UNREVISED FREELANCE TRANSLATION. REFER TO ORIGINAL FOR TABLES AND DIAGRAMS

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National Standards of the People's Republic of China

GB×××× - 2003

Replacing GB15084 - 1994

Motor Vehicles - Rear-View Mirrors - Requirements of Performance and Installation

[ECE-R46 Uniform provisions concerning the approval of rear-view mirrors and of motor vehicles with regard to the installation of rear-view mirrors, MOD]

(version submitted for approval)

Promulgated on 2003 - ×× - ××　　Implemented on 2003 - ×× - ××

Promulgated by　General Administration of Quality Supervision, Inspection and Quarantine, The People's Republic of China

Contents

Introduction

All the technical contents of the Standards are mandatory.

The Standards are the revised version of GB15084-1994, "Motor Vehicles - Rear-View Mirrors - Requirements of Performance and Installation."

The amendments to the Standards employ the technical contents of legal regulations ECE-R46 (01 series, 1998 version) - "Unified Requirements for Certification of Installation of Rear-View Mirrors and Rear-View Mirrors of Motor Vehicles" (English version). A comparison list between the Reference Nos. of parts of the articles of the Standards with the Reference Nos. of articles of ECE-R46 is shown in Appendix (D).

The Standards are not included in the contents of "Certification Procedures and Certification Standards" of ECE-R46 because of the difference in forms between the system of standards and the system of legal regulations.

For the sake of convenience in use, the following amendments have been made to the technical requirements of ECE-R46:

a) "The legal regulations" are revised as "the standards":
b) The "2m" appearing in Articles 6.1.1, 6.2.2.6.2.3, 8.2.2.6, 8.3.6 and 8.3.7 are changed to be "180mm."
c) Any instances in the unit "m" in the Standards are changed to be "mm."
d) An informative appendix, Appendix D, is added.

Appendix A, Appendix B and Appendix C are regulatory appendices, and Appendix D is an informative appendix.

The suggested implementation date of the Standards is:

It is suggested that the Standards are to be officially implemented after 18 months upon the promulgation.

The Standards are proposed by China Association of Automobile Manufacturers.
The Standards are collated by the National Automotive Standardisation Technical Committee.
The Standards are drafted by the Wuhan Institute of Accessories of the Bodies of Automobiles, Wuhan University of Technology and Shanghai Ganxiang Automobile Mirror (Group) Co., Ltd.
Major drafters of the Standards: Jun Kong, Zaihua Li, Maodi Gan, Hong Zhao

Motor Vehicles - Rear-View Mirrors - Requirements of Performance and Installation

1 Scope

The Standards regulate the requirements of performance for rear-view mirrors installed on the bodies of vehicles of Categories M and N, other vehicles with less than four wheels and vehicles with part or all of the vehicle body enclosing the driver, as well as the requirements of installation on the abovementioned vehicles.

The Standards are applicable to vehicles of Categories M and N, other vehicles with less than four wheels and vehicles with part or all of the vehicle body enclosing the driver.

2 Regulatory Document Being Quoted

The articles of the following document are adopted by the Standards, and become the articles of the Standards. For all those documents with dates indicated, their subsequent amendments (excluding the contents of errors) or revised versions shall not be applicable to the Standards. Nevertheless, people of different circles are encouraged to study whether the latest versions of these documents can be included in the Standards after negotiation is made. For all those documents with no date indicated, their latest versions shall be applicable to the Standards.

GB/T 15089-2001 Classification of Power-Driven Vehicles and Trailers

Part 1 Performance Requirements of Rear-View Mirror

3 Terms and Definitions

The following terms and definitions are applicable to the Standards.

3.1

Rear-View Mirror

Referring to a device available for seeing clearly the images at the rear part and lateral side of vehicle within the field of vision satisfying the requirements specified in Article 8.5 of the Standards.

3.2

Interior Rear-View Mirror

Referring to a device installed inside the passenger cabin of vehicle with its field of vision specified satisfying the requirements of Article 3.1 of the Standards.

3.3

Exterior Rear-View Mirror

Referring to a device installed outside the vehicle with its field of vision specified satisfying the requirements of Article 3.1 of the Standards.

3.4

Surveillance Rear-View Mirror

Referring to a rear-view mirror, being different from the definition specified in Article 3.1 of the Standards, installed inside or outside the vehicle providing a field of vision being different from the requirements of Article 8.5 of the Standards.

3.5

Type of Rear-View Mirror

Referring to the rear-view mirrors whose major characteristics indicated below are similar:

3.5.1 Size and the radius of curvature of the reflecting surface of rear-view mirror.

3.5.2 Design, shape and material of rear-view mirror

3.6

Class of Rear-View Mirror

Referring to a rear-view device with one class or several classes of common characteristics and functions, which can be divided into several classes as follows:

Class I: interior rear-view mirror, whose field of vision is specified in Article 8.5.2 of the Standards.

Classes II, III: main exterior rear-view mirror, whose field of vision is specified in Article 8.5.3 of the Standards.

Class IV: wide-angle exterior rear-view mirror, whose field of vision is specified in Article 8.5.4 of the Standards.

Class V: close-proximity exterior rear-view mirror, whose field of vision is specified in Article 8.5.5 of the Standards.

3.7

r

Referring to the average radius of curvature measured on the reflecting surface by using the method indicated in Appendix C of the Standards.

3.8

Principal radius of curvature at one point obtained on the reflecting surface (r_i)

Referring to the radius of curvature obtained after the apparatus indicated in Appendix C of the Standards has gone through the centre of the reflecting surface, and is parallel to the line b section of the mirror and is perpendicular to the direction of the line section. The determination of line b section is shown in Article 5.1.2.1.

3.9

Radius of curvature at one point on the reflecting surface (r_p)

Referring to the arithmetical average value of the principal radius of curvature.

$$r_p = \frac{r_i + r_i'}{2} \quad \text{.....(1)}$$

3.10

Centre of the Mirror

Referring to the centre of mass of the visible region of the reflecting surface.

3.11

Radius of curvature of the constituent parts of the rear-view mirror C

Referring to the radius of curvature of the shape being nearest to the curve shape at a certain position of the constituent parts of rear-view mirror.

3.12

Vehicles of Categories M and N

Referring to the vehicles of Categories M and N defined in GB/T15089 - 2001.

4 General Requirements

4.1 All the rear-view mirrors can be adjusted.

4.2 The edge of the reflecting surface has to be wrapped in the protecting frame (such as supporting frame, etc.). The C values of all the points at its edges have to be greater than or equal to 2.5mm in all directions. If the reflecting surface exceeds the protecting frame, the radius of curvature C at the edge of the protruding part should not be less than 2.5mm, and the protruding part under the applied force of 50N can return to the inside of the frame. This force should be almost parallel to the vertical standard plane of vehicle, and be horizontally applied to where the protrusion of the reflecting surface is kept at the highest point of the frame.

4.3 After the rear-view mirror is tested according to Article 6.2, the rear-view mirror is put on a horizontal plane. Use a sphere with a diameter of 165mm to touch the

tangible position of the interior rear-view mirror. Use a sphere with a diameter of 100mm to touch the tangible position of the exterior rear-view mirror. All these tangible positions, including the positions connecting with the supporting frame (no matter how its adjusted position is) must not have a radius of curvature of less than 2.5mm.

4.3.1 As to the edge of the fixed hole or the recess on the rear-view mirror with its diameter or the greatest diagonal line less than 12mm, if it has gone through the smooth treatment, it needs not satisfy the requirement of the radius of curvature specified in Article 4.3.

4.4 The connection of the rear-view mirror with the connecting parts of the vehicle should be designed according to the following methods: it has to be guaranteed that the rear-view mirror be attached with a cylinder at the radius 50mm with the turning axis or the rotation centre deviated along the direction of impact or the axis line of one of them; and the cylinder should at least cut the surface portion connected with the connecting part.

4.5 With regards to the exterior rear-view mirror, if the parts mentioned in Articles 4.2 and 4.3 are made by the material with its Sualwell hardness no greater than A60, the abovementioned requirement needs not to be met.

4.6 With regards to the interior rear-view mirror, if the parts on the rear-view mirror are made by the material with its Sualwell hardness lower than A50, and installed on the rigid supporting part, then the tests of Articles 4.2 and 4.3 are only applicable to the supporting part.

5 Special Requirements

5.1 Size

5.1.1 Interior Rear-View Mirror (Class I)

A rectangle has to be able to be drawn on its reflecting surface. The rectangle is 40mm tall, and the length of its bottom sides is a. The calculation method of the size of a is:

$$a = \frac{150}{1 + \frac{1000}{r}} \text{ mm} \quad \ldots\ldots (2)$$

5.1.2 Exterior Rear-View Mirror (Classes II and III)

5.1.2.1 The size of the reflecting surface has to meet the following requirements:

5.1.2.1.1 A rectangle, with bottom side a and height 40mm, has to be able to be

drawn on its reflecting surface;

5.1.2.1.2 The line being parallel to the height of the rectangle is b;

5.1.2.2 Table1 below shows the smallest values of a and b:

Table 1 unit: mm

Class of rear-view mirror	Category of vehicle that rear-view mirror is designed for	a	b
II	M_2, M_3, N_2, N_3	$\frac{170}{1 + \frac{1000}{r}}$	200
III	M_1, N_1, N_2, N_3 (when 8.2.1.3 is applicable)	$\frac{130}{1 + \frac{1000}{r}}$	70

5.1.3 Wide-Angle Exterior Rear-View Mirror (Class IV)

The external outline of the reflecting surface should be in a simple shape. Its size should satisfy the requirements of the field of vision specified in Article 8.5.4 of the Standards.

5.1.4 Close-Proximity Exterior Rear-View Mirror (Class V)

The external outline of the reflecting surface should be in a simple shape. Its size should satisfy the requirements of the field of vision specified in Article 8.5.5 of the Standards.

5.2 Reflecting Surface and Reflection Rate

5.2.1 The reflecting surface of the rear-view mirror has to be the plane mirror or the spherical convex mirror.

5.2.2 Difference of the Radii of Curvature

5.2.2.1 The difference between various principal radii of curvature r_i' or r_i and r_p should not be greater than 0.15r.

5.2.2.2 The difference between r_p (r_{p1} , r_{p2} and r_{p3}) of any point and r should not be greater than 01.5r.

5.2.2.3 When the r value of the reflecting surface of rear-view mirror is not less than 3,000mm, the 0.15r specified in Articles 5.2.2.1 and 5.2.2.2 should be replaced by 0.25r.

5.2.3 The r value should not be less than:

5.2.3.1 1,200mm for the interior rear-view mirror (Class I) and the main exterior rear-view mirror (Class III);

5.2.3.2 1,800mm for the main exterior rear-view mirror (Class II);

5.2.3.3 400mm for the wide-angle exterior rear-view mirror (Class IV) and the close- proximity exterior rear-view mirror (Class V).

5.2.4 The value of the state-indicated reflection rate determined by the method specified in Appendix of the Standards should not be lower than 40%. If the rear-view mirror has two working positions (in the daytime and at night), then at the daytime position it should be able to identify the colourful traffic signs on the road, and at the night-time position the reflection rate should not be lower than 4%.

5.2.5 Except under extremely bad weather conditions, the rear-view mirror under normal application procedures should achieve a reflecting surface which can satisfy the reflection rate specified in Article 5.2.4.

6. Tests

6.1 Except close-proximity rear-view mirror (Class V), all the rear-view mirrors have to undergo the tests indicated in Articles 6.2 and 6.3.

6.1.1 With regards to all the rear-view mirrors, if the vehicle is fully loaded and all the parts of the rear-view mirror are at a height of above 1,800mm from the ground (no matter how its adjustment positions are), the test indicated in Article 6.2 can be exempted.

If the connecting part (such as connecting plate, supporting arm, rotating axis, etc.) of the rear-view mirror does not exceed the projection width of vehicle and is at a height of below 1,800mm from the ground, the measurement should be made on the vertical cross-section at the bottom side of the connecting part of rear-view mirror. If the rear part exceeds much of the width of vehicle, the point on the cross-section towards the front direction is regarded as the datum.

Under these circumstances, a description of the conditions of the installation position of the connecting part on the vehicle should be provided.

Regarding the rear-view mirror not taking the impact test, there should be a label of 1,800mm stuck on the supporting arm. In the test report, this result should also be stated.

6.2 Impact Test

6.2.1 Testing Device

6.2.1.1 Impact test platform comprises a fixed frame of the test mirror and a pendulum which can go around two horizontal axes swinging at a right angle, and one of them is within the plane of the vertical point of release. At the end of the

pendulum is a rigid sphere with a diameter 165mm ± 1mm. The sphere is covered by a layer of rubber at Sualwell hardness A50 and thickness 5mm. There is also an indicator for determining the maximum angle of the supporting arm within the release plane. According to the impact requirement specified in Article 6.2.2.6 below, the supporting stand for keeping the sample well should be solidly fixed on the working platform with supporting pendulum. Figure 1 shows the size of the testing device and the special requirements of its design.

6.2.1.2 The impact centre of the pendulum has to meet the centre of sphere. The distance between the centre of sphere and the rotating axis line is I, where I = 1,000mm ± 5mm. The mass of the pendulum, when converted as the mass of the impact centre, is m_o, where m_o = 6.8kg ± 0.05kg. The distance between the mass centre of pendulum and rotating axis line is d, and its relationship equation is:

$$m_o = m \frac{d}{I} \quad \text{..... (3)}$$

6.2.2 Description of the Test

6.2.2.1 The device for tightly gripping the rear-view mirror is provided by the rear-view mirror manufacturer or vehicle manufacturer.

6.2.2.2 Positioning of Rear-View Mirror During the Test

6.2.2.2.1 The rear-view mirror should be fixed on the testing platform according to the method recommended by the rear-view mirror manufacturer or vehicle manufacturer. The axis lines of its horizontal and vertical positions should be the same as the actual situations of the installed vehicle.

6.2.2.2.2 If the rear-view mirror can be adjusted according to its base, it should be located within the adjustment range indicated by the rear-view mirror manufacturer or vehicle manufacturer, and at the position which is most disadvantageous to turning in times of the impact.

6.2.2.2.3 If the rear-view mirror can be adjusted according to its base, the adjustment device should be adjusted, keeping it at the closest distance from the base.

6.2.2.2.4 If the reflecting surface can be adjusted within the protecting shell, the furthest upper angle from the vehicle should be adjusted to the position with the maximum protrusion from the protecting shell.

6.2.2.3 Interior rear-view mirror has to receive Test 2 specified in Article 6.2.2.6.1 Besides, as the pendulum is at a vertical position, the central horizontal plane and the vertical drop plane of the sphere should go through the centre of the mirror defined in

Article 3.10. The vertical swinging direction of the pendulum should be parallel to the vertical datum plane of vehicle.

6.2.2.4 When the installation and adjustment are carried out according to Articles 6.2.2.2.1 and 6.2.2.2.2, if the parts of rear-view mirror restrict the to-and-fro action of the sphere, the point of impact should be adjusted in the direction being vertical to the turning axis or rotating centre. But it has to be determined that such adjustment is necessary to the completion of the test, and one of the following requirements has to be satisfied:

6.2.2.4.1 The exterior outline of the sphere should be at least guaranteed to have cut the surface of the cylinder specified in Article 4.4;

6.2.2.4.2 The distance between the contact point of sphere and the edge of the reflecting surface should be at least 10mm.

6.2.2.5 During the test, let the sphere fall freely at an angle of 60^{o} of the drop line of the pendulum. As the pendulum swings to the drop position, the sphere would hit the rear-view mirror.

6.2.2.6 The rear-view mirror should receive impact under different conditions as follows:

6.2.2.6.1 Interior Rear-View Mirror:

size unit: mm

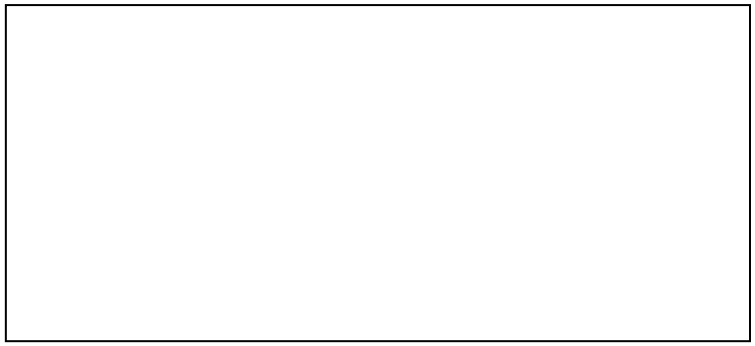


Figure 1

6.2.2.6.1.1 Test 1: The point of impact should meet the requirements of Article 6.2.2.3, and the sphere should cause an impact on the reflecting surface.

6.2.2.6.1.2 Test 2: The point of impact should form an angle of 45^{o} with the plane of mirror, and at the edge of the horizontal protecting shell going through the centre of mirror. The impact direction should be aiming at the reflecting surface.

6.2.2.6.2 Exterior Rear-View Mirror

6.2.2.6.2.1 Test 1: The point of impact should meet the requirements of Article

6.2.2.3 or Article 6.2.2.4, and the sphere should be made to cause impact on the reflecting surface of rear-view mirror.

6.2.2.6.2.2 Test 2: The point of impact should meet the requirements of Article 6.2.2.3 or Article 6.2.2.4, and the sphere should be made to cause impact on the back of the reflecting surface of the rear-view mirror.

6.2.2.6.2.3 If the rear-view mirror of Class II or Class III and the rear-view mirror of Class IV are installed on the same supporting frame, the test shall only be done to the lower rear-view mirror. If the distance between the upper rear-view mirror and the ground is less than 1,800mm, the technical department-in-charge can decide whether the test should be repeated, or whether the test should be made together with the upper rear-view mirror.

6.3 Bending test of protecting shell installed on the fixed part

6.3.1 Description of Test

6.3.1.1 The protecting shell is horizontally placed on the testing platform, and the adjustment part is gripped. At the direction of the protecting shell at its maximum size and at the nearest end from the fixed point of the adjustment part, a fixed stopper at the width of 15mm is used for covering the whole width of the shell body and making it unable to turn.

6.3.1.2 At the other end, a stopper having the same function as the above stopper is also placed on the shell body so as to carry out the test of load application from the top according to the requirements (see Figure 2).

6.3.1.3 Gripping can be conducted at the other end where load is applied.

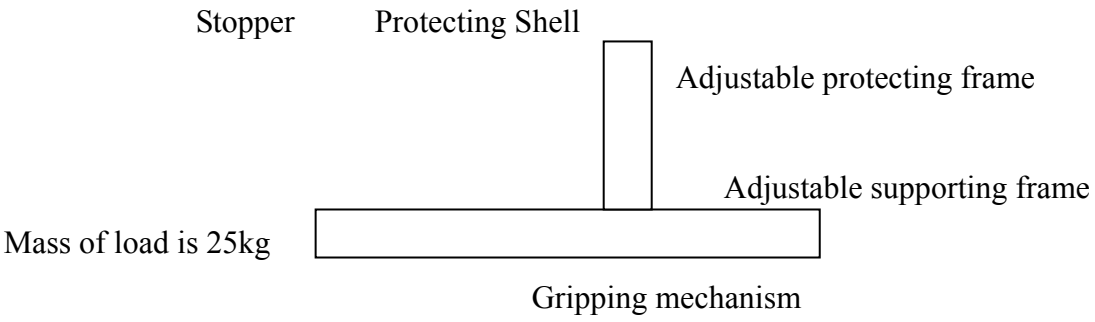


Figure 2 Exemplified bending test device of protecting shell of rear-view mirror

6.3.2 The mass of load to be applied in the test is 25kg, and the sustaining time is 1 minute.

6.4 Test Result

6.4.1 When the impact test is carried out according to Article 6.2, the pendulum having caused impact on the rear-view mirror has to be able to continue swinging at above 20^{o} within the release plane of the swinging arm.

6.4.1.1 The accuracy of the measurement of angle should be $\pm 1^{o}$.

6.4.1.2 This requirement is not applicable to the rear-view mirror adhered to the windscreen. The rear-view mirror of this class shall be regulated in Article 6.4.2 below.

6.4.1.3 For all the Class II and Class IV rear-view mirrors, as well as the co-installed Class III and Class IV rear-view mirrors, the required angle can be decreased from 20^{o} to 10^{o}.

6.4.2 As to the rear-view mirror attached to the windscreen, a test should be made according to Article 6.2. If the supporting part of the rear-view mirror is damaged, the remaining part protruding from the base should not be greater than 10mm, and its appearance should still meet the requirements of Article 4.3.

6.4.3 When the test is made according to Articles 6.2 and 6.3, the reflecting surface of the rear-view mirror should not be broken. But the following two situations are regarded as meeting the requirements:

6.4.3.1 The glass fragments are still adhered to the protecting shell, or adhered to the object solidly connected with the protecting shell. The glass is allowed to fall partially from the above position. However any side of the broken part should not exceed 2.5mm. On the point of impact, small fragments are allowed to fall from the above positions.

6.4.3.2 The reflecting surface should be made of safety glass.

Part 2 Installation Requirements of Rear-View Mirror

7 Terms and Definitions

The following terms and definitions are applicable to the Standards.

7.1

Types of Vehicles Related to Rear-View Mirrors

Motor vehicles having the same basic characteristics as follows:

7.1.1 The characteristic of vehicle body that would cause narrowed field of vision;

7.1.2 The coordinates of point R of the driver's seat;

7.1.3 Installation position and class of the forcibly installed and selectively installed rear-view mirror (already installed).

7.2

Driver's Ocular Points

Referring to a plane being made parallel to the vertical datum plane of vehicle, and going through the centre of the driver's designated seat determined by vehicle manufacturer. At 635mm going upward from point R of the driver's seat inside the plane, a straight line section is made vertical to this plane. Two points are respectively made at 32.5mm from the two sides of the intersection between the straight line section and the plane (total distance 65mm). These two points are just the driver's ocular points.

7.3

Ambinocular Vision

Referring to the total field of vision achieved from the met fields of visions of the left eye and the right eye.

7.4

Unladen Kerb Mass (MK) (kg)

Referring to the mass of a drivable vehicle carrying no persons and no goods, but including the driver's mass of 75kg. It should be equivalent to 90% of the mass of fuel in the fuel box specified by the vehicle manufacturer, and the mass of cooling liquid, lubricant, in-vehicle tools, spare tyre (if installed), etc.

Figure 3 Ambinocular Vision

8. Requirements

8.1 Vehicles should meet the following requirements:

8.1.1 The rear-view mirror installed on the vehicle should be the rear-view mirror which has already met the Standards.

8.1.2 The fixing method of the rear-view mirror should make it unmoveable and not

allow it to change the area of its field of vision obviously, or not to cause the image to appear distorted to the driver due to vibration.

8.1.2.1 When the vehicle is driven at the speed of not exceeding 80% (but not exceeding 150km/h) of the maximum designed speed of vehicle, the rear-view mirror has to meet the requirements of Article 8.1.2.

8.2 Quantity

8.2.1 Minimum Quantity of Rear-View Mirrors to be Installed

8.2.1.1 The field of vision of the vehicles of Categories M and N are specified in Article 8.5 The minimum quantity of rear-view mirrors to be installed for meeting this field of vision is shown in Table 2.

8.2.1.2 For vehicles of Categories M_1 and N_1:

8.2.1.2.1 If the interior rear-view mirror cannot meet the requirements specified in Article 8.5.2, an exterior rear-view mirror should be additionally installed on the right hand side of the vehicle.

8.2.1.2.2 If the interior rear-view mirror cannot provide any field of rear vision, it is not required to be installed.

8.2.1.2.3 The installation of a Class II exterior rear-view mirror is allowed.

8.2.1.3 If the vehicles of Categories N_2 and N_3, because of their designs, cannot satisfy the requirements of the field of vision specified in Articles 8.5.3.2.2 and 8.5.4, and the Class IV rear-view mirror and Class II rear-view mirror are both installed on the same supporting frame, then the abovementioned Class II exterior rear-view mirror can be replaced by the Class III rear-view mirror

8.2.1.4 The maximum designed total mass does not exceed 7,500kg. For the vehicles of Category N_2 installed with the Class II rear-view mirror according to the requirements, if the surface of the installed Class II rear-view mirror is not convex, a Class IV rear-view mirror should be installed on the same side.

8.2.1.5 For vehicles with less than four wheels and with its vehicle body partly or entirely enclosing the driver, they should be installed with:

a) an interior rear-view mirror, and a Class II or Class III exterior rear-view mirror installed on the right-hand side, or

b) Class II or Class III exterior rear-view mirrors installed on the two sides of vehicle.

The requirements of Article 8.5 are not applicable to the abovementioned vehicles.

8.2.2 Maximum Quantity of Selectively Installed Rear-View Mirrors

8.2.2.1 For vehicles of Categories M_1 and N_1, an exterior rear-view mirror can be additionally installed on the other side of the rear-view mirror, required to be installed according to Article 8.2.1.1.

8.2.2.2 For vehicles of Categories M_2, M_3, and also N_2 whose maximum designed total mass should not exceed 7,500kg, a Class V exterior rear-view mirror can be additionally installed.

8.2.2.3 For vehicles of Categories N_2 and N_3, an interior rear-view mirror can be additionally installed.

8.2.2.4 A Class IV exterior rear-view mirror can be additionally installed to:

a) vehicles of Category N_2 with the maximum designed total mass not exceeding 7,500kg.

b) vehicles of Categories M_2, M_3.

8.2.2.5 The rear-view mirror mentioned in Articles 8.2.2.1 and 8.2.2.4 has to meet the requirements of the Standards. Article 8.5 is not applicable to the rear-view mirror mentioned in Articles 8.2.2.3.

8.2.2.6 The Standards are not applicable to the exterior surveillance rear-view mirror defined in Article 3.4. But when the vehicle is fully loaded, it should satisfy the requirement that its height from the ground should not be less than 1,800mm.

8.3 Position

8.3.1 The position of rear-view mirror should be guaranteed so that the driver, under normal driving situation, can see clearly the rear-part of the road situation between the two sides of the road.

8.3.2 The exterior rear-view mirror should be able to be seen from the lateral window of the vehicle or the wiping area of the front windscreen wiper. However, due to the structural limitation, no such requirement is needed for the exterior rear-view mirror installed at the right hand side of vehicles of Categories M_2, M_3.

8.3.3 If the measurement of the field of vision is made on the chassis with driving chamber only, the vehicle manufacturer has to provide the largest and the smallest width sizes. If necessary, a false front box plate can be used for simulation. During the testing period, all the considered decorations of the vehicle and rear-view mirror should be indicated in the test report.

8.3.4 The exterior rear-view mirror at one side of the driver should be installed within the range of no greater than the included angle 55^o between the drop plane and vertical datum plane connecting from the centre of the rear-view mirror to the centre

of the driver's ocular point (the distance between two ocular points is 65mm).

8.3.5 The degree of the rear-view mirror's protrusion from the vehicle body should not exceed the required degree related to the field of vision indicated in Article 8.5.

8.3.6 When the vehicle is fully loaded, and the bottom side of the exterior rear-view mirror is at a height of less than 1,800mm from the ground, then its single lateral outstretching volume should not be greater than the maximum width 200mm measured when the vehicle has not been installed with rear-view mirror.

8.3.7 A Class V rear-view mirror should be installed on the vehicle according to the following methods: When the vehicle is fully loaded, no matter at what adjustment position the rear-view mirror is, its component or supporting frame should be at a height of no less than 1,800mm from the ground.

A Class V rear-view mirror cannot be installed on any vehicle having a driving chamber with its height not satisfying this requirement.

8.3.8 Provided that the requirements of Articles 8.3.5 and 8.3.6 are met, the rear-view mirror is allowed to be stretched out of the maximum allowed width.

8.4 Adjustment

8.4.1 The interior rear-view mirror should be able to be adjusted by the driver at the driver's position.

8.4.2 The exterior rear-view mirror installed by one side of driver should be able to be adjusted by the driver when the vehicle door is closed or opened, and the rear-view mirror can be tightly locked outside the vehicle.

8.4.3 Article 8.4.2 is not applicable to those rear-view mirrors which need no adjustment after impact, and can be returned to the original position.

Table 2

Kind of Vehicle	Interior Rear-View Mirror	Exterior Rear-View Mirror			
		Main Rear-View Mirror		Wide-Angle Rear-View Mirror	Close-Proximity Rear-View Mirror
	Class I	Class II	Class III	Class IV	Class V
M_1	1 See (8.2.1.2)	- See (8.2.1.2.3)	1 Right side of vehicle See (8.2.2.1)	-	-
M_2	-	2 (1 in left + 1 in right)	-	See (8.2.2.4)	- See (8.2.2.2 and 8.3.7)
M_3	-	2 (1 in left + 1 in right)	-	See (8.2.2.4)	- See (8.2.2.2 and 8.3.7)
N_1	1 See (8.2.1.2)	- See (8.2.1.2.3)		-	-
N_2 (≤ 7,500kg)	- See (8.2.2.3)	2 (1 in left + 1 in right)	See (8.2.1.3)	- See (8.2.2.4 and 8.2.1.4)	- See (8.2.2.2 and 8.3.7)
N_2 (>7,500kg)	- See (8.2.2.3)	2 (1 in left + 1 in right)	See (8.2.1.3)	1	1 See (8.3.7)
N_3	- See (8.2.2.3)	2 (1 in left + 1 in right)	See (8.2.1.3)	1	1 See (8.3.7)

8.5 Field of Vision

8.5.1 Determine the positions of driver's ocular points defined in Article 7.2. The following requirements of the field of rear vision are those of the field of vision under the condition of "ambinocular vision." When determining the field of rear vision of the vehicle, the tested vehicle should be at the driving status specified in article 7.4. The field of vision has to be determined through the window of the vehicle. The total vertical transparency rate of its visible light should be at least 70%.

8.5.2 Interior Rear-View Mirror (Class I)

8.5.2.1 With the assistance of the interior rear-view mirror, the driver has to be able to see an area of vision at a width of at least 20,000mm on the horizontal road surface.

Its central plane is the vertical datum plane of the vehicle. It extends outwards from 60,000mm of the driver's ocular points towards the horizon (see Figure B1 in Appendix B).

8.5.2.2 When measuring the abovementioned field of rear vision, it is acceptable for there to be a head cushion, sunshading board, rear windscreen wiper, heating component, type S_3 brake lights or constituent parts of the vehicle body (such as: part of the field of vision is sheltered by the parts like the vertical column of the rear window of two-half doors around the vertical datum plane). But when the sheltered portion is projected on the plummet plane being perpendicular to the vertical datum plane of vehicle, the total vision should be less than 15% of the specified field of vision. The degree of shelter is determined at the lowest position of the head cushion when the sunshading board is folded back to its position.

8.5.3 Main Exterior Rear-View Mirror (Classes II, III)

8.5.3.1 Left Exterior Rear-View Mirror. With the assistance of the exterior rear-view mirror, the driver has to be able to see an area of vision at a width of at least 2,500mm on the horizontal road surface. For its right side, the plane being parallel to the vertical datum plane of vehicle and cutting the plane at the most exterior point of the left hand side of vehicle is regarded as the datum. It extends outwards from 10,000mm of the driver's ocular points towards the horizon (see Figure B2 in Appendix B).

8.5.3.2 Right Exterior Rear-View Mirror

8.5.3.2.1 For vehicles of Category M_1 and vehicles of Category N_1 with the maximum mass not exceeding 2,000kg, with the assistance of the exterior rear-view mirror, the driver has to be able to see an area of vision at a width of at least 4,000mm on the horizontal road surface. For its left side, the plane which is parallel to the vertical datum plane of the vehicle and cutting the plane at the most exterior point at the right hand side of vehicle is regarded as the datum. And it extends outwards from 20,000mm of the driver's ocular points towards the horizon (see Figure B3 in Appendix B).

8.5.3.2.2 For the vehicles other than those specified in Article 8.5.3.2.1, with the assistance of the exterior rear-view mirror, the driver has to be able to see an area of vision at a width of at least 3,500mm on the horizontal road surface. For its left side, the plane which is parallel to the vertical datum plane of vehicle and cutting the plane at the most exterior point at the right hand side of vehicle is regarded as the datum.

And it extends outwards from 30,000mm of the driver's ocular points towards the horizon. Besides, with the assistance of the exterior rear-view mirror, the driver should also be able to see an area of vision at a width of 750mm, and it extends from 4,000mm of the driver's ocular points and links with the abovementioned area of vision (see Figure B4 in Appendix B).

8.5.4 Wide-Angle Exterior Rear-View Mirror

With the assistance of the exterior rear-view mirror, the driver has to be able to see an area of vision at a width of at least 12,500mm on the horizontal road surface. Its left side should be parallel to the vertical datum plane of the vehicle, and the plane cuts the plane at the most exterior point of the right hand side of vehicle, and extends outwards from 15,000mm towards 25,000mm of the driver's ocular points. Besides, with the assistance of the exterior rear-view mirror, the driver should also be able to see an area of vision at a width of 2,500mm, and it extends from 3,000mm behind the vertical plane of the driver's ocular points and links with the abovementioned area of vision (see Figure B4 in Appendix B).

8.5.5 Close-Proximity Exterior Rear-View Mirror (Class V)

With the assistance of the exterior rear-view mirror, the driver should be able to see the horizontal road section at one side of the vehicle, and its boundary is determined by the following vertical planes:

8.5.5.1 Make a plane parallel to the vertical datum plane of the vehicle and cut the most exterior point at 200mm from the right hand side of driver's chamber. The width of the driving chamber is measured at the horizontal vertical plane cutting the driver's ocular points;

8.5.5.2 Horizontally, make a plane parallel to the horizontally outstretched 1,000mm from the plane measured in Article 8.5.5.1;

8.5.5.3 Backwards, make a plane parallel to 1,250mm behind the horizontal vertical plane that cuts the driver's ocular points;

8.5.5.4 Forwards, make a plane parallel to 1,000mm behind the horizontal vertical plane that cuts the driver's ocular points. If the distance between the horizontal vertical plane that cuts the front edge of vehicle's bumper and the horizontal vertical plane that cuts the driver's ocular points is less than 1,000mm, then the field of vision should be limited by the plane (see Figure B5(b) in Appendix B).

8.5.6 For the rear-view mirror composed by the reflecting surface with several different curvatures or mutually forming a certain angle, there should be at least a

reflecting surface providing this field of vision, and its size should meet the classified requirements (see Article 5.1.2).

8.5.7 Obstacle

In the field of vision specified in Articles 8.5.3, 8.5.4 and 8.5.5, the total portion sheltered by the obstacle (such as: vehicle body and its accessories, door handle, side marker light, turn signal light, two ends of rear bumper, and the cleaning device of the reflecting surface, etc.) should be less than 10% of the specified field of vision.

8.5.8 Determination Method

When determining the area of rear vision, a high power light source should be offered at the driver's ocular points. It is determined by the reflecting beam inspected on the surveillance panel. Other methods with the same effects can also be adopted.

Appendix A
(Regulatory Appendix)
Determination Method of Reflection Rate

A.1. Terms and Definitions

A.1.1 CIE Standard Luminary A: [1)]

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

A.1.2 CIE Standard Light source A[1)]: gas-filled tungsten lamp as the related colour temperature T_{68} = 2,855.6k.

A.1.3 CIE 1931 Standard Colour Concentration Observation Apparatus[1)]: It is a kind of radiation sensor whose colour characteristic is equivalent to spectral tristimulus values, $\bar{x}$ (λ), overbarred y (λ), overbarred z (λ) (see the attached table).

A.1.4 CIE spectral tristimulus values[1)]: the tristimulus values of equal-energy spectral volume in CIE (x, y, z) system.

A.1.5 clear vision[1)]: the vision of normal eyes having adapted to the brightness of at least how many candela (cd) per square metre.

The definition of [1)] is quoted from the published matter 50 (45) of CIE (International Commission on Illumination), International electronic Terms, Group 45: Illumination.

A.2 Apparatus

A.2.1 Outline

A.2.1.1 The testing apparatuses comprise light source, sample supporting frame, receiving unit with light inspector and indicating panel, and the device which can eliminate the effects of external light (see Figure A.1).

A.2.1.2 The receiving unit can include an integrating sphere for measuring the non-plane mirror (convex mirror) (see Figure A.2).

A.2.2 Light Source and Spectral Characteristics of Light Inspector

A.2.2.1 Light source is composed of CIE standard light source A and the mirror enabling the light given out of the light source to become parallel beams. In order to

keep the light source voltage stable as the apparatuses are working, it is recommended to use stable-voltage power source.

A.2.2.2 The spectral effects of the light inspector attached to the receiving unit should be positively proportional to the suitable luminance function of CIE (1931) standard colour concentration observation apparatus. We can also use the combination of other receivers with completely the same effects as the CIE standard luminary A and the clear-vision luminary - filter. When using the integrating sphere in the receiving unit, a layer of glossy (diffusion reflected) white paint without selection towards spectrum is applied to the interior surface of the sphere.

A.2.3 Geometric Conditions

A.2.3.1 The incident beam angle (θ) must form a radian 0.44 ± 0.09 ($25^o \pm 5^o$) with the vertical line being perpendicular to the testing surface, and should not exceed the upper limit of the angle (radian 0.53 or 30^o). The angle (θ) that the axis line of the receiver forms with the vertical line should be equal to the incident beam angle (see Figure A.1). The diameter of the incident beam on the testing surface should not be smaller than 19mm. The area of the reflecting beam covering the light inspector should be smaller than its sensitisation area, but should not be smaller than 50% of this sensitisation area. Try to make it close to the covering area during the demarcation of apparatus.

A.2.3.2 When the integrating sphere is applied to the receiving unit, the diameter of sphere should not be less than 127mm. The test mirror and the aperture of the incident beam on the wall of sphere should be available for the incident beam and reflecting beam to go through completely. The light inspector should be placed at a position with no direct incident beam and reflecting beam.

A.2.4 Light Inspector - Electrical Characteristics of the Device of the Indicating Panel

On the indicating panel, the reading given out of the light inspector is the linear function of luminance in the sensitisation zone. For easier adjustment to zero reading and demarcation, the light, electric or combined light-electric methods can be employed. But the method cannot affect the linearity and spectral characteristics of apparatus. The receiver - indicating that the accuracy of system should be within the range of full gradation ± 2%, or within the range of reading value ± 10%, and the

smaller value should be picked.

A.2.5 Supporting Frame of Test Mirror

The supporting frame of the test mirror should be able to position the test mirror, and make the supporting arm of the light source intersect with the reflecting surface of the axis line of the receiver. The reflecting surface can be located at the centre of mirror or any single surface, depending on its being the first surface, the second surface, or "replaceable" prism.

A.3 Methods

A.3.1 Direct Demarcation Method

A.3.1.1 In the direct demarcation method, the atmosphere is taken as the reference standard. This method is applicable to the apparatus which structurally allows the receiver to be adjusted to the optical path of light source for conduction of 100% measurement demarcation (see Figure A.1).

A.3.1.2 Under certain circumstances (such as the determination of low reflection rate of surface), it is required to use this method to demarcate a medium value (between 0% and 100% of the gradation disc). During this time, a neutral-density filter with the transparency rate already known is inserted in the optical path. Then the demarcation button should be adjusted until the reading of the apparatus reaches the transparency percentage of the neutral-density filter. Before determining the reflection rate of the test mirror, the filter has to be removed.

A.3.2 Indirect Demarcation Method

The indirect demarcation method is applicable to the apparatus whose light source and the geometric position of receiver are both fixed. This method needs the referential standard to have received strict demarcation and kept its reflection rate unchanged. This standard sample must be a plane mirror with a reflection rate being closest to that of the test mirror.

A.3.3 Determination of Plane Mirror

The reflection of the plane mirror can be determined by direct or indirect demarcation method. The numerical value of the reflection rate can be directly read from the indicating panel of apparatus.

A.3.4 Determination of Non-Plane Mirror (Convex Mirror)

Use an apparatus with integrating sphere to determine the reflection rate of the non-plane mirror (convex mirror) (see Figure A.2). When the reflection rate is at the referential standard sample of E%, the gradation of n_E is shown on the indicating

panel of the apparatus. Thus, the gradation of a mirror with its reflection rate unknown is n_X. Then the corresponding reflection rate X% can be calculated by the given equation:

$$X = E \frac{n_X}{n_E} \quad \text{..... (4)}$$

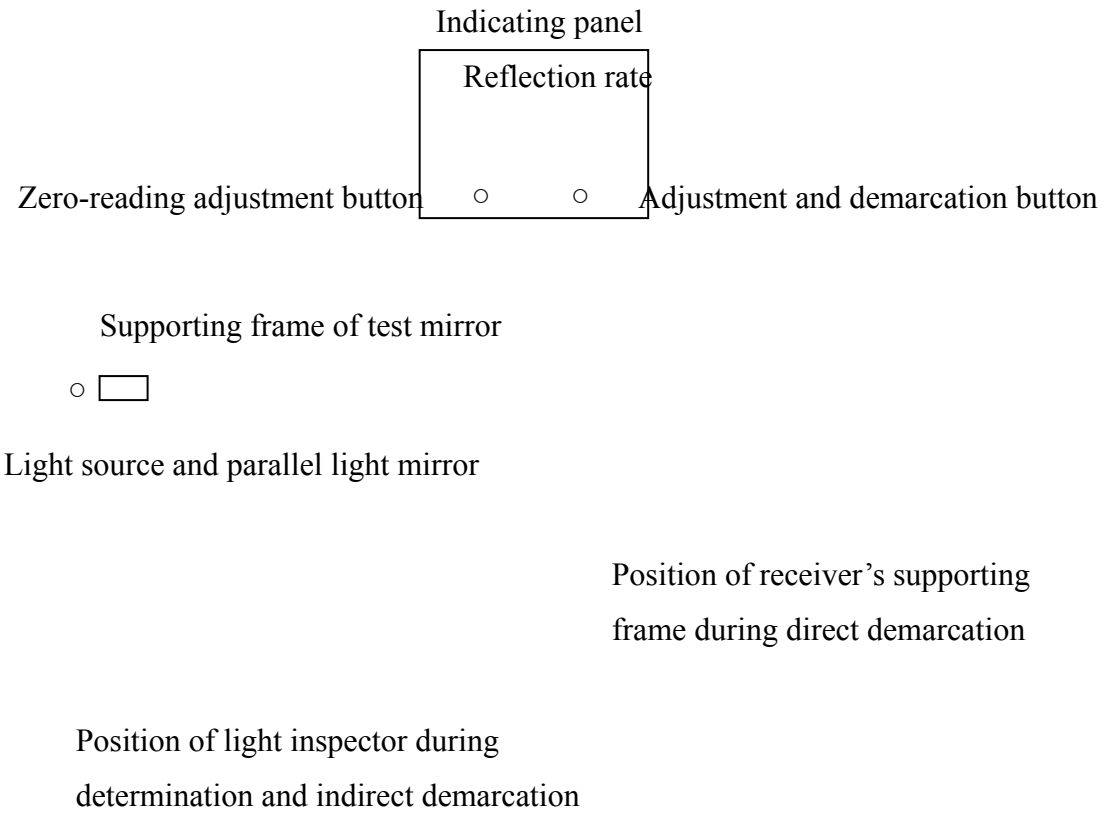


Figure A.1 Geometric relationship of reflection rate determination apparatuses that use two demarcation methods

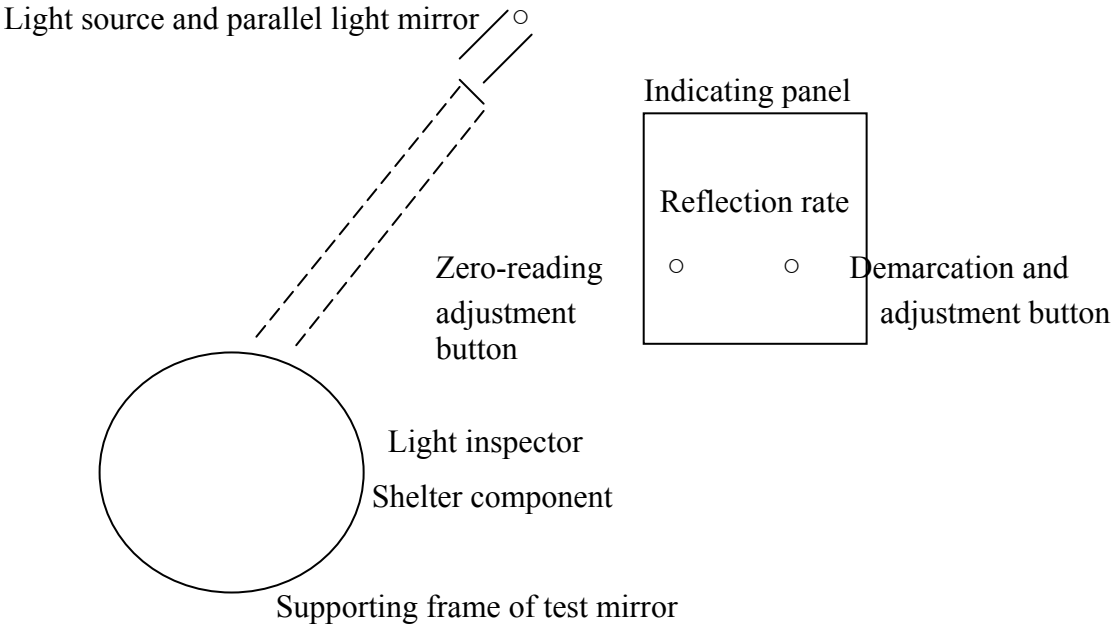


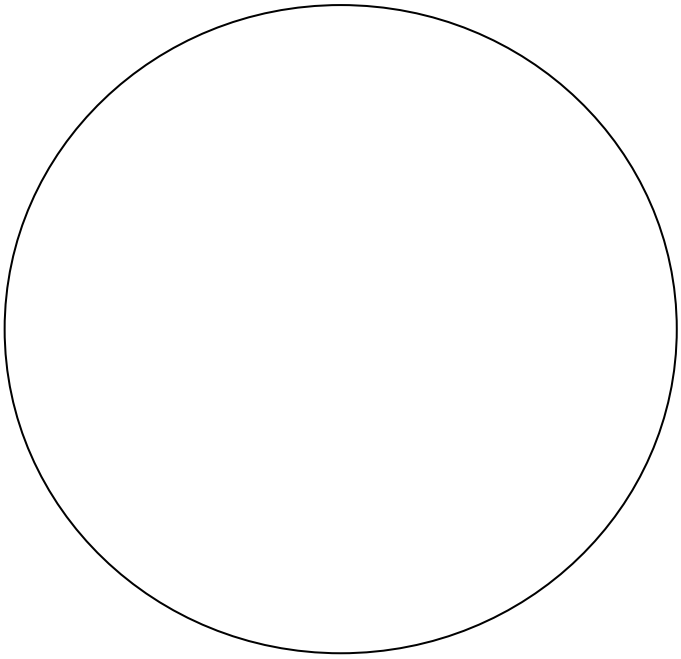
Figure A.2 Reflection rate determination apparatus with integrating sphere additionally installed in the receiving unit

Spectral Tristimulus Values of
CIE Standard Colour Concentration Observation Apparatus

(this table is quoted from CIE published matter 50 (45) (1970) [1)]

Note: 1) table omitted, $y(\lambda) = v(\lambda)$, take each numerical value to 4 places after the decimal point

2) revised in 1966, changing 3 to be 2.



C = receiver

D = diaphragm

E = incident window

F = determined window

L = lens

M = window of test mirror

S = light source

(S) = integrating sphere

Figure A.3 Device for measuring reflection rate of spherical mirror

Appendix B
(Regulatory Appendix)
Field of Vision of Rear-View Mirror
on Horizontal Road Surface

B1. Interior Rear-View Mirror (Class I) (see Article 8.5.2 of the Standards)

Driver's ocular points

Field of vision of horizontal road surface

Figure B.1

B2. Exterior Rear-View Mirror

B2. 1 Main Exterior Rear-View Mirror (Classes II, III) (see Article 8.5.3 of the Standards)

Right exterior rear-view mirror

Left exterior rear-view mirror

Driver's ocular points

Field of vision of horizontal road surface

Figure B.2

Driver’s ocular points

Right exterior rear-view mirror

Left exterior rear-view mirror

Field of vision of horizontal road surface

Figure B.3

B2. 2 Wide-Angle Exterior Rear-View Mirror (Class IV) (see Article 8.5.4 of the Standards)

Field of vision of horizontal road surface

Rear-view mirror

Driver’s ocular points

Figure B.4

B2. 3　Close-Proximity Exterior Rear-View Mirror (Class V) (see Article 8.5.5 of the Standards)

Field of vision of horizontal road surface

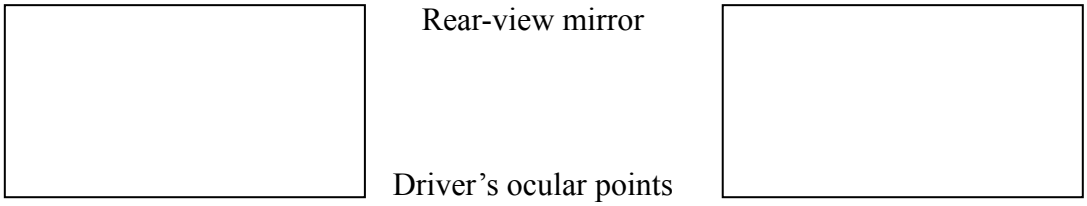


Figure B. 5a　　Figure B. 5b

Appendix C
(Regulatory Appendix)
Procedures of Determining Radius r of Curvature of Reflecting Surface of Rear-View Mirror

C1 Measurement

C1.1 Equipments: Using the spherical metre indicated in Figure C1.

C1.2 Measuring point

C1.2.1 The radius of the curvature of the basic point should be measured on three points. Their positions are at the centre of mirror, on the line parallel to line b section, and at the distance of about ⅓, ½ and ⅔ of the total length. If the side which is perpendicular to line b section of mirror is the longest, the measurement point should be perpendicular to line b section, and on the line cutting the centre of the mirror.

C1.2.2 If the mirror cannot be measured according to the method specified in Article 1.2.1 for the reason of the size of mirror, then the technician who is in charge of the test can try to measure at the point closest to the abovementioned requirement in the two mutually perpendicular directions.

C2 Calculation of the radius of curvature

r is indicated by mm, and the calculation equation is as follows:

$$r = \frac{r_{p1} + r_{p2} + r_{p3}}{3} \quad \text{..... (5)}$$

where,

r_{p1} - radius of curvature of the first testing point

r_{p3} - radius of curvature of the second testing point

r_{p3} - radius of curvature of the third testing point

Figure C. 1

Appendix D

(Informative Appendix)

Comparison between Reference Nos. of Articles of the Standards with Reference Nos. of Articles of ECE-R46

Table E.1 Comparison between Reference Nos. of Articles of the Standards with Reference Nos. of Articles of ECE-R46

Reference Nos. of Articles of the Standards	Reference Nos. of Articles of ECE-R46
1	**1**
3	**2**
4	**6**
5	**7**
6	**8**
7	**13**
8	**16**
Appendix A	**Appendix 5**
Appendix B	**Appendix 6**
Appendix C	**Appendix 7**