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Acts whose titles are printed in light type are those relating to day-to-day management of agricultural matters, and are generally valid for a limited period.

The titles of all other acts are printed in bold type and preceded by an asterisk.

II

*(Non-legislative acts)***ACTS ADOPTED BY BODIES CREATED BY
INTERNATIONAL AGREEMENTS**

Only the original UN/ECE texts have legal effect under international public law. The status and date of entry into force of this Regulation should be checked in the latest version of the UN/ECE status document TRANS/WP.29/343, available at:
<http://www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29docstts.html>

**Regulation No 28 of the Economic Commission for Europe of the United Nations (UN/ECE) —
Uniform provisions concerning the approval of audible warning devices and of motor vehicles with
regard to their audible signals**

Incorporating all valid text up to:

Supplement 3 to the original version of the Regulation — Date of entry into force: 28 December 2000

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II. Arrangement of the approval mark of a vehicle with regard to its audible signals

1. SCOPE

This Regulation applies to:

1.1. audible warning devices (AWD) ⁽¹⁾, supplied with direct or alternating current or compressed air, which are intended for fitting to motor vehicles of categories L3 to 5, M and N, excluding mopeds (categories L1 and L2) ⁽²⁾

1.2. the audible signals ⁽³⁾ of motor vehicles, with the exception of motor cycles.

I. AUDIBLE WARNING DEVICES

2. DEFINITIONS

For the purposes of this Regulation, audible warning devices (AWD) of different 'types' shall be understood to mean devices essentially different from one another with respect to such matters as:

2.1. trade name or mark;

2.2. principles of operation;

2.3. type of electrical supply (direct or alternating current);

2.4. outer shape of case;

2.5. shape and dimensions of diaphragm(s);

2.6. shape or kind of sound outlet(s);

2.7. rated sound frequency or frequencies;

2.8. rated supply voltage;

2.9. for devices supplied directly from an external compressed air source, rated operating pressure.

2.10. The AWD is principally intended for:

2.10.1. motor cycles of a power less than or equal to 7 kW (class I).

2.10.2. vehicles of categories M and N and motor cycles of a power greater than 7 kW (class II).

⁽¹⁾ An (AWD) consisting of several sound outlets activated by a single power unit shall be regarded as an AWD.

⁽²⁾ As defined in the Consolidated Resolution (R.E.3).

⁽³⁾ An AWD consisting of several units, each emitting a sound signal and operated simultaneously by the actuation of a single control shall be regarded as an audible warning system.

3. APPLICATION FOR APPROVAL

- 3.1. The application for approval of a type of audible warning device shall be submitted by the holder of the trade name or mark or by his duly accredited representative.
- 3.2. It shall be accompanied by the following documents, in triplicate, giving the following particulars:
- 3.2.1. a description of the type of audible warning device, paying particular attention to the points mentioned in paragraph 2;
- 3.2.2. a drawing showing, inter alia, the warning device in cross section;
- 3.2.3. a list of the components used in manufacture, duly identified, with an indication of the materials used;
- 3.2.4. detailed drawings of all the components used in manufacture. The drawings shall show the place provided for the approval number in relation to the circle of the approval mark.
- 3.3. In addition, the application for approval shall be accompanied by two samples of the type of warning device.
- 3.4. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type approval is granted.

4. MARKINGS

- 4.1. The samples of the audible warning devices submitted for approval shall bear the manufacturer's trade name or mark; this mark must be clearly legible and indelible.
- 4.2. Each sample shall have a space of adequate dimensions for the approval mark; this space shall be indicated in the drawing referred to in paragraph 3.2.2.

5. APPROVAL

- 5.1. If the samples submitted for approval conform to the provisions of paragraphs 6 and 7 below, approval for this type of warning device 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 this number to another type of audible warning device.
- 5.3. The same approval number may be assigned to types of warning device differing only with respect to rated voltage, rated frequency or frequencies or, for the devices mentioned in paragraph 2.8 above, rated operating pressure.
- 5.4. Notice of approval or refusal or extension or withdrawal of approval or production definitely discontinued of a type of warning device pursuant to this Regulation shall be communicated to the Parties to the Agreement applying this Regulation by means of a form conforming to the model in annex 1 to the Regulation, and of drawings of the audible warning device (supplied by the applicant for approval) with maximum format A4 (210 × 297 mm) or folded to this format and on the scale 1:1.

- 5.5. On every audible warning device which conforms to a type approved under this Regulation, there shall be affixed conspicuously, in an easily accessible place indicated on the approval form, an international approval mark comprising:
- 5.5.1. a circle containing the letter 'E' followed by the distinguishing number of the country granting approval ⁽¹⁾;
- 5.5.2. an approval number.
- 5.5.3. an additional symbol in the form of a figure in Roman numerals, showing the class to which the AWD belongs.
- 5.6. The approval mark and the additional symbol must be clearly legible and indelible.
- 5.7. Annex 3, Section 1, to this Regulation gives an example of the arrangement of the approval mark.
6. SPECIFICATIONS
- 6.1. General specifications
- 6.1.1. The audible warning device shall emit a continuous and uniform sound; its acoustic spectrum shall not vary substantially during its operation.
- For warning devices supplied with alternating current, this requirement shall apply only at constant generator speed, within the range specified in paragraph 6.2.3.2.
- 6.1.2. The warning device shall have acoustic characteristics (spectral distribution of the acoustic energy, sound pressure level) and mechanical characteristics such that it passes, in the order indicated, the following tests.
- 6.2. Measurement of the sound characteristics
- 6.2.1. The warning device should, preferably, be tested in an anechoic environment.

Alternatively, it may be tested in a semi-anechoic chamber or in an open space ⁽²⁾. In this case, precautions shall be taken to avoid reflections from the ground within the measuring area (for instance by erecting a set of absorbing screens). Compliance with the spherical divergence to a limit of 1 dB within a hemisphere of not less than 5 m radius, up to the maximum frequency to be measured, especially in the measuring direction and at the height of the apparatus and the microphone, shall be checked.

The ambient noise level shall be at least 10 dB lower than the sound pressure level to be measured.

The device to be tested and the microphone shall be placed at the same height. This height shall be between 1,15 and 1,25 m. The axis of maximum sensitivity of the microphone shall coincide with the direction of the maximum sound level of the device.

The microphone shall be so placed that its diaphragm is at a distance of $2 \pm 0,01$ m from the plane of the sound outlet of the device. In the case of devices with several outlets, the distance shall be determined in relation to the plane of the nearest outlet to the microphone.

⁽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, 46 for Ukraine and 47 for South Africa. 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.

⁽²⁾ The site may take the form, for instance, of an open space of 50 metres radius, the central part of which must be practically horizontal over a radius of at least 20 metres, the surface being of concrete, asphalt or a similar material, which must not be covered with powdery snow, tall weeds, or loose soil or cinders. The measurements shall be made on a clear day. No-one other than the observer reading the instrument shall remain near the audible warning device or the microphone, since the presence of spectators may affect the readings of the instrument to a considerable extent, if they are near the audible warning device or the microphone. Any peak which appears to be unrelated to the general sound level shall be disregarded in the reading.

- 6.2.2. The measurements of the sound pressure levels shall be made with a class 1 precision sound level metre conforming to the specifications of IEC Publication No 651, first edition (1979). All measurements shall be made using the time constant 'F'. The measurement of the over-all sound pressure level shall be made using the weighting curve A. The spectrum of the sound emitted shall be measured according to the Fourier transform of the acoustic signal. Alternatively, one-third octave filters conforming to the specifications of IEC Publication No 225, first edition (1966) may be used:

in this case, the sound pressure level in the mid-band frequency 2 500 Hz shall be determined by adding the quadratic means of the sound pressures in the one-third mid-band frequencies 2 000, 2 500 and 3 150 Hz.

In every case, only the Fourier transform method shall be regarded as a reference method.

- 6.2.3. The AWD shall be supplied with current, as appropriate, at one of the test voltages:
- 6.2.3.1. in the case of AWDs supplied with direct current, at a voltage measured at the terminal of the electric power source of $\frac{13}{12}$ of the rated voltage.
- 6.2.3.2. in the case of AWDs supplied with alternating current, the current shall be supplied by an electric generator of the type normally used with this type of AWD. The acoustic characteristics of the AWD shall be recorded for electric generator speeds corresponding to 50 %, 75 % and 100 % of the maximum speed indicated by the manufacturer of the generator for continuous operation. During this test, no other electrical load shall be imposed on the electric generator. The endurance test described in paragraph 6.3 shall be carried out at a speed indicated by the manufacturer of the equipment and selected from the above range.
- 6.2.4. If a rectified current source is used for the test of an AWD supplied with direct current, the alternating component of the voltage measured at its terminals, when the warning devices are in operation, shall not be more than 0,1 volt, peak to peak.
- 6.2.5. For AWDs supplied with direct current, the resistance of the connecting leads, expressed in ohms, including terminals and contacts, shall be as close as possible to $(0,10/12) \times$ rated voltage in volts.
- 6.2.6. The warning device shall be mounted rigidly, by means of the equipment indicated by the manufacturer, on a support whose mass is at least ten times that of the warning device under test and not less than 30 kg. In addition, arrangements must be made to ensure that reflexions on the sides of the support and its own vibrations have no appreciable effect on the measuring results.
- 6.2.7. Under the conditions set forth above, the sound-pressure weighted in accordance with curve A shall not exceed the following values:
- (a) 115 dB(A) for AWDs intended principally for motor cycles with a power less than or equal to 7 kW;
- (b) 118 dB(A) for AWDs intended principally for vehicles of categories M and N, and motor cycles with a power greater than 7 kW.
- 6.2.7.1. In addition, the sound-pressure level in the frequency band 1 800 to 3 550 Hz shall be greater than that of any component of a frequency above 3 550 Hz and in any event equal to or greater than:
- (a) 95 dB(A) for AWDs intended principally for motor cycles with a power less than or equal to 7 kW;
- (b) 105 dB(A) for AWDs intended principally for vehicles of categories M and N, and motor cycles with a power greater than 7 kW.
- 6.2.7.2. AWDs meeting the sound characteristics mentioned in (b) may be used on the vehicles mentioned in (a).

- 6.2.8. The specifications indicated above shall also be met by a device subjected to the endurance test referred to in paragraph 6.3 below, with the supply voltage varying between 115 % and 95 % of its rated voltage for AWDs supplied with direct current or, for AWDs supplied with alternating current, between 50 % and 100 % of the maximum speed of the generator indicated by the manufacturer for continuous operations.
- 6.2.9. The time lapse between the moment when the device is actuated and the moment when the sound reaches the minimum value prescribed in paragraph 6.2.7 above shall not exceed 0,2 second measured at an ambient temperature of 20 ± 5 °C. This provision is applicable, *inter alia*, to pneumatic or electro-pneumatic warning devices.
- 6.2.10. Pneumatic or electro-pneumatic warning devices shall, when operating under the power supply conditions established for the devices by the manufacturers, satisfy the same acoustic requirements as are prescribed for electrically operated audible warning devices.
- 6.2.11. In the case of multiple-tone devices in which each sound-emitting unit is capable of functioning independently, the minimum values specified above shall be obtained when each of the constituent units is operated separately. The maximum value of the over-all sound level shall not be exceeded when all the constituent units are operated simultaneously.
- 6.3. Endurance test
- 6.3.1. The AWD shall be supplied with current at the rated voltage and with the connecting lead resistances specified in paragraphs 6.2.3 to 6.2.5 above, and operated respectively:
- 10 000 times for AWDs intended principally for motor cycles with power less than or equal to 7 kW
- 50 000 times for AWDs intended principally for vehicles of categories M and N and motor cycles with a power greater than 7 kW, each time for one second followed by an interval of four seconds. During the test, the AWD shall be ventilated by an air current having a speed of approximately 10 m/sec.
- 6.3.2. If the test is made in an anechoic chamber, the chamber shall be large enough to ensure normal dispersal of the heat released by the warning device during the test.
- 6.3.3. The ambient temperature in the testing room shall be between + 15 and + 30 °C.
- 6.3.4. If, after the AWD has been operated for half the number of times prescribed, the sound-level characteristics are no longer the same as before the test, the AWD may be adjusted. After being operated the prescribed number times, and after further adjustment if necessary, the AWD must pass the test described in paragraph 6.2 above.
- 6.3.5. For warning devices of the electro-pneumatic type, the device may be lubricated with the oil recommended by the manufacturer after every 10 000 times of operation.
7. MODIFICATION OF THE TYPE OF AUDIBLE WARNING DEVICE AND EXTENSION APPROVAL
- 7.1. Any modification of the type of audible warning device shall be notified to the administrative department which granted approval to the type of audible warning device. This department may then:
- 7.1.1. either take the view that the modifications made are not likely to have any appreciable adverse effect;
- 7.1.2. or call for a new report from the technical service responsible for the tests.

- 7.2. Notice of confirmation of the approval, with particulars of the modifications, or of refusal of approval shall be communicated to the Parties to the Agreement applying this Regulation, in accordance with the procedure indicated in paragraph 5.4 above.
- 7.3. 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:
- 8.1. AWD approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraph 6 above.
- 8.2. 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.
- 8.3. The holder of the approval shall in particular:
- 8.3.1. ensure existence of procedures for the effective control of the quality of products,
- 8.3.2. have access to the control equipment necessary for checking the conformity to each approved type,
- 8.3.3. ensure that data of test results are recorded and that annexed documents shall remain available for a period to be determined in accordance with the administrative service,
- 8.3.4. analyse the results of each type of test, in order to verify and ensure the stability of the product characteristics making allowance for variation of an industrial production,
- 8.3.5. ensure that for every type of AWD sufficient checks are carried out so as to ensure that all AWDs in production comply with the specifications given for the AWD submitted for the type approval,
- 8.3.6. ensure that any sampling of samples or test pieces giving evidence of non-conformity with the type of test considered shall give rise to another sampling and another test. All the necessary steps shall be taken to re-establish the conformity of the corresponding production.
- 8.4. The competent authority which has granted type-approval may at any time verify the conformity control methods applicable to each production unit.
- 8.4.1. In every inspection, the test books and production survey records shall be presented to the visiting inspector.
- 8.4.2. The inspector may take samples at random which will be tested in the manufacturer's laboratory. The minimum number of samples may be determined according to the results of the manufacturer's own verification.
- 8.4.3. When the quality level appears unsatisfactory or when it seems necessary to verify the validity of the tests carried out in application of paragraph 8.4.2., the inspector shall select samples to be sent to the technical service which has conducted the type approval tests.
- 8.4.4. The competent authority may carry out any test prescribed in this Regulation.
- 8.4.5. The normal frequency of inspections authorised by the competent authority shall be one per year. In the case where negative results are recorded during one of these visits, the competent authority shall ensure that all necessary steps are taken to re-establish the conformity of production as rapidly as possible.

9. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

9.1. The approval granted to a type of audible warning device pursuant to this Regulation may be withdrawn if the conditions set forth in paragraph 8.1 are not complied with or if the audible warning device fails to pass the checks referred to in paragraph 8.2 above.

9.2. Should a Party to the Agreement applying this Regulation withdraw an approval which it has previously granted, it shall forthwith 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 statement, signed and dated: 'APPROVAL WITHDRAWN'.

10. PRODUCTION DISCONTINUED

If the holder of an approval granted pursuant to this Regulation discontinues the production of the type of audible warning device approved, he shall inform the authority which granted the approval. Upon receipt of the communication, this authority shall inform 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 statement, signed and dated: 'PRODUCTION DISCONTINUED'.

II. AUDIBLE SIGNALS OF MOTOR VEHICLES

11. DEFINITIONS

For the purpose of this Regulation,

11.1. 'Approval of the motor vehicle' shall be understood to mean approval of vehicle type with regard to its audible signal;

11.2. 'Vehicle type' shall be understood to mean vehicles not essentially different from another with respect to such matters as:

11.2.1. the number and type(s) of warning devices fitted on the vehicle;

11.2.2. the mountings used to fit the warning devices to the vehicle;

11.2.3. the position of the warning devices on the vehicle;

11.2.4. the rigidity of the parts of the structure on which the warning device(s) is (are) mounted;

11.2.5. the shape and materials of the bodywork at the front of the vehicle which might affect the level of the sound emitted by the warning device(s) and have a masking effect.

12. APPLICATION FOR APPROVAL

12.1. The application for approval of a vehicle type with regard to its audible signals shall be submitted by the vehicle manufacturer or by his duly accredited representative;

12.2. It shall be accompanied by the following documents in triplicate giving the following particulars:

12.2.1. a description of the vehicle type with regard to the items mentioned in paragraph 11.2 above;

12.2.2. a list of the components required to identify the warning device(s) that may be mounted on the vehicle;

12.2.3. Drawings indicating the position on the vehicle of the warning device(s) and of its (their) mountings.

12.3. A vehicle representative of the vehicle type to be approved shall be submitted to the technical service responsible for the approval tests.

13. APPROVAL
- 13.1. If the vehicle type submitted for approval pursuant to this Regulation meets the requirements of paragraphs 14 and 15 below, approval for this vehicle type shall be granted.
- 13.2. 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 this number to another vehicle type.
- 13.3. Notice of approval or of refusal of approval or extension or withdrawal or production definitely discontinued of a vehicle type pursuant to this Regulation shall be communicated to the Parties to the Agreement applying this Regulation by means of a form conforming to the model in annex 2 to the Regulation, and of drawings (supplied by the applicant for approval) with maximum format A4 (210 × 297 mm), or folded to this format, and on an appropriate scale.
- 13.4. On every vehicle which conforms to a vehicle type approved under this Regulation there shall be affixed conspicuously, in an easily accessible place indicated on the approval form, an international approval mark comprising:
- 13.4.1. a circle containing the letter 'E' followed by the distinguishing number of the country granting approval,
- 13.4.2. the number of this Regulation placed to the right of the circle referred to in paragraph 13.4.1.
- 13.5. If the vehicle conforms to a vehicle type approved, under another (other) Regulation(s) annexed to the Agreement, in the same country as that which has granted the approval under this Regulation, the symbol referred to in paragraph 13.4 need not be repeated; in this case, the additional numbers and symbols of all the Regulations under which approval has been granted in the country which granted the approval under this Regulation shall be set out in vertical columns to the right of the symbol referred to in paragraph 13.4.
- 13.6. The approval mark must be clearly legible and indelible.
- 13.7. The approval mark shall be placed near the plate bearing the characteristics of the vehicle and may also be affixed to this plate.
- 13.8. Annex 3, Section II, to this Regulation gives an example of the arrangement of the approval mark.
- 13.9. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type approval is granted.
14. SPECIFICATIONS
- The vehicle shall comply with the following specifications:
- 14.1. The audible warning device(s) (or system) fitted on the vehicle shall be of a type approved under this Regulation;
- Audible warning devices of Class II approved under this Regulation in its original form, and therefore not bearing the symbol II in their approval mark, may continue to be fitted to vehicle types submitted for approval pursuant to this Regulation.
- 14.2. The test voltage shall be as specified in paragraph 6.2.3 of the Regulation;
- 14.3. The sound pressure measurements shall be made in the conditions specified in paragraph 6.2.2 of this Regulation

- 14.4. The A-weighted sound pressure level emitted by the device fitted on the vehicle shall be measured at a distance of 7 m in front of the vehicle, the latter being placed on an open site, on ground as smooth as possible and, in the case of devices supplied with direct current, with its engine stopped.
- 14.5. The microphone of the measuring instrument shall be placed approximately in the mean longitudinal plane of the vehicle;
- 14.6. The sound pressure level of the background noise and wind noise must be at least 10 dB (A) below the sound to be measured;
- 14.7. The maximum sound-pressure level shall be sought within the range of 0,5 and 1,5 m above the ground;
- 14.8. Measured under the conditions specified in paragraphs 14.2 to 14.7, the maximum sound-pressure level (14.7.) of the audible signal tested shall be at least:
- (a) equal to 83 dB(A) and not more than 112 dB(A) for the signals of motor cycles of a power less than or equal to 7 kW;
 - (b) equal to 93 dB(A) and at most 112 dB(A) for the signals of vehicles of categories M and N and motor cycles of a power greater than 7 kW.
15. MODIFICATIONS OF VEHICLE TYPE AND EXTENSION OF APPROVAL
- 15.1. Any modification of the vehicle type shall be notified to the administrative department which granted approval to the vehicle type. This department may then:
- 15.1.1. either take the view that the modifications made are not likely to have any appreciable adverse effect and that in any case the vehicle still meets the requirements; or
 - 15.1.2. call for a new report from the technical service responsible for the tests.
- 15.2. Notice of confirmation of approval with particulars of the modifications, or of refusal of approval shall be communicated to the Parties to the Agreement applying this Regulation, in accordance with the procedure indicated in paragraph 13.3 above.
- 15.3. The competent authority issuing the extension of approval shall assign a series number to each communication form drawn up for such an extension.
16. 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:
- 16.1. A vehicle approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraph 14 above.
- 16.2. 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.
- 16.3. The order of the approval shall in particular:
- 16.3.1. ensure existence of procedures for effective control of the quality of the vehicles as regards all aspects relevant to compliance with the requirements set out in paragraph 14 above,

- 16.3.2. ensure that for every type of vehicle sufficient checks are carried out regarding the number and type of AWD, so as to ensure that all vehicles in production comply with the specifications given of vehicle submitted for type approval,
- 16.3.3. ensure that, if the checks carried out pursuant to paragraph 16.3.2 above give evidence of non-conformity of one or more vehicles with the requirements set out in paragraph 14 above, all necessary steps are taken to restore conformity of the corresponding production.
- 16.4. The competent authority which granted type-approval may at any time verify the conformity control methods applied for each production unit. The authority may also carry out any random checks on serially-manufactured vehicles in respect to the requirements set out in paragraph 14 above.
- 16.5. Where unsatisfactory results are found during verifications and checks pursuant to paragraph 16.4 above, the competent authority shall ensure that all necessary steps are taken to restore conformity of production as rapidly as possible.
17. PENALTIES FOR NON-CONFORMITY OF PRODUCTION
- 17.1. The approval granted to a vehicle type pursuant to this Regulation may be withdrawn if the conditions set forth in paragraph 16.1 above are not complied with, or if the vehicle fails to pass the checks referred to in paragraph 16.2 above.
- 17.2. Should a Party to the Agreement applying this Regulation withdraw an approval which it has previously granted, it shall forthwith 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 statement, signed and dated: 'APPROVAL WITHDRAWN'.
18. NAMES AND ADDRESSES OF THE TECHNICAL SERVICES CONDUCTING APPROVAL TESTS AND OF ADMINISTRATIVE DEPARTMENTS
- The Parties to the Agreement applying this Regulation shall communicate to the United Nations Secretariat the names and addresses of the technical services responsible for 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.
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ANNEX I

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by: Name of administration:

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

concerning the approval (or refusal or withdrawal of approval or production definitely discontinued or extension of approval) of a type of audible warning device for motor vehicles pursuant to Regulation No 28

Approval No Extension No

1. Trade name or mark
2. Type (electro-pneumatic, electro-magnetic with resonator disc, electromagnetic horn, etc., indicating whether it is a single-tone or multiple-tone warning device.)
3. Manufacturer's name and address
4. If applicable, name and address of manufacturer's representative
.....
5. Brief description of warning devices
6. Supply voltage(s) volts ⁽²⁾
7. Rated operating pressure(s) kg/cm² ⁽²⁾
8. Rated frequency (or frequencies) Hz ⁽²⁾
9. Geometrical characteristics (internal length and diameter) of connecting line between compressor or control and the audible warning device
10. Submitted for approval on
11. Technical service responsible for conducting approval tests
.....
12. Date of report issued by that service
13. Number of report issued by that service
14. Approval granted/refused ⁽²⁾
15. Place
16. Date
17. Signature
18. A list of documents contained in the approval file transmitted to the administrative service which has granted approval is annexed to this communication.

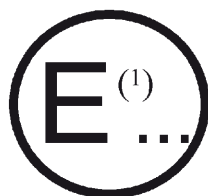
⁽¹⁾ Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulation).

⁽²⁾ Strike out whatever does not apply.

ANNEX 2

COMMUNICATION

(Maximum format: A 4 (210 × 297 mm))



issued by:

Name of administration

.....

.....

.....

concerning the approval (or refusal or withdrawal of approval or production definitely discontinued or extension of approval) of a vehicle type with regard to its audible signals pursuant to Regulation No 28

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. Type(s) of warning device(s) ⁽²⁾
6. Sound level values:
7. Submitted for approval on
8. Technical service responsible for approval tests
9. Date of report issued by that service
10. Number of report issued by that service
11. Approval granted/refused ⁽³⁾
12. Place
13. Date
14. Signature
15. A list of documents contained in the approval file transmitted to the administrative service which has granted approval is annexed to this communication.

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

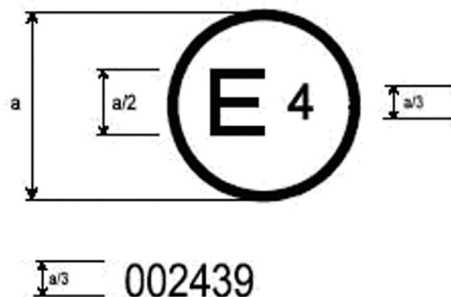
⁽²⁾ Indicate the approval numbers.

⁽³⁾ Strike out what does not apply.

ANNEX 3

I. ARRANGEMENT OF THE APPROVAL MARK OF THE AUDIBLE WARNING DEVICE

(see paragraph 5.5 of this Regulation)



a = 8 mm min.

The above approval mark affixed to an audible warning device shows that this AWD of Class I has been approved in the Netherlands (E 4) 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 28 in its original form.

Note The approval number must be placed close to the circle and must be in a position either above or below the letter 'E' or to left or right of that letter. The digits of the approval number must be on the same side of the letter 'E' and face in the same direction. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

II. ARRANGEMENT OF THE APPROVAL MARK OF A VEHICLE WITH REGARD TO ITS AUDIBLE SIGNALS

(see paragraph 13.4 of this Regulation)

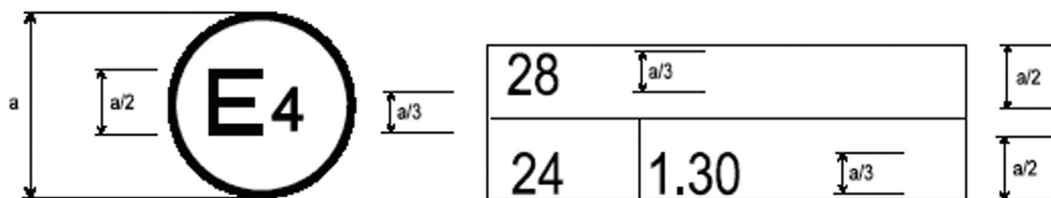
MODEL A



a = 8 mm min.

The above approval mark affixed to a vehicle indicates that, pursuant to Regulation No 28, this vehicle type has been approved in the Netherlands (E 4), with regard to its audible signals.

MODEL B



a = 8 mm min.

The above approval mark affixed to a vehicle indicates that, pursuant to Regulations No 28 and No 24, this vehicle type has been approved in the Netherlands (E 4), with regard to its audible signals and to emissions of pollutants by the Diesel engine. In the case of the latter Regulation, the corrected value of the absorption factor is 1,30 m⁻¹.

Only the original UN/ECE texts have legal effect under international public law. The status and date of entry into force of this Regulation should be checked in the latest version of the UN/ECE status document TRANS/WP.29/343, available at:
<http://www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29docstts.html>

**Regulation No 31 of the Economic Commission for Europe of the United Nations (UN/ECE) —
Uniform provisions concerning the approval of power-driven vehicle's sealed-beam headlamps (SB)
emitting a European asymmetrical passing beam or a driving beam or both**

Revision 2

Incorporating all valid text up to:

Supplement 7 to the 02 series of amendments — Date of entry into force: 15 October 2008

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ANNEXES

- Annex 1 — Communication concerning the approval or extension or refusal or withdrawal of approval or production definitely discontinued of a type of halogen sealed-beam headlamp unit (HSB unit) pursuant to Regulation No 31
- Annex 2 — Examples of arrangements of approval marks
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Annex 7 — Requirements for lamps incorporating lenses of plastic material — testing of lens or material samples and of complete lamps.

Annex 8 — Minimum requirements for sampling by an inspector

1. SCOPE ⁽¹⁾

This Regulation applies to headlamps for vehicles of categories M, N, and T ⁽²⁾.

2. DEFINITIONS

For the purpose of this Regulation,

2.1. 'Halogen sealed-beam headlamp unit' (hereinafter termed 'HSB unit') means a headlamp whose components, including a reflector of glass, metal or other material, an optical system and one or more halogen light sources, form an integral whole which is indivisibly joined and cannot be dismantled without rendering the unit completely unusable. Such units are:

2.1.1. of 'category 1', when they emit only a driving beam;

2.1.2. of 'category 21', when they emit only a passing beam;

2.1.3. of 'category 22', when they emit, at the user's choice, either a driving beam or a passing beam;

2.2. 'Lens' means the outermost component of the headlamp (unit) which transmits light through the illuminating surface;

2.3. 'Coating' means any product or products applied in one or more layers to the outer face of a lens;

2.4. 'HSB units of different types' means units which differ in such essential respects as:

2.4.1. the trade name or mark;

2.4.2. the characteristics of the optical system;

2.4.3. the inclusion or elimination of components capable of altering the optical effects by reflection, refraction, absorption and/or deformation during operation; the fitting or elimination of filters intended solely to change the colour of the beam but not its light distribution does not constitute a change of type;

2.4.4. the rated voltage;

2.4.5. the shape of the filament or filaments;

2.4.6. the kind of beam produced (passing beam, driving beam or both);

2.4.7. the materials constituting the lens and coating, if any.

2.5. 'Colour of the light emitted from the device'. The definitions of the colour of the light emitted given in Regulation No 48 and its series of amendments in force at the time of application for type approval shall apply to this Regulation.

⁽¹⁾ Nothing in this Regulation shall prevent a Party to the Agreement applying this Regulation from prohibiting the combination of an HSB unit incorporating a lens of plastic material approved under this Regulation with a mechanical headlamp-cleaning device (with wipers).

⁽²⁾ As defined in Annex 7 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), (document TRANS/WP.29/78/Rev.1/Amend.2 as last amended by Amend.4).

3. APPLICATION FOR APPROVAL
- 3.1. The application for approval shall be submitted by the owner of the trade name or mark or by his duly accredited representative. It shall specify:
 - 3.1.1. whether the HSB unit is intended to provide both a passing beam and a driving beam or only one of these beams;
 - 3.1.2. where the HSB unit is intended to provide a passing beam, whether it is designed for both right-hand and left-hand traffic or for right-hand or left-hand traffic only.
- 3.2. Every application for approval shall be accompanied by:
 - 3.2.1. drawings in triplicate, sufficiently detailed to permit identification of the type and giving a front view of the HSB unit (with, if applicable, details of the lens moulding) and a cross-section; also the filament(s) and shield(s) shall be shown on the drawings at a scale of 2:1 both in front view and in side view; the drawing must show the position intended for the approval number and the additional symbols in relation to the circle of the approval mark;
 - 3.2.2. a brief technical description;
 - 3.2.3. samples as follows:
 - 3.2.3.1. for approval of an HSB unit emitting uncoloured light: five samples,
 - 3.2.3.2. for approval of an HSB unit emitting coloured light: two coloured-light samples and five uncoloured-light samples of the same type, differing from the type submitted, only in that the lens or filter is not coloured,
 - 3.2.3.3. in the case of HSB units which emit coloured light, which differ from uncoloured-light units only in the colour of light emitted and which have already satisfied the requirements of paragraphs 6, 7 and 8 below, it will be sufficient to submit only one sample of a coloured-light unit to undergo the tests described in paragraph 9 below.
 - 3.2.4. For the test of plastic material of which the lenses are made:
 - 3.2.4.1. thirteen lenses.
 - 3.2.4.1.1. Six of these lenses may be replaced by six samples of material at least 60 × 80 mm in size, having a flat or convex outer surface and a substantially flat area (radius of curvature not less than 300 mm) in the middle measuring at least 15 × 15 mm.
 - 3.2.4.1.2. Every such lens or sample of material shall be produced by the method to be used in mass production,
 - 3.2.4.2. a reflector to which the lenses can be fitted in accordance with the manufacturer's instructions.
- 3.3. The characteristics of the materials making up the lenses and coatings, if any, should be accompanied by the test report on these materials and coatings if they have already been tested.
- 3.4. The Competent Authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type approval is granted.

4. MARKINGS ⁽¹⁾
 - 4.1. HSB units submitted for approval shall bear the trade name or mark of the applicant.
 - 4.2. They shall comprise, on the lens, a space of sufficient size to accommodate the approval mark and the additional symbols provided for in paragraph 5 below; the space shall be shown in the drawings referred to in paragraph 3.2.1 above.
 - 4.3. They shall bear, either on the lens or on the body, the rated voltage and rated wattage of the driving-beam filament, followed by the rated wattage of the passing-beam filament, where applicable.
5. APPROVAL
 - 5.1. General
 - 5.1.1. If all the HSB unit type samples submitted in pursuance of paragraph 3 above meet the requirements of this Regulation, approval shall be granted.
 - 5.1.2. Where grouped, combined or reciprocally incorporated lamps satisfy the requirements of more than one Regulation, a single international approval mark may be affixed provided that each of the grouped, combined or reciprocally incorporated lamps satisfies the provisions applicable to it.
 - 5.1.3. An approval number shall be assigned to each type approved. Its first two digits (at present 02) 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 HSB unit covered by this Regulation except in the case of an extension of the approval to a device differing only in the colour of the light emitted.
 - 5.1.4. Notice of approval or of extension or refusal or withdrawal of approval or production definitely discontinued of a type of optical unit pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement applying this Regulation, by means of a form conforming to the model in annex 1 to this Regulation.
 - 5.1.5. In addition to the mark prescribed in paragraph 4.1, an approval mark as described in paragraphs 5.2 and 5.3 below shall be affixed in the spaces referred to in paragraph 4.2 above to every headlamp conforming to a type of HSB unit approved under this Regulation.
 - 5.2. Composition of the approval mark

The approval mark shall consist of:

 - 5.2.1. an international approval marking, comprising
 - 5.2.1.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval ⁽²⁾;

⁽¹⁾ In the case of units designed to meet the requirements of traffic moving on one side of the road only (either right or left), it is further recommended that the area which can be occulted to prevent discomfort to users in a country where traffic moves on the side of the road opposite to that for which the unit was designed should be outlined indelibly on the lens. This marking is not necessary, however, where the area is clearly apparent from the design.

⁽²⁾ 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 Serbia, 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 (vacant), 36 for Lithuania, 37 for Turkey, 38 (vacant), 39 for Azerbaijan, 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, 46 for Ukraine, 47 for South Africa, 48 for New Zealand, 49 for Cyprus, 50 for Malta, 51 for the Republic of Korea, 52 for Malaysia, 53 for Thailand, 54 and 55 (vacant), 56 for Montenegro, 57 (vacant) and 58 for Tunisia. 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.

- 5.2.1.2. the approval number prescribed in paragraph 5.1.3 above;
- 5.2.2. the following additional symbol (or symbols):
 - 5.2.2.1. on HSB optical units meeting left-hand traffic requirements only, a horizontal arrow, pointing to the right of an observer, facing the HSB optical unit, i.e., to the side of the road on which the traffic moves;
 - 5.2.2.2. on HSB optical units meeting the requirements of this Regulation in respect of the passing beam only, the letters 'HSC';
 - 5.2.2.3. on HSB optical units meeting the requirements of this Regulation in respect of the driving beam only, the letters 'HSR';
 - 5.2.2.4. on HSB optical units meeting the requirements of this Regulation in respect of both the passing beam and the driving beam, the letters 'HSCR';
 - 5.2.2.5. on HSB optical units meeting the requirements of this Regulation in respect of the driving beam, an indication of the maximum luminous intensity expressed by a reference mark, as defined in paragraph 8.3.2.1.2 below, placed near the circle surrounding the letter 'E';
 - 5.2.2.6. on HSB units incorporating a lens of plastic material, the group of letters 'PL' near the symbols prescribed in paragraphs 5.2.2.3 to 5.2.2.5 above;
 - 5.2.2.7. the two digits of the approval number (at present 02) which indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval and, if necessary, the required arrow may be marked close to the above additional symbols.
 - 5.2.2.8. In every case the relevant operating mode used during the test procedure according to paragraph 1.1.1.1 of annex 6 and the allowed voltage(s) according to paragraph 1.1.1.2 of annex 6 shall be stipulated on the approval forms and on the communication forms transmitted to the countries which are Contracting Parties to the Agreement and which apply this Regulation.

In the corresponding cases the device shall be marked as follows:

On units meeting the requirements of this Regulation which are so designed that the filament of the passing beam shall not be lit simultaneously with that of any other lighting function with which it may be reciprocally incorporated:

an oblique stroke (/) shall be placed behind the passing lamp symbol in the approval mark.

- 5.2.2.9. The marks and symbols referred to in paragraphs 5.2.1 and 5.2.2 above shall be clearly legible and be indelible even when the optical unit is fitted in the vehicle.
- 5.3. Arrangement of the approval mark
 - 5.3.1. Independent lamps

Annex 2, figures 1 to 7, to this Regulation gives examples of arrangements of the approval mark with the above-mentioned additional symbols.
 - 5.3.2. Grouped, combined or reciprocally incorporated lamps
 - 5.3.2.1. Where grouped, combined or reciprocally incorporated lamps have been found to comply with the requirements of several Regulations, a single international approval mark may be affixed, consisting of a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted the approval, and an approval number. This approval mark may be located anywhere on the grouped, combined or reciprocally incorporated lamps, provided that:

- 5.3.2.1.1. it is visible after their installation;
- 5.3.2.1.2. no part of the grouped, combined or reciprocally incorporated lamps that transmits light can be removed without at the same time removing the approval mark.
- 5.3.2.2. The identification symbol for each lamp appropriate to each Regulation under which approval has been granted, together with the corresponding series of amendments incorporating the most recent major technical amendments to the Regulation at the time of issue of the approval and, if necessary, the required arrow shall be marked:
- 5.3.2.2.1. either on the appropriate light-emitting surface,
- 5.3.2.2.2. or in a group, in such a way that each of the grouped, combined or reciprocally incorporated lamps may be clearly identified (see four possible examples in annex 2).
- 5.3.2.3. The size of the components of a single approval mark shall not be less than the minimum size required for the smallest of the individual marks by the Regulation under which approval has been granted.
- 5.3.2.4. An approval number shall be assigned to each type approved. The same Contracting Party may not assign the same number to another type of grouped, combined or reciprocally incorporated lamps covered by this Regulation.
- 5.3.2.5. Annex 2, figure 8, to this Regulation gives examples of arrangements of approval marks for grouped, combined or reciprocally incorporated lamps with all the above-mentioned additional symbols.
- 5.3.3. Lamps, the lens of which is used for different types of lamps and which may be reciprocally incorporated or grouped with other lamps
- The provisions laid down in paragraph 5.3.2 above are applicable.
- 5.3.3.1. In addition, where the same lens is used, the latter may bear the different approval marks relating to the different types of headlamps or units of lamps, provided that the main body of the HSB unit, even if it cannot be separated from the lens, also comprises the space described in paragraph 4.2 above and bears the approval mark of the actual functions.
- If different types of HSB units comprise the same main body, the latter may bear the different approval marks.
- 5.3.3.2. Annex 2, figure 9, to this Regulation gives examples of arrangements of approval marks relating to the above case

6. GENERAL SPECIFICATIONS

- 6.1. Every sample shall conform to the specifications set forth in this paragraph and in paragraphs 7 and 8 below and, if necessary, to those set forth in paragraph 9.
- 6.2. HSB units shall be so designed and made that in normal use, despite the vibrations to which they may then be subjected, their satisfactory operation continues to be ensured and they retain the characteristics prescribed by this Regulation.
- 6.2.1. HSB optical units shall be fitted with a device enabling them to be so adjusted on the vehicle as to comply with the rules applicable to them. Such a device need not be fitted on HSB optical unit insert if the use of such inserts is confined to vehicles on which the headlamp setting can be adjusted by other means.

Where an HSB optical unit providing a driving beam and an HSB optical unit providing a passing beam are assembled as exchangeable subunits to form a composite unit, the adjusting device shall enable each HSB unit individually to be duly adjusted.

- 6.2.2. However, this will not apply to headlamp assemblies whose reflectors are indivisible. For this type of assembly the requirements of paragraph 8.3 of this Regulation shall apply. In the case where more than one light source is used to provide the main beam, the combined main-beam functions will be used to determine the maximum value of the illumination (E_M).
- 6.3. The terminals shall be in electrical contact with the appropriate filament or filaments only and shall be robust and firmly fixed to the HSB unit.
- 6.4. HSB units shall comprise electrical connections in conformity with those shown in one of the patterns reproduced in annex 3 to this Regulation and shall be of the dimensions specified in that annex.
- 6.5. Complementary tests shall be done according to the requirements of annex 6 to ensure that in use there is no excessive change in photometric performance.
- 6.6. If the lens of the HSB unit is of plastic material, tests shall be done according to the requirements of annex 7.
7. RATED AND TEST VALUES
- 7.1. The rated voltage is 12 volts ⁽¹⁾.
- 7.2. The wattage shall not exceed 75 watts on the driving beam filament and 68 watts on the passing beam filament measured at a test voltage of 13,2 volts.
8. ILLUMINATION ⁽²⁾
- 8.1. General specifications
- 8.1.1. HSB units shall be made so as to give adequate illumination without dazzle when emitting the passing beam and good illumination when emitting the driving beam.
- 8.1.2. The illumination produced by the HSB unit shall be determined by means of a vertical screen set up 25 m forward of the unit as shown in annex 4 to this Regulation ⁽³⁾.
- 8.1.3. On this screen, the illumination referred to in paragraphs 8.2.5, 8.2.6 and 8.3 below shall be measured by means of a photoreceptor, the effective area of which shall be contained within a square of 65 mm side.
- 8.2. Requirements concerning the passing beam
- 8.2.1. The passing beam shall produce a 'cut-off' sharp enough to serve as a satisfactory means of adjustment. The 'cut-off' shall be a horizontal straight line on the side opposite to the direction of the traffic for which the unit is intended. On the other side it shall not extend beyond either the broken line HV H₁ H₄ formed by a straight line HV H₁ making a 45° angle with the horizontal and a straight line H₁ H₄, 25 cm above the straight line hh, or the straight line HV H₃, inclined at an angle of 15° above the horizontal (see annex 4 to this Regulation). A 'cut-off' extending beyond both line HV H₂ and line H₂ H₄ and resulting from a combination of the above two possibilities shall in no circumstances be permitted.
- 8.2.2. The HSB unit shall be so aimed that on the passing beam:

⁽¹⁾ Requirements for HSB units with a rated voltage of 24 volts are under consideration.

⁽²⁾ All photometric measurements shall be made at the rated voltage specified in paragraph 7.1.

⁽³⁾ If, in the case of an HSB unit designed to meet the requirements of this Regulation in respect of the passing beam only, the focal axis diverges appreciably from the general direction of the beam, lateral adjustment shall be effected in the manner which best satisfies the requirements for illumination at points 75 R and 50 R for right-hand traffic and 75 L and 50 L for left-hand traffic.

- 8.2.2.1. in the case of HSB units designed to meet the requirements of right-hand traffic, the 'cut-off' on the left half of the screen ⁽¹⁾ is horizontal and, in the case of HSB units designed to meet the requirements of left-hand traffic, the 'cut-off' on the right half of the screen is horizontal;
- 8.2.2.2. this horizontal part of the 'cut-off' is situated on the screen 25 cm below the level hh (see annex 4 to this Regulation);
- 8.2.2.3. The 'elbow' of the 'cut-off' is on line vv ⁽²⁾.
- 8.2.3. When so adjusted, the HSB unit need meet only the requirements laid down in paragraphs 8.2.5 and 8.2.6 below if approval thereof is sought solely for provision of a passing beam ⁽³⁾; if it is intended to provide both a passing beam and a driving beam it shall meet the requirements laid down in paragraphs 8.2.5, 8.2.6 and 8.3.
- 8.2.4. Where an HSB unit so adjusted does not meet the requirements laid down in paragraphs 8.2.5, 8.2.6 and 8.3, its alignment may be changed provided that the axis of the beam is not displaced laterally by more than 1° (= 44 cm) to the right or left ⁽⁴⁾. To facilitate alignment by means of the 'cut-off', the unit may be partially occulted in order to sharpen the 'cut-off'.
- 8.2.5. The illumination produced on the screen by the passing beam shall meet the following requirements:

POINT ON MEASURING SCREEN		REQUIRED ILLUMINATION IN LUX
HSB UNITS FOR RIGHT-HAND TRAFFIC	HSB UNITS FOR LEFT-HAND TRAFFIC	
B 50 L	B 50 L	≤ 0,4
75 L	75 L	≥ 12
75 L	75 R	≤ 12
50 L	50 R	≥ 12
50 R	50 L	≤ 15
50 V	20 V	≥ 6
25 L	25 R	≥ 2
25 R	25 L	≥ 2
		≤ 0,7
		≥ 3
Any point in zone III Any point in zone IV Any point in zone I		≤ 2 × (E _{50 R} or E _{50 L}) (*)

(*) E_{50R} and E_{50L} are the illuminations actually measured.

⁽¹⁾ The test screen shall be wide enough to allow examination of the 'cut-off' over a range of at least 5° on either side of the line vv.

⁽²⁾ If the beam does not have a 'cut-off' with a clear 'elbow', lateral adjustment shall be affected in the manner which best satisfies the requirements for illumination at points 75 R and 50 R for right-hand traffic and 75 L and 50 L for left-hand traffic.

⁽³⁾ An HSB unit designed to emit a passing beam may incorporate a driving beam not subject to this specification.

⁽⁴⁾ The limit of realignment of 1° to the right or left is not incompatible with vertical realignment upward or downward. The latter is limited only by the requirements of paragraph 8.3. However, the horizontal part of the 'cut-off' should not extend beyond the line hh (the provisions of paragraph 8.3 are not applicable to HSB units intended to meet the requirements of this Regulation only for provision of a passing beam).

8.2.6. There shall be no lateral variations detrimental to good visibility in any of the Zones I, II, III and IV.

8.3. Requirements concerning the driving beam

8.3.1. In the case of an HSB unit designed to provide a driving beam and a passing beam, measurements of the illumination produced on the screen by the driving beam shall be taken with the same HSB unit alignment as for measurements under paragraphs 8.2.5 and 8.2.6; if the HSB unit provides a driving beam only, it shall be so adjusted that the area of maximum illumination is centred on the point of intersection HV of lines hh and vv; such an HSB unit need meet only the requirements laid down in paragraph 8.3.

8.3.2. The illumination produced on the screen by the driving beam shall meet the following requirements:

8.3.2.1. The point of intersection HV of lines hh and vv shall be situated within the isolux 80 % of maximum illumination. This maximum value (E_M) shall not be less than 48 lux. The maximum value (E_M) shall not exceed 240 lux; in addition, in the case of a combined passing and driving HSB unit, it shall in no case exceed 16 times the illumination measured for the passing beam at point 75 R (or 75 L).

8.3.2.1.1. The maximum intensity (I_M) of the driving beam expressed in thousands of candelas shall be calculated by the formula:

$$I_M = 0,625 E_M$$

8.3.2.1.2. The reference mark (I'_M) of this maximum intensity, referred to in paragraph 5.2.2.5, shall be obtained by the ratio: $I'_M = I_M/3 = 0,208 E_M$

This value shall be rounded off to the nearest value 7,5-10-12,5-17,5-20-25-27,5-30-37,5-40-45-50.

8.3.2.2. Starting from point HV, horizontally to the right and left, the illumination shall be not less than 24 lux up to a distance of 1,125 m and not less than 6 lux up to a distance of 2,25 m.

9. COLOUR

9.1. HSB units shall emit white light.

10. GAUGING OF DISCOMFORT

The discomfort caused by the passing beam of HSB units shall be gauged ⁽¹⁾.

11. CONFORMITY OF PRODUCTION

11.1. Headlamps approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 8 and 9.

11.2. In order to verify that the requirements of paragraph 11.1 are met, suitable controls of the production shall be carried out.

11.3. The holder of the approval shall in particular:

11.3.1. ensure the existence of procedures for the effective control of the quality of products;

11.3.2. have access to the control equipment necessary for checking the conformity to each approved type;

⁽¹⁾ This requirement will be subject to a recommendation to administrations.

- 11.3.3. ensure that data of test results are recorded and that related documents shall remain available for a period to be determined in accordance with the administrative service;
- 11.3.4. analyze the results of each type of test in order to verify and ensure the stability of the product characteristics, making allowance for variation of an industrial production;
- 11.3.5. ensure that for each type of product at least the tests prescribed in annex 5 to this Regulation are carried out;
- 11.3.6. ensure that any collecting of samples giving evidence of non-conformity with the type of test considered shall give rise to another sampling and another test. All the necessary steps shall be taken to re-establish the conformity of the corresponding production.
- 11.4. The Competent Authority which has granted type approval may at anytime verify the conformity control methods applicable to each production unit.
 - 11.4.1. In every inspection, the test books and production survey records shall be presented to the visiting inspector.
 - 11.4.2. The inspector may take samples at random to be tested in the manufacturer's laboratory. The minimum number of samples may be determined in the light of the results of the manufacturer's own checks.
 - 11.4.3. When the quality level appears unsatisfactory or when it seems necessary to verify the validity of the tests carried out in the application of paragraph 11.4.2 above, the inspector shall select samples, to be sent to the technical service which has conducted the type approval tests, using the criteria of annex 8.
 - 11.4.4. The Competent Authority may carry out any test prescribed in this Regulation. These tests will be on samples selected at random without causing distortion of the manufacturer's delivery commitments and in accordance with the criteria of annex 8.
 - 11.4.5. The Competent Authority shall strive to obtain a frequency of inspection of once every two years. However, this is at the discretion of the Competent Authority and their confidence in the arrangements for ensuring effective control of the conformity of production. In the case where negative results are recorded, the Competent Authority shall ensure that all necessary steps are taken to re-establish the conformity of production as rapidly as possible.
- 11.5. Headlamps with apparent defects are disregarded.
- 11.6. The reference mark is disregarded.
- 12. PENALTIES FOR NON-CONFORMITY OF PRODUCTION
 - 12.1. The approval granted in respect of a type of HSB unit pursuant to this Regulation may be withdrawn if the requirements set forth above are not met, or if an HSB unit bearing the approval mark does not conform to the type approved.
 - 12.2. 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 applying this Regulation, by means of a communication form conforming to the model in annex 1 to this Regulation.
- 13. MODIFICATION AND EXTENSION OF APPROVAL OF A TYPE OF HALOGEN SEALED-BEAM HEADLAMP UNIT (HSB UNIT)
 - 13.1. Every modification of the type of HSB unit shall be notified to the administrative department which approved the type of HSB unit. The department may then either:

- 13.1.1. Consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the HSB unit still complies with the requirements; or
 - 13.1.2. Require a further test report from the technical service responsible for conducting the tests.
 - 13.2. Confirmation or refusal of approval, specifying the alterations shall be communicated by the procedure specified in paragraph 5.1.4 above to the Parties to the Agreement applying this Regulation.
 - 13.3. The Competent Authority issuing the extension of approval shall assign a series number for such an extension and inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in annex 1 to this Regulation.
 14. PRODUCTION DEFINITELY DISCONTINUED

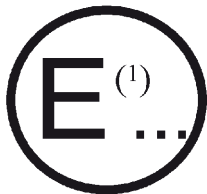
If the holder of an approval completely ceases to manufacture a type of HSB unit approved in accordance with this Regulation, he shall so inform the authority which granted the approval. Upon receiving the relevant communication, that authority shall inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in annex 1 to this Regulation
 15. TRANSITIONAL PROVISIONS
 - 15.1. As from the date of entry into force of the 02 series of amendments to this Regulation no Contracting Party applying it shall refuse to grant approvals under this Regulation as amended by the 02 series of amendments.
 - 15.2. As from 24 months after the date of entry into force mentioned in paragraph 15.1 above, Contracting Parties applying this Regulation shall grant approvals only if the type of HSB unit corresponds to the requirements of this Regulation as amended by the 02 series of amendments.
 - 15.3. Existing approvals granted under this Regulation before the date mentioned in paragraph 15.2 above shall remain valid. However, Contracting Parties applying this Regulation may prohibit the fitting of HSB units which do not meet the requirements of this Regulation as amended by the 02 series of amendments:
 - 15.3.1. on vehicles for which type approval or individual approval is granted more than 24 months after the date of entry into force mentioned in paragraph 15.1 above,
 - 15.3.2. on vehicles first registered more than five years after the date of entry into force mentioned in paragraph 15.1 above.
 16. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS AND OF ADMINISTRATIVE DEPARTMENTS

The Parties to the 1958 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, or production definitely discontinued, issued in other countries, are to be sent.
-

ANNEX I

COMMUNICATION

(maximum format: A4 (210 × 297 mm))



issued by: Name of administration

.....

.....

.....

concerning ⁽²⁾: APPROVAL GRANTED
 APPROVAL EXTENDED
 APPROVAL REFUSED
 APPROVAL WITHDRAWN
 PRODUCTION DEFINITELY DISCONTINUED

of a type of: halogen sealed-beam headlamp Unit (SB unit) pursuant to Regulation No 31

Approval No Extension No

1. SB unit submitted for approval as type ⁽³⁾

Rated voltage

Rated wattage

2. The passing lamp filament may/may not ⁽²⁾ be lit simultaneously with the driving lamp filament and/or another reciprocally incorporated lamp

3. Trade name or mark

4. Manufacturer's name and address

5. If applicable, name and address of manufacturer's representative

6. Submitted for approval on

7. Technical service responsible for conducting approval tests

8. Date of report issued by that service

9. Number of report issued by that service

10. Approval granted/extended/refused/withdrawn ⁽²⁾

11. Reason(s) of extension (if applicable)

12. Maximum illumination (in lux) of the driving beam at 25 m from the HSB unit
 (average for 5 units)

13. Place

14. Date

15. Signature

16. The attached drawing No

..... shows the unit.

(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.

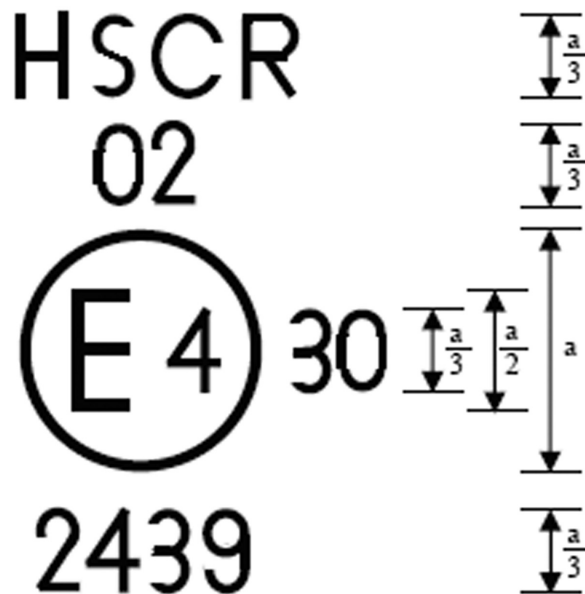
(³) Indicate the appropriate marking selected from the list below:

HSCR, HSCR, HSCR, HSC, HSC, HSC, HSR, HSC/R, HSC/R, HSC/R, HSC/, HSC/,
HSC/, HSCR PL, HSCR PL, HSCR PL, HSC PL, HSC PL, HSC PL, HSC PL, HSC PL, HSR PL,
HSC/R PL, HSC/R PL, HSC PL, HSC PL, HSC PL

ANNEX 2

EXAMPLES OF ARRANGEMENTS OF APPROVAL MARKS

Figure 1

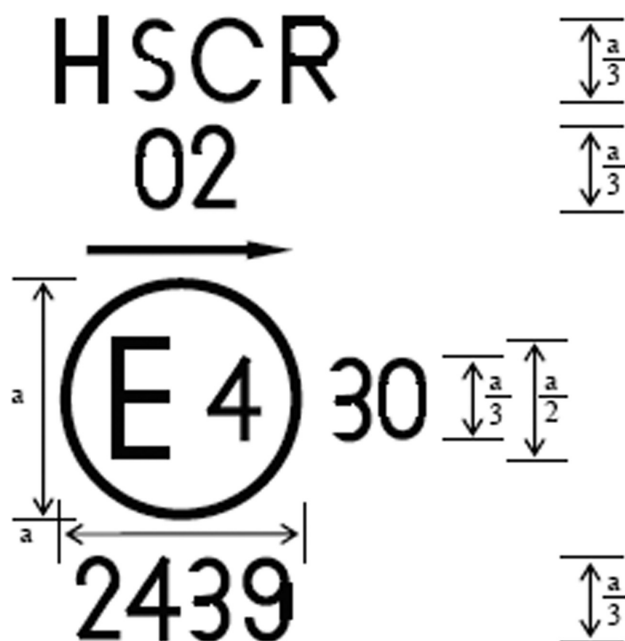


The above approval mark affixed to an HSB optical unit indicates that the unit concerned was approved in the Netherlands (E4) under number 2439, that it meets the requirements of this Regulation, as amended by the 02 series of amendments, in respect of both the driving beam and the passing beam, and that it is designed for right-hand traffic only.

The figure 30 indicates that the maximum intensity of the driving beam is between 86 250 and 101 250 candelas.

Note: The approval number and the additional symbol(s) shall be placed close to the circle and either above or below the letter 'E', or to the right or left of that letter. The digits of the approval number shall be on the same side of the letter 'E' and face the same direction. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

Figure 2



The above approval mark affixed to an HSB optical unit indicates that the unit concerned meets the requirements of this Regulation as amended by the 02 series of amendments, with respect to both the passing beam and the driving beam and that it is designed for left-hand traffic only.

Figure 3a



The above approval mark affixed to an HSB optical unit indicates that the unit concerned meets the requirements of this Regulation as amended by the 02 series of amendments, in respect of the passing beam only, and that it is designed for right-hand traffic only.

Figure 3b

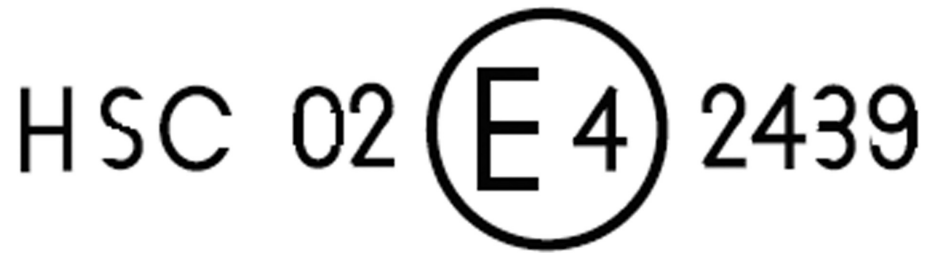
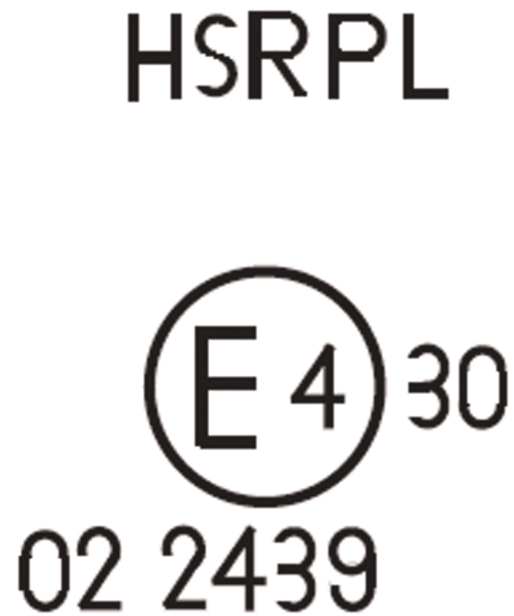


Figure 4



Figure 5



The above approval marks affixed to HSB optical units incorporating the lens of plastic material indicate that the units concerned meet the requirements of this Regulation, as amended by the 02 series of amendments:

With respect to the passing beam only, and that they are designed for left-hand traffic only.

With respect to driving the beam only.

The number 30 indicates that the maximum intensity of the driving beam is between 82 500 and 101 250 candelas.

Figure 6



Figure 7



Identification of an HSB unit meeting the requirements of Regulation No 31

With respect to both the passing beam and the driving beam and designed for right-hand traffic only.

With respect to the passing beam only and designed for righthand traffic only.

The passing lamp filament shall not be lit simultaneously with the driving lamp filament and/or another reciprocally incorporated lamp.

Figure 8

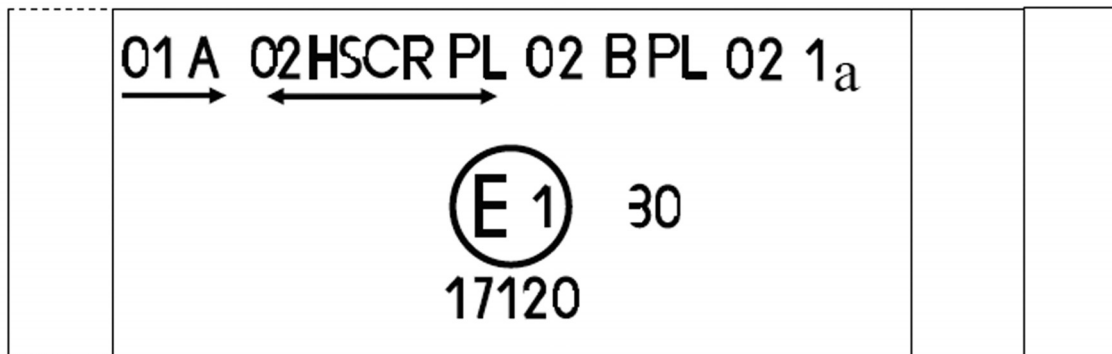
Simplified marking for grouped, combined or reciprocally incorporated lamps

(The vertical and horizontal lines schematise the shape of the light-signalling device. They are not part of the approval mark.)

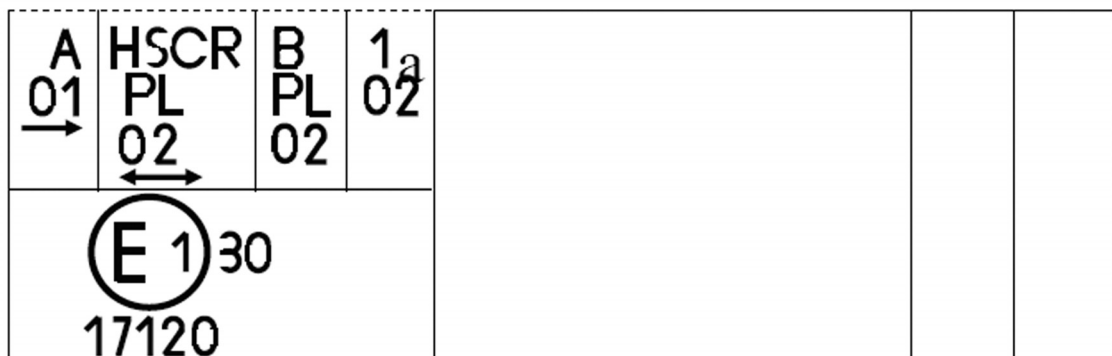
MODEL A

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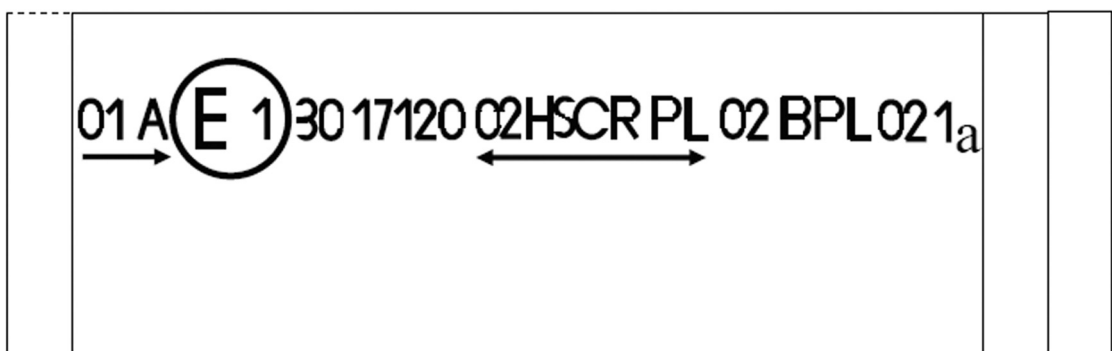
MODEL B



MODEL C



MODEL D



Note: The four examples shown above correspond to a lighting device bearing an approval mark relating to:

A front position lamp approved in accordance with the 01 series of amendments to Regulation No 7;

An HSB optical unit with a passing beam designed for right-hand and left-hand traffic and a driving beam with a maximum intensity comprised between 86 250 and 101 250 candelas (as indicated by the number 30), approved in accordance with the 02 series of amendments to Regulation No 31 and incorporating a lens of plastic material;

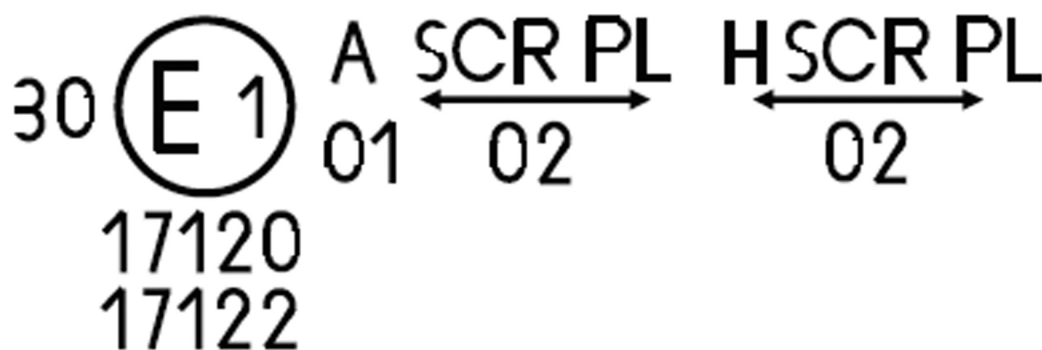
A front fog lamp approved in accordance with the 02 series of amendments to Regulation No 19 and incorporating a lens of plastic material;

A front direction indicator lamp of category 1a, approved in accordance with the 02 series of amendments to Regulation No 6.

Figure 9

Lamp reciprocally incorporated with an HSB unit

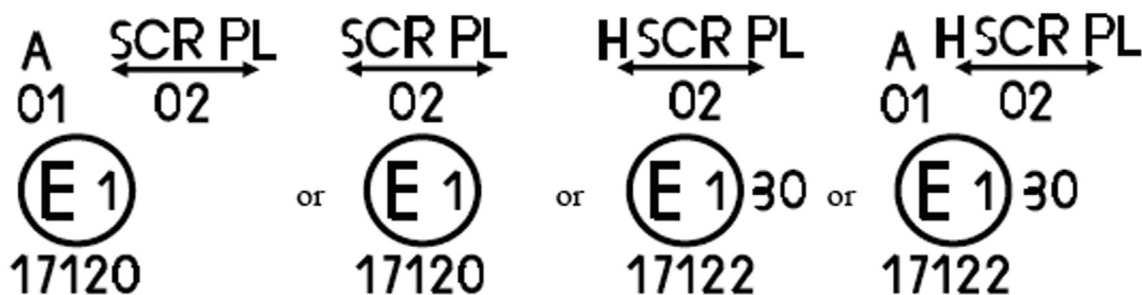
Example 1



The above example corresponds to the marking of a lens of plastic material intended to be used in different types of HSB units, namely:

- either: an HSB unit with a passing beam designed for right-hand and left-hand traffic and a driving beam approved in Germany (E1) in accordance with the requirements of Regulation No 5 as amended by the 02 series of amendments, which is reciprocally incorporated with a front position lamp approved in accordance with the 01 series of amendments to Regulation No 7;
- or: an HSB unit with a passing beam designed for right-hand and left-hand traffic and a driving beam with a maximum intensity comprised between 86 250 and 101 250 candelas, approved in Germany (E1) in accordance with the requirements of Germany (E1) in accordance with the requirements of Regulation No 31 as amended by the 02 series of amendments which is reciprocally incorporated with the same front position lamp as above;
- or even: either of the above-mentioned HSB units approved as a single lamp.

The main body of the optical unit shall bear the only valid approval number, for instance:



Example 2



The above example corresponds to the marking of a lens used in an assembly of two HSB optical units approved in the Netherlands (E4), consisting of a headlamp emitting a passing beam designed for both traffic systems and of a driving beam meeting the requirements of Regulation No 1, and of a headlamp emitting a driving beam meeting the requirements of Regulation No 31.

ANNEX 3

ELECTRICAL CONNECTIONS OF HSB UNITS

Figure 1

Category 1 (Driving only)

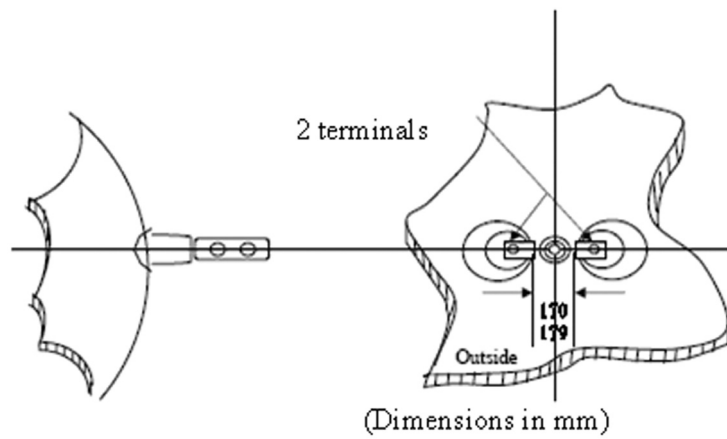


Figure 2

Category 21 (Passing only)

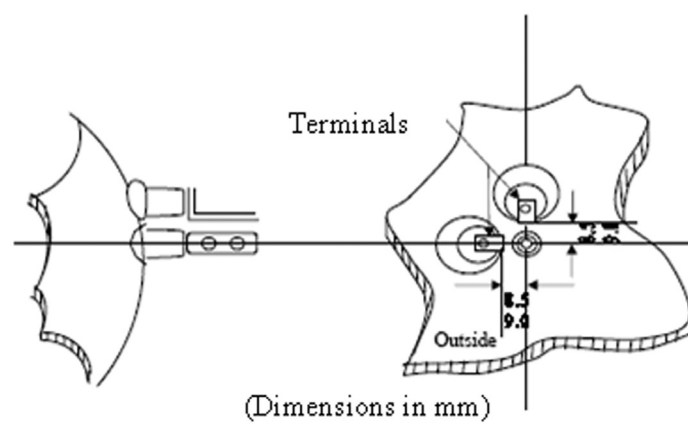
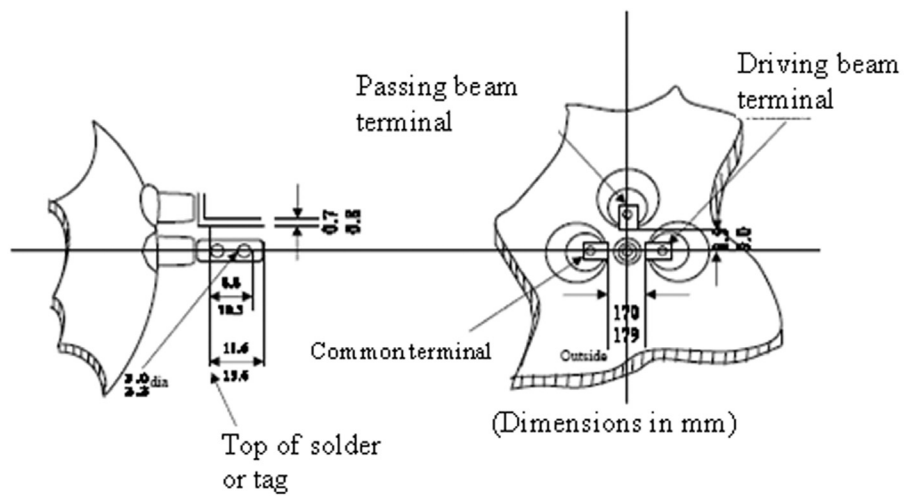


Figure 3

Category 22 (Passing and driving)



ANNEX 5

Minimum requirements for conformity of production control procedures

1. GENERAL

1.1. The conformity requirements shall be considered satisfied from a mechanical and geometric standpoint, if the differences do not exceed inevitable manufacturing deviations within the requirements of this Regulation.

1.2. With respect to photometric performances, the conformity of mass produced headlamps shall not be contested if, when testing photometric performances of any headlamp chosen at random:

1.2.1. no measured value deviates unfavourably by more than 20 per cent from the values prescribed in this Regulation. For values B 50 L (or R) and zone III, the maximum unfavourable deviation may be respectively:

B 50 L (or R)	0,2	lx equivalent 20 per cent
	0,3	lx equivalent 30 per cent
Zone III	0,3	lx equivalent 20 per cent
	0,45	lx equivalent 30 per cent

1.2.2. or if

1.2.2.1. for the passing beam, the values prescribed in this Regulation are met at HV (with a tolerance of + 0,2 lx) and related to that aiming at least one point of each area delimited on the measuring screen (at 25 m) by a circle 15 cm in radius around points B 50 L (or R) ⁽¹⁾ (with a tolerance of + 0,1 lx), 75 R (or L), 50 V, 25 R, 25 L, and in the entire area of zone IV which is not more than 22,5 cm above line 25 R and 25 L;

1.2.2.2. and if, for the driving beam, HV being situated within the isolux 0,75 E_{max}, a tolerance of + 20 per cent for maximum values and – 20 per cent for minimum values is observed for the photometric values at any measuring point specified in paragraph 8.3 of this Regulation.

1.2.3. If the results of the tests described above do not meet the requirements, the alignment of the headlamp may be changed, provided that the axis of the beam is not displaced laterally by more than 1° to the right or left ⁽²⁾.

1.3. With respect to the verification of the change in vertical position of the cut-off line under the influence of heat, the following procedure shall be applied:

One of the sampled headlamps shall be tested according to the procedure described in paragraph 2.1 of annex 6 after being subjected three consecutive times to the cycle described in paragraph 2.2.2 of annex 6.

The headlamp shall be considered as acceptable if Δr does not exceed 1,5 mrad.

If this value exceeds 1,5 mrad but is not more than 2,0 mrad, a second headlamp shall be subjected to the test after which the mean of the absolute values recorded on both samples shall not exceed 1,5 mrad.

1.4. The chromaticity coordinates shall be complied with.

2. MINIMUM REQUIREMENTS FOR VERIFICATION OF CONFORMITY BY THE MANUFACTURER

For each type of headlamp the holder of the approval mark shall carry out at least the following tests, at appropriate intervals. The tests shall be carried out in accordance with the provisions of this Regulation.

If any sampling shows non-conformity with regard to the type of test concerned, further samples shall be taken and tested. The manufacturer shall take steps to ensure the conformity of the production concerned.

2.1 Nature of tests

Tests of conformity in this Regulation shall cover the photometric characteristics and the verification of the change in vertical position of the cut-off line under the influence of heat.

⁽¹⁾ Letters in brackets refer to headlamps intended for left-hand traffic.

⁽²⁾ The limit of realignment of 1° to the right or left is not incompatible with vertical realignment upward or downward. The latter is limited only by the requirements of paragraph 8.3. However, the horizontal part of the 'cut-off' should not extend beyond the line hh (the provisions of paragraph 8.3 are not applicable to HSB units intended to meet the requirements of this Regulation only for provision of a passing beam).

2.2. Methods used in tests

2.2.1. Tests shall generally be carried out in accordance with the methods set out in this Regulation.

2.2.2. In any test of conformity carried out by the manufacturer, equivalent methods may be used with the consent of the Competent Authority responsible for approval tests. The manufacturer is responsible for proving that the applied methods are equivalent to those laid down in this Regulation.

2.2.3. The application of paragraphs 2.2.1 and 2.2.2 requires regular calibration of test apparatus and its correlation with measurements made by a Competent Authority.

2.2.4. In all cases the reference methods shall be those of this Regulation, particularly for the purpose of administrative verification and sampling.

2.3. Nature of sampling

Samples of headlamps shall be selected at random from the production of a uniform batch. A uniform batch means a set of headlamps of the same type, defined according to the production methods of the manufacturer.

The assessment shall in general cover series production from individual factories. However, a manufacturer may group together records concerning the same type from several factories, provided these operate under the same quality system and quality management.

2.4. Measured and recorded photometric characteristics

The sampled headlamp shall be subjected to photometric measurements at the points provided for in the Regulation, the reading being limited to points $E_{\max}$, HV ⁽¹⁾, HL, HR ⁽²⁾ in the case of the driving beam, and to points B 50 L (or R), HV, 50 V, 75 R (or L) and 25 L (or R) in the case of the passing beam (see figure in annex 4).

2.5. Criteria governing acceptability

The manufacturer is responsible for carrying out a statistical study of the test results and for defining, in agreement with the Competent Authority, criteria governing the acceptability of his products in order to meet the specifications laid down for verification of conformity of products in paragraph 11.1 of this Regulation.

The criteria governing the acceptability shall be such that, with a confidence level of 95 per cent, the minimum probability of passing a spot check in accordance with annex 8 (first sampling) would be 0,95.

⁽¹⁾ When the driving beam is reciprocally incorporated with the passing beam, HV in the case of the driving beam shall be the same measuring point as in the case of the passing beam.

⁽²⁾ HL and HR: points on 'hh' located at 1,125 m to the left and to the right of point HV respectively.

ANNEX 6

Tests for stability of photometric performance of headlamps in operation

TESTS ON COMPLETE HEADLAMPS

Once the photometric values have been measured according to the prescriptions of this Regulation, in points for $E_{\max}$ for driving beam and HV, 50 R, B 50 L for passing beam (or HV, 50 L, B 50 R for headlamps designed for left-hand traffic) a complete headlamp sample shall be tested for stability of photometric performance in operation. 'Complete headlamp' shall be understood to mean the complete lamp itself including those surrounding body parts and lamps which could influence its thermal dissipation.

1. TEST OF STABILITY OF PHOTOMETRIC PERFORMANCE

The tests shall be carried out in a dry and still atmosphere at an ambient temperature of $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, the complete headlamp being mounted on a base representing the correct installation on the vehicle.

1.1. Clean headlamp

The headlamp shall be operated for 12 hours as described in subparagraph 1.1.1 and checked as prescribed in subparagraph 1.1.2.

1.1.1. Test procedure

The headlamp shall be operated for a period according to the specified time, so that:

- 1.1.1.1. (a) in the case where only one lighting function (driving or passing beam) is to be approved, the corresponding filament is lit for the prescribed time ⁽¹⁾;

- (b) in the case of a reciprocally incorporated passing lamp and driving lamp (dual filament HSB headlamp):

If the applicant declares that the headlamp is to be used with a single filament lit ⁽²⁾ at a time, the test shall be carried out in accordance with this condition, activating ⁽¹⁾ each specified function successively for half the time specified in paragraph 1.1.

In all other cases ⁽¹⁾ ⁽²⁾ the headlamp, shall be subjected to the following cycle until the time specified is reached:

15 minutes, passing-beam filament lit

5 minutes, all filaments lit;

- (c) in the case of grouped lighting functions all the individual functions shall be lit simultaneously for the time specified for individual lighting functions (a) also taking into account the use of reciprocally incorporated lighting functions (b), according to the manufacturer's specifications.

1.1.1.2. Test voltage

The voltage shall be adjusted so as to supply 90 % of the maximum wattage specified in this Regulation for the type(s) of HSB headlamp(s) concerned is (are) obtained.

1.1.2. Test results

1.1.2.1. Visual inspection

Once the headlamp has been stabilised to the ambient temperature, the headlamp lens and the external lens, if any, shall be cleaned with a clean, damp cotton cloth. It shall then be inspected visually; no distortion, deformation, cracking or change in colour of either the headlamp lens or the external lens, if any, shall be noticeable.

⁽¹⁾ When the tested headlamp is grouped and/ or reciprocally incorporated with signalling lamps, the latter shall be lit for the duration of the test. In the case of a direction indicator lamp, it shall be lit in flashing operation mode with an on/ off time ratio of approximately one to one.

⁽²⁾ Should two filaments be simultaneously lit when headlamp flashing is used, this shall not be considered as being normal use of both filaments simultaneously.

1.1.2.2. Photometric test

To comply with the requirements of this Regulation, the photometric values shall be verified in the following points:

Passing beam:

50 R - B 50 L - HV for headlamps designed for right-hand traffic

50 L - B 50 R - HV for headlamps designed for left-hand traffic

Driving beam:

Point of Emax

Another aiming may be carried out to allow for any deformation of the headlamp base due to heat (the change of the position of the cut-off line is covered in para. 2 of this annex); A 10 % discrepancy between the photometric characteristics and the values measured prior to the test is permissible including the tolerances of the photometric procedure.

1.2. Dirty headlamp

After being tested as specified in subparagraph 1.1 above, the headlamp shall be operated for one hour as described in subparagraph 1.1.1, after being prepared as prescribed in subparagraph 1.2.1, and checked as prescribed in subparagraph 1.1.2.

1.2.1. Preparation of the headlamp

1.2.1.1. Test mixture

1.2.1.1.1. For headlamp with the outside lens in glass:

The mixture of water and a polluting agent to be applied to the headlamp shall be composed of:

9 parts by weight of silica sand with a particle size of 0-100 µm,

1 part by weight of vegetal carbon dust (beechwood) with a particle size of 0-100 µm,

0,2 part by weight of NaCMC ⁽¹⁾, and

an appropriate quantity of distilled water, with a conductivity of ≤ 1 mS/m.

The mixture must not be more than 14 days old.

1.2.1.1.2. For headlamp with outside lens in plastic material:

The mixture of water and polluting agent to be applied to the headlamp shall be composed of:

9 parts by weight of silica sand with a particle size of 0-100 µm,

1 part by weight of vegetal carbon dust (beechwood) with a particle size of 0-100 µm,

0,2 part by weight of NaCMC ⁽¹⁾,

13 parts by weight of distilled water with a conductivity of ≤ 1 mS/m, and

2 ± 1 parts by weight of surface-actant ⁽²⁾.

The mixture must not be more than 14 days old.

⁽¹⁾ NaCMC represents the sodium salt of carboxymethylcellulose, customarily referred to as CMC. The NaCMC used in the dirt mixture shall have a degree of substitution (DS) of 0,6-0,7 and a viscosity of 200-300 cP for a 2 % solution at 20 °C.

⁽²⁾ The tolerance on quantity is due to the necessity of obtaining a dirt that correctly spreads out on all the plastic lens.

1.2.1.2. Application of the test mixture to the headlamp

The test mixture shall be uniformly applied to the entire light emitting surface of the headlamp and then left to dry. This procedure shall be repeated until the illumination value has dropped to 15-20 % of the values measured for each following point under the conditions described in paragraph 1 above:

Point of Emax in driving beam, photometric distribution for a driving/passing lamp,

Point of Emax in driving beam, photometric distribution for a driving lamp only,

50 R and 50 V ⁽¹⁾ for a passing lamp only, designed for right-hand traffic,

50 L and 50 V ⁽¹⁾ for a passing lamp only, designed for left-hand traffic.

1.2.1.3. Measuring equipment

The measuring equipment shall be equivalent to that used during headlamp approval tests.

2. TEST FOR CHANGE IN VERTICAL POSITION OF THE CUT-OFF LINE UNDER THE INFLUENCE OF HEAT

This test consists of verifying that the vertical drift of the cut-off line under the influence of heat does not exceed a specified value for an operating passing lamp.

The headlamp tested in accordance with paragraph 1.1, shall be subjected to the test described in 2.1, without being removed from or readjusted in relation to its test fixture.

2.1. Test

The test shall be carried out in a dry and still atmosphere at an ambient temperature of 23 °C ± 5 °C.

Using a mass production HSB headlamp which has been aged for at least one hour the headlamp shall be operated on passing beam without being dismounted from or readjusted in relation to its test fixture. (For the purpose of this test, the voltage shall be adjusted as specified in para. 1.1.1.2). The position of the cut-off line in its horizontal part (between vv and the vertical line passing through point B 50 L for right-hand traffic or B 50 R for left-hand traffic) shall be verified 3 minutes (r3) and 60 minutes (r60) respectively after operation.

The measurement of the variation in the cut-off line position as described above shall be carried out by any method giving acceptable accuracy and reproducible results.

2.2. Test results

2.2.1. The result expressed in milliradians (mrad) shall be considered as acceptable when the absolute value $\Delta r_l = |r_3 - r_{60}|$ recorded on the headlamp is not more than 1,0 mrad ($\Delta r_l \leq 1,0$ mrad).

2.2.2. However, if this value is more than 1,0 mrad but not more than 1,5 mrad ($1,0 \text{ mrad} < \Delta r_l \leq 1,5 \text{ mrad}$) a second headlamp shall be tested as described in 2.1 after being subjected three consecutive times to the cycle as described below, in order to stabilise the position of mechanical parts of the headlamp on a base representative of the correct installation on the vehicle:

Operation of the passing lamp for one hour, (the voltage shall be adjusted as specified in paragraph 1.1.1.2),

Period of rest for one hour.

The headlamp type shall be considered as acceptable if the mean value of the absolute values Δr_l measured on the first sample and Δr_{II} measured on the second sample is not more than 1,0 mrad

$$\frac{(\Delta r_l + \Delta r_{II})}{2} \leq 1,0 \text{ mrad}$$

⁽¹⁾ 50 V is situated 375 mm below HV on the vertical line v-v on the screen at 25 m distance.

ANNEX 7

Requirements for lamps incorporating lenses of plastic material — testing of lens or material samples and of complete lamps

1. GENERAL SPECIFICATIONS

- 1.1. The samples supplied pursuant to paragraph 3.2.4 of this Regulation shall satisfy the specifications indicated in paragraphs 2.1 to 2.5 below.
- 1.2. Two out of the five samples of complete lamps supplied pursuant to paragraph 3.2.3 of this Regulation and incorporating lenses of plastic material shall, with regard to the lens material, satisfy the specifications indicated in paragraph 2.6 below.
- 1.3. The samples of lenses of plastic material or samples of material shall be subjected, with the reflector to which they are intended to be fitted (where applicable), to approval tests in the chronological order indicated in table A reproduced in appendix 1 to this annex.
- 1.4. However, if the lamp manufacturer can prove that the product has already passed the tests prescribed in paragraphs 2.1-2.5 below, or the equivalent tests pursuant to another Regulation, those tests need not be repeated; only the tests prescribed in appendix 1, table B, shall be mandatory.

2. TESTS

2.1. Resistance to temperature changes

2.1.1. Tests

Three new samples (lenses) shall be subjected to five cycles of temperature and humidity (RH = relative humidity) change in accordance with the following programme;

3 hours at $40\text{ °C} \pm 2\text{ °C}$ and 85-95 % RH;

1 hour at $23\text{ °C} \pm 5\text{ °C}$ and 60-75 % RH;

15 hours at $-30\text{ °C} \pm 2\text{ °C}$;

1 hour at $23\text{ °C} \pm 5\text{ °C}$ and 60-75 % RH; 3 hours at $80\text{ °C} \pm 2\text{ °C}$;

1 hour at $23\text{ °C} \pm 5\text{ °C}$ and 60-75 % RH;

Before this test, the samples shall be kept at $23\text{ °C} \pm 5\text{ °C}$ and 60-75 % RH for at least four hours.

Note: The periods of one hour at $23\text{ °C} \pm 5\text{ °C}$ shall include the periods of transition from one temperature to another which are needed in order to avoid thermal shock effects.

2.1.2. Photometric measurements

2.1.2.1. Method

Photometric measurements shall be carried out on the samples before and after the test.

These measurements shall be made using a standard lamp, at the following points:

B 50 L and 50 R for the passing beam of a passing lamp or a passing/driving lamp (B 50 R and 50 L in the case of headlamps intended for left-hand traffic);

E_{max} route for the driving beam of a driving lamp or a passing/driving lamp;

2.1.2.2. Results

The variation between the photometric values measured on each sample before and after the test shall not exceed 10 % including the tolerances of the photometric procedure.

2.2. Resistance to atmospheric and chemical agents

2.2.1. Resistance to atmospheric agents

Three new samples (lenses or samples of material) shall be exposed to radiation from a source having a spectral energy distribution similar to that of a black body at a temperature between 5 500K and 6 000K. Appropriate filters shall be placed between the source and the samples so as to reduce as far as possible radiations with wave lengths smaller than 295 nm and greater than 2 500 nm. The samples shall be exposed to an energetic illumination of $1\,200\text{ W/m}^2 \pm 200\text{ W/m}^2$ for a period such that the luminous energy that they receive is equal to $4\,500\text{ MJ/m}^2 \pm 200\text{ MJ/m}^2$. Within the enclosure, the temperature measured on the black panel placed on a level with the samples shall be $50\text{ °C} \pm 5\text{ °C}$. In order to ensure a regular exposure, the samples shall revolve around the source of radiation at a speed between 1 and 5 1/min.

The samples shall be sprayed with distilled water of conductivity lower than 1 mS/m at a temperature of $23\text{ °C} \pm 5\text{ °C}$, in accordance with the following cycle:

spraying: 5 minutes;

drying: 25 minutes.

2.2.2. Resistance to chemical agents

After the test described in paragraph 2.2.1 above and the measurement described in paragraph 2.2.3.1 below have been carried out, the outer face of the said three samples shall be treated as described in paragraph 2.2.2.2 with the mixture defined in paragraph 2.2.2.1 below.

2.2.2.1. Test mixture

The test mixture shall be composed of 61,5 % n-heptane, 12,5 % toluene, 7,5 % ethyl tetrachloride, 12,5 % trichloroethylene and 6 % xylene (volume per cent).

2.2.2.2. Application of the test mixture

Soak a piece of cotton cloth (as per ISO 105) until saturation with the mixture defined in paragraph 2.2.2.1 above and, within 10 seconds, apply it for 10 minutes to the outer face of the sample at a pressure of 50 N/cm^2 , corresponding to an effort of 100 N applied on a test surface of $14 \times 14\text{ mm}$.

During this 10-minute period, the cloth pad shall be soaked again with the mixture so that the composition of the liquid applied is continuously identical with that of the test mixture prescribed.

During the period of application, it is permissible to compensate the pressure applied to the sample in order to prevent it from causing cracks.

2.2.2.3. Cleaning

At the end of the application of the test mixture, the samples shall be dried in the open air and then washed with the solution described in paragraph 2.3 (Resistance to detergents) at $23\text{ °C} \pm 5\text{ °C}$. Afterwards the samples shall be carefully rinsed with distilled water containing not more than 0,2 % impurities at $23\text{ °C} \pm 5\text{ °C}$ and then wiped off with a soft cloth.

2.2.3. Results

2.2.3.1. After the test of resistance to atmospheric agents, the outer face of the samples shall be free from cracks, scratches, chipping and deformation, and the mean variation in transmission

$\Delta t = (T_2 - T_3)/T_2$, measured on the three samples according to the procedure described in appendix 2 to this annex shall not exceed 0,020

$(\Delta t_m \leq 0,020)$.

2.2.3.2. After the test of resistance to chemical agents, the samples shall not bear any traces of chemical staining likely to cause a variation of flux diffusion, whose mean variation

$\Delta d = (T_5 - T_4)/T_2$, measured on the three samples according to the procedure described in appendix 2 to this annex shall not exceed 0,020

$(\Delta d_m \leq 0,020)$.

2.3. Resistance to detergents and hydrocarbons

2.3.1. Resistance to detergents

The outer face of three samples (lenses or samples of material) shall be heated to $50\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and then immersed for five minutes in a mixture maintained at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and composed of 99 parts distilled water containing not more than 0,02 % impurities and one part alkylaryl sulphonate.

At the end of the test, the samples shall be dried at $50\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$. The surface of the samples shall be cleaned with a moist cloth.

2.3.2. Resistance to hydrocarbons

The outer face of these three samples shall then be lightly rubbed for one minute with a cotton cloth soaked in a mixture composed of 70 % n-heptane and 30 % toluene (volume per cent), and shall then be dried in the open air.

2.3.3. Results

After the above two tests have been performed successively, the mean value of the variation in transmission

$\Delta t = (T_2 - T_3)/T_2$, measured on the three samples according to the procedure described in appendix 2 to this annex shall not exceed 0,010 ($\Delta t_m \leq 0,010$).

2.4. Resistance to mechanical deterioration

2.4.1. Mechanical deterioration method

The outer face of the three new samples (lenses) shall be subjected to the uniform mechanical deterioration test by the method described in appendix 3 to this annex.

2.4.2. Results

After this test, the variations:

in transmission: $\Delta t = (T_2 - T_3)/T_2$,

and in diffusion: $\Delta t = (T_5 - T_4)/T_2$,

shall be measured according to the procedure described in appendix 2 in the area specified in paragraph 3.2.4.1.1 of this Regulation. The mean value of the three samples shall be such that: $\Delta t_m \leq 0,100$; $\Delta d_m \leq 0,050$.

2.5. Test of adherence of coatings, if any

2.5.1. Preparation of the sample

A surface of 20 mm × 20 mm in area of the coating of a lens shall be cut with a razor blade or a needle into a grid of squares approximately 2 mm × 2 mm. The pressure on the blade or needle shall be sufficient to cut at least the coating.

2.5.2. Description of the test

Use an adhesive tape with a force adhesion of 2 N/(cm of width) $\pm$ 20 % measured under the standardised conditions specified in appendix 4 to this annex. This adhesive tape, which shall be at least 25 mm wide, shall be pressed for at least five minutes to the surface prepared as prescribed in paragraph 2.5.1.

Then the end of the adhesive tape shall be loaded in such a way that the force of adhesion to the surface considered is balanced by a force perpendicular to that surface. At this stage, the tape shall be torn off at a constant speed of 1,5 m/s $\pm$ 0,2 m/s.

2.5.3. Results

There shall be no appreciable impairment of the gridded area. Impairments at the intersections between squares or at the edges of the cuts shall be permitted, provided that the impaired area does not exceed 15 per cent of the gridded surface.

2.6. Tests of the complete lamp incorporating a lens of plastic material

2.6.1. Resistance to mechanical deterioration of the lens surface

2.6.1.1. Tests

The lens of lamp sample No 1 shall be subjected to the test described in paragraph 2.4.1 above.

2.6.1.2. Results

After the test, the results of photometric measurements carried out on the lamp in accordance with this Regulation shall not exceed by more than 30 % the maximum values prescribed at points B 50 L and HV and not be more than 10 % below the minimum values prescribed at point 75 R (in the case of headlamps intended for left-hand traffic, the points to be considered are B 50 R, HV and 75 L),

2.6.2. Test of adherence of coatings, if any

The lens of lamp sample No 2 shall be subjected to the test described in paragraph 2.5 above.

3. VERIFICATION OF THE CONFORMITY OF PRODUCTION

3.1. With regard to the materials used for the manufacture of lenses, the lamps of a series shall be recognised as complying with this Regulation if:

3.1.1. After the test for resistance to chemical agents and the test for resistance to detergents and hydrocarbons, the outer face of the samples exhibits no cracks, chipping or deformation visible to the naked eye (see paras 2.2.2, 2.3.1 and 2.3.2);

3.1.2. After the test described in paragraph 2.6.1.1, the photometric values at the points of measurement considered in paragraph 2.6.1.2 are within the limits prescribed for conformity of production by this Regulation.

3.2. If the test results fail to satisfy the requirements, the tests shall be repeated on another sample of headlamps selected at random.

APPENDIX 1

CHRONOLOGICAL ORDER OF APPROVAL TESTS

A. Tests on plastic materials (lenses or samples of material supplied pursuant to paragraph 3.2.4 of this Regulation).

Samples Tests	Lenses or samples of material						Lenses						
	1	2	3	4	5	6	7	8	9	10	11	12	13
1.1. Limited photometry (para 2.1.2)										x	x	x	
1.1.1. Temperature change (para 2.1.1)										x	x	x	
1.1.2. Limited photometry (para 2.1.2)										x	x	x	
1.2.1. Transmission measurement	x	x	x	x	x	x	x	x	x				
1.2.2. Diffusion measurement	x	x	x				x	x	x				
1.3. Atmospheric agents (para 2.2.1)	x	x	x										
1.3.1. Transmission measurement	x	x	x										
1.4. Chemicals agents (para 2.2.2)	x	x	x										
1.4.1. Diffusion measurement	x	x	x										
1.5. Detergents (para 2.3.1)				x	x	x							
1.6. Hydrocarbons (para 2.3.2)				x	x	x							
1.6.1. Transmission measurement				x	x	x							
1.7. Deterioration (para 2.4.1)							x	x	x				
1.7.1. Transmission measurement							x	x	x				
1.7.2. Diffusion measurement							x	x	x				
1.8. Adherence (para 2.5)													x

B. Tests on complete lamps (supplied pursuant to paragraph 3.2.3 of this Regulation).

Tests	Complete headlamp	
	Sample No	
	1	2
2.1. Deterioration (para. 2.6.1.1)	x	
2.2. Photometry (para. 2.6.1.2)	x	
2.3. Adherence (para. 2.6.2)		x

APPENDIX 2

Method of measurement of the diffusion and transmission of light

1. EQUIPMENT (see figure)

The beam of a collimator K with a half divergence $\beta/2 = 17,4 \times 10^{-4}$ rd is limited by a diaphragm D_T with an opening of 6 mm against which the sample stand is placed.

A convergent achromatic lens L_2 , corrected for spherical aberrations, links the diaphragm D_T with the receiver R; the diameter of the lens L_2 shall be such that it does not diaphragm the light diffused by the sample in a cone with a half top angle of $\beta/2 = 14^\circ$.

An annular diaphragm D_D with angles $\alpha_0/2 = 1^\circ$ and $\alpha_{\max}/2 = 12^\circ$ is placed in an image focal plane of the lens L_2 .

The non-transparent central part of the diaphragm is necessary in order to eliminate the light arriving directly from the light source. It shall be possible to remove the central part of the diaphragm from the light beam in such a manner that it returns exactly to its original position.

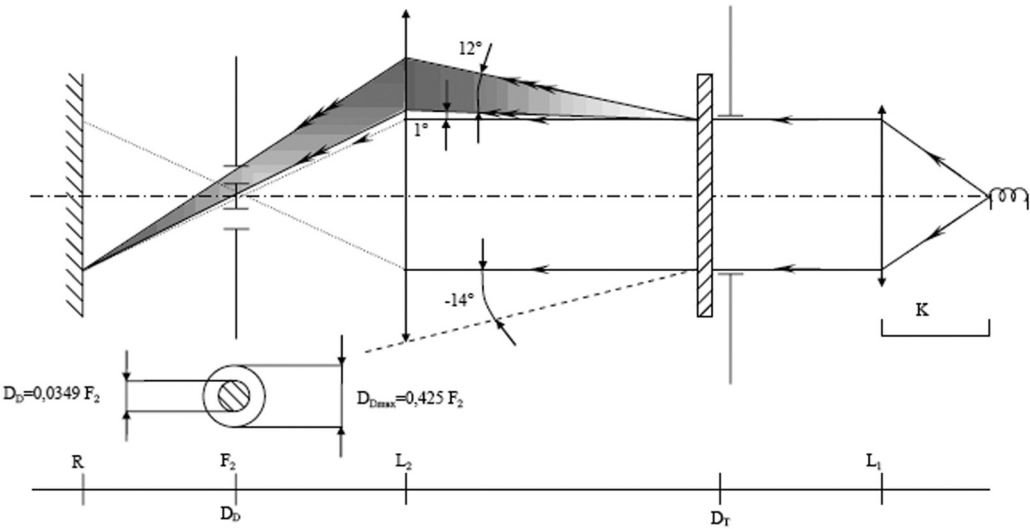
The distance $L_2 D_T$ and the focal length F_2 of the lens L_2 shall be so chosen that the image of D_T completely covers the receiver R.

When the initial incident flux is referred to 1 000 units, the absolute precision of each reading shall be better than 1 unit.

2. MEASUREMENTS

The following readings shall be taken:

Reading	With sample	With central part of D_D	Quantity represented
T_1	no	no	Incident flux in initial reading
T_2	yes(before test)	no	Flux transmitted by the new material in a field of 24°C
T_3	yes(after test)	no	Flux transmitted by the tested material in a field of 24°C
T_4	yes(before test)	yes	Flux diffused by the new material
T_5	yes(after test)	yes	Flux diffused by the tested material



APPENDIX 3

SPRAY TESTING METHOD

1. TEST EQUIPMENT

1.1. Spray gun

The spray gun used shall be equipped with a nozzle 1,3 mm in diameter allowing a liquid flow rate of $0,24 \pm 0,02$ l/minute at an operating pressure of 6,0 bars – 0, + 0,5 bar.

Under these operation conditions the fan pattern obtained shall be $170 \text{ mm} \pm 50 \text{ mm}$ in diameter on the surface exposed to deterioration, at a distance of $380 \text{ mm} \pm 10 \text{ mm}$ from the nozzle.

1.2. Test mixture

The test mixture shall be composed of:

Silica sand of hardness 7 on the Mohs scale, with a grain size between 0 and 0,2 mm and an almost normal distribution, with an angular factor of 1,8 to 2;

Water of hardness not exceeding 205 g/m^3 for a mixture comprising 25 g of sand per litre of water.

2. TEST

The outer surface of the lamp lenses shall be subjected once or more than once to the action of the sand jet produced as described above. The jet shall be sprayed almost perpendicular to the surface to be tested.

The deterioration shall be checked by means of one or more samples of glass placed as a reference near the lenses to be tested. The mixture shall be sprayed until the variation in the diffusion of light on the sample or samples measured by the method described in appendix 2, in such that:

$$\Delta d = (T5-T4)/T_2 = 0,0250 \pm 0,0025$$

Several reference samples may be used to check that the whole surface to be tested has deteriorated homogeneously.

APPENDIX 4

ADHESIVE TAPE ADHERENCE TEST**1. PURPOSE**

This method allows to determine under standard conditions the linear force of adhesion of an adhesive tape to a glass plate.

2. PRINCIPLE

Measurement of the force necessary to unstick an adhesive tape from a glass plate at an angle of 90°.

3. SPECIFIED ATMOSPHERIC CONDITIONS

The ambient conditions shall be at $23\text{ °C} \pm 5\text{ °C}$ and $65 \pm 15\%$ relative humidity (RH).

4. TEST PIECES

Before the test, the sample roll of adhesive tape shall be conditioned for 24 hours in the specified atmosphere (see para. 3 above).

Five test pieces each 400 mm long shall be tested from each roll. These test pieces shall be taken from the roll after the first three turns were discarded.

5. PROCEDURE

The test shall be under the ambient conditions specified in paragraph 3.

Take the five test pieces while unrolling the tape radially at a speed of approximately 300 mm/s, then apply them within 15 seconds in the following manner:

Apply the tape to the glass plate progressively with a slight length wise rubbing movement of the finger, without excessive pressure, in such a manner as to leave no air bubble between the tape and the glass plate.

Leave the assembly in the specified atmospheric conditions for 10 minutes.

Unstick about 25 mm of the test piece from the plate in a plane perpendicular to the axis of the test piece. Fix the plate and fold back the free end of the tape at 90°. Apply force in such a manner that the separation line between the tape and the plate is perpendicular to this force and perpendicular to the plate.

Pull to unstick at a speed of $300\text{ mm/s} \pm 30\text{ mm/s}$ and record the force required.

6. RESULTS

The five values obtained shall be arranged in order and the median value taken as the result of the measurement. This value shall be expressed in Newtons per centimetre of width of the tape.

ANNEX 8

MINIMUM REQUIREMENTS FOR SAMPLING BY AN INSPECTOR

1. GENERAL

- 1.1. The conformity requirements shall be considered satisfied from a mechanical and a geometric standpoint, in accordance with the requirements of this Regulation, if any, if the differences do not exceed inevitable manufacturing deviations.
- 1.2. With respect to photometric performance, the conformity of mass produced headlamps shall not be contested if, when testing photometric performances of any headlamp chosen at random;
- 1.2.1. no measured value deviates unfavourably by more than 20 per cent from the values prescribed in this Regulation. For values B 50 L (or R) and Zone III the maximum deviation may be respectively:

B 50 L (or R)	0,2	lx equivalent 20 per cent
	0,3	lx equivalent 30 per cent
Zone III	0,3	lx equivalent 20 per cent
	0,45	lx equivalent 30 per cent

1.2.2. or if

- 1.2.2.1. for the passing beam, the values prescribed in this Regulation are met at HV (with a tolerance of 0,2 lx) and related to that aiming at least one point of each area delimited on the measuring screen (at 25 m) by a circle 15 cm in radius around points B 50 L (or R) ⁽¹⁾ (with a tolerance of 0,1 lx), 75 R (or L), 50 V, 25 R, 25 L, and in the entire area of zone IV which is not more than 22,5 cm above line 25 R and 25 L;
- 1.2.2.2. and if, for the driving beam, HV being situated within the isolux 0,75 E_{max}, a tolerance of + 20 per cent for maximum values and – 20 per cent for minimum values is observed for the photometric values at any measuring point specified in paragraph 8.3 of this Regulation. The reference mark is disregarded.
- 1.2.3. If the results of the tests described above do not meet the requirements, the alignment of the headlamp may be changed, provided that the axis of the beam is not displaced laterally by more than 1° to the right or left ⁽²⁾.
- 1.2.4. Headlamps with apparent defects are disregarded.
- 1.2.5. The reference mark is disregarded.
- 1.3. The chromaticity coordinates shall be complied with.

2. FIRST SAMPLING

In the first sampling four headlamps are selected at random. The first sample of two is marked A, the second sample of two is marked B.

2.1. The conformity is not contested

- 2.1.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall not be contested if the deviation of the measured values of the headlamps in the unfavourable directions are:

⁽¹⁾ Letters in brackets refer to headlamps intended for left-hand traffic.

⁽²⁾ The limit of realignment of 1° to the right or left is not incompatible with vertical realignment upward or downward. The latter is limited only by the requirements of paragraph 8.3. However, the horizontal part of the 'cut-off' should not extend beyond the line hh (the provisions of paragraph 8.3 are not applicable to HSB units intended to meet the requirements of this Regulation only for provision of a passing beam).

2.1.1.1. sample A

A1	one headlamp		0 per cent
	one headlamp	not more than	20 per cent
A2	both headlamps	more than	0 per cent
	but	not more than	20 per cent
	go to sample B		

2.1.1.2. sample B

B1	both headlamps	0 per cent
----	----------------	------------

2.1.2. or if the conditions of paragraph 1.2.2 for sample A are fulfilled.

2.2. The conformity is contested

2.2.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the headlamps are:

2.2.1.1. sample A

A3	one headlamp	not more than	20 per cent
	one headlamp	more than	20 per cent
	but	not more than	30 per cent

2.2.1.2. sample B

B2	in the case of A2		
	one headlamp	more than	0 per cent
	but	not more than	20 per cent
	one headlamp	not more than	20 per cent
B3	in the case of A2		
	one headlamp		0 per cent
	one headlamp	more than	20 per cent
	but	not more than	30 per cent

2.2.2. or if the conditions of paragraph 1.2.2 for sample A are not fulfilled.

2.3. Approval withdrawn

Conformity shall be contested and paragraph 12 applied if, following the sampling procedure in Figure 1 of this annex deviations of the measured values of the headlamps are:

2.3.1. sample A

A4	one headlamp	not more than	20 per cent
	one headlamp	more than	30 per cent
A5	both headlamps	more than	20 per cent

2.3.2. sample B

B4	in the case of A2		
	one headlamp	more than	0 per cent
	but	not more than	20 per cent
	one headlamp	not more than	20 per cent
B5	in the case of A2		
	both headlamps	more than	20 per cent
B6	in the case of A2		
	one headlamp		0 per cent
	one headlamp	more than	30 per cent

2.3.3. or if the conditions of paragraph 1.2.2 for samples A and B are not fulfilled.

3. REPEATED SAMPLING

In the cases of A3, B2, B3 a repeated sampling, third sample C of two headlamps and fourth sample D of two headlamps, selected from stock manufactured after alignment, is necessary within two months time after the notification.

3.1. The conformity is not contested

3.1.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall not be contested if the deviations of the measured values of the headlamps are:

3.1.1.1. sample C

C1	one headlamp		0 per cent
	one headlamp	not more than	20 per cent
C2	both headlamps	more than	0 per cent
	but	not more than	20 per cent
	go to sample D		

3.1.1.2. sample D

D1	in the case of C2		
	both headlamps		0 per cent

3.1.2. or if the conditions of paragraph 1.2.2 for sample C are fulfilled.

3.2. The conformity is contested

3.2.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the headlamps are:

3.2.1.1. sample D

D2	in the case of C2		
	one headlamp	more than	0 per cent
	but	not more than	20 per cent
	one headlamp	not more than	20 per cent

3.2.1.2. or if the conditions of paragraph 1.2.2 for sample C are not fulfilled:

3.3. Approval withdrawn

Conformity shall be contested and paragraph 12 applied if, following the sampling procedure in Figure 1 of this annex, the deviations of the measured values of the headlamps are:

3.3.1. sample C

C3	one headlamp	not more than	20 per cent
	one headlamp	more than	20 per cent
C4	both headlamps	more than	20 per cent

3.3.2. sample D

D3	in the case of C2		
	one headlamp	0 or more than	0 per cent
	one headlamp	more than	20 per cent

3.3.3. or if the conditions of paragraph 1.2.2 for samples C and D are not fulfilled.

4. CHANGE OF THE VERTICAL POSITION OF THE CUT-OFF LINE

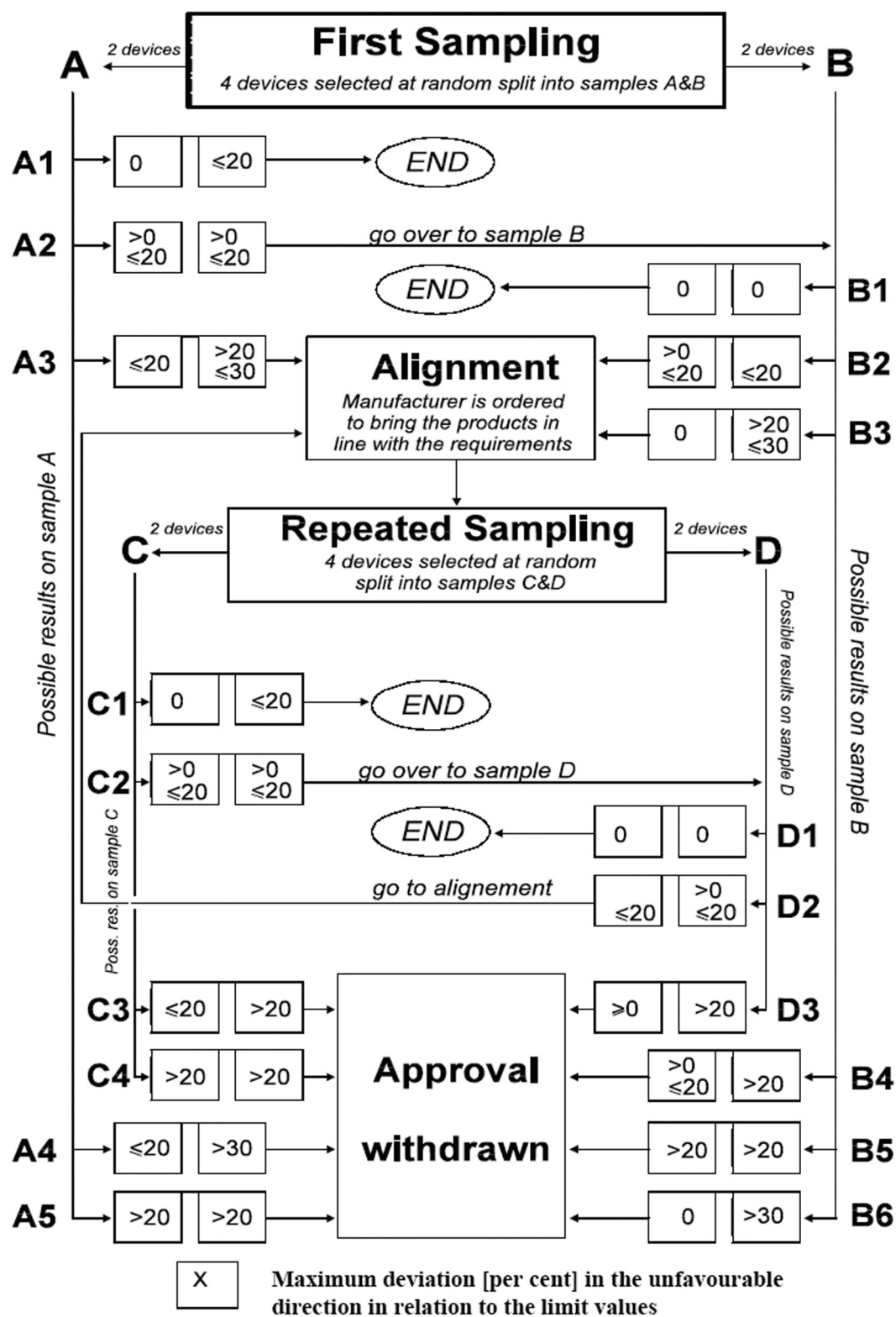
With respect to the verification of the change in vertical positions of the cut-off line under the influence of heat, the following procedure shall be applied:

One of the headlamps of sample A after sampling procedure in Figure 1 of this annex shall be tested according to the procedure described in paragraph 2.1 of annex 6 after being subjected three consecutive times to the cycle described in paragraph 2.2.2 of annex 6.

The headlamp shall be considered as acceptable if Δr does not exceed 1,5 mrad.

If this value exceeds 1,5 mrad but is not more than 2,0 mrad, the second headlamp of sample A shall be subjected to the test after which the mean of the absolute values recorded in both samples shall not exceed 1,5 mrad. However, if this value of 1,5 mrad on sample A is not complied with, the two headlamps of sample B shall be subjected to the same procedure and the value of Δr for each of them shall not exceed 1,5 mrad.

Figure 1



Only the original UN/ECE texts have legal effect under international public law. The status and date of entry into force of this Regulation should be checked in the latest version of the UN/ECE status document TRANS/WP.29/343, available at:
<http://www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29fdocstts.html>

**Regulation No 93 of the Economic Commission for Europe of the United Nations (UN/ECE) —
Uniform provisions concerning the approval of:**

I. Front underrun protective devices (FUPDs)

II. Vehicles with regard to the installation of an FUPD of an approved type

III. Vehicles with regard to their front underrun protection (FUP)

Date of entry into force: 27 February 1994

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ANNEXES

Annex 1 — Communication concerning the approval or extension or refusal or withdrawal of approval or production definitely discontinued of a type of front underrun protection device (FUPD) pursuant to Regulation No 93 (Part I)

Annex 2 — Communication concerning the approval or extension or refusal or withdrawal of approval or production definitely discontinued of a vehicle type with regard to the installation of a front underrun protection device (FUPD) of an approved type pursuant to Regulation No 93 (Part II)

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Annex 4 — Arrangements of approval marks

Annex 5 — Test conditions and procedures

Annex 6 — Conformity of production and other administrative procedures

1. SCOPE

1.1. This Regulation applies to:

1.1.1. PART I: the FUPDs which are intended to be fitted to vehicles of categories N₂ and N₃ ⁽¹⁾;

1.1.2. PART II: the installation on vehicles of categories N₂ and N₃ ⁽¹⁾ of FUPDs which have been type approved to Part I of this Regulation;

1.1.3. PART III: vehicles of categories N₂ and N₃ with regard to its front underrun protection (FUP), equipped with an FUPD which has not been separately approved according to Part I of this Regulation or so designed and/or equipped that their component parts can be regarded as fulfilling the function of the FUPD.

1.2. Vehicles of categories N₂ with a maximum mass not exceeding 7,5 tonnes shall comply only with the ground clearance requirement of 400 mm set out in this Regulation.

1.3. The requirements of this Regulation do not apply to:

1.3.1. off-road vehicles of categories N₂G and N₃G ⁽¹⁾

1.3.2. vehicles such that their use is incompatible with the provisions of front underrun protection.

2. PURPOSE

The purpose of this Regulation is to offer effective protection for vehicles of category M₁ or N₁ ⁽¹⁾ against underrunning of vehicles mentioned in paragraph 1 of this Regulation in the event of a frontal collision.

3. DEFINITIONS

3.1. For the purpose of this Regulation:

3.1.1. 'Maximum mass' of the vehicle means the mass stated by the vehicle manufacturer to be the maximum technically permissible (this may be higher than the 'permissible maximum mass' laid down by the national administration);

3.1.2. 'Maximum weight' of the vehicle means the vertical force (in newtons) required to support the same vehicle loaded to its maximum mass;

3.1.3. 'Unladen vehicle' means the vehicle in running order unoccupied and unladen but complete with fuel, coolant, lubricant, tools and a spare wheel (if provided as standard equipment by the vehicle manufacturer);

3.1.4. 'Approval of an FUPD' means the approval of such a type of FUPD with respect to the requirements laid down in paragraph 7 below;

3.1.5. 'Type of FUPD' means FUPD which do not differ with respect to the essential characteristics such as shape, dimensions, attachment, materials and the markings cited in paragraph 4.2 below;

3.1.6. 'Front underrun protection (FUP)' means the presence at the front of the vehicle of either:

3.1.6.1. A special device (FUPD); or

3.1.6.2. Body work, chassis parts or other components, such that by virtue of their shape and characteristics, these elements can be regarded as fulfilling the function of the FUPD;

⁽¹⁾ See Consolidated Resolution on the Construction of Vehicles (R.E.3, annex 7) (TRANS/SC1/WP29/78/Amend.3).

3.1.7. 'Approval of a vehicle' means the approval of a vehicle type:

for Part II of this Regulation — with regard to the installation of an FUPD of an approved type according to Part I of this Regulation, or

for Part III of this Regulation - with regard to its FUP;

3.1.8. 'Vehicle type' means vehicles which do not essentially differ in such aspects as:

The width of the foremost axle measured at the outermost part of the tyres excluding the bulging of the tyres close to the ground.

The structure, the dimensions, the shape and materials of the front part of the vehicle in so far as they have a bearing on the requirements of the relevant Part of this Regulation.

The approved FUPDs fitted to the vehicle, where the application is pursuant to satisfying Part II of this Regulation.

The maximum mass of the vehicle type.

4. APPLICATION FOR APPROVAL

4.1. The application for approval to a Part of this Regulation shall be submitted by the manufacturer of the type (vehicle/FUPD) or his duly accredited representative.

4.2. For each type the application shall be accompanied by:

4.2.1. Documentation in triplicate giving a description of the technical characteristics of the type (vehicle/FUPD); its dimensions, lines and constituent materials, in so far as required for the purpose of this Regulation.

4.2.2. In case of FUPD sample of the type: the sample shall be clearly and indelibly marked on all its main components, relevant to the front underrun, with the applicant's trade name or mark and the type designation;

4.2.3. A representative of the type of device or vehicle to be approved shall be submitted for each test to the technical service responsible for conducting the approval tests;

4.2.4. For applications pursuant to Parts II or III of this Regulation a vehicle not comprising all the components proper to the type may be accepted for test provided that they do not adversely affect the front underrun protection.

4.2.5. Identification of the positions of the points P_1 , P_2 and P_3 as defined in annex 5. For applications pursuant to satisfying Part I of this Regulation these should take into account the requirements of Part II.

4.3. Applications pursuant to satisfying Part II of this Regulation shall be accompanied by:

4.3.1. A list of the FUPDs intended to be fitted to the vehicle type;

4.3.2. At the request of the competent authority the type approval communication form conforming to annex 1 of this Regulation of each FUPD shall also be supplied.

- 4.4. Applications pursuant to satisfying Parts II and III of this Regulation shall be accompanied by information on the vehicle type as defined in paragraph 3.1.8
- 4.5. The competent authority shall maintain the following administrative procedures according to annex 6 to cover the following:
 - 4.5.1. Verification of the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type approval is granted,
 - 4.5.2. Penalties for non-conformity of production,
 - 4.5.3. Modification or extension of approval of a type,
 - 4.5.4. Production being definitely discontinued.

PART I

APPROVAL OF FRONT UNDERRUN PROTECTIVE DEVICES (FUPDs)

- 5. APPROVAL OF AN FUPD
 - 5.1. If the FUPD submitted for approval pursuant to this Regulation meets the requirements of paragraph 6 below, approval of that type of FUPD shall be granted in accordance with the arrangements contained in annex 4.
 - 5.2. Notice of approval, or of extension or of refusal of approval of the type of FUPD pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement which apply this Regulation, by means of a form conforming to the model in annex 1 to this Regulation.
- 6. REQUIREMENTS FOR FUPDs
 - 6.1. The FUPD shall offer adequate resistance to forces applied parallel to the longitudinal axis of the vehicle and also satisfy certain dimensional requirements. These shall be demonstrated in accordance with the test procedure and conditions specified in annex 5 to this Regulation.
 - 6.2. The section height of the FUPD cross-member shall not be less than 100 mm for category N₂ vehicles and 120 mm for vehicles of category N₃. The lateral extremities of the cross-member shall not bend to the front or have a sharp outer edge; this condition is fulfilled when the lateral extremities of the cross-member are rounded on the outside and have a radius of curvature of not less than 2,5 mm.
 - 6.3. The device may be so designed that its position at the front of the vehicle can be varied. In this event, there shall be a guaranteed method of securing it in the service position so that any unintentional change of position is precluded. It shall be possible for the operator to vary the position of the device by applying a force not exceeding 40 daN;
 - 6.4. The outermost surfaces of every front guard installation shall be essentially smooth or horizontally corrugated save that domed heads of bolts or rivets may protrude beyond the surface to a distance not exceeding 10 mm.

PART II

APPROVAL OF A VEHICLE WITH REGARD TO THE INSTALLATION OF AN FUPD OF AN APPROVED TYPE

7. APPROVAL OF AN INSTALLATION OF AN APPROVED FUPD
 - 7.1. If the vehicle submitted for approval pursuant to this Part of this Regulation is provided with an approved FUPD and meets the requirements of paragraph 8 below, approval of that vehicle type shall be granted in accordance with the arrangements contained in annex 4.
 - 7.2. Notice of approval, or of extension or of refusal of approval of the vehicle type pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement which apply this Regulation, by means of a form conforming to the model in annex 2 to this Regulation.
8. REQUIREMENTS FOR THE INSTALLATION OF AN APPROVED FUPD
 - 8.1. The maximum mass of a vehicle type for which approval is requested shall not exceed the value indicated on the type approval communication form of each approved FUPD intended to be installed on that vehicle.
 - 8.2. The vehicle with the FUPD installed shall satisfy certain dimensional requirements specified in annex 5 taking into account the test conditions and information indicated on the communication document contained in annex 1 issued in respect of the FUPD.
 - 8.3. The FUPD shall be so fitted to the vehicle that the horizontal distance measured in the rearward direction from the foremost part of the vehicle to the front of the FUPD does not exceed 400 mm diminished by the recorded deformation (annex 1, item 9) measured at any of the points where the test forces have been applied during the type approval of the FUPD in conformity with the provisions of Part I of this Regulation and recorded in the type approval communication form (see figures 1 and 2).
 - 8.4. In measuring these distances, any part of the vehicle which is more than 2 m above the ground shall be excluded.
 - 8.5. The maximum ground clearance with respect to the underside of the FUPD shall be no more than 400 mm, as specified in paragraph 3 of annex 5, between the two points P_1 in the installed condition. Outboard of each point P_1 this height may be greater than 400 mm providing the underside is not above a plane passing through the underside of the FUPD directly below the point P_1 and forming a slope at 15° above the horizontal (see figure 3).
 - 8.6. The height above the ground of the points of application of the test forces applied to the FUPD according to Part I of this Regulation and recorded in the type approval communication form (annex 1, item 8) shall not exceed 445 mm as specified in paragraph 3 of annex 5.
 - 8.7. The maximum ground clearance with respect to the underside of the FUPD between the two points P_1 shall be no more than 450 mm taking into account their movement during the application of the test load, according to Part I.
 - 8.8. The width of the FUPD shall at no point exceed the width of the mudguards covering the wheels of the foremost axle nor shall it be more than 100 mm shorter on either side than the foremost axle measured at the outermost points of the tyres, excluding the bulging of the tyres close to the ground (see figure 1), or 200 mm shorter on either side, measured from the outermost points of the access steps to the driver's cabin.

PART III

APPROVAL OF A VEHICLE WITH REGARD TO ITS FRONT UNDERRUNPROTECTION (FUP)

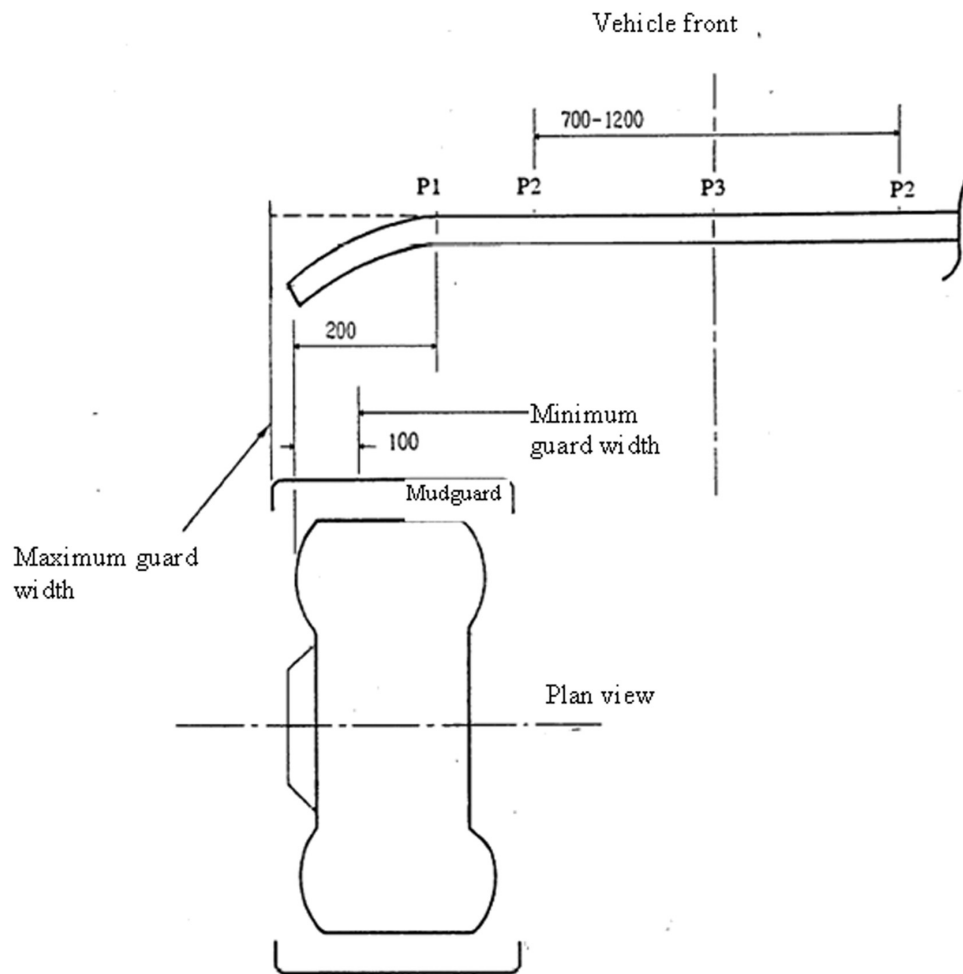
9. APPROVAL OF A VEHICLE WITH FUP

- 9.1. If the vehicle submitted for approval pursuant to this Regulation is provided with FUP that meets the requirements of paragraph 10 below, approval of that vehicle type shall be granted in accordance with the arrangements contained in annex 4.
- 9.2. Notice of approval, or of extension or of refusal of approval of the vehicle type pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement which apply this Regulation, by means of a form conforming to the model in annex 3 to this Regulation.

10. REQUIREMENTS FOR A VEHICLE WITH FUP

- 10.1. Any vehicle in one of the categories N_2 or N_3 will be deemed to satisfy the condition set out in paragraph 2 provided that the vehicle is equipped with an FUPD which has not been separately approved to Part I of this Regulation or is so designed and/or equipped at the front that, by virtue of their shape and characteristics, its component parts can be regarded as replacing the front underrun protective device. Components whose combined function satisfies the following requirements are considered to form a front underrun protective device.
- 10.2. The FUP shall offer adequate resistance to forces applied parallel to the longitudinal axis of the vehicle. The FUP shall also satisfy certain dimensional requirements. These shall be demonstrated in accordance with the test procedure and conditions specified in annex 5 to this Regulation.
- 10.3. For application pursuant to Part III, the section height of the FUPD cross-member (not separately approved to Part I) shall not be less than 100 mm for category N_2 vehicles and 120 mm for vehicles of category N_3 .
- 10.4. The device may be so designed that its position at the front of the vehicle can be varied. In this event, there shall be a guaranteed method of securing it in the service position so that any unintentional change of position is precluded. It shall be possible for the operator to vary the position of the device by applying a force not exceeding 40 daN;
- 10.5. The FUP shall have sufficient strength that the horizontal distance measured in the rearward direction between the foremost part of the vehicle after the application of the test forces (specified in this annex) and the test ram contact surface on the vehicle does not exceed 400 mm.
- 10.6. In measuring these distances, any part of the vehicle which is more than 2 m above the ground shall be excluded.
- 10.7. The maximum ground clearance with respect to the underside of the FUP shall be no more than 400 mm, as specified in paragraph 2 of annex 5, between the two points P_1 . Outboard of each point P_1 this height may be greater than 400 mm providing the underside is not above a plane passing through the underside of the FUP directly below the point P_1 and forming a slope at 15° above the horizontal (see figure 3).
- 10.8. The maximum ground clearance with respect to the underside of the FUP between the two points P_1 shall be no more than 450 mm taking into account their movement during the application of the test load.
- 10.9. The width of the FUP shall at no point exceed the width of the mudguards covering the wheels of the foremost axle nor shall it be more than 100 mm shorter on either side than the foremost axle measured at the outermost points of the tyres, excluding the bulging of the tyres close to the ground (see figure 1), or 200 mm shorter on either side, measured from the outermost points of the access steps to the driver's cabin.

Figure 1



FUP normally consists of a cross-member and links to the chassis or other structural members

Note: The shape of FUPD is only an example.

Figure 2

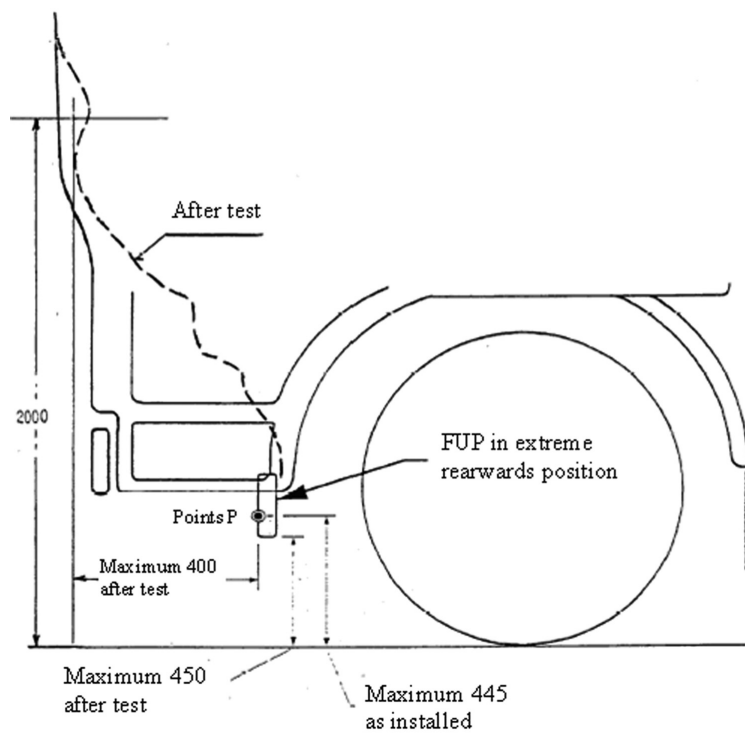
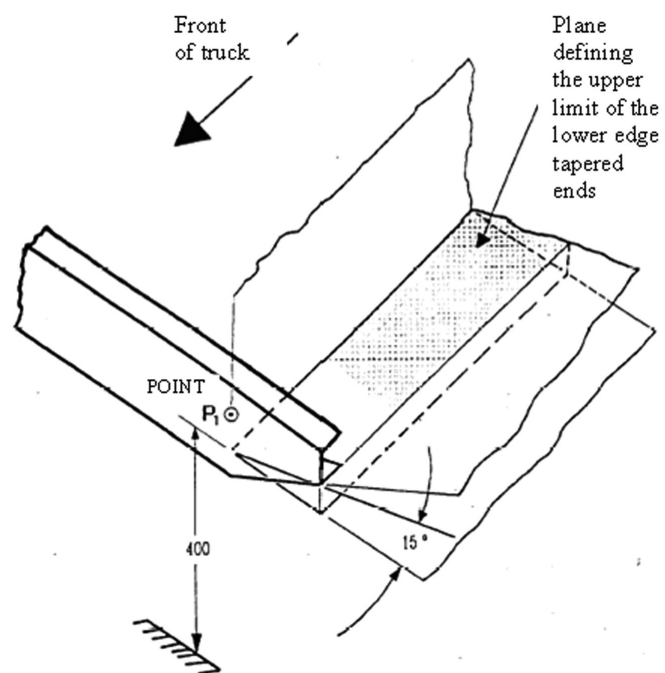


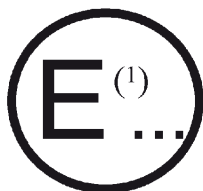
Figure 3



ANNEX I

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by: Name of administration:

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

concerning ⁽²⁾: APPROVAL GRANTED
APPROVAL EXTENDED
APPROVAL REFUSED
APPROVAL WITHDRAWN
PRODUCTION DEFINITELY DISCONTINUED

of a type of front underrun protection device (FUPD) pursuant to Regulation No 93 (Part I)

Approval No: Extension No:

1. Trade name or mark of technical unit
2. If necessary the type of vehicle(s) and category to which it is intended
3. Maximum mass of vehicle(s) to which FUPD is to be installed
4. Name and address of manufacturer
5. Name and address of manufacturer's authorized representative (if any)
6. Characteristics of the technical unit
7. Restrictions on use and mounting specifications (if any)
8. Position on the device of the points of application of the test forces
9. Maximum horizontal and vertical deflection during and after the application of the test forces of any test point
10. Date on which the device was submitted for approval tests
11. Technical service responsible for carrying out the approval tests on devices
12. Date of test report issued by the technical service
13. Number of test report issued by the technical service
14. Approval granted/refused/extended/withdrawn ⁽²⁾
15. Reason(s) for the extension of the approval applicable
16. Position of the approval mark
17. Place
18. Date
19. Signature
- Name

20. The list of documents filed with the administration which has granted approval, and is available, is annexed to this communication.

21. Remarks (if any)

.....

.....

.....

.....

—

⁽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.

ANNEX 2

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by: Name of administration:

.....

.....

.....

concerning ⁽²⁾: APPROVAL GRANTED
 APPROVAL EXTENDED
 APPROVAL REFUSED
 APPROVAL WITHDRAWN
 PRODUCTION DEFINITELY DISCONTINUED

of a vehicle type with regard to the installation of a front underrun protection device (FUPD) of an approved type pursuant to Regulation No 93 (Part II)

Approval No: Extension No:

1. Trade name or mark of the vehicle
2. Type and category of vehicle(s)
3. Maximum mass of vehicle(s)
4. Name and address of manufacturer
5. Name and address of manufacturer's authorized representative (if any)
6. Brief description of the vehicle type as regards its dimensions and lines
7. Trade name or mark of the FUPD(s) and its/their approval number(s)
8. Date on which vehicle was submitted for approval tests
9. Technical service responsible for carrying out the approval tests on vehicles:
10. Date of test report issued by the technical service:
11. Number of test report issued by the technical service:
12. Approval granted/refused/extended/withdrawn ⁽²⁾
13. Reason(s) for the extension of the approval applicable:
14. Position of approval mark on the vehicle
15. Place:
16. Date:
17. Signature:
 Name:
18. Annexed is a list of documents making up the approval file, deposited with the competent authority which granted approval; a copy can be obtained on request.
19. Remarks (if any):

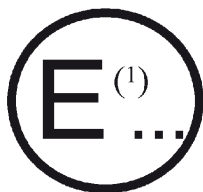
⁽¹⁾ Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulation).

⁽²⁾ Strike out what does not apply.

ANNEX 3

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by: Name of administration:

.....

.....

.....

concerning ⁽²⁾: APPROVAL GRANTED
 APPROVAL EXTENDED
 APPROVAL REFUSED
 APPROVAL WITHDRAWN
 PRODUCTION DEFINITELY DISCONTINUED

of a vehicle with regard to its front underrun protection (FUP) pursuant to Regulation No 93 (Part III)

Approval No: Extension No:

1. Trade name or mark of the vehicle
2. Type and category of vehicle(s)
3. Maximum mass of vehicle(s)
4. Name and address of manufacturer
5. If applicable, name and address of manufacturer's representative
6. Characteristics of the parts providing frontal protection
7. Date on which the vehicle was submitted for approval tests
8. Position on the FUP of the points of application of the test forces
9. Maximum vertical and horizontal deflection during and after the application of the test forces of any test point
10. Technical service responsible for carrying out the approval tests on vehicles
11. Date of test report issued by the technical service
12. Number of test report issued by the technical service
13. Approval granted/refused/extended/withdrawn ⁽²⁾
14. Reason(s) for the extension of the approval applicable
15. Position of approval mark on the vehicle
16. Place
17. Date
18. Signature
- Name
19. Annexed is a list of documents making up the approval file, deposited with the competent authority which granted approval; a copy can be obtained on request.
20. Remarks (if any)

⁽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.

ANNEX 4

ARRANGEMENTS OF APPROVAL MARKS

1. APPROVAL NUMBER

- 1.1. An approval number shall be assigned to each type approved. Its first two digits (at present 00) 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 shall not assign the same number to another type.
- 1.2. Notice of approval, or of extension or of refusal of approval of a type pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement which apply this Regulation, by means of a form conforming to one of the models in annexes 1, 2 or 3 to this Regulation.
- 1.3. There shall be affixed, conspicuously and in the case of a technical unit in a position where in the installed condition it is readily accessible and specified on the approval form, to every one of series conforming to a type approved under this Regulation an international approval mark consisting of:
 - 1.3.1. A circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval ⁽¹⁾;
 - 1.3.2. 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 1.3.1.
 - 1.3.3. An additional symbol separated from the number of this Regulation by a vertical line and consisting of the Roman numeral(s) for the Part (I, II or III) of the Regulation pursuant to which the device or the vehicle has been approved.
- 1.4. If the vehicle conforms to a vehicle 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 1.3.1 of this annex 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 1.3.1 of this annex.
- 1.5. The approval mark shall be clearly legible and be indelible.

2. ARRANGEMENTS OF APPROVAL MARKS

2.1. Model A

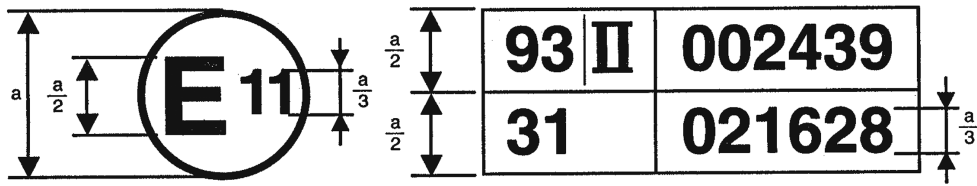


$a \geq 8 \text{ mm}$

- 2.1.1. The above approval mark affixed to a vehicle shows that the vehicle type concerned has, with regard to the front underrun protection in the event of a collision, been approved in the United Kingdom (E11) pursuant to Regulation No 93, Part II (installation of a front underrun protection device (FUPD) of an approved type) 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 93, Part II in its original form.

⁽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, 25 (vacant), 26 for Slovenia and 27 for Slovakia. Subsequent numbers shall be assigned to other countries in the chronological order in which they ratify or accede to the Agreement concerning the 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.

2.2. Model B



a ≥ 8 mm

2.2.1. The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the United Kingdom (E 11) pursuant to Regulation No 93, Part II and Regulation No 31 ⁽¹⁾. The approval numbers indicate that, at the dates when the respective approvals were given, Regulation No 93 was in its original form and Regulation No 31 included the 02 series of amendments.

⁽¹⁾ The latter number is given as an example only.

ANNEX 5

TEST CONDITIONS AND PROCEDURES

1. TEST CONDITIONS FOR FUPDs

1.1. At the request of the manufacturer the test may be conducted either:

1.1.1. On a vehicle of the type for which FUPD is intended; in that case the conditions set out in paragraph 2 shall be observed; or

1.1.2. On a part of the chassis of the vehicle type for which the FUPD is intended; this part shall be representative of the vehicle type(s) in question; or

1.1.3. On a rigid test bench.

1.2. In the case of paragraphs 1.1.2 and 1.1.3 above the parts used to connect the FUPD to part of the vehicle chassis or to the rigid test bench shall be equivalent to those which are used to secure the FUPD when it is installed on the vehicle.

1.3. At the request of the manufacturer and with the consent of the technical service the test procedure described in paragraph 3 below may be simulated by calculation or another such method provided that its equivalence is demonstrated.

2. TEST CONDITIONS FOR VEHICLES

2.1. The vehicle may, if necessary to achieve the test forces required in paragraph 3.1 below, be restrained by any method, this method to be specified by the vehicle manufacturer.

2.2. Dimensions shall be taken as if the vehicle were in the following condition:

2.2.1. The vehicle was unladen.

2.2.2. The vehicle was at rest on a level, flat, rigid and smooth surface.

2.2.3. The front wheels were in the straight-ahead position.

2.2.4. The tyres were inflated to the pressure recommended by the vehicle manufacturer.

2.2.5. Vehicles equipped with hydropneumatic, hydraulic or pneumatic suspension or a device for automatic levelling according to load were in their normal running condition specified by the manufacturer.

3. TEST PROCEDURE

3.1. Points P_1 are located up to 200 mm from the longitudinal planes tangential to the outermost points of the tyres on the front axle, excluding the bulging of the tyres close to the ground; points P_2 are symmetrical to the median longitudinal plane of the vehicle at a distance from each other of 700 to 1 200 mm inclusive. The exact positions shall be specified by the manufacturer.

3.2. The height above the ground of points P_1 and P_2 shall be defined by the vehicle manufacturer within the lines that bound the front face of the device. The height shall not, however, exceed 445 mm when the vehicle is unladen. P_3 is in the vertical longitudinal median plane of the vehicle (see figure 1 of the Regulation).

3.3. The test forces set out below shall be applied to each of the test points in separate tests on the same vehicle or device or, if requested by the manufacturer/agent, on different vehicles or device samples.

3.3.1. If the structure and components of the vehicle relevant to the front underrun protection are located substantially symmetrical to its longitudinal median plane the tests at points P_1 and P_2 shall be carried out only on one side.

- 3.3.2. When tested the forces shall be applied as rapidly as possible and the device or vehicle shall withstand the forces in the following paragraphs for at least 0,2 seconds.
- 3.3.3. A horizontal force equal to 50 % of the maximum weight of the vehicle or intended vehicle type(s) but not exceeding 80×10^3 N shall be applied successively to both points P_1 ;
- 3.3.4. A horizontal force equal to 100 % of the maximum weight of the vehicle or intended vehicle type(s) but not exceeding 160×10^3 N shall be applied successively to both points P_2 . If the device is discontinuous and is reduced in cross-section area between the two points P_2 , then the tests shall continue with the application of a horizontal force applied to the point P_3 the same as that to the points P_1 ;
- 3.4. The maximum horizontal and vertical displacements of each test point during the application of the above forces shall be recorded and the highest recorded on the communication document.
- 3.5. Whenever a practical test is performed to verify compliance with the above-mentioned requirements, the following conditions shall be fulfilled:
- 3.5.1. For application pursuant to Part III, an FUPD (not separately approved to Part I) shall be connected to the chassis side members of the vehicle or to whatever replaces them or a structure with demonstrated equivalent performance capabilities.
- 3.5.2. The specified forces shall be applied by rams which are suitably articulated (e.g. by means of universal joints) and shall be parallel to the median longitudinal plane of the vehicle via a surface not more than 250 mm in height (the exact height and width shall be indicated by the manufacturer) and not more than 400 mm wide, with a radius of curvature of 5 ± 1 mm at the vertical edges; the centre of the surface is placed successively at points P_1 , P_2 and P_3 .
-

ANNEX 6

Conformity of production and other administrative procedures

1. CONFORMITY OF PRODUCTION
 - 1.1. FUPDs and vehicles approved to this Regulation shall be so manufactured as to conform to the type approval by meeting the requirements set forth in this Regulation.
 - 1.2. In order to verify that the requirements of paragraph 1.1 above are met, suitable controls of the production shall be carried out.
 - 1.3. The holder of the approval shall in particular:
 - 1.3.1. ensure existence of procedures for the effective control of the quality of the vehicle or the device;
 - 1.3.2. have access to the testing equipment necessary for checking the conformity to each approved type;
 - 1.3.3. record data of test results and annexed documents which shall remain available for a period to be determined in accordance with the administrative service;
 - 1.3.4. analyse the results of each type of test, in order to verify and ensure the stability of the vehicle or the device characteristics making allowance for variations of an industrial production;
 - 1.3.5. ensure that for each type of vehicle or device sufficient checks and tests are carried out regarding the dimensions, materials and performance of the components, which fulfil the function of the FUP and of those for the installation on the vehicle;
 - 1.3.6. ensure that any set of samples or test pieces giving evidence of non-conformity with the type of test considered shall give rise to another sampling and another test. All the necessary steps shall be taken to re-establish the conformity of the corresponding production.
 - 1.4. The competent authority which has granted type-approval may at any time verify the conformity control methods applicable to each production unit.
 - 1.4.1. In every inspection, the test books and production survey records shall be presented to the visiting inspector.
 - 1.4.2. The inspector may take samples at random which will be tested in the manufacturer's laboratory. The minimum number of samples may be determined according to the results of the manufacturer's own verification.
 - 1.4.3. When the quality level appears unsatisfactory or when it seems necessary to verify the validity of the tests carried out in application of paragraph 1.4.2 above the inspector may select samples to be sent to the technical service which has conducted the type approval tests.
 - 1.4.4. The competent authority may carry out any test prescribed in this Regulation.
 - 1.4.5. The normal frequency of inspections authorized by the competent authority shall be one per two years. In the case when negative results are recorded during one of these visits, the competent authority shall ensure that all necessary steps are taken to re-establish the conformity of production as rapidly as possible.
2. PENALTIES FOR NON-CONFORMITY OF PRODUCTION
 - 2.1. The approval granted in respect of a type of FUPD or vehicle pursuant to this Regulation may be withdrawn if the requirements set forth above are not met or if the protective device has failed to pass the test prescribed in this Regulation.

- 2.2. 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 applying this Regulation, by means of a communication form conforming to the model in annexes 1, 2 or 3 to this Regulation.
3. MODIFICATION AND EXTENSION OF APPROVAL
 - 3.1. Every modification of a type of FUPD or vehicle shall be notified to the administrative department which approved the type. The department may then either:
 - 3.1.1. Consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the FUPD or vehicle still complies with the requirements; or
 - 3.1.2. Require a further test report from the technical service responsible for conducting the tests.
 - 3.2. Confirmation or refusal of approval, specifying the alterations shall be communicated by means of a form conforming to the model in annexes 1, 2 or 3 to this Regulation to the Parties to the Agreement applying this Regulation.
 - 3.3. The competent authority issuing the extension of approval shall assign a series number to such an extension and inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in annexes 1, 2 or 3 to this Regulation.
4. PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a type of FUPD or vehicle FUP 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 1958 Agreement applying this Regulation by means of a communication form conforming to the model in annexes 1, 2 or 3 to this Regulation.
5. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS

The Contracting Parties to the 1958 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, or production definitely discontinued, issued in other countries, are to be sent.

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