



RDW

**Technical requirements  
diesel particulate filter  
(soon at [www.vrom.nl/roetfilters](http://www.vrom.nl/roetfilters))**

## Type approval requirements for particulate matter reduction systems

### **Article 1.** Type approval

After entering into an agreement with the manufacturer of particulate reduction systems, the Road transport Directorate (RDW) grants type approval for a type of particulate reduction system for motor vehicles of the categories M1, having a maximum mass of no more than 3500 kg and N1, with a compression ignition engine if the following requirements are fulfilled.

### **Article 2.** Definitions

*Particulate matter reduction system:* A exhaust gas after treatment device reducing particulate matter emissions by mechanical and/or aerodynamic separation as well as through the effects of diffusion and/or inertia.

*Class B particulate matter reduction system:* Particulate reduction system which has a gravimetric particulate retention coefficient of between 30% and <90% as established according to Article 11, having been designed and build in a way that during load conditions of the engine under which no regeneration takes place even after an extended period of use no unacceptable increase of the exhaust gas back pressure occurs. Engine-specific modifications to electronic units and components do not constitute particulate matter reduction systems.

*Continuously regenerating particulate matter reduction system:* Particulate matter reduction system where regeneration is not initiated by modified engine control parameters, additional systems or engine full load operating points. The continuous regeneration of the particulate matter reduction system takes place by itself during certain exhaust gas temperature conditions.

*Loading condition:* Constant particulate matter loading condition of the particulate matter reduction system under certain driving conditions without external regeneration measures.

*Retention coefficient:* Ratio of particulate mass retained by the particulate matter reduction system to the particulate mass in the vehicle's initial state, measured in the NEDC.

*By-pass ratio:* Ratio of the free geometric cross-section, through which by design a partial exhaust gas flow can unabatedly circumvent the particulate matter reduction system in full or in part, relative to the total cross-section of the filter entry point.

*NEDC:* New European Driving Cycle in accordance with Annex III, Appendix 1, of Directive 70/220/EEC, as amended by Directive 98/69/EEC (OJ 1998, L 350, p1)

**Worst Case Regeneration:** Regeneration of a class B particulate matter reduction system under maximum particulate loading following an endurance test of 4 000 km with minimum exhaust gas cooling by the engine as well as a high oxygen surplus in the exhaust gas. The Worst Case Regeneration serves as proof of the particulate matter reduction system's thermal stability.

**Particulate matter reduction system family:** Family of all particulate matter reduction systems which, in terms of their function, are regarded as identical, technically speaking, pursuant to the conformity criteria in article 5.

**Article 3. Abbreviations:**

- $\eta$ : Retention coefficient
- $N_g$ : Retrofitted state
- $P_I$ : Arithmetically mean particulate emission levels in condition I
- $P_{II}$ : Arithmetically mean particulate emission levels in condition II
- $P_{III}$ : Arithmetically mean particulate emission levels in condition III
- $P_{IVT2}$ : Arithmetically mean particulate emission levels in condition IV, measured in part 2 of the New European Driving Cycle
- $P_{IV}$ : Arithmetically mean particulate emission levels in condition IV
- PMS:** Particulate matter reduction system
- $P_{Ng}$ : Arithmetically mean particulate emission levels in the retrofitted state with class B systems
- $P_{NgFe}$ : Particulate emission levels for a system in a family, measured according to Annex I number 1.2 e
- $P_{NgFg}$ : Particulate emission levels for a system in a family, measured according to Annex I number 1.2 g
- $P_s$ : Arithmetically mean particulate emission levels in the initial state (without particulate matter reduction system)
- $V_F$ : Volume of the particulate matter reduction system
- $V_H$ : Swept volume of the engine
- Euro 1:** The designation that a vehicle fulfils the emission limit values as stated in item 5.3.1.4 of annex I to directive 70/220/EEC, as amended by directive 91/441/EC (OJ 1991, L 242)
- Euro 2:** The designation that a vehicle fulfils the emission limit values as stated in item 5.3.1.4 of annex I to directive 70/220/EEC, as amended by directive 94/12/EC (OJ 1994, L 100)
- Euro 3:** The designation that a vehicle fulfils the emission limit values as stated in line A of item 5.3.1.4 of annex I to directive 70/220/EEC, as amended by directive 98/69/EC (OJ 1998, L 350)
- Euro 4:** The designation that a vehicle fulfils the emission limit values as stated in line B of item 5.3.1.4 of annex I to directive 70/220/EEC, as amended by directive 98/69/EC (OJ 1998, L 350)

**Article 4. Durability**

The applicant for the type-approval for a particulate matter reduction system must substantiate and corroborate, by means of the tests described in the articles 6 to and including 15, that the efficiency of this system is being guaranteed when operating in accordance with its intended use over a service life of up to 5 years or up to a mileage of 80 000 km, depending on whichever is reached first.

**Article 5. Conformity criteria**

The particulate matter reduction system may not deviate in the following characteristics:

- its type of retention, its modus operandi, its reduction material (metal, ceramics)
- the reduction design of the filter material (plates, mesh, knitted coils, minimal cell/material/fleece density, maximum porosity, pore diameter, the number of cavities/spheres, surface roughness, wire/sphere/fibre diameter)
- the minimum coating of the particulate matter reduction system (g/ft<sup>3</sup>)
- canning/packaging (vehicle bearing arrangement/holding fixture)
- volume  $\pm$  20%
- regeneration strategy (catalytic, or thermal regeneration)
- by-pass ratio
- with or without an oxidation catalyst connected upstream.

**Article 6. Specification of the endurance test**

1. For the the expert appraisal of the particulate matter reduction system it is, as proof of operational reliability when subsequently used in the field, subjected to an endurance test of at least 4,000 km. The endurance test shall serve as proof of operational reliability, system stability and efficiency. The motor vehicle used for this endurance test purpose must fulfil the Euro 3 requirements; in the case of motor vehicles with a total permissible mass exceeding 2,500 kg or in case of a category N1 class II or III vehicle, the Euro 2 requirements must be satisfied.
2. The particulate emission level of the endurance test vehicle in the initial state may not be less than 0.030 g/km in the New European Driving Cycle. If no endurance test vehicle with corresponding particulate emission levels is available, the stages at 2,000 km or 4,000 km shall be extended by the ratio of the stipulated particulate mass of 0.030 g/km to the actual vehicle emissions (example: at a particulate mass of 0.020 g/km, the measurements are moved from 2,000 to 3,000 km and from 4,000 to 6,000 km respectively).
3. The motor vehicle chosen for the endurance test does not have to be originating from the same vehicle manufacturer as the desired range of use.
4. A system's range of use comprises an engine capacity range between 65 and 130%, related to the engine capacity of the test vehicle. As test cycle for the exhaust emission measurements on the chassis dynamometer, the New European Driving Cycle shall be applied with urban and rural portion

(parts 1 and 2) as per Annex III, Appendix 1 of Directive 70/220/EEC, as amended by Directive 98/69/EEC (OJ 1998, L 350). The endurance test shall be conducted over a distance travelled of at least 4,000 km. At the request of the applicant, a vehicle inspection may be carried out by the technical services entrusted with the expert appraisal and the OBD [on-board diagnostic] system selected prior to the endurance test starting.

5. The distance accumulation may be carried out on the chassis dynamometer by repeating the urban portion of the New European Driving Cycle (part 1).
6. The distance accumulation on the chassis dynamometer may be conducted in the New European Driving Cycle with an urban (part 1) and rural (part 2, reduced) portion. In this case, a speed of 70 km/h and a maximum exhaust gas temperature of 300 °C immediately in front of the reduction system may not be exceeded in part 2 of the New European Driving Cycle. Alternatively, the endurance test route to be described in detail in the test documentation may be chosen by the approval authority in such a way that it corresponds to a realistic urban driving profile. In this regard, the average speed must be between 25-35 km/h, the maximum speed below 70 km/h, the proportion of time when the vehicle is idling must not be below 7% and the proportion of time when the speed of the vehicle is between 50 and 70 km/h must be less than 10% (not driven at the end of the endurance test). Without external regeneration, the maximum exhaust gas temperature immediately in front of and behind the particulate matter reduction system must always, on average, be below 300 °C and the engine speed less than 60% of the nominal speed. During the endurance test as a whole, vehicle speed, distance, engine speed and the pressure differential between the entrance to and exit from the particulate matter reduction system shall be included in the test documentation.

#### **Article 7. Measurements during the endurance test**

Exhaust emission measurements with installed particulate matter reduction system are carried out according to Annex I number 1.

- a. prior to the start of the endurance test (baseline measurement, condition I),
- b. after at least 2,000 km (condition II),
- c. after at least 4,000 km (condition III) and
- d. after the “worst case” regeneration (condition IV).

Before and after the endurance test, with a view to determining particulate matter retention efficiency subsequently, measurements are carried out on the vehicle in its initial state without the particulate matter reduction system.

After both the 2,000 and 4,000 km measurements, the manufacturer may request additional exhaust emission measurements to be conducted in the initial state.

After the reinstallation of the system, the exhaust emission measurement shall be repeated in this case. The maximum exhaust emission value obtained each time in this regard shall be taken into consideration for determining the retention coefficient.

The amount of deviation in the exhaust emission measurements with a particulate matter reduction system prior to and after installation/removal may not exceed 15%.

**Article 8.** Opacity measurement

In case of class B particulate matter reduction systems, an additional exhaust gas opacity test shall be carried out according to article 2.3.12 of the Regulation on permanent requirements<sup>1</sup>, with the peak value determined of the opacity of the exhaust gases during free acceleration.

**Article 9.** ‘Worst Case Regeneration’ after the endurance test

To safeguard the thermal stability of retrofitted vehicles in subsequent field use, after the exhaust emission measurements at 4,000 km and the opacity test, a ‘Worst Case Regeneration’ is carried out.

The thermal ‘worst case regeneration’ is initiated with the test vehicle on the roller type test stand via the engine load (swift load change from the lower part load to a full load condition). After particulate matter ignition is detected in the reduction system, the idling point is reached using engine overrun. The test vehicle therefore remains at idling speed until soot is no longer burned in the retention system. Unless exhaust emission temperatures of 600 degrees Celsius occur within 10 minutes under the operating conditions indicated above, the ‘worst case test’ shall be ended.

In the case of vehicles with an engine power in excess of 160 kW, the ‘worst case regeneration’ may be initiated on the road.

If thermal regeneration could not be initiated, regeneration of the particulate matter reduction system shall be carried out while the vehicle is operational in accordance with the manufacturer’s specifications.

In all instances, exhaust emission measurements are carried out afterwards. The arithmetically mean particulate emission level in this regard may not deviate from particulate emission level  $P_{Ng}$  by more than 15%.

In addition, the manufacturer must furnish proof and corroborate that the burnt particulate mass and the exhaust emission temperatures occurring in this regard shall be regarded as non-critical in terms of the system’s service life.

**Article 10.** Exhaust emission measurements during the endurance test

1. Determining particulate matter emissions in the NEDC:  
The exhaust emission values in the initial state ( $P_S$ ), condition I (baseline measurement) ( $P_I$ ), condition II ( $P_{II}$ ), condition III ( $P_{III}$ ) and condition IV ( $P_{IV}$ ) are established each time as the mean of two measurements (provided they do not differ from one another by more than 15%, otherwise three measurements) in the NEDC.
2. Determining gaseous emissions ( $NO_x$ , CO, HC) and fuel consumption in  $CO_2$ :

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<sup>1</sup> The Dutch regulation how to perform periodic vehicle inspections

- arithmetical mean of the NEDC in the initial state without a reduction system ( $\text{HC}_S$ ,  $\text{CO}_S$ ,  $\text{NO}_{xS}$ ) and ( $\text{CO}_{2S}$ );
- arithmetical mean of the NEDC with a reduction system in the retrofitted state ( $\text{HC}_{(I,II,III)}$ ,  $\text{CO}_{(I,II,III)}$ ,  $\text{NO}_{x(I,II,III)}$  and  $\text{CO}_{2(I,II,III)}$ ). Emissions during the 'worst case regeneration' are disregarded.

#### **Article 11.** Evaluating the class B particulate matter reduction system

The particulate matter reduction system test is regarded as having been passed if the following criteria are met:

1. The particulate emission level  $P_{Ng} = (P_I + 2 \cdot P_{II} + 4 \cdot P_{III}) / 7$  must lie below the limit value of 0.025 g/km; in the case of motor vehicles with a total permissible mass exceeding 2 500 kg and vehicles of category N1 class II and III, this emission level must be below the limit value of 0.050 g/km.
2. The retention coefficient  $\eta = 1 - (P_{Ng} / P_S)$  must be at least 0.3 (= 30%) where  $P_S = (P_{S1} + P_{S2}) / 2$ . The retention coefficient during soot oxidation  $\eta_R = 1 - (P_{IVT2} / P_{ST2})$  from the respective measurements  $P_{IV}$  from part 2 of the New European Driving Cycle (rural portion) must attain a value of at least 0.3 (= 30%). The measured particulate emission level  $P_{IV}$  must be smaller than  $1.15 \cdot P_{Ng}$ .
3. In both the initial and retrofitted states, the limited pollutants must be below the limit values of the originally homologated pollutant class.
4. As regards the opacity measurements as per Annex I Section 1.1, in both the initial and retrofitted states, the manufacturer's opacity coefficients may not be exceeded.

#### **Article 12.** Requirements for a class B particulate matter reduction system establishing a vehicle family

1. Vehicle families may be established with class B particulate matter reduction systems of different sizes (volumes) while adhering to the conformity criteria of article 5.
2. Conformity criteria for vehicle families:
  - a) For stipulating the range of use of a particulate matter reduction system as per number 3.1 which is identical in terms of its construction, but with different volumes, for different vehicle models, the test vehicles may not differ in terms of their characteristics according to number 4.1.2. Every vehicle manufacturer shall determine the upper and lower limits of a system's range of use by carrying out measurements on two different test vehicles as per number 4.2 on the roller type test stand.
  - b) The vehicle models which make up the family and the test vehicles themselves must correspond in terms of the following criteria:
    - i. vehicle manufacturers (if other vehicle manufacturers use the same driving motor as the vehicle manufacturer who has been tested,

- provided all the other requirements are met, these vehicle models may also be included in the range of use.)
- ii. normally aspirated engine, supercharged engine
  - iii. pollutant classes:
    - Class I: Euro 1, Euro 2
    - Class II: Euro 3
    - Class III: Euro 4
  - iv. vehicle category:
    - category M1<sup>2</sup> and N1 class I<sup>3</sup>
    - category N1 class II
    - category N1 class III
  - v. place of installation in the exhaust emission system (connection of the exhaust manifold to the entry point of the particulate matter reduction system  $\pm$  300 mm from the endurance test vehicle). At the same time, the applicant shall confirm that the temperature profile when carrying out an endurance test as per article 6 does not deviate in a downstream direction by more than 30 °C either - relative to the base vehicle for the endurance test - with regard to the motor vehicles mentioned in the range of use.
3. Selecting test vehicles
- The test vehicles for a selected range of use must meet the following criteria
- a) Test vehicle I:
    - maximum engine power in the range of use
    - largest filter volume ( $V_{FI}$ )
    - highest inertia mass class
    - commonly used transmission configuration
    - high, frequently occurring chassis dynamometer load
  - b) Test vehicle II:
    - lowest engine power in the range of use
    - smallest filter volume ( $V_{FII}$ )
    - smallest inertia mass class
    - commonly used transmission configuration
    - smallest, frequently occurring chassis dynamometer load
- In the event that, within class I, the pollutant classes Euro 1 and Euro 2 for motor vehicles from a particular manufacturer are covered by the tests, one of the test vehicles must cover Euro 1 and the other Euro 2.
4. Test criteria for the determination of the range of use within a family as per Annex I item 2:
- a) The test vehicles must have a mileage of at least 15 000 km. As regards all regulated emissions, in their initial and retrofitted states, test vehicles must adhere to the values of their originally homologated limit value level. The deterioration factors shall not be applied.

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<sup>2</sup> with a maximum allowable mass not exceeding 3,500 kg

<sup>3</sup> as meant in table 5.3.1.4. of annex I to directive 70/220/EEC

- b) The modification on the test vehicle must correspond to the initial retrofitted state applied for subsequently.
  - c) Vehicles with on-board diagnosis may not be restricted in terms of their monitoring functions as a result of the installation of the retrofitted system. The electronic engine management (e.g. for injection, mass air flow sensor, exhaust emission reduction) may not be altered as a result of retrofitting.
5. Test and measurement sequence on the chassis dynamometer
- a. Vehicle pre-conditioning takes the form of 2 • 10 New European Driving Cycles (220 km) (see Annex I item 2 under d).
  - b. The number of test shall be determined according to article 10, item 1.
  - c. The emission of all regulated pollutants is determined in the New European Driving Cycle for :
    - the initial state, the arithmetical mean of two or three measurements for each pollutant,
    - the retrofitted state, the arithmetical mean of two or three measurements for each pollutant,
  - d. Applying article 10 item 1 the fuel consumption (expressed as CO<sub>2</sub>) is determined in the New European Driving Cycle for:
    - the initial state, the arithmetical mean of two or three measurements for each pollutant;
    - the retrofitted state, the arithmetical mean of two or three measurements for each pollutant.

**Article 13.** Evaluating the class B particulate matter reduction systems for the range of use within a vehicle family

Testing a particulate matter reduction system for the range of use of a vehicle family is regarded as having been passed if the following criteria are met:

- a. The particulate emission level  $P_{NgFe}$  in the retrofitted state must lie below the following the limit values in mg/km:

	M1 and N1 class I	N1 class II	N1 class III
Euro 1 and 2	50	70	100
Euro 3	25	40	60
Euro 4	12.5	20	30

$P_{NgFe}$  (Annex I item 2 under e) being the mean value of up to three measurements in the New European Driving Cycle following system preparation.

- b. The retention ratio  $\eta_{NgFe} = 1 - (P_{NgFe} / ((P_{S1F} + P_{S2F}) / 2))$  must be at least 0.3 (= 30%) in the retrofitted state.

- c.  $P_{NgFg}$  may not be greater than  $1.15 \cdot P_{NgFe}$ .  $P_{NgFg}$  (Annex I item 2 under g) being the mean of up to three measurements in the New European Driving Cycle following system stability.
- d. As regards the opacity measurements as per Annex I Section 1.2, in the initial and retrofitted states, the manufacturer's opacity coefficients may not be exceeded.
- e. Mean fuel consumption in the retrofitted state may not exceed fuel consumption levels in the initial state by more than 4%.
- f. In the initial and retrofitted state, the limited pollutant levels must be below the limit values of the originally homologated pollutant class.

#### **Article 14**

1. The installation of the particulate matter retention system may not impair operating performance or pose any additional dangers for vehicle safety.
2. In combination with class B particulate matter reduction systems the use of fuel additives facilitating regeneration is not permitted.
3. If the original oxidation catalyst a vehicle is equipped with is of importance for the proper functioning of the particulate matter reduction system, the installation manual of the particulate matter reduction system shall specify the criteria on which this oxidation catalyst may have to be replaced. Catalysts showing visible defects shall be replaced in any case.
4. Particulate matter reduction systems may not be expected to have any negative effect on the noise characteristics of the vehicle.
5. If electronic units and/or control units are used, these must correspond to the provisions of directive 72/45/EEC.
6. The particulate matter reduction systems may not be provided with devices to deactivate them.

#### **Article 15** Obligations for the holder of a type approval

The holder of a type approval for a particulate matter reduction system issued by the Road Transport Directorate (RDW) shall provide each system he puts on the market in the Netherlands with an installation manual fulfilling the requirements of annex II and with a copy of the type approval certificate.

#### **Article 16** Application for type approval

1. An application for type approval of a particulate matter reduction system for retrofit purposes is submitted to the Road Transport Directorate in Zoetermeer (Netherlands)
2. Preceding the application for type approval an agreement on this subject is concluded between the applicant and the Road Transport Directorate.
3. An application is accompanied by a completed document according to a model provided by the Road Transport Directorate.
4. Basis for granting of type approval is the report of a technical service certified by a EU member state to carry out tests according to directive 70/220/EEC, in which the particulate matter reduction system is described and in which it is

stated that the requirements of this regulation are fulfilled, or a type approval certificate issued by the German Federal Office for Motor Traffic (KBA), together with the test report on which that type approval is based, showing that the German requirements (Anlage XXVI of the StvZO) on particulate matter reduction systems are fulfilled.

5. During the type approval procedure the shape and dimensions of the retention element of are stipulated in the documentation. Subsequent changes to the element's length and cross-section are possible in the context of extension of the approval with a maximum of up to  $\pm 10\%$ . These changes may increase the volume by up to 10%. A reduction of the original volume is not permitted without carrying out tests showing the functionality of the modified system.

#### **Article 17** Conformity of Production

1. The measures taken to guarantee conformity of production shall fulfil the requirements of article 10 of directive 70/156/EEC.
2. Special requirements
  - The checks as meant in section 2.2 of annex X of directive 70/156/EEC include the checks on the conformity with the criteria of article 5 of this regulation.
  - For the application of section 3.5 of annex X of directive 70/156/EEC the tests described in the articles 6 up to and including 13 may be carried out.
3. Before type approvals may be granted, the manufacturers shall submit the following data on conformity of production (in English, German or Dutch language) shall be submitted for the purpose of the initial assessment :
  - A completed and signed application form, according to a model to be provided by the RDW.
  - A description of the requested information, according to the annex to the application form.
  - A copy of the ISO9001:2000 certificate, or any equivalent quality system, with a relevant scope.
4. Based on this information certified manufacturers may be admitted, receiving an Initial Assessment Statement based on the appraisal of documents.
5. In case the manufacturer does not have a certified quality system, a company assessment is carried out based on ISO9001:2000, including COP aspects.
6. At least the following ISO aspects are to be described and verified:
  - Quality management system
  - Responsibilities of the board
  - Management of resources
  - Realisation of the product
  - Measurement, analysis and improvement
7. To confirm the existence of adequate measures and procedures for an effective control on COP the manufacturer receives a Compliance Statement, at the published certificate fee.
8. The statement has a stated validity

9. Before the expiration of the validity of both statements the RDW will carry out a COP audit by process control at the manufacturer, to verify the effectiveness of the applied COP controls.

Annex I

### **Schematic test procedure for class B particulate matter reduction systems**

1. Examination of the functioning of the particulate matter reduction system

Initial state  $S_1$  of the endurance test vehicle:

- a. Pre-conditioning: 3 x Part 2 of the New European Driving Cycle
- b. Exhaust emission measurement: 2 - 3 x the New European Driving Cycle (cold)
- c. Measurement of opacity without particulate matter reduction system

*Installation of the particulate matter reduction system*

Condition I (baseline measurement):

- d. Pre-conditioning: 3 x Part 2 of the New European Driving Cycle
- e. Exhaust emission measurement: 2 - 3 x the New European Driving Cycle (cold)

*2 000 km endurance test*

Condition II:

- f. Pre-conditioning: 3 x Part 2 of the New European Driving Cycle
- g. Exhaust emission measurement: 2 - 3 x the New European Driving Cycle (cold)

*2 000 km endurance test up to a total of 4 000 km*

Condition III:

- h. Pre-conditioning: 3 x Part 2 of the New European Driving Cycle
- i. Exhaust emission measurement: 2 - 3 x the New European Driving Cycle (cold)
- k. Measurement of opacity with particulate matter reduction system

*“Worst case” regeneration*

Condition IV (thermally altered state):

- l. Pre-conditioning: 3 x Part 2 of the New European Driving Cycle
- m. Exhaust emission measurement: 2 - 3 x the New European Driving Cycle (cold)

*Particulate matter reduction system removal*

Initial state after the endurance test  $S_2$ :

- n. Pre-conditioning: 3 x Part 2 of the New European Driving Cycle
- o. Exhaust emission measurement: 2 - 3 x the New European Driving Cycle (cold)
- p. Measurement of opacity without particulate matter reduction system

**2 Determination of the range of use for vehicle families**

Initial state  $S_{1F}$ :

- a. Pre-conditioning: 3 x Part 2 of the New European Driving Cycle
- b. Exhaust emission measurement: 2 - 3 x the New European Driving Cycle (cold)
- c. Measurement of opacity without particulate matter reduction system

*Particulate matter reduction system installation*

Retrofitted state  $N_{gF}$ :

- d. System preparation: 10 x the New European Driving Cycle
- e. Exhaust emission measurement: 2 - 3 x the New European Driving Cycle (cold)
- f. System stability: 10 x the New European Driving Cycle
- g. Exhaust emission measurement: 2 - 3 x the New European Driving Cycle (cold)
- h. Measurement of opacity with particulate matter reduction system

*Particulate matter reduction system removal*

Initial state  $S_{2F}$ :

- i. Pre-conditioning: 3 x Part 2 of the New European Driving Cycle
- k. Exhaust emission measurement: 2 - 3 x the New European Driving Cycle (cold)

**Requirements on the installation manual**

Every new retrofit particulate matter reduction system has to be accompanied by an installation manual in Dutch language containing at least the following information:

1. The name or trademark of the manufacturer of the particulate matter reduction system.
2. The type of particulate matter reduction system.
3. The Dutch type approval number, and, if applicable, the German type approval number.
4. Of the vehicle types (with indication of the model year) for which the particulate matter reduction system has been approved:
  - Make
  - Type (commercial name)
  - Type (manufacturer's code)
  - If applicable: the EC approval number of the vehicle(s)
  - Model years if necessary in combination with VIN numbers
  - Engine type (Engine code)
  - Engine capacity
  - Engine Power
  - Transmission type
5. Adequate information for a qualified person to install the particulate matter reduction system on the vehicle.
6. The criteria upon which the original oxidation catalyst shall be replaced. This applies only if the functioning of the original oxidation catalyst is of importance for the proper functioning of the particulate matter reduction system.  
(Catalysts showing visible defects shall to be replaced in any case)
7. The location on the particulate matter reduction system where, after installation of the system on the vehicle, the final 4 digits of the VIN number may be stamped in or engraved.