

มาตรฐานผลิตภัณฑ์อุตสาหกรรม

THAI INDUSTRIAL STANDARD

มอก. 2330— 2550

ECE Regulation No.81

00 series of amendments

กระจกมองหลังสำหรับรถจักรยานยนต์

REAR-VIEW MIRRORS FOR MOTORCYCLES

สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

กระทรวงอุตสาหกรรม

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มอก. 2330 – 2550

สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
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กระจกมองหลังเป็นอุปกรณ์ที่มีความจำเป็นสำหรับรถจักรยานยนต์ เพื่อให้เกิดความปลอดภัยจึงต้องมีมาตรฐานที่เหมาะสม และเพื่อเป็นการส่งเสริมอุตสาหกรรมจึงกำหนด มาตรฐานผลิตภัณฑ์อุตสาหกรรม กระจกมองหลังสำหรับรถจักรยานยนต์ ขึ้น

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้กำหนดขึ้นโดยรับ Economic Commission for Europe (ECE) Regulation No.81 UNIFORM PROVISIONS CONCERNING THE APPROVAL OF TWO-WHEELED POWER-DRIVEN VEHICLES WITH OR WITHOUT SIDE CAR, WITH REGARD TO THE INSTALLATION OF REAR-VIEW MIRRORS ON HANDLEBARS ดังต่อไปนี้

1. Regulation No. 81

2. Regulation No. 81 Amendment 1

Supplement 1 to the original version of the Regulation

มาใช้ในระดับเหมือนกันทุกประการ (identical) เฉพาะสาระสำคัญทางวิชาการซึ่งแสดงถึงคุณลักษณะที่ต้องการทั่วไป ข้อกำหนดคุณลักษณะเฉพาะ การทดสอบ และคุณลักษณะที่ต้องการสำหรับการติดตั้ง

สำหรับข้อกำหนดด้านการรับรองหรือการดำเนินการต่างๆ ที่เกี่ยวข้องให้เป็นไปตามพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม โดยสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรมจะประกาศกำหนดหลักเกณฑ์การรับรองต่อไป

คณะกรรมการมาตรฐานผลิตภัณฑ์อุตสาหกรรมได้พิจารณามาตรฐานนี้แล้ว เห็นสมควรเสนอรัฐมนตรีประกาศตาม มาตรา 15 แห่งพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม พ.ศ. 2511



ประกาศกระทรวงอุตสาหกรรม

ฉบับที่ 3777 (พ.ศ. 2550)

ออกตามความในพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม

พ.ศ. 2511

เรื่อง กำหนดมาตรฐานผลิตภัณฑ์อุตสาหกรรม

กระจกมองหลังสำหรับรถจักรยานยนต์

อาศัยอำนาจตามความในมาตรา 15 แห่งพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม พ.ศ. 2511 รัฐมนตรีว่าการกระทรวงอุตสาหกรรมออกประกาศกำหนดมาตรฐานผลิตภัณฑ์อุตสาหกรรม กระจกมองหลังสำหรับรถจักรยานยนต์ มาตรฐานเลขที่ มอก. 2330-2550 ไว้ ดังมีรายละเอียดต่อไปนี้ประกาศนี้

ประกาศ ณ วันที่ 12 กันยายน พ.ศ. 2550

โสมิต ปันเปี่ยมรัษฎ์

รัฐมนตรีว่าการกระทรวงอุตสาหกรรม

มาตรฐานผลิตภัณฑ์อุตสาหกรรม กระจกมองหลังสำหรับรถจักรยานยนต์

ขอบข่าย

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ครอบคลุมคุณลักษณะที่ต้องการทั่วไป ข้อกำหนดคุณลักษณะเฉพาะ การทดสอบและคุณลักษณะที่ต้องการสำหรับการติดตั้ง สำหรับรถจักรยานยนต์ แบบ 2 หรือ 3 ล้อ ซึ่งไม่มีตัวถังล้อมรอบผู้ขับขี่บางส่วน หรือทั้งหมด รวมถึงการติดตั้งกระจกมองหลัง */

บทนิยาม

ความหมายของคำที่ใช้ในมาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ให้เป็นไปตาม ECE Regulation No.81

ข้อกำหนด

คุณลักษณะที่ต้องการทั่วไป ข้อกำหนดคุณลักษณะเฉพาะ การทดสอบ และคุณลักษณะที่ต้องการสำหรับการติดตั้ง ในมาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ ให้เป็นไปตาม ECE Regulation No.81 ข้อ 6. ถึงข้อ 8. และ ข้อ 16.

การทดสอบ

การทดสอบและการหาค่าต่าง ๆ ในมาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ให้เป็นไปตาม ECE Regulation No. 81 ANNEX ที่เกี่ยวข้อง

*/ สำหรับยานยนต์ซึ่งขับเคลื่อนด้วยเครื่องยนต์ที่มีล้อน้อยกว่า 4 ล้อ มีตัวถังล้อมรอบบางส่วนหรือทั้งหมด ให้ใช้ข้อกำหนดตาม ECE Regulation No.46

អង្គ. 2330—2550

ECE Regulation No. 81

00 series of amendments

Regulation No. 81

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF REAR-VIEW MIRRORS AND
OF TWO-WHEELED POWER-DRIVEN VEHICLES WITH OR WITHOUT SIDE CAR, WITH
REGARD TO THE INSTALLATION OF REAR-VIEW MIRRORS ON HANDLEBARS

CONTENTS

REGULATION	<u>Page</u>
1. Scope	1
I. REAR-VIEW MIRRORS	
2. Definitions	1
3. Application for approval	2
4. Markings	3
5. Approval	3
6. General requirements	4
7. Special specifications	5
8. Tests	6
9. Conformity of production	11
10. Penalties for non-conformity of production	12
11. Modification and extension of approval of the type of rear-view mirror	13
12. Production definitely discontinued	13
II. INSTALLATION OF REAR-VIEW MIRRORS	
13. Definitions	13
14. Application for approval	14
15. Approval	14
16. Requirements	15
17. Conformity of production	16
18. Penalties for non-conformity of production	17

CONTENTS (continued)

	<u>Page</u>
19. Modifications and extension of approval of the vehicle type	17
20. Production definitely discontinued	17
21. Names and addresses of technical services responsible for conducting approval tests and of administrative departments	18

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ANNEXES

Annex 1 - Communication concerning the approval or refusal or extension or withdrawal of approval or production definitely discontinued of a type of rear-view mirror, pursuant to Regulation No./81	19
Annex 2 - Communication concerning the approval or refusal or extension or withdrawal of approval or production definitely discontinued of a vehicle type with regard to the installation of rear-view mirrors, pursuant to Regulation No./81	21
Annex 3 - Arrangement of the rear-view mirror approval mark	23
Annex 4 - Arrangements of the vehicle approval mark concerning the installation of rear-view mirrors	25
Annex 5 - Test method for determining reflectivity	27
Annex 6 - Procedure for determining the radius of curvature "r" of a mirror's reflecting surface	33
Annex 7 - Control of the conformity of production	35

Regulation No. 81

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF REAR-VIEW MIRRORS AND
OF TWO-WHEELED POWER-DRIVEN VEHICLES WITH OR WITHOUT SIDE CAR, WITH
REGARD TO THE INSTALLATION OF REAR-VIEW MIRRORS ON HANDLEBARS

1. SCOPE

This Regulation applies:

- 1.1. To rear-view mirrors intended to be installed two- or three-wheeled power-driven vehicles not fitted with bodywork which partly or wholly encloses the driver and
- 1.2. */ To the installation of rear-view mirrors on power-driven vehicles defined in paragraph 1.1. above.

I - REAR-VIEW MIRRORS

2. DEFINITIONS

For the purpose of this Regulation,

- 2.1. "Rear-view mirror" means any device intended to give a clear view to the rear;
- 2.2. "Rear-view mirror type" means devices which do not differ in respect of the following main characteristics:
 - 2.2.1. The dimensions and radius of curvature of the rear-view mirror reflecting surface,
 - 2.2.2. The design, shape or materials of the rear-view mirrors, including the connection with the vehicle;
- 2.3. "Class of rear-view mirrors" means all devices having one or several features or functions in common.

The rear-view mirrors mentioned in this Regulation are grouped in Class "L".
- 2.4. "r" means the average of the radii of curvature measured over the reflecting surface, in accordance with the method described in paragraph 2 of annex 6 to this Regulation;

*/ For power-driven vehicles having less than four wheels and fitted with bodywork which partly or wholly encloses the driver the requirements of Regulation No. 46 shall apply.

2.5. "Principal radii of curvature at one point obtained on the reflecting surface (ri) and (r'i)" means the values obtained using the apparatus defined in annex 6, measured on the arc of the reflecting surface contained in a plane parallel to the greatest dimension of the mirror and passing through its centre and on the arc perpendicular to it;

2.6. "Radius of curvature at one point on the reflecting surface (rp)" means the arithmetic average of the principal radii of curvature ri and r'i, i.e.:

$$rp = \frac{ri + r'i}{2}$$

2.7. "Centre of the mirror" means the centroid of the visible area of the reflecting surface;

2.8. "Radius of curvature of the constituent parts of the rear-view mirror" means the radius "c" of the arc of the circle which most closely approximates to the curved form of the part in question.

3. APPLICATION FOR APPROVAL

3.1. The application for approval of a type of rear-view mirror shall be submitted by the holder of the trade name or mark or by his duly accredited representative.

3.2. For each type of rear-view mirror the application shall be accompanied by the undermentioned documents in triplicate and by the following particulars:

3.2.1. A technical description, including mounting instructions and specifying the type(s) of vehicles for which the rear-view mirror is intended,

3.2.2. Drawings sufficiently detailed to enable:

3.2.2.1. Compliance with the general specifications prescribed in paragraph 6 to be verified,

3.2.2.2. Compliance with the dimensions prescribed in paragraph 7.1. to be verified and

3.2.2.3. Compliance with the positioning of the spaces provided for the approval mark and prescribed by paragraph 4.2. below to be checked.

3.3. In addition, the application for approval shall be accompanied by four samples of the type of rear-view mirror. At the request of the technical service responsible for conducting approval tests supplementary samples may be required.

- 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 rear-view mirrors submitted for approval shall bear the trade name or mark of the manufacturer; this marking shall be clearly legible and be indelible.
- 4.2. Every rear-view mirror shall possess on its holder a space large enough to accommodate the approval mark, which must be legible when the rear-view mirror has been mounted on the vehicle; this space shall be shown on the drawings referred to in paragraph 3.2.2. above.
5. APPROVAL
- 5.1. If the samples submitted for approval meet the requirements of paragraphs 6 to 8 below, approval of the pertinent type of rear-view mirror shall be granted.
- 5.2. An approval number shall be assigned to each type approved. Its first two digits (at present 00 for the Regulation in its original form) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another type of rear-view mirror.
- 5.3. Notice of approval or of extension or refusal of approval of a type of rear-view mirror 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.
- 5.4. There shall be affixed, conspicuously and in the space referred to in paragraph 4.2. above, to every rear-view mirror conforming to a type approved under this Regulation, in addition to the mark prescribed in paragraph 4.1., an international approval mark consisting of:

- 5.4.1. A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval, 1/
- 5.4.2. An approval number,
- 5.4.3. An additional symbol in the form of the letter "L".
- 5.5. The approval mark and the additional symbol shall be clearly legible and be indelible.
- 5.6. Annex 3 to this Regulation gives an example of the arrangement of the approval mark and additional symbol.
6. GENERAL REQUIREMENTS
- 6.1. All rear-view mirrors shall be adjustable.
- 6.2. The edge of the reflecting surface shall be enclosed in a holder which, on its perimeter, shall have a value of "c" \geq 2.5 mm at all points and in all directions. If the reflecting surface projects beyond the holder, the radius of curvature "c" of the edge of the projecting part shall be not less than 2.5 mm and shall return into the holder under a force of 50 N applied to the point of greatest projection relative to the holder in a horizontal direction approximately parallel to the longitudinal median plane of the vehicle.
- 6.3 When the rear-view mirror is mounted on a plane surface, all its parts, irrespective of the adjustment position of the device, including those parts remaining attached to the holder after the test set out in paragraph 8.2., which are in potential static contact with a sphere 100 mm in diameter shall have a radius of curvature "c" of not less than 2.5 mm.
- 6.3.1. Edges of fixing holes or recesses, which are less than 12 mm in width are exempt from the radius requirements of paragraph 6.3. provided they are blunted.

1/ One for the Federal Republic of Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for Czechoslovakia, 9 for Spain, 10 for Yugoslavia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 for the German Democratic Republic, 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal and 22 for the Union of Soviet Socialist Republics. Subsequent numbers shall be assigned to other countries in the chronological order in which they ratify or accede to the Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

6.4. The parts of rear-view mirrors that are made of a Shore A hardness not greater than 60 are exempt from the provisions set out in paragraphs 6.2. and 6.3. above.

7. SPECIAL SPECIFICATIONS

7.1. Dimensions

7.1.1. The minimum dimensions of the reflecting surface must be such that:

7.1.1.1. The area shall not be less than 69 cm²,

7.1.1.2. In the case of circular mirrors, the diameter shall not be less than 94 mm,

7.1.1.3. In the case of non-circular mirrors, the dimension will permit the inscription of a circle with a diameter of 78 mm on the reflecting surface.

7.1.2. The maximum dimensions of the reflecting surface must be such that:

7.1.2.1. In the case of circular mirrors, the diameter shall not be greater than 150 mm,

7.1.2.2. In the case of non-circular mirrors, the reflecting surface shall fit into a rectangle measuring 120 mm by 200 mm.

7.2. Reflecting surface and coefficient of reflection

7.2.1. The reflecting surface of a rear-view mirror shall be spherically convex.

7.2.2. Differences between the radii of curvature:

7.2.2.1. The difference between r_i or r'_i and r_p at each reference point shall not exceed 0.15 r .

7.2.2.2. The difference between any of the radii of curvature (r_{p1} , r_{p2} and r_{p3}) and r shall not exceed 0.15 r .

7.2.3. The value of " r " shall not be less than 1,000 mm nor greater than 1,500 mm.

- 7.2.4. The value of the normal coefficient of reflection, determined according to the method described in annex 5 to this Regulation, shall not be less than 40%. If the mirror has two positions ("day" and "night"), the "day" position shall allow the colours of the signals used for road traffic to be recognized. The value of the normal coefficient of reflection in the "night" position shall not be less than 4%.
- 7.2.5. The reflecting surface shall retain the characteristics specified in paragraph 7.2.4., in spite of prolonged exposure to adverse weather conditions, in normal conditions of use.
8. TESTS
- 8.1. Rear-view mirrors shall be subjected to the tests described in paragraphs 8.2. and 8.3. below, to determine their behaviour under impact on and bending of the holder secured to the stem or support.
- 8.2. Impact test
- 8.2.1. Description of the test device:
- 8.2.1.1. The test device shall consist of a pendulum capable of swinging about two horizontal axes at right angles to each other, one of which is perpendicular to the front plane containing the "release" trajectory of the pendulum. The end of the pendulum shall comprise a hammer formed by a rigid sphere with a diameter of 165 ± 1 mm and having a 5 mm-thick rubber covering of Shore A 50 hardness. A device shall be provided which permits determination of the maximum angle assumed by the arm in the plane of release. There shall be a support firmly fixed to the structure supporting the pendulum which serves to hold the specimens in compliance with the impact requirements stipulated in paragraph 8.2.2.6. below. Figure 1 below gives the dimensions of the test facility and the special design specifications.
- 8.2.1.2. The centre of percussion of the pendulum shall coincide with the centre of the sphere which forms the hammer. It is at a distance "1" from the axis of oscillation in the release plane which is equal to $1 \text{ m} \pm 5 \text{ mm}$. The reduced mass of the pendulum to its centre of percussion is $m_0 = 6.8 \pm 0.05 \text{ kg}$. The relationship between the centre of gravity of the pendulum and its axis of rotation is expressed in the equation:
- $$m_0 = m \frac{d}{1}$$

Rev.1/Add.80
page 7

(Dimensions in mm)

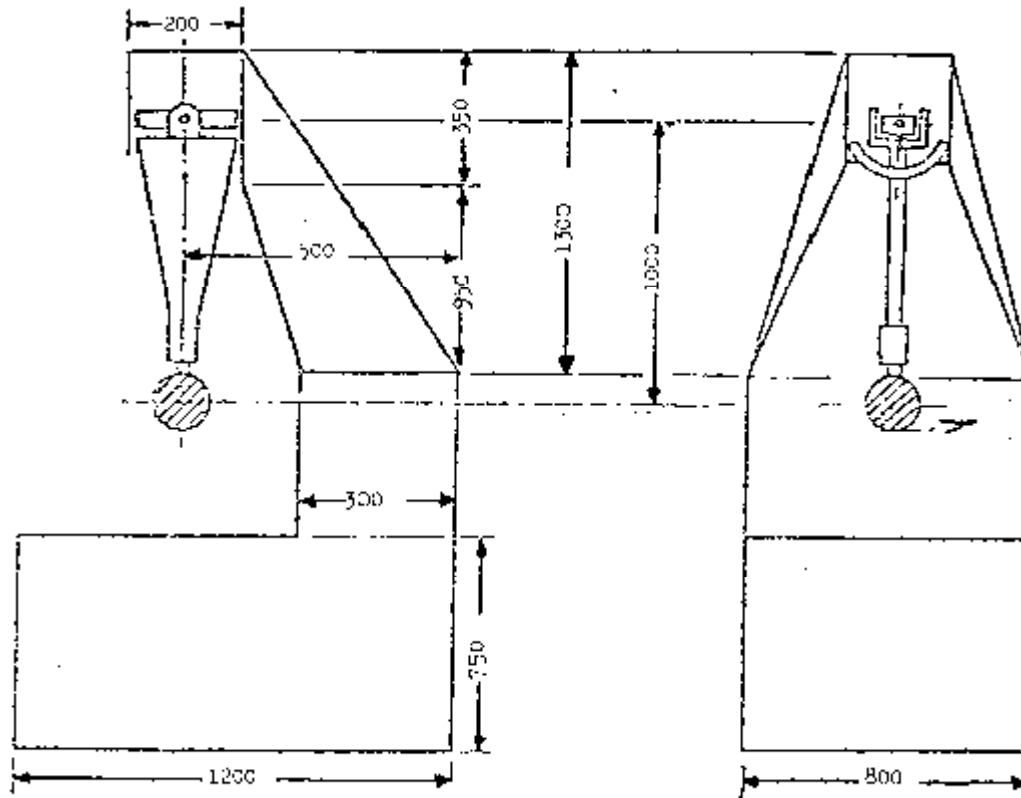


Figure 1

8.2.2. Description of the test:

8.2.2.1. The procedure used to clamp the rear-view mirror to the support shall be that recommended by the manufacturer of the device, or, where appropriate, by the vehicle manufacturer.

8.2.2.2. Positioning the rear-view mirror for the test.

8.2.2.2.1. Rear-view mirrors shall be positioned on the pendulum impact rig such that the axes which are horizontal and vertical when installed on a vehicle in accordance with the vehicle or rear-view mirror manufacturers' mounting instructions, are in a similar position.

8.2.2.2.2. When a rear-view mirror is adjustable in relation to the base, the test position shall be the least favourable for any pivoting device to operate within the limits provided by the mirror or vehicle manufacturer.

8.2.2.2.3. When the rear-view mirror has a device for adjusting its distance from the base, the device shall be set in the position where the distance between the holder and the base is shortest.

8.2.2.2.4. When the reflecting surface is mobile in the holder, it shall be adjusted so that the upper corner which is furthest from the vehicle, is in the position of greatest projection relative to the holder.

8.2.2.3. When the pendulum is in a vertical position, the horizontal and longitudinal vertical planes passing through the centre of the hammer, shall pass through the centre of the mirror as defined in paragraph 2.7. above. The longitudinal direction of oscillation of the pendulum shall be parallel to the longitudinal plane of the vehicle.

8.2.2.4. When, under the conditions governing adjustment prescribed in paragraphs 8.2.2.2.1. and 8.2.2.2.2. above, parts of the rear-view mirror limit the return of the hammer, the point of impact shall be shifted in a direction perpendicular to the axis of rotation or pivot in question. This displacement shall be that which is strictly necessary for the implementation of the test.

It shall be limited in such a way that the point of contact of the hammer is located at least 10 mm from the periphery of the reflecting surface.

- 8.2.2.5. The test consists in allowing the hammer to fall from a height corresponding to a pendulum angle of 60° from the vertical so that the hammer strikes the rear-view mirror at the moment when the pendulum reaches the vertical position.
- 8.2.2.6. The rear-view mirrors are subjected to impact in the following different conditions:
 - 8.2.2.6.1. Test 1: The point of impact shall be as defined in paragraphs 8.2.2.3 or 8.2.2.4 above. The impact shall be such that the hammer strikes the rear-view mirror on the reflecting surface side.
 - 8.2.2.6.2. Test 2: The point of impact shall be as defined in paragraphs 8.2.2.3. or 8.2.2.4. above. The impact shall be such that the hammer strikes the rear-view mirror on the opposite side to the reflecting surface.
- 8.3. Bending test on the holder fixed to the stem
 - 8.3.1. Description of the test
 - 8.3.1.1. The holder shall be placed horizontally in a device in such a way that the adjustment parts of the mounting can be clamped securely. In the direction of the greatest dimension of the holder, the end nearest to the point of fixing on the adjustment part shall be immobilized by means of a fixed step 15 mm wide, covering the entire width of the holder.
 - 8.3.1.2. At the other end, a step identical with the one described above shall be placed on the holder so that the specified test load can be applied to it (see figure 2 below).
 - 8.3.1.3. The end of the holder opposite that at which the force is applied may be clamped instead of kept in position as shown in figure 2.

Example of bending test apparatus for rear view mirror protective housings

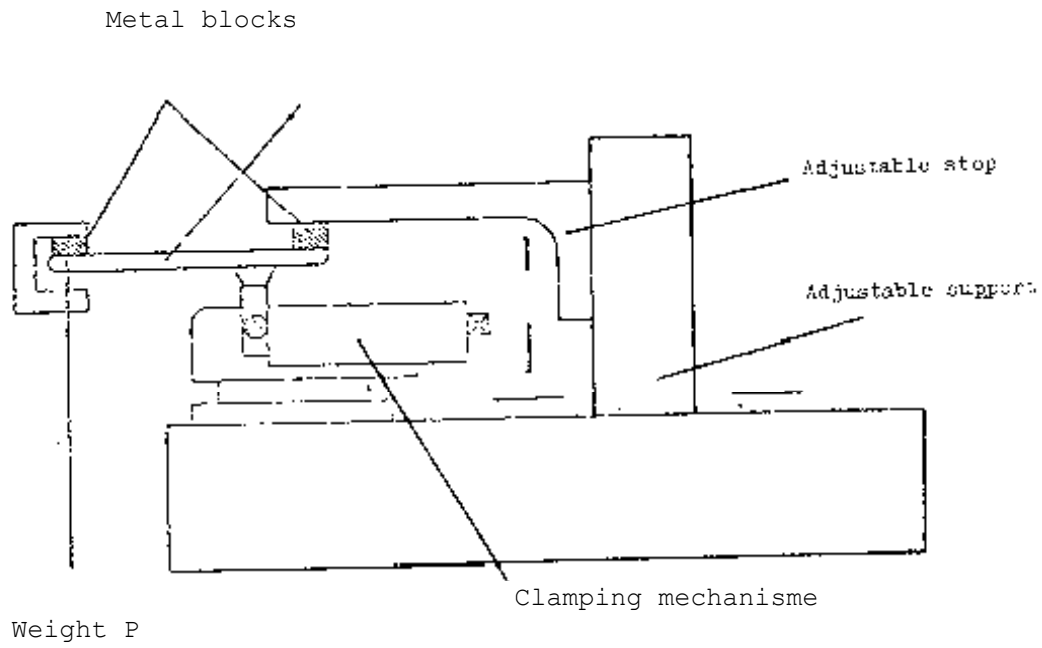


Figure 2

8.3.2. The test load shall be 25 kg applied for one minute.

8.4. Results of the tests

8.4.1. In the tests described in paragraph 8.2. above, the pendulum shall return in such a way that the projection on the release plane of the position taken by the arm makes an angle of at least 20° with the vertical.

8.4.1.1. The accuracy of the angle measurement shall be $\pm 1^\circ$.

8.4.2. The mirror shall not break during the tests described in paragraphs 8.2. and 8.3 above. However, breakage of the reflecting surface of the mirror shall be allowed if one of the following conditions is fulfilled:

8.4.2.1. The fragments of glass still adhere to the back of the holder or to a surface firmly attached to the holder, except that partial separation of the glass from its backing is permitted, provided this does not exceed 2.5 mm either side of the crack. It is permissible for small splinters to become detached from the surface of the glass at the point of impact;

8.4.2.2. The mirror is made of safety glass.

9. CONFORMITY OF PRODUCTION

9.1. Any rear-view mirror approved pursuant to this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 6. to 8. above.

9.2. In order to verify that the requirements of paragraph 9.1. are met, suitable controls of the production shall be carried out.

9.3. The holder of the approval shall, in particular:

9.3.1. Ensure existence of procedures for the effective control of the quality of rear-view mirrors,

9.3.2. Have access to the control equipment necessary for checking the conformity of each approved type,

9.3.3. 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,

- 9.3.4. Analyse the results of each type of test, in order to verify and ensure the stability of the rear-view mirror characteristics, making allowance for variation of an industrial production,
- 9.3.5. Ensure that for each type of rear-view mirror at least the tests prescribed in annex 7 to this Regulation are carried out,
- 9.3.6. Ensure that any 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.
- 9.4. The competent authority which has granted type-approval may at any time verify the conformity control methods applicable to each production unit.
- 9.4.1. In every inspection, the test books and production survey records shall be presented to the visiting inspector.
- 9.4.2. 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.
- 9.4.3. When the quality level appears unsatisfactory or when it seems necessary to verify the validity of the tests carried out in application of paragraph 9.4.2., the inspector shall select samples to be sent to the technical service which has conducted the type-approval tests.
- 9.4.4. The competent authority may carry out any test prescribed in this Regulation.
- 9.4.5. The normal frequency of inspections authorized by the competent authority shall be one per two 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.
10. PENALTIES FOR NON-CONFORMITY OF PRODUCTION
- 10.1. The approval granted in respect of a type of rear-view mirror pursuant to this Regulation may be withdrawn if the requirements set forth above are not met.
- 10.2. 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.

- 11. MODIFICATION AND EXTENSION OF APPROVAL OF A TYPE OF REAR-VIEW MIRROR
 - 11.1. Every modification of the vehicle type shall be notified to the administrative department which approved the type of rear-view mirror. The department may then either:
 - 11.1.1. Consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the rear-view mirror still complies with the requirements; or
 - 11.1.2. Require a further test report from the technical service responsible for conducting the tests.
 - 11.2. Confirmation or refusal of approval, specifying the alterations shall be communicated by the procedure specified in paragraph 5.3 above to the Parties to the Agreement applying this Regulation.
 - 11.3. 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.
- 12. PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a type of rear-view mirror 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.

II - INSTALLATION OF REAR-VIEW MIRRORS

- 13. DEFINITIONS

For the purpose of this Regulation,
- 13.1. "The maximum design speed" as specified in paragraph 16.2. of this Regulation.
- 13.2. "Type of vehicle as regards rear-view mirrors" means vehicles which are identical in respect of the following basic features:
 - 13.2.1. The geometrical features of the vehicle, liable to influence the installation of rear-view mirrors,
 - 13.2.2. The positions and types of rear-view mirror specified.

14. APPLICATION FOR APPROVAL

14.1. The application for approval of a vehicle type with regard to the installation of rear-view mirrors shall be submitted by the vehicle manufacturer or by his duly accredited representative.

14.2. It shall be accompanied by the undermentioned documents in triplicate and by the following particulars:

14.2.1. A description of the vehicle type with respect to the items mentioned in paragraph 13.2. above;

14.2.2. A list of the components necessary to identify rear-view mirrors which can be installed in the vehicle;

14.2.3. Drawings showing the position of the rear-view mirror and its adapting components on the vehicle.

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

14.4. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type-approval is granted.

15. APPROVAL

15.1. If the vehicle type submitted for approval in accordance with paragraph 14 above meets the requirements of paragraph 16 of this Regulation, approval shall be granted.

15.2. An approval number shall be assigned to each type approved. Its first two digits (at present 00, for the Regulation in its original form) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another vehicle type.

15.3. Notice of approval or of extension or refusal of approval of a vehicle type 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 2 to this Regulation.

15.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a type approved under this Regulation an international approval mark consisting of:

- 15.4.1. A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval, */
- 15.4.2. The number of this Regulation, followed by the letter "R", a dash and the approval number to the right of the circle prescribed in paragraph 15.4.1.
- 15.5. 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 15.4.1. need not be repeated; in such a case, the Regulation and approval numbers and the additional symbols of all the Regulations under which approval has been granted in the country which has granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 15.4.1.
- 15.6. The approval mark shall be clearly legible and be indelible.
- 15.7. The approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.
- 15.8. Annex 4 to this Regulation gives examples of arrangements of the approval mark.
16. REQUIREMENTS
- 16.1. The vehicle shall meet the following requirements:
- 16.1.1. The rear-view mirrors installed on the vehicle shall be of Class/L type approved under this Regulation.
- 16.1.2. Rear-view mirrors shall be fixed in such a way that they remain steady under normal conditions of use.
- 16.2. Number
- 16.2.1. All two-wheeled vehicles with a maximum design speed not exceeding 100 km/h must be fitted with a rear-view mirror. This rear-view mirror must be fitted on the left side of the vehicle in countries with right-hand rule of the road, and on the right side of the vehicle in countries with left-hand rule of the road.
- 16.2.2. All two-wheeled vehicles with a maximum design speed exceeding 100/km/h must be fitted with two rear-view mirrors, one on the left and one on the right of the vehicle.

*/ See paragraph 5.4.1., footnote1/

16.3. Site

16.3.1. Rear-view mirrors must be mounted or adjusted in such a way that the distance of the centre of the reflective surface, as measured in a horizontal plane, is at least 280 mm outward from the longitudinal vertical plane passing through the centre of the steering head of the vehicle. Before the measurement, the handlebar shall be placed in the straight ahead position and the mirror(s) shall be adjusted to its (their) normal position.

16.4. Adjustment

16.4.1. Rear-view mirror(s) shall be such that the driver can adjust it (them) in the normal driving position.

17. CONFORMITY OF PRODUCTION

17.1. Any vehicle approved pursuant to this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set out in paragraph 16 above.

17.2. In order to verify that the requirements of paragraph 17.1. above are met, suitable controls of the production shall be carried out.

17.3. The holder of the approval shall in particular:

17.3.1. Ensure existence of procedures for the effective control of the quality of the vehicles as regards all aspects relevant for compliance with the requirements set out in paragraph 16 above;

17.3.2. Ensure that for each type of vehicle sufficient checks are carried out as regards the number and type of the rear-view mirrors and the dimensions relevant for their correct installation in order to ensure that all vehicles in production comply with the specifications given for the vehicle which was submitted for type- approval;

17.3.3. Ensure that, if the checks carried out pursuant to paragraph 17.3.2. above give evidence of non-conformity of one or more vehicles with the requirements set out in paragraph 16 above, all necessary steps are taken to re-establish the conformity of the corresponding production.

17.4. The competent authority which has granted type-approval may at any time verify the conformity control methods applicable to each production unit. It may also carry out any random checks on serially-manufactured vehicles regarding the requirements set out in paragraph 16 above.

17.5. In the case where negative results are recorded during the verifications and checks pursuant to paragraph 17.4. above, the competent authority shall ensure that all necessary steps are taken to re-establish the conformity of production as rapidly as possible.

18. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

- 18.1. The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirements set forth above are not met.
- 18.2. 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.

19. MODIFICATION AND EXTENSION OF APPROVAL OF THE VEHICLE TYPE

- 19.1. Every modification of the vehicle type shall be notified to the administrative department which approved the vehicle type. The department may then either:
- 19.1.1. Consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the vehicle still complies with the requirements; or
- 19.1.2. Require a further test report from the technical service responsible for conducting the tests.
- 19.2. Confirmation or refusal of approval, specifying the alterations shall be communicated by the procedure specified in paragraph 15.3 above to the Parties to the Agreement applying this Regulation.
- 19.3. 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 2 to this Regulation.

20. PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a vehicle type 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 2 to this Regulation.

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

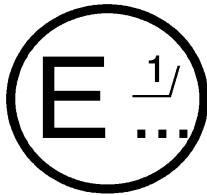
The Parties to the 1958 Agreement applying this Regulation shall communicate to the United Nations Secretariat the names and addresses of the technical services responsible for conducting approval tests and of the administrative departments which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval, issued in other countries, are to be sent.

page 19

Annex 1

Annex 1

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



COMMUNICATION

issued by: Name of administration:

concerning: 2/ APPROVAL GRANTED
 APPROVAL EXTENDED
 APPROVAL REFUSED
 APPROVAL WITHDRAWN
 PRODUCTION DEFINITELY DISCONTINUED

of a type of rear-view mirror pursuant to Regulation No. 81

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

1. Trade name or mark of the equipment:
2. Equipment type:
3. Brief description including in particular the following information:
 - 3.1. Main dimensions)
of the reflecting surface
 - 3.2. Nominal radius of curvature)
4. Manufacturer's name and address:
.....
5. If applicable, name and address of manufacturer's representative:
.....
6. Equipment 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. Vehicles for which the equipment is designed:
-
11. Approval is granted/refused/extended/withdrawn 2/
12. Reason(s) for extension of approval:
-
13. Place:
14. Date:
15. Signature:
16. 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 what does not apply.

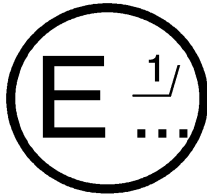
Rev.1/Add.80

page 21

Annex 2

Annex 2

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



COMMUNICATION

issued by: Name of administration:

.....

.....

.....

concerning: 2/ APPROVAL GRANTED
 APPROVAL EXTENDED
 APPROVAL REFUSED
 APPROVAL WITHDRAWN
 PRODUCTION DEFINITELY DISCONTINUED

of a type of vehicle with regard to the installation of rear-view mirrors
pursuant to Regulation No. 81

Approval No. ...

Extension No. ...

1. Trade name or mark of the vehicle:
2. Vehicle type:
3. Vehicle maximum design speed: \leq 100 km/h, $<$ 100 km/h 2/
4. Manufacturer's name and address:
.....
5. If applicable, name and address of manufacturer's representative:
.....

6. Trade name or mark of rear-view mirror(s):
7. Approval mark of the rear mirror:
8. Vehicle submitted for approval on:
9. Technical service responsible for conducting approval tests:
10. Date of report issued by that service:
11. Number of report issued by that service:
12. Approval is granted/refused/extended/withdrawn 2/
13. Reason(s) for extension of approval:
.....
14. Place:
15. Date:
16. Signature:
17. 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).

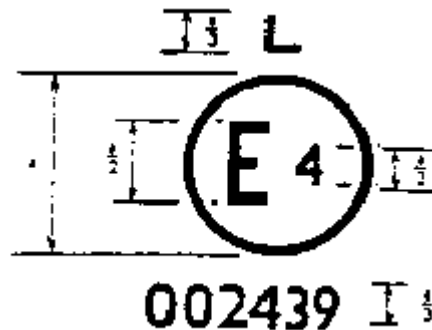
2/ Strike out what does not apply.

Rev.1/Add.80
age 23
Annex 3

Annex 3

ARRANGEMENT OF THE REAR-VIEW MIRROR APPROVAL MARK

(See paragraph 5.4. of the Regulation)



a = 8 mm min

The above approval mark affixed to a rear-view mirror indicates that the mirror is a rear-view mirror, of type L, which 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./81 in its original form.

Note: The approval number and the additional symbol must be placed close to the circle and either above or below the "E" or to the left or right of that letter. The digits of the approval number must be on the same side of the "E" and point in the same direction. The additional symbol must be directly opposite the approval number. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

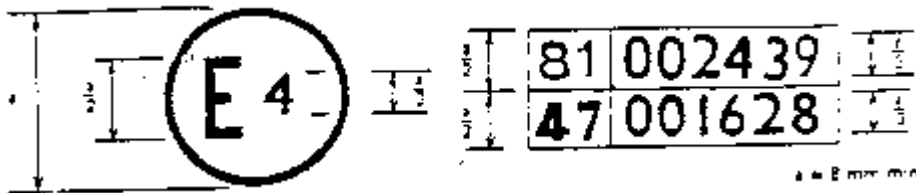
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ECE Regulation No. 81
00 series of amendments

Annex 4

ARRANGEMENTS OF THE VEHICLE APPROVAL MARK CONCERNING
THE INSTALLATION OF REAR-VIEW MIRRORS

Model A

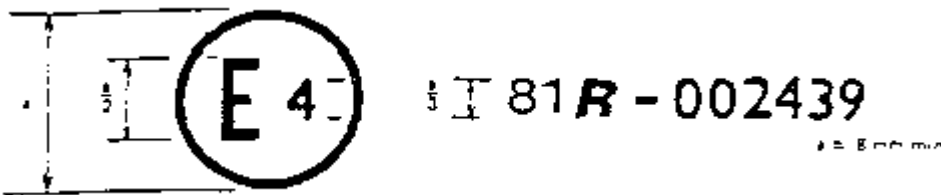
(See paragraph 15.4. of the Regulation)



The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E 4) pursuant to Regulation No. 81 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. 81 in its original form.

Model B

(See paragraph 15.5. of the Regulation)



The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E 4) pursuant to Regulations Nos. 81 and 47. ^{1/} The first two digits of the approval numbers indicate that, at the dates when the respective approvals were granted, Regulation No. 81 had not been modified, and Regulation No. 47 already included the 01 series of amendments.

^{1/} The second number is given as an example only.

မအ. 2330—2550
ECE Regulation No. 81
00 series of amendments

Annex 5

TEST METHOD FOR DETERMINING REFLECTIVITY

1. DEFINITIONS

1.1. CIE standard illuminant A: 1/

λ	\bar{x}	(λ)
600	1.062	2
620	0.854	4
650	0.283	5

1.2. CIE standard source A: 1/ Gas-filled tungsten filament lamp operating at a correlated colour temperature of $T_{68} = 2,855.6$ K.

1.3. CIE 1931 standard colorimetric observer: 1/ Receptor of radiation whose colorimetric characteristics correspond to the spectral tristimulus values $\bar{x}(\lambda)$, $y(\lambda)$, $z(\lambda)$ (see table).

1.4. CIE spectral tristimulus values: 1/ Tristimulus values of the spectral components of an equi-energy spectrum in the CIE (XYZ) system.

1.5. Photopic vision: 1/ Vision by the normal eye when it is adapted to levels of luminance of at least several candelas per square metre.

2. APPARATUS

2.1. General

2.1.1. The apparatus shall consist of a light source, a holder for the test sample, a receiver unit with a photodetector and an indicating meter (see figure 1), and a means of eliminating the effects of extraneous light.

2.1.2. The receiver may incorporate a light-integrating sphere to facilitate measuring the reflectance of non-flat (convex) mirrors (see figure 2).

2.2. Spectral characteristics of light source and receiver.

2.2.1. The light source shall consist of a CIE standard source A and associated optics to provide a near-collimated light beam. A voltage stabilizer is recommended to maintain a fixed lamp voltage during instrument operation.

- 2.2.2. The receiver shall have a photodetector with a spectral response proportional to the photopic luminosity function of the CIE (1931) standard colorimetric observer (see table). Any other combination of illuminant-filter-receptor giving the overall equivalent of CIE standard illuminant A and photopic vision may be used. When an integrating sphere is used in the receiver, the interior surface of the sphere shall be coated with a matt (diffusive) spectrally non-selective white coating.
- 2.3. Geometric conditions
- 2.3.1. The angle of the incident beam (θ) should preferably be 0.44 ± 0.09 rad ($25 \pm 5^\circ$) from the perpendicular to the test surface and shall not exceed the upper limit of the tolerance (i.e. 0.53 rad or 30°). The axis of the receptor shall make an angle (θ) with this perpendicular equal to that of the incident beam (see figure 1). The incident beam upon arrival at the test surface shall have a diameter of not less than 19 mm. The reflected beam shall not be wider than the sensitive area of the photodetector, shall not cover less than 50% of such area, and as nearly as possible shall cover the same area segment as used during instrument calibration.
- 2.3.2. When an integrating sphere is used in the receiver section, the sphere shall have a minimum diameter of 127 mm. The sample and incident beam apertures in the sphere wall shall be of such a size as to admit the entire incident and reflected light beams. The photodetector shall be located so as not to receive direct light from either the incident or the reflected beams.
- 2.4. Electrical characteristics of the photodetector-indicator unit
- The photodetector output as read on the indicating meter shall be a linear function of the light intensity on the photosensitive area. Means (electrical and/or optical) shall be provided to facilitate zeroing and calibration adjustments. Such means shall not affect the linearity or the spectral characteristics of the instrument. The accuracy of the receptor-indicator unit shall be with $\pm 2\%$ of full scale, or $\pm 10\%$ of the magnitude of the reading, whichever is the smaller.
- 2.5. Sample holder
- The mechanism shall be capable of locating the test sample so that the axes of the source arm and receptor are intersect at the reflecting surface. The reflecting surface may lie within or at either face of the mirror sample, depending on whether it is a first-surface, second-surface, or prismatic "flip" type mirror.

3. PROCEDURE

3.1. Direct calibration method

3.1.1. In the direct calibration method, air is used as the reference standard. This method is applicable for those instruments which are so constructed as to permit calibration at the 100% point by swinging the receiver to a position directly on the axis of the light source (see figure/1).

3.1.2. It may be desired in some cases (such as when measuring low-reflectivity surfaces) to use an intermediate calibration point (between 0 and 100% on the scale) with this method. In these cases a neutral density filter of known transmittance shall be inserted in the optical path, and the calibration control shall then be adjusted until the meter reads the percentage transmission of the neutral density filter. This filter shall be removed before making reflectivity measurements.

3.2. Indirect calibration method

The indirect calibration method is applicable for those instruments with fixed source and receiver geometry. A properly calibrated and maintained reflectance standard is required. This reference standard should preferably be a flat mirror with a reflectance value as near as possible to that of the test samples.

3.3. Non-flat (convex) mirror measurement

The measurement of the reflectance of non-flat (convex) mirrors requires the use of instruments which incorporate an integrating sphere in the receiver unit (see figure 2). If the instrument indicating meter indicates n_e divisions with a reference standard mirror of E per cent reflectance, then, with a mirror of unknown reflectance, n_x divisions will correspond to a reflectance of X per cent, given by the formula:

$$X = E \frac{n_x}{n_e}$$

1/ Definitions taken from CIE Publication 50 (45), International Electrotechnical Vocabulary, Group/45: lighting.

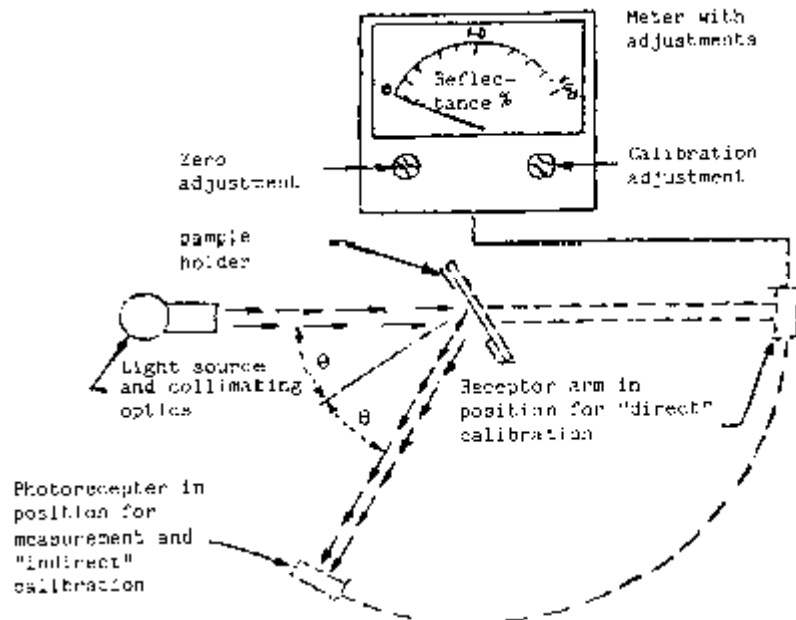


Figure 1 - Generalized reflectometer showing geometries for the two calibration methods

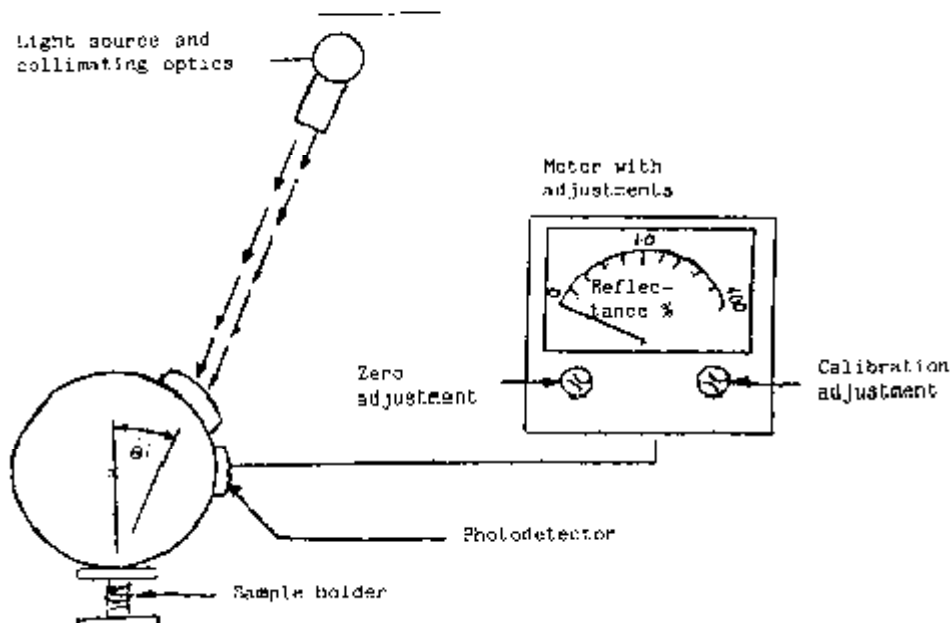


Figure 2 - Generalized reflectometer, incorporating an integrating sphere in the receptor.

SPECTRAL TRISTIMULUS VALUES FOR THE CIE 1931 STANDARD COLORIMETRIC OBSERVER 1/
 (This table is taken from CIE Publication 50(45) (1970))

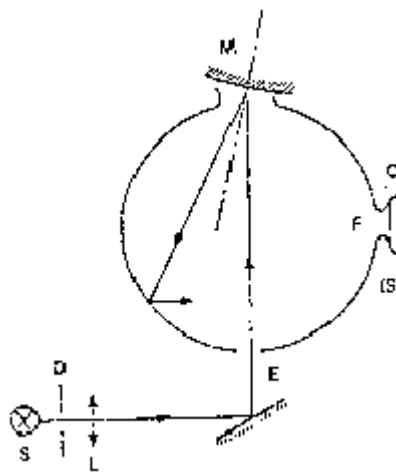
λ nm	$x(\lambda)$	$\bar{y}(\lambda)$	$\bar{z}(\lambda)$
380	0.001 4	0.000 0	0.006 5
390	0.004 2	0.000 1	0.020 1
400	0.014 3	0.000 4	0.067 9
410	0.043 5	0.001 2	0.207 4
420	0.134 4	0.004 0	0.645 6
430	0.283 9	0.011 6	1.385 6
440	0.348 3	0.023 0	1.747 1
450	0.336 2	0.038 0	1.772 1
460	0.290 8	0.060 0	1.669 2
470	0.195 4	0.091 0	1.287 6
480	0.095 6	0.139 0	0.813 0
490	0.032 0	0.208 0	0.465 2
500	0.004 9	0.323 0	0.272 0
510	0.009 3	0.503 0	0.158 2
520	0.063 3	0.710 0	0.078 2
530	0.165 5	0.862 0	0.042 2
540	0.290 4	0.954 0	0.020 3
550	0.433 4	0.995 0	0.008 7
560	0.594 5	0.995 0	0.003 9
570	0.762 1	0.952 0	0.002 1
580	0.916 3	0.870 0	0.001 7
590	1.026 3	0.757 0	0.001 1
600	1.062 2	0.631 0	0.000 8
610	1.002 6	0.503 0	0.000 3
620	0.854 4	0.381 0	0.000 2
630	0.642 4	0.265 0	0.000 0
640	0.447 9	0.175 0	0.000 0
650	0.233 5	0.107 0	0.000 0
660	0.164 9	0.061 0	0.000 0
670	0.087 4	0.032 0	0.000 0
680	0.046 8	0.017 0	0.000 0
690	0.022 7	0.008 2	0.000 0
700	0.011 4	0.004 1	0.000 0
710	0.005 8	0.002 1	0.000 0
720	0.002 9	0.001 0	0.000 0
730	0.001 4	0.000 5	0.000 0
740	0.000 7	0.000 2 <u>2/</u>	0.000 0
750	0.000 3	0.000 1	0.000 0
760	0.000 2	0.000 1	0.000 0
770	0.000 1	0.000 0	0.000 0
780	0.000 0	0.000 0	0.000 0

1/ Abridged table. The values of $\bar{y}(\lambda) = V(\lambda)$ are rounded off to four decimal places.

2/ Changed in 1966 (from 3 to 2).

EXPLANATORY FIGURE

Example of device for measuring the reflection factor of spherical mirrors



C = Receiver

D = Diaphragm

E = Window of entry

F = Window of measurement

L = Lens

M = Object window

S = Light source

(S) = Integrating sphere

Annex 6

PROCEDURE FOR DETERMINING THE RADIUS OF CURVATURE "r" OF
A MIRROR'S REFLECTING SURFACE

1. Measurements

1.1. Equipment

The "spherometer" described in figure/1 is used.

1.2. Measuring points

1.2.1. The principal radii of curvature shall be measured at 3 points situated as close as possible to positions at 1/3, 1/2 and 2/3 of the distance along the arc of the reflecting surface contained in a plane parallel to the greatest dimension of the mirror and passing through its centre and of the arc perpendicular to it.

1.2.2. Where, because of mirror size, it is impossible to obtain measurement in the directions defined in item/1.2.1. the technical departments responsible for the tests may take measurements at this point in two perpendicular directions as close as possible to those prescribed above.

2. Calculation of the radius of curvature (r)

"r" expressed in mm is calculated using the formula:

$$r = \frac{r_{p1} + r_{p2} + r_{p3}}{3}$$

where r_{p1} is the radius of curvature of the first measuring point, r_{p2} at the second and r_{p3} at the third.

мод. 2330—2550

ECE Regulation No. 81

00 series of amendments

Rev.1/Add.80

page 34

Annex 6

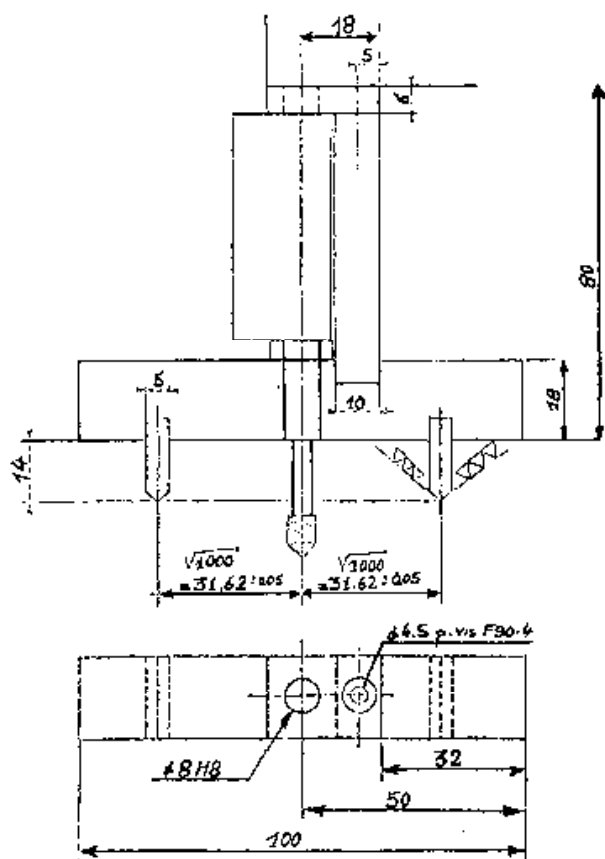
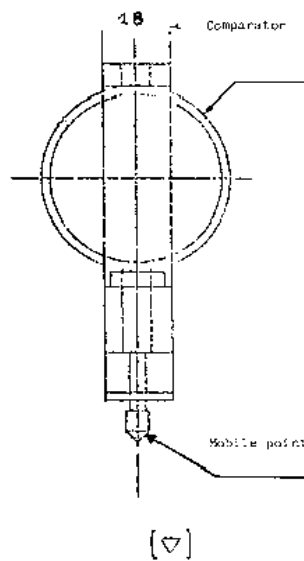


Figure 1

Annex 7

CONTROL OF THE CONFORMITY OF PRODUCTION

1. DEFINITIONS

For the purpose of this annex,

"Type of deflection system" means a given combination of axes, swivel points and other articulating mechanisms which ensures deflection of the rear-view mirror in the direction of impact concerned.

2. TESTS

Rear-view mirrors shall be subjected to the following tests:

2.1. Reflecting surface

2.1.1. Verification of the nominal radius of curvature, pursuant to the requirements of paragraph 2 of annex6 to this Regulation;

2.1.2. Measurement of the differences between radii of curvature pursuant to the requirements of paragraph 7.2.2. of this Regulation.

2.2. Deflection system

Impact test pursuant to the requirements of paragraph 8.2. of this Regulation.

3. FREQUENCY AND RESULTS OF TESTS

3.1. Verification of the nominal radius of curvature and measurement of the differences between radii of curvature

3.1.1. Frequency:

One test every three months, per approval number, per nominal radius of curvature.

3.1.2. Results:

All measurement results shall be recorded.

The maximum difference values prescribed in paragraph 7.2.2. of this Regulation shall be complied with.

3.2. Impact test

3.2.1. Frequency:

One test every three months, per approval number, per type of deflection system, per base configuration.

3.2.2. Results:

All results shall be recorded.

The provisions of paragraph 8.4. of this Regulation shall be complied with.

3.3. Selection of samples

The selection of samples to be tested shall take account of the quantity produced for each type of rear-view mirrors.

Paragraph 5.4.1., footnote 1/, amend to read:

"1/ 1 for Germany, 8 for the Czech Republic, 15 (vacant), 22 for the Russian Federation, 23 for Greece, 24 (vacant), 25 for Croatia, 26 for Slovenia, 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30 (vacant), 31 for Bosnia and Herzegovina, 32-36 (vacant) and 37 for Turkey. Subsequent numbers"

Paragraph 16.2.1., amend to read:

"16.2.1. All two-wheeled vehicles with a maximum design speed not exceeding 50 km/h must be fitted with at least one rear-view mirror. If one only, this rear-view mirror must be fitted"

Paragraph 16.2.2., amend to read:

"16.2.2. All two-wheeled vehicles with a maximum design speed exceeding 50 km/h and all three-wheeled vehicles must be fitted with two rear-view mirrors,"

Annex 2, item 3, amend to read:

"3. Vehicle maximum design speed: 2/ ≤ 50 km/h / > 50 km/h"