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**COUNCIL DIRECTIVE**

**of 27 July 1976**

**on the approximation of the laws of the Member States relating to reflex reflectors for motor vehicles and their trailers**

(76/757/EEC)

(OJ L 262, 27.9.1976, p. 32)

Amended by:

	Official Journal		
	No	page	date
► <b><u>M1</u></b> Council Directive 87/354/EEC of 25 June 1987	L 192	43	11.7.1987

Amended by:

► <b><u>A1</u></b> Act of Accession of Greece	L 291	17	19.11.1979
► <b><u>A2</u></b> Act of Accession of Spain and Portugal	L 302	23	15.11.1985



**COUNCIL DIRECTIVE**

**of 27 July 1976**

**on the approximation of the laws of the Member States relating to  
reflex reflectors for motor vehicles and their trailers**

(76/757/EEC)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 100 thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Parliament<sup>(1)</sup>,

Having regard to the opinion of the Economic and Social Committee<sup>(2)</sup>,

Whereas the technical requirements which motor vehicles must satisfy pursuant to national laws relate *inter alia* to their reflex reflectors;

Whereas those requirements differ from one Member State to another; whereas it is therefore necessary that all Member States adopt the same requirements either in addition to or in place of their existing rules in order, in particular, to allow the EEC type-approval procedure, which was the subject of Council Directive 70/156/EEC of 6 February 1970 on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers<sup>(3)</sup>, to be introduced in respect of each type of vehicle;

Whereas, in Directive 76/756/EEC<sup>(4)</sup>, the Council laid down common requirements for the installation of lighting and light-signalling devices on motor vehicles and their trailers;

Whereas a harmonized type-approval procedure for reflectors makes it possible for each Member State to check compliance with the common construction and testing requirements and to inform the other Member States of its findings by sending a copy of the component type-approval certificate completed for each type of reflex reflector; whereas the placing of an EEC component type-approval mark on all reflex reflectors manufactured in conformity with the approved type obviates any need for technical checks on these reflex reflectors in the Member States;

Whereas it is desirable to take into account the technical requirements adopted by the UN Economic Commission for Europe in its Regulation No 3 ('Uniform provisions for the approval of reflex reflecting devices for motor vehicles')<sup>(5)</sup>, which is annexed to the Agreement of 20 March 1958 concerning the adoption of uniform conditions for approval and reciprocal recognition of approval for motor vehicle equipment and parts;

Whereas the approximation of national laws relating to motor vehicles entails reciprocal recognition by Member States of the checks carried out by each of them on the basis of the common requirements,

<sup>(1)</sup> OJ No C 55, 13. 5. 1974, p. 14.

<sup>(2)</sup> OJ No C 109, 19. 9. 1974, p. 26.

<sup>(3)</sup> OJ No L 42, 23. 2. 1970, p. 1.

<sup>(4)</sup> See page 1 of this Official Journal.

<sup>(5)</sup> Economic Commission for Europe, Document

E/ECE/324  
E/ECE/TRANS/505 } Addendum 2.



HAS ADOPTED THIS DIRECTIVE:

*Article 1*

1. Each Member State shall grant EEC component type-approval for any type of reflex reflector which satisfies the construction and testing requirements laid down in Annexes 0, I, III, V, VI, VII, VIII, IX, X, XI and XII.
2. The Member State which has granted EEC component type-approval shall take the measures required in order to verify that production models conform to the approved type, in so far as this is necessary and if need be in cooperation with the competent authorities in the other Member States. Such verification shall be limited to spot checks.

*Article 2*

Member States shall, for each type of reflex reflector which they approve pursuant to Article 1, issue to the manufacturer, or to his authorized representative, an EEC component type-approval mark conforming to the model shown in Annex III.

Member States shall take all appropriate measures to prevent the use of marks liable to create confusion between reflex reflectors which have been type-approved pursuant to Article 1, and other devices.

*Article 3*

1. No Member State may prohibit the placing on the market of reflex reflectors on grounds relating to their construction or method of functioning if they bear the EEC component type-approval mark.
2. Nevertheless, a Member State may prohibit the placing on the market of reflex reflectors bearing the EEC component type-approval mark which consistently fail to conform to the approved type.

That State shall forthwith inform the other Member States and the Commission of the measures taken, specifying the reasons for its decision.

*Article 4*

The competent authorities of each Member State shall within one month send to the competent authorities of the Member States a copy of the component type-approval certificates, an example of which is given in Annex II, completed for each type of reflex reflector which they approve or refuse to approve.

*Article 5*

1. If the Member State which has granted EEC component type-approval finds that a number of reflex reflectors bearing the same EEC component type-approval mark do not conform to the type which it has approved, it shall take the necessary measures to ensure that production models conform to the approved type. The competent authorities of that State shall advise those of the other Member States of the measures taken which may, where there is consistent failure to conform, extend to withdrawal of EEC component type-approval. The said authorities shall take the same measures if they are informed by the competent authorities of another Member State of such failure to conform.
2. The competent authorities of the Member States shall within one month inform each other of any withdrawal of EEC component type-approval and of the reasons for such a measure.

*Article 6*

Any decision taken pursuant to the provisions adopted in implementation of this Directive, to refuse or withdraw type-approval for a reflex reflector or prohibit its placing on the market or use shall set out in detail the reasons on which it is based. Such decision shall be notified to the party concerned, who shall at the same time be informed of the remedies available to him under the laws in force in the Member States and of the time limits allowed for the exercise of such remedies.

*Article 7*

No Member State may refuse to grant EEC type-approval or national type-approval of a vehicle on grounds relating to its reflex reflectors if these bear the EEC component type-approval mark and are fitted in accordance with the requirements laid down in Directive 76/756/EEC.

*Article 8*

No Member State may refuse or prohibit the sale, registration, entry into service or use of any vehicle on grounds relating to its reflex reflectors if these bear the EEC component type-approval mark and are fitted in accordance with the requirements laid down in Directive 76/756/EEC.

*Article 9*

For the purposes of this Directive, 'vehicle' means any motor vehicle intended for use on the road, with or without bodywork, having at least four wheels and a maximum design speed exceeding 25 km/h, and its trailers, with the exception of vehicles which run on rails, agricultural tractors and machinery and public works vehicles.

*Article 10*

Any amendments necessary to adjust the requirements of the Annexes to take account of technical progress shall be adopted in accordance with the procedure laid down in Article 13 of Directive 70/156/EEC.

*Article 11*

1. Member States shall adopt and publish the provisions necessary in order to comply with this Directive before 1 July 1977 and shall forthwith inform the Commission thereof. They shall apply these provisions from 1 October 1977 at the latest.
2. Once this Directive has been notified, the Member States shall also ensure that the Commission is informed, in sufficient time for it to submit its comments, of any draft laws, regulations or administrative provisions which they propose to adopt in the field covered by this Directive.

*Article 12*

This Directive is addressed to the Member States.

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## List of Annexes

- Annex 0 (\*) — Definitions, conformity of production, general specifications, special specifications
- Annex I — Definitions of technical terms  
— Appendix 1: Symbols and units  
— Appendix 2: Symbols
- Annex II — Model EEC component type-approval certificate
- Annex III — EEC component type-approval and marking requirements  
— Appendix: Example of EEC component type-approval mark
- (Annex IV)
- Annex V (\*) — Test procedure
- Annex VI (\*) — Specifications of shape and dimensions  
— Appendix: Reflex reflectors for trailers — Class III
- Annex VII (\*) — Colorimetric specifications
- Annex VIII (\*) — Photometric specifications
- Annex IX (\*) — Resistance to external agents
- Annex X (\*) — Stability of the optical properties with ageing
- Annex XI (\*) — Resistance to heat
- Annex XII (\*) — Colour-fastness

Appendix to the Annexes: Chronological order of tests.

(\*) The technical requirements of this Annex are similar to those of Regulation No 3 of the Economic Commission for Europe. In particular, the breakdown into sections is the same. For this reason, where a section of Regulation No 3 has no counterpart in this Directive, its number is given in brackets for the record.



## ANNEX 0

**DEFINITIONS, CONFORMITY OF PRODUCTION, GENERAL SPECIFICATIONS, SPECIAL SPECIFICATIONS**

(1.)

## 2. DEFINITIONS

- 2.1. The definitions of the technical terms used in this Directive are given in Annex I.
- 2.2. A type of reflex reflector is defined by the models and descriptive literature submitted with the application for EEC component type-approval. Reflex reflectors may be considered as belonging to a type if they have one or more 'reflex reflecting optical units' which are identical with those of the standard model of that type, and if their other parts differ from those of the standard model only in ways not affecting the properties to which this Directive applies.
- 2.3. Reflex reflectors are divided into two classes according to their photometric characteristics: 'Class I' and 'Class III' (see 4.3 of Annex III).

(3.)

(4.)

## 5. CONFORMITY OF PRODUCTION

- 5.1. Every device bearing an EEC component type-approval mark must conform to the type approved under that mark. The competent authority issuing the EEC component type-approval mark shall retain two samples which together with the EEC component type-approval certificate shall serve to establish whether reflex reflectors put on the market bearing the EEC component type-approval mark satisfy this condition.

(5.2.)

(5.3.)

## 6. GENERAL SPECIFICATIONS

- 6.1. Reflex reflectors must be so constructed that they function satisfactorily under normal conditions of use. In addition, they must not have any defect in design or manufacture which is detrimental to their efficient operation or maintenance in good condition.
- 6.2. The components of reflex reflectors must not be capable of being easily dismantled.
- 6.3. The optical units of reflex reflectors must not be replaceable.
- 6.4. The outer surface of reflex reflectors must be easy to clean. Hence it must not be a rough surface. It may however, have protuberances, provided cleaning remains easy.

## 7. SPECIAL SPECIFICATIONS (TESTS)

- 7.1. Reflex reflectors must also satisfy the conditions as to dimensions and shape, and the colorimetric, photometric, physical and mechanical requirements set forth in Annexes VI to XII.
- 7.2. Depending on the nature of the materials of which the reflex reflectors and in particular their optical units are made, the competent authorities may authorize laboratories to omit certain unnecessary tests, subject to the express reservation that such omission must be mentioned under 'Remarks' on the EEC component type-approval certificate.



## ANNEX I

## DEFINITIONS OF TECHNICAL TERMS

## I.1. REFLEX REFLECTION

'Reflex reflection' means reflection in which light is reflected in directions close to the direction from which it came. This property is maintained over wide variations of the illumination angle.

## I.2. REFLEX REFLECTING OPTICAL UNIT

'Reflex reflecting optical unit' means the combination of optical components producing reflex reflection.

## I.3. REFLEX REFLECTOR

'Reflex reflector' means a device used to indicate the presence of a vehicle by the reflection of light emanating from a light source not connected to the vehicle, the observer being situated near the source.

For the purposes of this Directive, the following are not considered as reflex reflectors:

- retro-reflecting number plates;
- the retro-reflecting signals mentioned in the ADR;
- other plates and retro-reflecting signals which must be used to comply with a Member State's specifications for use as regards certain categories of vehicles or certain methods of operation.

## I.4. ILLUMINATING SURFACE OF A REFLEX REFLECTOR

'Illuminating surface of a reflex reflector' means the illuminating surface of a reflex reflector in a plane perpendicular to the axis of reference and bounded by planes touching the outer edges of the light projection surface of the reflex reflector and parallel to this axis. To determine the lower, upper and lateral limits of the illuminating surface, only vertical and horizontal planes shall be used.

## I.5. AXIS OF REFERENCE

'Axis of reference' means the characteristic axis of the light signal, determined by the manufacturer for use as the direction of reference ( $H = 0^\circ$ ,  $V = 0^\circ$ ) for photometric measurements and when fitting the reflex reflector to the vehicle.

## I.6. CENTRE OF REFERENCE

'Centre of reference' means the intersection of the axis of reference with the exterior light-emitting surface, specified by the manufacturer of the reflex reflector.

## I.7. ANGLE OF DIVERGENCE

'Angle of divergence' means the angle between the straight lines connecting the centre of reference to the centre of the receiver and to the centre of the source of illumination.

## I.8. ILLUMINATION ANGLE

'Illumination angle' means the angle between the axis of reference and the straight line connecting the centre of reference to the centre of the source of illumination.

## I.9. ANGLE OF ROTATION

'Angle of rotation' means the angle through which the reflex reflector is rotated about its axis of reference starting from one given position.

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## I.10. ANGULAR DIAMETER OF THE REFLEX REFLECTOR

‘Angular diameter of the reflex reflector’ means the angle subtended by the greatest dimension of the visible area of the illuminating surface, either at the centre of the source of illumination or at the centre of the receiver.

## I.11. ILLUMINATION OF THE REFLEX REFLECTOR

‘Illumination of the reflex reflector’ means the illumination measured in a plane perpendicular to the incident rays and passing through the centre of reference.

## I.12. COEFFICIENT OF LUMINOUS INTENSITY (CIL)

‘Coefficient of luminous intensity’ means the luminous intensity reflected in the direction considered, divided by the illumination of the reflex reflector for given angles of illumination, divergence and rotation.





## Appendix 1

## SYMBOLS AND UNITS

- A = Area of the illuminating surface of the reflex reflector (cm<sup>2</sup>)
- C = Centre of reference.
- NC = Axis of reference.
- Rr = Receiver, observer or measuring device.
- Cr = Centre of receiver.
- Ør = Diameter of receiver Rr if circular (cm).
- Se = Source of illumination.
- Cs = Centre of source of illumination.
- Øs = Diameter of source of illumination (cm).
- De = Distance from centre Cs to centre C (m).
- D'e = Distance from centre Cr to centre C (m).
- Note:* De and D'e are generally very nearly the same and under normal conditions of observation it shall be assumed that De = D'e.
- D = Observation distance from and beyond which the illuminating surface appears to be continuous.
- α = Angle of divergence.
- β = Illumination angle. With respect to the line CsC which is always considered to be horizontal, this angle is prefixed with signs – (left), + (right), + (up) or – (down), according to the position of the source Se in relation to the axis NC, as seen when looking towards the reflex reflector.  
For any direction defined by two angles, vertical and horizontal, the vertical angle is always given first.
- γ = Angular diameter of the measuring device Rr as seen from point C.
- δ = Angular diameter of the source Se as seen from point C.
- ε = Angle of rotation. This angle is positive when the rotation is clockwise as seen when looking towards the illuminating surface.  
If the reflex reflector is marked 'TOP', the position thus indicated is taken as the origin.
- E = Illumination of the reflex reflector (lux).
- CIL = Coefficient of luminous intensity (millicandelas/lux). Angles are expressed in degrees and minutes.



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## ANNEX II

## MODEL EEC COMPONENT TYPE-APPROVAL CERTIFICATE

(Maximum format: A4 (210 × 297 mm))

Name of administration
---------------------------

**Notification concerning the granting, refusal, or withdrawal of EEC component type-approval  
or the granting, refusal, or withdrawal of an extension of the EEC component type-approval  
for a type of reflex reflector**

- Component type-approval No .....
1. Trade name or mark .....
  2. Name and address of manufacturer .....
  3. If applicable, name and address of manufacturer's authorized representative .....
  4. Submitted for EEC component type-approval on .....
  5. Technical service conducting EEC component type-approval tests .....
  6. Date of report issued by that service .....
  7. Number of report issued by that service .....
  8. Extension of EEC component type-approval: amber/colourless (\*)
  9. Date of granting/refusal/withdrawal of EEC component type-approval (\*) .....
  10. Date of granting/refusal/withdrawal of extension of EEC component type-approval (\*) .....
  11. Single EEC component type-approval granted on the basis of 3.3 of Annex III for a lighting  
and light-signalling device comprising several lamps, and in particular .....
  12. Date of refusal/withdrawal of single EEC component type-approval (\*) .....
  13. Place .....
  14. Date .....
  15. Signature .....
  16. The following documents bearing the EEC component type-approval number indicated above  
are appended hereto:  
.....  
.....
  17. Remarks .....

---

(\*) Delete where inapplicable.



## ANNEX III

**EEC COMPONENT TYPE-APPROVAL AND MARKING REQUIREMENTS**

1. APPLICATION FOR EEC COMPONENT TYPE-APPROVAL
  - 1.1. The application for EEC component type-approval shall be submitted by the holder of the trade name or mark or by his authorized representative.
  - 1.2. In the case of each type of reflex reflector, the application shall be accompanied by:
    - 1.2.1. a brief description of the technical specifications of the materials constituting the reflex reflecting optical unit;
    - 1.2.2. drawings (three copies) in sufficient detail to permit identification of the type, showing geometrically the position in which the reflex reflector is to be fitted to the vehicle. The drawings shall indicate the intended position of the component type-approval number and the additional symbol in relation to the rectangle surrounding the EEC component type-approval mark;
    - 1.2.3. samples of the reflex reflector in red. The number of samples to be submitted is indicated in Annex V;
    - 1.2.4. possibly, two amber and/or colourless samples for situations where component type-approval is to be simultaneously or subsequently extended to amber and/or colourless devices.
2. MARKINGS
  - 2.1. Reflex reflectors submitted for EEC component type-approval must bear:
    - the trade name or mark of the applicant, which must be clearly legible and indelible,
    - the mark or marks 'TOP', appearing horizontally at the top of the illuminating surface, if required to determine unequivocally the angle or angles of rotation specified by the manufacturer.
  - 2.2. Each reflex reflector shall have sufficient space for the EEC component type-approval mark. This space shall be indicated on the drawings referred to in 1.2.2.
3. EEC COMPONENT TYPE-APPROVAL
  - 3.1. If all the samples submitted in accordance with section 1 meet the requirements of sections 6 and 7 of Annex 0, EEC component type-approval shall be granted and a component type-approval number issued.
  - 3.2. This number shall not be allocated to any other type of reflex reflector except where EEC component type-approval is extended to another type differing only in colour.
  - 3.3. If EEC component type-approval is requested for a type of lighting and light-signalling device comprising a reflex reflector and other lamps, a single EEC component type-approval mark may be allocated provided that the reflex reflector complies with the requirements of this Directive and that each of the other lamps forming part of the type of lighting and light-signalling device for which EEC component type-approval is requested, complies with the specific Directive applying to it.
4. MARKS
  - 4.1. Every reflex reflector conforming to a type approved pursuant to this Directive shall bear an EEC component type-approval mark.
  - 4.2. This mark shall consist of a rectangle surrounding the lower case letter 'e', followed by the distinguishing letter(s) or number of the Member State which has granted the component type-approval:



- 1 for Germany,
- 2 for France,

**▼A2**

3 for Italy,  
4 for the Netherlands,  
6 for Belgium,  
9 for Spain,  
11 for the United Kingdom,  
13 for Luxembourg,  
DK for Denmark,

**▼M1**

EL for Greece,

**▼A2**

IRL for Ireland,  
P for Portugal.

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It must also include the EEC component type-approval number which corresponds to the number of the EEC component type-approval certificate issued for the type of reflex reflector in question.

- 4.3. The EEC component type-approval mark must be supplemented by the additional symbol, consisting of the roman numeral I or III indicative of the class in which the reflex reflector is classified when EEC component type-approval is granted.
- 4.4. The EEC component type-approval number must be placed in any convenient position near the rectangle surrounding the letter 'e'.
- 4.5. The EEC component type-approval mark and the additional symbol shall be affixed to the lens of the lamp or one of the lenses in such a way as to be indelible and clearly legible even when the reflex reflectors are fitted on the vehicle.
- 4.6. An example of the EEC component type-approval mark together with the additional symbol is shown in the Appendix.
- 4.7. Where a single EEC component type-approval number is issued, as under 3.3, for a type of lighting and light-signalling device comprising a reflex reflector and other lamps, a single EEC component type-approval mark may be affixed, consisting of:
  - a rectangle surrounding the letter 'e', followed by the distinguishing letter(s) or number of the Member State which has granted the component type-approval,
  - an EEC component type-approval number,
  - the additional symbols required by the various Directives under which EEC component type-approval was granted.
- 4.8. The dimensions of the various components of this mark must not be less than the largest of the minimum dimensions specified for individual markings by the various Directives under which the EEC component type-approval was granted.

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## Appendix

## EXAMPLE OF EEC COMPONENT TYPE-APPROVAL MARK

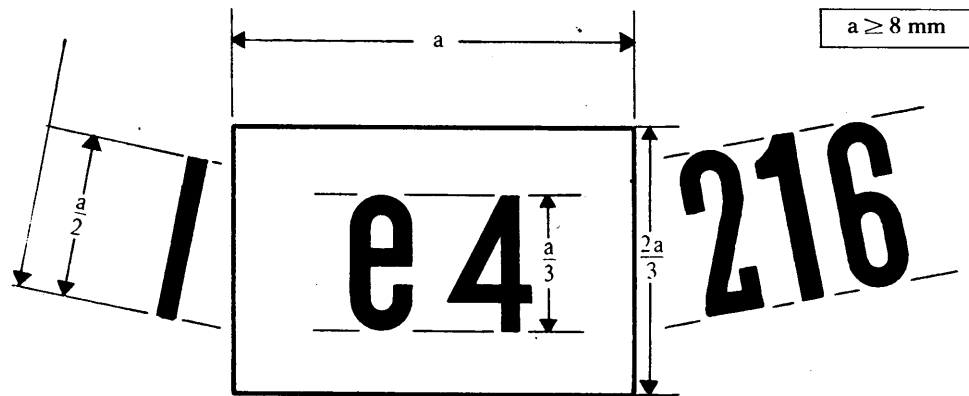


Figure 1

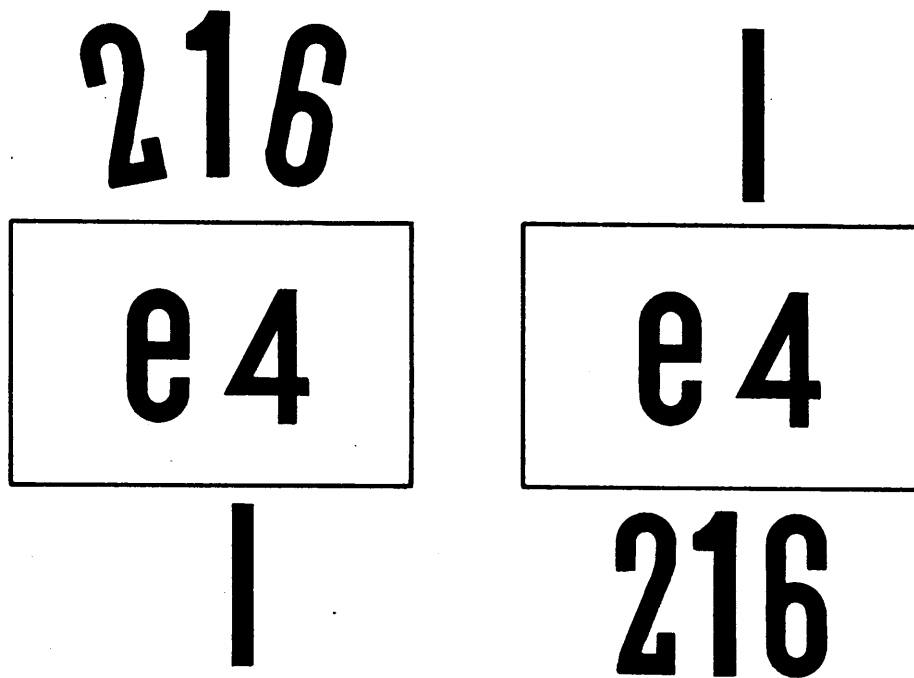


Figure 2

Figure 3

The reflex reflector bearing the EEC component type-approval mark shown above is a Class I reflector EEC type-approved in the Netherlands (4) under the number 216.



(ANNEX IV)

ANNEX V

TEST PROCEDURE

- V.1. The applicant shall submit 10 samples for EEC component type-approval.
- V.2. After verification of the general specifications (section 6 of Annex 0) and the specifications of shape and dimensions (Annex VI), the 10 samples shall be examined as to their colorimetric characteristics (Annex VII) and CIL (Annex VIII) for an angle of divergence of 20' and an illumination angle  $V = H = 0^\circ$  or if necessary, in the position defined in VIII.4 and VIII.4.1. The two reflex reflectors giving the minimum and maximum values shall then be fully tested as shown in VIII.3. These two samples shall be kept by the laboratories as provided in 5.1 of Annex 0 for any further checks which may be found necessary. The other eight samples shall be divided into four groups of two:
- First group — The two samples are subjected to the water penetration test (IX.1) and then, if the result of this test is satisfactory, to the tests for resistance to motor fuels and lubricants (IX.3 and IX.4).
- Second group — The two samples are, if necessary, subjected to the corrosion test (IX.2) and then to the resistance test for the reverse side of the reflex reflector (IX.5). The same two samples are then subjected to the heat test (Annex XI).
- Third group — The two samples are subjected to the test for stability of the optical properties with ageing (Annex X).
- Fourth group — The two samples are subjected to the colour-fastness test (Annex XII).
- V.3. After undergoing the tests referred to in V.2, the reflex reflectors in each group must have:
- 3.1. a colour which satisfies the conditions laid down in Annex VII. This shall be verified by a qualitative method, and, in case of doubt, confirmed by a quantitative method;
- 3.2. a CIL which satisfies the conditions laid down in Annex VIII and after the test reaches at least 60 % of the value previously obtained with the same sample. The test shall be made only with an angle of divergence of 20' and an illumination angle of  $V = H = 0^\circ$  or, if necessary, in the position defined in VIII.4 and VIII.4.1.



## ANNEX VI

## SPECIFICATIONS OF SHAPE AND DIMENSIONS

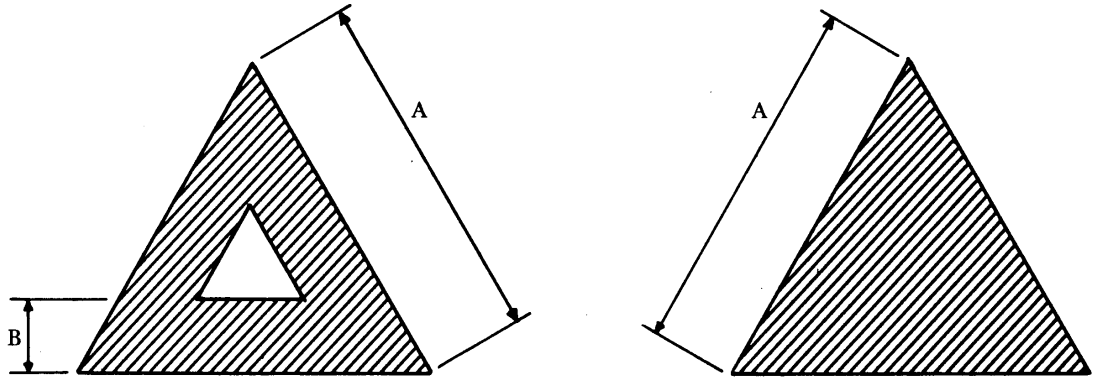
- VI.1. SHAPE AND DIMENSIONS OF REFLEX REFLECTORS IN CLASS I
- 1.1. The illuminating surfaces of reflex reflectors in Class I must be capable of being inscribed within a circle 200 mm in diameter.
  - 1.2. The shape of the illuminating surfaces must be simple and not easily confused with a letter, figure or triangle at normal observation distances.
  - 1.3. As an exception to 1.2, a shape resembling the simply formed letters or figures 0, I, U or 8 is permissible.
- VI.2. SHAPE AND DIMENSIONS OF REFLEX REFLECTORS IN CLASS III
- 2.1. The illuminating surfaces of reflex reflectors in Class III must have the shape of an equilateral triangle. If the word 'TOP' is inscribed in one angle, this means that that angle must form the apex of the triangle.
  - 2.2. The illuminating surface may or may not have at its centre a triangular, non-reflecting area, the sides of which are parallel to those of the outer triangle.
  - 2.3. The illuminating surface may or may not be continuous. In any case, the shortest distance between two adjacent reflex reflecting optical units must not exceed 15 mm.
  - 2.4. The illuminating surface of a reflex reflector shall be considered to be continuous if the edges of the illuminating surfaces of adjacent separate optical units are parallel and if the said optical units are evenly distributed over the whole solid surface of the triangle.
  - 2.5. If the illuminating surface is not continuous, the number of separate reflex reflecting optical units may not be less than four on each side of the triangle including the corner units.
    - 2.5.1. The separate reflex reflecting optical units must not be replaceable unless they consist of approved reflex reflectors in Class I.
  - 2.6. The outside edges of the illuminating surfaces of triangular reflex reflectors in Class III must be between 150 and 200 mm long. In the case of hollow-type devices, the minimum width of the sides, measured at right angles to them, shall be at least 20 % of the effective length between the extremities of the illuminating surfaces.
- VI.3. Compliance with the above specifications may where appropriate be visually established.



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## Appendix

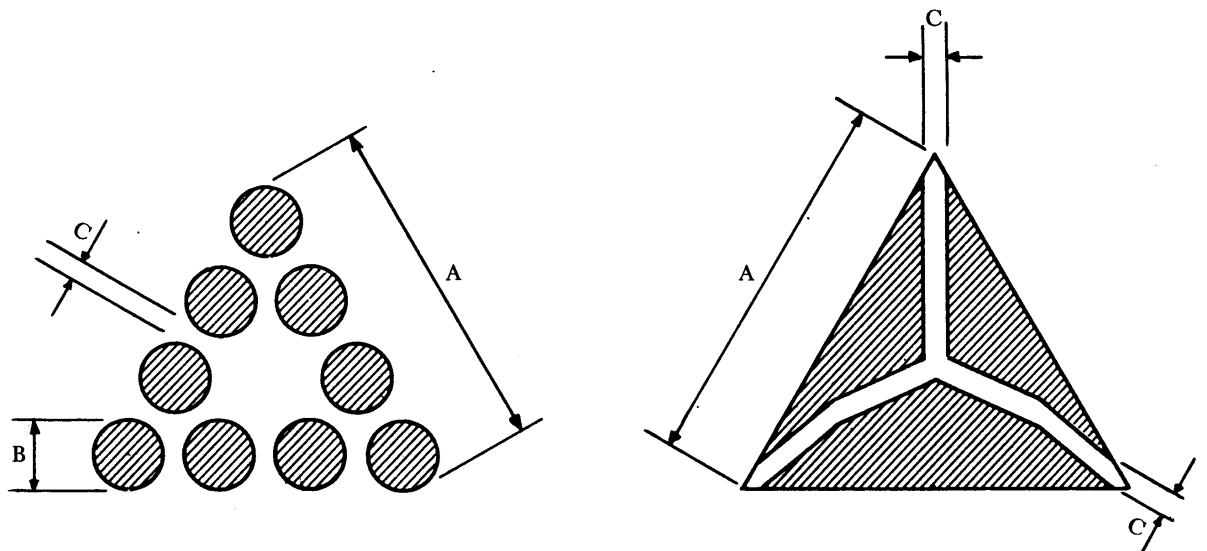
## REFLEX REFLECTORS FOR TRAILERS — CLASS III



$$150 \text{ mm} \leq A \leq 200 \text{ mm}$$

$$B \geq \frac{A}{5}$$

$$C \leq 15 \text{ mm}$$



Note: These sketches are given as examples.



## ANNEX VII

## COLORIMETRIC SPECIFICATIONS

- VII.1. These specifications shall apply only to colourless, red or amber reflex reflectors.
- 1.1. Reflex reflectors may consist of a combined reflex reflecting optical unit and filter, which must be so designed that they cannot be separated under normal conditions of use.
  - 1.2. The colouring of reflex reflecting optical units and filters by means of paint or varnish is not permitted.
- VII.2. When the reflex reflector is illuminated by CIE standard illuminant A, with an angle of divergence of 20' and an illumination angle  $V = H = 0^\circ$ , or, if this produces a colourless surface reflection, an angle  $V = \pm 5^\circ$ ,  $H = 0^\circ$ , the trichromatic coordinates of the reflected luminous flux must be within the following limits:
- RED:        limit towards yellow:  $y \leq 0.335$ ,  
               limit towards purple:  $z \leq 0.008$ .
- AMBER:     limit towards yellow:  $y \leq 0.429$ ,  
               limit towards red:      $y \geq 0.398$ ,  
               limit towards white:  $z \leq 0.007$ .
- 2.1. In the case of red and amber, compliance with the colorimetric specifications shall be verified by a visual comparison test.
  - 2.2. If any doubt remains after this test, compliance with the colorimetric specifications shall be verified by determining the trichromatic coordinates of the most doubtful sample.
- VII.3. Colourless reflex reflectors must not produce a selective reflection; that is to say, the trichromatic coordinates 'x' and 'y' of the standard illuminant A used to illuminate the reflex reflector must not undergo a change of more than 0.01 after reflection by the reflex reflector.
- 3.1. This shall be verified by the visual comparison test indicated in 2.1 the control field being illuminated by a light source of which the trichromatic coordinates differ by 0.01 from that of standard illuminant A.
  - 3.2. In case of doubt, the trichromatic coordinates for the sample with the greatest selective reflection shall be determined.



## ANNEX VIII

## PHOTOMETRIC SPECIFICATIONS

- VIII.1. When applying for EEC component type-approval, the applicant shall specify the axis of reference. This corresponds to the illumination angle  $V = H = 0^\circ$  in the table of coefficients of luminous intensity (CIL).
- VIII.2. For photometric measurements, only the illuminating surface contained within a circle of 120 mm diameter for Class I shall be considered, and the illuminating surface itself shall be limited to 100 cm<sup>2</sup> for Class I although the surface of the reflex reflecting optical units need not necessarily attain this area. The manufacturer shall specify the perimeter of the area to be used. In the case of Class III, the whole of the illuminating surfaces shall be considered without limitation as to size.
- VIII.3. The CIL values for red reflex reflectors must be not less than those in the table below expressed in millicandelas per lux, for the angles of divergence and illumination shown:

Class	Angle of divergence $\alpha$	Illumination angles $\beta$			
		vertical V horizontal H	$0^\circ$ $0^\circ$	+ and $-10^\circ$ $0^\circ$	+ and $-5^\circ$ + and $-20^\circ$
I	20'		100	50	50
	1° 30'		5	2.5	2.5
(II)					
III	20'		150	75	75
	1° 30'		7.5	3.75	3.75

CIL values lower than those shown in the last two columns of the above table are not permissible within the solid angle having the reference centre as its apex and bounded by the planes intersecting along the following lines:

$$(V = + \text{ and } - 10^\circ, H = 0^\circ) \quad (V = + \text{ and } - 5^\circ, H = + \text{ and } - 20^\circ)$$

- VIII.4. When the CIL of a reflex reflector is measured for an angle  $\beta$  of  $V = H = 0^\circ$ , it shall be ascertained whether any mirror effect is produced by slightly turning the device. If there is any such effect, a reading shall be taken with an angle  $\beta$  of  $V =$  between  $- 5$  and  $+ 5$ ,  $H = 0^\circ$ . The position adopted shall be that corresponding to the minimum CIL for one of these positions.
- 4.1. With an illumination angle  $\beta$  of  $V = H = 0^\circ$ , or the angle specified in VIII.4, and an angle of divergence of 20', reflex reflectors which are not marked 'TOP' shall be rotated about their axes of reference to the position of minimum CIL, which must conform to the value specified in VIII.3. When the CIL is measured for the other angles of illumination and divergence, the reflex reflector shall be placed in the position corresponding to the specified value of the angle of rotation  $\epsilon$ . If the specified values are not attained, the device may be rotated about its axis of reference between  $- 5$  and  $+ 5^\circ$  from that position.
- 4.2. With an illumination angle  $\beta$  of  $V = H = 0^\circ$ , or the angle specified in VIII.4, and an angle of divergence of 20', reflex reflectors marked 'TOP' shall be rotated between  $- 5$  and  $+ 5^\circ$  about their axis of reference. The CIL must not fall below the prescribed value in any position assumed by the device during this rotation.
- 4.3. If for the direction  $V = H = 0^\circ$ , and for  $\epsilon = 0$  the CIL exceeds the specified value by 50 % or more, all measurements for all angles of illumination and divergence shall be made for  $\epsilon = 0^\circ$ .
- VIII.5. For making the necessary measurements, the method recommended by CIE for the photometry of reflex reflectors shall be adopted.



## ANNEX IX

## RESISTANCE TO EXTERNAL AGENTS

## IX.1. RESISTANCE TO PENETRATION OF WATER

Reflex reflectors, whether or not grouped or reciprocally incorporated with a lamp, shall be stripped of all removable parts and immersed for 10 minutes in water at a temperature of  $25 \pm 5$  °C, the highest point of the upper part of the illuminating surface being about 20 mm below the surface of the water. This test shall be repeated after turning the reflex reflector through 180°, so that the illuminating surface is at the bottom and the reverse side covered by about 20 mm of water.

- 1.1. No water must penetrate to the reflecting surface of the reflex reflecting optical unit. If inspection clearly reveals the presence of water, the device shall be considered to have failed the test.
- 1.2. If inspection does not reveal the presence of water, or in case of doubt, the CIL shall be measured by the method described in V.3.2 after lightly shaking the reflex reflecting device to remove excess water from the outside.

## IX.2. RESISTANCE TO CORROSION

Reflex reflecting devices must be so designed that they retain the prescribed photometric and colorimetric characteristics despite the humidity and corrosive influences to which they are normally exposed. The resistance of the front surface to tarnishing and that of the protective rear surface to deterioration shall be checked when an essential metal component appears susceptible to corrosion.

The reflex reflector, stripped of all removable parts, or the lamp with which the reflex reflector is grouped or reciprocally incorporated, shall be subjected to the action of a saline mist for a period of 50 hours, comprising two periods of exposure of 24 hours each, separated by an interval of two hours during which the sample is allowed to dry.

The saline mist shall be produced by atomizing, at a temperature of  $35 \pm 2$  °C, a saline solution obtained by dissolving 20 + 2 parts by weight of sodium chloride in 80 parts of distilled water containing not more than 0.02 % of impurities.

Immediately after completion of the test, the sample must not show signs of excessive corrosion liable to impair the efficiency of the device.

## IX.3. RESISTANCE TO MOTOR FUELS

The outer surface of the reflex reflector and, in particular, of the illuminating surface, shall be lightly wiped with a cotton cloth soaked in a mixture of petrol and benzol (proportion 90: 10). After about five minutes, the surface shall be inspected. It must not show any visible change.

## IX.4. RESISTANCE TO LUBRICATING OILS

The outer surface of the reflex reflector and, in particular, the illuminating surface, shall be lightly wiped with a cotton cloth soaked in a detergent lubricating oil. After about five minutes, the surface shall be cleaned. The CIL shall then be measured (V.3.2.).

## IX.5. RESISTANCE OF THE ACCESSIBLE REVERSE SIDE OF MIRROR-BACKED REFLEX REFLECTORS

The reverse side of the reflex reflector shall be brushed with a hard nylon brush and then covered or thoroughly wetted with a mixture of petrol and benzol (proportion 90: 10) for one minute. The mixture shall then be removed and the reflex reflector allowed to dry.

As soon as evaporation is completed, an abrasion test shall be carried out by brushing the reverse side with the same nylon brush as before.

The CIL shall then be measured (V.3.2) after the whole surface of the mirror-backed reverse side has been covered with indian ink.

*ANNEX X***STABILITY OF THE OPTICAL PROPERTIES WITH AGEING**

- X.1. The administration which granted EEC component type-approval may check the stability of the optical properties of a type of reflex reflector in service as ageing takes place.
- X.2. The competent authorities of Member States other than the State in which EEC component type-approval was granted may carry out similar checks in their territory. If a type of reflex reflector displays a consistent failure to conform when in use, they shall send any parts selected for testing to the authority which granted EEC component type-approval, with a request for its opinion.
- X.3. In the absence of other criteria, the concept of 'consistent failure to conform' of a type of reflex reflector when in use shall be interpreted in accordance with 6.1 of Annex 0.

**▼B***ANNEX XI***RESISTANCE TO HEAT**

- XI.1. The reflex reflector shall be kept for a period of 12 hours in a dry atmosphere at a temperature of  $65 \pm 2$  °C.
- XI.2. After this test, no cracking or appreciable distortion of the reflex reflector, and in particular, of its optical units must be visible.
- XI.3. The colorimetric and photometric characteristics shall be checked in accordance with V.3.1 and V.3.2.

*ANNEX XII***COLOUR-FASTNESS**

- XII.1. The authority which granted EEC component type-approval may check the colour-fastness of a type of reflex reflector in service.
- XII.2. The competent authorities of Member States other than the State in which EEC component type-approval was granted may carry out similar checks in their territory. If a type of reflex reflector displays a consistent failure to conform when in use, they shall send any parts selected for testing to the administration which granted EEC component type-approval, with a request for its opinion.
- XII.3. In the absence of other criteria, the concept of 'consistent failure to conform' of a type of reflex reflector when in use shall be interpreted in accordance with 6.1 of Annex 0.



## Appendix to Annexes

## CHRONOLOGICAL ORDER OF TESTS

Section	Test	Samples									
		a	b	c	d	e	f	g	h	i	j
0.6	General specifications: visual examination	×	×	×	×	×	×	×	×	×	×
VI.	Shapes and dimensions: visual examination	×	×	×	×	×	×	×	×	×	×
VII.	Colorimetry: visual examination trichromatic coordinates in case of doubt	×	×	×	×	×	×	×	×	×	×
VIII.	Photometry: limited to 20' and V = H = 0°	×	×	×	×	×	×	×	×	×	×
VIII.3.	Complete			×	×						
IX.1.	Water: 10 minutes in normal position 10 minutes in inverted position visual examination							×	×		
V.3.1.	Colorimetry: visual examination trichromatic coordinates in case of doubt							×	×		
V.3.2.	Photometry: limited to 20' and V = H = 0°							×	×		
IX.3.	Motor fuels: five minutes visual examination							×	×		
IX.4.	Oils: five minutes visual examination							×	×		
V.3.1.	Colorimetry: visual examination trichromatic coordinates in case of doubt							×	×		
V.3.2.	Photometry: limited to 20' and V = H = 0°							×	×		
IX.2.	Corrosion: 24 hours two hours' interval 24 hours visual examination					×	×				
IX.5.	Reverse side: one minute visual examination					×	×				
XI.	Heat: 12 hours at 65 ± 2 °C visual examination for distortion					×	×				
V.3.1.	Colorimetry: visual examination trichromatic coordinates in case of doubt					×	×				
V.3.2.	Photometry: limited to 20' and V = H = 0°					×	×				
X.	Stability of optical properties with ageing										
V.3.1.	Colorimetry: visual examinations or trichromatic coordinates										
V.3.2.	Photometry: limited to 20' and V = H = 0°										
XII.	Colour-fastness										
V.3.1.	Colorimetry: visual examination or trichromatic coordinates										
V.3.2.	Photometry: limited to 20' and V = H = 0°										
0.5.1.	Deposit of samples with administration			×	×						