IS 2206-3 (1989): Flameproof electric lighting fittings, Part 3: Fittings Using FLuorescent Lamps and Plastic Covers [ETD 24: Illumination Engineering and Luminaries]

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IS 2206 (Part 3) : 1990
(Reaffirmed 2005)

Indian Standard

FLAMEPROOF ELECTRIC LIGHTING FITTINGS— SPECIFICATION

PART 3 FITTINGS USING FLUORESCENT LAMPS AND PLASTIC COVERS

भारतीय मानक

विद्युत प्रकाश व्यवस्था के लिए ज्वालासह फिटिंगें – विशिष्टि

भाग 3 प्रदीप्ति बत्तियों और प्लास्टिक आवरण के साथ प्रयुक्त फिटिंगें

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

May 1990

Price Group 2

FOREWORD

This Indian Standard (Part 3) was adopted by the Bureau of Indian Standards on 21 August 1989, after the draft finalized by the Illuminating Engineering and Luminaires Sectional Committee, ETDC 45 had been approved by the Electrotechnical Division Council.

This standard deals with fittings incorporating tubes made from approved synthetics plastics. At present the only material which has been evaluated and approved is the acrylic plastics polymethylmethacrylate.

This material is produced in the form of cast tube and moulding powder, the latter for injection of compression moulding, or for extrusion. Different moulding powders are available, including clear and coloured transparent grades, also opal grades of different opacities. Cast tube is considered only as in the clear transparent grade.

This standard shall be read in conjunction with Part 1 of this standard.

The experiments carried out in the laboratories indicate that these fittings are suitable only for Group I applications and should not be used in Group IIA and Group IIB atmosphere for reasons of safety.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

FLAMEPROOF ELECTRIC LIGHTING FITTINGS— SPECIFICATION

PART 3 FITTINGS USING FLUORESCENT LAMPS AND PLASTIC COVERS

1 SCOPE

1.1 This standard (Part 3) covers the range of fixed lighting fittings of flameproof construction, intended for use where flammable gas or vapour may occur in explosive mixture with air. Flameproof fittings covered by this standard are those types using plastic tubes to enclose tubular fluorescent lamps (Group I only).

NOTE — The use of these fittings is restricted to Group I application only as certain of the gases and vapours in Group IIA and IIB attack some plastics and cause a decrease in strength.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
IS 1534 (Part 1) : 1977	Specification for ballasts for fluorescent lamps: Part 1 For switch start circuits (*first revision*)
IS 2148 : 1981	Specification for flameproof enclosures of electrical apparatus (*second revision*)
IS 2206 (Part 1) : 1984	Specification for flameproof electric lighting fittings: Part 1 Well-glass and bulkhead types (*first revision*)
IS 2418 (Part 2) : 1977	Specification for tubular fluorescent lamps for general lighting service: Part 2 Standard lamp data sheets
IS 3323 : 1980	Specification for bi-pin lampholders for tubular fluorescent lamps (*first revision*)
IS 4821 : 1968	Specification for cable glands and cable boxes for use in mines

3 TERMINOLOGY

3.0 For the purpose of this standard, the definitions given in IS 2206 (Part 1) : 1984 shall apply.

4 GENERAL REQUIREMENTS

4.1 Fittings shall comply with appropriate clauses of IS 2206 (Part 1) : 1984 and requirement of IS 2148 : 1981

5 DESIGN, MATERIAL AND CONSTRUCTION

5.1 Lamps

Fittings shall accommodate tubular fluorescent lamps of the appropriate wattage complying with IS 2418 (Part 2) : 1977.

5.2 Lampholders

Lampholders shall comply with IS 3323 : 1980 and be of such materials as to withstand the service temperature.

5.3 Control Gear and Internal Wiring

Discharge lamp auxiliary gear shall comply with IS 1534 (Part 1) : 1977. All internal wiring shall comply with the appropriate Indian Standard and be such as to withstand the service temperatures.

5.4 Terminals

Terminals shall comply with the requirements of IS 2206 (Part 1) : 1984.

5.5 Plastics Tubes

The plastics tubes shall comply with the following requirements.

5.5.1 *Composition*

Tubes made by a casting process, or by fabrication from thermoplastic sheet, shall be of unplasticized polymethyl-methacrylate. Extruded tubes shall be made from unplasticized acrylic moulding powder. Tubes shall be free from the following defects:

a) Crazing;

b) Splits, cracks, air bubbles and foreign material; and

c) Dirt specks of area greater than 1·5 mm^2.

Acrylic moulding powder shall be free from dirt speck of area greater than 1·5 mm^2, and from foreign material.

5.5.2 *Optical Properties Including Light Transmission*

Tubes made from clear acrylic material shall have a light absorption not greater than 2 percent/cm of thickness.

Optical characteristics of tubes shall be agreed to between the manufacturer of the material and the manufacturer of the fittings.

5.5.3 *Finish of Surface*

Tubes made shall not be subjected to any surface finishing process which involves solvent etching.

5.5.4 *Dimensions of Tubes*

The tubes shall be circular in cross-section and the ratio of maximum to minimum diameter at any one cross-section shall not exceed 1·1. The wall thickness shall be not less than 6 percent of the nominal external diameter or 3·2 mm, whichever is the greater.

5.6 Mounting of Plastics Tubes

5.6.1 The plastics tube shall be supported at both ends, the ends of the tube being mounted in or screwed into ferrules which shall be affixed with an approved acrylic or epoxy cement (*see* Fig. 1 and 2). The length of the cement path shall be not less than one-third of the external diameter of the plastics tube, with a minimum of 25·4 mm. The plastics tube and cemented ferrules shall form a single replaceable unit.

NOTE — Cement joints are capable of withstanding compressive loads but have limited ability to resist shear or tensile stresses; ferrules and associated supports should be designed with this in mind.

5.6.2 Air-tightness may be achieved by the use of an appropriate type of gasket, which shall not be part of a flameproof path (*see* Fig. 1 and 2).

5.7 Bodies of fittings and the ferrules shall be of metal. Provision shall be made, where desired, for the incorporation of the fluorescent lamp auxiliaries. The mounting of the lamp-holders shall be such as to take into account any permitted tolerances and any overall length for which the fitting is designed.

Where the eletrical connections are housed within a coupling enclosure or tube, the end bodies, together with the said coupling, shall be designed and tested as an integral unit.

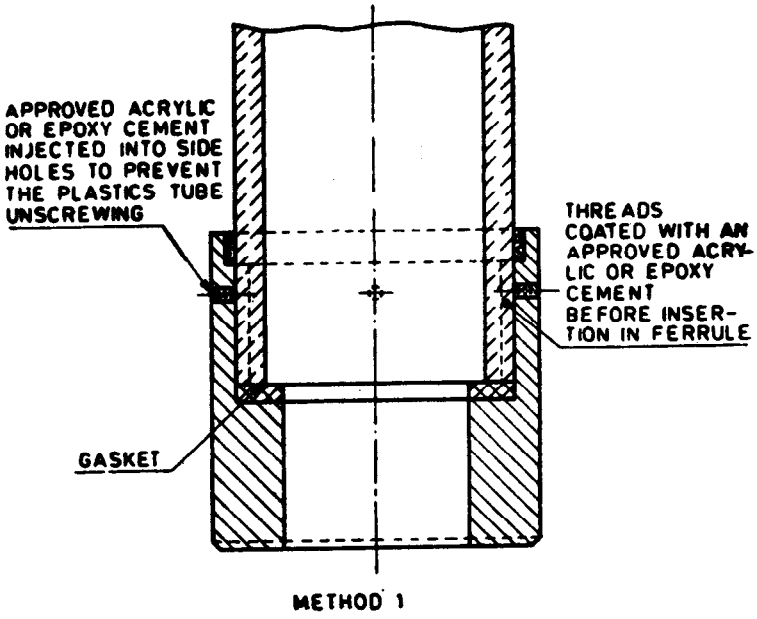
5.8 Fittings for Use with Cable

Provision for the attachment of cable shall be made in accordance with IS 2148 : 1981 and where necessary, IS 4821 : 1968 or other relevant Indian Standards.

5.9 Securing Screws or Bolts

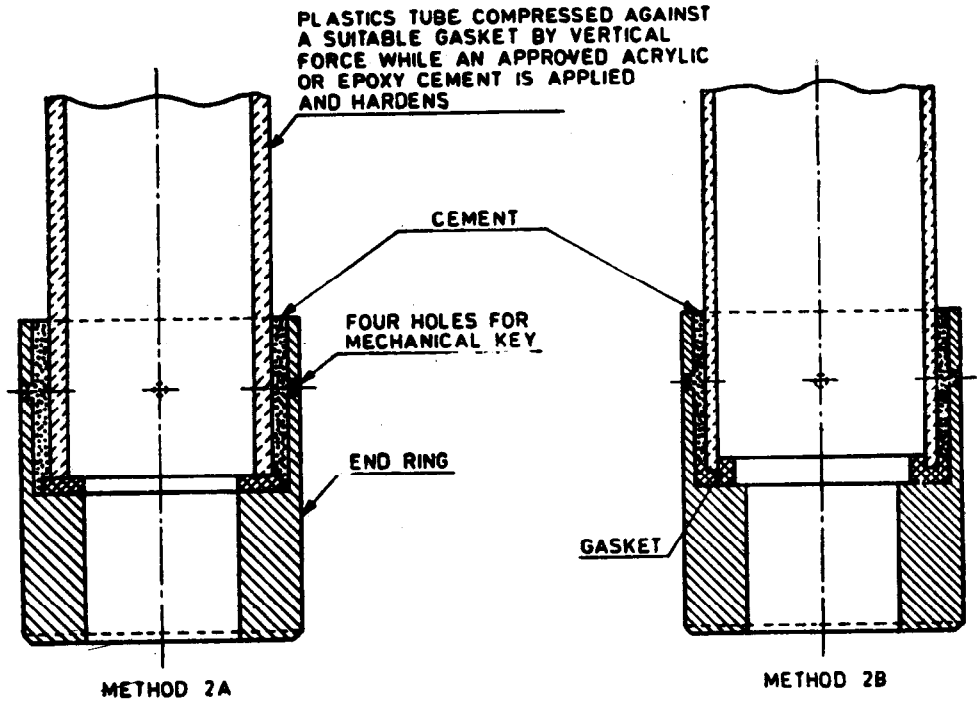
Any external screws, hinges or bolts securing the various components of the fittings shall be of corrosion resistant metal, or be suitably treated to resist corrosion.

Bolts, set screws, studs and nuts used to ensure the flameproofness of the enclosure shall comply with the requirement of IS 2148 : 1981.



NOTE — This figure is typical only and does not purport to show design detail.

FIG. 1 TYPICAL METHOD OF MOUNTING PLASTICS TUBE IN FERRULES OF FITTINGS



Similar to method 2A but flat gasket replaced by channel

NOTE — These figures are typical only and do not purport to show design details.

FIG. 2 TYPICAL METHODS OF MOUNTING PLASTICS TUBES IN FERRULES FITTINGS

5.10 Provision of Reflectors

Where required, provision shall be made on fittings for the attachment of reflectors. The reflectors shall comply with the relevant Indian Standards.

5.11 Provision for Guards

Where required, provision shall be made for fixing efficient guards to protect against mechanical damage.

6 TEMPERATURE RISE AND OPERATING POSITION

6.1 The maximum surface temperature rise shall not exceed 50°C (range *Z*), whatever the operating position, when measured in accordance with Annex D of Part 1 of this standard.

7 MARKING

7.1 Each fitting shall be permanently marked, either by raised lettering cast integrally with, or by a plate attached to the body of the fitting, in a manner which will not impair the flameproof enclosure, to indicate the following particulars:

a) Name of the manufacturer, or his agent;

b) Name (or name and number) by which the type is identified on the certificate;

c) Maximum wattage of the lamp permitted for use in the fitting;

d) Reproduction of the registered flameproof mark, if the manufacturer holds a licence to apply this mark; and

e) Number of the flameproof certificate, the group number I and the temperature range letter *Z* (or in figures, 85°C).

7.2 Every plastics tube shall be marked indelibly and in a prominent position with a reproduction of the registered flameproof mark; such a mark is evidence that the plastics tube complies with the requirements of the specification and that the manufacturer holds a licence to apply the mark.

7.3 The voltage range and frequency appropriate to the fluorescent lamp auxiliary gear shall be marked in a prominent position, either inside or outside, in the vicinity of the terminal compartment.

7.4 Marking of Earth Connection

The earthing terminal shall be identified by the symbol '⏚' marked in a legible and indelible manner on or adjacent to the terminal.

8 TESTS

8.1 Classification of Tests

8.1.1 *Type Tests*

The following shall constitute the type tests:

a) Dimensional check up (*see* **8.2**),

b) Static hydraulic test (*see* **8.3**),

c) Impact test (*see* **8.4**),

d) Test for temperature rise (*see* **8.5**), and

e) Test for flameproofness (*see* **8.6**).

8.1.2 *Acceptance Test*

The following shall constitute the acceptance tests:

a) Dimensional check up (*see* **8.2**),

b) Static hydraulic test (*see* **8.3**),

c) Impact test (*see* **8.4**), and

d) Test for temperature rise (*see* **8.5**).

8.1.2.1 The number of samples for acceptance tests and criterion of approval shall be as given in Annex E of Part 1 of this standard.

8.1.3 *Routine Tests*

The following shall constitute the routine tests:

a) Dimensional check-up (*see* **8.2**), and

b) Static hydraulic test (*see* **8.3**).

8.2 Dimensional Check-up

The lighting fittings shall be examined for the various dimensions and shall comply with the requirements of this specification.

8.3 Static Hydraulic Test

Each tube, held at its seating surface only, shall be subjected to an internal hydraulic pressure of 10·50 kgf/cm^2, applied for a period of not less than 15 seconds, or more than 20 seconds. The pressure is to be brought up gradually to that value, the time taken being not more than 1 minute. For the purpose of this test the tube should be clamped between flat pressure plates with a suitable gasket material pressed against its ends.

8.4 Impact Test

Tubes, when subjected to the test described in Annex C of Part 1 shall be capable of withstanding without perceptible damage an impact, normal to the contour of the tubes, of a 1·8 kg hammer falling from a height of 15·2 cm.

8.5 Temperature Rise Test

The maximum surface temperature rise shall not exceed 50°C (range *Z*), whatever be the operating position, when measured in accordance with Annex D of Part 1 of this standard.

8.6 Test for Flameproofness

All fittings purporting to comply with this specification shall be of a type that has been certified as flameproof by the recognized testing authority (*see* IS 2148 : 1981).

Bureau of Indian Standards

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards : Monthly Additions'.

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Amendments Issued Since Publication

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