

**‘AMC and GM to Part-21 — Issue 2, Amendment 13’**

The Annex to ED Decision 2012/020/R is amended as follows:

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

- (a) deleted text is ~~struck through~~;
- (b) new or amended text is highlighted in blue;
- (c) an ellipsis (...) indicates that the remaining text is unchanged.

**GM1 21.A.21(a)(3)(A~~i~~) Clarification of the term ‘determined’**

A type certificate ‘determined’ in accordance with Part 21 means a type certificate, or a document that allows the issuance of a certificate of airworthiness, issued before 28 September 2003 by a Member State complying with Article 3(1)(a) of Regulation (EU) No 748/2012.

[...]

**AMC2 ~~No 2~~ 21.A.130(b) Statement of Conformity for Products (other than complete aircraft), parts, appliances and materials — The Authorised Release Certificate (EASA Form 1)****A. INTRODUCTION**

[...]

**5. COMPLETION OF THE CERTIFICATE BY THE ORIGINATOR**

[...]

Block 12 – Remarks

[...]

- d) In case of an engine, when the ~~€~~competent ~~A~~authority has granted an ~~emissions production cut-off~~ exemption from the environmental protection requirements, the following statement must be entered in block 12:

~~["NEW" OR "SPARE"] ENGINE EXEMPTED FROM NO<sub>x</sub> EMISSIONS PRODUCTION CUT-OFF REQUIREMENT~~. 'ENGINE EXEMPTED FROM [REFERENCE TO THE TYPE OF EMISSION] EMISSIONS ENVIRONMENTAL PROTECTION REQUIREMENT'

[...]

**AMC1 21.A.130(b)(4)(i) Applicable engine exhaust emissions requirements****~~1. General~~**

This determination is made according to the data provided by the engine type-certificate holder. ~~This data should allow the determination of whether the engine complies with the emissions production cut off requirement of paragraph (d) of Volume II, Part III, Chapter 2, paragraph 2.3.2 of Annex 16 to the Chicago Convention.~~ It should be noted that ~~in the case of engines for which the C~~ Competent Authority has the possibility to ~~granted an~~ 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. ~~, the emissions requirements applicable are the regulatory levels defined in Volume II, Part III, Chapter 2, paragraph 2.3.2 c) of Annex 16 to the Chicago Convention.~~

When such an exemption is granted, the competent authority:

- takes into account the number of exempted engines that will be produced and their impact on the environment;
- considers imposing a time limit on the production of such engines; and
- issues an exemption document.

The Agency establishes and maintains a register, containing at least the engine serial number, and makes it publicly available.

ICAO Doc 9501 'Environmental Technical Manual' Volume II provides guidance on the issuing of exemptions.

## ~~2. Process and criteria for exemptions against a NO<sub>x</sub> emissions production cut off requirement~~

### ~~2.1 Request~~

~~The organisation should submit a formal request to the Competent Authority, signed by an appropriate manager, and copied to all other relevant organisations and involved Competent Authorities including the Agency. The letter should include the following information for the Competent Authority to be in a position to review the application:~~

#### ~~a) Administration~~

~~Name, address and contact details of the organisation.~~

#### ~~b) Scope of the request~~

~~Engine type (model designation, type certificate (TC) number, TC date, emission TC basis, ICAO Engine Emissions Databank Unique Identification (UID) Number);~~

~~Number of individual engine exemptions requested;~~

~~Duration (end date) of continued production of the affected engines.~~

~~Whether the proposed affected engines are 'spares' or 'new' and whom the engines will be originally delivered to.~~

~~Note: In the case where the engines are 'new' (new engines installed on new aircraft), and if this would result in a larger negative environmental impact as compared to exemptions only for spare engines, more detailed justification could be required to approve this application.~~

#### ~~c) Justification for exemptions~~

~~When requesting an exemption for a 'new' engine, the organisation should, to the extent possible, address the following factors, with quantification, in order to support the merits of the exemption request:~~

- ~~Technical issues, from an environmental and airworthiness perspective, which may have delayed compliance with the production cut-off requirement;~~
- ~~Economic impacts on the manufacturer, operator(s) and aviation industry at large;~~
- ~~Environmental effects. This should consider the amount of additional NOx emissions that will be emitted as a result of the exemption. This could include consideration of items such as:
  - ~~the amount that the engine model exceeds the NOx emissions standard, taking into account any other engine models in the engine family covered by the same type certificate and their relation to the standard;~~
  - ~~the amount of NOx emissions that would be emitted by an alternative engine for the same application; and~~
  - ~~the impact of changes to reduce NOx on other environmental factors, including community noise and CO<sub>2</sub> emissions;~~~~
- ~~Impact of unforeseen circumstances and hardship due to business circumstances beyond the manufacturer's control (e.g. employee strike, supplier disruption or calamitous events);~~
- ~~Projected future production volumes and plans for producing a compliant version of the engine model seeking exemption;~~
- ~~Equity issues in administering the production cut-off among economically competing parties (e.g. provide rationale for granting this exemption when another manufacturer has a compliant engine and does not need an exemption, taking into account the implications for operator fleet composition, commonality and related issues in the absence of the engine for which exemptions are sought);~~
- ~~Any other relevant factors.~~

## ~~2.2 Evaluation~~

~~2.2.1. Since the Agency has the overview of the exemptions granted within the Member States and within Third Countries by contacting the relevant Design Organisation, the Agency advises the Competent Authority during the process of granting exemptions. The advice from the Agency should take the form of a letter sent to the Competent Authority.~~

~~2.2.2 The evaluation of an exemption request should be based on the justification provided by the organisation and on the following definitions and criteria:~~

### ~~a) Use of engines~~

~~'Spare engines' are defined as complete new engine units which are to be installed on in-service aircraft for maintenance and replacement. It can be presumed that exemption applications associated with engines for this purpose would be granted as long as the emissions were equal to or lower than those engines they are replacing. The application should include the other items described in points (a) and (b) of paragraph 2.1 above, but it would not need to include the items specified in point (c). For spare engines, the evaluation of the exemption application would be conducted for record keeping and~~

~~reporting purposes, but it would not be done for approval of an exemption.~~

~~'New engines' are defined as complete new engine units which are to be installed on new aircraft. They can only be exempted from a NOx production cut off requirement if they already meet the previous standard (e.g. exemption from the CAEP/6 NOx production cut off requirement of paragraph (d) of Volume II, Part III, Chapter 2, paragraph 2.3.2 of Annex 16 to the Chicago Convention is only possible if an engine type already meets the regulatory levels defined in Volume II, Part III, Chapter 2, paragraph 2.3.2 c) of Annex 16 to the Chicago Convention). Also, in order for an exemption to be granted for this type of engine the applicant must clearly demonstrate that they meet the criteria for an exemption by including items described in points (a), (b) and (c) of paragraph 2.1 above. The Competent Authority may require additional information regarding the appropriateness of the potential exemption.~~

~~b) Number of new engine exemptions~~

~~Exemptions should be based on a total number of engines and time period for delivery of these engines, which would be agreed at the time the application is approved and based on the considerations explained in point (c) of paragraph 2.1 above. The number of engines exempted should not exceed 75 per engine type certificate, and the end date of continued production of the affected engines should not exceed 31.12.2016. The number of exemptions is related to individual non-compliant engines covered under the same type certificate.~~

~~Exemptions for new engines should be processed and approved by the Competent Authority, in agreement with the Agency, for both the manufacture of the exempted engines and the initial operator of the aircraft to which they are to be fitted. Given the international nature of aviation, the Agency should attempt to collaborate and consult on the details of exemptions. In the case where engine type certification is done through a reciprocity agreement between the Agency and Third Countries, the Agency should coordinate on the processing of exemptions and concur before approval is granted.~~

~~e) Other engines~~

~~Unlimited exemptions may be granted for continued production of spare engines having emissions equivalent to or lower than the engines they are replacing.~~

~~Engines for use on aircraft excluded from the scope of the Basic Regulation – i.e. aircraft specified in Annex II to the Basic Regulation and aircraft involved in activities referred to in Article 1(2) of the Basic Regulation (e.g. military, customs, police, search and rescue, fire fighting, coastguard or similar activities or services) – are excluded from civil aircraft NOx production cut-off requirements.~~

~~2.3 Rejection of request~~

~~If the competent authority rejects the request for exemption, the response should include a detailed justification.~~

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

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

1. the ~~'D~~ **'date of manufacture for the first individual production model'**, which refers **to the date when the type certificate is issued for** ~~to~~ the engine type **or model certification date; and**
2. **the 'date of application for a type certificate', which refers to the application date to the certifying authority of the State of Design of the engine type certification; and**
- ~~2.3.~~ **the 'D **'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 refers to the date of the first engine EASA Form 1 issued after the completion of the engine production pass-off test.**

The ~~second~~ **third** reference is used in the application of the engine ~~NO<sub>x</sub>~~ emissions production cut-off requirement, which specifies a date after which all in-production engine models must meet a certain ~~NO<sub>x</sub>~~ emissions standard.

21.A.130(b)(4)(i) includes the production requirements **for engine exhaust emissions**, ~~and refers to paragraphs (b) and (d) of Volume II, Part III, Chapter 2, paragraph 2.3 of Annex 16 to the Chicago Convention.~~

**ICAO Doc 9501 'Environmental Technical Manual' Volume II provides guidance on these applicability dates.**

## AMC1 21.A.130(b)(4)(ii) Applicable aeroplane CO<sub>2</sub> emissions requirements

### ~~1. General~~

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<sub>2</sub> emissions applicability requirements **in Chapter 2, paragraph 2.1.1 of Part II of Volume III of Annex 16 to the Chicago Convention**, ~~Volume III, Part II, Chapter 2, paragraph 2.1.1.~~

It should be noted that the **C**ompetent **A**uthority has the possibility to grant exemptions as noted in ~~Volume III, Part II,~~ Chapter 1, paragraph 1.11 and Chapter 2, paragraph 2.1.3 **of Part II of Volume III of Annex 16 to the Chicago Convention.**

**When such an exemption is granted, the competent authority:**

- **takes into account the number of exempted aeroplanes that will be produced and their impact on the environment; and**
- **issues an exemption document.**

**The Agency establishes and maintains a register, containing at least the aeroplane serial number, and makes it publicly available.**

ICAO Doc 9501 'Environmental Technical Manual' Volume III provides guidance on the issuing of exemptions.

[...]

## AMC ~~No-2~~ 21.A.163(c) Completion of EASA Form 1

[...]

EASA Form 1 Block 12 'Remarks'

Examples of conditions which would necessitate statements in Block 12 are:

[...]

Examples of data to be entered in this block as appropriate:

- For complete engines, a statement of compliance with the applicable emissions requirements current on the date of manufacture of the engine.
- For ETSO articles, state the applicable ETSO number.
- Modification standard.
- Compliance or non-compliance with airworthiness directives or service bulletins.
- Details of repair work carried out, or reference to a document where this is stated.
- Shelf-life data, manufacture date, cure date, etc.
- Information needed to support shipment with shortages or reassembly after delivery.
- References to aid traceability, such as batch numbers.
- In the case of an engine, if the competent authority has granted an exemption from the applicable engine ~~exhaust emissions production cut-off~~ environmental protection requirements exemption, the record: ~~'[New or Spare] engine exempted from NOx emissions production cut-off requirements'~~ 'ENGINE EXEMPTED FROM [REFERENCE TO THE TYPE OF EMISSION] EMISSIONS ENVIRONMENTAL PROTECTION REQUIREMENT'.

## AMC1 21.A.165(c)(3) Applicable engine exhaust emissions requirements

### 1. ~~General~~

This determination is made according to the data provided by the engine type-certificate holder. ~~This data should allow the determination of whether the engine complies with the emissions production cut-off requirement of paragraph (d) of Volume II, Part III, Chapter 2, paragraph 2.3.2 of Annex 16 to the Chicago Convention.~~ It should be noted that ~~in the case of engines for which the~~ ~~Competent Authority~~ has the possibility to ~~granted an~~ 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. ~~, the emissions requirements applicable are the regulatory levels defined in Volume II, Part III, Chapter 2, paragraph 2.3.2 c) of Annex 16 to the Chicago Convention.~~

When such an exemption is granted, the competent authority:

- takes into account the number of exempted engines that will be produced and their impact on the environment;
- considers imposing a time limit on the production of such engines; and
- issues an exemption document.

The Agency establishes and maintains a register, containing at least the engine serial number, and makes it publicly available.

ICAO Doc 9501 'Environmental Technical Manual' Volume II provides guidance on the issuing of exemptions.

### 2. ~~Process and criteria for applying for exemptions against a NOx emissions production cut-off requirement.~~

#### 2.1 ~~Request~~

~~The organisation should submit a formal request to the Competent Authority, signed by an appropriate manager, and copied to all other relevant organisations and involved Competent Authorities including the Agency. The letter should include the following information for the Competent Authority to be in a position to review the application:~~

##### a) ~~Administration~~

~~Name, address and contact details of the organisation.~~

##### b) ~~Scope of the request~~

~~Engine type (model designation, type certificate (TC) number, TC date, emission TC basis, ICAO Engine Emissions Databank Unique Identification (UID) Number);~~

~~Number of individual engine exemptions requested;~~

~~Duration (end date) of continued production of the affected engines.~~

~~Designate whether the proposed exempted engines are 'spares' or 'new' and whom the engines will be originally delivered to.~~

~~Note: In the case where the engines are 'new' (new engines installed on new aircraft), and if this would result in a larger negative environmental impact as compared to exemptions only for spare engines, more detailed justification could be required to approve this application.~~

~~e) — Justification for exemptions~~

~~When requesting an exemption for a ‘new’ engine, the organisation should, to the extent possible, address the following factors, with quantification, in order to support the merits of the exemption request:~~

~~Technical issues, from an environmental and airworthiness perspective, which may have delayed compliance with the production cut-off requirement;~~

~~Economic impacts on the manufacturer, operator(s) and aviation industry at large;~~

~~Environmental effects. This should consider the amount of additional NOx emissions that will be emitted as a result of the exemption. This could include consideration of items such as:~~

~~the amount that the engine model exceeds the NOx emissions standard, taking into account any other engine models in the engine family covered by the same type certificate and their relation to the standard;~~

~~the amount of NOx emissions that would be emitted by an alternative engine for the same application; and~~

~~the impact of changes to reduce NOx on other environmental factors, including community noise and CO<sub>2</sub> emissions;~~

~~Impact of unforeseen circumstances and hardship due to business circumstances beyond the manufacturer’s control (e.g. employee strike, supplier disruption or calamitous events);~~

~~Projected future production volumes and plans for producing a compliant version of the engine model seeking exemption;~~

~~Equity issues in administering the production cut-off among economically competing parties (e.g. provide rationale for granting this exemption when another manufacturer has a compliant engine and does not need an exemption taking into account the implications for operator fleet composition, commonality and related issues in the absence of the engine for which exemptions are sought);~~

~~Any other relevant factors.~~

~~2.2 — Evaluation process.~~

~~2.2.1 Since the Agency has the overview of the exemptions granted within the Member States and within Third Countries by contacting the relevant Design Organisation, the Agency advises the Competent Authority during the process of granting exemptions. The advice from the Agency should take the form of a letter sent to the Competent Authority.~~

~~2.2.2 The evaluation of an exemption request should be based on the justification provided by the organisation and on the following definitions and criteria:~~

~~a) — Use of engines~~

~~‘Spare engines’ are defined as complete new engine units which are to be installed on in-service aircraft for maintenance and replacement. It can be presumed that exemption applications associated with engines for this purpose would be granted as long as the emissions were equal to or lower than those engines they are replacing. The application~~



~~should include the other items described in points (a) and (b) of paragraph 2.1 above, but it would not need to include the items specified in point (c). For spare engines, the evaluation of the exemption application would be conducted for record-keeping and reporting purposes, but it would not be done for approval of an exemption.~~

~~'New engines' are defined as complete new engine units which are to be installed on new aircraft. They can only be exempted from a NO<sub>x</sub> production cut off requirement if they already meet the previous standard (e.g. exemption from the CAEP/6 NO<sub>x</sub> production cut off requirement of paragraph (d) of Volume II, Part III, Chapter 2, paragraph 2.3.2 of Annex 16 to the Chicago Convention is only possible if an engine type already meets the regulatory levels defined in Volume II, Part III, Chapter 2, paragraph 2.3.2 c) of Annex 16 to the Chicago Convention). Also, in order for an exemption to be granted for this type of engine the applicant must clearly demonstrate that they meet the criteria for an exemption by including items described in points (a), (b) and (c) of paragraph 2.1 above. The Competent Authority may require additional information regarding the appropriateness of the potential exemption.~~

~~b) Number of new engine exemptions~~

~~Exemptions should be based on a total number of engines and time period for delivery of these engines, which would be agreed at the time the application is approved and based on the considerations explained in point (c) of paragraph 2.1 above. The number of engines exempted should not exceed 75 per engine type certificate, and the end date of continued production of the affected engines should not exceed 31.12.2016. The number of exemptions is related to individual non-compliant engines covered under the same type certificate.~~

~~Exemptions for new engines should be processed and approved by the Competent Authority, in agreement with the Agency, for both the manufacture of the exempted engines and the initial operator of the aircraft to which they are to be fitted. Given the international nature of aviation, the Agency should attempt to collaborate and consult on the details of exemptions. In the case where engine type certification is done through a reciprocity agreement between the Agency and Third Countries, the Agency should coordinate on the processing of exemptions and concur before approval is granted.~~

~~e) Other engines~~

~~Unlimited exemptions may be granted for continued production of spare engines having emissions equivalent to or lower than the engines they are replacing.~~

~~Engines for use on aircraft excluded from the scope of the Basic Regulation – i.e. aircraft specified in Annex II to the Basic Regulation and aircraft involved in activities referred to in Article 1(2) of the Basic Regulation (e.g. military, customs, police, search and rescue, fire fighting, coastguard or similar activities or services) – are excluded from civil aircraft NO<sub>x</sub> production cut-off requirements.~~

### ~~2.3~~ Rejection of request

~~If the competent authority rejects the request for exemption, the response should include a detailed justification.~~

## GM1 21.A.165(c)(3) Definitions of engine type certification date and production date

Volume II of Annex 16 to the Chicago Convention contains ~~two~~ **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** ~~to~~ the engine type **or model** ~~certification date~~; **and**
2. the **'date of application for a type certificate'**, which refers to the application date to the certifying authority of the State of Design of the engine type certification; **and**
- ~~2.3.~~ 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 refers to the date of the first engine EASA Form 1 issued after the completion of the engine production pass-off test.**

The ~~second~~ **third** reference is used in the application of engine ~~NOx~~ emissions production cut-off requirement which specifies a date after which all in-production engine models must meet a certain ~~NOx~~ emissions standard.

21.A.165(c)(3) includes the production requirements **for engine exhaust emissions**. ~~and refers to paragraphs (b) and (d) of Volume II, Part III, Chapter 2, paragraph 2.3 of Annex 16 to the Chicago Convention.~~

**ICAO Doc 9501 'Environmental Technical Manual' Volume II provides guidance on these applicability dates.**

## AMC1 21.A.165(c)(4) Applicable aeroplane CO<sub>2</sub> emissions requirements

### ~~1.~~ General

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<sub>2</sub> emissions applicability requirements **in Chapter 2, paragraph 2.1.1 of Part II of Volume III of Annex 16 to the Chicago Convention**, ~~Volume III, Part II, Chapter 2, paragraph 2.1.1.~~

It should be noted that the competent authority has the possibility to grant exemptions as noted in ~~Volume III, Part II~~, Chapter 1, paragraph 1.11 and Chapter 2, paragraph 2.1.3 **of Part II of Volume III of Annex 16 to the Chicago Convention.**

**When such an exemption is granted, the competent authority:**

- **takes into account the number of exempted aeroplanes that will be produced and their impact on the environment; and**

— issues an exemption document.

The Agency establishes and maintains a register, containing at least the aeroplane serial number, and makes it publicly available.

ICAO Doc 9501 'Environmental Technical Manual' Volume III provides guidance on the issuing of exemptions.

[...]

## GM1 21.B.85(a) Applicable environmental protection requirements

### 1. APPLICABLE ENVIRONMENTAL PROTECTION REQUIREMENTS

The applicable environmental protection requirements are the Standards and Recommended Practices in Volume I, Volume II and Volume III of Annex 16 to the Chicago Convention 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 Annex 16 to the Chicago Convention are those adopted in the first subparagraph of Article 9(2) of Regulation (EU) 2018/1139.

### 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<sub>2</sub> EMISSIONS

Guidance material for the application of the certification procedures for aeroplane CO<sub>2</sub> emissions is contained in ICAO Doc 9501 'Environmental Technical Manual', Volume III 'Procedures for the CO<sub>2</sub> Emissions Certification of Aeroplanes'.