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Replacing GB 15084-2006

Motor vehicles - Devices for indirect vision - Requirements of performance and installation

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Standardization Administration Committee.

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Foreword

Clause 4, Clause 5 and Clause 6 of this Standard are compulsory; the rest are recommendatory.

The standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces GB 15084-2006 “Motor Vehicles - Rear View Mirror - Requirements of Performance and Installation”.

Compared with GB 15084-2006, the main technical changes are as follows:

- In application scope, it added requirements and installation on indirect vision of Class L motor vehicles of which the cabin is at least partially enclosed.

- Added definitions of “devices for indirect vision”, “camera-monitor devices for indirect vision”, “video camera”, “monitor”, “resolution rate”, “critical object”, “critical field of vision”, “detection distance”, “critical field of vision”, “viewing reference point”, “visible spectrum”, “other devices for indirect vision”, “camera-monitor-recording device”, “type of devices for indirect vision”, and “flat type” (referring to 3.1, 3.17~3.22, and 3.24~3.31).

- Added technical requirements, experimental method and installation requirements as well as vision requirements for front view mirrors of Class “VII” [referring to 4.1.2.1.5, 4.1.2.2.2.3d) and Table 2, 6.3,.7 and 6.5.7];

- Added technical requirements, test methods, installation requirements as well as vision requirements for motor vehicles of Class L of which the cabin is at least partially enclosed [referring to 4.1.1.5, 4.1.2.1.6, 4.1.2.2.2.3c), 6.2.1.3, 6.2.1.4, 6.5.8,6.5.8.1, 6.5.8.2, Figure 10];

- Modified curvature radius of view mirrors of Class II, Class IV and Class V [4.1.2.2.2.3h) and 4.1.2.2.2.3c] of this edition]; referring to 5.2.3.2 and 5.2.3.3 of edition 2006];

- Added requirements for devices of indirect vision except view mirror (4.2 of this edition);

- Modified the number of installation and requirements for view mirror vision (Table 2 of this edition; referring to Table 2 of edition 2006);

- Modified the content of experimental requirements; deleted “except close-proximity rear view mirror (Class V)”, all rear view mirrors shall receive the tests stipulated in 6.2 and 6.3; increased view mirrors of “Class I ~ Class VI” shall also include view mirrors of Class VII used for vehicles

- Units involved in this Standard were all replaced by “mm”;

- Added informative Appendix A.

This Standard was proposed by the Ministry of Industry and Information Technology of the People’s Republic of China.

This Standard shall be under the jurisdiction of National Technical Committee of Auto Standardization (SAC/TC 114) .

Drafting organizations of this Standard: China Quality Certification Center Wuhan Sub-center, Wuhan University of Technology, Shanghai Ganxiang Auto-Mirror (Group) Co., Ltd., Yingtan City Kesuda Electronic Plastic Co., Ltd., Guilin Jingda Science and Technology Co., Ltd.

Main drafters of this Standard: Li Zaihua, Kong Jun, Gan Maodi, Pan Bin and Zhao Hong.

This Standard replaces the following previous standards:

- GB 15084-1994, GB 15084-2006.

Motor Vehicles - Devices for Indirect Vision - Requirements of Performance and Installation

1 Scope

This Standard specifies indirect motor vehicle devices of Class M, Class N and Class L of which it has less than four wheels and the cabin is at least partially enclosed.

This Standard applies to the installation of indirect motor vehicle devices of Class M, Class N and Class L of which the cabin is at least partially enclosed.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 15089 Classification of power-driven vehicles and trailers

ISO 15008:2003 Road vehicles - Ergonomic aspects of transport information and control systems - Specifications and compliance procedures for in-vehicle visual presentation

EN 12368:2006 Traffic control equipment - Signal heads

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions shall apply.

3.1 Devices for indirect vision

Devices used to observe adjacent traffic area of vehicle that cannot be observed through direct vision. They may include conventional optical view mirror, video camera-monitor or other devices that can provide information on indirect vision to drivers.

3.2 View mirror

A device of turning a kind of signal into the image of visible spectrum.

3.20 Resolution

Being able to discern the smallest details of the object, i.e. being able to discern the smallest portion of the object.

Note: Resolution of human eyes is called “visual sensitivity”.

3.21 Critical object

Circular object of which the diameter D_0 is 800mm.

Note: Use indirect vision system to observe target objects which represent relevant road users. Correlation of road users is defined by the location and (possible) speed. Size of road users will be enlarged with speed acceleration. For viewing, it is provided that motor cyclist at a distance of 40,000 mm is equivalent to the pedestrian (D=500mm) at a distance of 25,000 mm. Taking into account of speed, identify the size of motor cyclist as the size standard of target object observed. For this reason, determine the circular object of which the diameter is 800mm as the standard size of target object observed.

3.22 Critical perception

Visual level that human eyes generally achieve under various conditions. Under traffic conditions, the limiting value of critical field of vision is 8 arc minutes of angle of view.

3.23 Field of vision

The scope of three-dimensional space that can be observed by means of devices for indirect vision. It is based on ground view provided by the device and may be defined on the basis of device applicable maximum detection distance.

3.24 Detection distance

Measuring distance on the ground from viewing reference point to the farthest point where critical object can be seen (the limiting value of just reaching critical field of vision).

3.25 Critical field of vision

The area where critical object may be observed through the devices for indirect vision. It is defined by one angle and one or more detection distances.

3.26 Viewing reference point

4.1.1.2 The edge of reflecting surface shall be enclosed in a protective frame (e.g. stand, etc.). Radius of curvature C of all points in the periphery of protective frame shall be greater than or equal to 2.5mm in any direction. If the reflecting surface is beyond the protective frame, radius C of the protruding edge shall not be less than 2.5mm, and the protruding part can return to the frame under an applied force of 50 N. This force shall be approximately parallel to longitudinal datum plane of vehicle and is horizontally applied to the highest point of protruding maintenance frame of reflecting surface.

4.1.1.3 After the view mirror is tested according to 5.2, place the view mirror on the horizontal plane; use a ball of which the diameter is165mm to touch the possible site of interior view mirror; use a ball of which the diameter is 100mm to touch the possible site of interior view mirror. For all of these accessible parts, including the positions of parts connected to the support frame (regardless of the adjusting position), the radius C of curvature shall not be less than 2.5mm.

4.1.1.4 For the edges of fixed hole movable recess of which the diameter or maximum diagonal line of view mirror is less than 12mm, if it has been rounded, then it shall not need to meet requirement for radius C of curvature in 4.1.1.3.

4.1.1.5 Connecting members that connect view mirror to the vehicle shall be involved in the following manner, i.e. ensuring that revolving axis that view mirror deviates along the strike or revolving center or one of them as the axis; make a cylinder of which the radius is 70mm (50 mm for vehicles of class L); the cylinder shall be cut to at least the surface portion connected by the connecting member.

4.1.1.6 For out view glass, if the parts involved in 4.1.1.2 and 4.1.1.3 are made of material of which Shore Hardness is not greater than A60, then it shall be unnecessary to meet above requirements.

4.1.1.7 For inner view mirror, if the parts involved in 4.1.1.2 and 4.1.1.3 are made of material of which Shore Hardness is less than A60, then test involved in 4.1.1.2 and 4.1.1.3 only apply to the supporting member.

4.1.2 Special requirements

4.1.2.1 Dimensions

4.1.2.1.1 Interior view mirror (Class I)

A rectangle may be plotted in its reflecting surface. Height of the rectangle is 40mm; length of bottom side is a; calculation method of size a is as shown in equation (2):

b) When the view mirror is circular, the diameter shall not be less than 94mm;

c) When the view mirror is not circular, its reflecting surface shall be able to accommodate a circle of which the diameter is 78mm.

The maximum size of the reflecting surface shall comply with the following requirements:

a) Diameter of any circular view mirror shall not be less than 150mm;

b) The reflecting surfaces of any non-circular view mirrors shall be in a rectangle of 120mmX200mm.

4.1.2.2 Reflecting surface and reflectivity

4.1.2.2.1 Requirements for reflecting surface

The reflecting surface of view mirror shall be a live spherical convex. The reflecting surface of outer reflecting mirror may be attached to aspheric part, as long as main view mirror can meet the requirements of indirect vision.

Reflectance value of reflecting surfaces in standard state measured according to the method prescribed in Appendix B shall not be less than 40%. If the view mirror has two operating positions (day and night), then in the day time, it shall be able to correctly identity the color road traffic signals, while the reflectivity value of the reflecting surface in the night shall not be less than 4%.

Except that view mirror is in extreme atmospheric conditions for a long term, in normal use, the reflecting surface shall be able to meet the above reflectance values specified.

4.1.2.2.2 Requirements for radius of curvature

4.1.2.2.2.1 Requirements for differences between radii of curvature are as follows:

a) The difference between radius of curvature r_i' or r_i value and r_p value may not be greater than 0.15r;

b) Differences between any point's r_p (r_{p1}, r_{p2} and r_{p3}) value and r value shall not be more than 0.15r;

c) When r of rearview mirror's reflective surface is not less than 3000 mm, 0.15r in a) and b) can be replaced by 0.25r.

4.1.2.2.2.2 Requirements for reflective surface's additional aspheric surface are as follows:

a) The additional aspheric surface shall have sufficient dimensions and proper shapes for providing useful information to the driver. Generally, the curved surface shall be at least 30mm wide;

b) Curvature radius r_i of the aspheric surface shall not be less than 150mm.

4.1.2.2.2.3 Requirements of the spherical mirror surface's r value:

a) Class I inside mirror shall be 1200mm;

b) Class II and Class III main outside mirrors shall be 1200mm;

c) Wide-angle outside mirror (Class IV) and blind-compensate outside mirror (Class V) shall be 300mm;

d) Front-view mirror (Class VI) shall be 200mm;

e) Class VII mirrors shall not be less than 1000mm; H shall not be more than 1500mm.

4.2 Indirect field-view device except mirrors

4.2.1 General requirements

4.2.1.1 If users require adjustment, the indirect field-view device shall be adjustable without any tools.

4.2.1.2 If the indirect field-view device only has to observe the whole specified view field through scanning, then the total time of scanning, imaging and returning to the original position shall not exceed 2 s.

4.2.2 Camera-monitor device for indirect view field

4.2.2.1 General requirements

4.2.2.1.1 When the camera-monitor device for indirect view field is installed on a plane, c value of all components (not considering the device's adjustment position; for the monitor, these components are possible to have static contact with the 165mm-diameter sphere; for the camera, it is possible to have static contact with the 100mm-diameter sphere) shall not be less than 2.5 mm.

4.2.2.1.2 If diameter or the longest diagonal of the fixing hole or the shrinkage hole is less than 12mm, then the edge of the fixing hole or the shrinkage hole needn't comply with the requirements of c value in 4.2.2.1.1, but shall be rounding.

4.2.2.1.3 If Shore Hardness A of the materials for making the camera and monitor is less than 60 and they are installed in the same hard bracket, then

testing description in 5.2, and Class VII mirrors with stay bar shall comply with the testing description in 5.3.

5.1.2 For all Class M & N outside mirrors, when vehicle with full load is in the maximum permitted mass state, if distance between all parts of the H mirror and the ground is more than 1,800 mm (despite its adjustment position), then tests specified in 5.2 can be exempted.

If the mirror's connectors (e.g. connecting board, support arm, rotary axle, etc.) do not exceed the vehicle's projection width, and distance between the H mirror and the ground is less than 1,800mm, then the measurement shall be conducted on the vertical cross section of the bottom edge of the mirror's connector; if it is much more than the vehicle width at the back, then points on the forward cross section shall be referred to. Under this condition, description of connectors' installation position conditions on the vehicle shall be provided.

For mirrors not taking bump test, 1,800 mm identification shall be marked on the support arms, and this result shall also be specified in the test report.

5.2 Bump test

5.2.1 Test equipment

5.2.1.1 The bump test-bed is composed of a mirror fixing support and a pendulum that can swing around two horizontal axles which are perpendicular with each other, with one in the plane of vertically-releasing track. The end of the pendulum is a rigid sphere of which the diameter is 165mm ±1mm, it is covered by a layer of rubber of which Shore Hardness is A50 and thickness is 5mm. As well as an indicator for measuring the largest angle of the support arm in the releasing plane. According to the bump requirements specified in 5.2.2.6, the bracket for sample supporting is firmly fastened on the working table of the supporting pendulum. Dimensions and special design requirements of the test equipment are shown in Figure 2.

Unit: mm

5.2.2.3 In addition to test 2 specified in 5.2.2.6 a), when the pendulum is in vertical position, the sphere center's horizontal plane and longitudinal plumb plane shall be through the mirror center defined in 3.11, and the pendulum's longitudinal swinging direction shall be parallel to the longitudinal reference plane of the vehicle.

5.2.2.4 During the installation and adjustment conducted according to the requirements of 5.2.2.2 a) and 5.2.2.2 b), if the mirror's parts restrain the return of the sphere, then the bump point shall be adjusted in the direction perpendicular to the spin axis or the rotation center, but it shall be sure that this adjustment is necessary to finishing this test, and one of the following requirements shall be met:

a) The sphere's profile line shall be tangent to the surface of the cylinder involved in 4.1.1.5;

b) Distance between the sphere's contact point and the reflective surface edge shall at least be 10mm.

5.2.2.5 During the test, release the sphere from the position forming a 60° angle with the plumb line of the pendulum; when the sphere drops to the plumb position, it bumps the mirror.

5.2.2.6 The mirror shall take bumps under the following different conditions:

a) Inside mirror:

1) Test 1: the bump point shall comply with the requirements specified in 5.2.2.3; the sphere model shall bump to the reflective surface.

2) Test 2: the mirror's reflective surface shall form a 45° angle with the original motion direction of the bump point on the sphere, and bump direction shall face the reflective surface, and the bump point shall pass the edge of the protective shell of the mirror's reflective surface center horizontal plane.

b) Outside mirror:

1) Test 1: the bump point shall comply with the requirements specified in 5.2.2.3 or 5.2.2.4; the sphere model shall bump to the mirror's reflective surface.

2) Test 2: the bump point shall comply with the requirements specified in 5.2.2.3 or 5.2.2.4; the sphere model shall bump to back of the mirror's reflective surface.

3) If Class-II or Class-III mirrors are installed on the same support as

For all Class II, Class IV and Class III mirrors installed together with Class IV mirror, the required angle can be reduced from 20° to 10°.

5.4.2 For mirror stuck on the air window, during the test conducted according to the requirements of 5.2, if supporting parts of the mirror are damaged, then the residual parts standing out of the base shall not be more than 10mm, and the profile shall also comply with the requirements of 4.1.1.3.

5.4.3 During the test conducted according to the requirements of 5.2 and 5.3, the mirror's reflective surface shall not be damaged; however, the following two conditions are deemed as qualified:

a) The glass fragments are still stuck on the protective shell or stuck on objects firmly connecting to the protective shell. The glass is permitted partially to divorce from the above part, but any edge of the broken part shall not exceed 2.5 mm. At the bump point, small fragments are permitted to divorce from the above part.

b) The reflective surface is made of safety glass.

6 Installation requirements

6.1 General requirements

6.1.1 Mirrors installed on the vehicle shall comply with this Standard.

6.1.2 Mirrors shall be fixed so as not to move and obviously change its view field, or disturb the driver's sight due to vibration.

6.1.3 When the vehicle runs at the speed not exceeding 80% of the maximum designed speed (but not exceeding 150 km/h), the mirror shall comply with the requirements of 6.1.2.

6.2 Quantity requirements of the mirror

6.2.1 The least compulsory quantity

6.2.1.1 In 6.5, the least compulsory quantity of mirrors to meet the view field requirements is shown in Table 2. If there is optional mirror, then it shall not be compulsory to install other indirect view field devices.

Table 2 The Least Installation Quantity of Mirrors

Vehicle type	Inside mirror	Outside mirror				
		Main outside mirror		Wide-angle	Blind-compensate	Front-view mirror
	Class I	Class II	Class III	Class IV	Class V	Class VI

Mirror (Class VI) and/or Blind-compensate outside mirror (Class V) described in 6.5.6, view field can be acquired by other indirect view field devices. If it complies with the provisions of 4.2 and Chapter VI Installation Requirements, then other indirect view field devices can be used to replace related mirrors and combined mirrors.

If camera-monitor device is applied, then it shall completely and independently display:

a) When the blind-compensate outside mirror is replaced, it shall display the view field specified in 6.5.6.

b) When the vehicle runs forwards at the speed lower than 10 km/h, if the front-view mirror is replaced, then it shall display the view field specified in 6.5.7, or

c) When the blind-compensate outside mirror and the front-view mirror are replaced at the same time, it shall display the view field specified in 6.5.6 and 6.5.7 at the same time. When the vehicle runs forward or backward at the speed more than 10 km/h, view field specified in 6.5.6 shall be displayed stably. The monitor can be used to provide other information.

6.2.1.3 Quantity requirements of mirror for L-Class enclosed vehicle are shown in Table 3.

Table 3 Quantity Requirements of Mirrors for L-Class Enclosed Vehicle Unit: set

Vehicle type	Mirror type	
	Inside mirror (Class I) Installation quantity	Main outside mirror (Class III & Class VII) Installation quantity
Class L fully-enclosed or partially-enclosed vehicle	1*	1 (if it has one inside mirror) 2 (if it has no inside mirror)
* Referring to description of 6.5.2, if the view field condition can not be reached, then inside mirror has no need to be installed, but the outside mirrors at the two sides shall be installed as required.		

Single main outside mirror shall be installed on the left.

6.2.1.4 Selection of mirrors for Class L vehicles

According to the requirements of 6.2.1.3, if one side of the vehicle is compulsorily equipped with an outside mirror, then the other side can be optionally equipped with an outside mirror, but it shall comply with the requirements of this Standard.

6.2.2 Monitor installation requirements

This subsection is not applicable to monitors defined in 3.5; if this kind of

device is installed, it shall be at least 1800 mm away from the ground under total technically-permitted mass.

6.3 Mirror position requirements

6.3.1 Mirror shall be installed at the position to ensure that the driver is, in normal driving state, able to clearly see the road conditions at the back of and at the two sides of the vehicle.

6.3.2 The outside mirror shall be seen from the side window or the area where the front air window wiper works. However, considering the design, this subsection is not applicable to:

a) Optional mirror at the driver side and outside mirror at the passenger side for M2 and M3 Class vehicle;

b) Class VI front-view mirror.

6.3.3 For vehicle with II chassis, during view field measurement, the automobile manufacturer shall provide the maximum and minimum width dimensions, and adopt stimulated front boxboard when necessary. During the test, all vehicles and mirror arrangements within consideration shall be specified in the test report.

6.3.4 During the positioning of the outside mirror at the driver side, it shall be ensured that angle between the vertical longitudinal mid-plane of the vehicle and the vertical plane passing through the mirror center and connecting the driver's two eye points 65mm line segment shall not be more than 55°.

6.3.5 Mirror shall not stand out of the vehicle outside as much as the view field scope specified in 6.5.

6.3.6 When the vehicle is in full designed load and distance between the lowest edge of the outside mirror and the ground is less than 1800mm, the extending dimension of its single-side mirror shall not be 250 mm more than the maximum width of the vehicle without being equipped with mirrors.

6.3.7 During the installation of Class V blind-compensate outside mirror and Class VI front-view mirror, it shall be ensured that when the vehicle is in full designed load, any part of these mirrors or their supporting frame (despite their adjustment position) shall be at least 1800mm away from the ground.

However, vehicle of which its cabin is unable to meet this requirement shall not be equipped with these two kinds of mirrors. In this situation, other indirect view field devices are not required to install.

6.3.8 According to the requirements of 6.3.5, 6.3.6 and 6.3.7, mirrors can

6.5.9.1 Inside Mirror (Class I)

Visual field of the mirror may be reduced due to the influence of relevant parts, such as sun shield, rear windshield, defogging parts and Class-S3 brake lamp. When shielding part of such devices may be projected onto the plumb plane perpendicular to the longitudinally-vertical mid plane of the vehicle, their sum shall not be more than 15% of the specified visual field. Headrest, frame or body structures, for example, rear double column and rear window frame, are not included. When measuring the shielding degree, the sunshield shall be set at the retracted position.

6.5.9.2 Outside Mirror (Class II, III, IV, V, VI and VII)

The specified visual field of the outside mirror may be shielded by the vehicle body, vehicle parts and other barriers, for example, other cabin mirrors, doorknob, outline marker lamps, direction indicator lamps, front and rear bumpers and cleaning parts of the reflector, etc., if the shielding area is not more than 10% of the specified field, it may be not considered; if mirror is designed or structured for a vehicle of special purpose and fails to meet the requirement for 10%, the shielding area of Class VI front-view mirror due to special features may be larger than 10%, but not beyond the requirements of special functions.

6.6 Requirement for Visual Field Measurement

The visual field shall be measured by setting high-power light source at the eyepoints of the driver and determined by detecting the reflective beam on the monitoring screen. It may be also measured with other equivalent methods.

6.7 Indirect Vision Devices in addition to Mirrors

6.7.1 All indirect vision devices shall meet the following performance requirements: under critical vision conditions, critical objects shall be detected in the specified field.

6.7.2 It is required to minimize the direct obstruction of the visual vision of the driver due to installation of the indirect vision devices.

6.7.3 Observation distance of the indirect vision devices of camera-monitor shall be determined according to Appendix D.

6.7.4 Requirement for Monitor Installation

Observation direction of the monitor shall be the same with that of one main mirror.

6.7.5 The vehicle can be also equipped with other indirect vision devices.

6.7.6 This Clause is not applicable to the monitoring camera-monitor-record device defined in 3.29. External camera monitor shall be installed when the vehicle is at its maximum technically allowable mass and is at least 1,800mm above the ground; or when its lower edge is off the ground, that is, when the distance from the bottom of device to the ground is less than 1,800mm, the vehicle without such a device shall not be wider than 50mm and its corner radius shall not be less than 2.5mm.

7 Transition Period of Implementation

Requirements for transition period of the standard implementation:

a) For newly approved product, the standard shall be implemented as of the implementation date of the standard;

b) For the product that has been approved, the standard shall be implemented as of 13th month after the implementation date of the standard.

Appendix A

(Informative)

Comparison of the serial numbers of Clause and Article in this Standard and in ECE R46

Table A.1 offers a comparison table of the serial numbers of chapter and article in this standard and in ECE R46.

Table A.1 Comparison of the serial numbers of chapter and article in this standard and in ECE R46

Serial numbers of Clause and Article in this Standard	Serial numbers of Clause and Article in ECE R46
1	1
2	-
3	2, 12
4	6
5	6,13
6	15
—	Appendix 1- Appendix 5
Appendix A	-
Appendix B	Appendix 6
Appendix C	Appendix 7
Appendix D	Appendix 10
	Appendix 8
	Attachment 1 in Appendix 8
	Attachments in Appendix 8
	Attachment 2 in Appendix 8
	Attachment 3 in Appendix 8
	Appendix 9
	Appendix 8

450	0. 336 2	0. 038 0	1. 772 1	660	0. 164 9	0. 061 0	0. 000 0
460	0. 290 8	0. 060 0	1. 669 2	670	0. 087 4	0. 032 0	0. 000 0
470	0. 195 4	0. 091 0	1. 287 6	680	0. 046 8	0. 017 0	0. 000 0
480	0. 095 6	0. 139 0	0. 813 0	690	0. 022 7	0. 008 2	0. 000 0
490	0. 032 0	0. 208 0	0. 465 2	700	0. 011 4	0. 004 1	0. 000 0
500	0. 004 9	0. 323 0	0. 272 0	710	0. 005 8	0. 002 1	0. 000 0
510	0. 009 3	0. 503 0	0. 158 2	720	0. 002 9	0. 001 0	0. 000 0
520	0. 063 3	0. 710 0	0. 078 2	730	0. 001 4	0. 000 5	0. 000 0
530	0. 165 5	0. 862 0	0. 042 2	740	0. 000 7	0. 000 2'	0. 000 0
540	0. 290 4	0. 954 0	0. 020 3	750	0. 000 3	0. 000 1	0. 000 0
550	0. 433 4	0. 955 0	0. 008 7	760	0. 000 2	0. 000 1	0. 000 0
560	0. 594 5	0. 955 0	0. 003 9	770	0. 000 1	0. 000 0	0. 000 0
570	0. 762 1	0. 952 0	0. 002 1	780	0. 000 0	0. 000 0	0. 000 0
580	0. 916 3	0. 870 0	0. 001 7				
In the revised edition of 1966, 3 was changed to 2.							

B.1.4 CIE spectrum tristimulus values[1)]: in CIE(x, y, z) system, tristimulus values with equivalent energy spectral components.

B.1.5 Photopic vision[1)]: vision of normal glasses after adapting to at least a few times of Kendra brightness per square meter.

B.2 Instruments

B.2.1 Overview

B.2.1.1 Experimental instruments consist of light source, audition bracket, receiving unit of indicating instrument with a photodetector, and instruments that can eliminate the influence of external lights (shown in Figure B.1).

B.2.3.2 The diameter of sphere shall not be less than 127mm when light integrator sphere is used in receiving unit. The incident beam aperture of mirror and sphere wall on sphere shall be passed through by incident beam and folded light beam. Optical detector shall be placed at a position where without perpendicular incidence of incident and folded light beams.

B.2.4 Electrical characteristics of optical detector-indicating instrument device

On indicating instrument, the reading of optical detector is the linear function of brightness on photosensitive area. Optical, electrical, or a combination of optical and electrical methods can be adopted to facilitate zero set and calibration, but shall not affect linearity and spectral characteristic of instrument. The accuracy degree of receiver-indicating system shall be within ±2% of the full scale, or within ±10% of the reading value, whichever is smaller.

B.2.5 Audition bracket

Audition bracket shall facilitate audition location, and enable intersection of supporting arm of light source and receiver axis on reflective surface. Reflective surface may be located in the middle of lens, or any side of them, as the first surface, second surface, or “converting” prism may be.

B.3 Method

B.3.1 Direct calibration method

B.3.1.1 Atmosphere can be referred to as reference standard in direct calibration, this method applies to the optical path which allows adjusting receiver to light source on its structure to conduct 100% measurement calibration (see Figure B.1).

B.3.1.2 Under some circumstance (e. g. measuring low reflectivity surface) which requires to calibrate an intermediate value using this method (from 0% to 100% on dial). Insert an optical filter with neutral density and known light transmission rate in optical path, then adjust adjustment and calibration button until instrument reading appears light transmission rate of the optical filter with neutral density. Optical filter must be taken off before measuring reflectivity of audition.

B.3.2 Indirect calibration method

Indirect calibration method applies to instrument of light source and receiver with fixed geometric positions. The method requires reference standard that have passed strict calibration and remains unchanged reflectivity. The sample is preferably a plane mirror close to reflectivity of audition.

B.3.3 Determination of plane mirror

The reflectivity of plane mirror can be measured by direct or indirect calibration methods. The value of reflectivity can be directly read from the indicating instrument.

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