

Directive 2005/55/EC of the European Parliament and of the Council of 28 September 2005 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive-ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles (Text with EEA relevance) (repealed)

Article 1	.....
Article 2	Obligations of the Member States
Article 3	Durability of emission control systems
Article 4	On-board diagnostic systems
Article 5	Emission control systems using consumable reagents
Article 6	Tax incentives
Article 7	Implementation measures and amendments
Article 8	Review and reports
Article 9	Transposition
Article 10	Repeal
Article 11	Entry into force
Article 12	Addressees

ANNEX I

SCOPE, DEFINITIONS AND ABBREVIATIONS, APPLICATION FOR EC TYPE-APPROVAL, SPECIFICATIONS AND TESTS AND CONFORMITY OF PRODUCTION

1. SCOPE
2. DEFINITIONS
 - 2.1.
 - 2.2. Symbols, abbreviations and international standards
 - 2.2.1. Symbols for test parameters
 - 2.2.2.
 - 2.2.3.
 - 2.2.4. Symbols for the fuel composition
 - 2.2.5. Standards referenced by this Directive
3. APPLICATION FOR EC TYPE-APPROVAL
 - 3.1. Application for EC type-approval for a type of engine or...
 - 3.1.1.
 - 3.1.2.
 - 3.1.2.1.
 - 3.1.3.
 - 3.2. Application for EC type-approval for a vehicle type in respect...
 - 3.2.1.
 - 3.2.2.
 - 3.2.2.1.
 - 3.2.3.

- 3.3. Application for EC type-approval for a vehicle type with an...
 - 3.3.1.
 - 3.3.2.
 - 3.3.2.1.
 - 3.3.3.
- 3.4. On-board diagnostic systems
 - 3.4.1.
 - 3.4.1.1.
 - 3.4.1.2.
 - 3.4.1.2.1.
 - 3.4.1.3.
 - 3.4.1.4.
 - 3.4.1.5.
 - 3.4.1.6.
- 4. EC TYPE-APPROVAL
 - 4.1. Granting of a universal fuel EC type-approval
 - 4.1.1.
 - 4.1.2.
 - 4.1.2.1.
 - 4.1.3.
 - 4.1.3.1.
 - 4.1.4.
 - 4.1.5.
 - 4.1.5.1.
 - 4.2. Granting of a fuel range restricted EC type-approval
 - 4.2.1.
 - 4.2.1.1.
 - 4.2.1.2.
 - 4.2.1.3.
 - 4.2.2.
 - 4.2.2.1.
 - 4.2.2.2.
 - 4.2.2.3.
 - 4.3. Exhaust emissions approval of a member of a family
 - 4.3.1.
 - 4.3.2. Secondary test engine
 - 4.4. Type-approval certificate
 - 4.5.
- 5. ENGINE MARKINGS
 - 5.1. The engine approved as a technical unit must bear:
 - 5.1.1.
 - 5.1.2.
 - 5.1.3.
 - 5.1.4.
 - 5.1.5. Labels
 - 5.1.5.1. Content
 - 5.1.5.2. Properties
 - 5.1.5.3. Placing
 - 5.2.
 - 5.3.

- 6. SPECIFICATIONS AND TESTS
 - 6.1. General
 - 6.1.1. Emission control equipment
 - 6.1.1.1.
 - 6.1.2.
 - 6.1.2.1.
 - 6.1.3. Emission control strategy
 - 6.1.3.1.
 - 6.1.4. Requirements for base emission control strategy
 - 6.1.4.1.
 - 6.1.5. Requirements for auxiliary emission control strategy
 - 6.1.5.1.
 - 6.1.5.2.
 - 6.1.5.3.
 - 6.1.5.4.
 - 6.1.5.5.
 - 6.1.5.6.
 - 6.1.6. Requirements for torque limiters
 - 6.1.6.1.
 - 6.1.6.2.
 - 6.1.7. Special requirements for electronic emission control systems
 - 6.1.7.1. Documentation requirements
 - 6.1.8. Specifically for the type-approval of engines according to row A...
 - 6.1.8.1.
 - 6.1.8.2.
 - 6.1.9. The transitional provisions for extension of type-approval are given in...
 - 6.1.10. Provisions for electronic system security
 - 6.1.10.1.
 - 6.1.10.2.
 - 6.1.10.3.
 - 6.1.10.4.
 - 6.1.10.5.
 - 6.2. Specifications Concerning the Emission of Gaseous and Particulate Pollutants and...
 - 6.2.1. Limit values
 - 6.2.2. Hydrocarbon measurement for diesel and gas fuelled engines
 - 6.2.2.1.
 - 6.2.3. Specific requirements for diesel engines
 - 6.2.3.1.
 - 6.2.3.2.
 - 6.3. Durability and deterioration factors
 - 6.3.1.
 - 6.3.2.
 - 6.4. On-Board Diagnostic (OBD) system
 - 6.4.1.
 - 6.4.2. Small batch engine production
 - 6.5. Requirements to ensure correct operation of NO_x control measures
 - 6.5.1. General
 - 6.5.1.1.
 - 6.5.1.2. Application dates
 - 6.5.1.3.
 - 6.5.1.4.

Status: EU Directives are being published on this site to aid cross referencing from UK legislation. After IP completion day (31 December 2020 11pm) no further amendments will be applied to this version.

	6.5.1.5.
	6.5.1.6.
	6.5.1.7.
	6.5.1.8.
6.5.2.	Maintenance requirements
	6.5.2.1.
	6.5.2.2.
	6.5.2.3.
	6.5.2.4.
	6.5.2.5.
	6.5.2.6.
6.5.3.	Engine system NO _x control
	6.5.3.1.
	6.5.3.2.
	6.5.3.3.
	6.5.3.4.
	6.5.3.5.
6.5.4.	Reagent control
	6.5.4.1.
	6.5.4.2.
	6.5.4.3.
	6.5.4.4.
	6.5.4.5.
	6.5.4.6.
	6.5.4.7.
	6.5.4.8.
	6.5.4.9.
	6.5.4.10.
	6.5.4.11.
	6.5.4.12.
6.5.5.	Measures to discourage tampering of exhaust aftertreatment systems
	6.5.5.1.
	6.5.5.2.
	6.5.5.3.
	6.5.5.4.
	6.5.5.5.
	6.5.5.6.
	6.5.5.7.
	6.5.5.8.
6.5.6.	Operating conditions of the emission control monitoring system
	6.5.6.1.
	6.5.6.2.
	6.5.6.3.
	6.5.6.4.
	6.5.6.5.
	6.5.6.6.
6.5.7.	Failure of the emission control monitoring system
	6.5.7.1.
	6.5.7.2.
	6.5.7.3.
	6.5.7.4.
	6.5.7.5.
6.5.8.	Demonstration of the emission control monitoring system

	6.5.8.1.	.....
	6.5.8.2.	.....
	6.5.8.3.	The testing of the emission control monitoring system consists of...
	6.5.8.3.1.	.....
	6.5.8.3.2.	.....
	6.5.8.3.3.	.....
	6.5.8.3.4.	.....
	6.5.8.3.5.	.....
	6.5.8.4.	.....
	6.5.8.5.	.....
	6.5.8.6.	.....
	6.5.8.7.	.....
7.	INSTALLATION ON THE VEHICLE	
	7.1.	.....
	7.1.1.	.....
	7.1.2.	.....
	7.1.3.	.....
	7.1.4.	.....
8.	ENGINE FAMILY	
	8.1.	Parameters defining the engine family
	8.2.	Choice of the parent engine
	8.2.1.	Diesel engines
	8.2.2.	Gas engines
	8.3.	Parameters for defining an OBD-engine family
9.	PRODUCTION CONFORMITY	
	9.1.	.....
	9.1.1.	.....
	9.1.1.1.	.....
	9.1.1.1.1.	.....
	9.1.1.1.2.	.....
	9.1.1.1.3.	.....
	9.1.1.2.	.....
	9.1.1.2.1.	.....
	9.1.1.2.2.	.....
	9.1.1.2.3.	.....
	9.1.1.2.4.	.....
	9.1.1.2.5.	.....
	9.1.1.2.6.	.....
	9.1.2.	On-Board Diagnostics (OBD)
	9.1.2.1.	.....
	9.1.2.2.	.....
	9.1.2.3.	.....
	9.1.2.4.	.....
	9.1.2.5.	.....
10.	CONFORMITY OF IN-SERVICE VEHICLES/ENGINES	
	10.1.	.....
	10.2.	.....
	10.3.	.....

Status: EU Directives are being published on this site to aid cross referencing from UK legislation. After IP completion day (31 December 2020 11pm) no further amendments will be applied to this version.

Appendix 2

ESSENTIAL CHARACTERISTICS OF THE ENGINE FAMILY

.....
.....

Appendix 3

.....
.....
.....
.....
.....
.....
.....

Appendix 4

CHARACTERISTICS OF THE ENGINE-RELATED VEHICLE PARTS

Appendix 5

OBD-RELATED INFORMATION

- 1.
 - 1.1.
 - 1.2.
 - 1.3.
 - 1.3.1.
 - 1.3.2.
 - 1.3.3.

Appendix 6

Information required for roadworthiness testing

- A. Measurement of carbon monoxide emissions
 - 3.2.1.6.
 - 3.2.1.6.1.
 - 3.2.1.7.
- B. Measurement of smoke opacity
 - 3.2.13.
- 4.
 - 4.3.
 - 4.3.1.

ANNEX III TEST PROCEDURE

1. INTRODUCTION
 - 1.1.
 - 1.2.
 - 1.3. Measurement principle
 - 1.3.1. ESC Test
 - 1.3.2. ELR test
 - 1.3.3. ETC Test
2. TEST CONDITIONS
 - 2.1. Engine Test Conditions
 - 2.1.1.
 - 2.1.2. Test Validity
 - 2.2. Engines with charge air cooling
 - 2.3. Engine air intake system
 - 2.4. Engine exhaust system
 - 2.5. Cooling system
 - 2.6. Lubricating oil
 - 2.7. Fuel
 - 2.8.
 - 2.8.1.
 - 2.8.2.

Appendix 1

ESC AND ELR TEST CYCLES

1. ENGINE AND DYNAMOMETER SETTINGS
 - 1.1. Determination of engine speeds A, B and C
 - 1.2. Determination of dynamometer settings
2. ESC TEST RUN
 - 2.1. Preparation of the Sampling Filter
 - 2.2. Installation of the measuring equipment
 - 2.3. Starting the dilution system and the engine
 - 2.4. Starting the particulate sampling system
 - 2.5. Adjustment of the dilution ratio
 - 2.6. Checking the analysers
 - 2.7. Test cycle
 - 2.7.1. The following 13-mode cycle shall be followed in dynamometer operation...
 - 2.7.2. Test sequence
 - 2.7.3. Analyser response
 - 2.7.4. Particulate sampling
 - 2.7.5. Engine conditions
 - 2.7.6. NO_x check within the control area
 - 2.7.7. Rechecking the analysers
3. ELR TEST RUN
 - 3.1. Installation of the measuring equipment

- 3.2. Checking of the opacimeter
- 3.3. Test cycle
 - 3.3.1. Conditioning of the engine
 - 3.3.2. Test sequence
- 3.4. Cycle validation
- 3.5. Rechecking of the opacimeter

4. CALCULATION OF THE EXHAUST GAS FLOW
 - 4.1. Determination of Raw Exhaust Gas Mass Flow
 - 4.1.1. Direct measurement method
 - 4.1.2. Air and fuel measurement method
 - 4.2. Determination of Diluted Exhaust Gas Mass Flow

5. CALCULATION OF THE GASEOUS EMISSIONS
 - 5.1. Data Evaluation
 - 5.2. Dry/Wet Correction
 - 5.3. NO_x correction for humidity and temperature
 - 5.4. Calculation of the emission mass flow rates
 - 5.5. Calculation of the specific emissions
 - 5.6. Calculation of the area control values
 - 5.6.1. Calculation of the Specific Emission
 - 5.6.2. Determination of the Emission Value from the Test Cycle
 - 5.6.3. Comparison of NO_x Emission Values

6. CALCULATION OF THE PARTICULATE EMISSIONS
 - 6.1. Data Evaluation
 - 6.2. Partial Flow Dilution System
 - 6.2.1. Isokinetic systems
 - 6.2.2. Systems with measurement of CO₂ or NO_x concentration
 - 6.2.3. Systems with CO₂ measurement and carbon balance method
 - 6.2.4. Systems with flow measurement
 - 6.3. Full Flow Dilution System
 - 6.4. Calculation of the Particulate Mass Flow Rate
 - 6.5. Calculation of the specific emission
 - 6.6. Calculation of the specific emission

7. CALCULATION OF THE SMOKE VALUES
 - 7.1. Bessel algorithm
 - 7.1.1. Calculation of filter response time and Bessel constants
 - 7.1.2. Calculation of the Bessel algorithm
 - 7.2. Data evaluation
 - 7.3. Determination of smoke
 - 7.3.1. Data conversion
 - 7.3.2. Calculation of Bessel averaged smoke
 - 7.3.3. Final result

Appendix 2

ETC TEST CYCLE

1. ENGINE MAPPING PROCEDURE
 - 1.1. Determination of the mapping speed range

- 1.2. Performing the engine power map
 - 1.3. Mapping curve generation
 - 1.4. Alternate mapping
 - 1.5. Replicate tests
2. GENERATION OF THE REFERENCE TEST CYCLE
 - 2.1. Actual speed
 - 2.2. Actual torque
 - 2.3. Example of the unnormalisation procedure
3. EMISSIONS TEST RUN
 - 3.1. Preparation of the sampling filters (if applicable)
 - 3.2. Installation of the measuring equipment
 - 3.3. Starting the dilution system and the engine
 - 3.4. Starting the particulate sampling system (diesel engines only)
 - 3.5. Adjustment of the dilution system
 - 3.6. Checking the analysers
 - 3.7. Engine starting procedure
 - 3.8. Test cycle
 - 3.8.1. Test sequence
 - 3.8.2. Gaseous emissions measurement
 - 3.8.2.1. Full flow dilution system
 - 3.8.2.2. Raw exhaust measurement
 - 3.8.3. Particulate sampling (if applicable)
 - 3.8.3.1. Full flow dilution system
 - 3.8.3.2. Partial flow dilution system
 - 3.8.4. Engine stalling
 - 3.8.5. Operations after test
 - 3.9. Verification of the test run
 - 3.9.1. Data shift
 - 3.9.2. Calculation of the cycle work
 - 3.9.3. Validation statistics of the test cycle
4. CALCULATION OF THE EXHAUST GAS FLOW
 - 4.1. Determination of the diluted exhaust gas flow
 - 4.2. Determination of raw exhaust gas mass flow
 - 4.2.1. Response time
 - 4.2.2. Direct measurement method
 - 4.2.3. Air and fuel measurement method
 - 4.2.4. Tracer measurement method
 - 4.2.5. Air flow and air-to-fuel ratio measurement method
5. CALCULATION OF THE GASEOUS EMISSIONS
 - 5.1. Data evaluation
 - 5.2. Dry/wet correction
 - 5.3. NO_x correction for humidity and temperature
 - 5.4. Calculation of the emission mass flow rates
 - 5.4.1. Determination of the background corrected concentrations (full flow dilution system,...
 - 5.5. Calculation of the specific emissions
 - 5.5.1.
6. CALCULATION OF THE PARTICULATE EMISSION (IF APPLICABLE)

Status: EU Directives are being published on this site to aid cross referencing from UK legislation. After IP completion day (31 December 2020 11pm) no further amendments will be applied to this version.

- 6.1. Data evaluation
- 6.2. Calculation of the mass flow
 - 6.2.1. Full flow dilution system
 - 6.2.2. Partial flow dilution system
- 6.3. Calculation of the Specific Emission
 - 6.3.1.

Appendix 3

.
.

Appendix 4

MEASUREMENT AND SAMPLING PROCEDURES

- 1. INTRODUCTION
- 2. DYNAMOMETER AND TEST CELL EQUIPMENT
 - 2.1. Engine dynamometer
 - 2.2. Other instruments
 - 2.3. Exhaust gas flow
 - 2.4. Diluted exhaust gas flow
- 3. DETERMINATION OF THE GASEOUS COMPONENTS
 - 3.1. General analyser specifications
 - 3.1.1. Accuracy
 - 3.1.2. Precision
 - 3.1.3. Noise
 - 3.1.4. Zero drift
 - 3.1.5. Span drift
 - 3.1.6. Rise time
 - 3.2. Gas drying
 - 3.3. Analysers
 - 3.3.1. Carbon monoxide (CO) analysis
 - 3.3.2. Carbon dioxide (CO₂) analysis
 - 3.3.3. Hydrocarbon (HC) analysis
 - 3.3.4. Non-Methane Hydrocarbon (NMHC) analysis (NG fuelled gas engines only)
 - 3.3.4.1. Gas chromatographic (GC) method
 - 3.3.4.2. Non-Methane Cutter (NMC) method
 - 3.3.5. Oxides of Nitrogen (NO_x) analysis
 - 3.3.6. Air-to-fuel measurement
 - 3.4. Sampling of Gaseous Emissions
 - 3.4.1. Raw exhaust gas
 - 3.4.2. Diluted exhaust gas
- 4. DETERMINATION OF THE PARTICULATES
 - 4.1. Particulate sampling filters
 - 4.1.1. Filter specification
 - 4.1.2. Filter size

- 4.1.3. Filter face velocity
- 4.1.4. Filter loading
- 4.1.5. Filter holder
- 4.2. Weighing chamber and analytical balance specifications
 - 4.2.1. Weighing chamber conditions
 - 4.2.2. Reference filter weighing
 - 4.2.3. Analytical balance
 - 4.2.4. Elimination of static electricity effects
 - 4.2.5. Specifications for flow measurement
 - 4.2.5.1. General requirements
 - 4.2.5.2. Special provisions for partial flow dilution systems
- 5. DETERMINATION OF SMOKE
 - 5.1. General requirements
 - 5.2. Specific requirements
 - 5.2.1. Linearity
 - 5.2.2. Zero drift
 - 5.2.3. Opacimeter display and range
 - 5.2.4. Instrument response time
 - 5.2.5. Neutral density filters

Appendix 5

CALIBRATION PROCEDURE

- 1. CALIBRATION OF THE ANALYTICAL INSTRUMENTS
 - 1.1. Introduction
 - 1.2. Calibration gases
 - 1.2.1. Pure gases
 - 1.2.2. Calibration and span gases
 - 1.2.3. Use of precision blending devices
 - 1.3. Operating procedure for analysers and sampling system
 - 1.4. Leakage test
 - 1.5. Response time check of analytical system
 - 1.6. Calibration
 - 1.6.1. Instrument assembly
 - 1.6.2. Warming-up time
 - 1.6.3. NDIR and HFID analyser
 - 1.6.4. Establishment of the calibration curve
 - 1.6.5. Alternative methods
 - 1.6.6. Calibration of tracer gas analyser for exhaust flow measurement
 - 1.6.7. Verification of the calibration
 - 1.7. Efficiency test of the NO_x converter
 - 1.7.1. Test set-up
 - 1.7.2. Calibration
 - 1.7.3. Calculation
 - 1.7.4. Adding of oxygen
 - 1.7.5. Activation of the ozonator
 - 1.7.6. NO_x mode
 - 1.7.7. Deactivation of the ozonator
 - 1.7.8. NO mode
 - 1.7.9. Test interval

Status: EU Directives are being published on this site to aid cross referencing from UK legislation. After IP completion day (31 December 2020 11pm) no further amendments will be applied to this version.

- 1.7.10. Efficiency requirement
 - 1.8. Adjustment of the FID
 - 1.8.1. Optimisation of the detector response
 - 1.8.2. Hydrocarbon response factors
 - 1.8.3. Oxygen interference check
 - 1.8.4. Efficiency of the non-methane cutter (NMC, for NG fuelled gas...
 - 1.8.4.1. Methane efficiency
 - 1.8.4.2. Ethane efficiency
 - 1.9. Interference effects with CO, CO₂, and NO_x analysers
 - 1.9.1. CO analyser interference check
 - 1.9.2. NO_x analyser quench checks
 - 1.9.2.1. CO₂ quench check
 - 1.9.2.2. Water quench check
 - 1.10. Calibration intervals
2. CALIBRATION OF THE CVS-SYSTEM
- 2.1. General
 - 2.2. Calibration of the Positive Displacement Pump (PDP)
 - 2.2.1. Data analysis
 - 2.3. Calibration of the Critical Flow Venturi (CFV)
 - 2.3.1. Data analysis
 - 2.4. Calibration of the Subsonic Venturi (SSV)
 - 2.4.1. Data analysis
 - 2.5. Total system verification
 - 2.5.1. Metering with a critical flow orifice
 - 2.5.2. Metering by means of a gravimetric technique
3. CALIBRATION OF THE PARTICULATE MEASURING SYSTEM
- 3.1. Introduction
 - 3.2. Flow measurement
 - 3.2.1. Periodical calibration
 - 3.2.2. Carbon flow check
 - 3.2.3. Pre-test check
 - 3.3. Determination of transformation time (for partial flow dilution systems on...)
 - 3.4. Checking the partial flow conditions
 - 3.5. Calibration intervals
4. CALIBRATION OF THE SMOKE MEASUREMENT EQUIPMENT
- 4.1. Introduction
 - 4.2. Calibration procedure
 - 4.2.1. Warming-up time
 - 4.2.2. Establishment of the linearity response
 - 4.3. Calibration intervals

Appendix 6

CARBON FLOW CHECK

- 1. INTRODUCTION
- 2. CALCULATIONS
 - 2.1. Carbon flow rate into the engine (location 1)

- 2.2. Carbon flow rate in the raw exhaust (location 2)
- 2.3. Carbon flow rate in the dilution system (location 3)
- 2.4.

ANNEX IV

TECHNICAL CHARACTERISTICS OF REFERENCE FUEL PRESCRIBED FOR APPROVAL TESTS AND TO VERIFY CONFORMITY OF PRODUCTION

- 1.2.
- 2. NATURAL GAS (NG)
- 3. TECHNICAL DATA OF THE LPG REFERENCE FUELS
 - A. Technical data of the LPG reference fuels used for testing...
 - B. Technical data of the LPG reference fuels used for testing...

ANNEX V

ANALYTICAL AND SAMPLING SYSTEMS

- 1. DETERMINATION OF THE GASEOUS EMISSIONS
 - 1.1. Introduction
 - 1.2. Description of the analytical system
 - 1.2.1. Components of Figures 7 and 8
 - EP Exhaust pipe
 - Exhaust gas sampling probe (Figure 7 only)
 - SP2 Diluted exhaust gas HC sampling probe (Figure 8 only)...
 - SP3 Diluted exhaust gas CO, CO₂, NO_x sampling probe (Figure...)
 - HSL1 Heated sampling line
 - HSL2 Heated NO_x sampling line
 - SL Sampling line for CO and CO₂
 - BK Background bag (optional; Figure 8 only)
 - BG Sample bag (optional; Figure 8 CO and CO₂ only)...
 - F1 Heated pre-filter (optional)
 - F2 Heated filter
 - P Heated sampling pump
 - HC
 - CO, CO₂
 - NO
 - C Converter
 - B Cooling bath (optional)
 - T1, T2, T3 Temperature sensor
 - T4 Temperature sensor
 - T5 Temperature sensor
 - G1, G2, G3 Pressure gauge
 - R1, R2 Pressure regulator
 - R3, R4, R5 Pressure regulator
 - FL1, FL2, FL3 Flowmeter
 - FL4 to FL6 Flowmeter (optional)
 - V1 to V5 Selector valve

Status: EU Directives are being published on this site to aid cross referencing from UK legislation. After IP completion day (31 December 2020 11pm) no further amendments will be applied to this version.

- V6, V7 Solenoid valve
- V8 Needle valve
- V9, V10 Needle valve
- V11, V12 Toggle valve (optional)
- 1.3. NMHC analysis (NG fuelled gas engines only)
 - 1.3.1. Gas chromatographic method (GC, Figure 9)
 - Components of Figure 9
 - PC Porapak column
 - MSC Molecular sieve column
 - OV Oven
 - SLP Sample loop
 - P Pump
 - D Dryer
 - HC
 - V1 Sample injection valve
 - V3 Selector valve
 - V2, V4, V5, V6, V7, V8 Needle valve
 - R1, R2, R3 Pressure regulator
 - FC Flow capillary
 - G1, G2, G3 Pressure gauge
 - F1, F2, F3, F4, F5 Filter
 - FL1
 - 1.3.2. Non-methane cutter method (NMC, Figure 10)
 - Components of Figure 10
 - NMC Non-methane cutter
 - HC
 - V1 Selector valve
 - V2, V3 Solenoid valve
 - V4 Needle valve
 - R1 Pressure regulator
 - FL1 Flowmeter
- 2. EXHAUST GAS DILUTION AND DETERMINATION OF THE PARTICULATES
 - 2.1. Introduction
 - 2.2. Partial flow dilution system
 - Isokinetic systems (Figures 11, 12)
 - Flow controlled systems with concentration measurement (Figures 13 to 17)...
 - Flow controlled systems with flow measurement (Figures 18, 19)
 - 2.2.1. Components of Figures 11 to 19
 - EP Exhaust pipe
 - SP Sampling probe (Figures 10, 14, 15, 16, 18, 19)...
 - ISP Isokinetic sampling probe (Figures 11, 12)
 - FD1, FD2 Flow divider (Figure 16)
 - FD3 Flow divider (Figure 17)
 - EGA Exhaust gas analyser (Figures 13, 14, 15, 16, 17)...
 - TT Transfer tube (Figures 11 to 19)
 - DPT Differential pressure transducer (Figures 11, 12, 17)
 - FC1 Flow controller (Figures 11, 12, 17)
 - PCV1, PCV2 Pressure control valve (Figure 16)
 - DC Damping chamber (Figure 17)
 - VN Venturi (Figure 15)
 - FC2 Flow controller (Figures 13, 14, 18, 19, optional)

- FM1 Flow measurement device (Figures 11, 12, 18, 19)
- FM2 Flow measurement device (Figure 19)
- PB Pressures blower (Figures 11, 12, 13, 14, 15, 16,...)
- SB Suction blower (Figures 11, 12, 13, 16, 17, 19)...
- DAF Dilution air filter (Figures 11 to 19)
- DT Dilution tunnel (Figures 11 to 19)
- HE Heat exchanger (Figures 16, 17)
- 2.3. Full flow dilution system
 - 2.3.1. Components of Figure 20
 - EP Exhaust pipe
 - PDP Positive displacement pump
 - CFV Critical Flow Venturi
 - HE Heat exchanger (optional, if EFC is used)
 - EFC Electronic flow compensation (optional, if HE is used)
 - DT Dilution tunnel
 - DAF Dilution air filter
 - PSP Particulate sampling probe
- 2.4. Particulate sampling system
 - 2.4.1. Components of Figures 21 and 22
 - PTT Particulate transfer tube (Figures 21, 22)
 - SDT Secondary dilution tunnel (Figure 22)
 - FH Filter holder(s) (Figures 21, 22)
 - P Sampling pump (Figures 21, 22)
 - DP Dilution air pump (Figure 22)
 - FC3 Flow controller (Figures 21, 22)
 - FM3 Flow measurement device (Figures 21, 22)
 - FM4 Flow measurement device (Figure 22)
 - BV Ball valve (optional)
- 3. DETERMINATION OF SMOKE
 - 3.1. Introduction
 - 3.2. Full flow opacimeter
 - 3.2.1. Components of Figure 23
 - EP Exhaust Pipe
 - OPL Optical Path Length
 - LS Light source
 - LD Light detector
 - CL Collimating lens
 - T1 Temperature sensor (optional)
 - 3.3. Partial flow opacimeter
 - 3.3.1. Components of Figure 24
 - EP Exhaust pipe
 - SP Sampling probe
 - TT Transfer tube
 - FM Flow measurement device
 - MC Measuring chamber
 - OPL Optical path length
 - LS Light source
 - LD Light detector
 - CL Collimating lens
 - T1 Temperature sensor
 - P Sampling pump (optional)

Status: EU Directives are being published on this site to aid cross referencing from UK legislation. After IP completion day (31 December 2020 11pm) no further amendments will be applied to this version.

ANNEX VI

.....

Appendix 1

to EC type-approval certificate No ... concerning the type approval of a vehicle/separate technical unit/component

.....

- 1.4. Emission levels of the engine/parent engine:
 - 1.4.1. ESC test:
 - 1.4.2. ELR test:
 - 1.4.3. ETC test:
- 1.5.
- 1.6. Carbon monoxide emissions test results
- 1.7. Smoke opacity test results
 - 1.7.1.
 - 1.7.2. Free acceleration tests
 - 1.7.2.1. Engine test in accordance with Section 4.3 of Annex VI...
 - 1.7.2.2. Under free acceleration
 - 1.7.2.2.1.
 - 1.7.2.2.2.
 - 1.7.2.2.3.
 - 1.7.2.3. Vehicle test according to section 3 of Annex VI to...
 - 1.7.2.3.1.
 - 1.7.2.3.2.
 - 1.7.3.
 - 1.7.4.
 - 1.7.5. Principal characteristics of engine type
 - 1.7.5.1.
 - 1.7.5.2.
 - 1.7.5.3.
 - 1.7.5.4.
 - 1.7.5.5.

Appendix 2

OBD RELATED INFORMATION

.....
.....
.....
.....

ANNEX VII

EXAMPLE OF CALCULATION PROCEDURE

1. ESC TEST
 - 1.1. Gaseous emissions
 - Calculation of the dry to wet correction factor KW,r (Annex...
 - Calculation of the wet concentrations:
 - Calculation of the NO_x humidity correction factor KH,D (Annex III,...
 - Calculation of the emission mass flow rates (Annex III, Appendix...
 - Calculation of the specific emissions (Annex III, Appendix 1, Section...
 - Calculation of the specific NO_x emission of the random point...
 - Determination of the emission value from the test cycle (Annex...
 - Comparison of the NO_x emission values (Annex III, Appendix 1,...
 - 1.2. Particulate emissions
 - Calculation of GEDF (Annex III, Appendix 1, Sections 5.2.3 and...
 - Calculation of the mass flow rate (Annex III, Appendix 1,...
 - Background correction (optional)
 - Calculation of the specific emission (Annex III, Appendix 1, Section...
 - Calculation of the specific weighting factor (Annex III, Appendix 1,...
2. ELR TEST
 - 2.1. General remarks on the Bessel filter
 - 2.2. Calculation of the Bessel algorithm
 - Step 1 Required Bessel filter response time tF :
 - Step 2 Estimation of cut-off frequency and calculation of Bessel constants $E,...$
 - Step 3 Application of Bessel filter on step input:
 - Step 4 Filter response time of first iteration cycle:
 - Step 5 Deviation between required and obtained filter response time of first...
 - Step 6 Checking the iteration criteria:
 - Step 7 Final Bessel algorithm:
 - 2.3. Calculation of the smoke values
 - Calculation of the k-value (Annex III, Appendix 1, Section 6.3.1):...
 - Calculation of Bessel averaged smoke (Annex III, Appendix 1, Section...
 - Calculation of the final smoke value (Annex III, Appendix 1,...
 - Cycle validation (Annex III, Appendix 1, Section 3.4)
3. ETC TEST
 - 3.1. Gaseous emissions (diesel engine)
 - Calculation of the diluted exhaust gas flow (Annex III, Appendix...
 - Calculation of the NO_x correction factor (Annex III, Appendix 2,...
 - Calculation of the background corrected concentrations (Annex III, Appendix 2,...
 - Calculation of the emissions mass flow (Annex III, Appendix 2,...
 - Calculation of the specific emissions (Annex III, Appendix 2, Section...
 - 3.2. Particulate emissions (diesel engine)
 - Calculation of the mass emission (Annex III, Appendix 2, Section...
 - Calculation of the background corrected mass emission (Annex III, Appendix...
 - Calculation of the specific emission (Annex III, Appendix 2, Section...
 - 3.3. Gaseous emissions (CNG engine)

Status: EU Directives are being published on this site to aid cross referencing from UK legislation. After IP completion day (31 December 2020 11pm) no further amendments will be applied to this version.

Calculation of the NO_x, correction factor (Annex III, Appendix 2,...
Calculation of the NMHC concentration (Annex III, Appendix 2,
Section...
Calculation of the background corrected concentrations (Annex III,
Appendix 2,...
For NMHC, the background concentration is the difference between
HCconcd...
Calculation of the emissions mass flow (Annex III, Appendix 2,...
Calculation of the specific emissions (Annex III, Appendix 2, Section...

4. λ -SHIFT FACTOR ($S\lambda$)
 - 4.1. Calculation of the λ -shift factor ($S\lambda$)
 - 4.2. Examples for the calculation of the λ -shift factor $S\lambda$
 - Example **GP25**: CH₄ = 86 %, N₂ = 14 % (by volume)
 - Example **GR**: CH₄ = 87 %, C₂H₆ = 13 % (by vol)
 - Example **USA**: CH₄ = 89 %, C₂H₆ = 4,5 %, C₃H₈ = 2,3 %,...

ANNEX VIII

SPECIFIC TECHNICAL REQUIREMENTS RELATING TO ETHANOL-FUELLED DIESEL ENGINES

.....

IN ANNEX III, APPENDIX 1:

- 4.2. Dry/wet correction
- 4.3. NO_x correction for humidity and temperature
- 4.4. Calculation of the emission mass flow rates

IN ANNEX III, APPENDIX 2:

- 4.2.
- 4.3. Calculation of the emission mass flow
 - 4.3.1 Systems with constant mass flow
 - 4.3.1.1. Determination of the background corrected concentrations
 - 4.3.2. Systems with flow compensation
- 4.4. Calculation of the specific emissions

ANNEX IX

TIME-LIMITS FOR THE TRANSPOSITION OF THE REPEALED DIRECTIVES INTO NATIONAL LAWS

.....

ANNEX X

CORRELATION TABLE

.....