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**Economic Commission for Europe****Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on Noise****Sixty-fourth session**

Geneva, 5–7 September 2016

Item 6 of the provisional agenda

**Regulation No. 92 (Replacement exhaust silencing systems for motorcycles)****Proposal for a Supplement to Regulation No. 92****Submitted by the expert from the European Commission\***

The text reproduced below was prepared by the expert from the European Commission in accordance with a decision at the sixty-third session of the Working Party on Noise (GRB) (ECE/TRANS/WP.29/GRB/61, para. 14) to consider updating the provisions of Regulation No. 92 to a level at least equivalent to the corresponding provisions in the European Union legislation. The text below is based on Informal document GRB-63-09 and takes into account comments provided at the sixty-third session of GRB as well as comments communicated to the European Commission after the session. It proposes improved terminology and definitions, including new ones, improved sound emission testing conditions and procedures. It also introduces anti-tampering provisions and an "Additional sound emission provisions" (ASEP) statement by the manufacturer. The proposed amendments to the current Regulation are incorporated into the consolidated text and marked in bold for new or strikethrough for deleted characters.

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\* In accordance with the programme of work of the Inland Transport Committee for 2014-2018 (ECE/TRANS/240, para. 105 and ECE/TRANS/2014/26, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.



## I. Proposal

Regulation No. 92, amend to read:

**Uniform provisions concerning the approval of non-original replacement exhaust silencing systems (NORESS) for vehicles of categories L<sub>1</sub>, L<sub>2</sub>, L<sub>3</sub>, L<sub>4</sub> and L<sub>5</sub> with regard to sound emission motorcycles, mopeds and three-wheeled vehicles**

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## 1. Scope

This Regulation applies to **non-original** replacement exhaust silencing systems for vehicles of categories L<sub>1</sub>, L<sub>2</sub>, L<sub>3</sub>, L<sub>4</sub> and L<sub>5</sub><sup>1</sup>.

## 2. Definitions

For the purpose of this Regulation

- 2.1. "*Non-original replacement exhaust **silencing** system or components of this system*" means a system of a type different from that fitted to the vehicle on approval or extension of approval. It may be used only as a replacement exhaust or silencing system.

**The acronym NORESS denotes the non-original replacement exhaust silencing system.**

- 2.2. "*Non-original replacement exhaust **silencing** system component*" means one of the various components which together form the exhaust **silencing** system<sup>2</sup>;

- 2.3. "*Non-original replacement exhaust **silencing** systems of different types*" means silencing systems which differ significantly in such respects as:

- (a) Their components bear different trade names or marks,
- (b) The characteristics of the materials constituting a component are different or the components differ in shape or size; a modification in respect to coating (zinc coating, aluminium coating, etc.) is not considered a change of type,
- (c) The operating principles of at least one component are different,
- (d) Their components are combined differently;

- 2.4. "*Non-original replacement exhaust **silencing** system (NORESS) or component thereof*" means any part of the exhaust silencing system defined in paragraph 2.1. intended for use on a vehicle other than a part of the type fitted to the vehicle when submitted for type approval pursuant to Regulation No. 9, Regulation No. 41 or Regulation No. 63;

- 2.5. "*Approval of a ~~non-original~~ NORESS or component(s) thereof*" means the approval of the whole or a part of a silencing system adaptable to one or several specified types of ~~motorcycle, moped or three-wheeled~~ vehicle, **falling under the scope of this Regulation**, as regards the limitation of their ~~noise sound~~ level;

- 2.6. "*~~Motorcycle, moped or three-wheeled~~ "vehicle type"* means ~~motorcycles, mopeds or three-wheeled~~ vehicles, **falling under the scope of this Regulation**, which do not differ in such essential respects as:

<sup>1</sup> As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3.), document ECE/TRANS/WP.29/78/Rev.4, para. 2.

<sup>2</sup> Those components are, in particular, the exhaust manifold, the silencer proper, the expansion chamber and the resonator.

- (a) The type of engine (two-stroke or four-stroke with reciprocating or rotary pistons; number and capacity of cylinders; number and type of carburettors or injection systems; arrangement of valves; maximum net power and corresponding engine speed). For rotary piston engines, the cubic capacity should be taken to be double of the volume of the chamber;
- (b) ~~Number and ratio of gears~~ **Drive train, in particular the number and ratios of the gears of the transmission and the final ratio;**
- (c) Number, type and arrangement of exhaust silencing systems.

**2.7. "Rated engine speed" means the engine speed at which the engine develops its rated maximum net power as stated by the manufacturer.<sup>3</sup>**

**The symbol  $n_{\text{rated}}$ , denotes the numerical value of the rated engine speed expressed in revolutions per minute.**

### **3. Application for approval**

3.1. The application for approval of a **NORESS** or components thereof shall be submitted by its manufacturer or by his duly accredited representative.

3.2. It shall be accompanied by the under mentioned documents in triplicate and the following particulars:

- (a) A description of the ~~motor-cycle~~ **vehicle** type(s) on which the **NORESS** or components are intended to be fitted, with regard to the items referred to in paragraph 2.6 above. The numbers and/or symbols identifying the engine type and the ~~motor-cycle~~ **vehicle** type shall be specified and the ~~motor-cycle~~ **vehicle** type approval number, if necessary;
- (b) A description of the complete **NORESS** showing the relative position of each of its components, together with instructions for their assembly;
- (c) Detailed drawings of each **NORESS** component to enable it to be easily located and identified, and specification of the materials used. These drawings shall also indicate the location for the mandatory affixing of the approval number.

3.3. At the request of the Technical Service conducting the tests for approval, the manufacturer of the **NORESS** shall submit:

- (a) Two samples of the **NORESS** or its components submitted for approval;
- (b) A sample of the original exhaust silencing system with which the ~~motor-cycle~~ **vehicle** was equipped when submitted for type approval;
- (c) A test ~~motor-cycle~~ **vehicle** representative of the type to which the **NORESS** is to be fitted; this ~~motor-cycle~~ **vehicle**, when measured for

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<sup>3</sup> **If the rated maximum net power is reached at several engine speeds, the rated engine speed is used in this Regulation as the highest engine speed at which the rated maximum net power is reached.**

~~noise-sound~~ emission according to the methods described in Annex 3 (including all relevant amendments) to Regulation No. 9, Regulation No. 41 or Regulation No. 63 shall satisfy the following conditions:

- (i) If the ~~motorcycle, moped or three-wheeled~~ vehicle is of a type for which approval has been issued pursuant to the requirements of each of Regulations Nos. 9, 41 or 63:
  - a. The sound level, during the test in motion shall not exceed the ~~specified~~ limit **specified in the appropriate Regulation** by more than 1 dB(A);
  - b. The sound level during the stationary test shall not exceed by more than 3 dB(A), the level determined during the approval and indicated on the manufacturer's plate.
- (ii) If the ~~motorcycle, moped or three-wheeled~~ vehicle is not of the type for which approval has been issued pursuant to the requirements of the **appropriate** Regulation, the sound level shall not exceed by more than 1 dB(A) the limit applicable at the time when it was first put on the road.

#### 4. Markings

- 4.1. Each component of the NORESS, excluding pipes and fitting accessories, shall bear:
  - (a) The trade name or mark of the manufacturer of the NORESS of its components;
  - (b) The commercial designation given by the manufacturer.
- 4.2. These markings shall be clearly legible and indelible and also visible in the position at which the NORESS is fitted.
- 4.3. The NORESS shall be labelled by its manufacturer; indicating the type(s) of ~~motor cycle(s)~~ **vehicle(s)** for which it has been granted the approval.
- 4.4. A component may carry several approval numbers if it has been approved as a component of several replacement exhaust systems.
- 4.5. The replacement exhaust system shall be supplied in a packaging or carry a label both providing the following particulars:
  - (a) The trade name or mark of the manufacturer of the replacement silencing system and its components,
  - (b) The address of the manufacturer or his representative,
  - (c) A list of vehicle models for which the replacement silencing system is intended.
- 4.6. The manufacturer shall provide:
  - (a) Instructions explaining in detail the correct method of mounting on the vehicle,
  - (b) Instructions for handling the silencing system,

- (c) A list of components with the numbers of the corresponding parts, excluding retainers.

4.7. The approval mark.

## 5. Approval

5.1. If the **NORESS** or component thereof submitted for approval under this Regulation meets the requirements of paragraph 6. below, approval for that type shall be granted.

5.2. An approval number shall be assigned to each **NORESS** type approved. Its first two digits (at present 01 corresponding to the 01 series of amendments to the Regulation) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another type of **NORESS** or component designed for, the same type(s) of ~~motor cycle~~ **vehicle**.

5.3. Notice of approval or extension or refusal of approval of a **NORESS** or component thereof under this Regulation shall be communicated to the Parties to the Agreement which apply this Regulation, by means of a form conforming to the model in Annex 1 to this Regulation.

5.4. There shall be affixed to every **NORESS** and component thereof conforming to a type approved under this Regulation an international approval mark consisting of:

- (a) A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval <sup>4</sup>;
- (b) The number of this Regulation, followed by the letter "R", a dash and the approval number to the right of the circle prescribed in (a) above;
- (c) The approval number shall be indicated in the approval form, together with the method used for the approval tests.

5.5. The approval mark shall be easily legible when the **NORESS** is fitted to the vehicle, and shall be indelible.

5.6. A component may be marked with more than one approval number if it has been approved as a part of more than one **NORESS**; in this case the circle need not be repeated. Annex 2 to this Regulation gives an example of the approval mark.

## 6. Specifications

6.1. General specifications

The silencer shall be designed, constructed and capable of being mounted so that:

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<sup>4</sup> The distinguishing numbers of the Contracting Parties to the 1958 Agreement are reproduced in Annex 3 to the Consolidated Resolution on the Construction of Vehicles (R.E.3) (ECE/TRANS/WP.29/78/Rev.4).

- (a) The ~~motor-eyele~~ **vehicle** complies with the requirements of this Regulation under normal conditions of use, and in particular regardless of any vibrations to which it may be subjected;
- (b) It displays reasonable resistance to the corrosion phenomena to which it is exposed, with due regard to the normal conditions of use of the ~~motor-eyele~~ **vehicle**;
- (c) The ground clearance provided by the silencer originally fitted, and the possible inclined position of the ~~motor-eyele~~ **vehicle**, are not reduced;
- (d) Unduly high temperatures do not exist at the surface;
- (e) Its edges are not sharp or jagged and there is sufficient space for shock absorbers and springs;
- (f) Adequate clearance of spring parts is provided;
- (g) Adequate safety clearance of pipes is provided;
- (h) It is tamper-resistant in a way that is compatible with clearly-defined maintenance and installation requirements;
- (i) ~~Additional prescriptions related to tamper ability and manually adjustable multimode exhaust or silencing systems:~~
  - i. ~~All exhaust or silencing systems shall be constructed in a way that does not easily permit removal of baffles, exit cones and other parts whose primary function is as part of the silencing/expansion chambers. Where incorporation of such a part is unavoidable, its method of attachment shall be such that removal is not facilitated easily (e.g. with conventional threaded fixings) and should also be attached such that removal causes permanent/ irrecoverable damage to the assembly.~~
  - ii. ~~Exhaust or silencing systems with multiple, manually adjustable operating modes shall meet all requirements in all operating modes. The reported noise levels shall be those resulting from the mode with the highest noise levels~~

#### 6.2. Specifications regarding sound levels

The acoustic efficiency of the NORESS or components thereof shall be verified by means of the methods described in Regulation Nos. 9, 41 or 63. In particular, for the application of this paragraph reference shall be made to the series of amendments to Regulation No. 92 which was in force at the time of type approval of the new vehicle. When the NORESS or its components is fitted to the ~~motorcycle, moped or three wheeled~~ vehicle described in paragraph 3.3. (c), the sound level values obtained using the two methods (stationary and ~~running~~ **vehicle in motion**) shall satisfy the following condition:

They shall not exceed the values measured in conformity with the requirements of paragraph 3.3.(c), for the same ~~moped, motorcycle, or three wheeled~~ vehicle when fitted with the original silencing system during ~~either the running test with the vehicle in motion and or~~ the stationary test.

#### 6.3. Additional requirements

**6.3.1. Tampering protection provisions**

The NORESS or its components shall be constructed in a way that does not permit removal of baffles, exit-cones and other parts whose primary function is as part of the silencing/expansion chambers. Where incorporation of such a part is unavoidable, its method of attachment shall be such that removal is not facilitated (e.g. with conventional threaded fixings) and shall also be attached such that removal causes permanent / irrecoverable damage to the assembly.

**6.3.2. Multi-mode NORESS**

NORESS with multiple, manually or electronically adjustable, rider selectable operating modes shall meet all requirements in all operating modes. The reported sound levels shall be those resulting from the mode with the highest sound levels.

**6.3.3. Prohibition of defeat devices**

The NORESS manufacturer shall not intentionally alter, adjust or introduce any device or procedure solely for the purpose of fulfilling the sound emission requirements of this Regulation, which will not be operational during typical on-road operation.

**6.3.4. Additional sound emission provisions (ASEP)**

The requirements of paragraph 6.3. of the 04 series of amendments to Regulation No. 41 shall also be fulfilled for the NORESS, if it is designed to be used on vehicles that are type approved according to the 04 series of amendments to Regulation No. 41 and are subject to the requirements of paragraph 6.3. of the 04 series of amendments to Regulation No. 41.

If tests are to be performed, the vehicle as described in paragraph 3.3. (c) shall be used.

The Type Approval Authority may require any relevant test to verify the compliance of the NORESS to these requirements.

The manufacturer shall provide a statement in conformity with annex 4 of this Regulation, that the NORESS or components to be approved comply with the additional sound emission provision requirements of paragraph 6.3 of the 04 series of amendments to Regulation No. 41.

~~6.3.~~ **6.4. Measurement of vehicle performance**

~~6.3.1.~~ **6.4.1.** The NORESS or its components shall be such as to ensure that the ~~motor~~ ~~eyele's~~ **vehicle's** performance is comparable with that achieved with the original exhaust silencing system or components thereof.

~~6.3.2.~~ **6.4.2.** The NORESS or, at the manufacturer's choice, the components thereof shall be compared with an original silencing system or components, also in new condition, successively fitted to the ~~motor-eyele~~ **vehicle** referred to in paragraph 3.3. (c).

~~6.3.3.~~ **6.4.3.** The verification shall be carried out by measuring the output curve in accordance with paragraph 6.~~34~~.4.1. or 6.~~34~~.4.2. The maximum power and the **engine speed at** maximum power ~~speed~~ measured with the NORESS shall not exceed the net power and the **engine** speed measured under the conditions set out below with the original equipment exhaust system by more than ±5 per cent.

- 6.34.4. Test method
- 6.34.4.1. Engine test method
- The measurements shall be carried out ~~on the engine referred to in paragraph 3.3.(d) or, if it is not available,~~ on the engine of the ~~motor cycle~~ **vehicle** referred to in paragraph 3.3.(c), the engine being ~~in both cases~~ mounted on a dynamometer.
- 6.34.4.2. ~~Motor cycle~~ **Vehicle** test method
- The measurements shall be carried out on the ~~motor cycle~~ **vehicle** referred to in paragraph 3.3. (c). The values obtained with the original silencing system shall be compared with those obtained with the **NORESS**. The test shall be conducted on a roller dynamometer.
- ~~6.4.~~ **6.5.** Additional provisions regarding the **NORESS** or its components filled with fibrous materials
- The use of fibrous absorbent material shall be permitted in the construction of the **NORESS** only if the requirements in Annex 3 are met.
- 6.56. Evaluation of the emission of pollutants of vehicles equipped with replacement silencer system
- The vehicle referred to in paragraph 3.3. (c) **with the non-original replacement** exhaust silencing system (**NORESS**) of the type for which approval is requested, shall fulfil the pollution requirements according to the type approval of the vehicle. The evidence shall be documented in the test report.

## **7. Modification and extension of the approval of NORESS and extension of approval**

- 7.1. Every modification of the type of **NORESS** or its components shall be notified to the Type Approval Authority which approved the type of **NORESS**. The said Authority may then either:
- (a) Consider that the modifications made are unlikely to have an appreciable adverse effect, or
  - (b) Require a further test report from the Technical Service responsible for conducting the tests.
- 7.2. The manufacturer of the **NORESS** or component thereof or his duly accredited representative may ask the Type Approval Authority which has granted the approval of the **NORESS** for one or several types of ~~motorcycle, moped or three wheeled~~ vehicle for an extension of the approval to other types of ~~motorcycle, moped or three wheeled~~ vehicle. The procedure shall be as described in paragraph 3. above.
- 7.3. Confirmation or refusal of approval, specifying the modifications, shall be communicated in accordance with the procedure specified in paragraph 5.3. above to the Contracting Parties to the Agreement applying this Regulation.
- 7.4. The competent authority issuing the extension of approval shall assign a series number to each communication form drawn up for such an extension.

## **8. Conformity of production**

The conformity of production procedures shall comply with those set out in the Agreement, Appendix 2 (E/ECE/324-E/ECE/TRANS/505/Rev.2), with the following requirements:

- (a) The **NORESS** approved to this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set out in paragraph 6. above.
- (b) The holder of the approval shall ensure that for each type of **NORESS** at least the tests prescribed in paragraph 6. of this Regulation are carried out.
- (c) The authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be once every two years.
- (d) The production is considered to conform to the requirements of this Regulation, if the provisions of Regulations Nos. 9, 41 and 63, corresponding to the type of vehicle, are complied with and if the sound level measured by the method described in the given Regulations during the test in motion does not exceed by more than 3 dB(A) the sound level measured during the type approval and does not exceed by more than 1 dB(A) the limits prescribed in Regulations Nos. 9, 41 and 63 as applicable.

## **9. Penalties for non-conformity of production**

- 9.1. The approval granted in respect of a type of **NORESS** or its components under this Regulation may be withdrawn if the requirements laid down in paragraph 8. above are not complied with, or if the **NORESS** or its components fail to pass the tests provided for in paragraph 8.(b) above.
- 9.2. If a Contracting Party to the Agreement applying this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties to the 1958 Agreement applying this Regulation, by means of a communication form conforming to the model contained in Annex 1 to this Regulation.

## **10. Production definitively discontinued**

If the holder of the approval completely ceases to manufacture a type of replacement silencing system or components thereof in accordance with this Regulation, he shall so inform the authority which granted the approval which shall in turn inform thereof the other Contracting Parties to the 1958 Agreement applying this Regulation, by means of a copy of the communication form conforming to the model contained in Annex 1 to this Regulation.

**11. Names and addresses of Technical Services responsible for conducting approval tests, and of Type Approval Authorities**

The Contracting Parties to the 1958 Agreement which apply this Regulation shall communicate to the United Nations Secretariat the names and addresses of the Technical Services responsible for conducting approval tests and of the Type Approval Authorities which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval, or production definitively discontinued issued in other countries, are to be sent.

**Annex 1**

**Part A. NORESS for vehicle types approved according to the 04 series of amendments to Regulation No. 41**

**Communication**

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



issued by:

Name of administration:

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

- concerning<sup>2</sup>:
- Approval granted
  - Approval extended
  - Approval refused
  - Approval withdrawn
  - Production definitively discontinued

of a vehicle type with regard to a type of **NORESS** or component there of pursuant to Regulation No. 92.

Approval No..... Extension No.....

1. Trade name or mark of the ~~motorcycle~~ **vehicle**: .....
2. ~~Motorcycle~~ **Vehicle** type: .....
3. Manufacturer's name and address: .....
4. If applicable, name and address of manufacturer's representative: .....
5. Engine
- 5.1. Manufacturer: .....
- 5.2. Type: .....
- 5.3. Model: .....
- 5.4. Rated maximum net power: ..... kW at ..... min<sup>-1</sup>
- 5.5. Kind of engine (e.g. positive-ignition, compression ignition, etc.)<sup>3</sup>: .....
- 5.6. Cycles: two-stroke/four-stroke <sup>2</sup>

<sup>1</sup> Distinguishing number of the country which has granted/extended/refused/withdrawn an approval (see approval provisions in the Regulation).

<sup>2</sup> Delete what does not apply.

<sup>3</sup> If a non-conventional engine is used, this should be stated.

- 5.7. Cylinder capacity: ..... cm<sup>3</sup>
6. Transmission
- 6.1. Type of transmission: non-automatic gearbox/automatic gearbox: .....
- 6.2. Number of gears: .....
7. Equipment
- 7.1. Exhaust silencer
- 7.1.1. Manufacturer or authorized representative (if any): .....
- 7.1.2. Model: .....
- 7.1.3. Type: ..... in accordance with drawing No. ....
- 7.2. Intake silencer
- 7.2.1. Manufacturer or authorized representative (if any): .....
- 7.2.2. Model: .....
- 7.2.3. Type: ..... in accordance with drawing No. ....
8. Gears used for test of motor cycle in motion: .....
9. Final drive ratio(s): .....
10. ECE type approval number of tyre(s): .....
- If not available, the following information shall be provided:
- 10.1. Tyre manufacturer: .....
- 10.2. Commercial description(s) of the type of tyre (by axle), (e.g. trade name, speed index, load index): .....
- 10.3. Tyre size (by axle): .....
- 10.4. Other type approval number (if available): .....
11. Masses
- 11.1. Maximum permissible gross weight: ..... kg
- 11.2. Test mass: ..... kg
- 11.3. Power to mass ratio index (*PMR*): .....
12. Vehicle length: ..... m
- 12.1. Reference length  $l_{ref}$ : ..... m
13. Vehicle speeds of measurements in gear (i)
- 13.1. Vehicle speed at the beginning of the period of acceleration (average of 3 runs) for gear (i): ..... km/h
- 13.2. Pre-acceleration length for gear (i): ..... m
- 13.3. Vehicle speed  $v_{pp}$  (average of 3 runs) for gear (i): ..... km/h
- 13.4. Vehicle speed  $v_{BB}$  (average of 3 runs) for gear (i): ..... km/h
14. Vehicle speeds of measurements in gear (i+1) (if applicable)
- 14.1. Vehicle speed at the beginning of the period of acceleration (average of 3 runs) for gear (i+1): ..... km/h

- 14.2. Pre-acceleration length for gear (i+1): ..... m
- 14.3. Vehicle speed  $v_{PP'}$  (average of 3 runs) for gear (i+1): ..... km/h
- 14.4. Vehicle speed  $v_{BB'}$  (average of 3 runs) for gear (i+1): ..... km/h
- 15. Accelerations are calculated between lines AA' and BB'/PP' and BB'
- 15.1. Description of functionality of devices used to stabilize the acceleration (if applicable): .....
- 16. ~~Noise~~ **Sound** levels of moving vehicle
- 16.1. Wide-open-throttle test result  $L_{wot}$ : ..... db(A)
- 16.2. Constant speed test results  $L_{crs}$ : ..... db(A)
- 16.3. Partial power factor  $k_p$ : ..... db(A)
- 16.4. Final test result  $L_{urban}$ : ..... db(A)
- 17. ~~Noise~~ **Sound** level of stationary vehicle
- 17.1. Position and orientation of microphone (according to Appendix 2 of Annex 3 of 04 series of Regulation No. 41): .....
- 17.2. Test result for stationary test: ..... db(A) at .....  $\text{min}^{-1}$
- 18. Additional sound emission provisions:  
See manufacturer's statement of compliance (attached)
- 19. In-use compliance reference data
- 19.1. Gear (i) or, for vehicles tested with non-locked gear ratios, the position of the gear selector chosen for the test: .....
- 19.2. Pre-acceleration length  $l_{PA}$ : ..... m
- 19.3. Vehicle speed at the beginning of the period of acceleration (average of 3 runs) for gear (i): ..... km/h
- 19.4. Sound pressure level  $L_{wot(i)}$ : ..... dB(A)
- ~~20. Deviations in calibration of sound level meter: ..... dB(A)~~
- ~~21-20.~~ Date of submission of vehicle for approval: .....
- ~~22-21.~~ Technical Service performing the approval tests: .....
- ~~23-22.~~ Date of report issued by that Service: .....
- ~~24-23.~~ Number of report issued by that Service: .....
- ~~25-24.~~ Approval granted/extended/refused/withdrawn<sup>2</sup>: .....
- ~~26-25.~~ Position of approval mark on the motor cycle: .....
- ~~27-26.~~ Place: .....
- ~~28-27.~~ Date: .....
- ~~29-28.~~ Signature: .....
- ~~30-29.~~ The following documents, bearing the approval number shown above, are annexed to this communication:

Drawings, diagrams and plans of the engine and of the **noise sound** reduction system;

Photographs of the engine and of the exhaust or silencing system;

List of components, duly identified constituting the **noise sound** reduction system.

**Part B. NORESS for vehicle types approved according to Regulations Nos. 9 or 63**

**Communication**

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



issued by:

Name of administration:

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

- concerning<sup>2</sup>:
- Approval granted
  - Approval extended
  - Approval refused
  - Approval withdrawn
  - Production definitively discontinued

of a vehicle type with regard to a type of NORESS or component there of pursuant to Regulation No. 92.

Approval No..... Extension No.....

1. Trade name or mark of the vehicle: .....
2. Vehicle type: .....
3. Manufacturer's name and address: .....
4. If applicable, name and address of manufacturer's representative: .....
5. Engine
  - 5.1. Manufacturer:.....
  - 5.2. Type: .....
  - 5.3. Model: .....
  - 5.4. Rated maximum net power: ..... kW at ..... min<sup>-1</sup>
  - 5.5. Kind of engine (e.g. positive-ignition, compression ignition, etc.)<sup>3</sup>: .....
  - 5.6. Cycles: two-stroke/four-stroke <sup>2</sup>
  - 5.7. Cylinder capacity: ..... cm<sup>3</sup>
6. Transmission
  - 6.1. Type of transmission: non-automatic gearbox/automatic gearbox: .....

<sup>1</sup> Distinguishing number of the country which has granted/extended/refused/withdrawn an approval (see approval provisions in the Regulation).

<sup>2</sup> Delete what does not apply.

<sup>3</sup> If a non-conventional engine is used, this should be stated.

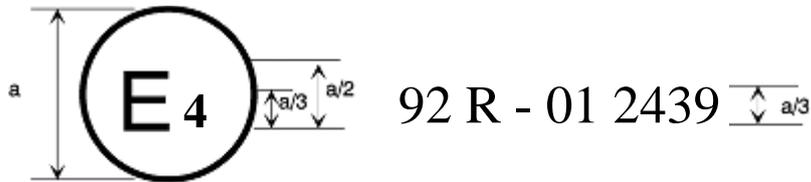
- 6.2. Number of gears: .....
7. Equipment
- 7.1. Exhaust silencer
- 7.1.1. Manufacturer or authorized representative (if any): .....
- 7.1.2. Model: .....
- 7.1.3. Type: ..... in accordance with drawing No. ....
- 7.2. Intake silencer
- 7.2.1. Manufacturer or authorized representative (if any): .....
- 7.2.2. Model: .....
- 7.2.3. Type: ..... in accordance with drawing No. ....
8. Gears used for test of motor cycle in motion: .....
9. Final drive ratio(s): .....
10. ECE type approval number of tyre(s): .....
- If not available, the following information shall be provided:
- 10.1. Tyre manufacturer: .....
- 10.2. Commercial description(s) of the type of tyre (by axle), (e.g. trade name, speed index, load index): .....
- 10.3. Tyre size (by axle): .....
- 10.4. Other type approval number (if available): .....
11. Masses
- 11.1. Maximum permissible gross weight: ..... kg
- 11.2. Test mass: ..... kg
- 11.3. Power to mass ratio index (*PMR*): .....
12. Vehicle length: ..... m
13. Sound level of the vehicle in motion ..... dB(A)
- 13.1. Gear (i) for the test of the vehicle in motion.....
- 13.2. Vehicle speed at the beginning of the period of acceleration (average of 3 runs) for gear (i): ..... km/h
14. Sound level of the stationary vehicle.....dB(A)
- 14.1. at engine speed..... min<sup>-1</sup>
- 14.2. Position and orientation of microphone: .....
15. In-use compliance reference data
- 15.1. Gear (i) or, for vehicles tested with non-locked gear ratios, the position of the gear selector chosen for the test: .....
- 15.2. Vehicle speed at the beginning of the period of acceleration (average of 3 runs) for gear (i): ..... km/h
- 15.3. Sound pressure level  $L_{(i)}$ : ..... dB(A)

- 16. **Date of submission of vehicle for approval:.....**
- 17. **Technical Service performing the approval tests: .....**
- 18. **Date of report issued by that Service: .....**
- 19. **Number of report issued by that Service: .....**
- 20. **Approval granted/extended/refused/withdrawn<sup>2</sup>:.....**
- 21. **Position of approval mark on the motor cycle: .....**
- 22. **Place:.....**
- 23. **Date:.....**
- 24. **Signature: .....**
- 25. **The following documents, bearing the approval number shown above, are annexed to this communication:**
  - Drawings, diagrams and plans of the engine and of the noise sound reduction system;**
  - Photographs of the engine and of the exhaust or silencing system;**
  - List of components, duly identified constituting the noise sound reduction system.**

## Annex 2

### Example of the approval marks

(See paragraph 5.4. of this Regulation)



$a = 8 \text{ mm min}$

The above approval mark affixed to a component of silencing systems shows that the replacement silencing system type concerned has been approved in the Netherlands (E4) pursuant to Regulation No. 92 under approval No. 012439. The first two digits of the approval number 01 indicate that the approval was granted in accordance with the requirements of this current Regulation No. 92 whilst the approval number 00 indicate that the approval was granted in accordance with the requirements of Regulation No. 92 in its original form.

## Annex 3

### Requirements for fibrous absorbent materials used in NORESS

(See paragraph ~~6.4.~~ **6.5.** of this Regulation)

1. Fibrous absorbent material *shall be asbestos-free* and may be used in the construction of silencers only if suitable devices ensure that the fibrous absorbent material is kept in place for the whole time that the silencer is being used and it meets the requirements of any one of sections 2, 3 or 4 according to the manufacturer's choice.
2. After removal of the fibrous material, the sound level shall comply with the requirements of paragraph 6.2. of this Regulation
3. The fibrous absorbent material may not be placed in those parts of the silencer through which the exhaust gases pass and shall comply with the following requirements:
  - (a) The material shall be heated at a temperature of  $650 \pm 5^{\circ}\text{C}$  for four hours in a furnace without reduction in average length, diameter or bulk density of the fibre.
  - (b) After heating at  $650 \pm 5^{\circ}\text{C}$  for one hour in a furnace, at least 98 per cent of the material shall be retained in a sieve of nominal aperture size 250  $\mu\text{m}$  complying with ISO 3310/1 when tested in accordance with ISO 2599.
  - (c) The loss in weight of the material shall not exceed 10.5 per cent after soaking for 24 hours at  $90 \pm 5^{\circ}\text{C}$  in a synthetic condensate of the following composition:
    - (i) 1 N hydrobromic acid (HBr), 10 ml
    - (ii) 1 N sulphuric acid ( $\text{H}_2\text{SO}_4$ ), 10 ml
    - (iii) Distilled water to make up to 1,000 ml

*Note:* The material shall be washed in distilled water and dried for one hour at  $105^{\circ}\text{C}$  before weighing.
4. Before the system is tested in accordance with paragraph 6.2. of this Regulation it shall be put into a normal state for road use by one of the ~~following~~ conditioning methods in accordance with **and as described in paragraph 5.1.4. of Annex 3 of Regulations Nos. 9 or 63 or in paragraph 1.3. of Annex 5 of Regulation No. 41, whatever is applicable. the manufacturer's choice in accordance with the Appendix.**

## Appendix

### Conditioning methods

1. Test procedures
  - 1.1. Motoreycles
    - 1.1.1. According to the classes of motor cycles, the minimum distances to be completed during conditioning shall be in accordance with Table 1.

Table 1

#### Class of motor cycle and minimum distance to be completed during conditioning

<i>Class of motoreycle according to Power-to-Mass ratio index (PMR)</i>	<i>Distance (km)</i>
$\leq 25$	4,000
$> 25 \leq 50$	6,000
$> 50$	8,000

- (a) 50 per cent  $\pm$  10 per cent of this conditioning cycle consists of town driving and the remainder of long distance runs at high speed; the continuous road cycle may be replaced by a corresponding test track programme.
  - (b) The two speed modes shall be alternated at least six times.
  - (c) The complete test programme shall include a minimum of 10 breaks of at least three hours' duration in order to reproduce the effects of cooling and condensation.
- 1.2. Mopeds
    - 1.2.1. The minimum distance to be covered during conditioning shall be 2,000 km.
    - 1.2.2. 50 per cent  $\pm$  10 per cent of this conditioning cycle shall consist of town driving and the remainder of long distance runs; the continuous road cycle may be replaced by a corresponding test track programme.
    - 1.2.3. The two speed regimes shall be alternated at least six times.
    - 1.2.4. The complete test programme shall include a minimum of 10 breaks of at least three hours' duration in order to reproduce the effects of cooling and condensation.
  - 1.3. Three wheeled vehicles
    - 1.3.1. Depending on the category of vehicle, the minimum distance to be completed during conditioning shall be in accordance with Table 2.

Table 2

**Category of vehicle and minimum distance to be completed during conditioning**

<i>Category of vehicle according to cylinder capacity (cc)</i>	<i>Distance (km)</i>
$\leq 250$	4,000
$> 250 \leq 500$	6,000
$> 500$	8,000

1.3.2. ~~50 per cent + 10 per cent of this conditioning cycle shall consist of town driving and the remainder of long distance runs at high speed; the continuous road cycle may be replaced by a corresponding test track programme.~~

1.3.3. ~~The two speed regimes shall be alternated at least six times.~~

1.3.4. ~~The complete test programme shall include a minimum of 10 breaks of at least three hours duration in order to reproduce the effects of cooling and condensation.~~

## 2. ~~Conditioning by pulsation~~

2.1. ~~The exhaust system or components thereof shall be fitted to the motorcycle or to the engine. In the former case, the motorcycle shall be mounted on a roller dynamometer. In the second case, the engine shall be mounted on a test bench.~~

~~The test apparatus, a detailed diagram of which is shown in Figure 1, is fitted at the outlet of the exhaust system. Any other apparatus providing equivalent results is acceptable.~~

2.2. ~~The test equipment shall be adjusted so that the flow of exhaust gases is alternatively interrupted and restored 2,500 times by a rapid action valve.~~

2.3. ~~The valve shall open when the exhaust gas back pressure, measured at least 100 mm downstream of the intake flange, reaches a value of between 0.35 and 0.40 bar. Should such a figure be unattainable because of the engine characteristics, the valve shall open when the gas back pressure reaches a level equivalent to 90 per cent of the maximum that can be measured before the engine stops. It shall close when this pressure does not differ by more than 10 per cent from its stabilized value with the valve open.~~

2.4. ~~The time delay switch shall be set for the duration of exhaust gases calculated on the basis of the requirements of paragraph 4.2.3 above.~~

2.5. ~~Engine speed shall be 75 per cent of the speed (S) at which the engine develops maximum power.~~

2.6. ~~The power indicated by the dynamometer shall be 50 per cent of the full-throttle power measured at 75 per cent of engine speed (S).~~

2.7. ~~Any drainage holes shall be closed off during the test.~~

2.8. ~~The entire test shall be completed within 48 hours. If necessary, a cooling period shall be allowed after each hour.~~

## 3. ~~Conditioning on a test bench~~

- 3.1. The exhaust system shall be fitted to an engine representative of the type fitted to the motorcycle for which the system is designed, and mounted on a test bench.
- 3.2. Motorcycles
- 3.2.1. Conditioning consists of the specified number of test bench cycles for the class of motor cycle for which the exhaust system was designed. The number of cycles for each class of motor cycle shall be in accordance with Table 3.

Table 3

**Number of cycles for each class of motorcycle**

<i>Class of motorcycle according to Power to Mass ratio index (PMR)</i>	<i>No. of cycles</i>
-	-
$\leq 25$	6
$> 25 \leq 50$	9
$> 50$	12

- 3.2.2. Each test bench cycle shall be followed by a break of at least six hours in order to reproduce the effects of cooling and condensation.
- 3.2.3. Each test bench cycle consists of six phases. The engine conditions for and the duration of each phase shall be in accordance with Table 4.

Table 4

**Engine conditions for and the duration of each phase for motorcycles**

<i>Phase</i>	<i>Conditions</i>	<i>Duration of phase (in minutes)</i>	
		<i>PMR <math>\leq 50</math></i>	<i>PMR <math>&gt; 50</math></i>
-	-	PMR $\leq 50$	PMR $> 50$
1	Idling	6	6
2	25% load at 75% S	40	50
3	50% load at 75% S	40	50
4	100% load at 75% S	30	40
5	50% load at 100% S	12	12
6	25% load at 100% S	22	22
-	Total Time	150	150

- 3.2.4. During this conditioning procedure, at the request of the manufacturer, the engine and the silencer may be cooled so that the temperature recorded at a point not more than 100 mm from the exhaust gas outlet does not exceed that measured when the motor cycle running at 110 km/h or 75 per cent of S in top gear. The engine and/or motor cycle speeds are determined to within  $\pm 3$  per cent.
- 3.3. Mopeds
- 3.3.1. Conditioning consists of three test cycles.
- 3.3.2. Each test bench cycle shall be followed by a break of at least six hours' duration in order to reproduce the effects of cooling and condensation.
- 3.3.3. Each test bench cycle shall consist of six phases. The engine conditions for the duration of each phase shall be as given in Table 5.

Table 5

**Engine conditions for the duration of each phase for mopeds**

<i>Phase</i>	<i>Conditions</i>	<i>Duration of phase (minutes)</i>
-	-	
1	Idling	6
2	25% load at 75% S	40
3	50% load at 75% S	40
4	100% load at 75% S	30
5	50% load at 100% S	12
6	25% load at 100% S	22
-	Total Time	150

3.3.4. During this conditioning procedure, at the request of the manufacturer, the engine and the silencer may be cooled so that the temperature recorded at a point not more than 100 mm from the exhaust gas outlet does not exceed that measured when the moped is running at 75 per cent of S in top gear. The engine and/or moped speeds shall be determined to within  $\pm 3$  per cent.

3.4. Three-wheeled vehicles

3.4.1. Conditioning shall consist of the specified number of test bench cycles for the category of vehicle for which the exhaust system was designed. The number of cycles for each vehicle category shall be as given in Table 6.

Table 6

**Number of cycles for each vehicle category for three wheeled vehicles**

<i>Category of vehicle by to cylinder capacity (cc)</i>	<i>No. of cycles</i>
-	-
$\leq 250$	6
$> 250 \leq 500$	9
$> 500$	12

3.4.2. Each test bench cycle shall be followed by a break of at least six hours' duration in order to reproduce the effects of cooling and condensation.

3.4.3. Each test bench cycle shall consist of six phases. The engine conditions for and the duration of each phase shall be as given in Table 7.

Table 7

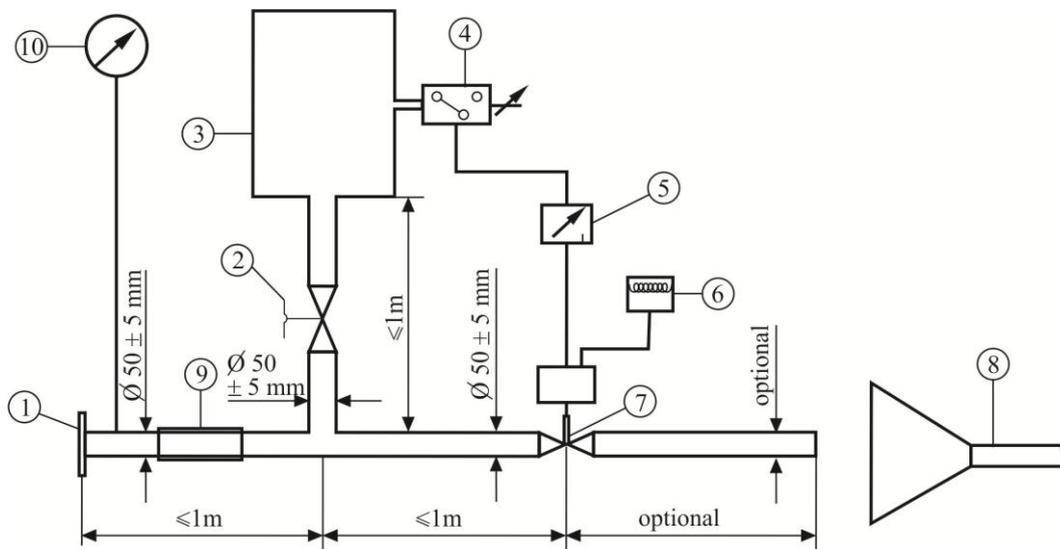
**Engine conditions for the duration of each phase for three wheeled vehicles**

<i>Phase</i>	<i>Conditions</i>	<i>Duration of phase (minutes)</i>	
		<i>Engines of less than 250 cm<sup>3</sup></i>	<i>Engines of not less than 250 cm<sup>3</sup></i>
-	-		
1	Idling	6	6
2	25% load at 75% S	40	50
3	50% load at 75% S	40	50
4	100% load at 75% S	30	40

Phase	Conditions	Duration of phase (minutes)	
5	50% load at 100% S	12	12
6	25% load at 100% S	22	22
-	Total Time	150	150

3.4.4. During this conditioning procedure, at the request of the manufacturer, the engine and the silencer may be cooled in order that the temperature recorded at a point not more than 100 mm from the exhaust gas outlet does not exceed that measured when the vehicle is running at 110 km/h or 75 per cent of S in top gear. The engine and/or vehicle speeds shall be determined to within  $\pm 3$  per cent.

Figure 1  
Test apparatus for conditioning by pulsation



1. Inlet flange or sleeve for connection to the rear of the test exhausts system.
2. Hand operated regulating valve.
3. Compensating reservoir with a maximum capacity of 40 l and a filling time of not less than one second.
4. Pressure switch with an operating range of 0.05 to 2.5 bar.
5. Time delay switch.
6. Pulse counter.
7. Quick acting valve, such as exhaust brake valve 60 mm in diameter, operated by a pneumatic cylinder with an output of 120 N at 4 bar. The response time, both when opening and closing, shall not exceed 0.5 second.
8. Exhaust gas evacuation.
9. Flexible pipe.
10. Pressure gauge.

**Annex 4**

**Statement of Compliance with the Additional Sound Emission Provisions**

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

This statement is required for non-original replacement exhaust silencing systems specified for the use on L<sub>3</sub> category vehicles that are type approved pursuant to the 04 series of amendments to Regulation No. 41 and are subject to the requirements of paragraph 6.3. of the 04 series of amendments to Regulation No. 41.

..... (Name of manufacturer) attests that the non-original replacement exhaust silencing systems of this type ..... (type with regard to its sound emission pursuant to the 04 series of amendments to Regulation No. 41) comply with the requirements of paragraph 6.3. of the 04 series of amendments to Regulation No. 41.

..... (Name of manufacturer) makes this statement in good faith, after having performed an appropriate evaluation of the sound emission performance of the non-original replacement exhaust silencing system in accordance with the requirements of Regulation No. 92.

Date: .....

Name of authorized representative: .....

Signature of authorized representative: .....

\_\_\_\_\_

## II. Justification

### *Throughout the whole Regulation*

1. The Informal Working Group on the Vehicle Propulsion System Definitions (VPSD) decided to use the term "RESS" for "rechargeable energy storage system". Therefore, the term "RESS", which was used in Regulation No. 92 as "replacement exhaust silencer system", needs to be replaced. Since the title of this Regulation implies that it is dedicated to non-original replacement exhaust silencing systems, it is obvious to use the term "NORESS". Consequently, the term "RESS" was replaced by "NORESS" in the whole Regulation.
2. The phrase "motorcycles, mopeds and three-wheeled vehicles" was replaced by "vehicles of categories L<sub>1</sub>, L<sub>2</sub>, L<sub>3</sub>, L<sub>4</sub> and L<sub>5</sub>" in order to bring it in line with the scope. Consequently, the phrase "motorcycle, moped or three wheeled vehicle" was replaced by "vehicle".
3. "With regard to sound emission" was added in the title in order to be more specific.
4. The term "noise" was replaced by "sound" throughout the whole Regulation, except for "background noise", in order to bring it in line with other Regulations (e.g., Nos. 41 and 51).
5. The expression "exhaust system" was replaced by "exhaust silencing system" in order to make the text more comprehensible.
6. Whenever the word "speed" was used without further specification, it was specified whether "engine speed" or "vehicle speed" is meant.

### *Paragraph 1.*

7. "Non-original" was added in order to make the text more specific.

### *Paragraphs 2.5. and 2.6.*

8. "Falling under the scope of this Regulation" was added in order to make the text more comprehensible.
9. The text in paragraph 2.6., indent (b) was modified in order to make it more specific.

### *Paragraph 2.7*

10. "Rated engine speed" and the corresponding footnote was added. The term "rated engine speed" was used in this Regulation, but not defined so far.

### *Paragraph 3.3.*

11. The text was enhanced in order to make it more precise.

### *Paragraph 6.1.*

12. The text under indent (i) i. was moved to a new paragraph 6.3.1., the text under indent (i) ii. was moved to a new paragraph 6.3.2. Both texts were updated to become more comprehensible.

### *Paragraph 6.2.*

13. The text was modified in order to make it more comprehensible.

### *Paragraph 6.3.*

14. A new paragraph 6.3. "Additional requirements" and sub-paragraphs 6.3.1. "Tampering protection provisions", 6.3.2. "Multi-mode NORESS" and 6.3.3. "Prohibition of defeat devices" were added to ensure the same level of stringency for a NORESS compared to Regulations Nos. 9 and 63.

15. Furthermore, sub-paragraph 6.3.4. "Additional sound emission provisions" was added for NORESS intended for the use on vehicles that are type approved according to the 04 series of amendments to Regulation No. 41 and are subject to the ASEP requirements in the 04 series of amendments to Regulation No. 41, in order to ensure the same level of stringency for a NORESS compared to the 04 series of amendments to Regulation No. 41.

16. The subsequent subparagraphs in paragraph 6. were renumbered accordingly.

*Paragraph 6.4.4.1. (former 6.3.4.1.)*

17. The first option with a reference to paragraph 3.3. (d) was deleted, because 3.3. (d) did not exist.

*Annex 1*

18. In the existing Annex 1 the following header was added: "Part A. NORESS for vehicle types approved according to the 04 series of amendments to Regulation No. 41". Item 19 was deleted in order to bring Annex 1 in line with the corresponding Annex in the 04 series of amendments to Regulation No. 41. The subsequent items were renumbered accordingly.

19. A second Communication form was added with the header: "Part B. NORESS for vehicle types approved according to Regulation Nos. 9 or 63", because the existing Annex 1 exclusively related to NORESS for vehicles type approved according to the 04 series of amendments to Regulation No. 41.

*Annex 3, paragraph 4.*

20. The reference in paragraph 4. to the appendix of Annex 3 was deleted and replaced by references to the appropriate paragraphs in the corresponding vehicle Regulations (Nos. 9, 63 and 41).

21. The appendix is dedicated to L<sub>3</sub> category vehicles, but the requirements should also be fulfilled for the other L category vehicles falling under the scope of this Regulation.

*Annex 4, Statement of Compliance with the Additional Sound Emission Provisions*

22. A new annex 4 was added for NORESS that have to fulfil the requirements of a new paragraph 6.3.4. of this Regulation in order to align the ASEP requirements with the 04 series of amendments to Regulation No. 41.