

**COMMISSION DELEGATED REGULATION (EU) 2018/987****of 27 April 2018****amending and correcting Delegated Regulation (EU) 2017/655 supplementing Regulation (EU) 2016/1628 of the European Parliament and of the Council with regard to monitoring of gaseous pollutant emissions from in-service internal combustion engines installed in non-road mobile machinery****(Text with EEA relevance)**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC <sup>(1)</sup>, and in particular Article 19(2) thereof,

Whereas:

- (1) Commission Delegated Regulation (EU) 2017/655 <sup>(2)</sup> lays down, inter alia, the procedures for the monitoring of gaseous pollutant emissions from in-service internal combustion engines installed in non-road mobile machinery.
- (2) Pursuant to Table III-1 of Annex III to Regulation (EU) 2016/1628, the mandatory dates of application for EU type-approval and placing on the market of engines of sub-category NRE-v-5 is one year later than for engines of sub-category NRE-v-6.
- (3) Therefore, to facilitate manufacturers of these NRE-v-5 engines of lower power ranges to comply with the limit dates for submitting test results to the approval authorities set out in Delegated Regulation (EU) 2017/655, the required duration of accumulated service of in-service internal combustion engines installed in non-road mobile machinery and tested in the framework of monitoring of gaseous pollutant emissions should be reduced for that sub-category of engines.
- (4) For the purpose of clarity, it should be stated in Appendix 5 of the Annex to Delegated Regulation (EU) 2017/655 that the reference work and reference CO<sub>2</sub> mass used by the manufacturer in the procedures for the calculation of gaseous pollutant emissions for an engine type, or any engine type within the same engine family, are those specified in the addendum of the EU type-approval certificate of the engine type, or the engine family, in accordance with the template set out in Annex IV to Commission Implementing Regulation (EU) 2017/656 <sup>(3)</sup>.
- (5) To avoid mistakes in the rounding of gaseous pollutant emissions calculations, it should be clarified that the applicable exhaust emissions limit values are set out in Article 18(2) of Regulation (EU) 2016/1628.
- (6) To ensure the internal consistency of the Delegated Regulation (EU) 2017/655 and to align it with Commission Delegated Regulation (EU) 2017/654 <sup>(4)</sup>, certain measurement units should be revised.
- (7) Following the publication of Delegated Regulation (EU) 2017/655, errors of different types, including incorrect assignment of responsibilities and mistakes in certain equations, have been detected and need to be corrected.
- (8) Delegated Regulation (EU) 2017/655 should therefore be amended and corrected accordingly,

<sup>(1)</sup> OJ L 252, 16.9.2016, p. 53.

<sup>(2)</sup> Commission Delegated Regulation (EU) 2017/655 of 19 December 2016 supplementing Regulation (EU) 2016/1628 of the European Parliament and of the Council with regard to monitoring of gaseous pollutant emissions from in-service internal combustion engines installed in non-road mobile machinery (OJ L 102, 13.4.2017, p. 334).

<sup>(3)</sup> Commission Implementing Regulation (EU) 2017/656 of 19 December 2016 laying down the administrative requirements relating to emission limits and type-approval of internal combustion engines for non-road mobile machinery in accordance with Regulation (EU) 2016/1628 of the European Parliament and of the Council (OJ L 102, 13.4.2017, p. 364).

<sup>(4)</sup> Commission Delegated Regulation (EU) 2017/654 of 19 December 2016 supplementing Regulation (EU) 2016/1628 of the European Parliament and of the Council with regard to technical and general requirements relating to emission limits and type-approval for internal combustion engines for non-road mobile machinery (OJ L 102, 13.4.2017, p. 1).

HAS ADOPTED THIS REGULATION:

*Article 1*

**Amendments to Delegated Regulation (EU) 2017/655**

Delegated Regulation (EU) 2017/655 is amended as follows:

(1) the following Article 3a is inserted:

*‘Article 3a*

**Transitional provisions**

1. Notwithstanding the application of the provisions of this Regulation, as amended by Commission Delegated Regulation (EU) 2018/987 (\*), approval authorities shall, until 31 December 2018, also continue to grant EU type-approvals to engine types or engine families in accordance with this Regulation, in its version applicable on 6 August 2018.;

2. Notwithstanding the application of the provisions of this Regulation, as amended by Delegated Regulation (EU) 2018/987, the Member States shall, until 30 June 2019, also permit the placing on the market of engines based on an engine type approved in accordance with this Regulation, in its version applicable on 6 August 2018.

(\*) Commission Delegated Regulation (EU) 2018/987 of 27 April 2018 amending and correcting Delegated Regulation (EU) 2017/655 supplementing Regulation (EU) 2016/1628 of the European Parliament and of the Council with regard to monitoring of gaseous pollutant emissions from in-service internal combustion engines installed in non-road mobile machinery (OJ L 182, 18.7.2018, p. 40).;

(2) the Annex to Delegated Regulation (EU) 2017/655 is amended in accordance with Annex I to this Regulation.

*Article 2*

**Corrections to Delegated Regulation (EU) 2017/655**

The Annex to Delegated Regulation (EU) 2017/655 is corrected in accordance with Annex II to this Regulation.

*Article 3*

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 27 April 2018.

*For the Commission*  
*The President*  
Jean-Claude JUNCKER

## ANNEX I

The Annex to Delegated Regulation (EU) 2017/655 is amended as follows:

(1) points 2.6.1.1 and 2.6.1.2 are replaced by the following:

‘2.6.1.1. Testing 9 engines with an accumulated service of less than *a* % of the EDP, in accordance with Table 1. Test results shall be submitted to the approval authority by 31 December 2022.

2.6.1.2. Testing 9 engines with an accumulated service higher than *b* % of the EDP, in accordance with Table 1. Test reports shall be submitted to the approval authority by 31 December 2024.’;

(2) in point 2.6.1.3, the following Table 1 is added:

‘Table 1

**% of EDP values**

Reference power of selected engine (kW)	<i>a</i>	<i>b</i>
$56 \leq P < 130$	20	55
$130 \leq P \leq 560$	30	70’;

(3) point 2.6.2.1 is replaced by the following:

‘2.6.2.1. The test results of the first nine engines shall be submitted not later than 12 months after the first engine was installed in a non-road mobile machinery and not later than 18 months after starting the production of the approved engine type or engine family.’;

(4) point 3.1.1 is replaced by the following:

‘3.1.1. The non-road mobile machinery’s operator performing the in-service monitoring test may be other than the usual professional one if the manufacturer demonstrates to the approval authority that the designated operator has attained enough skills and training to operate the non-road mobile machine.’;

(5) in Appendix 3, in point 4.1, the table is replaced by the following:

‘Table

**Tolerances**

Slope of the regression line, <i>m</i>	0,9 to 1,1 – Recommended
Coefficient of determination, <i>r</i> <sup>2</sup>	min. 0,90 – Mandatory’;

(6) Appendix 5 is amended as follows:

(a) the following point 2.1.5 is inserted before Figure 1:

‘2.1.5. The reference work and reference CO<sub>2</sub> mass of an engine type, or for all engine types within the same engine family, shall be those specified in points 11.3.1 and 11.3.2 of the addendum to the EU type approval certificate of the engine type or the engine family, as set out in Annex IV to Commission Implementing Regulation (EU) 2017/656 (\*).

(\*) Commission Implementing Regulation (EU) 2017/656 of 19 December 2016 laying down the administrative requirements relating to emission limits and type-approval of internal combustion engines for non-road mobile machinery in accordance with Regulation (EU) 2016/1628 of the European Parliament and of the Council (OJ L 102, 13.4.2017, p. 364).’;

(b) point 3 is replaced by the following:

**‘3. Rounding of gaseous pollutant emissions calculations**

In accordance with Standard ASTM E 29-06b (Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications), the final test results shall be rounded in one step to the number of places to the right of the decimal point indicated by the applicable exhaust emissions limit values set out in Article 18(2) of Regulation (EU) 2016/1628 plus one additional significant figure.’

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## ANNEX II

The Annex to Delegated Regulation (EU) 2017/655 is corrected as follows:

(1) point 5.1 is replaced by the following:

‘5.1. The ECU shall provide data stream information to the measurement instruments or data logger of the Portable Emissions Measurement System (PEMS) in accordance with the requirements set out in Appendix 7.’;

(2) points 6.1 to 6.4 are replaced by the following:

‘6.1. In-service monitoring tests shall be conducted using PEMS in accordance with Appendix 1.

6.2. Manufacturers shall comply with the test procedure set out in Appendix 2 with regard to the in-service monitoring of engines installed on non-road mobile machinery using a PEMS.

6.3. Manufacturers shall follow the procedures set out in Appendix 3 for the pre-processing of the data resulting of the in-service monitoring of engines installed on non-road mobile machinery using a PEMS.

6.4. Manufacturers shall follow the procedures set out in Appendix 4 for the determination of valid events during an in-service monitoring test of engines installed on non-road mobile machinery using a PEMS.’;

(3) point 8 is replaced by the following:

**‘8. Calculations**

Manufacturers shall follow the procedures set out in Appendix 5 for the gaseous pollutant emissions calculations for the in-service monitoring of engines installed on non-road mobile machinery using a PEMS.’;

(4) in point 10.1, the first sentence is replaced by the following:

‘Manufacturers shall draft a test report of the in-service monitoring of engines installed on non-road mobile machinery using a PEMS for each engine tested.’;

(5) Appendix 5 is corrected as follows:

(a) point 2.2.1 is replaced by the following:

‘2.2.1. Calculations of the brake specific gaseous pollutant emissions

The brake-specific gaseous pollutant emissions  $e_{gas}$  (g/kWh) shall be calculated for each averaging window and each gaseous pollutant in the following way:

$$e_{gas} = \frac{m_i}{W(t_{2,i}) - W(t_{1,i})}$$

Where:

—  $m_i$  is the mass emission of the gaseous pollutant during the  $i^{th}$  averaging window, g/averaging window,

—  $W(t_{2,i}) - W(t_{1,i})$  is the engine work during the  $i^{th}$  averaging window, kWh.’;

(b) point 2.2.3 is replaced by the following:

‘2.2.3. Calculations of the conformity factors

The conformity factors shall be calculated for each individual valid averaging window and each individual gaseous pollutant in the following way:

$$CF = \frac{e_{gas}}{L}$$

Where:

—  $e_{gas}$  is the brake-specific emission of the gaseous pollutant, g/kWh;

—  $L$  is the applicable limit, g/kWh.’;

(c) in point 2.3, in the legend for the first equation, the indents relating to  $m_{\text{CO}_2}(t_{j,i})$  and  $m_{\text{CO}_2,\text{ref}}$  are replaced by the following:

‘—  $m_{\text{CO}_2}(t_{j,i})$  is the CO<sub>2</sub> mass measured between the test start and time  $t_{j,i}$ , g;

—  $m_{\text{CO}_2,\text{ref}}$  is the CO<sub>2</sub> mass determined for the NRTC, g;’;

(d) in point 2.3.1, in the legend for the equation, the indent relating to  $P_{\text{max}}$  is replaced by the following:

‘—  $P_{\text{max}}$  is the maximum net power, as defined in Article 3(28) of Regulation (EU) 2016/1628, kW;’;

(e) point 2.3.2 is replaced by the following:

‘2.3.2. Calculations of the conformity factors

The conformity factors shall be calculated for each individual averaging window and each individual pollutant in the following way:

$$CF = \frac{CF_I}{CF_C}$$

With

$$CF_I = \frac{m_i}{m_{\text{CO}_2}(t_{2,i}) - m_{\text{CO}_2}(t_{1,i})} \text{ (in service ratio) and}$$

$$CF_C = \frac{m_L}{m_{\text{CO}_2,\text{ref}}} \text{ (certification ratio)}$$

Where:

—  $m_i$  is the mass emission of the gaseous pollutant during the  $i^{\text{th}}$  averaging window, g/averaging window,

—  $m_{\text{CO}_2}(t_{2,i}) - m_{\text{CO}_2}(t_{1,i})$  is the CO<sub>2</sub> mass during the  $i^{\text{th}}$  averaging window, g;

—  $m_{\text{CO}_2,\text{ref}}$  is the engine CO<sub>2</sub> mass determined for the NRTC, g,

—  $m_L$  is the mass emission of gaseous pollutant corresponding to the applicable limit on the NRTC, g;’;

(6) in Appendix 8, point 2.8 is replaced by the following:

‘2.8. Engine total swept volume [cm<sup>3</sup>].’

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