Draft Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Annex I (Part 21) to Commission Regulation (EU) No 748/2012

related to

Implementation of the latest CAEP amendments to ICAO Annex 16 Volumes I, II and III

RMT.0514 (Subtask 2)

The same format as for the publication of notices of proposed amendment (NPAs) has been used to show the changes:

— deleted text is ~~struck through~~;

— new or amended text is highlighted in blue;

— an ellipsis '[…]' indicates that the rest of the text is unchanged.

Disclaimer

This is a draft document and is provided for information purposes only. Its contents have not been subjected to any type of review whatsoever.

Acceptable Means of Compliance
and
Guidance Material
to Annex I (Part 21)
to Commission Regulation (EU) No 748/2012

SECTION A

[…]

SUBPART B — TYPE-CERTIFICATES AND RESTRICTED TYPE-CERTIFICATES

[…]

AMC1 21.A.14(b) Demonstration of capability

ALTERNATIVE PROCEDURES FOR THE DEMONSTRATION OF DESIGN CAPABILITY

[…]

3. Management of changes to type certificates, repair designs and production deviations

[…]

3.2 Classification

[…]

3.2.3 *Considerations of effects of the change*

The procedure should show how the effects on airworthiness, operational suitability or environmental ~~protection~~ compatibility are analysed, from the very beginning, by reference to the applicable certification specifications.

If no specific certification specifications are applicable to the change, the above review should be carried out at the level of the part or system where the change is integrated and where specific certification specifications are applicable.

[…]

GM 21.A.15(c) Updates to the certification programme

[…]

The certification programme should be updated and resubmitted to EASA. In particular, updates to the following elements should be provided:

— […]

— any change in the product design or its characteristics that may affect the criteria used to assess the likelihood of an unidentified non-compliance with the type-certification basis, operational suitability data (OSD) certification basis or the environmental protection requirements, including the potential impact of that non-compliance on product safety or environmental ~~protection~~compatibility, as defined in 21.A.15(b)(6) and 21.B.100(a)(1) to (4);

Note: An update of the DOA dashboard after the first issuance of the certification programme only needs to be considered if there is a significant change in the performance.

[…]

GM 21.A.20(d) Final statement

[…]

'No feature or characteristics' in point 21.A.20(d)2 means the following: while every effort is made to address in the applicable certification basis all the risks to product safety ~~or to the environment~~ that may be caused by the product, experience shows that safety-related events may occur with products in service, even though compliance with the certification basis is fully demonstrated. One of the reasons may be that some existing risks are not properly addressed in the certification basis. Therefore, the applicant has to declare that they have not identified any such features or characteristics.

Point 21.A.20 also applies by reference to minor changes, in which case the risk to product safety or to environmental ~~protection~~ compatibility is quite low. Nevertheless, minor changes should not be approved if either the applicant/design organisation approval (DOA) holder approving minor changes under their privileges, or EASA, is aware of a feature or characteristic that may make the product unsafe for the uses for which certification is requested.

[…]

SUBPART D — CHANGES TO TYPE-CERTIFICATES AND RESTRICTED TYPE-CERTIFICATES

[…]

GM 21.A.91 Classification of changes to a type certificate ~~(TC)~~

1. PURPOSE OF CLASSIFICATION

Classification of changes to a type certificate (TC) into MAJOR or MINOR is to determine the approval route to be followed in Part 21 ~~Part 21~~ Subpart D, i.e.~~,~~ either 21.A.95 or 21.A.97, or alternatively whether application and approval has to be made in accordance with Part 21 ~~Part-21~~ Subpart E.

2. INTRODUCTION

2.1 21.A.91 proposes criteria for the classification of changes to a TC as minor or major.

(a) This GM is intended to provide guidance on the term 'appreciable effect' affecting the airworthiness of the product, the certified noise or emissions levels or affecting any of the other characteristics mentioned in 21.A.91, where 'airworthiness' is interpreted in the context of a product in conformity with type design and in condition for safe operation. It provides complementary guidelines to assess a change to the TC in order to fulfil the requirements of 21.A.91 and 21.A.117 where classification is the first step of a procedure.

Characteristics that affect the environmental compatibility of the product are characteristics that affect the compliance of the product with the applicable environmental protection requirements (e.g. vented fuel requirements in Part II of Volume II of Annex 16 to the Chicago Convention).

Note: For classification of ~~R~~repairs, see GM 21.A.435(a).

[…]

3. ASSESSMENT OF A CHANGE FOR CLASSIFICATION

[…]

3.4 Complementary guidance for classification of changes

A change to the TC is judged to have an 'appreciable effect on the mass, balance, structural strength, reliability, operational characteristics, certified noise or emissions levels,~~noise, fuel venting, exhaust emission,~~ operational suitability or other characteristics affecting the airworthiness~~,~~ or the environmental compatibility ~~environmental protection or operational suitability~~ of the product' and, therefore, should be classified as major, in particular but not only, when one or more of the following conditions are met:

[…]

3.7 Complementary guidance for classification of changes to certified noise and emissions levels~~environmental protection characteristics~~

Volumes I, II and III of ICAO Doc 9501 'Environmental Technical Manual' define 'no-acoustical changes', 'no-emissions changes' and 'no-CO_2 changes' respectively as changes that would result in very small changes in the certified levels and provide criteria for their determination. Consequently, they are classified as minor changes for environmental protection and the certified levels remain unchanged.

If a 'no-acoustical change', a 'no-emissions change' or a 'no-CO_2 change' is demonstrated using an equivalent procedure to the one specified in ICAO Annex 16, the applicant should seek the agreement of EASA on the classification of the change. An equivalent procedure is a test or analysis procedure which, while differing from the one specified in ICAO Annex 16, effectively yields the same noise or emissions levels as the specified procedure according to the technical judgement of EASA.

All other changes to the certified noise and emissions levels are classified as major changes.

Examples of changes that might have an appreciable effect on the certified noise and emissions levels are provided in~~See~~ Section 8 of Appendix A to GM 21.A.91.

Appendix A to GM 21.A.91 Examples of ~~M~~major ~~C~~changes per discipline

[…]

8. Environmental protection

The lists below provide examples of changes that might have an appreciable effect on the certified noise and emissions levels.

~~The introductory text to Appendix A to GM 21.A.91 describes how in Part 21 a negative definition is given of minor changes only. This philosophy is similar to the manner in which the ICAO Standards and Recommended Practices for environmental protection (ICAO Annex 16)~~

~~and the associated Guidance Material (ICAO Environmental Technical Manual) define changes affecting a product's environmental characteristics in terms of 'no-acoustical changes', 'no-emissions changes' and 'no-CO_2 changes' (i.e. changes which do not appreciably affect the product's environmental characteristics).~~

~~Following the general philosophy of this Appendix, however, it is preferred to give examples of changes which might have an appreciable effect on a product's environmental characteristics (i.e. the effect might be greater than the no-acoustic change, no-emissions change and no-CO_2 change criteria) and might therefore lead to a 'major change' classification.~~

~~Where a change is made to an aircraft or aircraft engine, the effect of the 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 major changes, are listed below. The examples are not exhaustive and will not, in every case, result in an appreciable change to the product's environmental characteristics, and therefore, will not per se and in every case result in a 'major change' classification.~~

~~An appreciable effect is considered to be one which exceeds the ICAO criteria for a no-acoustical change, a no-emissions change or a no-CO_2 change. For the definition of a no-acoustical change refer to the section of the ICAO Environmental Technical Manual, Volume I (ICAO Doc 9501, Volume I – Procedures for the Noise Certification of Aircraft) concerning changes to aircraft type designs involving no-acoustical changes (see also the definitions of a 'derived version' in ICAO Annex 16, Volume I). For the definition of a no-emissions change, refer to the section of the ICAO Environmental Technical Manual, Volume II (ICAO Doc 9501, Volume II – Procedures for the Emissions Certification of Aircraft Engines) concerning no-emissions changes. For the definition of a no-CO_2 change, refer to ICAO Doc 9501 'Environmental Technical Manual', Volume III 'Procedures for the CO_2 Emissions Certification of Aeroplanes', 1st Edition 2018, concerning no-CO_2 changes.~~

Note: Regardless of a change to the product, projects that demonstrate compliance with a production cut-off requirement included in the applicable environmental protection requirements (e.g. for engine emissions and aeroplane CO_2 emissions) are considered major changes, since they trigger a change to the TCDS.

(i) Aircraft ~~N~~noise~~:~~

A change that introduces either:

— an increase in the certified noise ~~certification~~level(s); or

— a ~~reduction~~ decrease in the certified noise ~~certification~~ 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 (maximum take-off mass greater than 8 618 kg) 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 V2 ('take-off safety speed'); or
- a change to the lift augmentation devices, including their configuration 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 VREF (reference landing speed); 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~~ modifies the aircraft's drag;

— A 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 such as winglets and vortex generators~~; generally the installation of small antennas does not represent an acoustical change~~;

— A change that introduces an antenna, which protrudes outside the boundary layer and with direct line of sight to the noise measuring station(s);

— A 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 that might affect the flow characteristics (e.g. velocity, incidence angle) over an open-ended cavity (e.g. fuel relief valve), which might induce an acoustic resonance that was not present before the change;

— A change of engine or, if fitted, propeller type;

— 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;

— A change that affects the engine thermodynamic cycle, including a change to the engine's bypass ratio;

— A change to the engine nacelle~~, including a change to the acoustic liners~~;

— A change to any of the engine acoustic liners;

— A change to the engine exhaust;

— A change to the engine bleed valves, including bleed valve scheduling;

— A change in the operation of engine power off-takes (e.g. the operation of the Environmental Control System (ECS) during a normal take-off or approach);

- A change to the Auxiliary Power Unit (APU), including associated operating limitations (e.g. a change that allows the APU to be operated during a normal approach when previously it was not allowed);
- A change to the propeller pitch and/or propeller speed during a normal take-off or approach;
- A change that ~~causes a change to~~affects the angle at which air flows into the propeller.

(2) For light (maximum take-off mass 8 618 kg or less) 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 distance;
  - a change to the rate of climb; or
  - a change to Vy (best rate of climb speed);~~.~~
- 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 of engine or propeller type;
- 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, tip shape, blade thickness or the number of blades;
- The installation of a variable or adjustable pitch propeller in place of a fixed pitch propeller and vice versa;
- A change that ~~causes a change to~~ affects the angle at which air flows into the propeller.

(3) For helicopters:

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

— A change to VNE (never-exceed airspeed) or to VH (airspeed in level flight obtained using the torque corresponding to minimum engine installed, maximum continuous power available for sea level pressure, 25 °C ambient conditions at the relevant maximum certificated mass);

— 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;

— A change to the maximum normal operating rpm 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 on the helicopter's noise characteristics of either carrying external loads or the installation of external equipment do not need ~~not~~to be considered.

(ii) Aircraft engine ~~E~~emissions~~:~~

A change that introduces an increase or decrease in the certified emissions ~~certification~~ levels. Examples of ~~smoke and gaseous~~aircraft engine emission-related changes that might lead to a major change classification are:

— A change in engine thrust rating;

— A change to the aerodynamic flow lines through the engine;

— A change that affects the engine thermodynamic cycle, specifically relevant engine cycle parameters (e.g. combustor pressure P3, combustor entry temperature T3, 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.

(iii) Aeroplane CO_2 emissions~~:~~

~~a~~A change that introduces either:

— an increase in the certified CO_2 emissions ~~certification~~ level; or

— a decrease in the certified CO_2 emissions ~~certification~~ level for which an applicant wishes to take credit.

Examples of CO_2 emissions-related changes that may lead to a 'major change' classification are:

— a change to the maximum take-off mass;

— a change that may affect the aeroplane's specific air range performance, including one or several of the following:

  — a change that increases the aircraft's drag;

  — a change of engine or, if fitted, propeller type;

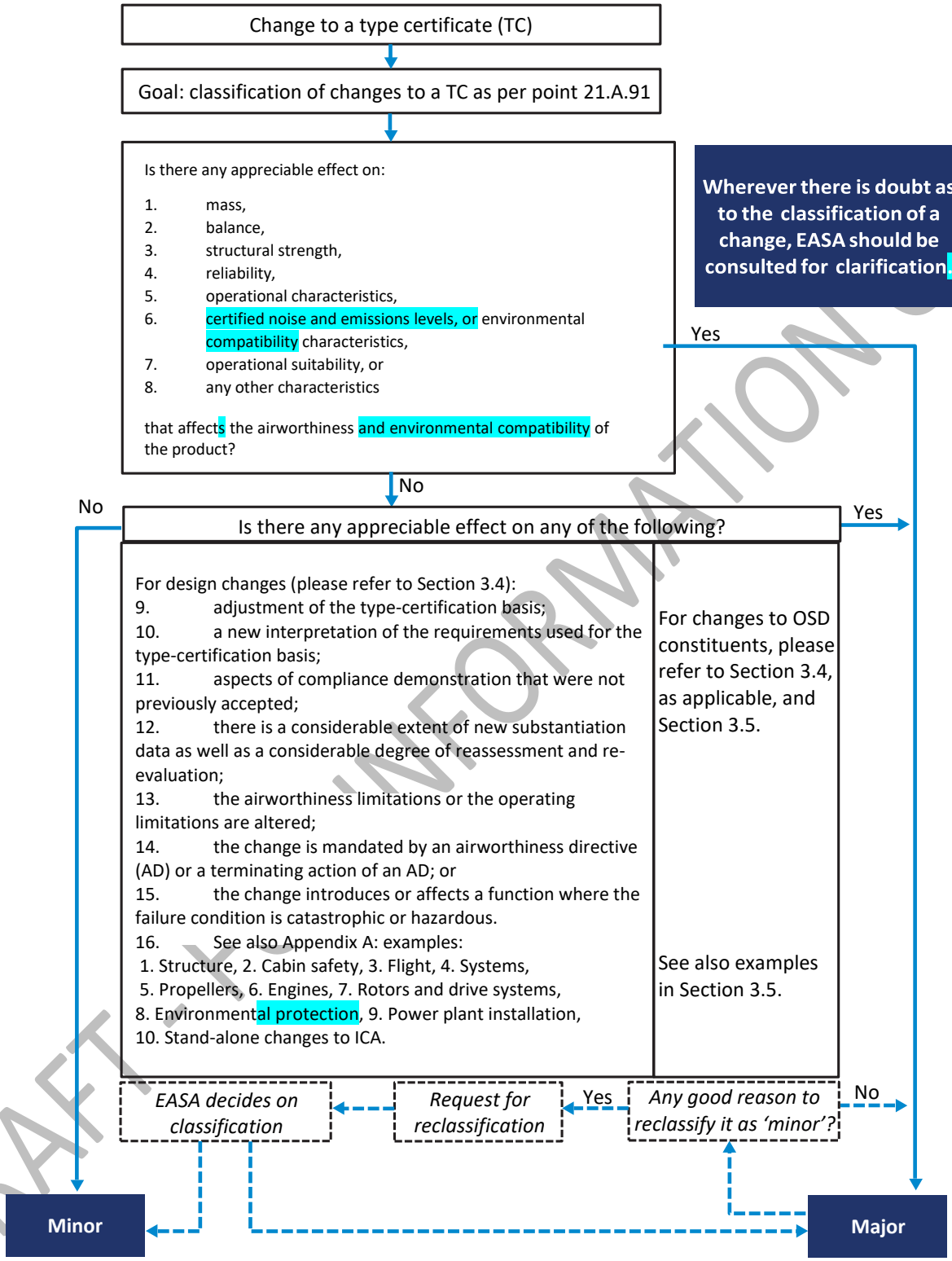
  — a change in the engine design that affects the engine specific fuel consumption in cruise;~~.~~

— a change to the aeroplane's reference geometric factor (RGF).

9. Power plant ~~i~~installation

[…]

Classification ~~P~~process



[…]

GM No 1 to 21.A.93(b)(1)(iii) Interaction of changes to the type design and changes to operational suitability data (OSD)

[…]

(b) […]

Table 1: Examples of major type design changes and their expected impact on OSD constituents

Discipline	Example of major type design change	Expected impact on OSD constituent			
		FCD	SIMD	CCD	MCSD
[…]	[…]	[…]	[…]	[…]	[…]
Environmental protection	(i) A change that introduces either an increase in the certified noise~~certification~~ level(s) or a ~~reduction~~ decrease in the certified noise~~certification~~ level(s) for which the applicant wishes to take credit.	No	No	No	No
[…]	[…]	[…]	[…]	[…]	[…]

[…]

SUBPART F — PRODUCTION WITHOUT PRODUCTION ORGANISATION APPROVAL

[…]

AMC1 21.A.130(b)(4)(i) Statement of conformity~~Applicable engine exhaust emissions requirements~~

APPLICABLE ENGINE EXHAUST EMISSIONS REQUIREMENTS

This determination is made according to the data provided by the engine type-certificate holder. It should be noted that the competent authority has the possibility to grant exemptions from these requirements as noted in Chapter 2, paragraph 2.1.1 and Chapter 4, paragraph 4.1.1 of Part III of Volume II of Annex 16 to the Chicago Convention.

[…]

GM1 21.A.130(b)(4)(i) Statement of conformity~~Definitions of engine type certification date and production date~~

DEFINITIONS OF ENGINE TYPE CERTIFICATION DATE AND PRODUCTION DATE

Volume II of Annex 16 to the Chicago Convention contains three different references to applicability dates:

1. the ‘date of manufacture for the first individual production model’, which refers to the date when the type certificate is issued for the engine type or model;
2. the ‘date of application for a type certificate’, which refers to the application date to the certificating authority of the State of Design of the engine type certification; and

3. the ‘date of manufacture for the individual engine’, which refers to the production date of a specific engine serial number (date of EASA Form 1).

~~The third reference~~Point 1 refers to the date of the first engine EASA Form 1 issued after the completion of the engine production pass-off test.

~~The third reference~~Point 3 refers to the date ~~is~~used in the application of the engine emissions production cut-off requirement~~,~~ and ~~which specifies a date~~ on or after which all in-production engine models must meet a certain emissions standard.

21.A.130(b)(4)(i) includes the applicable production requirements for aircraft engine ~~exhaust~~ emissions.

ICAO Doc 9501 ‘Environmental Technical Manual’ Volume II provides guidance on these applicability dates.

AMC1 21.A.130(b)(4)(ii) Statement of conformity~~Applicable aeroplane CO_2 emissions requirements~~

APPLICABLE AEROPLANE CO_2 EMISSIONS REQUIREMENTS

This determination is made according to the data provided by the aeroplane type-certificate holder. This data should allow the determination of whether the aeroplane complies with the CO_2 emissions applicability requirements in Chapter 2, paragraph 2.1.1 of Part II of Volume III of Annex 16 to the Chicago Convention.

[…]

SUBPART G — PRODUCTION ORGANISATION APPROVAL

[…]

AMC1 21.A.165(c)(3)(i) Obligations of the holder~~Applicable engine exhaust emissions requirements~~

APPLICABLE ENGINE EXHAUST EMISSIONS REQUIREMENTS

This determination is made according to the data provided by the engine type-certificate holder. It should be noted that the competent authority has the possibility to grant exemptions from these requirements as noted in Chapter 2, paragraph 2.1.1 and Chapter 4, paragraph 4.1.1 of Part III of Volume II of Annex 16 to the Chicago Convention.

[…]

GM1 21.A.165(c)(3)(i) Obligations of the holder~~Definitions of engine type certification date and production date~~

DEFINITIONS OF ENGINE TYPE CERTIFICATION DATE AND PRODUCTION DATE

Volume II of Annex 16 to the Chicago Convention contains three different references to applicability dates:

1. the ‘date of manufacture for the first individual production model’, which refers to the date when the type certificate is issued for the engine type or model;
2. the ‘date of application for a type certificate’, which refers to the application date to the certificating authority of the State of Design of the engine type certification; and
3. the ‘date of manufacture for the individual engine’, which refers to the production date of a specific engine serial number (date of EASA Form 1).

~~The third reference~~Point 1 refers to the date of the first engine EASA Form 1 issued after the completion of the engine production pass-off test.

~~The third reference~~Point 3 refers to the date~~is~~ used in the application of engine emissions production cut-off requirement and ~~which specifies a date~~ on or after which all in-production engine models must meet a certain emissions standard.

21.A.165(c)(3) includes the applicable production requirements for aircraft engine ~~exhaust~~ emissions.

ICAO Doc 9501 ‘Environmental Technical Manual’ Volume II provides guidance on these applicability dates.

AMC1 21.A.165(c)~~(4)~~(3)(ii) Obligations of the holder~~Applicable aeroplane CO_2 emissions requirements~~

APPLICABLE AEROPLANE CO_2 EMISSIONS REQUIREMENTS

This determination is made according to the data provided by the aeroplane type-certificate holder. This data should allow the determination of whether the aeroplane complies with the CO_2 emissions applicability requirements in Chapter 2, paragraph 2.1.1 of Part II of Volume III of Annex 16 to the Chicago Convention

[…]

SUBPART H — CERTIFICATES OF AIRWORTHINESS AND RESTRICTED CERTIFICATES OF AIRWORTHINESS

[…]

GM1 21.A.174(b)(3)(ii) Application

CO_2 EMISSIONS PRODUCTION CUT-OFF REQUIREMENTS FOR A USED AEROPLANE ORIGINATING FROM A NON-MEMBER STATE

Volume III of Annex 16 to the Chicago Convention (‘ICAO Annex 16') includes CO_2 emissions production cut-off standards that apply to subsonic jet aeroplanes with a Maximum Take-Off Mass (MTOM) greater than 5700 kg and propeller-driven aeroplanes with a MTOM greater than 8618 kg, for which a type certificate was issued but that were not certified for CO_2 emissions in accordance with Volume III of ICAO Annex 16, and for which the individual certificate of airworthiness (CofA) was first issued on or after 1 January 2028 (Sections 2.1.1.(f) and (g) of Chapter 2 of Part II of Volume III of ICAO Annex 16). These production cut-off standards were introduced with the first edition of Volume III of ICAO Annex 16.

The applicant for a CofA (or a restricted CofA) for a used aeroplane originating from a non-Member State is specifically required to provide the date on which the first CofA was issued. This should permit the competent authority of the Member State of registry to establish whether a CO_2 emissions production cut-off requirement applies to that aeroplane and verify that the compliance with this requirement has been demonstrated. If such a requirement applies, the applicant for a CofA (or a restricted CofA) shall provide the CO_2 emissions evaluation metric value as certified in accordance with the applicable Standards and Recommended Practices in Volume III of ICAO Annex 16. The Agency publishes the CO_2 emissions evaluation metric values approved by the Agency in the EASA Aeroplane CO_2 Emissions Database[1].

If a CO_2 standard applies, approval of the aeroplane's CO_2 emissions evaluation metric value by the Agency is a prerequisite for a CofA (or a restricted CofA) from a Member State and is typically part of the Agency's approval of the type design.

[…]

SUBPART J — DESIGN ORGANISATION APPROVAL

[…]

AMC1 21.A.239(d) Design management system

DESIGN ASSURANCE ELEMENT

(a) Reserved

(b) Reserved

(c) Design assurance system

The complete design process, starting with the type certification basis, operational ~~sutiability~~suitability data (OSD) certification basis, as well as environmental protection requirements and product specifications, and culminating with the issuing of a type certificate (TC), is shown in Figure 1, which identifies the relationships between the design, the certification, and the design assurance processes.

[…]

(1) Planned and systematic tasks

[…]

(iv) Airworthiness function

[…]

(T) ensuring that there is cooperation in preparing SBs and the structural repair manual, and any subsequent revisions, with special attention to the manner in which the contents affect airworthiness and environmental ~~protection~~compatibility, and granting the approval on behalf of EASA;

[…]

[1] https://www.easa.europa.eu/en/domains/environment/easa-aeroplane-co2-emissions-database-0

(v) Maintenance and operating instructions

(A) […]

(c) […]

(3) verification of technical consistency with the corresponding approved change(s), repair(s)~~,~~ or approved data, including effectivity, description, effects on airworthiness and environmental ~~protection~~compatibility, especially when limitations are changed;

[…]

AMC1 21.A.243(d) Handbook

STATEMENT OF QUALIFICATIONS AND EXPERIENCE

(a) The following statements should be provided:

[…]

(2) The staff that make decisions that affect airworthiness, operational suitability and environmental ~~protection~~compatibility.

[…]

GM1 21.A.243(d) Handbook

STATEMENT OF QUALIFICATIONS AND EXPERIENCE

Three different types of functions are named or implicitly identified in the requirements of Part 21, Subpart J or in the associated AMC and GM, when using qualified and experienced personnel:

[…]

the staff making decisions affecting airworthiness, operational suitability~~,~~ and environmental ~~protection~~compatibility:

— compliance verification engineers (see AMC1 21.A.239(d), point (c)(1)(iii) and AMC1 21.A.239(c)(2)); and

— staff of the Office of Airworthiness making decisions affecting airworthiness, operational suitability and environmental ~~protection~~compatibility, especially those that are linked with the 21.A.263 privileges (signing documents for release, approving classification of changes and repairs, and granting the approval of minor/major changes, supplemental type certificates (STCs) and minor/major repairs, granting the approval of service bulletins (SBs), and minor revisions to the aircraft flight manual) (see AMC1 21.A.239(d), point (c)(1)(iv)).

[…]

GM1 21.A.247 Significant changes to the design management system

In addition to a change in ownership (see point 21.A.249), the following changes to the design management system should be considered to be 'significant' for the demonstration of compliance, or for the airworthiness, operational suitability~~,~~ or environmental ~~protection~~ compatibility of the products:

(a) Organisation

— Relocation to new premises (see also GM 21.A.249);

— A change in the industrial organisation (partnership, subcontractors, design work sharing), unless it can be shown that the independent verification function of the demonstration of compliance is not affected;

— A change in the parts of the organisation that contribute directly to the airworthiness, operational suitability~~,~~ or environmental ~~protection~~ compatibility (independent verification function, airworthiness function (or equivalent));

— A change to the independent monitoring principles of compliance and adequacy (see point 21.A.239(e)).

[…]

AMC2 21.A.263(c)(1) Privileges

ORGANISATIONS THAT DESIGN MINOR CHANGES TO A TYPE CERTIFICATE (TC) OR A SUPPLEMENTAL TYPE CERTIFICATE (STC), AND MINOR REPAIRS TO PRODUCTS: CLASSIFICATION PROCEDURE

[…]

3. Classification

The procedure should show how the effects on airworthiness, operational suitability and environmental ~~protection~~ compatibility are analysed, from the very beginning, by reference to the specific ~~applicable~~ requirements applicable ~~of~~ to the affected items.

If no specific CSs or environmental protection requirements are applicable to the affected items, the above review should be carried out at the level of the part or system where the affected items are integrated and where specific CSs or environmental protection requirements are applicable.

For repairs, the criteria used for the classification should be in compliance with point 21.A.435 and follow the guidelines provided in GM 21.A.435(a).

The procedure should define provisions to contact EASA in case of doubts regarding the classification.

[…]

AMC No 1 to 21.A.263(c)(5), (8) and (9) Scope and criteria

[…]

2. Definition of 'certain major changes' and 'certain supplemental type certificates'

[…]

2.1 Criteria for limitations on eligibility

The following types of changes are not eligible:

[…]

(h) changes that affect the certified noise or emissions levels or environmental compatibility ~~noise and/or emissions~~ characteristics of the changed product, unless otherwise agreed with EASA;

[…]

GM 21.A.265(h) Designation of data and information issued under the authority of a design organisation approval (DOA) holder

[…]

4. PROCEDURE

For the information and instructions issued under point 21.A.265(h), the DOA holder should establish a procedure that addresses the following aspects:

— their preparation;

— verification of their technical consistency with the corresponding approved change(s), repair(s) or approved data, including their effectivity, description, effects on airworthiness and environmental ~~protection~~compatibility, especially when limitations are changed;

— verification of their feasibility in practical applications, when relevant and feasible;

— the authorised signatories.

The procedure should include the information or the instructions prepared by suppliers, and declared applicable to its products by the DOA holder.

[…]

SUBPART M — REPAIRS

[…]

AMC 21.A.432C(b) Certification programme for a repair design approval

Clarification of 21.A.432C(b)(1): the description of the repair should consist of:

— the pre- and post-repair configuration;

— a drawing or outline of the repair;

— a list of the detailed features;

— a description of the type and extent of the inspection; and

— an outline of the damage.

Clarification of 21.A.432C(b)(3): the identification of reinvestigations does not refer to the demonstration of compliance itself, but to the list of the affected certification specifications (CSs) and applicable environmental protection requirements, together with the means of compliance.

[…]

GM 21.A.435(a) Classification of repair~~s~~ designs

1. Clarification of the terms 'm~~M~~ajor'/ 'm~~M~~inor'

In line with the definitions given in 21.A.91, a new repair is classified as ~~'~~major~~'~~ if the result on the approved type design has an appreciable effect on structural performance, weight, balance, systems, operational characteristics, certified noise or emissions levels, ~~or~~ other characteristics affecting the airworthiness of the product, part or appliance, or other characteristics affecting the environmental compatibility of the product. In particular, a repair is classified as major if it needs extensive static, fatigue and damage tolerance strength justification and/or testing in its own right, or if it needs methods, techniques or practices that are unusual (i.e.~~,~~ unusual material selection, heat treatment, material processes, jigging diagrams, etc.).

Repairs that require a re-assessment and re-evaluation of the original certification substantiation data to ensure that the aircraft still complies with all the relevant requirements, are to be considered as major repairs.

Repairs whose effects are considered minor and require minimal or no assessment of the original certification substantiation data to ensure that the aircraft still complies with all the relevant requirements, are to be considered ~~'~~minor~~'~~.

It is understood that not all the certification substantiation data will be available to those persons/organisations classifying repairs. A qualitative judgement of the effects of the repair will therefore be acceptable for the initial classification. The subsequent review of the design of the repair may lead to it being re-classified, owing to early judgements being no longer valid.

2. Airworthiness concerns for ~~M~~major/~~M~~minor classification

The following should be considered for the significance of their effect when classifying repairs. Should the effect be considered to be significant then the repair should be classified ~~'M~~major~~'~~. The repair may be classified as ~~'M~~minor~~'~~ where the effect is known to be without appreciable consequence.

[…]

v) Other characteristics

— changes to load path and load sharing

— ~~change to noise and emissions~~

— fire protection / resistance

Note: Considerations for classifying repairs ~~'M~~major/~~M~~minor~~'~~ should not be limited to those listed above.

3. Examples of ~~'M~~major~~'~~ repairs

i) A repair that requires a permanent additional inspection to the approved maintenance programme, necessary to ensure the continued airworthiness of the product. Temporary repairs for which specific inspections are required prior to installation of a permanent repair do not necessarily need to be classified as ~~'M~~major~~'~~. Also, inspections and changes to inspection frequencies not required as part of the approval to ensure continued airworthiness do not cause classification as ~~'M~~major~~'~~ of the associated repair.

[…]

SUBPART P — PERMIT TO FLY

[…]

GM 21.A.701(a) Permit to fly when a certificate of airworthiness or a restricted certificate of airworthiness is not appropriate

[…]

(14) Flying aircraft meeting the applicable certification specifications before conformity to the applicable environmental protection requirements has been ~~found~~demonstrated:

— Flying an aircraft which has been demonstrated to comply with all applicable certification specifications but not with the applicable environmental protection requirements.

[…]

SECTION B

[…]

SUBPART B — TYPE-CERTIFICATES AND RESTRICTED TYPE-CERTIFICATES

[…]

GM1 21.B.85 Applicable environmental protection requirements for a type certificate or restricted type certificate

ENVIRONMENTAL COMPATIBILITY

'Environmental compatibility' is a new term introduced with Regulation (EU) 2018/1139. It is used throughout Regulation (EU) No 748/2012 to describe the status of a product that complies with the

applicable environmental protection requirements. Similarly, the terms 'environmentally compatible' or 'environmentally incompatible' are adjectives to describe products that are compliant with the applicable environmental protection requirements or not.

GM1 21.B.85(a) Applicable environmental protection requirements for a type certificate or restricted type certificate

1. APPLICABLE ENVIRONMENTAL PROTECTION REQUIREMENTS

The applicable environmental protection requirements are the Standards and Recommended Practices (SARPs) in Volume I, Volume II and Volume III of Annex 16 to the Chicago Convention ('ICAO Annex 16') for aircraft and engines for which the first subparagraph of Article 9(2) of Regulation (EU) 2018/1139 applies. The applicable levels of amendment to Volume I, Volume II and Volume III of ICAO Annex 16 ~~to the Chicago Convention~~ are those adopted in the first subparagraph of Article 9(2) of Regulation (EU) 2018/1139 as amended by delegated acts to implement the latest amendment levels of these volumes.

2. VOLUME I OF ICAO ANNEX 16 — AIRCRAFT NOISE

2.1. SARPs

Volume I of ICAO Annex 16 contains the SARPs for the noise certification of subsonic jet aeroplanes, propeller-driven aeroplanes, supersonic aeroplanes, helicopters and tilt-rotors.

2.1.1. Part I

Part I of that volume provides the definitions and nomenclature, which are an essential part of the SARPs.

2.1.2. Part II

Chapter 1 of Part II of that volume on administration includes the overall applicability of that part.

Each other chapter of that part applies to a specific aircraft type for a given date of application for a type certificate or for the certification of their derived versions. These chapters contain the noise level limits that shall not be exceeded and some reference criteria.

2.1.3. Appendices

The methods for the evaluation of noise levels are provided in the appendices to that volume.

2.2. Guidance material

Guidance material for the application of the SARPs is provided in the attachments to that volume and in Doc 9501 'Environmental Technical Manual', Volume I 'Procedures for the Noise Certification of Aircraft'.

3. VOLUME II OF ICAO ANNEX 16 — AIRCRAFT ENGINE EMISSIONS

3.1. SARPs

Volume II of ICAO Annex 16 contains the SARPs for the aircraft fuel venting certification and the aircraft engine emissions certification.

3.1.1. Part I

Part I of that volume provides the definitions and symbols, which are an essential part of the SARPs.

3.1.2. Part II

Part II of that volume for the aircraft fuel venting certification applies to turbine engine powered aircraft manufactured after 18 February 1982.

3.1.3. Part III

Part III of that volume applies to the aircraft engine emissions certification for turbojet and turbofan engines intended for the propulsion at subsonic and supersonic speeds and involves the following emissions: smoke gaseous emissions such as unburned hydrocarbons, carbon monoxide and oxides of nitrogen, and non-volatile particulate matter.

Chapter 1 of that part on administration includes the overall applicability of that part. The other chapters of that part specify the applicability to the aircraft engine types and contain the emissions regulatory levels that shall not be exceeded and some reference criteria.

The information below summarises the applicability categories. The detailed criteria provided in Part III are essential to determine the related applicable emissions regulatory levels.

— Standards for new type and model designs

These standards apply to aircraft engines of a type or model for which an application for a type certificate was submitted on or after a given date.

— Standards for first individual production models

These standards apply to aircraft engines of a type or model for which the date of manufacture of the first individual production model was on or after a given date. The emissions regulatory levels that shall not be exceeded for these aircraft engines are different from those for new type design aircraft engines.

These standards are minimum requirements for continued production of an aircraft engine (production cut-off standards).

Note: The standards for turbojet and turbofan engines intended for supersonic speeds apply only to all those engines for which the date of manufacture is on or after 18 February 1982 (Part III, Chapter 3).

3.1.4. Part IV

Part IV of that volume applies to aircraft engines that are certified for non-volatile particulate matter and for which the non-volatile particulate matter losses in the sampling and measurement system shall be assessed in accordance with

Appendix 8. The correction factors resulting from this assessment shall be reported to the competent authority for inventory and modelling purposes.

3.1.5. Appendices

The procedures for the evaluation of the emissions levels are provided in the appendices to that volume.

3.2. Guidance material

Guidance material for the application of the SARPs is provided in the attachments to that volume and in Doc 9501 'Environmental Technical Manual', Volume II 'Procedures for the Emissions Certification of Aircraft Engines'.

4. VOLUME III OF ICAO ANNEX 16 — AEROPLANE CO_2 EMISSIONS

4.1. SARPs

Volume III of ICAO Annex 16 contains the SARPs for the CO_2 emissions certification of subsonic jet aeroplanes and propeller-driven aeroplanes.

4.1.1. Part I

Part I of that volume provides the definitions and symbols, which are an essential part of the SARPs.

4.1.2. Part II

Chapter 1 of Part II of that volume on administration includes the overall applicability of that part.

Chapter 2 of that part defines the applicability to specific aeroplane types and their related maximum permitted CO_2 emissions evaluation metric value. It also contains some reference criteria.

The information below summarises the applicability categories. The detailed criteria provided in Chapter 2 are essential to determine the related applicable maximum permitted CO_2 emissions evaluation metric values. The applicability provisions in Chapter 2 shall be applied in conjunction with the definitions of a 'derived version of a non-CO_2-certified aeroplane' and a 'derived version of a CO_2-certified aeroplane', as contained in Part I, Chapter 1. These definitions include additional criteria for the determination of the applicable CO_2 standard for such aeroplanes.

— Standards for new type designs and their derived versions

These standards apply to aeroplanes and their derived versions for which the application for a type certificate was submitted on or after a given date (1 January 2020 and 1 January 2023 in Sections 2.1.1(a) to (c)).

— Standards for individual non-CO_2 certified aeroplanes

These standards apply to aeroplanes for which a type certificate was issued but that were not certified for CO_2 emissions in accordance with Volume III of ICAO Annex 16, and for which the individual certificate of airworthiness

(CofA) was first issued on or after a given date (1 January 2028 in Sections 2.1.1.(f) and (g)).

These standards are production cut-off standards.

— Standards for derived versions of non-CO_2-certified aeroplanes

These standards apply to individual aeroplanes for which a type certificate was issued but that were not certified for CO_2 emissions in accordance with Volume III of ICAO Annex 16, and for which:

— the application for approval of a change to the type certificate was submitted on or after a given date (1 January 2023 in Sections 2.1.1(d) and (e)); and

— the change in the type design is made (i.e. applied to the individual aeroplane) prior to the issuance of the first CofA.

4.1.3. Appendices

The methods for the evaluation of CO_2 emissions levels are provided in the appendices to that volume.

4.2. Guidance material

Guidance material for the application of the SARPs is provided in the attachments to that volume and in ICAO Doc 9501 'Environmental Technical Manual', Volume III 'Procedures for the CO_2 Emissions Certification of Aeroplanes'.

~~2. AIRCRAFT NOISE~~

~~Guidance material for the application of the certification procedures for aircraft noise is presented in:~~

~~(a) Volume I of Annex 16 to the Chicago Convention:~~

~~(1) in Attachment A for equations for the calculation of maximum permitted noise levels as a function of take-off mass;~~

~~(2) in Attachment D for evaluating an alternative method of measuring helicopter noise during approach;~~

~~(3) in Attachment E for applicability of noise certification standards for propeller-driven aeroplanes; and~~

~~(4) in Attachment F for guidelines for noise certification of tilt rotors; and~~

~~(b) ICAO Doc 9501 'Environmental Technical Manual', Volume I 'Procedures for the Noise Certification of Aircraft', except Chapter 8.~~

~~3. FUEL VENTING~~

~~Guidance material for the application of the certification procedures for aircraft engine emissions is presented in ICAO Doc 9501 'Environmental Technical Manual' Volume II 'Procedures for the Emissions Certification of Aircraft Engines'.~~

~~4. ENGINE EMISSIONS~~

~~4.1. Guidance material related to engine emissions requirements~~

~~Guidance material for the application of the certification procedures for aircraft engine emissions is presented in:~~

~~(a) Attachment E to Appendix 3 to Volume II of Annex 16 to the Chicago Convention for the calculation of the emissions parameters; and~~

~~(b) ICAO Doc 9501 'Environmental Technical Manual' Volume II 'Procedures for the Emissions Certification of Aircraft Engines'.~~

~~4.2. Engine emissions requirements for inventory and modelling purposes~~

~~Aircraft engine manufacturers are required to calculate the nvPM mass and nvPM number system loss correction factors as per Appendix 8 to Volume II of Annex 16 to the Chicago Convention and to report them to the competent authority. The nvPM mass and number system loss correction factors permit an estimation of the nvPM mass and number emissions at the exhaust of the aircraft engine from the nvPM mass and number concentration obtained in accordance with the procedures laid down in Appendix 7 to Volume II of Annex 16 to the Chicago Convention.~~

~~5. AEROPLANE CO_2 EMISSIONS~~

~~Guidance material for the application of the certification procedures for aeroplane CO_2 emissions is contained in ICAO Doc 9501 'Environmental Technical Manual', Volume III 'Procedures for the CO_2 Emissions Certification of Aeroplanes'.~~

[…]

AMC 21.B.100(a) and 21.A.15(b)(6) Level of involvement (LoI) in a certification project for a type certificate (TC), a major change to a TC, a supplemental type certificate (STC), a major repair design or European technical standard order (ETSO) authorisation for an auxiliary power unit (APU)

[…]

3. Principles and generic criteria for the LoI determination

EASA determines its LoI based on the applicant's proposal in view of the risk (the combination of the likelihood of an unidentified non-compliance and its potential impact). This is performed after proper familiarisation with the certification project in three steps:

[…]

This AMC contains criteria, common to all EASA panels, for the determination of:

— […]

— the criticality of the design or technology and the related safety and environmental compatibility risks, including those identified on similar designs; and

— […]

[…]

3.3. Criticality

The second step that is necessary to determine the risk class is the assessment of the potential impact of a non-compliance on part of the certification basis regarding the airworthiness or the environmental ~~protection~~ compatibility of the product. For the purpose of risk class determination, the following simplification has been made: the impact of a non-compliance can be either critical or non-critical.

[…]

SUBPART H — CERTIFICATES OF AIRWORTHINESS AND RESTRICTED CERTIFICATES OF AIRWORTHINESS

[…]

GM1 21.B.326(a)(3) and (b)(3) Certificate of airworthiness

CO_2 EMISSIONS PRODUCTION CUT-OFF REQUIREMENTS

Volume III of Annex 16 to the Chicago Convention ('ICAO Annex 16') includes CO_2 emissions production cut-off standards that apply to subsonic jet aeroplanes with a Maximum Take-Off Mass (MTOM) greater than 5700 kg and propeller-driven aeroplanes with a MTOM greater than 8618 kg, for which a type certificate was issued but that were not certified for CO_2 emissions in accordance with Volume III of ICAO Annex 16, and for which the individual certificate of airworthiness (CofA) was first issued on or after 1 January 2028 (Sections 2.1.1.(f) and (g) of Chapter 2 of Part II of Volume III of ICAO Annex 16). These production cut-off standards were introduced with the first edition of Volume III of ICAO Annex 16.

— For a new aeroplane (21.B.326(a)(3)):

The competent authority assesses whether an aeroplane CO_2 emissions production cut-off requirement applies to the aeroplane, and, if such a requirement applies, that the aeroplane conforms to this requirement before issuing the first CofA.

— For a used aeroplane, which does not have an airworthiness certificate issued in accordance with Part 21 (for example an aeroplane imported from a third country) (21.B.326(b)(3)):

The competent authority assesses whether an aeroplane CO_2 emissions production cut-off requirement applied to the aeroplane when its first CofA was issued, and, if such a requirement applied, that the aeroplane conformed to that requirement on the date on which the CofA was first issued. The competent authority may check that the CO_2 metric value provided by the applicant for a CofA corresponds to the CO_2 metric value approved by the Agency for the aeroplane type.

Note: For a used aeroplane, which has an airworthiness certificate issued in accordance with Part 21 (for example an aeroplane imported from a Member State), the compliance with the applicable environmental protection requirements was already assessed for the issuance of the previous CofA.

The competent authority may refer to the corresponding certified CO_2 emissions evaluation metric values that are published by the Agency in the EASA Aeroplane CO_2 Emissions Database[2].

These specific requirements ensure that the CO_2 emissions production cut-off requirement that may apply to the aeroplane is not overlooked. Further guidance material on the applicability of the aeroplane CO_2 emissions requirements is provided in ICAO Doc 9501 'Environmental Technical Manual', Volume III 'Procedures for the CO_2 Emissions Certification of Aeroplanes'.

[…]

SUBPART I — NOISE CERTIFICATES

[…]

GM1 21.B.425(a) Noise certificates

1. Completion of the noise certificate by a Member State

1.1. Completion instructions

[…]

Block 5. Manufacturer and manufacturer's designation of the aircraft

The manufacturer or type-certificate holder and the ~~type and~~ model of the subject aircraft. This item should match the corresponding information ~~on the certificate of registration and certificate of airworthiness~~ in the EASA aircraft type certificate data sheet for noise (TCDSN) or in the EASA database of certification noise levels.

[…]

Block 7. Manufacturer and manufacturer's designation of the engine(s) ~~Engine~~

The manufacturer or type-certificate holder and the designation of the installed engine(s) for identification and verification of the aircraft configuration. ~~It should contain the type and model of the subject engine(s). The designation should be in accordance with the type certificate or supplemental type certificate for the subject engine(s).~~ This item should contain at least the engine designation in the EASA aircraft type certificate data sheet for noise (TCDSN) or in the EASA database of certification noise levels.

Block 8. Manufacturer and manufacturer's designation of the propeller(s) ~~Propeller~~

The manufacturer or type-certificate holder and the designation of the installed propeller(s) for identification and verification of the aircraft configuration. ~~It should contain the type and model of the subject propeller(s). The designation should be in accordance with the type certificate or supplemental type certificate for the subject propeller(s).~~ This

[2] https://www.easa.europa.eu/en/domains/environment/easa-aeroplane-co2-emissions-database-0

item should contain at least the propeller designation in the EASA aircraft type certificate data sheet for noise (TCDSN) or in the EASA database of certification noise levels. ~~This item~~It is included only in noise certification documentation for propeller driven aeroplanes.

[…]

Block 10. Maximum landing mass (kg)

The maximum landing mass associated with the certificated noise levels of the aircraft in kilograms. The unit (kg) should be specified explicitly in order to avoid misunderstanding. If the primary unit of mass for the State of manufacture of the aircraft is different from kilograms, the conversion factor used should be in accordance with Annex 5 to the Chicago Convention. This item will only be included in the noise certification documentation for noise certificates issued under Chapters 2, 3, 4, 5, 12 and 14.

[…]