Regulation No 103 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of replacement catalytic converters for power-driven vehicles (*)

1. SCOPE

This Regulation applies to catalytic converters intended to be fitted on power driven vehicles of categories M_1 and N_1 as replacement parts (1).

2. DEFINITIONS

For the purpose of this Regulation:

2.1. 'Original equipment catalytic converter' means a catalytic converter or an assembly of catalytic converters covered by the type approval delivered for the vehicle and whose types are indicated in the documents related to annex 1 of Regulation No 83.

2.2. 'Replacement catalytic converter' means a catalytic converter or an assembly of catalytic converters for which approval can be obtained according to this Regulation, other than those defined in paragraph 2.1 above.

2.3. 'Type of catalytic converter' means catalytic converters which do not differ in such essential aspects as:

(i) number of coated substrates, structure and material

(ii) type of catalytic activity (oxidising, three-way, . . .)

(iii) volume, ratio of frontal area and substrate length

(iv) catalyst material content

(v) catalyst material ratio

(vi) cell density

(vii) dimensions and shape

(viii) thermal protection

2.4. 'Vehicle type'

See paragraph 2.3 of Regulation No 83.

2.5. 'Approval of a replacement catalytic converter' means the approval of a converter intended to be fitted as a replacement part on one or more specific types of vehicles with regard to the limitation of pollutant emissions, noise level and effect on vehicle performance.

3. APPLICATION FOR APPROVAL

3.1. The application for approval of a type of replacement catalytic converter shall be submitted by its manufacturer or by his authorized representative.

3.2. For each type of replacement catalytic converter for which type approval is requested, the application for approval shall be accompanied by the following documents in triplicate.

3.2.1. Drawings of the replacement catalytic converter identifying in particular all the characteristics referred to in paragraph 2.3 of this Regulation.

(*) Publication in accordance with Article 4(5) of Council Decision 97/836/EC of 27 November 1997 (OJ L 346, 17.12.1997, p. 78).

(1) This Regulation does not apply to replacement catalytic converters intended to be fitted on vehicles of categories M_1 and N_1 equipped with an On-Board Diagnostic (OBD) system. As soon as an OBD Regulation enters into force, the technical content of this Regulation will be reconsidered.

3.2.2. Description of the vehicle type or types for which the replacement catalytic converter is intended. The number and/or symbols characterizing the engine and vehicle type(s) shall be indicated.

3.2.3. Description and drawings showing the position of the replacement converter relative to the engine exhaust manifold(s).

3.2.4. Drawings indicating the intended location of the approval mark.

3.3. The applicant for approval shall provide the technical service responsible for approval tests with:

3.3.1. Vehicle(s) of a type approved in accordance with Regulation No 83 equipped with a new original catalytic converter. This (these) vehicle(s) shall be selected by the applicant with the agreement of the technical service. It (they) shall comply with the requirements of paragraph 3 of annex 4 of Regulation No 83.

The test vehicle(s) shall have no emission control system defects; any excessively worn out or malfunctioning emission related original part shall be repaired or replaced. The test vehicle(s) shall be tuned properly and set to the manufacturer's specification prior to emission testing.

3.3.2. One sample of the type of the replacement catalytic converter. This sample shall be clearly and indelibly marked with the applicant's trade name or mark and its commercial designation.

4. APPROVAL

4.1. If the replacement catalytic converter submitted for approval pursuant to this Regulation meets the requirements of paragraph 5 below, approval of that type of replacement catalytic converter shall be granted.

4.2. An approval number shall be assigned to each type approved. Its first two digits (00 for the Regulation in its present 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 catalytic converter.

4.3. Notice of approval or of extension or of refusal of approval of a type of replacement catalytic converter pursuant to this Regulation shall be communicated to the Contracting Parties to the Agreement applying this Regulation by means of a form conforming to the model in annex 1 to this Regulation.

4.4. There shall be affixed, conspicuously and in a place specified on the approval form, to the replacement catalytic converter conforming to a type of replacement catalytic converter approved under this Regulation, an international approval mark consisting of:

4.4.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval ([1]);

([1]) 1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for the Czech Republic, 9 for Spain, 10 for Yugoslavia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 (vacant), 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal, 22 for the Russian Federation, 23 for Greece, 24 for Ireland, 25 for Croatia, 26 for Slovenia, 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30 (vacant), 31 for Bosnia and Herzegovina, 32 for Latvia, 33 (vacant), 34 for Bulgaria, 35-36 (vacant), 37 for Turkey, 38-39 (vacant), 40 for The former Yugoslav Republic of Macedonia, 41 (vacant), 42 for the European Community (Approvals are granted by its Member States using their respective ECE symbol), 43 for Japan, 44 (vacant), 45 for Australia and 46 for Ukraine. 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 Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

4.4.2. The number of this Regulation, followed by the letter 'R', a dash and the approval number in the vicinity of the circle prescribed in paragraph 4.4.1.

4.5. If the replacement catalytic converter conforms to a catalytic converter type approved under one or more other Regulations annexed to the Agreement in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 4.4.1 need not be repeated; in such a case, the Regulation and approval numbers and the additional symbols of all the Regulations under which approval has been granted in the country which has granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 4.4.1.

4.6. The approval mark shall be indelible and clearly legible when the replacement catalytic converter is mounted under the vehicle.

4.7. Annex 2 to this Regulation gives examples of arrangements of approval marks.

5. REQUIREMENTS

5.1. *General requirements*

5.1.1. The replacement catalytic converter shall be designed, constructed and capable of being mounted so as to enable the vehicle to comply with the provisions of those Regulations which it was originally in compliance with and that pollutant emissions are effectively limited throughout the normal life of the vehicle under normal conditions of use.

5.1.2. The installation of the replacement catalytic converter shall be at the exact position of the original equipment catalytic converter, and the position on the exhaust line of the oxygen probe(s), if applicable, shall not be modified.

5.1.3. If the original equipment catalytic converter includes thermal protections, the replacement catalytic converter shall include equivalent protections.

5.1.4. The replacement catalytic converter shall be durable, that is designed, constructed and capable of being mounted, so that reasonable resistance to the corrosion and oxidation phenomena to which it is exposed is obtained, having regard to the conditions of use of the vehicle.

5.2. *Requirements regarding emissions*

The vehicle(s) indicated in paragraph 3.3.1 of this Regulation, equipped with a replacement converter of the type for which approval is requested, shall be subjected to a type I test under the conditions described in the corresponding annexes of Regulation No 83 in order to compare its performance with the original catalytic converter according to the procedure described below.

5.2.1. Determination of the basis for comparison

The vehicle(s) shall be fitted with a new original catalytic converter (see paragraph 3.3.1) which shall be run in with 12 extra urban cycles (test type I part 2). After this preconditioning, the vehicle(s) shall be kept in a room in which the temperature remains relatively constant between 293 and 303 K (20 and 30 °C). This conditioning shall be carried out for at least six hours and continue until the engine oil temperature and coolant, if any, are within ± 2 K of the temperature of the room. Subsequently three exhaust gas tests type I shall be made.

5.2.2. Exhaust gas test with replacement catalytic converter

The original catalytic converter of the test vehicle(s) shall be replaced by the replacement catalytic converter (see paragraph 3.3.2) which shall be run in with 12 extra urban cycles (test type I part 2). After this preconditioning, the vehicle(s) shall be kept in a room in which the temperature remains relatively constant between 293 and 303 K (20 and 30 °C). This conditioning shall be carried out for at least six hours and continue until the engine oil temperature and coolant, if any, are within ± 2 K of the temperature of the room. Subsequently three exhaust gas tests type I shall be made.

5.2.3. Evaluation of the emission of pollutants of vehicles equipped with replacement catalytic converters

The test vehicle(s) with the original catalytic converter shall comply with the limit values according to the type approval of the vehicle(s) including — if applicable — the deterioration factors applied during the type approval of the vehicle(s).

The requirements regarding emissions of the vehicle(s) equipped with the replacement catalytic converter shall be deemed to be fulfilled if the results meet for each regulated pollutant (CO, HC + NO_x and particulates) the following conditions:

1. $M \leq 0{,}85\ S + 0{,}4\ G$

2. $M \leq G$

where:

M: mean value of the emissions of one pollutant (CO or particulates) or the sum of two pollutants (HC + NO_x) obtained from the three type I tests with the replacement catalytic converter

S: mean value of the emissions of one pollutant (CO or particulates) or the sum of two pollutants (HC + NO_x) obtained from the three type I tests with the original catalytic converter

G: limit value of the emissions of one pollutant (CO or particulates) or the sum of two pollutants (HC + NO_x) according to the type approval of the vehicle(s) divided by — if applicable — the deterioration factors determined in accordance with paragraph 5.4 below.

Where approval is applied for different types of vehicles from the same car manufacturer, and provided that these different types of vehicles are fitted with the same type of original equipment catalytic converter, the type I testing may be limited to at least two vehicles selected after agreement with the technical service responsible for approval.

5.3. *Requirements regarding noise and vehicle performance*

The replacement catalytic converter shall satisfy the technical requirements of Regulation No 59. As an alternative to the measurement of back-pressure as specified in Regulation No 59, the verification of the vehicle performance can be performed by measuring on a chassis dynamometer the maximum absorbed power at a speed corresponding to the engine maximum power. The value determined under reference atmospheric conditions as specified in Regulation No 85 with the replacement catalytic converter shall not be lower by more than 5 per cent than that determined with the original equipment catalytic converter.

5.4. *Requirements regarding durability*

The replacement catalytic converter shall comply with the requirements of paragraph 5.3.5 of Regulation No 83, i.e. type V test or deterioration factors from the following table for the results of the type I tests.

Engine category	Deterioration factors		
	CO	HC + NO_x	Particulates
(i) Positive ignition	1,2	1,2	—
(ii) Compression ignition	1,1	1	1,2

6. MODIFICATION OF THE REPLACEMENT CATALYTIC CONVERTER TYPE AND EXTENSION OF APPROVAL

Every modification of the replacement catalytic converter type shall be notified to the administrative department which approved this type of replacement catalytic converter.

The department may then either:

(i) consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the replacement catalytic converter still complies with the requirements, or

(ii) require a further test report for some or all the tests described in paragraph 5 of this Regulation from the technical service responsible for conducting the tests.

Confirmation or refusal of approval, specifying the alteration, shall be communicated by the procedure specified in paragraph 4.3 above to the Parties to the Agreement applying this Regulation.

The competent authority issuing the extension of approval shall assign a serial number to each communication form drawn up for such an extension.

7. 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.

7.1. The replacement catalytic converters approved under this Regulation shall be so manufactured as to conform to the type approved in the characteristics as defined under paragraph 2.3 of this Regulation.

They shall meet the requirements set forth in paragraph 5 and, where applicable, fulfil the requirements of the tests specified in this Regulation.

7.2. The approval authority may carry out any check or test prescribed in this Regulation. In particular, the tests described in paragraph 5.2 of this Regulation (requirements regarding emissions) may be carried out. In this case, the holder of the approval may ask, as an alternative, to use as a basis for comparison not the original equipment converter, but the replacement catalytic converter which was used during the type approval tests (or another sample that has been proven to conform to the approved type). Emissions' values measured with the sample under verification shall then on average not exceed by more than 15 per cent the mean values measured with the sample used for reference.

8. PENALTIES FOR NONCONFORMITY OF PRODUCTION

8.1. The approval granted in respect of a type of replacement catalytic converter pursuant to this Regulation may be withdrawn if the requirements laid down in paragraph 7 above are not complied with.

8.2. 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 form conforming to the model in annex 1 to this Regulation.

9. PRODUCTION DEFINITIVELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a type of replacement catalytic converter approved 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 form conforming to the model in annex 1 to this Regulation.

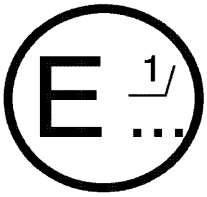
10. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS

The Contracting Parties to the Agreement applying 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 extension or refusal or withdrawal of approval issued in other countries are to be sent.

ANNEX 1

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by: Name of administration (1)

.....

.....

.....

concerning (2) APPROVAL GRANTED

APPROVAL EXTENDED

APPROVAL REFUSED

APPROVAL WITHDRAWN

PRODUCTION DEFINITELY DISCONTINUED

of a replacement catalytic converter pursuant to Regulation No 103

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

1. Applicant's name and address: .....

2. Manufacturer's name and address: .....

3. Manufacturer's trade name or mark: .....

4. Commercial designation of the replacement catalytic converter: .....

.....

5. Vehicles type(s) for which the catalytic converter type qualifies as replacement catalytic converter: .....

.....

6. Type(s) of vehicle(s) on which the replacement catalytic converter has been tested: .....

7. Submitted for approval on: .....

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

(2) Strike out what does not apply.

8. Technical Service responsible for approval tests: .....

.....

8.1. Date of test report: .....

8.2. Number of test report: .....

9. Approval granted/extended/refused/withdrawn [1]

10. Place: .....

11. Date: .....

12. Signature: .....

13. Annexed to this communication is a list of documents in the approval file deposited at the administrative services having delivered the approval and which can be obtained upon request.

---

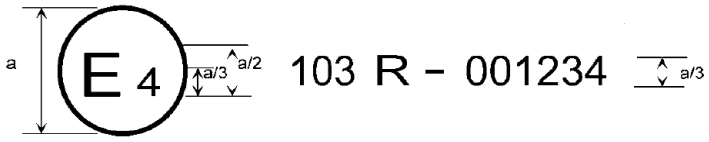
[1] Strike out what does not apply.

ANNEX 2

EXAMPLES OF ARRANGEMENTS OF APPROVAL MARKS

Model A

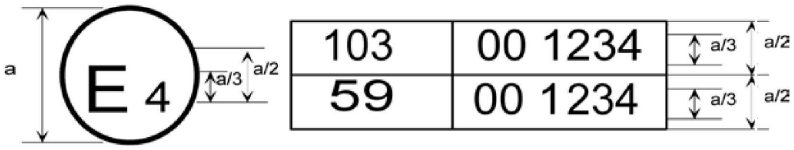
(see paragraph 4.4 of this Regulation)



The above approval mark affixed to a component of a replacement catalytic converter shows that the type concerned has been approved in the Netherlands (E 4), pursuant to Regulation No 103 under approval No 001234. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No 103 in its original form.

Model B

(see paragraph 4.5 of this Regulation)



The above approval mark affixed to a component of replacement catalytic converter shows that the type concerned has been approved in the Netherlands (E 4) pursuant to Regulations Nos 103 and 59 ([1]).

The first two digits of the approval numbers indicate that, on the date on which these approvals were granted, Regulations Nos 103 and 59 were in their original form.

([1]) The second number is given merely as an example.