

*Status: Point in time view as at 31/12/2020.*

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## ANNEX VII

### VERIFYING THE DURABILITY OF ENGINE SYSTEMS

#### 1. INTRODUCTION

- 1.1. This Annex sets out the procedures for selecting engines to be tested over a service accumulation schedule for the purpose of determining deterioration factors. The deterioration factors shall be applied in accordance with the requirements of point 3.6 of this Annex to the emissions measured according to Annex III.
- 1.2. This Annex also sets out the emission and non-emission-related maintenance carried out on engines undergoing a service accumulation schedule. Such maintenance shall conform to the maintenance performed on in-service engines and shall be communicated to owners of new engines and vehicles.
- [<sup>F1</sup>1.3. In the case of dual-fuel engines, paragraph 6.5 of Annex 15 to UNECE Regulation No 49 shall also apply.]

#### Textual Amendments

- F1** Inserted by [Commission Regulation \(EU\) No 133/2014 of 31 January 2014 amending, for the purposes of adapting to technical progress as regards emission limits, Directive 2007/46/EC of the European Parliament and of the Council, Regulation \(EC\) No 595/2009 of the European Parliament and of the Council and Commission Regulation \(EU\) No 582/2011 \(Text with EEA relevance\).](#)

#### 2. SELECTION OF ENGINES FOR ESTABLISHING USEFUL LIFE DETERIORATION FACTORS

- [<sup>F2</sup>2.1. The selection of the engines shall be carried out in accordance with paragraph 2 of Annex 7 to UNECE Regulation No 49.]

#### Textual Amendments

- F2** Substituted by [Commission Regulation \(EU\) No 133/2014 of 31 January 2014 amending, for the purposes of adapting to technical progress as regards emission limits, Directive 2007/46/EC of the European Parliament and of the Council, Regulation \(EC\) No 595/2009 of the European Parliament and of the Council and Commission Regulation \(EU\) No 582/2011 \(Text with EEA relevance\).](#)

- <sup>F3</sup>2.2. ....

#### Textual Amendments

- F3** Deleted by [Commission Regulation \(EU\) No 133/2014 of 31 January 2014 amending, for the purposes of adapting to technical progress as regards emission limits, Directive 2007/46/EC of the European Parliament and of the Council, Regulation \(EC\) No 595/2009 of the European Parliament and of the Council and Commission Regulation \(EU\) No 582/2011 \(Text with EEA relevance\).](#)

- <sup>F3</sup>2.3. [<sup>F3</sup>.....]

- 2.3.1. ....

#### 3. ESTABLISHING USEFUL LIFE DETERIORATION FACTORS

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[<sup>F2</sup>3.1. The requirements for the establishment of useful life deterioration factors shall be those set out in paragraph 3 of Annex 7 to UNECE Regulation No 49, with the exceptions provided for in points 3.1.1 to 3.1.6.]

[<sup>F1</sup>3.1.1. Paragraph 3.2.1.3 of Annex 7 to UNECE Regulation No 49 shall be understood as follows:

3.2.1.3. The emission values at the start point and at the useful life end point calculated in accordance with paragraph 3.5.2 shall meet the limit values specified in the table of Annex I to Regulation (EC) No 595/2009, but individual emission results from the test points may exceed those limit values.

3.1.2. Paragraph 3.2.1.9 of Annex 7 to UNECE Regulation No 49 shall be understood as follows:

3.2.1.9. The service accumulation schedule may be shortened by accelerated ageing on a fuel consumption basis. This shall be based on the ratio between the typical in-use fuel consumption and the fuel consumption on the ageing cycle. The service accumulation schedule shall not be reduced by more than 30 per cent, even if fuel consumption on the ageing cycle exceeds the typical in-use fuel consumption by more than 30 per cent.

3.1.3. Paragraph 3.5.1 of Annex 7 to UNECE Regulation No 49 shall be understood as follows:

3.5.1. For each pollutant measured on the hot WHTC and WHSC tests at each test point during the service accumulation schedule, a “best fit” linear regression analysis shall be made on the basis of all test results. The results of each test for each pollutant shall be expressed to the same number of decimal places as the limit value for that pollutant, as shown in the table of Annex I to Regulation (EC) No 595/2009, plus one additional decimal place. In accordance with paragraph 3.2.1.4 of Annex 7 to Regulation UNECE No 49, if it has been agreed that only one test cycle (hot WHTC or WHSC) be run at each test point and the other test cycle (hot WHTC or WHSC) run only at the beginning and at the end of the service accumulation schedule, the regression analysis shall be made only on the basis of the test results from the test cycle run at each test point.

At the request of the manufacturer and with the prior approval of the approval authority a non-linear regression shall be permitted.

3.1.4. Paragraph 3.7.1 of Annex 7 to UN/ECE Regulation No 49 shall be understood as follows:

3.7.1. The engines shall meet the respective emission limits for each pollutant, as given in the table of Annex I to Regulation (EC) No 595/2009, after application of the deterioration factors to the test result as measured in accordance with Annex III ( $e_{\text{gas}}$ ,  $e_{\text{PM}}$ ). Depending on the type of deterioration factor (DF), the following provisions shall apply:

(a) multiplicative:  $(e_{\text{gas}} \text{ or } e_{\text{PM}}) * DF \leq \text{emission limit}$

(b) additive:  $(e_{\text{gas}} \text{ or } e_{\text{PM}}) + DF \leq \text{emission limit}$

3.1.5. Paragraph 3.8.1 of Annex 7 to UNECE Regulation No 49 shall be understood as follows:

3.8.1. Conformity of production for emissions compliance shall be checked on the basis of the requirements set out in Section 7 of Annex I to this Regulation.

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3.1.6. Paragraph 3.8.3 of Annex 7 to UNECE Regulation No 49 shall be understood as follows:

3.8.3. For the purposes of type-approval, only the deterioration factors provided for in paragraphs 3.5 or 3.6 of Annex 7 to UNECE Regulation No 49 shall be specified in points 1.4.1 and 1.4.2 of the Addendum to Appendix 5 and in points 1.4.1 and 1.4.2 of the Addendum to Appendix 7 of Annex I to this Regulation.]

[<sup>F2</sup>3.2. The use of market fuels is allowed for conducting the service accumulation schedule. A reference fuel shall be used to carry out the emission test.]

<sup>F3</sup>3.2.1. *In-service and dynamometer service accumulation*

3.2.1.1. ....

3.2.1.2. ....

3.2.1.3. ....

3.2.1.4. ....

3.2.1.5. ....

3.2.1.6. ....

3.2.1.7. ....

3.2.1.8. *Minimum service accumulation period*

.....

3.2.1.9. ....

3.2.1.10. ....

<sup>F3</sup>3.2.2. ....

<sup>F3</sup>3.3. **Engine testing**

3.3.1. *Engine system stabilisation*

3.3.1.1. ....

3.3.1.2. ....

3.3.2. *Service accumulation testing*

3.3.2.1. ....

3.3.2.2. ....

3.3.2.3. ....

<sup>F3</sup>3.4. **Reporting**

3.4.1. ....

3.4.2. ....

<sup>F3</sup>3.5. **Determination of deterioration factors**

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3.5.1. ....

3.5.2. ....

3.5.3. ....

**F33.6. Assigned deterioration factors**

3.6.1. ....

**F33.7. Application of deterioration factors**

3.7.1. ....

3.7.2. ....

3.7.3. ....

**F33.8. Checking of conformity of production**

3.8.1. ....

3.8.2. ....

3.8.3. ....

**[F24. MAINTENANCE**

The requirements on maintenance shall be those set out in paragraph 4 of Annex 7 to UNECE Regulation No 49.]

**4.1. Emission-related scheduled maintenance**

F34.1.1. ....

F34.1.2. ....

F34.1.3. ....

**F34.2. Changes to scheduled maintenance**

4.2.1. ....

**F34.3. Non-emission-related scheduled maintenance**

4.3.1. ....

**F34.4. Repair**

4.4.1. ....

4.4.2. ....

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