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Commission Regulation (EU) No 582/2011 of 25 May 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) and amending Annexes I and III to Directive 2007/46/EC of the European Parliament and of the Council (Text with EEA relevance)

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## ANNEX X

### ON-BOARD DIAGNOSTICS

#### 6. IN USE PERFORMANCE REQUIREMENTS

The requirements of this Section shall apply to the OBD system monitors in accordance with the provisions of Annex 9C to UN/ECE Regulation No 49.

##### 6.1. Technical requirements

6.1.1. The technical requirements for assessing the in-use performance of OBD systems including requirements concerning communication protocols, numerators, denominators and their increment shall be those set out in Annex 9C to UN/ECE Regulation No 49.

6.1.2. In particular, the in-use performance ratio ( $IUPR_m$ ) of a specific monitor  $m$  of the OBD system shall be calculated by the following formula:

$$IUPR_m = \text{Numerator}_m / \text{Denominator}_m$$

where:

‘ $\text{Numerator}_m$ ’ means the numerator of a specific monitor  $m$  and is a counter indicating the number of times a vehicle has been operated in such a way that all monitoring conditions necessary for that specific monitor to detect a malfunction have been encountered; and

‘ $\text{Denominator}_m$ ’ means the denominator of a specific monitor  $m$  and is a counter indicating the number of vehicle driving cycles that are of relevance to that specific monitor (or, ‘in which events occur that are of relevance to that specific monitor’).

6.1.3. The in-use performance ratio ( $IUPR_g$ ) of a group  $g$  of monitors on board a vehicle is calculated by the following formula:

$$IUPR_g = \text{Numerator}_g / \text{Denominator}_g$$

where:

‘ $\text{Numerator}_g$ ’ means the numerator of a group  $g$  of monitors and is the actual value ( $\text{Numerator}_m$ ) of the specific monitor  $m$  that has the lowest in-use performance ratio as defined in Section 6.1.2 of all monitors within that group  $g$  of monitors on board a particular vehicle; and

‘ $\text{Denominator}_g$ ’ means the denominator of a group  $g$  of monitors and is the actual value ( $\text{Denominator}_m$ ) of the specific monitor  $m$  that has the lowest in-use performance ratio as defined in Section 6.1.2 of all monitors within that group  $g$  of monitors on board a particular vehicle.

##### 6.2. Minimum in-use performance ratio

6.2.1. The in-use performance ratio  $IUPR_m$  of a monitor  $m$  of the OBD system as defined in Section 5 of Annex 9C to UN/ECE Regulation No 49, shall be greater than or equal to the minimum in-use-performance ratio  $IUPR_m(\text{min})$  applicable to the monitor  $m$  throughout the useful life of the engine as specified in Article 4 of Regulation (EC) No 595/2009.

6.2.2. The value of minimum in-use-performance ratio  $IUPR(\text{min})$  is 0,1 for all monitors.

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6.2.3. The requirement of Section 6.2.1 is deemed to be fulfilled if for all groups of monitors g the following conditions are met:

6.2.3.1. The average value  $\overline{IUPR_g}$  of the values  $IUPR_g$  of all vehicles equipped with engines belonging to the OBD engine family under consideration is equal to or above  $IUPR(\min)$ , and

6.2.3.2. more than 50 % of all engines considered in Section 6.2.3.1 have an  $IUPR_g$  equal to or above  $IUPR(\min)$ .

### 6.3. Documentation requirements

6.3.1. The documentation associated with each monitored component or system and required by Section 8 of Annex 9B to UN/ECE Regulation No 49 shall include the following information concerning in-use performance data:

- (a) the criteria used for incrementing the numerator and the denominator;
- (b) any criterion for disabling incrementation of the numerator or of the denominator.

6.3.1.1. Any criterion for disabling incrementation of the general denominator shall be added to the documentation referred to in Section 6.3.1.

### 6.4. Statement of OBD in-use Performance compliance

6.4.1. In the application for type-approval, the manufacturer shall provide a statement of OBD in-use Performance compliance in accordance with the model set out in Appendix 6. In addition to this statement, compliance with the requirements of Section 6.1 shall be verified through the additional assessment rules specified in Section 6.5.

6.4.2. This statement referred to in point 6.4.1 shall be attached to the documentation related to the OBD engine family required by points 5 and 6.3 of this Annex.

6.4.3. The manufacturer shall maintain records which contain all test data, engineering and manufacturing analyses, and other information which provides the basis for the OBD in-use performance compliance statement. The manufacturer shall make such information available to the approval authority upon request.

6.4.4. During the phase-in period set out in Article 4(7), the manufacturer shall be exempted from providing the statement required by Section 6.4.1.

### 6.5. Assessment of the in-use performance

6.5.1. The OBD in-use performance and compliance with Section 6.2.3 of this Annex shall be demonstrated at least according to the procedure set out in Appendix 4 to this Annex.

6.5.2. National authorities and their delegates may pursue further tests to verify compliance with Section 6.2.3 of this Annex.

6.5.2.1. To demonstrate non-compliance with the requirements of Section 6.2.3 of this Annex, based on the provision of Section 6.5.2 of this Annex, the authorities must show for at least one of the requirements of Section 6.2.3 of this Annex non-compliance with a statistical confidence level of 95 %, based on a sample of at least 30 vehicles.

6.5.2.2. The manufacturer shall have the opportunity to establish compliance with the requirements of Section 6.2.3 of this Annex, for which non-compliance was demonstrated according to Section 6.5.2.1 of this Annex, by using a test based on

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- a sample of at least 30 vehicles, with a better statistical confidence than the test mentioned in 6.5.2.1.
- 6.5.2.3. For tests performed according to Sections 6.5.2.1 and 6.5.2.2 both authorities and manufacturers must disclose relevant details, such as those relating to the selection of the vehicles, to the other party.
- 6.5.3. If non-compliance with the requirements of Section 6.2.3 of this Annex is established according to Sections 6.5.1 or 6.5.2 of this Annex, remedial measures in accordance with Article 13 shall be taken.
- 6.5.4. The reference to driving cycle in Annex 9C to UN/ECE Regulation No 49 shall be read as reference to Driving cycle as defined in Article 2 point 36 of this Regulation.
- 6.5.5. During the phase-in period set out in Article 4(7) the assessment of the in-use performance of OBD systems shall be conducted in accordance with the provisions set out in Appendix 5.
- 6.5.5.1. During the phase-in period set out in Article 4(7) compliance of the OBD systems with the requirements of Section 6.2.3 of this Annex is not mandatory.

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