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

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

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[(1)], and in particular Article 24(11), Article 25(4)(a), (b) and (c), Article 26(6), Article 34(9), Article 42(4), Article 43(5) and Article 48 thereof,

Whereas:

(1) In order to complete the framework established by Regulation (EU) 2016/1628, it is necessary to set out the technical and general requirements and test methods relating to emission limits, EU type-approval procedures for internal combustion engines for non-road mobile machinery, arrangements with regard to conformity of production and the requirements and procedures relating to technical services for those engines.

(2) By Council Decision 97/836/EC[(2)], the Union has acceded to the Agreement of the United Nations Economic Commission for Europe (UNECE) concerning the adoption of uniform technical prescriptions for wheeled vehicles, equipment and parts which can be fitted to and/or be used on wheeled vehicles and the conditions for reciprocal recognition of approvals granted on the basis of these prescriptions.

(3) With the aim to ensure that the provisions on the construction of engines to be installed in non-road mobile machinery correspond to the technical progress, the latest versions of CEN/Cenelec or ISO standards which are accessible to the public should be made applicable as regards to certain requirements.

(4) Checks on the conformity of engines with the applicable technical requirements throughout the production process are an essential part of the EU type-approval process. Therefore, checks on the conformity of production procedures should be further improved and aligned with the stricter procedures applicable to road vehicles in order to increase the overall efficiency of the EU type-approval process.

Changes to legislation: *There are currently no known outstanding effects for the Commission Delegated Regulation (EU) 2017/654. (See end of Document for details)*

(5) In order to ensure that technical services meet the same high level of performance standards in all Member States, this Regulation should set out the harmonised requirements with which technical services have to comply, as well as the procedure for the assessment of that compliance and for the accreditation of those services.

(6) For the sake of clarity, it is appropriate to align the numbering of test procedures in this Regulation with those in Global Technical Regulation No 11[(3)] and in UNECE Regulation 96[(4)],

HAS ADOPTED THIS REGULATION:

Article 1

Definitions

The following definitions shall apply:

(1) 'wobbe index' or 'W' means the ratio of the corresponding calorific value of a gas per unit volume and the square root of its relative density under the same reference conditions:

$$W = H_{gas} \times \sqrt{\rho_{air} / \rho_{gas}}$$

(2) 'λ-shift factor' or 'S_λ' means an expression that describes the required flexibility of the engine management system regarding a change of the excess-air ratio λ if the engine is fuelled with a gas composition different from pure methane;

(3) 'liquid-fuel mode' means the normal operating mode of a dual-fuel engine during which the engine does not use any gaseous fuel for any engine operating condition;

(4) 'dual-fuel mode' means the normal operating mode of a dual-fuel engine during which the engine simultaneously uses liquid fuel and a gaseous fuel at some engine operating conditions;

(5) 'particulate after-treatment system' means an exhaust after-treatment system designed to reduce emissions of particulate pollutants through a mechanical, aerodynamic, diffusional or inertial separation;

(6) 'governor' means a device or control strategy that automatically controls engine speed or load, other than an over-speed limiter as installed in an engine of category NRSh limiting the maximum engine speed for the sole purpose of preventing the engine operating at speeds in excess of a certain limit;

(7) 'ambient temperature' means, in relation to a laboratory environment (e.g. filter weighing room or chamber), the temperature within the specified laboratory environment;

(8) 'base emission control strategy' or 'BECS' means an emission control strategy that is active throughout the range of torque and speed over which the engine operates, unless an auxiliary emission control strategy (AECS) is activated;

(9) 'reagent' means any consumable or non-recoverable medium required and used for the effective operation of the exhaust after-treatment system;

(10) ‘auxiliary emission control strategy’ or ‘AECS’ means an emission control strategy that is activated and temporarily modifies a base emission control strategy (BECS) for a specific purpose and in response to a specific set of ambient and/or operating conditions and only remains in operation as long as those conditions exist;

(11) ‘good engineering judgment’ means judgments consistent with generally accepted scientific and engineering principles and available relevant information;

(12) ‘high speed’ or ‘n_{hi}’ means the highest engine speed where 70 % of the maximum power occurs;

(13) ‘low speed’ or ‘n_{lo}’ means the lowest engine speed where 50 % of the maximum power occurs;

(14) ‘maximum power’ or ‘P_{max}’ means the maximum power in kW as designed by the manufacturer;

(15) ‘partial flow dilution’ means the method of analysing the exhaust gas whereby a part of the total exhaust gas flow is separated, then mixed with an appropriate amount of dilution air prior to reaching the particulate sampling filter;

(16) ‘drift’ means the difference between a zero or calibration signal and the respective value reported by a measurement instrument immediately after it was used in an emission test;

(17) ‘to span’ means to adjust an instrument so that it gives a proper response to a calibration standard that represents between 75 % and 100 % of the maximum value in the instrument range or expected range of use;

(18) ‘span gas’ means a purified gas mixture used to span gas analysers;

(19) ‘HEPA filter’ means high-efficiency particulate air filters that are rated to achieve a minimum initial particle-removal efficiency of 99,97 % using ASTM F 1471–93;

(20) ‘calibration’ means the process of setting a measurement system's response to an input signal so that its output agrees with a range of reference signals;

(21) ‘specific emissions’ means the mass emissions expressed in g/kWh;

(22) ‘operator demand’ means an engine operator's input to control engine output;

(23) ‘maximum torque speed’ means the engine speed at which the maximum torque is obtained from the engine, as designed by the manufacturer;

(24) ‘engine governed speed’ means the engine operating speed when it is controlled by the installed governor;

(25) ‘open crankcase emissions’ means any flow from an engine's crankcase that is emitted directly into the environment;

(26) ‘probe’ means the first section of the transfer line which transfers the sample to the next component in the sampling system;

(27) ‘test interval’ means a duration of time over which brake-specific emissions are determined;

(28) ‘zero gas’ means a gas that yields the value zero as response to its input in an analyser;

Changes to legislation: *There are currently no known outstanding effects for the Commission Delegated Regulation (EU) 2017/654. (See end of Document for details)*

(29) 'zeroed' means that an instrument was adjusted in a manner that it gives a zero response to a zero calibration standard, such as purified nitrogen or purified air;

(30) 'variable-speed non-road steady-state test cycle'' (hereinafter 'variable-speed NRSC') means a non-road steady-state test cycle that is not a constant-speed NRSC;

(31) 'constant-speed non-road steady-state test cycle' (hereinafter 'constant-speed NRSC') means any of the following non-road steady-state test cycles defined in Annex IV to Regulation (EU) 2016/1628: D2, E2, G1, G2 or G3;

(32) 'updating-recording' means the frequency at which the analyser provides new, current, values;

(33) 'calibration gas' means a purified mixture of gases used to calibrate gas analysers;

(34) 'stoichiometric' means relating to the particular ratio of air and fuel such that if the fuel were fully oxidised, there would be no remaining fuel or oxygen;

(35) 'storage medium' means a particulate filter, sample bag, or any other storage device used for batch sampling;

(36) 'full flow dilution' means the method of mixing the exhaust gas flow with dilution air prior to separating a fraction of the diluted exhaust gas flow for analysis;

(37) 'tolerance' means the interval in which 95 % of a set of recorded values of a certain quantity shall lie, with the remaining 5 % of the recorded values deviating from the tolerance interval;

(38) 'service mode' means a special mode of a dual-fuel engine that is activated for the purpose of repairing, or of moving the non-road mobile machinery to a safe location when operation in the dual-fuel mode is not possible;

Article 2

Requirements for any other specified fuels, fuel mixtures or fuel emulsions

The reference fuels and other specified fuels, fuel mixtures or fuel emulsions included by a manufacturer in an application for EU type-approval as referred to in Article 25(2) of Regulation (EU) 2016/1628 shall comply with the technical characteristics and be described in the information folder as laid down in Annex I to this Regulation.

Article 3

Arrangements with regard to conformity of production

In order to ensure that the engines in production conform to the approved type in accordance with Article 26(1) of Regulation (EU) 2016/1628, the approval authorities shall take the measures and follow the procedures laid down in Annex II to this Regulation.

***Changes to legislation:** There are currently no known outstanding effects for the Commission Delegated Regulation (EU) 2017/654. (See end of Document for details)*

[F1 Article 4

Methodology for adapting the emission laboratory test results to include the deterioration factors

The emission laboratory test results shall be adapted to include the deterioration factors, comprising those related with the measurement of the particle number (PN) and with gaseous-fuelled engines, referred to in Article 25(1)(c) of Regulation (EU) 2016/1628, in accordance with the methodology laid down in Annex III to this Regulation.**]**

Textual Amendments

F1 Substituted by Commission Delegated Regulation (EU) 2018/989 of 18 May 2018 amending and correcting Delegated Regulation (EU) 2017/654 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 (Text with EEA relevance).

Article 5

Requirements with regard to emission control strategies, NO_x control measures and particulate control measures

The measurements and tests in respect of the emission control strategies referred to in Article 25(3)(f)(i) of Regulation (EU) 2016/1628 and of the NO_x control measures referred to in Article 25(3)(f)(ii) of that Regulation and the particulate pollutant emission control measures, as well as the documentation required to demonstrate them, shall be conducted in compliance with the technical requirements laid down in Annex IV to this Regulation.

Article 6

Measurements and tests with regard to the area associated with the non-road steady-state test cycle

The measurements and tests with regard to the area referred to in Article 25(3)(f)(iii) of Regulation (EU) 2016/1628 shall be conducted in compliance with the detailed technical requirements laid down in Annex V to this Regulation.

Article 7

Conditions and methods for the conduct of tests

The conditions for conduct of the tests referred to in Articles 25(3)(a) and (b) of Regulation (EU) 2016/1628, the methods for determining the engine load and speed settings referred to in Article 24 of that Regulation, the methods for taking account of emissions of crankcase gases referred to in Article 25(3)(e)(i) of that Regulation and the methods for determining and taking account of continuous and periodic regeneration of