



UNITED NATIONS

AGREEMENT

**CONCERNING THE ADOPTION OF UNIFORM CONDITIONS OF APPROVAL
AND RECIPROCAL RECOGNITION OF APPROVAL
FOR MOTOR VEHICLE EQUIPMENT AND PARTS**

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**UNIFORM PROVISIONS CONCERNING THE APPROVAL OF REPLACEMENT
SILENCING SYSTEMS**

Regulation No. 59

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF REPLACEMENT SILENCING SYSTEMS

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Regulation No.59

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF REPLACEMENT
SILENCING SYSTEMS

1. SCOPE

This Regulation contains provisions relating to the approval of silencing systems or components thereof to be fitted to one or more given types of motor vehicles in categories M₁ and N₁^{*/} as replacement parts.

2. DEFINITIONS

For the purpose of this Regulation,

- 2.1. "Silencing system" means a complete set of components necessary for limiting the noise produced by the engine of a motor vehicle and its exhaust;
- 2.2. "Silencing system component" means one of the separate components which together form the exhaust system (e.g. silencer proper, expansion chamber, resonator);
- 2.3. "Silencing system of different types" means silencing systems which differ significantly in such respects as:
- 2.3.1. that their components bear different trade names or marks,
- 2.3.2. that the characteristics of the materials constituting a component are different or that the components differ in shape or size, a modification regarding the coating (zinc coating, aluminium coating, etc.) is not considered changing the type,
- 2.3.3. that the operating principles of at least one component are different,
- 2.3.4. that their components are combined differently;

*/ Category M: Power-driven vehicles having at least four wheels or having three wheels when the maximum weight exceeds 1 metric ton, and used for the carriage of passengers. (Articulated vehicles comprising two non-separable but articulated units shall be considered as single vehicles.)

Category M₁: Vehicles used for the carriage of passengers and comprising not more than eight seats in addition to the driver's seat.

Category N: Power-driven vehicles having at least four wheels or having three wheels when the maximum weight exceeds 1 metric ton, and used for the carriage of goods.

Category N₁: Vehicles used for the carriage of goods and having a maximum weight not exceeding 3.5 metric tons.

In conformity with "Classification of vehicles" in Regulation No. 13 (E/ECE/324 - E/ECE/TRANS/505/Rev.1/Add.12/Rev.2, paragraph 5.2.).

- 2.4. "Replacement silencing system or components of said system" means any part of the exhaust system defined in paragraph 2.1. above intended for use on a vehicle, other than a part of the type fitted to this vehicle when submitted for type approval pursuant to this Regulation;
- 2.5. "Approval of a replacement silencing system or components of said system" means the approval of the whole or part of a silencing system adaptable to one or several specified types of motor vehicles, as regards the limitation of their noise level;
- 2.6. "Vehicle type" means a category of motor vehicles which do not differ significantly in such respects as:
- 2.6.1. the lines and constituent materials of the body (more particularly the engine compartment and its soundproofing),
 - 2.6.2. the length and width of the vehicle,
 - 2.6.3. the type of engine (positive ignition, compression ignition, two stroke or four stroke, reciprocating or rotary), number and capacity of cylinders, number of carburettors, arrangement of valves, maximum horse-power and corresponding engine speed (r.p.m.), etc.
 - 2.6.4. number and ratios of gears, total ratio of the transmission,
 - 2.6.5. the number, type and arrangement of the exhaust systems, and
 - 2.6.6. the number, type and arrangement of the intake systems.
3. APPLICATION FOR APPROVAL
- 3.1. The application for approval of a replacement silencing system or components of said system shall be submitted by its manufacturer or by his duly accredited representative.
- 3.2. It shall be accompanied by the undermentioned documents in triplicate and the following particulars:
- 3.2.1. a description of the vehicle type(s) on which the system or components is intended to be mounted, with regard to the items mentioned in paragraph 2.6. above. The numbers and/or symbols identifying the engine type and the vehicle type shall be specified and the vehicle type approval number, if necessary;
 - 3.2.2. a description of the assembled silencing system showing the relative position of each of its components, as well as mounting instructions;
 - 3.2.3. detailed drawings of each component to enable it to be easily located and identified, and a specification of the material used.
- 3.3. On request of the technical service conducting the tests for approval, the manufacturer of the silencing system shall submit:

- 3.3.1. two samples of the system or components submitted for approval;
- 3.3.2. a sample of the original silencing system with which the vehicle was equipped when submitted for type approval;
- 3.3.3. a vehicle representative of the type to which the system is to be fitted; this vehicle, when measured for noise emission according to the methods described in paragraphs 3.1. and 3.2. of annex 3 to Regulation No. 51 must satisfy the following conditions:
 - 3.3.3.1. the noise level when the vehicle is in motion must not exceed the limit applicable to the category of vehicle concerned at the time when the type to which the vehicle belongs was approved; furthermore, it must not exceed by more than 3 dB(A) the noise level indicated in the approval of the type to which the vehicle belongs;
 - 3.3.3.2. the noise level when the vehicle is stationary does not exceed the reference value indicated in the approval of the type to which the vehicle belongs;
- 3.3.4. A separate engine, of at least the same cylinder capacity and power as that of the above-mentioned vehicle.

4. MARKINGS

- 4.1. Each component of the replacement silencing system, excluding tubes and mounting accessories, shall bear:
 - 4.1.1. the trade name or mark of the manufacturer of the system or its components,
 - 4.1.2. the commercial description given by the manufacturer.
- 4.2. Such markings shall be clearly legible and indelible.

5. APPROVAL

- 5.1. If the type of replacement silencing system submitted for approval pursuant to 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 type approved. Its first two digits (at present 00 for the Regulation in its original form) 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 replacement silencing system or component designed for the same type(s) of vehicle.

- 5.3. Notice of approval or of refusal of approval of a replacement silencing system or components of said system pursuant to 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 the Regulation, and of drawings of the silencing system or components supplied by the applicant for approval, in a format not exceeding A4 (210 x 297 mm) or folded to that format and on an appropriate scale.
- 5.4. There shall be affixed to every component of silencing system conforming to a type approved under this Regulation an international approval mark consisting of:
- 5.4.1. a circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval;^{1/}
- 5.4.2. the number of this Regulation, followed by the letter "R", a dash and the approval number to the right of the circle prescribed in paragraph 5.4.1.;
- 5.4.3. the approval number shall be mentioned in the approval form, as well as the method used for approval tests.
- 5.5. The approval mark shall be easily legible and indelible, when the silencing system is mounted on the vehicle.
- 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 replacement silencing system; in this case the circle need not be repeated. Annex 2 to this Regulation gives an example of the arrangement of the approval mark.
6. SPECIFICATIONS
- 6.1. General specifications
- 6.1.1. The replacement exhaust system or components thereof must be designed, constructed and capable of being mounted so as to ensure that the vehicle complies with the provisions of this Regulation under normal conditions of use, notwithstanding any vibrations to which it may be subject.

^{1/} 1 for the Federal Republic of Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for Czechoslovakia, 9 for Spain, 10 for Yugoslavia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 for the German Democratic Republic, 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland and 21 for Portugal. Subsequent numbers shall be assigned to other countries in the chronological order in which they ratify or accede to the Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

6.1.2. The silencing system or components thereof must be designed, constructed and capable of being mounted so that reasonable resistance to the corrosion phenomenon to which it is exposed is obtained having regard to the conditions of use of the vehicle.

6.2. Specifications regarding noise levels

6.2.1. The acoustic efficiency of the replacement silencing system or components of said system shall be verified by means of the methods described in paragraphs 3.1. and 3.2. of annex 3 to Regulation No. 51.

When the replacement silencing system or components thereof is mounted on the vehicle described in paragraph 3.3.3. above, the noise levels obtained using the two methods (stationary and running vehicle) shall satisfy one of the following conditions:

6.2.1.1. they shall not exceed the values obtained with the type of vehicle concerned when submitted for type approval,

6.2.1.2. they shall not exceed the noise values measured on the vehicle referred to in paragraph 6.2.1. above, when this is fitted with an exhaust silencing system corresponding to the type fitted to the vehicle when submitted for type approval.

6.3. Measurement of the vehicle performances

6.3.1. The replacement exhaust system or components thereof must be such as to ensure that vehicle performance is comparable with that achieved with the original equipment exhaust system or component thereof.

6.3.2. The replacement silencing system or, depending on the manufacturer's choice, the components of said system shall be compared with an original silencing system or components, which are also in new condition, successively mounted on the vehicle mentioned in paragraph 3.3.3. above.

6.3.3. The verification shall be carried out by measuring the back pressure pursuant to paragraph 6.3.4. below.

The value measured with the replacement silencing system shall not exceed the value measured with the original standard silencing system by more than 25 per cent under the conditions mentioned below.

6.3.4. Test method

6.3.4.1. Test method with engine

The measurements shall be conducted on the engine referred to in paragraph 3.3.4. above coupled to a dynamometer. With the throttle completely open, the bench shall be adjusted so as to obtain the engine speed(s) corresponding to the rated maximum power of the engine.

For the measurement of back pressure, the distance at which the pressure tap shall be placed from the exhaust manifold is indicated in annex 4 to this Regulation.

6.3.4.2. Test method with vehicle

The measurements shall be carried out on the vehicle referred to in paragraph 3.3.3. above.

The test shall be conducted:

either on the road,
or on a roller dynamometer.

With the throttle completely open, the engine must be loaded so as to obtain the engine speed corresponding to the rated maximum power of the engine (engine speed S).

For the measurement of back pressure, the distance at which the pressure tap shall be placed from the exhaust manifold is indicated in annex 4 to this Regulation.

6.4. Additional specifications regarding silencing systems or components filled with fibrous materials

Absorbing fibrous materials may be used in silencing systems or components only when it is established by appropriate means of design and manufacturing, that the efficiency of the system in traffic conditions is sufficient to comply with the existing regulations. Such a silencing system is deemed to be effective in traffic conditions if the exhaust gas is not in contact with the fibrous materials or if, the silencing system being emptied of its absorbing materials and tested on vehicle in conformity with the procedures described in Regulation No. 51, annex 3, paragraphs 3.1 and 3.2., the acoustic pressure levels comply with the provisions laid down in paragraph 6.2. above.

If that condition is not fulfilled, the complete silencing system shall be submitted to a conventional conditioning using the installation and procedure described below or one of the two tests described in Regulation No. 51, annex 3, paragraphs 3.1.1. and 3.1.2. When the procedure described in paragraph 6.2.1.2. above is employed, the applicant for approval may ask for the emptying or the conditioning of the original silencing system.

6.4.1. Test method and apparatus

The exhaust system or components of said system is/are fitted to the vehicle referred to in paragraph 3.3.3. above or the engine referred to in paragraph 3.3.4. In the former case, the vehicle must be mounted on a roller dynamometer, and, in the second case, the engine must be mounted on a dynamometer.

The test apparatus described below is fitted at the outlet of the silencing system.

6.4.1.1. Test apparatus

The test apparatus, a detailed diagram of which is shown in annex 3 to this Regulation must be fitted at the outlet of the exhaust system. Any other apparatus providing equivalent results is acceptable.

6.4.2. Test procedure

6.4.2.1. The test apparatus shall be adjusted in such a way that the exhaust gas flow is alternately interrupted and re-established by the quick action valve for 2,500 cycles.

6.4.2.2. The valve is opened when the exhaust gas pressure, measured at 100 mm at least downstream from the intake flange, reaches a value between 0.35 and 0.40 bar. It is closed when this pressure does not differ by more than 10 per cent from its stabilized value, measured with the valve open.

6.4.2.3. The time delay switch shall be set for the duration of gas exhaust resulting from the provisions laid down in paragraph 6.4.2.2. above.

6.4.2.4. Engine speed shall be 75 per cent of the speed S at which, according to the manufacturer, the engine develops maximum power.

6.4.2.5. 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).

6.4.2.6. Any drain holes shall be closed off during the test.

6.4.2.7. The entire test must be completed within 48 hours. If necessary, one cooling period will be observed after each hour.

6.4.2.8. After conditioning, the noise level is checked pursuant to paragraph 6.2. above.

7. EXTENSION OF APPROVAL

The silencing system manufacturer or his duly accredited representative may ask the administrative department which has granted the approval of the silencing system for one or several types of vehicles, for an extension of the approval to other types of vehicles.

The procedure is that described in paragraph 3. above.

Notice of the extension of approval (or refusal of extension) shall be communicated to the Parties to the Agreement which apply this Regulation in accordance with the procedure specified in paragraph 5.3. above.

8. MODIFICATION OF THE TYPE OF SILENCING SYSTEM

8.1. Every modification of the type of replacement silencing system shall be notified to the administrative department which approved the type of silencing system. The said department may then either:

8.1.1. consider that the modifications made are unlikely to have an appreciable adverse effect, or

8.1.2. require a further test report from the technical service responsible for conducting the tests.

8.2. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 5.3. above to the Parties to the Agreement applying this Regulation.

9. CONFORMITY OF PRODUCTION

9.1. Every replacement silencing system bearing an approval mark as prescribed under this Regulation shall conform to the type of silencing system approved and satisfy the requirements of paragraph 6. above.

9.2. In order to verify conformity as prescribed in paragraph 9.1. above, a silencing system bearing the approval mark required by this Regulation shall be taken from the series. Production shall be deemed to conform to the requirements of this Regulation if the levels measured do not exceed by more than 1 dbA the limits prescribed in paragraph 6.2.1. above.

10. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

10.1. The approval granted in respect of a type of silencing system pursuant to this Regulation may be withdrawn if the requirements laid down in paragraph 9. above are not complied with, or if the silencing system or components fail to pass the tests provided for in paragraph 9.2. above.

10.2. If a Party to the Agreement which applies this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation, by means of a copy of the approval form bearing at the end, in large letters, the signed and dated annotation "APPROVAL WITHDRAWN".

11. PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a type of replacement silencing system or components of the said system in accordance with this Regulation, he shall so inform the authority which granted the approval. Upon receiving the relevant communication, that authority shall inform thereof the other Parties to the Agreement applying this Regulation, by means of a copy of the approval form bearing at the end, in large letters, the signed and dated annotation: "PRODUCTION DISCONTINUED".

12. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS

The Parties to the 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 administrative departments which grant approval and to which forms certifying approval or refusal or withdrawal of approval, issued in other countries, are to be sent.

Annex 1

(Maximum format: A 4 (210 x 297 mm))



Name of administration

Communication concerning the approval (or extension or refusal or withdrawal of approval or production definitely discontinued) of a type of replacement silencing system or components of the said system pursuant to Regulation No. 59.

- Approval No.
1. Trade name or mark of the silencing system
 2. Type of the silencing system
 3. Manufacturer's name and address
 4. If applicable, name and address of manufacturer's representative
 5. Brief description of the silencing system (with/without^{*}/ fibrous material, etc.)
 6. Trade name or mark of the vehicle type for which the silencing system is intended
 7. Vehicle type, starting from serial number:
 8. Kind of engine: positive-ignition, compression ignition
 9. Cycles: two-stroke or four-stroke
 10. Cylinder capacity
 11. Engine power (kW ECE)
 12. Number of gears
 13. Gears used
 14. Final drive ratio(s)
 15. Maximum power
 16. Load conditions of vehicles during test
 17. Sound levels:
 Vehicle in motiondbA at steady speed before acceleration
 ofkm/h
 Vehicle stationarydbA with engine running atr.p.m.
 18. Value of the back pressure:
 19. Silencing system submitted: For approval on
 For extension of approval on
 20. Technical service responsible for conducting approval tests

*/ Strike out whatever does not apply.

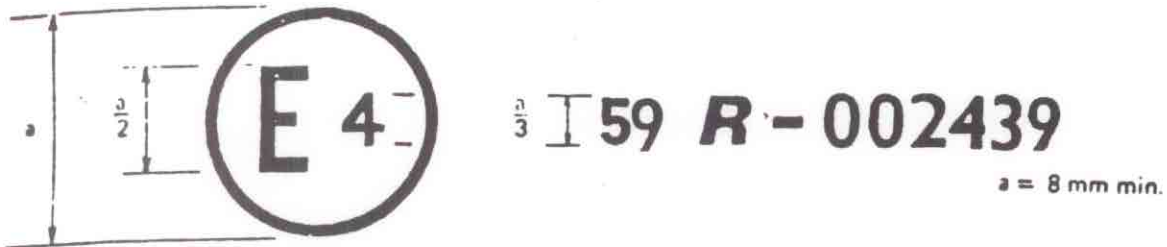
21. Date of report issued by that service
22. Number of report issued by that service
23. Approval granted/refused */
24. Position of approval mark on the vehicle
25. Place
26. Date
27. Signature
28. The following documents, bearing the approval number shown above, are annexed to this communication:
 - drawings, diagrams and plans of the silencing system
 - photographs of the silencing system
 - list of components, duly identified constituting the silencing system

*/ Strike out whatever does not apply.

Annex 2

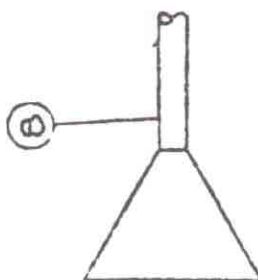
ARRANGEMENT OF THE APPROVAL MARK

(see paragraph 5.4. of this Regulation)



The above approval mark affixed to a component of silencing system shows that the replacement silencing system type concerned has been approved in the Netherlands (E 4) pursuant to Regulation No. 59 under approval number 002439. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No. 59 in its original form.

TEST APPARATUS



- 2

Annex 4

MEASURING POINTS - BACK PRESSURE

Examples of possible measuring points for loss-of-pressure tests. The exact measuring point shall be specified in the test report. It shall be in an area where gas flow is regular.

Fig. 1

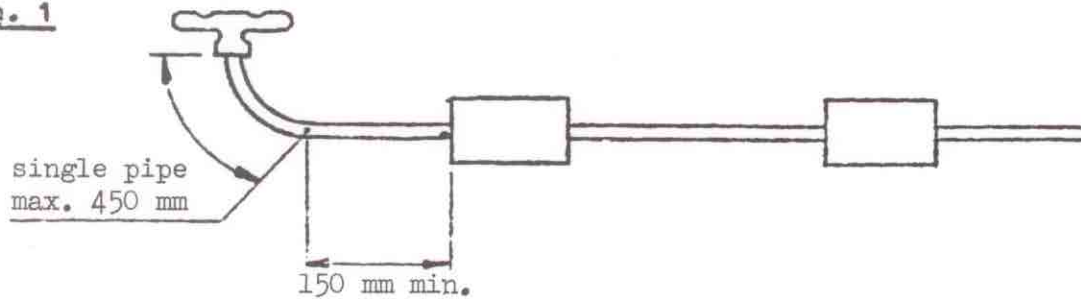


Fig. 2 1/

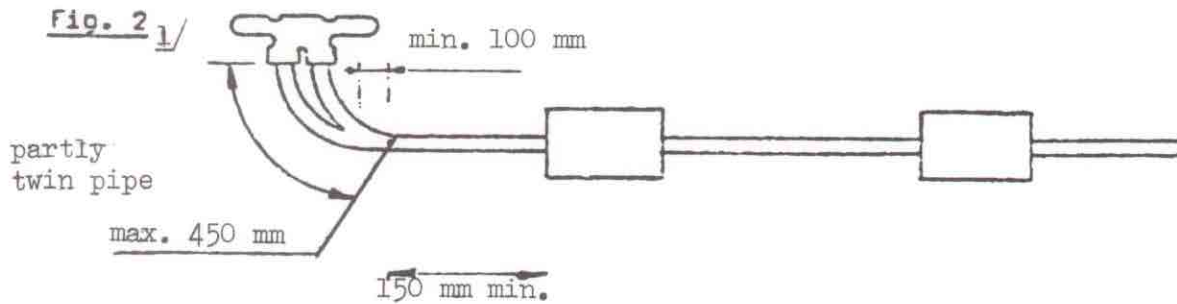
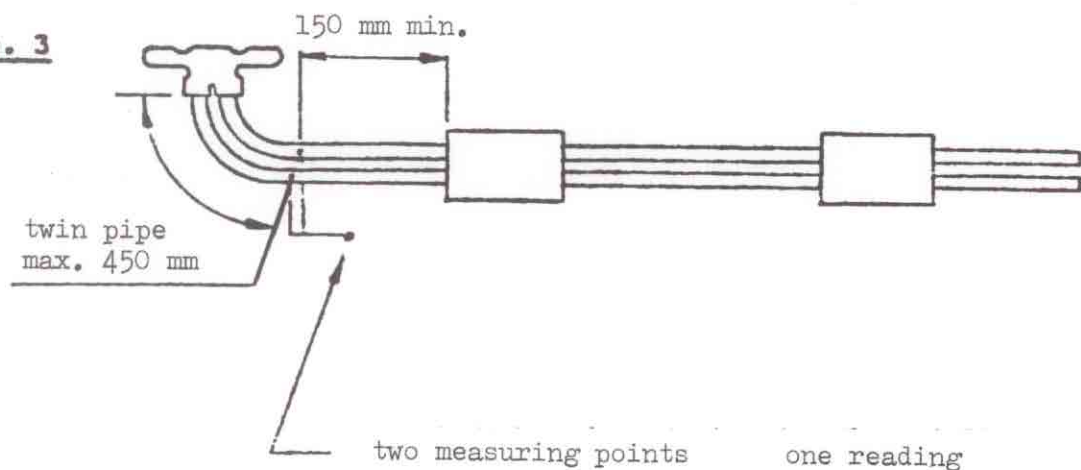


Fig. 3



1/ If not possible, refer to figure 3.

