SRI LANKA STANDARD 1256 : PART 18 : 2005
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METHODS OF TEST FOR PAINTS AND VARNISHES

PART 18 : MEASUREMENT OF SPECULAR GLOSS OF PAINT FILMS

SRI LANKA STANDARDS INSTITUTION

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METHODS OF TEST FOR PAINTS AND VARNISHES
PART 18 : MEASUREMENT OF SPECULAR GLOSS OF PAINT FILMS

SLS 1256 : Part 18 : 2005
(Superceding SLS 535 : Part 4 : Section 4.3 : 1981)

Gr. 4

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SRI LANKA.

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SRI LANKA STANDARD
METHODS OF TEST FOR PAINTS AND VARNISHES
PART 18 : MEASUREMENT OF SPECULAR GLOSS OF PAINT FILMS

FOREWORD

This Sri Lanka Standard was approved by the Sectoral Committee on Chemical and Polymer Technology and authorized for adoption and publication by the council of the Sri Lanka Standards Institution on 2005-09-08.

This standard was published in 1981 which superceded **CS 70 : 1969**. In this revision each test method is given as a separate part in order to facilitate updating. This standard supercedes **SLS 535 : Part 4** Tests associated with optical tests on paint films – section **4.3** Measurement of specular gloss of paint films

1 SCOPE

This part of the standard specifies a method for measuring of specular gloss of paints, varnishes or allied products.

2 REFERENCES

SLS 489 Glossary of terms for paints
SLS 523 Methods of sampling paints
SLS 1256 Methods of test for paints
Part 11 : Standard panels for testing

3 PRINCIPLE

3.1 The gloss (specular reflection value) of paints, varnishes or allied products is determined by comparison against a gloss standard.

4 APPARATUS

4.1 Test panel

4.1.1 Gloss panels as specified in **SLS 1256 : Part 11 : Section 1** at least 3 mm thick shall be used as the substrate, unless specified otherwise.

4.1.2 The material shall be applied by means of a spreading device (see **3.2**). The film of paint shall be uniform, 0.05 mm thick in the wet state, and at least 75 mm x 75 mm in size.

4.1.3 The film shall be allowed to dry horizontally (if a stoving paint, to dry horizontally by stoving) for the specified period under specified conditions.

4.2 Film applicator

4.2.1 An applicator as described in **SLS 1256 : Part 11 : Section 2** shall be used.

4.3 Glossmeter

4.3.1 A photoelectric glossmeter comprising a search unit (see Appendix **A**), a galvanometer unit (see Appendix **B**) and a gloss standard as described below shall be used.

4.3.2 The gloss standard

4.3.2.1 The standard shall be highly polished clear glass, plane to within two fringes per 10 mm and with a refractive index, $\mu = 1.523 \pm 0.002$. The exposed area of the upper surface of the glass shall have the same dimension as the base of the search unit. The under surface and edges of the glass shall be roughened and coated with black paint to prevent the ingress of stray light or any internal reflection.

The specular reflection value of this standard shall be taken as 100 units. Other glasses (plate glass blackened as above, or plan polished black glass) may be used only if they have been calibrated against the standard and have given specular reflecting values between 99 and 101 units.

5 PROCEDURE

5.1 Place the search unit on the gloss standard and with the lamp switched off, adjust the galvanometer to a reading of zero. Switch on the lamp and adjust the potentiometer until the galvanometer give a reading of 100.

5.2 Transfer the search unit to the painted panel. Observe the reading of the galvanometer and take this to be the specular reflection value of the test surface relative to that of the gloss standard taken as 100 units. If the specular reflection value of the test surface is over 100 units, proceed as described blow.

5.2.1 Set the reading on the gloss standard to a figure lower than 100 and multiply the reading obtained on the paint film by an appropriate factor (see also Appendix B). This procedure however, entails some loss of reading accuracy.

5.3 For measurements of films on plate glass substrates, take three readings on different areas of the film with the long axis of the instrument parallel to the length of the panels, checking back on the gloss standard to ensure that there is no drift in the output of the photocell. If the spread of results is less than five units, the mean shall be reported as the specular reflection value; otherwise three further measurements shall be made and the mean and extremes of all values reported.

5.4 For measurements of films on substrates other than plate glass take six measurements, three in each of two directions at right and report the mean of the six measurements and the extreme values.

5.5 Since the gloss values are greatly influenced by the flatness of the test panel, a large variation usually indicates that the substrate is unacceptable. Where the variation between extreme values is greater than 10 units the test panel should be rejected.

APPENDIX A
THE PHOTOELECTRIC SEARCH UNIT

The search unit essentially consists of a lamp housing containing a lamp bulb and a lens which directs a parallel beam of light at an angle of 45^0 on to the surface under test and a receiver housing containing a lens, diaphragm and photocell to receive the reflected light. The lamp housing and receiver housing are held rigidly in position in the body of the unit.

It is essential that the optical design of the search unit should conform to that of the instrument described below and illustrated in **Fig. 1**. Variation in constructional details are permissible but the dimensions of the optical system including lamp diaphragm and photocell should be reproduced closely.

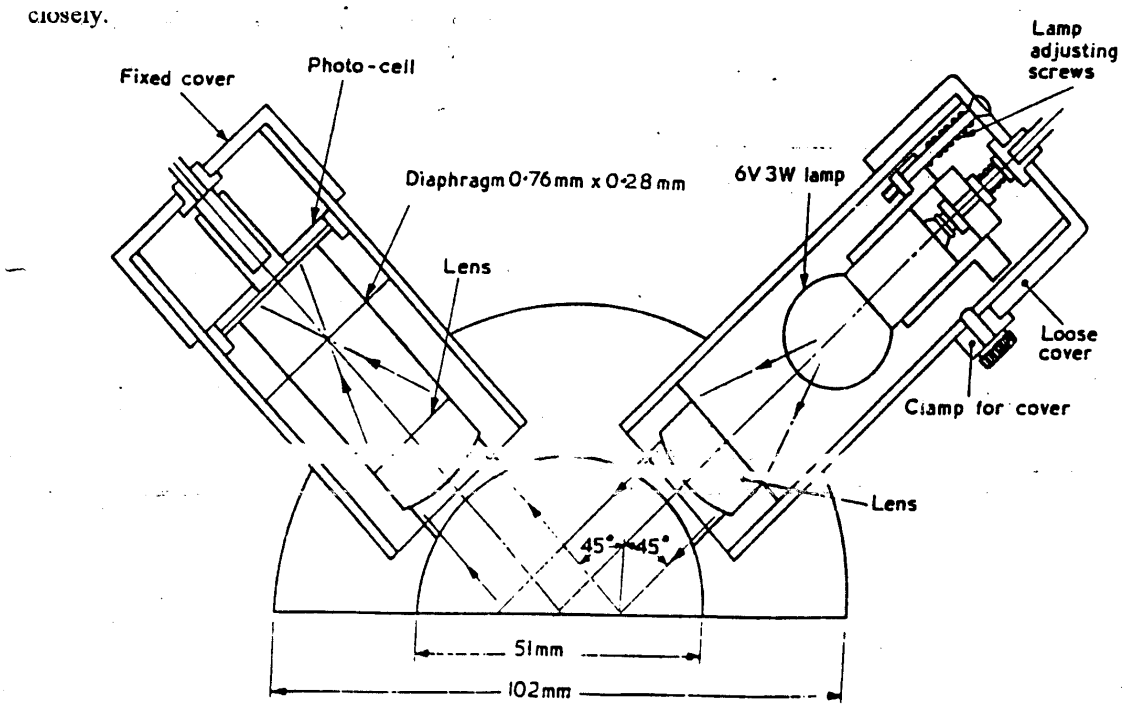

FIGURE 1 – photoelectric search unit

The body is constructed so that the axes of the housing for the lamp and the photocell are each inclined at an angle of 45 ± 0.25^{0} to the surface under test, so that their point of intersection 11 in this surface, and so that they both lie in one plane at right angles to this surface.

The lamp housing contains a focusing and centering device consist of a ring held in position by three spring-loaded screws. This ring holds the bulb, which is a six – volt, three –watt centre-contact automobile type. It is important that there should be no irregularities in the thickness of the bulb glass and that the filament, when viewed through the crown of the bulb should be straight and mounted centrally. The filament should be a single helix of approximately 0.25-mm external diameter and 2.3-mm apparent length.

NOTE : *It may be necessary to select a suitable bulb from a number of specimens because this type of automobile bulb is not made to a close dimensional specification.*

The positioning of the bulb is adjusted by the manufacturer of the instrument so that the light beam is focused as far as possible within the aperture of the diaphragm. This adjustment must be checked when a new bulb is fitted. The simplest method is to place the gloss meter on the standard and adjust the three spring loaded screws in turn until the galvanometer shows the maximum deflection.

The photocell, which is 25-mm in diameter and of the selenium barrier layer type is mounted in an insulating bush of synthetic resin-bonded paper sheet and is pressed down onto a contact ring by a spring loaded plunger.

The contact ring and the spring-loaded plunger form the connections to the photocell. The diaphragm, which is placed between the lens and the photocell at the focal plane of the lens, has a centrally placed rectangular aperture, 0.76 mm x 0.28 mm, the length being perpendicular to the plane formed by the axes of the lamp and photocell housings. The purpose of the diaphragm is to restrict the angular spread of that portion of the reflected beam which reaches the photocell behind it, thus ensuring that little light other than that specularly reflected at an angle of 45^{0} is measured.

The lenses are optically worked plano-convex lenses with an effective focal length of 25.4 ± 1.3 mm. These lenses are 19-mm in diameter and 10.9 ± 0.13 mm thick at the centre. They are mounted with the plane surface facing the lamp or the photocell, as appropriate.

A constant voltage supply is necessary to operate the lamp in the search unit. A six-volt accumulator or a six-volt constant voltage transformer may be used.

APPENDIX B
GALVANOMETER UNIT

This unit may be any low-resistance spot-type galvanometer with a sensitivity not less than 10 scale divisions per microampere and a scale of at least 100 divisions, each not less than 1 mm. The response of the galvanometer shall be linear within ± one per cent and shall be linearly related to the intensity of the light on the photocell. Provision is required for matching photocell output and galvanometer sensitivity. A continuously variable potentiometer of the wire-wound type is suitable for this purpose.

NOTE : *The most accurate results for panels which have a specular reflection value of over 100 units can be obtained by using a galvanometer which has a mechanical zero shift facility. If the galvanometer is not of this type, the reading on the gloss standard should be set to a figure lower than 100 and the reading obtained on the paint film multiplied by an appropriate factor. This procedure entails some loss of reading accuracy.*

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