

*Status: Point in time view as at 31/12/2020.*

*Changes to legislation: There are outstanding changes not yet made to Commission Regulation (EU) No 582/2011. Any changes that have already been made to the legislation appear in the content and are referenced with annotations. (See end of Document for details)*

## ANNEX VI

### REQUIREMENTS TO LIMIT OFF-CYCLE EMISSIONS (OCE) AND IN-USE EMISSIONS

#### 1. INTRODUCTION

- 1.1. This Annex sets out the performance requirements and prohibition of defeat strategies for engines and vehicles type-approved according to Regulation (EC) No 595/2009 and this Regulation so as to achieve effective control of emissions under a broad range of engine and ambient operating conditions encountered during normal in-use vehicle operation. This Annex also sets out the test procedures for testing off-cycle emissions during type-approval and in actual use of the vehicle.

#### 2. DEFINITIONS

The definitions in Section 3 of Annex 10 to UN/ECE Regulation No 49 shall apply.

#### 3. GENERAL REQUIREMENTS

- [<sup>F1</sup>3.1. The general requirements shall be those set out in paragraph 4 of Annex 10 to UNECE Regulation No 49.]

##### Textual Amendments

- F1** 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>F2</sup>3.2. In the case of dual-fuel engines, adaptive strategies are allowed provided that all of the following conditions are met:

- (a) the engine always remains in the dual-fuel type that has been declared for type-approval;
- (b) in case of a Type 2 dual-fuel engine, the resulting difference between the highest and the lowest GER<sub>WHTC</sub> within the family shall never exceed the percentage specified in paragraph 3.1.1 of Annex 15 to UNECE Regulation No 49;
- (c) these strategies are declared and satisfy the requirements set out in this Annex.]

##### Textual Amendments

- F2** 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 \(Text with EEA relevance\).](#)

#### 4. PERFORMANCE REQUIREMENTS

- [<sup>F1</sup>4.1. The performance requirements shall be those set out in paragraph 5 of Annex 10 to UNECE Regulation No. 49, with the exceptions provided for in point 4.1.1 of this Regulation.

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4.1.1. Point (a) of paragraph 5.1.2 of Annex 10 to UNECE Regulation No 49 shall be understood as follows:

(a) its operation is substantially included in the applicable type-approval tests, including the off-cycle test procedures provided for in paragraph 6 of Annex VI to this Regulation and the in-service provisions set out in Article 12 of this Regulation.]

F3 4.1.2. Section 5.2.1. of Annex 10 to UN/ECE Regulation No 49 shall be understood as follows:

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**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).

F3 4.1.3. The applicable emission limits shall be the following:

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F3 4.1.4. ....

5. AMBIENT AND OPERATING CONDITIONS

5.1. The ambient and operating conditions for the purpose of this Annex shall be those set out in Section 6. of Annex 10 to UN/ECE Regulation No 49.

[F16. OFF-CYCLE LABORATORY TESTING AND IN-USE VEHICLE TESTING AT TYPE-APPROVAL

6.1. The off-cycle test procedure during type-approval shall follow the off-cycle laboratory testing and in-use vehicle testing of engines at type-approval as described in paragraph 7 of Annex 10 to UNECE Regulation No 49 with the exception provided for in point 6.1.1.

6.1.1. The first subparagraph of paragraph 7.3 of Annex 10 to UNECE Regulation No 49 shall be understood as follows:

In-use testing

A PEMS demonstration test shall be performed at type-approval by testing the parent engine in a vehicle using the procedure described in Appendix 1 of this Annex.]

F3 6.1.2. Section 7.2.1 of Annex 10 to UN/ECE Regulation No 49 shall be understood as follows:

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F3 6.1.3. Section 7.3 of Annex 10 to UN/ECE Regulation No 49 shall be understood as follows:

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F3 6.1.3.1. ....

F3 6.1.3.2. ....

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<sup>F3</sup>6.1.4. Section 7.5.4 of Annex 10 to UN/ECE Regulation No 49 shall be understood as follows:

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<sup>F3</sup>6.1.5. Section 7.5.5 of Annex 10 to UN/ECE Regulation No 49 shall be understood as follows:

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<sup>F3</sup>6.1.6. Section 7.5.6 of Annex 10 to UN/ECE Regulation No 49 shall be understood as follows:

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## <sup>F2</sup>6.2. **Dual-fuel engines and vehicles**

The PEMS demonstration test at type-approval required by Annex 10 to UNECE Regulation No 49 shall be performed by testing the parent engine of a dual-fuel engine family when operating in dual-fuel mode.

6.2.1. In the case of Type 1B, Type 2B and Type 3B dual-fuel engines, an additional PEMS test shall be performed in diesel mode on the same engine and vehicle immediately after or before the PEMS demonstration test performed in dual-fuel mode.

In that case, certification can only be granted if both the PEMS demonstration test in dual-fuel mode and the PEMS demonstration test in diesel mode have concluded to a pass.

6.3. Additional requirements with respect to in-use vehicle testing will be specified at a later stage in accordance with Article 14(3) of this Regulation.]

## <sup>F17</sup> STATEMENT OF OFF-CYCLE EMISSION COMPLIANCE

7.1. The statement of off-cycle emission compliance shall be drawn up in accordance with paragraph 10 of Annex 10 to UNECE Regulation No 49, with the exception set out in point 7.1.1.

7.1.1. The first subparagraph of paragraph 10 of Annex 10 to UNECE Regulation No 49 shall be understood as follows:

Statement of off-cycle emission compliance

In the application for type-approval, the manufacturer shall provide a statement that the engine family or vehicle complies with the requirements set out in this Regulation limiting off-cycle emissions. In addition to this statement, compliance with the applicable emission limits and in-use requirements shall be verified through additional tests.]

## <sup>F48</sup> **DOCUMENTATION**

Paragraph 11 of Annex 10 to UNECE Regulation No 49 shall be understood as follows:

The Approval Authority shall require that the manufacturer provides a documentation package. This should describe any element of design and emission control strategy of the engine system and the means by which it controls its output variables, whether that control is direct or indirect.

The information shall include a full description of the emission control strategy. In addition, this shall include information on the operation of all AES and BES, including a description of the parameters that are modified by any AES and the boundary

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conditions under which the AES operate, and indication of which AES and BES are likely to be active under the conditions of the test procedures in this Annex.

This documentation package shall be provided in accordance with the provisions of Section 8 of Annex I to this Regulation.]

Textual Amendments

F4 Substituted by Commission Regulation (EU) 2016/1718 of 20 September 2016 amending Regulation (EU) No 582/2011 with respect to emissions from heavy-duty vehicles as regards the provisions on testing by means of portable emission measurement systems (PEMS) and the procedure for the testing of the durability of replacement pollution control devices (Text with EEA relevance).

F39. STATEMENT OF OFF-CYCLE EMISSION COMPLIANCE

[F3 .....

F3 .....]

9.1. ....

F310. DOCUMENTATION

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## [<sup>F5</sup>Appendix 1

### **PEMS demonstration test at type-approval**

#### 1. INTRODUCTION

This Appendix describes the procedure for PEMS demonstration test at type-approval.

#### 2. TEST VEHICLE

2.1. The vehicle used for demonstrating the PEMS demonstration test shall be representative for the vehicle category intended for the installation of the engine system. The vehicle may be a prototype vehicle or an adapted production vehicle.

2.2. The availability and conformity of the ECU data-stream information shall be demonstrated (for example following the provision of Section 5 of Annex II to this Regulation).

[<sup>F6</sup>2.3. Manufacturers shall ensure that vehicles can be tested with PEMS by an independent party on public roads by making available suitable adapters for exhaust pipes, granting access to ECU signals and making the necessary administrative arrangements. The manufacturer may charge a reasonable fee as set out in Article 7(1) of Regulation (EC) No 715/2007.]

#### **Textual Amendments**

**F6** Inserted by [Commission Regulation \(EU\) 2016/1718 of 20 September 2016 amending Regulation \(EU\) No 582/2011 with respect to emissions from heavy-duty vehicles as regards the provisions on testing by means of portable emission measurement systems \(PEMS\) and the procedure for the testing of the durability of replacement pollution control devices \(Text with EEA relevance\).](#)

#### 3. TEST CONDITIONS

##### [<sup>F4</sup>3.1. **Vehicle payload**

For the purpose of the PEMS demonstration test, the payload may be reproduced and an artificial load may be used.

The vehicle payload shall be 50-60 % of the maximum vehicle payload. The additional requirements set out in Annex II shall apply.]

##### 3.2. **Ambient conditions**

The test shall be conducted under ambient conditions as described in point 4.2 of Annex II.

3.3. The engine coolant temperature shall be in accordance with point 4.3 of Annex II.

##### 3.4. **Fuel, lubricants and reagent**

The fuel, lubricating oil and reagent for the exhaust after-treatment system shall follow the provisions of points 4.4 to 4.4.3 of Annex II.

##### 3.5. **Trip and operational requirements**

The trip and operational requirements shall be those described in points 4.5 to 4.6.8 of Annex II.

#### 4. EMISSIONS EVALUATION

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- 4.1. The test shall be conducted and the test results calculated in accordance with Section 6 of Annex II.
5. REPORT
- 5.1. A technical report describing the PEMS demonstration test shall show the activities and results and give at least the following information:
- (a) General information as described in points 10.1.1 to 10.1.1.14 of Annex II.
  - (b) Explanation as to why the vehicle(s)<sup>(1)</sup> used for the test can be considered to be representative for the category of vehicles intended for the engine system.
  - (c) Information about test equipment and test data as described in points 10.1.3 to 10.1.4.8 of Annex II.
  - (d) Information about the tested engine as described in points 10.1.5 to 10.1.5.20 of Annex II.
  - (e) Information about the vehicle used for the test as described in points 10.1.6 to 10.1.6.18 of Annex II.
  - (f) Information about the route characteristics as described in points 10.1.7 to 10.1.7.7 of Annex II.
  - (g) Information about instantaneous measured and calculated data as described in points 10.1.8 to 10.1.9.24 of Annex II.
  - (h) Information about averaged and integrated data as described in points 10.1.10 to 10.1.10.12 of Annex II.
  - (i) Pass-fail results as described in points 10.1.11 to 10.1.11.13 of Annex II.
  - (j) Information about test verifications as described in points 10.1.12 to 10.1.12.5 of Annex II.]

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(1) [<sup>F5</sup>Vehicle or vehicles in the case of a secondary engine.]

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**Textual Amendments**

**F5** Inserted by [Commission Regulation \(EU\) No 64/2012 of 23 January 2012 amending Regulation \(EU\) No 582/2011 implementing and amending Regulation \(EC\) No 595/2009 of the European Parliament and of the Council with respect to emissions from heavy duty vehicles \(Euro VI\) \(Text with EEA relevance\)](#).

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