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To:	General Secretariat of the Council
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Subject:	ANNEXES to the Commission Regulation supplementing Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information, amending Directive 2007/46/EC of the European Parliament and of the Council, Commission Regulation (EC) No 692/2008 and Commission Regulation (EU) No 1230/2012 and repealing Regulation (EC) No 692/2008

Delegations will find attached document D045884/03 ANNEXES 4 to 16.

Encl.: D045884/03 ANNEXES 4 to 16



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ANNEXES 4 to 16

ANNEXES

to the

Commission Regulation

supplementing Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information, amending Directive 2007/46/EC of the European Parliament and of the Council, Commission Regulation (EC) No 692/2008 and Commission Regulation (EU) No 1230/2012 and repealing Regulation (EC) No 692/2008

ANNEX IV

**EMISSIONS DATA REQUIRED AT TYPE-APPROVAL FOR ROADWORTHINESS
PURPOSES**

Appendix 1

MEASURING CARBON MONOXIDE EMISSION AT ENGINE IDLING SPEEDS

(TYPE 2 TEST)

1. INTRODUCTION

1.1. This appendix describes the procedure for the type 2 test, measuring carbon monoxide emissions at engine idling speeds (normal and high).

2. GENERAL REQUIREMENTS

2.1. The general requirements shall be those specified in section 5.3.2 and paragraphs 5.3.7.1 to 5.3.7.6 of UN/ECE Regulation No 83, with the exception set out in section 2.2.

2.2. The table referred to in paragraph 5.3.7.5. of UN/ECE Regulation No 83 shall be understood as the table for the Type 2 test in section 2.1 the Addendum to Appendix 4 to Annex I to this Regulation.

3. TECHNICAL REQUIREMENTS

3.1. The technical requirements shall be those set out in Annex 5 to UN/ECE Regulation No 83, with the exceptions set out in sections 3.2. and 3.3.

3.2. The reference fuel specifications referred to in paragraph 2.1 of Annex 5 to UN/ECE Regulation No 83 shall be understood as referring to the appropriate reference fuel specifications in Annex IX to this Regulation.

3.3. Reference to the Type I test in paragraph 2.2.1. of Annex 5 to UN/ECE Regulation No 83 shall be understood as referring to the Type 1 test in Annex XXI to this Regulation.

Appendix 2

MEASUREMENT OF SMOKE OPACITY

1. INTRODUCTION

1.1. This Appendix describes the requirements for measuring the opacity of exhaust emissions.

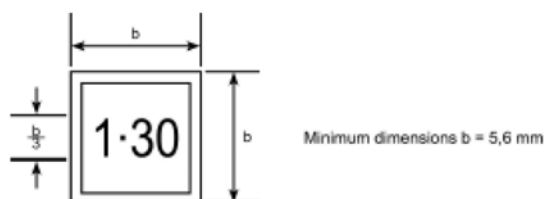
2. SYMBOL OF THE CORRECTED ABSORPTION COEFFICIENT

2.1. A symbol of the corrected absorption coefficient shall be affixed to every vehicle conforming to a vehicle type to which this test applies. The symbol shall be a rectangle surrounding a figure expressing in m^{-1} the corrected absorption coefficient obtained, at the time of approval, from the test under free acceleration. The test method is described in section 4.

2.2. The symbol shall be clearly legible and indelible. It shall be fixed in a conspicuous and readily accessible place, the location of which shall be specified in the Addendum to the type-approval certificate shown in Appendix 4 to Annex I.

2.3. Figure IV.2.1 gives an example of the symbol.

Figure IV.2.1



The above symbol shows that the corrected absorption coefficient is $1,30 \text{ m}^{-1}$.

3. SPECIFICATIONS AND TESTS

3.1. The specifications and tests shall be those set out in Part III, section 24, of UN/ECE Regulation No 24¹, with the exception to these procedures set out in section 3.2.

3.2. The reference to Annex 2 in paragraph 24.1 of UN/ECE Regulation No 24 shall be understood as a reference to Appendix 4 to Annex I to this Regulation.

¹ OJ L 326, 24.11.2006

4. TECHNICAL REQUIREMENTS

4.1. The technical requirements shall be those set out in Annexes 4, 5, 7, 8, 9 and 10 to UN/ECE Regulation No 24, with the exceptions set out in sections 4.2., 4.3 and 4.4.

4.2. Test at steady engine speeds over the full load curve

4.2.1. The references to Annex 1 in paragraph 3.1. of Annex 4 of UN/ECE Regulation No 24 shall be understood as references to Appendix 3 to Annex I to this Regulation.

4.2.2. The reference fuel specified in paragraph 3.2 of Annex 4 of UN/ECE Regulation No 24 shall be understood as reference to the reference fuel in Annex IX to this Regulation appropriate to the emission limits against which the vehicle is being type approved.

4.3. Test under free acceleration

4.3.1. The references to Table 2, Annex 2 in paragraph 2.2 of Annex 5 to UN/ECE Regulation No 24 shall be understood as references to the table under point 2.4.2.1 of Appendix 4 to Annex I to this Regulation.

4.3.2. The references to paragraph 7.3 of Annex 1 in paragraph 2.3 of Annex 5 to UN/ECE Regulation No 24 shall be understood as references to Appendix 3 to Annex I to this Regulation.

4.4. 'ECE' method of measuring the net power of C.I. engines

4.4.1. The references in paragraph 7 of Annex 10 to UN/ECE Regulation No 24 to the 'Appendix to this Annex' and in paragraphs 7 and 8 of Annex 10 to UN/ECE Regulation No 24 to 'Annex 1' shall be understood as references to Appendix 3 to Annex I to this Regulation.

ANNEX V

VERIFYING EMISSIONS OF CRANKCASE GASES

(TYPE 3 TEST)

1. INTRODUCTION

1.1. This Annex describes the procedure for the type 3 test verifying emissions of crankcase gases as described in section 5.3.3. of UN/ECE Regulation No 83.

2. GENERAL REQUIREMENTS

2.1. The general requirements for conducting the type 3 test shall be those set out in sections 1 and 2 of Annex 6 to UN/ECE Regulation No 83, with the exceptions set out in points 2.2 and 2.3 below.

2.2. Reference to the Type I test in paragraph 2.1. of Annex 6 to UN/ECE Regulation No 83 shall be understood as referring to the Type 1 test in Annex XXI to this Regulation.

2.3. The road load coefficients to be used shall be those for VL. If VL low does not exist the VH road load shall be used.

3. TECHNICAL REQUIREMENTS

3.1. The technical requirements shall be those set out in section 3 to 6 of Annex 6 to UN/ECE Regulation No 83, with the exception set out in point 3.2 below.

3.2. References to the Type I test in paragraph 3.2. of Annex 6 to UN/ECE Regulation No 83 shall be understood as referring to the Type 1 test in Annex XXI to this Regulation.

ANNEX VI

DETERMINATION OF EVAPORATIVE EMISSIONS

(TYPE 4 TEST)

1. INTRODUCTION

1.1. This Annex describes the procedure for the Type 4 test, which determines the emission of hydrocarbons by evaporation from the fuel systems of vehicles with positive ignition engines.

2. TECHNICAL REQUIREMENTS

2.1. Introduction

The procedure includes the evaporative emissions test and two additional tests, one for the aging of the carbon canister, as described in point 5.1, and one for the permeability of the fuel storage system, as described in point 5.2.

The evaporative emissions test (Figure VI.1) is designed to determine hydrocarbon evaporative emissions as a consequence of diurnal temperatures fluctuation, hot soaks during parking, and urban driving.

2.2 The evaporative emissions test consists of:

- a) Test drive including an urban (Part One) and an extra-urban (Part Two) driving cycle, followed by two urban (Part One) driving cycles,
- b) Hot soak loss determination,
- c) Diurnal loss determination.

The mass emissions of hydrocarbons from the hot soak and the diurnal loss phases are added up together with the permeability factor to provide an overall result for the test.

3. VEHICLE AND FUEL

3.1. Vehicle

3.1.1. The vehicle shall be in good mechanical condition and have been run in and driven at least 3,000 km before the test. For the purpose of the determination of evaporative emissions, the mileage and the age of the vehicle used for certification shall be recorded. The evaporative emission control system shall be connected and have been functioning correctly over the run in period and the carbon canister(s) shall have been subject to normal use, neither undergoing abnormal purging nor abnormal loading. The carbon canister(s) aged according to the procedure set out in paragraph 5.1 shall be connected as described in Figure VI.1.

3.2. Fuel

3.2.1. The Type 1 E10 reference fuel specified in Annex IX of this Regulation shall be used. For the purposes of this Regulation, E10 reference shall mean the Type 1 reference fuel, except for the canister aging, as set out in point 5.1.

4. TEST EQUIPMENT FOR EVAPORATIVE TEST

4.1. Chassis dynamometer

The chassis dynamometer shall meet the requirements of Appendix 1 of Annex 4a to UN/ECE Regulation No 83.

4.2. Evaporative emission measurement enclosure

The evaporative emission measurement enclosure shall meet the requirements of paragraph 4.2. of Annex 7 to UN/ECE Regulation No 83.

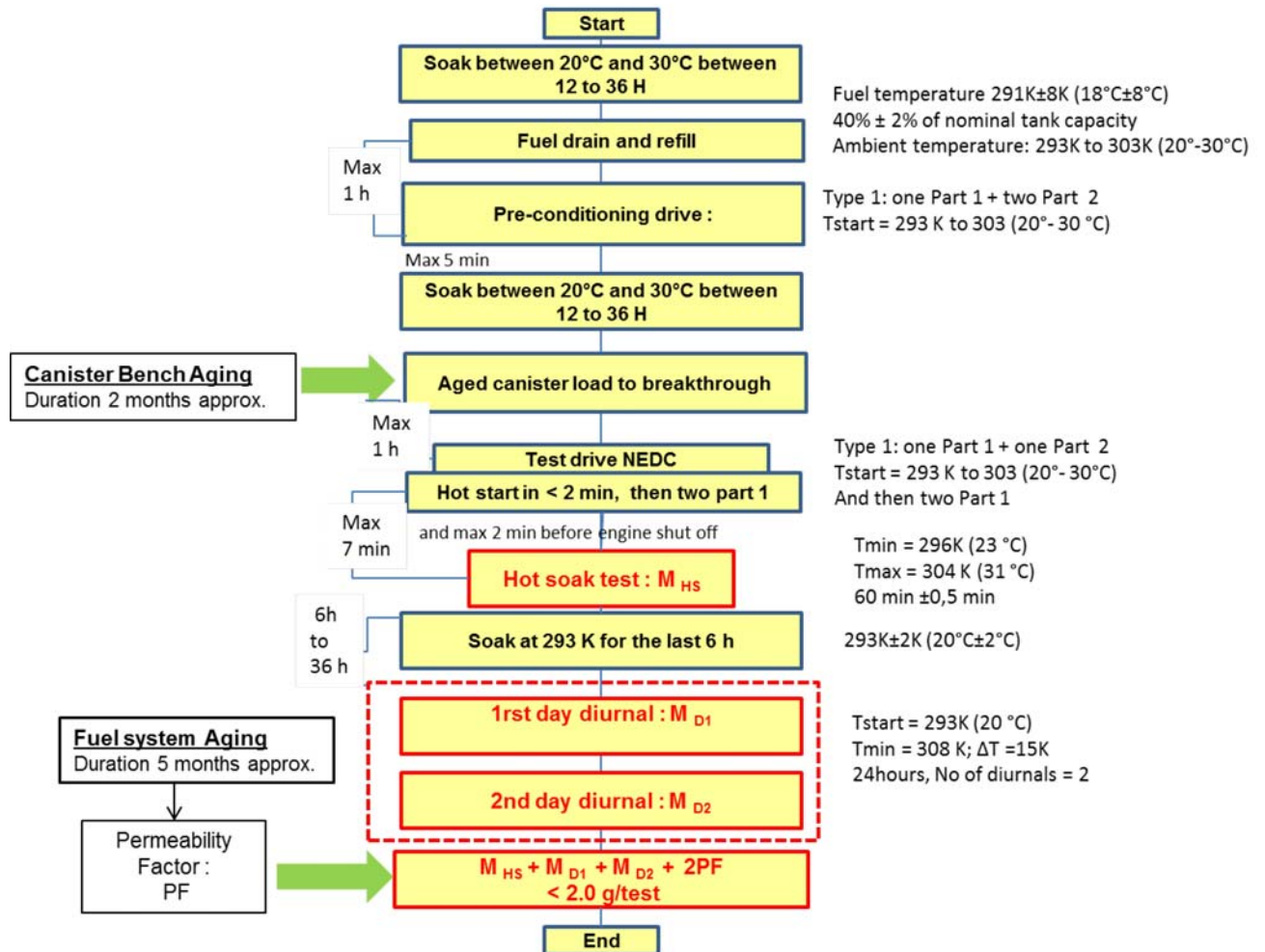
Figure VI.1: Determination of evaporative emissions

3,000 km run-in period (no excessive purge/load)

Use of aged of canister(s)

Steam-clean of vehicle (if necessary)

Reducing or removing non-fuel background emission sources (if agreed)



Notes:

1. Evaporative emission control families – as in paragraph 3.2 of Annex I

2. Exhaust emissions may be measured during Type 1 test drive but these are not used for legislative purposes. Exhaust emission legislative test remains separate.

4.3. Analytical systems

The analytical systems shall meet the requirements of paragraph 4.3. of Annex 7 to UN/ECE Regulation No 83.

4.4. Temperature recording

The temperature recording shall meet the requirements of paragraph 4.5. of Annex 7 to UN/ECE Regulation No 83.

4.5. Pressure recording

The pressure recording shall meet the requirements of paragraph 4.6. of Annex 7 to UN/ECE Regulation No 83.

4.6. Fans

The fans shall meet the requirements of paragraph 4.7. of Annex 7 to UN/ECE Regulation No 83.

4.7. Gases

The gases shall meet the requirements of paragraph 4.8. of Annex 7 to UN/ECE Regulation No 83.

4.8. Additional Equipment

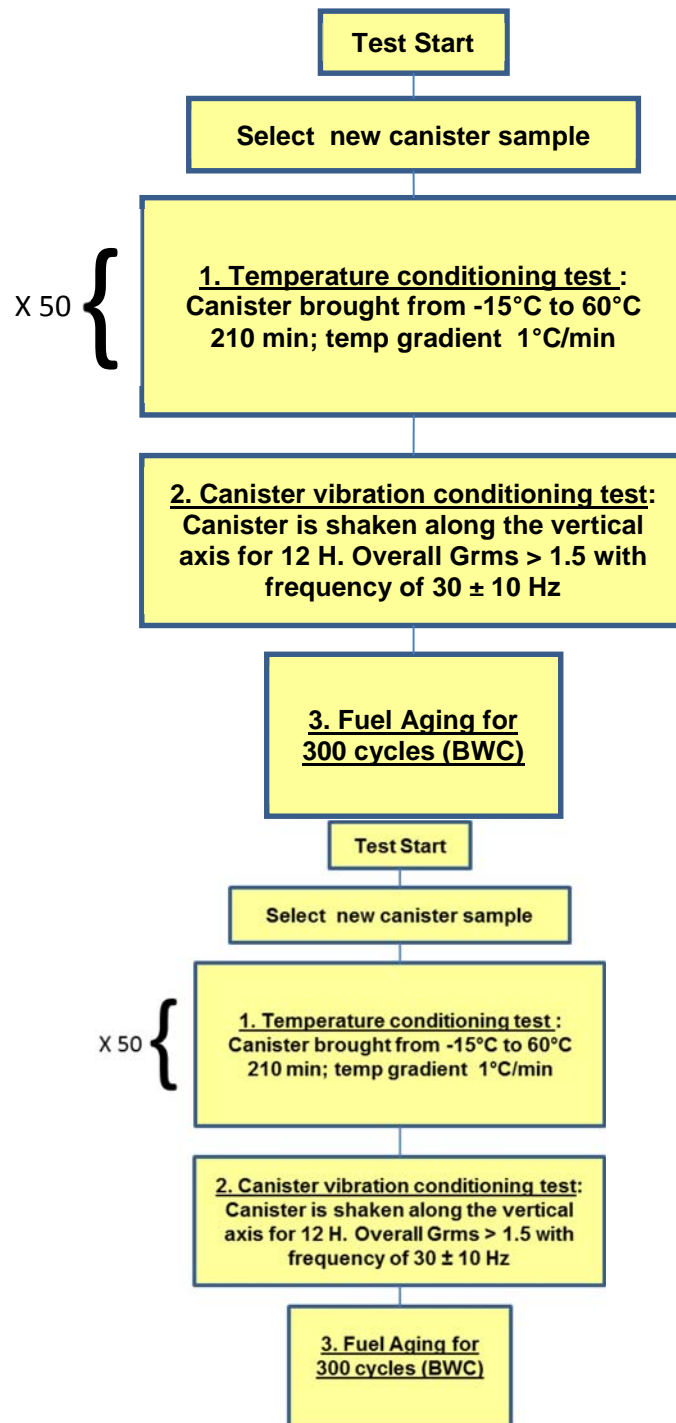
The additional equipment shall meet the requirements of paragraph 4.9. of Annex 7 to UN/ECE Regulation No 83.

5. TEST PROCEDURE

5.1. Canister(s) bench aging

Before performing the hot soak and diurnal losses sequences, the canister(s) must be aged according the following procedure described in Figure VI.2.

Figure VI.2: Canister bench aging procedure

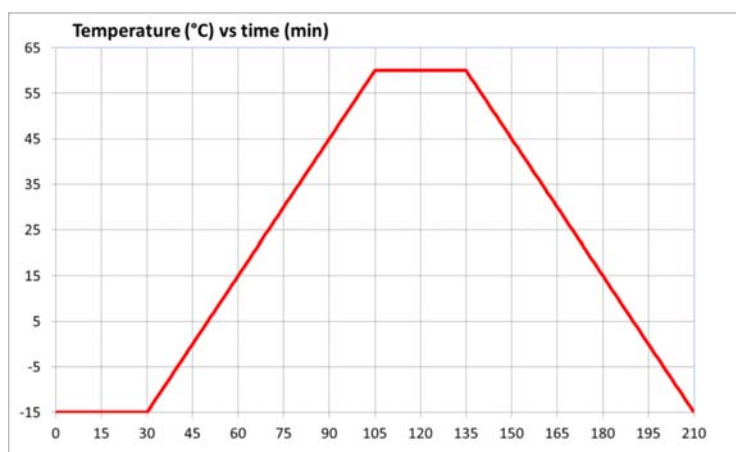


5.1.1. Temperature conditioning test

In a dedicated temperature chamber, the canister(s) is (are) cycled between temperatures from -15°C to 60°C, with 30 min of stabilisation at -15°C and 60°C. Each cycle shall last 210 min as in Figure 3. The temperature gradient shall be as close as possible to 1°C/min. No forced air flow should pass through the canister(s).

The cycle is repeated 50 times consecutively. In total, this operation will last 175 hours.

Figure VI.3: Temperature conditioning cycle



5.1.2. Canister vibration conditioning test

After the temperature aging procedure, the canister(s) is (are) shaken along the vertical axis with the canister(s) mounted as per its orientation in the vehicle with overall Grms² > 1.5m/sec² with frequency of 30 ± 10 Hz. The test shall last 12 hours.

5.1.3. Canister Fuel aging test

5.1.3.1. Fuel Aging for 300 cycles

5.1.3.1.1. After the temperature conditioning test and vibration test, the canister(s) is aged with a mixture of Type 1 E10 market fuel as specified in point 5.1.3.1.1.1 below and nitrogen or air with a 50 ± 15 percent fuel vapour volume. The fuel vapour fill rate must be kept between 60 ± 20 g/h.

The canister(s) is (are) loaded to the corresponding breakthrough. Breakthrough shall be considered as the point at which the cumulative quantity of hydrocarbons emitted is equal to 2 grams. As an alternative, the loading is deemed completed when the equivalent concentration level at the vent hole reaches 3000 ppm.

5.1.3.1.1.1 The E10 market fuel used for this test shall fulfil the same requirements as an E10 reference fuel for the following points:

Density at 15 °C

- Vapour Pressure (DVPE)
- Distillation (evaporates only)
- Hydrocarbon analysis (olefins, aromatics, benzene only)

² Grms: The root mean square (rms) value of the vibration signal is calculated by squaring the magnitude of the signal at every point, finding the average (mean) value of the squared magnitude, then taking the square root of the average value. The resulting number is the Grms metric.

- Oxygen content
- Ethanol content

5.1.3.1.2. The canister(s) shall be purged according the procedure of paragraph 5.1.3.8. of Annex 7 to UN/ECE Regulation No 83..

The canister must be purged between 5 minutes to 1 hour maximum after loading.

5.1.3.1.3. The steps of the procedure set out in points 5.1.3.1.1. and 5.1.3.1.2. shall be repeated 50 times, followed by a measurement of the Butane Working Capacity (BWC), meant as the ability of an activated carbon canister to absorb and desorb butane from dry air under specified conditions, in 5 butane cycles, as described in point 5.1.3.1.4 below. The fuel vapour ageing will continue until 300 cycles are reached. A measurement of the BWC in 5 butane cycles, as set out in point 5.1.3.1.4, will be made after the 300 cycles.

5.1.3.1.4. After 50 and 300 Fuel aging cycles, a measurement of BWC is performed. This measurement consists of loading the canister according to paragraph 5.1.6.3., of Annex 7 to UN/ECE Regulation No 83 until breakthrough. The BWC is recorded.

Then, the canister(s) shall be purged according the procedure of paragraph 5.1.3.8. of Annex 7 to UN/ECE Regulation No 83.

The canister must be purged between 5 minutes to 1 hour maximum after loading.

The operation of butane loading is repeated 5 times. The BWC is recorded after each butane loading step. The BWC₅₀ is calculated as the average of the 5 BWC and recorded.

In total, the canister(s) will be aged with 300 fuel aging cycles + 10 butane cycles and considered to be stabilized.

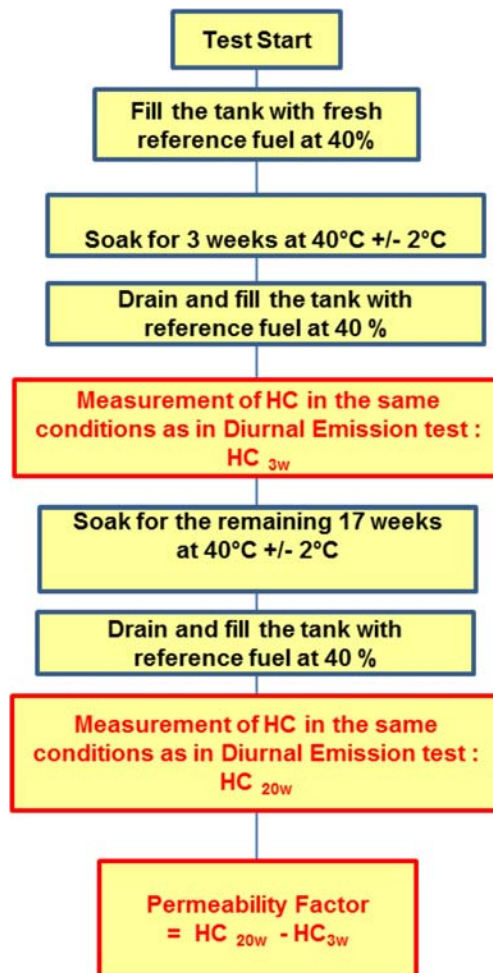
5.1.3.2. If the canister(s) is (are) provided by the Suppliers, the Manufacturers shall inform in advance the Type Approval Authorities to allow them to witness any part of the aging in the Supplier's facilities.

5.1.3.3. The manufacturer shall provide to the Type Approval Authorities a test report including at least the following elements:

- Type of activated carbon,
- Loading rate,
- Fuel specifications,
- BWC measurements

5.2. Determination of the Permeability Factor of the Fuel System (Figure VI.4)

Figure VI.4 : Determination of the Permeability Factor



The fuel storage system representative of a family is selected and fixed to a rig, then soaked with E10 reference fuel for 20 weeks at 40°C +/- 2°C. The orientation of the fuel storage system on the rig has to be similar to the original orientation on the vehicle.

5.2.1. The tank is filled with fresh E10 reference fuel at a temperature of 18°C ±8 °C. The tank is filled at 40 +/-2 % of the nominal tank capacity. Then, the rig with the fuel system is placed in a specific and secure room with a controlled temperature of 40°C +/-2 °C for 3 weeks.

5.2.2. At the end of the 3rd week, the tank is drained and refilled with fresh E10 reference fuel at a temperature of 18°C ±8 °C at 40 +/-2 % of the nominal tank capacity.

Within 6 to 36 hours, the last 6h at 20°C ±2°C the rig with the fuel system is placed in a VT-SHED a diurnal procedure is performed over a period of 24 hours, according to the procedure described according to paragraph 5.7. of Annex 7 of UN/ECE Regulation No 83. The fuel system is vented to the outside of the VT-SHED to eliminate the possibility of the tank venting emissions being counted as permeation. The HC emissions are measured and the value is recorded as HC_{3w}.

5.2.3. The rig with the fuel system is placed again in a specific and secure room with a controlled temperature of 40°C +/-2 °C for the remaining 17 weeks.

5.2.4. At the end of the remaining 17th week, the tank is drained and refilled with fresh reference fuel at a temperature of 18°C±8 °C at 40 +/-2 % of the nominal tank capacity.

Within 6 to 36 hours, the last 6h at 20°C ±2 °C, the rig with the fuel system is placed in a VT-SHED a diurnal procedure is performed over a period of 24 hours, according to the procedure described according to paragraph 5.7. Annex 7 of UN/ECE Regulation No 83. The fuel system is vented to the outside of the VT-SHED to eliminate the possibility of the tank venting emissions being counted as permeation. The HC emissions are measured and the value is recorded as HC_{20W}.

5.2.5. The Permeability Factor is the difference between HC_{20W} and HC_{3W} in g/24h with 3 digits.

5.2.6. If the Permeability Factor is determined by the Suppliers, the Manufacturers shall inform in advance the Type Approval Authorities to allow witness check in Supplier's facilities.

5.2.7 The manufacturer shall provide to the Type Approval Authorities a test report containing at least the following elements:

- a) A full description of the fuel storage system tested, including information on the type of tank tested, whether the tank is monolayer or multilayer and which types of materials are used for the tank and other parts of the fuel storage system,
- b) the weekly mean temperatures at which the ageing was performed,
- c) the HC measured at week 3 (HC_{3W}),
- d) the HC measured at week 20 (HC_{20W})
- e) the resulting Permeability Factor (PF)

5.2.8 As an exception to points 5.2.1 to 5.2.7 above, the Manufacturers using multilayer tanks may choose to use the following assigned permeability factor (APF) instead of the complete measurement procedure mentioned above:

$$\text{APF multilayer tank} = 120 \text{ mg/24h}$$

5.2.8.1 Where the manufacturer chooses to use Assigned Permeability Factors, the manufacturer shall provide to the Type Approval Authority, a declaration in which the type of tank is clearly specified, as well as a declaration of the type of materials used.

5.3. Sequence of measurement of hot soak and diurnal losses

The vehicle is prepared in accordance to paragraph 5.1.1. and 5.1.2. of Annex 7 of UN/ECE Regulation No 83. At the request of the manufacturer and with the approval of the approval authority, non-fuel background emission sources may be removed or reduced before testing (e.g. baking tire or vehicle, removing washer fluid).

5.3.1. Soak

The vehicle is parked for a minimum of 12 hours and a maximum of 36 hours in the soak area. The engine oil and coolant temperatures shall have reached the temperature of the area or within ±3 C of it at the end of the period.

5.3.2. Fuel drain and refill

The fuel drain and refill is performed in accordance to the procedure of paragraph 5.1.7. of Annex 7 of UN/ECE Regulation No 83.

5.3.3. Preconditioning drive

Within one hour from the completing of fuel drain and refill, the vehicle is placed on the chassis dynamometer and driven through one Part One and two Part Two driving cycles of Type I according to Annex 4a to UN/ECE Regulation No 83.

Exhaust emissions are not sampled during this operation.

5.3.4. Soak

Within five minutes of completing the preconditioning operation the vehicle is parked for a minimum of 12 hours and a maximum of 36 hours in the soak area. The engine oil and coolant temperatures shall have reached the temperature of the area or within ± 3 C of it at the end of the period.

5.3.5. Canister breakthrough

The canister(s) aged according to the sequence described in paragraph 5.1 is loaded to breakthrough according to the procedure paragraph 5.1.4 of Annex 7 to UN/ECE Regulation No 83.

5.3.6. Dynamometer test

5.3.6.1. Within one hour from completing of canister loading, the vehicle is placed on the chassis dynamometer and driven through one Part One and one Part Two driving cycles of Type I according to Annex 4a to UN/ECE Regulation No 83. Then the engine is shut off. Exhaust emissions may be sampled during this operation but the results shall not be used for the purpose of exhaust emission type approval.

5.3.6.2. Within two minutes of completing the Type I Test drive specified in point 5.3.6.1 the vehicle is driven a further conditioning drive consisting of two Part One test cycles (hot start) of Type I. Then the engine is shut off again. Exhaust emissions need not be sampled during this operation.

5.3.7. Hot Soak

After the Dynamometer test, hot soak evaporative emissions test is performed in accordance to paragraph 5.5 of Annex 7 to UN/ECE Regulation No 83. The hot soak losses result is calculated according to paragraph 6 of Annex 7 to UN/ECE Regulation No 83 and recorded as M_{HS} .

5.3.8. Soak

After hot soak evaporative emissions test, a soak is performed according to paragraph 5.6 of Annex 7 to UN/ECE Regulation No 83.

5.3.9. Diurnal test

5.3.9.1. After the soak, a first measurement of Diurnal Losses over 24 hours is performed according to paragraph 5.7 of Annex 7 to UN/ECE Regulation No 83. Emissions are calculated according to paragraph 6 of Annex 7 to UN/ECE Regulation No 83. The obtained value is recorded as M_{D1} .

5.3.9.2. After the first 24 hours diurnal test, a second measurement of Diurnal Losses over 24 hours is performed according to paragraph 5.7 of Annex 7 to UN/ECE Regulation No 83. Emissions are calculated according to paragraph 6 of Annex 7 to UN/ECE Regulation No 83. The obtained value is recorded as M_{D2} .

5.3.10. Calculation

The result of $M_{HS}+M_{D1}+M_{D2}+2PF$ shall be below the limit defined in Table 3 of Annex I to Regulation (EC) No 715/2007.

5.3.11 The manufacturer shall provide to the Type Approval Authorities a test report containing at least the following elements:

- a) description of the soak periods, including time and mean temperatures
- b) description to aged canister used and reference to exact ageing report
- c) mean temperature during the hot soak test
- d) measurement during hot soak test, HSL
- e) measurement of first diurnal, $DL_{1st\ day}$
- f) measurement of second diurnal, $DL_{2nd\ day}$
- g) final evaporative test result, calculated as " $M_{HS}+M_{D1}+M_{D2}+2PF$ "

ANNEX VII

VERIFYING THE DURABILITY OF POLLUTION CONTROL DEVICES

(TYPE 5 TEST)

1. INTRODUCTION

1.1. This Annex describes the tests for verifying the durability of pollution control devices.

2. GENERAL REQUIREMENTS

2.1. The general requirements for conducting the type 5 test shall be those set out in Section 5.3.6. of UN/ECE Regulation No 83 with exceptions provided in sections 2.2. and 2.3 below.

2.2. The table in paragraph 5.3.6.2. and the text in paragraph 5.3.6.4. of UN/ECE Regulation No 83 shall be understood to be as follows:

Engine Category	Assigned deterioration factors						
	CO	THC	NMHC	NO _x	HC + NO _x	PM	P
Positive-ignition	1,5	1,3	1,3	1,6	—	1,0	1,0
Compression-ignition	As there are no assigned deterioration factors for compression ignition vehicles, manufacturers shall use the whole vehicle or bench ageing durability test procedures to establish deterioration factors.						

2.3. The reference to the requirements of paragraphs 5.3.1 and 8.2 in paragraph 5.3.6.5 of UN/ECE Regulation No 83 shall be understood as reference to the requirements of Annex XXI and Section 4.2 of Annex I to this Regulation during the useful life of the vehicle.

2.4. Before emission limits set out in Table 2 of Annex I to Regulation (EC) No 715/2007 are used for assessing compliance with the requirements referred to in paragraph 5.3.6.5 of UN/ECE Regulation No 83 the deterioration factors shall be calculated and applied, as described in Table A7/1 of Sub-Annex 7 and Table A8/5 of Sub-Annex 8 to Annex XXI.

3. TECHNICAL REQUIREMENTS

3.1. The technical requirements and specifications shall be those set out in sections 1 to 7 and Appendices 1, 2 and 3 of Annex 9 to UN/ECE Regulation No 83, with the exceptions set out in sections 3.2. to 3.10.

3.2. Reference to Annex 2 in paragraph 1.5. of Annex 9 to UN/ECE Regulation No 83 shall be understood as referring to Appendix 4 to Annex I to this Regulation.

3.3. Reference to the emissions limits set out in Table 1 in paragraph 1.6. of Annex 9 to UN/ECE Regulation No 83 shall be understood as referring to the emissions limits set out in Table 2 of Annex I to Regulation (EC) No 715/2007.

- 3.4. The references to the Type I test in paragraph 2.3.1.7 of Annex 9 of UN/ECE Regulation No 83 shall be understood as reference to the Type 1 test in Annex XXI to this Regulation.
- 3.5. The references to the Type I test in paragraph 2.3.2.6 of Annex 9 of UN/ECE Regulation No 83 shall be understood as reference to the Type 1 test in Annex XXI to this Regulation.
- 3.6. The references to the Type I test in paragraph 3.1 of Annex 9 of UN/ECE Regulation No 83 shall be understood as reference to the Type 1 test in Annex XXI to this Regulation.
- 3.7. The reference to paragraph 5.3.1.4. in the first section of paragraph 7 of Annex 9 of UN/ECE Regulation No 83 shall be understood as reference to Table 2 of Annex I of the Regulation (EC) No 715/2007.
- 3.8. The reference in paragraph 6.3.1.2 of Annex 9 to UN/ECE Regulation No 83 to the methods in Appendix 7 to Annex 4a shall be understood as being a reference to Sub-Annex 4 to Annex XXI to this Regulation.
- 3.9. The reference in paragraph 6.3.1.4 of Annex 9 to UN/ECE Regulation No 83 to Annex 4a shall be understood as being a reference to Sub-Annex 4 to Annex XXI to this Regulation.
- 3.10. The road load coefficients to be used shall be those for VL. If VL low does not exist the VH road load shall be used.

ANNEX VIII

VERIFYING THE AVERAGE EMISSIONS AT LOW AMBIENT TEMPERATURES

(TYPE 6 TEST)

1. INTRODUCTION

1.1. This Annex describes the equipment required and the procedure for the Type 6 test in order to verify the emissions at cold temperatures.

2. GENERAL REQUIREMENTS

2.1. The general requirements for the Type 6 test are those set out in section 5.3.5 of UN/ECE Regulation No 83 with the exception specified in section 2.2 below.

2.2. The limit values referred to in paragraph 5.3.5.2 of UN/ECE Regulation No 83 relate to the limit values set out in Annex 1, Table 4, to Regulation (EC) No 715/2007.

3. TECHNICAL REQUIREMENTS

3.1. The technical requirements and specifications are those set out in section 2 to 6 of Annex 8 to UN/ECE Regulation No 83 with the exception specified in section 3.2 below.

3.2. The reference to paragraph 2 of Annex 10 in paragraph 3.4.1 of Annex 8 to UN/ECE Regulation No 83 shall be understood as reference to Section B of Annex IX to this Regulation.

3.3. The road load coefficients to be used shall be those for VL. If VL low does not exist the VH road load shall be used.

ANNEX IX

SPECIFICATIONS OF REFERENCE FUELS

A. REFERENCE FUELS

1. Technical data on fuels for testing vehicles with positive-ignition engines

Type: Petrol (E10):

Parameter	Unit	Limits ³		Test method
		Minimum	Maximum	
Research octane number, RON ⁴		95,0	98,0	EN ISO 5164
Motor octane number, MON ⁵		85,0	89,0	EN ISO 5163
Density at 15 °C	kg/m ³	743,0	756,0	EN ISO 12185
Vapour pressure (DVPE)	kPa	56,0	60,0	EN 13016-1
Water content	% v/v		0,05	EN 12937
Appearance at -7 °C		Clear and bright		
Distillation:				
— evaporated at 70 °C	% v/v	34,0	46,0	EN ISO 3405
— evaporated at 100 °C	% v/v	54,0	62,0	EN ISO 3405
— evaporated at 150 °C	% v/v	86,0	94,0	EN ISO 3405

³ The values quoted in the specifications are 'true values'. In establishment of their limit values the terms of ISO 4259 Petroleum products - Determination and application of precision data in relation to methods of test have been applied and in fixing a minimum value, a minimum difference of 2R above zero has been taken into account; in fixing a maximum and minimum value, the minimum difference is 4R (R = reproducibility). Notwithstanding this measure, which is necessary for technical reasons, the manufacturer of fuels shall nevertheless aim at a zero-value where the stipulated maximum value is 2R and at the mean value in the case of quotations of maximum and minimum limits. Should it be necessary to clarify whether a fuel meets the requirements of the specifications, the terms of ISO 4259 shall be applied.

⁴ A correction factor of 0,2 for MON and RON shall be subtracted for the calculation of the final result in accordance with EN 228:2008.

⁵ A correction factor of 0,2 for MON and RON shall be subtracted for the calculation of the final result in accordance with EN 228:2008.

— final boiling point	°C	170	195	EN ISO 3405
Residue	% v/v	—	2,0	EN ISO 3405
Hydrocarbon analysis:				
— olefins	% v/v	6,0	13,0	EN 22854
— aromatics	% v/v	25,0	32,0	EN 22854
— benzene	% v/v	—	1,00	EN 22854 EN 238
— saturates	% v/v	report		EN 22854
Carbon/hydrogen ratio		report		
Carbon/oxygen ratio		report		
Induction Period ⁶	minutes	480	—	EN ISO 7536
Oxygen content ⁷	% m/m	3,3	3,7	EN 22854
Solvent washed gum (Existent gum content)	mg/100 ml	—	4	EN ISO 6246
Sulphur content ⁸	mg/kg	—	10	EN ISO 20846 EN ISO 20884
Copper corrosion 3 hrs, 50 °C		—	class 1	EN ISO 2160
Lead content	mg/l	—	5	EN 237
Phosphorus content ⁹	mg/l	—	1,3	ASTM D 3231
Ethanol ¹⁰	% v/v	9,0	10,0	EN 22854

⁶ The fuel may contain oxidation inhibitors and metal deactivators normally used to stabilise refinery gasoline streams, but detergent/dispersive additives and solvent oils shall not be added.

⁷ Ethanol is the only oxygenate that shall be intentionally added to the reference fuel. The Ethanol used shall conform to EN 15376.

⁸ The actual sulphur content of the fuel used for the Type 1 test shall be reported.

⁹ There shall be no intentional addition of compounds containing phosphorus, iron, manganese, or lead to this reference fuel.

(²) Equivalent EN/ISO methods will be adopted when issued for properties listed above.

Type: Ethanol (E85)

Parameter	Unit	Limits ¹¹		Test method ¹²
		Minimum	Maximum	
Research octane number, RON		95	—	EN ISO 5164
Motor octane number, MON		85	—	EN ISO 5163
Density at 15 °C	kg/m ³	Report		ISO 3675
Vapour pressure	kPa	40	60	EN ISO 13016-1 (DVPE)
Sulphur content ¹³¹⁴	mg/kg	—	10	EN ISO 20846 EN ISO 20884
Oxidation stability	minutes	360		EN ISO 7536
Existent gum content (solvent washed)	mg/100ml	—	5	EN-ISO 6246
Appearance This shall be determined at ambient temperature or 15 °C whichever is higher.		Clear and bright, visibly free of suspended or precipitated contaminants		Visual inspection

¹⁰ Ethanol is the only oxygenate that shall be intentionally added to the reference fuel. The Ethanol used shall conform to EN 15376.

¹¹ The values quoted in the specifications are 'true values'. In establishment of their limit values the terms of ISO 4259 Petroleum products — Determination and application of precision data in relation to methods of test have been applied and in fixing a minimum value, a minimum difference of 2R above zero has been taken into account; in fixing a maximum and minimum value, the minimum difference is 4R (R = reproducibility). Notwithstanding this measure, which is necessary for technical reasons, the manufacturer of fuels shall nevertheless aim at a zero value where the stipulated maximum value is 2R and at the mean value in the case of quotations of maximum and minimum limits. Should it be necessary to clarify whether a fuel meets the requirements of the specifications, the terms of ISO 4259 shall be applied.

¹² In cases of dispute, the procedures for resolving the dispute and interpretation of the results based on test method precision, described in EN ISO 4259 shall be used.

¹³ In cases of national dispute concerning sulphur content, either EN ISO 20846 or EN ISO 20884 shall be called up similar to the reference in the national annex of EN 228.

¹⁴ The actual sulphur content of the fuel used for the Type 1 test shall be reported.

Ethanol and higher alcohols ¹⁵	% (V/V)	83	85	EN 1601 EN 13132 EN 14517
Higher alcohols (C3-C8)	% (V/V)	—	2	
Methanol	% (V/V)		0,5	
Petrol ¹⁶	% (V/V)	Balance		EN 228
Phosphorus	mg/l	0,3 ¹⁷		ASTM D 3231
Water content	% (V/V)		0,3	ASTM E 1064
Inorganic chloride content	mg/l		1	ISO 6227
pHe		6,5	9	ASTM D 6423
Copper strip corrosion (3h at 50 °C)	Rating	Class 1		EN ISO 2160
Acidity, (as acetic acid CH ₃ COOH)	% (m/m)	—	0,005	ASTM D 1613
	(mg/l)	—	40	
Carbon/hydrogen ratio		report		
Carbon/oxygen ration		report		

Type: LPG

Parameter	Unit	Fuel A	Fuel B	Test method
Composition:				ISO 7941
C ₃ -content	% vol	30 ± 2	85 ± 2	
C ₄ -content	% vol	Balance	Balance	
< C ₃ , > C ₄	% vol	Maximum 2	Maximum 2	

¹⁵ Ethanol to meet specification of EN 15376 is the only oxygenate that shall be intentionally added to this reference fuel.

¹⁶ The unleaded petrol content can be determined as 100 minus the sum of the percentage content of water and alcohols

¹⁷ There shall be no intentional addition of compounds containing phosphorus, iron, manganese, or lead to this reference fuel.

Olefins	% vol	Maximum 12	Maximum 15	
Evaporation residue	mg/kg	Maximum 50	Maximum 50	prEN 15470
Water at 0 °C		Free	Free	prEN 15469
Total sulphur content	mg/kg	Maximum 10	Maximum 10	ASTM 6667
Hydrogen sulphide		None	None	ISO 8819
Copper strip corrosion	Rating	Class 1	Class 1	ISO 6251 ¹⁸
Odour		Characteristic	Characteristic	
Motor octane number		Minimum 89	Minimum 89	EN 589 Annex B

Type: NG/Biomethane

Characteristics	Units	Basis	Limits		Test method
			minimum	maximum	
<i>Reference fuel G20</i>					
Composition:					
Methane	% mole	100	99	100	ISO 6974
Balance ¹⁹	% mole	—	—	1	ISO 6974
N ₂	% mole				ISO 6974
Sulphur content	mg/m ³²⁰	—	—	10	ISO 6326-5
Wobbe Index (net)	MJ/m ³²¹	48,2	47,2	49,2	
<i>Reference fuel G25</i>					
Composition:					
Methane	% mole	86	84	88	ISO 6974
Balance ²²	% mole	—	—	1	ISO 6974

¹⁸ This method may not accurately determine the presence of corrosive materials if the sample contains corrosion inhibitors or other chemicals which diminish the corrosivity of the sample to the copper strip. Therefore, the addition of such compounds for the sole purpose of biasing the test method is prohibited.

¹⁹ Inerts (different from N₂) + C₂ + C₂₊.

²⁰ Value to be determined at 293,2 K (20 °C) and 101,3 kPa.

²¹ Value to be determined at 273,2 K (0 °C) and 101,3 kPa.

²² Inerts (different from N₂) + C₂ + C₂₊.

N ₂	% mole	14	12	16	ISO 6974
Sulphur content	mg/m ³²³	—	—	10	ISO 6326-5
Wobbe Index (net)	MJ/m ³²⁴	39,4	38,2	40,6	

Type: Hydrogen for internal combustion engines

Characteristics	Units	Limits		Test method
		minimum	maximum	
Hydrogen purity	% mole	98	100	ISO 14687-1
Total hydrocarbon	µmol/mol	0	100	ISO 14687-1
Water ²⁵	µmol/mol	0	²⁶	ISO 14687-1
Oxygen	µmol/mol	0	²⁷	ISO 14687-1
Argon	µmol/mol	0	²⁸	ISO 14687-1
Nitrogen	µmol/mol	0	²⁹	ISO 14687-1
CO	µmol/mol	0	1	ISO 14687-1
Sulphur	µmol/mol	0	2	ISO 14687-1
Permanent particulates ³⁰				ISO 14687-1

2. Technical data on fuels for testing vehicles with compression ignition engines

Type: Diesel (B7):

Parameter	Unit	Limits ³¹	Test method
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²³ Value to be determined at 293,2 K (20 °C) and 101,3 kPa.

²⁴ Value to be determined at 273,2 K (0 °C) and 101,3 kPa.

²⁵ Not to be condensed.

²⁶ Combined water, oxygen, nitrogen and argon: 1,900 µmol/mol.

²⁷ Combined water, oxygen, nitrogen and argon: 1,900 µmol/mol.

²⁸ Combined water, oxygen, nitrogen and argon: 1,900 µmol/mol.

²⁹ Combined water, oxygen, nitrogen and argon: 1,900 µmol/mol.

³⁰ The hydrogen shall not contain dust, sand, dirt, gums, oils, or other substances in an amount sufficient to damage the fuelling station equipment or the vehicle (engine) being fuelled.

³¹ The values quoted in the specifications are 'true values'. In establishment of their limit values the terms of ISO 4259 Petroleum products – Determination and application of precision data in relation to

		Minimum	Maximum	
Cetane Index		46,0		EN ISO 4264
Cetane number ³²		52,0	56,0	EN ISO 5165
Density at 15 °C	kg/m ³	833,0	837,0	EN ISO 12185
Distillation:				
— 50 % point	°C	245,0	—	EN ISO 3405
— 95 % point	°C	345,0	360,0	EN ISO 3405
— final boiling point	°C	—	370,0	EN ISO 3405
Flash point	°C	55	—	EN ISO 2719
Cloud point	°C	—	– 10	EN 23015
Viscosity at 40 °C	mm ² /s	2,30	3,30	EN ISO 3104
Polycyclic aromatic hydrocarbons	% m/m	2,0	4,0	EN 12916
Sulphur content	mg/kg	—	10,0	EN ISO 20846 EN ISO 20884
Copper corrosion 3 hrs, 50 °C		—	Class 1	EN ISO 2160
Conradson carbon residue (10 % DR)	% m/m	—	0,20	EN ISO 10370
Ash content	% m/m	—	0,010	EN ISO 6245
Total contamination	mg/kg	—	24	EN 12662
Water content	mg/kg	—	200	EN ISO 12937
Acid number	mg KOH/g	—	0,10	EN ISO 6618

methods of test have been applied and in fixing a minimum value, a minimum difference of 2R above zero has been taken into account; in fixing a maximum and minimum value, the minimum difference is 4R (R = reproducibility). Notwithstanding this measure, which is necessary for technical reasons, the manufacturer of fuels shall nevertheless aim at a zero value where the stipulated maximum value is 2R and at the mean value in the case of quotations of maximum and minimum limits. Should it be necessary to clarify whether a fuel meets the requirements of the specifications, the terms of ISO 4259 shall be applied.

³²

The range for cetane number is not in accordance with the requirements of a minimum range of 4R. However, in the case of a dispute between fuel supplier and fuel user, the terms of ISO 4259 may be used to resolve such disputes provided replicate measurements, of sufficient number to archive the necessary precision, are made in preference to single determinations.

Lubricity (HFRR wear scan diameter at 60 °C)	µm	—	400	EN ISO 12156
Oxidation stability at 110 °C ³³	h	20,0		EN 15751
FAME ³⁴	% v/v	6,0	7,0	EN 14078

3. Technical data on fuels for testing fuel cell vehicles

Type: Hydrogen for fuel cell vehicles

Characteristics	Units	Limits		Test method
		minimum	maximum	
Hydrogen fuel ³⁵	% mole	99,99	100	ISO 14687-2
Total gases ³⁶	µmol/mol	0	100	
Total hydrocarbon	µmol/mol	0	2	ISO 14687-2
Water	µmol/mol	0	5	ISO 14687-2
Oxygen	µmol/mol	0	5	ISO 14687-2
Helium (He), Nitrogen (N ₂), Argon (Ar)	µmol/mol	0	100	ISO 14687-2
CO ₂	µmol/mol	0	2	ISO 14687-2
CO	µmol/mol	0	0,2	ISO 14687-2
Total sulphur compounds	µmol/mol	0	0,004	ISO 14687-2
Formaldehyde (HCHO)	µmol/mol	0	0,01	ISO 14687-2

³³ Even though oxidation stability is controlled, it is likely that shelf life will be limited. Advice shall be sought from the supplier as to storage conditions and life.

³⁴ FAME content to meet the specification of EN 14214.

³⁵ The hydrogen fuel index is determined by subtracting the total content of non-hydrogen gaseous constituents listed in the table (Total gases), expressed in mole percent, from 100 mole percent. It is less than the sum of the maximum allowable limits of all non-hydrogen constituents shown in the Table.

³⁶ The value of total gases is summation of the values of the non-hydrogen constituents listed in the table, except the particulates.

Formic acid (HCOOH)	µmol/mol	0	0,2	ISO 14687-2
Ammonia (NH ₃)	µmol/mol	0	0,1	ISO 14687-2
Total halogenated compounds	µmol/mol	0	0,05	ISO 14687-2
Particulates size	µm	0	10	ISO 14687-2
Particulates concentration	µg/l	0	1	ISO 14687-2

B. REFERENCE FUELS FOR TESTING EMISSIONS AT LOW AMBIENT TEMPERATURES — TYPE 6 TEST

Type: Petrol (E10):

Parameter	Unit	Limits ³⁷		Test method
		Minimum	Maximum	
Research octane number, RON ³⁸		95,0	98,0	EN ISO 5164
Motor octane number, MON ³⁹		85,0	89,0	EN ISO 5163
Density at 15 °C	kg/m ³	743,0	756,0	EN ISO 12185
Vapour pressure (DVPE)	kPa	56,0	95,0	EN 13016-1
Water content		max 0,05 % v/v		EN 12937

³⁷ The values quoted in the specifications are 'true values'. In establishment of their limit values the terms of ISO 4259 Petroleum products - Determination and application of precision data in relation to methods of test have been applied and in fixing a minimum value, a minimum difference of 2R above zero has been taken into account; in fixing a maximum and minimum value, the minimum difference is 4R (R = reproducibility). Notwithstanding this measure, which is necessary for technical reasons, the manufacturer of fuels shall nevertheless aim at a zero value where the stipulated maximum value is 2R and at the mean value in the case of quotations of maximum and minimum limits. Should it be necessary to clarify whether a fuel meets the requirements of the specifications, the terms of ISO 4259 shall be applied.

³⁸ A correction factor of 0,2 for MON and RON shall be subtracted for the calculation of the final result in accordance with EN 228:2008.

³⁹ A correction factor of 0,2 for MON and RON shall be subtracted for the calculation of the final result in accordance with EN 228:2008.

		Appearance at – 7 °C: clear and bright		
Distillation:				
— evaporated at 70 °C	% v/v	34,0	46,0	EN ISO 3405
— evaporated at 100 °C	% v/v	54,0	62,0	EN ISO 3405
— evaporated at 150 °C	% v/v	86,0	94,0	EN ISO 3405
— final boiling point	°C	170	195	EN ISO 3405
Residue	% v/v	—	2,0	EN ISO 3405
Hydrocarbon analysis:				
— olefins	% v/v	6,0	13,0	EN 22854
— aromatics	% v/v	25,0	32,0	EN 22854
— benzene	% v/v	—	1,00	EN 22854 EN 238
— saturates	% v/v	report		EN 22854
Carbon/hydrogen ratio		report		
Carbon/oxygen ratio		report		
Induction Period ⁴⁰	minutes	480	—	EN ISO 7536
Oxygen content ⁴¹	% m/m	3,3	3,7	EN 22854
Solvent washed gum (Existent gum content)	mg/100 ml	—	4	EN ISO 6246
Sulphur content ⁴²	mg/kg	—	10	EN ISO 20846

⁴⁰ The fuel may contain oxidation inhibitors and metal deactivators normally used to stabilise refinery gasoline streams, but detergent/dispersive additives and solvent oils shall not be added.

⁴¹ Ethanol is the only oxygenate that shall be intentionally added to the reference fuel. The ethanol used shall conform to EN 15376.

⁴² The actual sulphur content of the fuel used for the Type 6 test shall be reported.

				EN ISO 20884
Copper corrosion 3 hrs, 50 °C		—	class 1	EN ISO 2160
Lead content	mg/l	—	5	EN 237
Phosphorus content ⁴³	mg/l	—	1,3	ASTM D 3231
Ethanol ⁴⁴	% v/v	9,0	10,0	EN 22854

(²) Equivalent EN/ISO methods will be adopted when issued for properties listed above.

Type: Ethanol (E75)

Parameter	Unit	Limits ⁴⁵		Test method ⁴⁶
		Minimum	Maximum	
Research octane number, RON		95	—	EN ISO 5164
Motor octane number, MON		85	—	EN ISO 5163
Density at 15 °C	kg/m ³	report		EN ISO 12185
Vapour pressure	kPa	50	60	EN ISO 13016-1 (DVPE)
Sulphur content ⁴⁷⁴⁸	mg/kg	—	10	EN ISO

⁴³ There shall be no intentional addition of compounds containing phosphorus, iron, manganese, or lead to this reference fuel.

⁴⁴ Ethanol is the only oxygenate that shall be intentionally added to the reference fuel. The ethanol used shall conform to EN 15376.

⁴⁵ The values referred to in the specifications are 'true values'. When establishing the value limits, the terms of ISO 4259 Petroleum products — Determination and application of precision data in relation to methods of test were applied. When fixing a minimum value, a minimum difference of 2R above zero was taken into account. When fixing a maximum and minimum value, the minimum difference used was 4R (R = reproducibility). Notwithstanding this procedure, which is necessary for technical reasons, fuel manufacturers shall aim for a zero value where the stipulated maximum value is 2R and for the mean value for quotations of maximum and minimum limits. Where it is necessary to clarify whether fuel meets the requirements of the specifications, the ISO 4259 terms shall be applied.

⁴⁶ In cases of dispute, the procedures for resolving the dispute and interpretation of the results based on test method precision, described in EN ISO 4259 shall be used.

				20846 EN ISO 20884
Oxidation stability	minutes	360	—	EN ISO 7536
Existent gum content (solvent washed)	mg/100ml	—	4	EN ISO 6246
Appearance shall be determined at ambient temperature or 15 °C whichever is higher		Clear and bright, visibly free of suspended or precipitated contaminants		Visual inspection
Ethanol and higher alcohols ⁴⁹	% (V/V)	70	80	EN 1601 EN 13132 EN 14517
Higher alcohols (C ₃ – C ₈)	% (V/V)	—	2	
Methanol		—	0,5	
Petrol ⁵⁰	% (V/V)	Balance		EN 228
Phosphorus	mg/l	0,30 ⁵¹		EN 15487 ASTM D 3231
Water content	% (V/V)	—	0,3	ASTM E 1064 EN 15489
Inorganic chloride content	mg/l	—	1	ISO 6227 — EN 15492
pHe		6,50	9	ASTM D 6423

⁴⁷ In cases of national dispute concerning sulphur content, either EN ISO 20846 or EN ISO 20884 shall be called up similar to the reference in the national annex of EN 228.

⁴⁸ The actual sulphur content of the fuel used for the Type 6 test shall be reported.

⁴⁹ Ethanol to meet specification of EN 15376 is the only oxygenate that shall be intentionally added to this reference fuel.

⁵⁰ The unleaded petrol content may be determined as 100 minus the sum of the percentage content of water and alcohols.

⁵¹ There shall be no intentional addition of compounds containing phosphorus, iron, manganese, or lead to this reference fuel.

				EN 15490
Copper strip corrosion (3h at 50 °C)	Rating	Class 1		EN ISO 2160
Acidity (as acetic acid CH ₃ COOH)	% (m/m)		0,005	ASTM D1613
	mg/l		40	EN 15491
Carbon/hydrogen ration		report		
Carbon/oxygen ration		report		

ANNEX X

Reserved

ANNEX XI

ON-BOARD DIAGNOSTICS (OBD) FOR MOTOR VEHICLES

1. INTRODUCTION

1.1. This Annex sets out the functional aspects of on-board diagnostic (OBD) systems for the control of emissions from motor vehicles.

2. DEFINITIONS, REQUIREMENTS AND TESTS

2.1. The definitions, requirements and tests for OBD systems are those specified in Sections 2 and 3 of Annex 11 to UN/ECE Regulation No 83. The exceptions to these requirements are described in the following sections.

2.1.1. The introductory text to paragraph 2. of Annex 11 to UN/ECE Regulation No 83 shall be replaced with the following text:

“For the purposes of this Annex only:”

2.1.2. Paragraph 2.10. of Annex 11 to UN/ECE Regulation No 83 shall be replaced with the following text:

“A “*driving cycle*” consists of engine key on, a driving mode where a malfunction would be detected if present, and engine key-off”.

2.1.3. A new paragraph 3.2.3. of Annex 11 of UN/ECE Regulation No 83 shall be added as follows:

"3.2.3. Identification of deterioration or malfunctions may be also be done outside a driving cycle (e.g. after engine shutdown)."

2.1.4. Reference to ‘THC and NOx’ in paragraph 3.3.3.1. of Annex 11 to UN/ECE Regulation No 83 shall be understood as being reference to ‘NMHC and NOx’.

2.1.5. Reference to ‘limits’ in paragraphs 3.3.3.1. and 3.3.4.4. of Annex 11 to UN/ECE Regulation No 83 shall be understood as being reference to ‘OBD threshold limits’.

2.1.6. Reference to ‘emission limits’ in paragraph 3.3.5. of Annex 11 to UN/ECE Regulation No 83 shall be understood as being reference to ‘OBD threshold limits’.

2.1.7. Paragraphs 3.3.4.9. and 3.3.4.10. of Annex 11 of UN/ECE Regulation No 83 shall be deleted.

2.1.8. New paragraphs 3.3.5.1. and 3.3.5.2. of Annex 11 of UN/ECE Regulation No 83 shall be added as follows:

"3.3.5.1. The following devices should however be monitored for total failure or removal (if removal would cause the applicable emission limits in paragraph 5.3.1.4. of this Regulation to be exceeded):

- (a) A particulate trap fitted to compression ignition engines as a separate unit or integrated into a combined emission control device;
- (b) A NO_x after-treatment system fitted to compression ignition engines as a separate unit or integrated into a combined emission control device;
- (c) A diesel oxidation catalyst (DOC) fitted to compression ignition engines as a separate unit or integrated into a combined emission control device.

3.3.5.2. The devices referred to in paragraph 3.3.5.1. shall also be monitored for any failure that would result in exceeding the applicable OBD threshold limits."

2.1.9. Paragraph 3.8.1. of Annex 11 to UN/ECE Regulation No 83 shall be replaced with the following text:

"The OBD system may erase a fault code and the distance travelled and freeze-frame information if the same fault is not re-registered in at least 40 engine warm-up cycles or 40 driving cycles with vehicle operation in which the criteria specified in sections 7.5.1.(a)–(c) of Annex 11, Appendix 1 are met."

2.1.10. The reference to ISO DIS 15031 5 in paragraph 3.9.3.1. of Annex 11 to UN/ECE Regulation No 83 shall be replaced with the following text:

"... the standard listed in paragraph 6.5.3.2.(a) of Annex 11, Appendix 1 of this Regulation."

2.1.11. A new paragraph 3.10 of Annex 11 of UN/ECE Regulation No 83 shall be added as follows:

"3.10. Additional provisions for vehicles employing engine shut - off strategies

3.10.1. Driving cycle

3.10.1.1. Autonomous engine restarts commanded by the engine control system following an engine stall may be considered a new driving cycle or a continuation of the existing driving cycle."

2.2. The Type V durability distance and Type V durability test mentioned in section 3.1 and 3.3.1 of Annex 11 to UN/ECE Regulation No 83 respectively shall be understood as reference to the requirements of Annex VII to this Regulation.

2.3. The OBD threshold limits specified in section 3.3.2 of Annex 11 to UN/ECE Regulation 83 shall be understood as reference to the requirements specified in points 2.3.1 and 2.3.2 below:

2.3.1. The OBD thresholds limits for vehicles that are type approved according to the Euro 6 emission limits set out in Table 2 of Annex I to Regulation (EC) No 715/2007 from three years after the dates given in Article 10(4) and 10(5) of that Regulation are given in the following table:

<i>Final Euro 6 OBD threshold limits</i>							
		Refe	Mass of	Mass of non-	Mass of	Mass of	Number of

Category	Classes	reference mass (RM) (kg)	carbon monoxide		methane hydrocarbons		oxides of nitrogen		particulate matter ⁵²		particles ^{52, 53}	
			(CO) (mg/km)		(NMHC) (mg/km)		(NO _x) (mg/km)		(PM) (mg/km)		(PN) (#/km)	
			PI	CI	PI	CI	PI	CI	CI	PI	CI	PI
M	—	All	1900	1750	170	290	90	140	12	12		
N ₁	I	RM ≤ 1305	1900	1750	170	290	90	140	12	12		
	II	1305 < RM ≤ 1760	3400	2200	225	320	110	180	12	12		
	III	1760 < RM	4300	2500	270	350	120	220	12	12		
N ₂	—	All	4300	2500	270	350	120	220	12	12		

Key: PI = Positive Ignition, CI = Compression Ignition.

2.3.2. Until three years after the dates specified in Article 10(4) and (5) of Regulation (EC) No 715/2007 for new type approvals and new vehicles respectively, the following OBD threshold limits shall be applied to vehicles that are type approved according to the Euro 6 emission limits set out in Table 2 of Annex I to Regulation (EC) No 715/2007, upon the choice of the manufacturer:

<i>Preliminary Euro 6 OBD threshold limits</i>						
	Refer	Mass of	Mass of non-	Mass of oxides	Mass of	

⁵² Positive ignition particulate mass and particle number limits apply only to vehicles with direct injection engines.

⁵³ Particle number limits may be introduced at a later date

Category	Class	ence mass (RM) (kg)	carbon monoxide		methane hydrocarbons		of nitrogen		particulate matter ⁵⁴	
			(CO) (mg/km)		(NMHC) (mg/km)		(NOx) (mg/km)		(PM) (mg/km)	
			PI	CI	PI	CI	PI	CI	CI	PI
M	—	All	1900	1750	170	290	150	180	25	25
N ₁	I	RM ≤ 1305	1900	1750	170	290	150	180	25	25
	II	1305 < RM ≤ 1760	3400	2200	225	320	190	220	25	25
	III	1760 < RM	4300	2500	270	350	210	280	30	30
N ₂	—	All	4300	2500	270	350	210	280	30	30

Key: PI = Positive Ignition, CI = Compression Ignition

2.4. The reference to the threshold limits in Section 3.3.3.1 of Annex 11 to UNECE Regulation No 83 shall be understood as reference to the threshold limits in Section 2.3 of this Annex.

2.5. The Type I test cycle referred to in paragraph 3.3.3.2. of Annex 11 to UN/ECE Regulation No 83 shall be understood as being the same as the Type 1 cycle that was used for at least two consecutive cycles after introduction of the misfire faults according to paragraph 6.3.1.2. of Appendix 1 to Annex 11 to UN/ECE Regulation No 83.

2.6. The reference to the particulate threshold limits provided for by paragraph 3.3.2. in section 3.3.3.7 of Annex 11 to UN/ECE Regulation No 83 shall be understood as being reference to the particulate threshold limits provided in Section 2.3 of this Annex.

2.7. The reference to the Type I test cycle in section 2.1.3 of Appendix 1 to Annex 11 of UN/ECE Regulation No 83 shall be understood as a reference to the type 1 test according to

⁵⁴ Positive ignition particulate mass limits apply only to vehicles with direct injection engines.

Regulation (EC) 692/2008 or Annex XXI of this Regulation, upon the choice of the manufacturer for each individual malfunction to be demonstrated.

3. ADMINISTRATIVE PROVISIONS FOR DEFICIENCIES OF OBD SYSTEMS

3.1. The administrative provisions for deficiencies of OBD systems as set out in Article 6(2) shall be those specified in Section 4 of Annex 11 of UN/ECE Regulation No 83 with the following exceptions.

3.2. Reference to OBD threshold limits in paragraph 4.2.2. of Annex 11 to UN/ECE Regulation No 83 shall be understood as being reference to the OBD threshold limits in Section 2.3 of this Annex.

3.3. Paragraph 4.6 of Annex 11 to UN/ECE Regulation No 83 shall be understood as being as follows:

‘The approval authority shall notify its decision in granting a deficiency request in accordance with Article 6(2) .

4. ACCESS TO OBD INFORMATION

4.1. Requirements for access to OBD information are specified in section 5 of Annex 11 to UN/ECE Regulation 83. The exceptions to these requirements are described in the following sections.

4.2. References to Appendix 1 of Annex 2 to UN/ECE Regulation No 83 shall be understood as references to Appendix 5 to Annex I to this Regulation.

4.3. References to section 3.2.12.2.7.6. of Annex 1 to UN/ECE Regulation No 83 shall be understood as references to 3.2.12.2.7.6 of Appendix 3 to Annex I to this Regulation.

4.4. References to ‘contracting parties’ shall be understood as references to ‘member states’.

4.5. References to approval granted under Regulation 83 shall be understood as references to type-approval granted under this Regulation and Regulation (EC) No 715/2007.

4.6. UN/ECE type-approval shall be understood as EC type-approval.

Appendix 1

FUNCTIONAL ASPECTS OF ON-BOARD DIAGNOSTIC (OBD) SYSTEMS

1. INTRODUCTION

1.1. This Appendix describes the procedure of the test according to section 2 of this Annex.

2. TECHNICAL REQUIREMENTS

2.1. The technical requirements and specifications shall be those set out in Appendix 1 to Annex 11 to UN/ECE Regulation No 83 with the exceptions and additional requirements as described in the following sections.

2.2. The references in Appendix 1 to Annex 11 to UN/ECE Regulation No 83 to the OBD threshold limits set out in paragraph 3.3.2 to Annex 11 of UN/ECE Regulation No 83 shall be understood as references to the OBD threshold limits set out in section 2.3 of this Annex.

2.3. The reference fuels specified in paragraph 3.2 of Appendix 1 of Annex 11 of UN/ECE Regulation No 83 shall be understood as reference to the appropriate reference fuel specifications in Annex IX to this Regulation.

2.4. The reference to Annex 11 in paragraph 6.5.1.4 of Appendix 1 of Annex 11 of UN/ECE Regulation No 83 shall be understood as reference to Annex XI to this Regulation.

2.5. The following text shall be added as a new final sentence to the second paragraph of Section 1 of Appendix 1 to Annex 11 of UN/ECE Regulation No 83.

“For electrical failures (short/open circuit), the emissions may exceed the limits of paragraph 3.3.2. by more than twenty per cent.”

2.6. Paragraph 6.5.3. of Appendix 1 to Annex 11 of UN/ECE Regulation No 83 shall be replaced with the following:

"6.5.3. The emission control diagnostic system shall provide for standardised and unrestricted access and conform with the following ISO standards and/or SAE specification. Later versions may be used at the manufacturers' discretion.

6.5.3.1. The following standard shall be used as the on board to off-board communications link:

(a) ISO 15765-4:2011 "Road vehicles – Diagnostics on Controller Area Network (CAN) – Part 4: Requirements for emissions-related systems", dated 1 February 2011;

6.5.3.2. Standards used for the transmission of OBD relevant information:

(a) ISO 15031-5 "Road vehicles - communication between vehicles and external test equipment for emissions-related diagnostics – Part 5: Emissions-related diagnostic services", dated 1 April 2011 or SAE J1979 dated 23 February 2012;

(b) ISO 15031-4 "Road vehicles – Communication between vehicle and external test equipment for emissions related diagnostics – Part 4: External test equipment", dated 1 June 2005 or SAE J1978 dated 30 April 2002;

(c) ISO 15031-3 "Road vehicles – Communication between vehicle and external test equipment for emissions related diagnostics Part 3: Diagnostic connector and related electrical circuits: specification and use", dated 1 July 2004 or SAE J 1962 dated 26 July 2012;

(d) ISO 15031-6 "Road vehicles – Communication between vehicle and external test equipment for emissions related diagnostics – Part 6: Diagnostic trouble code definitions", dated 13 August 2010 or SAE J2012 dated 07 March 2013;

(e) ISO 27145 "Road vehicles – Implementation of World-Wide Harmonized On-Board Diagnostics (WWH-OBD)" dated 2012-08-15 with the restriction, that only 6.5.3.1.(a) may be used as a data link;

(f) ISO 14229:2013 "Road vehicles – Unified diagnostic services (UDS) with the restriction, that only 6.5.3.1.(a) may be used as a data link".

The standards (e) and (f) may be used as an option instead of (a) not earlier than 1 January 2019.

6.5.3.3. Test equipment and diagnostic tools needed to communicate with OBD systems shall meet or exceed the functional specification given in the standard listed in paragraph 6.5.3.2.(b) of this Appendix.

6.5.3.4. Basic diagnostic data, (as specified in paragraph 6.5.1.) and bi-directional control information shall be provided using the format and units described in the standard listed in paragraph 6.5.3.2.(a) of this appendix, and must be available using a diagnostic tool meeting the requirements of the standard listed in paragraph 6.5.3.2.(b) of this appendix.

The vehicle manufacturer shall provide to a national standardisation body the details of any emission-related diagnostic data, e.g. PID's, OBD monitor Id's, Test Id's not specified in the standard listed in paragraph 6.5.3.2.(a) of this Regulation but related to this Regulation.

6.5.3.5. When a fault is registered, the manufacturer shall identify the fault using an appropriate ISO/SAE controlled fault code specified in one of the standards listed in paragraph 6.5.3.2.(d) of this appendix, relating to "emission related system diagnostic trouble codes". If such identification is not possible, the manufacturer may use manufacturer controlled diagnostic trouble codes according to the same standard. The fault codes shall be fully accessible by standardised diagnostic equipment complying with the provisions of paragraph 6.5.3.2. of this Appendix.

The vehicle manufacturer shall provide to a national standardisation body the details of any emission-related diagnostic data, e.g. PID's, OBD monitor Id's, Test Id's not specified in the standards listed in paragraph 6.5.3.2.(a) of this Appendix but related to this Regulation.

6.5.3.6. The connection interface between the vehicle and the diagnostic tester shall be standardised and shall meet all the requirements of the standard listed in paragraph 6.5.3.2.(c) of this appendix. The installation position shall be subject to agreement of the administrative department such that it is readily accessible by service personnel but protected from tampering by non-qualified personnel.

6.5.3.7. The manufacturer shall also make accessible, where appropriate on payment, the technical information required for the repair or maintenance of motor vehicles unless that information is covered by an intellectual property right or constitutes essential, secret

know-how which is identified in an appropriate form; in such case, the necessary technical information shall not be withheld improperly.

Entitled to such information is any person engaged in commercially servicing or repairing, road-side rescuing, inspecting or testing of vehicles or in the manufacturing or selling replacement or retro-fit components, diagnostic tools and test equipment."

2.6. A new paragraph 6.1.1. of Appendix 1 to Annex 11 of UN/ECE Regulation No 83 shall be inserted as follows:

"6.1.1. The Type I Test need not be performed for the demonstration of electrical failures (short/open circuit). The manufacturer may demonstrate these failure modes using driving conditions in which the component is used and the monitoring conditions are encountered. These conditions shall be documented in the type approval documentation."

2.7. Paragraph 6.2.2. of Appendix 1 of Annex 11 of UN/ECE Regulation No 83 shall be amended to read as follows:

"At the request of the manufacturer, alternative and/or additional preconditioning methods may be used."

2.8. A new paragraph 6.2.3. of Appendix 1 to Annex 11 of UN/ECE Regulation No 83 shall be inserted as follows:

"6.2.3. The use of additional preconditioning cycles or alternative preconditioning methods shall be documented in the type approval documentation."

2.9. Paragraph 6.3.1.5. of Appendix 1 to Annex 11 of UN/ECE Regulation No 83 shall be replaced with the following:

"Electrical disconnection of the electronic evaporative purge control device (if equipped and if active on the selected fuel type)."

2.10. Paragraph 6.4.1.1. of Appendix 1 to Annex 11 of UN/ECE Regulation No 83 shall be replaced with the following:

"The MI shall be activated at the latest before the end of this test under any of the conditions given in paragraphs 6.4.1.2. to 6.4.1.5. The MI may also be activated during preconditioning. The Technical Service may substitute those conditions with others in accordance with paragraph 6.4.1.6. "

2.11. Paragraph 6.4.2.1. of Appendix 1 to Annex 11 of UN/ECE Regulation No 83 shall be replaced with the following:

"The MI shall be activated at the latest before the end of this test under any of the conditions given in paragraphs 6.4.2.2. to 6.4.2.5. The MI may also be activated during preconditioning. The Technical Service may substitute those conditions by others in accordance with paragraph 6.4.2.5. "

3. IN-USE PERFORMANCE

3.1. General Requirements

The technical requirements and specifications shall be those set out in Appendix 1 to Annex 11 to UN/ECE Regulation No 83 with the exceptions and additional requirements as described in the following sections.

3.1.1. The requirements of paragraph 7.1.5 of Appendix 1 to Annex 11 to UN/ECE Regulation No 83 shall be understood as being as follows.

For new type approvals and new vehicles the monitor required by point 2.9 of this Annex shall have an IUPR greater or equal to 0,1 until three years after the dates specified in Article 10(4) and (5) of Regulation (EC) No 715/2007 respectively.

3.1.2. The requirements of paragraph 7.1.7 of Appendix 1 to Annex 11 to UN/ECE Regulation No 83 shall be understood as being as follows.

The manufacturer shall demonstrate to the approval authority and, upon request, to the Commission that these statistical conditions are satisfied for all monitors required to be reported by the OBD system according to paragraph 7.6. of Appendix 1 to Annex 11 to Regulation No 83 not later than 18 months after the entry onto the market of the first vehicle type with IUPR in an OBD family and every 18 months thereafter. For this purpose, for OBD families consisting of more than 1000 registrations in the Union, that are subject to sampling within the sampling period, the process described in Annex II shall be used without prejudice to the provisions of paragraph 7.1.9. of Appendix 1 to Annex 11 to Regulation No 83.

In addition to the requirements set out in Annex II and regardless of the result of the audit described in Section 2 of Annex II, the authority granting the approval shall apply the in-service conformity check for IUPR described in Appendix 1 to Annex II in an appropriate number of randomly determined cases. ‘In an appropriate number of randomly determined cases’ means, that this measure has a dissuasive effect on non-compliance with the requirements of Section 3 of this Annex or the provision of manipulated, false or non-representative data for the audit. If no special circumstances apply and can be demonstrated by the type-approval authorities, random application of the in-service conformity check to 5 % of the type approved OBD families shall be considered as sufficient for compliance with this requirement. For this purpose, type-approval authorities may find arrangements with the manufacturer for the reduction of double testing of a given OBD family as long as these arrangements do not harm the dissuasive effect of the type-approval authority’s own in-service conformity check on non-compliance with the requirements of Section 3 of this Annex. Data collected by Member States during surveillance testing programmes may be used for in-service conformity checks. Upon request, type-approval authorities shall provide data on the audits and random in-service conformity checks performed, including the methodology used for identifying those cases, which are made subject to the random in-service conformity check, to the Commission and other type-approval authorities.

3.1.3. Non-compliance with the requirements of paragraph 7.1.6. of Appendix 1 to Annex 11 to Regulation No 83 established by tests described in point 3.1.2 of this Appendix or paragraph 7.1.9 of Appendix 1 to Annex 11 to Regulation No 83 shall be considered as an infringement subject to the penalties set out in Article 13 of Regulation (EC) No 715/2007. This reference does not limit the application of such penalties to other infringements of other provisions of Regulation (EC) No 715/2007 or this Regulation, which do not explicitly refer to Article 13 of Regulation (EC) No 715/2007.

3.1.4. Paragraph 7.6.1. of Appendix 1 to Annex 11 of UN/ECE Regulation No 83 shall be replaced with the following:

"7.6.1. The OBD system shall report, in accordance with the standard listed in paragraph 6.5.3.2.(a) of this Appendix, the ignition cycle counter and general denominator as well as separate numerators and denominators for the following monitors, if their presence on the vehicle is required by this annex:

- (a) Catalysts (each bank to be reported separately);
- (b) Oxygen/exhaust gas sensors, including secondary oxygen sensors
(each sensor to be reported separately);
- (c) Evaporative system;
- (d) EGR system;
- (e) VVT system;
- (f) Secondary air system;
- (g) Particulate filter;
- (h) NO_x after-treatment system (e.g. NO_x absorber, NO_x reagent/catalyst system);
- (i) Boost pressure control system."

Paragraph 7.6.2. of Appendix 1 to Annex 11 of UN/ECE Regulation No 83 shall be replaced with the following:

"7.6.2. For specific components or systems that have multiple monitors, which are required to be reported by this point (e.g. oxygen sensor bank 1 may have multiple monitors for sensor response or other sensor characteristics), the OBD system shall separately track numerators and denominators for each of the specific monitors and report only the corresponding numerator and denominator for the specific monitor that has the lowest numerical ratio. If two or more specific monitors have identical ratios, the corresponding numerator and denominator for the specific monitor that has the highest denominator shall be reported for the specific component."

A new paragraph 7.6.2.1. of Appendix 1 to Annex 11 of UN/ECE Regulation No 83 shall be inserted as follows:

"Numerators and denominators for specific monitors of components or systems, that are monitoring continuously for short circuit or open circuit failures are exempted from reporting.

"Continuously," if used in this context means monitoring is always enabled and sampling of the signal used for monitoring occurs at a rate no less than two samples per second and the presence or the absence of the failure relevant to that monitor has to be concluded within 15 seconds.

If for control purposes, a computer input component is sampled less frequently, the signal of the component may instead be evaluated each time sampling occurs.

It is not required to activate an output component/system for the sole purpose of monitoring that output component/system."

Appendix 2

ESSENTIAL CHARACTERISTICS OF THE VEHICLE FAMILY

The essential characteristics of the vehicle family shall be those specified in Appendix 2 to Annex 11 to UN/ECE Regulation No 83.

ANNEX XII

DETERMINATION OF CO₂ EMISSIONS, FUEL CONSUMPTION, ELECTRIC ENERGY CONSUMPTION AND ELECTRIC RANGE

4. TYPE-APPROVAL OF VEHICLES FITTED WITH ECO-INNOVATIONS

4.1. According to Article 11(1) of Regulation (EU) No 725/2011 for M₁ vehicles and Article 11(1) of Regulation (EU) No 427/2014 for N₁ vehicles, a manufacturer wishing to benefit from a reduction of its average specific CO₂ emissions, as result of the savings achieved by one or more eco-innovations fitted in a vehicle, shall apply to an approval authority for an EC type-approval certificate of the vehicle fitted with the eco-innovation.

4.2. The CO₂ emissions savings from the vehicle fitted with an eco-innovation shall, for the purpose of type approval, be determined using the procedure and testing methodology specified in the Commission Decision approving the eco-innovation, in accordance with Article 10 of Regulation (EU) No 725/2011 for M₁ vehicles, or Article 10 of Regulation (EU) No 427/2014 for N₁ vehicles.

4.3. The performance of the necessary tests for the determination of the CO₂ emissions savings achieved by the eco-innovations shall be considered without prejudice to the demonstration of compliance of the eco-innovations with the technical prescriptions laid down in Directive 2007/46/EC, if applicable.

4.4. If the innovative technology does not meet the threshold of 1g CO₂/km as specified in Article 9 of Regulation (EU) No 725/2011, the type approval certificate shall be issued without reference to the eco-innovation code or the CO₂ reductions achieved by the innovative technology.

5. DETERMINATION OF CO₂ EMISSIONS AND FUEL CONSUMPTION FROM N₁ VEHICLES SUBMITTED TO MULTI-STAGE TYPE-APPROVAL

5.1. For the purpose of determining the CO₂ emissions and fuel consumption of a vehicle submitted to multi-stage type-approval, as defined in Article 3(7) of Directive 2007/46/EC, the procedures of Annex XXI apply. Specific provisions for multi-stage type approval are set in points 5.2 to 5.7 of this annex.

5.2. The road load shall be determined with the road load matrix family by using the parameters of a representative multi-stage vehicle which are set in paragraph 4.2.1.4 in Sub-Annex 4 of Annex XXI.

5.3. The calculation of road load and running resistance are based on a representative vehicle of a road load matrix family as set in paragraph 5.1 of Sub-Annex 4 of Annex XXI.

5.4. The manufacturer of the base vehicle shall test a representative multi-stage vehicle for CO₂ emission and fuel consumption and make available a calculation tool to establish, on the basis of the parameters of completed vehicles, their fuel consumption and CO₂ values as set in Sub-Annex 7 of Annex XXI.

5.5. The final fuel consumption and CO₂ values shall be calculated by the final-stage manufacturer on the basis of the parameters of the completed vehicle as set in paragraph 3.2.4 of Sub-Annex 7 of Annex XXI.

5.6. The manufacturer of the completed vehicle shall include, in the certificate of conformity, the information of the completed vehicles and add the information of the base vehicles in accordance with Annex IX to Directive [2007/46/EC](#).

5.7. In the case of vehicles submitted to individual vehicle approval, the individual approval certificate shall include the following information:

- (a) the CO₂ emissions measured according to the methodology set out in points 5.1 to 5.6 above;
- (b) the mass of the completed vehicle in running order;
- (c) the identification code corresponding to the type, variant and version of the base vehicle;
- (d) the type-approval number of the base vehicle, including the extension number;
- (e) the name and address of the manufacturer of the base vehicle;
- (f) the mass of the base vehicle in running order.

ANNEX XIII

EC TYPE-APPROVAL OF REPLACEMENT POLLUTION CONTROL DEVICES AS SEPARATE TECHNICAL UNIT

1. INTRODUCTION

1.1. This Annex contains additional requirement for the type-approval as separate technical units of pollution control devices.

2. GENERAL REQUIREMENTS

2.1. Marking

Original replacement pollution control devices shall bear at least the following identifications:

- (a) the vehicle manufacturer's name or trade mark;
- (b) the make and identifying part number of the original replacement pollution control device as recorded in the information mentioned in point 2.3.

2.2. Documentation

Original replacement pollution control devices shall be accompanied by the following information:

- (a) the vehicle manufacturer's name or trade mark;
- (b) the make and identifying part number of the original replacement pollution control device as recorded in the information mentioned in point 2.3;
- (c) the vehicles for which the original replacement pollution control device is of a type covered by point 2.3 of the Addendum to Appendix 4 to Annex I, including, where applicable, a marking to identify if the original replacement pollution control device is suitable for fitting to a vehicle that is equipped with an on-board diagnostic (OBD) system;
- (d) installation instructions, where necessary.

This information shall be available in the product catalogue distributed to points of sale by the vehicle manufacturer.

2.3. The vehicle manufacturer shall provide to the technical service and/or approval authority the necessary information in electronic format which makes the link between the relevant part numbers and the type-approval documentation.

This information shall contain the following:

- (a) make(s) and type(s) of vehicle,
- (b) make(s) and type(s) of original replacement pollution control device,

(c) part number(s) of original replacement pollution control device,

(d) type-approval number of the relevant vehicle type(s).

3. EC SEPARATE TECHNICAL UNIT TYPE-APPROVAL MARK

3.1. Every replacement pollution control device conforming to the type approved under this Regulation as a separate technical unit shall bear an EC type-approval mark.

3.2. This mark shall consist of a rectangle surrounding the lower-case letter 'e' followed by the distinguishing number of the Member State which has granted the EC type-approval in accordance with the numbering system set out in Annex VII to Directive 2007/46/EC.

The EC type- approval mark shall also include in the vicinity of the rectangle the 'base approval number' contained in section 4 of the type-approval number referred to in Annex VII to Directive 2007/46/EC, preceded by the two figures indicating the sequence number assigned to the latest major technical amendment to Regulation (EC) No 715/2007 or this Regulation on the date EC type-approval for a separate technical unit was granted. For this Regulation, the sequence number is 00.

3.3. The EC type-approval mark shall be affixed to the replacement pollution control device in such a way as to be clearly legible and indelible. It shall, wherever possible, be visible when the replacement pollution control device is installed on the vehicle.

3.4. Appendix 3 to this Annex gives example of the EC type- approval mark.

4. TECHNICAL REQUIREMENTS

4.1. The requirements for the type-approval of replacement pollution control devices shall be those of Section 5 of UN/ECE Regulation No 103 with the exceptions set out in sections 4.1.1 to 4.1.5.

4.1.1. Reference to the 'test cycle' in Section 5 of UN/ECE Regulation No 103 shall be understood as being the same Type I / Type 1 test and Type I / Type 1 test cycle as used for the original type approval of the vehicle.

4.1.2. The terms 'catalytic converter' and 'converter' used in section 5 of UN/ECE Regulation No 103 shall be understood to mean 'pollution control device'

4.1.3. The regulated pollutants referred to throughout section 5.2.3 of UN/ECE Regulation No 103 shall be replaced by all the pollutants specified in Annex 1, Table 2 of Regulation (EC) No 715/2007 for replacement pollution control devices intended to be fitted to vehicles type approved to Regulation (EC) No 715/2007.

4.1.4. For replacement pollution control devices standards intended to be fitted to vehicles type approved to Regulation (EC) No 715/2007, the durability requirements and associated deterioration factors specified in section 5 of UN/ECE Regulation No 103, shall refer to those specified in Annex VII of this Regulation.

4.1.5. Reference to Appendix 1 of the type-approval communication in section 5.5.3 of UN/ECE Regulation No 103 shall be understood as reference to the addendum to the EC type-approval certificate on vehicle OBD information (Appendix 5 to Annex I).

4.2. For vehicles with positive-ignition engines, if the NMHC emissions measured during the demonstration test of a new original equipment catalytic converter, under paragraph 5.2.1 of UN/ECE Regulation No 103, are higher than the values measured during the type-approval of the vehicle, the difference shall be added to the OBD threshold limits. The OBD threshold limits are specified in point 2.3 of Annex XI of this Regulation.

4.3. The revised OBD threshold limits will apply during the tests of OBD compatibility set out in paragraphs 5.5 to 5.5.5 of UN/ECE Regulation No 103. In particular, when the exceedance allowed in paragraph 1 of Appendix 1 to Annex 11 to UN/ECE Regulation No 83 is applied.

4.4. Requirements for replacement periodically regenerating systems

4.4.1. Requirements regarding emissions

4.4.1.1. The vehicle(s) indicated in Article 11(3), equipped with a replacement periodically regenerating system of the type for which approval is requested, shall be subject to the tests described in paragraph 3 of Annex 13 of UN/ECE Regulation No 83, in order to compare its performance with the same vehicle equipped with the original periodically regenerating system.

4.4.1.2. Reference to the ‘Type I test’ and ‘Type I test cycle’ in paragraph 3. of Annex 13 of UN/ECE Regulation No 83 and the ‘test cycle’ in Section 5 of UN/ECE Regulation No 103 shall be understood as being the same Type I / Type 1 test and Type I / Type 1 test cycle as used for the original type approval of the vehicle.

4.4.2. Determination of the basis for comparison

4.4.2.1. The vehicle shall be fitted with a new original periodically regenerating system. The emissions performance of this system shall be determined following the test procedure set out in paragraph 3 of Annex 13 of UN/ECE Regulation No 83.

4.4.2.1.1. Reference to the ‘Type I test’ and ‘Type I test cycle’ in paragraph 3. of Annex 13 of UN/ECE Regulation No 83 and the ‘test cycle’ in Section 5 of UN/ECE Regulation No 103 shall be understood as being the same Type I / Type 1 test and Type I / Type 1 test cycle as used for the original type approval of the vehicle.

4.4.2.2. Upon request of the applicant for the approval of the replacement component, the approval authority shall make available on a non-discriminatory basis, the information referred to in points 3.2.12.2.1.11.1 and 3.2.12.2.6.4.1 of the information document contained in Appendix 3 to Annex I to this Regulation for each vehicle tested.

4.4.3. Exhaust gas test with a replacement periodically regeneration system

4.4.3.1. The original equipment periodically regenerating system of the test vehicle(s) shall be replaced by the replacement periodically regenerating system. The emissions performance of this system shall be determined following the test procedure set out in paragraph 3 Annex 13 of UN/ECE Regulation No 83.

4.4.3.1.1. Reference to the ‘Type I test’ and ‘Type I test cycle’ in paragraph 3. of Annex 13 of UN/ECE Regulation No 83 and the ‘test cycle’ in Section 5 of UN/ECE Regulation No 103 shall be understood as being the same Type I / Type 1 test and Type I / Type 1 test cycle as used for the original type approval of the vehicle.

4.4.3.2. To determine the D-factor of the replacement periodically regenerating system, any of the engine test bench methods referred to in paragraph 3 of Annex 13 of UN/ECE Regulation No 83 may be used.

4.4.4. Other requirements

The requirements of paragraphs 5.2.3, 5.3, 5.4 and 5.5 of UN/ECE Regulation No 103 shall apply to replacement periodically regenerating systems. In these paragraphs the words 'catalytic converter' shall be understood to mean 'periodically regenerating system'. In addition the exceptions made to these paragraphs in section 4.1 of this annex shall also apply to periodically regenerating systems.

5. DOCUMENTATION

5.1. Each replacement pollution control device shall be clearly and indelibly marked with the manufacturer's name or trade mark and accompanied by the following information:

- (a) the vehicles (including year of manufacture) for which the replacement pollution control device is approved, including, where applicable, a marking to identify if the replacement pollution control device is suitable for fitting to a vehicle that is equipped with an on-board diagnostic (OBD) system;
- (b) installation instructions, where necessary.

The information shall be available in the product catalogue distributed to points of sale by the manufacturer of replacement pollution control devices.

6. CONFORMITY OF PRODUCTION

6.1. Measures to ensure the conformity of production shall be taken in accordance with the provisions laid down in Article 12 of Directive 2007/46/EC.

6.2. Special provisions

6.2.1. The checks referred to in point 2.2 of Annex X to Directive 2007/46/EC shall include compliance with the characteristics as defined under point 8 of Article 2 of this Regulation.

6.2.2. For the application of Article 12(2) of Directive 2007/46/EC, the tests described in section 4.4.1 of this Annex and section 5.2 of UN/ECE Regulation No 103 (requirements regarding emissions) may be carried out. In this case, the holder of the approval may request, as an alternative, to use as a basis for comparison not the original equipment pollution control device, but the replacement pollution control device which was used during the type-approval tests (or another sample that has been proven to conform to the approved type). Emissions values measured with the sample under verification shall then on average not exceed by more than 15 % the mean values measured with the sample used for reference.

Appendix 1

MODEL

Information document No ...

relating to the EC type-approval of replacement pollution control devices

The following information, if applicable, must be supplied in triplicate and include a list of contents. Any drawings must be supplied in appropriate scale and sufficient detail on size A4 or on a folder of A4 format. Photographs, if any, must show sufficient detail.

If the systems, components or separate technical units have electronic controls, information concerning their performance must be supplied.

0. GENERAL

0.1. Make (trade name of manufacturer): ...

0.2. Type: ...

0.2.1. Commercial name(s), if available: ...

0.5. Name and address of manufacturer: ...

Name and address of authorised representative, if any: ...

0.7. In the case of components and separate technical units, location and method of affixing of the EC approval mark: ...

0.8. Address(es) of assembly plant(s): ...

1. DESCRIPTION OF THE DEVICE

1.1. Make and type of the replacement pollution control device: ...

1.2. Drawings of the replacement pollution control device, identifying in particular all the characteristics referred to under point 8 of Article 2 of this Regulation: ...

1.3. Description of the vehicle type or types for which the replacement pollution control device is intended: ...

1.3.1. Number(s) and/or symbol(s) characterising the engine and vehicle type(s): ...

1.3.2. Is the replacement pollution control device intended to be compatible with OBD requirements (Yes/No)⁵⁵

1.4. Description and drawings showing the position of the replacement pollution control device relative to the engine exhaust manifold(s): ...

⁵⁵ Delete where not applicable

Appendix 2

MODEL EC TYPE-APPROVAL CERTIFICATE

(Maximum format: A4 (210 mm × 297 mm))

EC TYPE-APPROVAL CERTIFICATE

Stamp of administration

Communication concerning the:

- EC type-approval⁵⁶, ...,
- extension of EC type-approval⁵⁷, ...,
- refusal of EC type-approval⁵⁸, ...,
- withdrawal of EC type-approval⁵⁹, ...,

of a type of component/separate technical unit⁶⁰

with regard to Regulation (EC) No 715/2007, as implemented by Regulation (EU) No xxx/2016.

Regulation (EC) No 715/2007 or Regulation (EU) No xxx/2016 as last amended by ...

EC type-approval number: ...

Reason for extension: ...

SECTION I

0.1. Make (trade name of manufacturer): ...

0.2. Type: ...

0.3. Means of identification of type if marked on the component/separate technical unit⁶¹: ...

0.3.1. Location of that marking: ...

0.5. Name and address of manufacturer: ...

0.7. In the case of components and separate technical units, location and method of affixing of the EC approval mark: ...

⁵⁶ Delete where not applicable

⁵⁷ Delete where not applicable

⁵⁸ Delete where not applicable

⁵⁹ Delete where not applicable

⁶⁰ Delete where not applicable

⁶¹ If the means of identification of type contains characters not relevant to describe the vehicle, component or separate technical unit types covered by this type-approval certificate such characters shall be represented in the document by the symbol: '?' (e.g. ABC??123??).

0.8. Name and address(es) of assembly plant(s): ...

0.9. Name and address of manufacturer's representative (if any): ...

SECTION II

1. Additional information

1.1. Make and type of the replacement pollution control device: ...

1.2. Vehicle type(s) for which the pollution control device type qualifies as replacement part:
...

1.3. Type(s) of vehicle(s) on which the replacement pollution control device has been tested:
...

1.3.1. Has the replacement pollution control device demonstrated compatibility with OBD requirements (yes/no)⁶²: ...

2. Technical service responsible for carrying out the tests: ...

3. Date of test report: ...

4. Number of test report: ...

5. Remarks: ...

6. Place: ...

7. Date: ...

8. Signature: ...

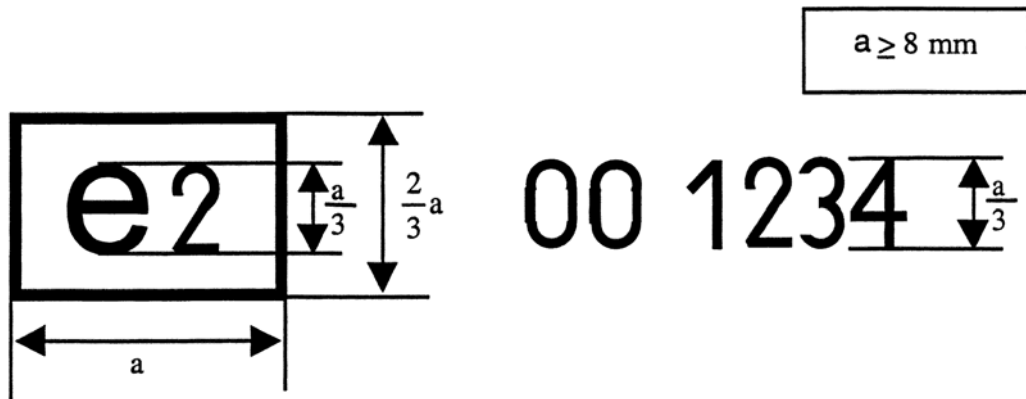
<i>Attachments:</i>	Information package.
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⁶² Delete where not applicable

Appendix 3

Example of the EC type-approval marks

(see point 5.2 of this Annex)



The above approval mark affixed to a component of a replacement pollution control device shows that the type concerned has been approved in France (e 2), pursuant to this Regulation. The first two digits of the approval number (00) indicate that this part was approved according to this Regulation. The following four digits (1234) are those allocated by the approval authority to the replacement pollution control device as the base approval number.

ANNEX XIV

Access to vehicle OBD and vehicle repair and maintenance information

1. INTRODUCTION

1.1. This Annex lays down technical requirements for the accessibility of vehicle OBD and vehicle repair and maintenance information.

2. REQUIREMENTS

2.1. Vehicle OBD and vehicle repair and maintenance information available through websites shall follow the technical specifications of OASIS Document SC2-D5, Format of Automotive Repair Information, version 1.0, 28 May 2003⁶³ and of Sections 3.2, 3.5, (excluding 3.5.2), 3.6, 3.7 and 3.8 of OASIS Document SC1-D2, Autorepair Requirements Specification, version 6.1, dated 10.1.2003⁶⁴, using only open text and graphic formats or formats which can be viewed and printed using only standard software plug-ins that are freely available, easy to install, and which run under computer operating systems commonly in use. Where possible, keywords in the meta data shall conform to ISO 15031-2. Such information shall be always available, except as required for web-site maintenance purposes. Those requiring the right to duplicate or re-publish the information should negotiate directly with the manufacturer concerned. Information for training material shall also be available, but may be presented through other media than web-sites.

Information on all parts of the vehicle, with which the vehicle, as identified by the vehicle identification number (VIN) and any additional criteria such as wheelbase, engine output, trim level or options, is equipped by the vehicle manufacturer and which can be replaced by spare parts offered by the vehicle manufacturer to its authorised repairers or dealers or third parties by means of reference to original equipment (OE) parts number, shall be made available in a database easily accessible to independent operators.

This database shall comprise the VIN, OE parts numbers, OE naming of the parts, validity attributes (valid-from and valid-to dates), fitting attributes and where applicable structuring characteristics.

The information on the database shall be regularly updated. The updates shall include in particular all modifications to individual vehicles after their production if this information is available to authorised dealers.

2.2. Access to vehicle security features used by authorised dealers and repair shops shall be made available to independent operators under protection of security technology according to the following requirements:

- (i) data shall be exchanged ensuring confidentiality, integrity and protection against replay;
- (ii) the standard https//ssl-tls (RFC4346) shall be used;

⁶³ Available at: <http://www.oasis-open.org/committees/download.php/2412/Draft%20Committee%20Specification.pdf>

⁶⁴ Available at: <http://lists.oasis-open.org/archives/autorepair/200302/pdf00005.pdf>

(iii) security certificates in accordance with ISO 20828 shall be used for mutual authentication of independent operators and manufacturers;

(iv) the independent operator's private key shall be protected by secure hardware.

The Forum on Access to Vehicle Information provided for by paragraph 9 of Article 13 will specify the parameters for fulfilling these requirements according to the state-of-the-art.

The independent operator shall be approved and authorised for this purpose on the basis of documents demonstrating that they pursue a legitimate business activity and have not been convicted of relevant criminal activity.

2.3. Reprogramming of control units shall be conducted in accordance with either ISO 22900 or SAE J2534, regardless of the date of type approval. For the validation of the compatibility of the manufacturer-specific application and the vehicle communication interfaces (VCI) complying to ISO 22900 or SAE J2534, the manufacturer shall offer either a validation of independently developed VCIs or the information, and loan of any special hardware, required for a VCI manufacturer to conduct such validation himself. The conditions of Article 7(1) of Regulation (EC) No 715/2007 apply to fees for such validation or information and hardware.

2.4. All emission-related fault codes shall be consistent with Appendix 1 to Annex XI.

2.5. For access to any vehicle OBD and vehicle repair and maintenance information other than that relating to secure areas of the vehicle, registration requirements for use of the manufacturer's web site by an independent operator shall require only such information as is necessary to confirm how payment for the information is to be made. For information concerning access to secure areas of the vehicle, the independent operator shall present a certificate in accordance with ISO 20828 to identify himself and the organisation to which he belongs and the manufacturer shall respond with his own certificate in accordance with ISO 20828 to confirm to the independent operator that he is accessing a legitimate site of the intended manufacturer. Both parties shall keep a log of any such transactions indicating the vehicles and changes made to them under this provision.

2.6. In the event that vehicle OBD and vehicle repair and maintenance information available on a manufacturer's website does not contain specific relevant information to permit the proper design and manufacture of alternative fuels retrofit systems, then any interested alternative fuels retrofit system manufacturer shall be able to access the information required in paragraphs 0, 2, and 3 of Appendix 3 to Annex I by contacting the manufacturer directly with such a request. Contact details for that purpose shall be clearly indicated on the manufacturer's website and the information shall be provided within 30 days. Such information need only be provided for alternative fuels retrofit systems that are subject to UN/ECE Regulation No 115⁶⁵ or for alternative fuels retrofit components that form part of systems subject to UN/ECE Regulation No 115, and need only be provided in response to a request that clearly specifies the exact specification of the vehicle model for which the information is required and that specifically confirms that the information is required for the development of alternative fuels retrofit systems or components subject to UN/ECE Regulation No 115.

2.7. Manufacturers shall indicate in their repair information websites the type-approval number by model.

⁶⁵ OJL323, 7.11.2014, p91

2.8. Manufacturers shall establish fees for hourly, daily, monthly, annual and per-transaction access to their repair and maintenance information websites, which are reasonable and proportionate.

Appendix 1

Manufacturer's Certificate on Access to Vehicle OBD and Vehicle Repair and
Maintenance Information

(Manufacturer) :

(Address of the manufacturer) :

Certifies that

it provides access to vehicle OBD and vehicle repair and maintenance information in compliance with the provisions of:

- Article 6 of Regulation (EC) No 715/2007;
- Articles 4(6) and 13 of [this Regulation];
- Annex I, section 2.3.1 and 2.3.5 of [this Regulation];
- Annex I, Appendix 3, section 16 of [this Regulation];
- Annex I, Appendix 5 of [this Regulation];
- Annex XI, section 4 of [this Regulation]; and
- Annex XIV of [this Regulation]

with respect to the vehicle types listed in attachment to this Certificate.

The principal website address through which the relevant information may be accessed and which are hereby certified to be in compliance with the above provisions are listed in an attachment to this Certificate along with the contact details of the responsible manufacturer's representative whose signature is below.

Where applicable: The manufacturer hereby also certifies that it has complied with the obligation in Article 13(5) of this Regulation to provide the relevant information for previous approvals of these vehicle types no later than 6 months after the date of type-approval.

Done at[.....Place]

On [.....Date]

[Signature of the Manufacturer's Representative]

Annexes: Website Addresses

Contact Details

Annex I

to

Manufacturer's Certificate on Access to Vehicle OBD and Vehicle Repair and
Maintenance Information

Website addresses referred to by this Certificate:

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Annex II

to

Manufacturer's Certificate on Access to Vehicle OBD and Vehicle Repair and
Maintenance Information

Contact details of the manufacturer's representative referred to by this Certificate:

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ANNEX XV

RESERVED

ANNEX XVI

REQUIREMENTS FOR VEHICLES THAT USE A REAGENT FOR THE EXHAUST AFTER-TREATMENT SYSTEM

1. INTRODUCTION

This Annex sets out the requirements for vehicles that rely on the use of a reagent for the after-treatment system in order to reduce emissions.

The requirements shall be those specified in Appendix 6 to UN/ECE Regulation No 83, with the following exception.

The reference to Annex 1 in paragraph 4.1. of Appendix 6 to UN/ECE Regulation No 83 shall be understood as reference to Appendix 3 to Annex I to this Regulation.