmental characteristics, and might therefore be classified as a major change, are listed below. The examples are not exhaustive and will not, in every case, result in a change to the product's environmental characteristics.

(i) Noise: A change that introduces either:

- an increase in the certification noise level(s); or
- a reduction in the certification noise level(s) for which the applicant wishes to take credit.

Examples of noise-related changes that might lead to a major change classification are:

(1) For jet and heavy propeller-driven aeroplanes:

- A change that might affect the aircraft's take-off performance including:
 - a change to the maximum take-off mass;
 - a change to the take-off safety speed (V_2); or
 - a change to the lift augmentation devices, including their deployment under normal take-off operating conditions.
- A change that might affect the aircraft's landing performance including:
 - a change to the maximum landing mass;
 - a change to the reference landing speed (V_{REF}); or
 - a change to the lift augmentation devices, including their deployment under normal landing operating conditions.
- A change to the Centre of Gravity (CG) limits;
- A change that increases the aircraft's drag;

- Any change that alters the external profile of the aircraft, including the installation or change of shape or size of any item on the external surface of the aircraft that might protrude into the airflow (e.g. winglets, vortex generators);
- Any change that introduces an open-ended hollow cavity at more or less right angles to the airflow (e.g. hollow pins in undercarriage assemblies);
- A change in engine thrust rating;
- A change to the engine rotating parts or stators, such as geometry, blade profile or blade number;
- A change to the aerodynamic flow lines through the engine;
- Any change that affects the engine thermodynamic cycle, including a change to the engine's bypass ratio;
- A change to the engine nacelle acoustic liners;
- A change to the engine exhaust configuration;
- A change to the engine bleed valves, including bleed valve scheduling;
- A change in the operation of power off-takes, including the Engine Control System (ECS);
- A change to the Auxiliary Power Unit (APU), including associated operating limitations;
- A change of propeller;
- A change to the propeller pitch and/or propeller speed during a normal take-off or approach;
- A change that causes a change to the propeller inflow angle.

(2) For light propeller-driven aeroplanes:

- A change that might affect the aircraft's take-off performance including:
 - a change to the take-off mass;
 - a change to the take-off distance;
 - a change to the rate of climb; or
 - a change to the best rate of climb speed (V_Y).
- A change that increases the aircraft's drag (e.g. the installation of external cargo pods, external fuel tanks, larger tyres to a fixed undercarriage, floats etc.);
- A change in take-off power including a change in engine speed (tachometer "red line") or, for piston engines, a change to the manifold pressure limitations;
- A change to the highest power in the normal operating range ("top of green arc");
- In the case of an aircraft where take-off power/engine speed is time limited, a change in the period over which take-off power/engine speed may be applied;
- A change to the engine inlet or exhaust including, if fitted, the inlet or exhaust muffler;
- A change in propeller diameter;
- A change to the propeller tip shape;
- A change in the propeller blade thickness;
- A change in the number of propeller blades;
- The installation of a variable pitch propeller in place of a fixed pitch propeller and vice versa;
- A change that causes a change to the propeller inflow angle.

(3) For helicopters:

- A change that might affect the take-off and/or landing performance, including a change in take-off mass and best rate of climb speed V_Y ;

- A change to the never-exceed airspeed (V_{NE}) or the airspeed in level flight obtained using the torque corresponding to minimum engine installed, maximum continuous power available, 25°C ambient conditions at the relevant maximum certificated mass (V_H);
- A change to the maximum take-off engine power or maximum continuous power;
- A change to the gearbox torque limits;
- A change of engine type;
- A change to the engine intake or exhaust;
- For piston engine helicopters a change to the engine exhaust;
- A change in the maximum normal operating speed of the main or tail rotors;
- A change to the main or tail rotors, including a change in diameter, blade thickness or blade tip profile.

Note: The effect of either carrying external loads or the installation of external equipment on the helicopter's noise characteristics need not be considered.

(ii) Emissions: A change that introduces an increase or decrease in the certification emissions levels. Examples of emission-related changes that might lead to a major change classification are:

(1) Fuel venting:

- A change to the fuel nozzles;
- A change which would increase or decrease the fuel pressure;
- A change in the fuel recirculation system;
- A change to the fuel drainage system.

(2) Smoke and gaseous engine emissions:

- A change in engine thrust rating;
- A change to the aerodynamic flow lines through the engine;
- Any change that affects the engine thermodynamic cycle, specifically relevant engine cycle parameters (e.g. combustor pressure P_3 , combustor entry temperature T_3 , Air Fuel Ratio (AFR));
- A change to the compressor that might influence the combustor inlet conditions and engine overall pressure ratio;
- A change to the combustor design (geometry);
- A change to the cooling of the combustor;
- A change to the air mass flow through the combustor;
- A change that affects the fuel spray characteristics.