IS 3323 (1980): Bi-pin lampholders for tubular fluorescent lamps [ETD 14: Electrotechnical]

IS : 3323 - 1980
(Reaffirmed 1992)

Indian Standard

SPECIFICATION FOR BI-PIN LANDHOLDERS FOR TUBULAR FLUORESCENT LAMPS

(*First Revision*)

Second Reprint MAY 1997

UDC 621.316.583

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 6

October 1980

IS : 3323-1980
(Reaffirmed 1992)

Indian Standard

SPECIFICATION FOR BI-PIN LAMPHOLDERS FOR TUBULAR FLUORESCENT LAMPS

(First Revision)

Electric Lamps and Accessories Sectional Committee, ETDC 23

Chairman	*Representing*
SHRI P. N. SRINIVASAN	Peico Electronics and Electricals Ltd, Bombay
Members	
SHRI R. K. BAJPAI (*Alternate* to Shri P. N. Srinivasan)	
SHRI G. K. AITHAL	Bajaj Electricals Ltd, Bombay
SHRI R. K. KATRE (*Alternate*)	
SHRI S. R. ANAND	Sylvania and Laxman Ltd, New Delhi
SHRI C. W. PATWARDHAN (*Alternate*)	
SHRI R. S. ARORA	Directorate General of Supplies and Disposals, New Delhi
SHRI S. KRISHNA (*Alternate*)	
GP CAPT H, S.BHATIA	Directorate of Technical Development and Production (Air), Ministry of Defence, New Delhi
SHRI H. C. PANDEY (*Alternate)*	
SHRI G. BHATTACHARYA	National Test House, Calcutta
SHRI M. P. WALVEKAR (*Alternate*)	
SHRI P. K. CHATTERJEE	Electric Lamp Manufacturers (India) Pvt Ltd, Calcutta
SHRI M. M. BANDYOPADHYAY (*Alternate*)	
SHRI N. S. CHARI	Crompton Greaves Ltd. Bombay
SHRI R. DAS GUPTA (*Alternate*)	
DR S. N. DHINGRA	The Miniature Bulb Industries (India) Pvt Ltd, Dehra Dun
SHRI V. S. CHIBBER (*Alternate*)	
CHIEF ENGINEER (ELECTRICAL)-I	Central Public Works Department, New Delhi
SURVEYOR OF WORKS II (ELECTRICAL) (*Alternate*)	
DEPUTY GENERAL MANAGER	Posts and Telegraphs Department (Ministry of Communications)
D(???)SIONAL ENGINEER (*Alternate*)	

(*Continued on page* 2)

(*Continued from page* 1)

Members	*Representing*
SHRI R. N. GANDHI	The Ahmedabad Millowners Association, Ahmadabad
SHRI THOMAS GEORGE	Toshiba Anand Lamps Ltd, Cochin
SHRI K. V. SREEKUHR (*Alternate*)	
SHRI A. N. GHOSH	The Development Commissioner, Small Scale Industries. New Delhi
SHRI P. SHARAN GUPTA	Auto Lamps Ltd, Faridabad
SHRI S. C. KHERA (*Alternate*)	
CDR M. M. KAILA	Naval Headauarters (Ministry of Defence)
LT CDR S. K. CHANDRA (*Alternate*)	
SHRI G. L. KESWANI	Directorate General of Technical Development, New Delhi
SHRI D. D. RAJDEV (*Alternate*)	
SHRI B. H. MHATRE	Bombay Electric Supply and Transport Undertaking, Bombay
SHRI R. V. S. RAO (*Alternate*)	
LT-COL S. S. MOHANTY	Ministry of Defence (DGI)
MAJ V. B. DESHMUKH (*Alternate*)	
SHRI B. P. G. PAI	Electric Lamp and Component Manufacturers Association of India, Bangalore
GP GAPT G. MUKHERJEE (*Alternate*)	
SHRI S. C. RASTOGI	Hindustan Machine Tools Ltd, Bangalore
SHRI A. AUGUSTINE (*Alternate*)	
SHRI K. V. S.RAU	The Bengal Electric Lamp Works Ltd. Calcutta
SHRI N. B. RAY (*Alternate*)	
SHRI N. B. RAY	Indian Lamp Factories Association, Calcutta
SHRI K. K. ROHATGI	Binay Electricals and Appliances Pvt Ltd, Calcutta
SHRI S. BHATTACHARYA (*Alternate*)	
SHRI V. R. ROHATGI	Pradip Lamp Works. Patna
SHRI AJIT K. ROHATGI (*Alternate*)	
SHRI K. S. SARMA	National Physical Laboratory (CSIR), New Delhi
SHRI I.P.SINGH	Railway Board, Ministry of Railways
SHRI S. B, MATHUR (*Alternate*)	
SHRI V.C. VERMA	Directorate General of Mines Safety, Dhanbad
SHRI B. K. SHARAN (*Alternate*)	
SHRI S. P. SACHDEV, Director (Elec tech)	Director General, BIS (*Ex-officie Member*)

Secretary

SHRI SUKH BIR SINGH

Assistant Director (Elec tech), BIS

Indian Standard

SPECIFICATION FOR BI-PIN LAMPHOLDERS FOR TUBULAR FLUORESCENT LAMPS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 28 February 1980, after the draft finalized by the Electric Lamps and Accessories Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 Tubular fluorescent lamps are being increasingly used for general lighting service. Need has, therefore, been felt for laying down dimensional and other requirements of bi-pin lampholders used with tubular fluorescent lamps with a view to ensuring interchangeability and safety. This standard also specifies the testing methods, sampling and conditions of compliance applicable to type testing and testing of batches.

0.3 This standard was first published in 1965. The important features in this revision is the inclusion of G-5 bi-pin lampholder for use in tubular fluorescent lamps in addition to the G-13 bi-pin lampholders covered in the earlier standard,

0.4 In preparing this revision, assistance has been derived from IEC Publication 400 (1972) ' Lampholders and starterholders for tubular fluorescent lamps' issued by International Flectrotechnical Commission.

0.5 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, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard lays down the dimensional, safety and performance requirements of bi-pin lampholders for use with tubular fluorescent lamps for general lighting service fitted with G-5 and G-13 bi-pin caps *[see*

*Rules for rounding off numerical values (*revised*).

IS : 2418 (Part III)-1977*]. These lanpholders are intended for use in circuits connected to an ac supply not exceeding 250 V to earth and not exceeding 660 V when the lamp is removed.

1.1.1 This standard does not cover bi-pin lampholders designed for special purposes, such as waterproof type, flameproof type, etc.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Independent Type Holder —A holder so designed that it does not require additional enclosures for being mounted separately.

2.2 Build-in Type Holder — A holder designed only for being mounted in additional enclosures such as lighting fittings.

2.3 Lampholder — An accessory used for connecting a lamp to an electrical circuit. It may also in addition support the lamp.

2.4 Live Part — A part which has a potential difference above the earth of the same order of magnitude (that is, between one-tenth of the full value and the full value) as the mains voltage.

2.5 Type Tests — Tests carried out to prove conformity with this specification. These are intended to prove the general quality and design of a given type of appliance or equipment.

2.6 Acceptance Tests — Tests carried out on samples taken from a lot for the purpose of acceptance of the lot.

2.7 Routine Tests — Tests carried out on each item to check requirements which are likely to vary during production.

3. MATERIAL, CONSTRUCTION AND WORKMANSHIP

3.1 Material

3.1.1 All material used in the construction of the lampholder shall be suitable for tropical use. No hygroscopic material shall be used unless they have been previously rendered moisture-proof.

3.1.2 External parts of the holder shall be made of insulating material. The insulating material used shall be non-flammable and able to withstand the temperatures likely to occur in the lampholder assembly during normal use.

3.1.3 Non-ferrous metallic parts of the holder shall not be brittle.

*Specification for tubular fluorescent lamps for general lighting service: Part III Dimensions of G-5 and G-13 bi-pin caps (*first revision*).

3.2 Construction — The landholders shall be so designed and constructed as to be mechanically robust and free from any operational difficulties. They shall be designed to ensure safe and easy functioning under normal conditions. They shall be so constructed as to be capable of withstanding the shock met with in normal transit, installation and use. They shall have adequate resistance to heat. All exposed metal parts likely to be affected by atmospheric conditions shall be adequately protected to prevent corrosion.

3.2.1 Provisions, if any, for fixing the lanpholders shall be such that the fixed part of the landholders cannot be turned or displaced during normal use.

3.2.2 The lanpholders shall be so designed that the working position of the lamp is clearly felt while inserting the lamp.

3.2.3 The lampholder contacts shall provide adequate pressure on the lamp cap pins when the lamp is in working position. The contact pressure, for lampholder making contact with the side of the lamp pin shall be between 2 and 45 N. If a rotary motion is necessary for the removal of the lamp from the lampholder, the torque required shall be between 0·1 and 0·5 Nm for each lampholder.

3.3 Workmanship — All parts shall be manufactured in accordance with the good engineering practice.

4. DIMENSIONAL INTERCHANGEABILITY

4.1 Lampholdcrs for G-5 and G-13 type of bi-pin caps shall be mounted according to distance given in Tables 1 and 2 respectively.

5. TERMINALS FOR EXTERNAL WIRING

5.0 Lampholders shall be provided with one of the following means of connection:

a) Terminals with screw clamping, and
b) Screwless terminals.

5.1 Terminals with Screw Clamping

5.1.1 All external terminals shall be of sufficient size relative to the current rating of the holder but in any case not less than 2A.

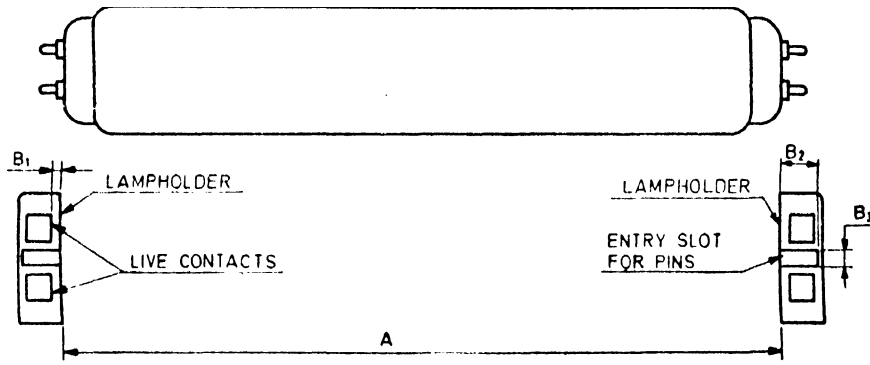
5.1.2 All external terminals shall be so located that wiring is easy. They shall be so designed that they do not work loose when the clamping screws are tightened or loosened.

5.1.3 The terminals shall be so designed that connections are made with adequate pressure, the core or conductor being held between two metal surfaces and without damage to the conductor.

TABLE 1 MOUNTING OF COMBINED PAIR OF INFLEXIBLE LAMPHOLDERS G-5

(*Clause* 4.1)

All dimensions in millimetres.



A = Mounting distance

RATED WATTAGE OF LAMP	LAMPHOLDER FACE TO LAMPHOLDER FACE = A	
	Max	*Min*
(0)	(2)	(3)
4	137·2	135·9
6	213·4	212·1
8	289·6	288·3

B_1 = The distance between the live contacts and the lampholders face shall be 2.5 mm *Max.*

B_2 = The minimum depth of entry slot of G-5 lampholders shall be 7·35 mm. This dimension is based on lamp dimensions as given in IS: 2418 (Part III)-1977*.

B_3 = The slot widths shall be such that a gauge, corresponding to a fluorescent lamp with two maximum form G-5 caps mounted with an angular displacement from true alignment of 6·5°, shall enter the combined pair of holders without difficulty.

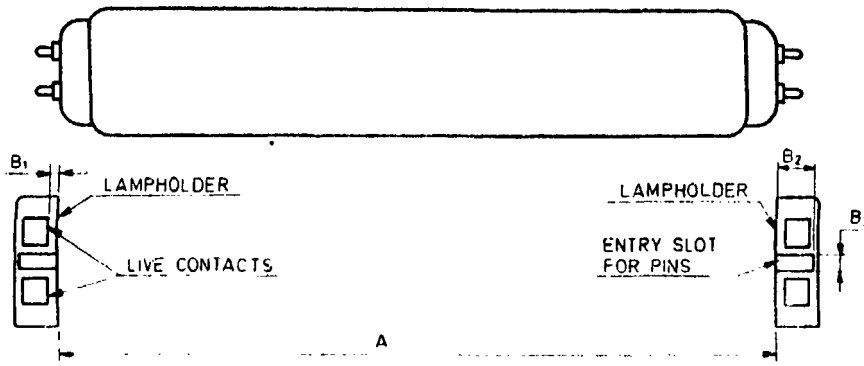
NOTE — The drawing is intended only to indicate the dimensions to be controlled.

*Specification for tubular fluorescent lamps for general lighting service: Part III Dimensions of G-5 and G-13 bi-pin caps (*first revision*).

TABLE 2 MOUNTING OF COMBINED PAIR OF INFLEXIBLE LAMPHOLDERS G-13

(*Clause* 4.1)

All dimensions in millimetres.



A = Mounting distance

RATED WATTAGE OF LAMP	LAMPHOLDER FACE TO LAMPHOLDER FACE = A	
	Max	*Min*
(1)	(2)	(3)
13	518·5	5169
20	591·6	590·0
40	1 201·2	1 199·6
65	1 501·8	1 500·25
80	1 501.8	1 500·25

B_1 = The distance between the live contacts and the lampholder face shall be 2·5 mm *Max.*

B_2 = The minimum depth of entry slot of fixed G-13 lampholders shall be 7·35 mm. This dimension is based on lamp dimensions as given in IS: 2418 (Part III)-1977*

B_3 = The slot widths shall be such that a gauge, corresponding to a fluorescent lamp with two maximum form G-13 caps mounted with an angular displacement from true alignment of 6.5°, shall enter the combined pair of holders without difficulty.

NOTE — The drawing is intended only to the dimensions to be controlled.

*Specification for tubular fluorescent lamps for general lighting service: Part III Dimensions of G-5 and G-13 bi-pin caps (*first revision*).

5.1.4 The terminals shall be so designed that the conductor does not slip out when the screw is tightened and they shall allow a wire to be connected without special preparation (such as soldering of the strands of the conductor, use of cable lugs, formation of eyelets, etc).

5.1.5 Terminals shall be so designed that the contact pressure is not transmitted through insulating material other than ceramic material.

5.2 Screwless terminals when used shall meet the requirements of IS : 6585-1972*.

5.3 Screw

5.3.1 Screws used in a terminal shall have metric thread [*See* IS : 4218 (Parts I to VI)-1967†] and shall not serve to fix any other component.

5.3.1.1 Screws used to clamp a conductor and screws with a nominal diameter less than 3 mm which may be used when connections are made, shall screw into a metal nut or metal insert.

5.3.1.2 A self-tapping screw shall not be used for any form of electrical connection.

6. CREEPAGE DISTANCES AND CLEARANCES

6.1 Creepage distance between live parts of different polarity and between live parts and non-current carrying and/or accessible metal parts shall not be less than 3 mm measured over the surface of the insulation isolating the live parts.

6.2 In cases where there are no insulating materials isolating live parts of different polarity or live parts from non-current carrying and/or accessible metal parts, a clearance distance of air gap of not less than 3 mm in the former case and not less than 4 mm in the latter case shall be provided.

7. PROTECTION AGAINST ACCIDENTAL CONTACT OF LIVE PARTS

7.1 Lampholders shall be so designed that it shall be possible to touch one of the lamp pins while the other pin is touching one contact in the holder, during insertion or removal of the lamp.

---

*Specification for screwless terminal and electrical connections for lighting fittings.

†ISO metric screw theads:

Part I Basic and design profiles (*first revision*).
Part II Diameter pitch combinations (*first revision*).
Part III Basic dimensions for design profiles (*first revision*).
Part IV Tolerancing system (*first revision*).
Part V Tolerances (*first revision*).
Part VI Limits of sizes for commercial bolts and nuts diameter range 1 to 52 mm (*first revision*).

7.1.1 Independent type holders shall have no openings giving access to live parts except those required for the connection and use of the holder. Such openings as are provided shall be so designed that there is sufficient protection against accidental contact when the holder is installed as in normal use,

NOTE — Lacquer or enamel shall not be accepted as adequate protection or insulation for the purpose of this requirement.

7.2 Protective enclosures and similar parts employed to prevent accidental contact with a live part shall have adequate mechanical strength and shall not work loose in normal use. It shall not be possible to. remove such parts without the use of tools.

7.3 External wiring terminals used in holders shall be so designed that when wires are correctly fitted there is no possibility of accidental contact between live parts and accessible metal parts.

7.4 Built-in type holders shall satisfy requirements of **7.1** to **7.3** when mounted in the enclosure(s) (for example, lighting fitting) for which they are designed.

8. MOISTURE RESISTANCE

8.1 The lampholder shall be proof against humid conditions which may occur in use. They shall withstand satisfactorily the moisture resistance tests specified in **10.8.**

9. MARKING

9.1 Each lampholder shall be marked, legibly and indelibly with th(???) following:

a) Manufacturer's name or trade-mark;

b) Manufacturer's model or type designation, if any;

c) Rated current in amperes;

d) Rated voltage in volts; and

e) Country of manufacture.

NOTE — Figures only may be used for marking the rated voltage and the rated current in which case the rated current is to be placed before or above the rated voltage. The following alternatives are suggested:

$$2A\ 250\ V \text{ or } 2/250 \text{ or } \frac{2}{250}$$

9.1.1 The landholders may also be marked with the Standard Mark

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1936 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys, the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

10. TESTS

10.1 Classification of Tests

10.1.1 *Type Tests* — The following shall constitute type tests:

a) Visual examination (*see* **10.2**),
b) Test for accidental contact of live parts (*see* **10.3**),
c) Test for screw terminals (*see* **10.4**),
d) Test for mechanical strength (*see* **10.5**),
e) Impact test (*see* **10.6**),
0 Test for measurement of contact pressure or torque (*see* **10.7**),
g) Test for moisture resistance (*see* **10.8**),
h) Endurance test (*see* **10.9**),
J) Test for performance (*see* **10.10**),
k) Test for creepage distance and clearance (*see* **10.11**),
m) Non-flammability test (on moulded insulating material) (*see* **10.12**),
n) Test for corrosion (on ferrous parts only) (*see* **10.13**),
P) Test for brittleness (on non-ferrous parts only) (*see* **10.14**), and
q) Test for heat resistance (*see* **10.15**).

10.1.1.1 *Number of samples and sequence of tests* — The type tests in accordance with this standard shall constitute of checking all the requirements specified in this standard. At least 6 samples of the same type shall be submitted for type tests. The tests shall be carried out in accordance with the sequence given in Appendix A.

10.1.1.2 *Conditions of acceptance* — The type test shall be considered as conforming to the requirements of this standard if no failure occurs in any of the tests. If one or more failures occur in any of the test(s), another set of six samples shall be selected and subjected to all test(s) when no failure shall occur for proving conformity to this standard.

10.1.2 *Acceptance Tests* — The following shall constitute acceptance tests to be carried out on number of samples selected at random from each lot:

a) Visual examination (*see* **10.2**),
b) Test for accidental contacts of live parts (*see* **10.3**),
c) Test for mechanical strength (*see* **10.5**),
d) Test for moisture resistance (*see* **10.8**),
e) Endurance tests (*see* **10.9**), and
f) Test for performance (*see* **10.10**).

10.1.2.1 The sampling procedure and criteria of acceptance shall be subject to agreement between the supplier and the purchaser. In the absence of such an agreement, the sampling procedure detailed in Appendix B may be followed.

10.1.3 *Routine Tests — The* following tests shall be carried out on all landholders:

a) Visual examination (*see* **10.2**), and
b) High voltage test.

NOTE — As a routine test, the high voltage test may be carried out in the form of flash test, the ac test voltage of 2 000 V rms being applied for a period of five seconds between the parts specified in 10.8.2.1, where there shall be no arcing or breakdown of insulation.

10.1.3.1 The conditions for the tests together with acceptable limits of measured values may be chosen to suit local conditions provided it is ensured that holders passing these tests do actually pass the type approval tests when conducted under specified conditions.

10.2 Visual Examination —The lampholder shall be visually examined and inspected for checking conformity with relevant requirements specified in this standard.

10.3 Test for Accidental Contact of Live Parts — It shall not be possible to touch any live parts by means of a test finger (*see* IS : 1401-1970*) fitted with an electrical contact indicator, applied in all possible directions with a force of 50 N. It is recommended that a voltage of not less than 40 V is used with an indicator lamp for the indication of electrical contact.

10.4 Test for Screw Terminals

10.4.1 Screw terminals shall be tested by tightening and loosening the clamping screws ten times by means of a suitable test screw driver applying

***Specification for assessibility test probes (*first revision*).**

a torque as indicated below:

Diameter of Screw	*Torque in* Nm	
mm	(a)	(b)
2	0·2	0·4
3	0·25	0·5
3·5	0·4	0·8
4	0·7	1·2
5	0·8	2·0
6	—	2·5

NOTE — Column (a) of the table refers to a screw without a head if the screw, when tightened, does not protrude from the hole. Column (b) refers to other screws.

10.4.1.1 Conductors of suitable cross-sectional area shall be placed in the terminals during the testing of the terminal screws and the conductors shall be slightly shifted after each loosening operation.

10.4.2 During this test no damage impairing the further use of screwed connections shall occur. Wires shall be considered to have been damaged if they show deep indentations or shearing. Compliance with 5 shall then be checked and the terminals shall show no signs of being loose after this test.

10.5 Mechanical Strength Test — Lampholders shall be able to withstand without any damage, a load of 50 N applied for one minute in the directions of the axis of test caps as specified in IS : 2418 (Part II1)-1977*, fitted to the lampholders.

10.6 Impact Test — The lampholder shall be placed on a horizontal plane and subjected to three blows that are struck from the lamp side of the holder from a suitable impact test apparatus. A typical apparatus is described in Appendix C.

10.6.1 After the test, the lampholder shall show no damage, especially no live parts shall have been made accessible.

10.7 Test for Measurement of Contact Pressure or Torque

10.7.1 *Contact Pressure* — This may be measured with any type of tension gauge.

10.7.1.1 *Procedure* — Place the feeler tip so as to lift the spring or pressure element from its stop or to bring it to the desired position for

*Specification for tubular fluorescent lamps for general lighting service: Part III Dimensions of G-5 and G-13 bi-pin caps (*first revision*).

measurement and read the indicated value. The value shall comply with **3.2.3.**

10.7.2 *Torque for Removal of the Lamp* — This may be measured with a torque measuring apparatus.

10.7.2.1 *Procedure* — The apparatus consists of a spindle from which a weight hangs. An indicating needle or pointer which is connected to the spindle, is capable of moving over a half annular graduated scale with the rotation of the spindle. Jigs suitable for measuring lampholder torque (a lamp cap made of steel) are mounted on the spindle. As the lampholder after engagement is rotated the pointer moves over the scale showing the torque required to disengage the lampholder. The measured value shall comply with **3.2.3.**

10.8 Moisture Resistance Test

10.8.1 The holders, having been brought to a temperature of 27 ± 2°C shall be placed for 48 hours in a chamber having a relative humidity of 95 ± 2 percent at a temperature of 27 ± 2°C.

10.8.2 Immediately after the treatment as in **10.8.1** the insulation resistance of the lampholder shall be measured according to **10.8.2.1** after removing visible drops of water, if any, with the aid of blotting papers but without heating.

10.8.2.1 The insulation resistance shall be measured one minute after the application of a dc voltage of 500 V between:

a) live parts of different polarity which can be separated, and

b) live parts and all external metal parts including fixing screws.

10.8.2.2 The insulation resistance measured shall be not less than 2 M .

10.8.3 After the measurement of insulating resistance the high voltage test described in **10.8.3.1** to **10.8.3.3** shall be carried out,

10.8.3.1 The holders shall satisfactorily withstand the application of an ac voltage of 2 000 V at 50 Hz between the parts specified in **10.8.2.1** without breakdown or arcing.

10.8.3.2 The initial voltage shall not exceed 30 percent of the full test voltage and shall be increased uniformly to the full voltage within 30 seconds. The full test voltage shall be maintained for one minute after which the voltage shall be diminished rapidly to 30 percent of its full value before switching it off.

10.8.3.3 The high voltage transformer used for the test shall have a rating of at least 500 VA.

10.9 Endurance Test — A cap as per IS: 2418 (Part III)-1977* with its contact short-circuited, shall be inserted 100 times into and withdrawn 100 times from the lampholder at a rate of about 30 times per minute, the lampholder being connected to an ac supply at rated voltage and the circuit arranged to pass the rated current, the power factor being 0.6 approximately.

10.9.1 After the test the lampholder shall show no damage.

10.10 Test for Performance — A cap as specified in IS : 2418 (Part III)-1977* with its contact short-circuited shall be fitted to the lampholder and the lampholder be loaded for one hour with the rated current in a circuit of not more than 6 V.

10.10.1 The voltage drop across each lampholder contact, measured at the end of the 1 hour period specified shall not exceed 35 mV.

10.11 Test for Creepage Distances and Clearances — Compliance with the requirements of creepage distances and clearances (*see* **6.1** and **6.2**) shall be checked by measurement. The measurement shall be made on the landholders with and without the connecting wires to its terminals. Terminal nuts and other parts used to secure the conductors shall, if free to move, be turned to its most unfavourable position.

10.12 Non-flammability Test — This test is applicable only to moulded insulating materials. The test shall be carried out in accordance with Appendix D.

10.13 Corrosion Test

10.13.0 This test is applicable only to ferrous parts. Small helical springs and other similar parts as well as parts exposed to abrasion need not be subjected to this test. A layer of grease on such parts is deemed to provide sufficient rust protection.

10.13.1 All greases shall be removed from the parts to be tested by immersion in carbon tetrachloride for 10 minutes. The parts shall then be immersed for 10 minutes in an aqueous solution of 10 percent ammonium chloride at a temperature of 27 ± 5°C.

10.13.2 Without drying, but after shaking off any drops of the solution, the parts shall then be placed for 10 minutes in a box containing air saturated with moisture at a temperature of 27 ± 5°C. The samples shall then be dried for 10 minutes in a heating cabinet at a temperature of 100 ± 5°C.

+Specification for tubular fluorescent lamps for general lighting service: Part III Dimensions of G-5 and G-13 bi-pin caps (*first rivision*).

10.13.3 At the end of this treatment, surfaces shall show no signs of corrosion.

10.13.3.1 Traces of corrosion on sharp edges and a yellowish film removable by rubbing should be ignored.

10.14 Brittleness Test

10.14.0 This test is applicable only to non-ferrous parts.

10.14.1 The parts shall be carefully cleaned with acetone, petroleum spirit or some other suitable solvent so that all traces of varnish, grease and oil are removed. The parts shall then be kept for 1 hour in a saturated solution of mercury chloride in water, at a temperature of 27 ± 5°C. After this treatment the parts shall be washed in running water.

10.14.2 There shall be no sign of cracks after 24 hours.

10.15 Heat Resistance Test — The test shall be conducted in accordance with Appendix E.

APPENDIX A

(*Clause* 10.1.1.1)

SEQUENCE AND NUMBER OF SAMPLES FOR TYPE TESTS

6 Samples

Visual examination (*see* **10.2**)

Test for accidental contact of live parts (*see* **10.3**)

Test for screw terminals (*see* **10.4**)

Test for mechanical strength (*see* **10.5**)

Impact test (*see* **10.6**)

Test for measurement of contact pressure or torque (*see* **10.7**)

Test for moisture resistance (*see* **10.8**)

Endurance test (*see* **10.9**)

Test for performance (*see* **10.10**)

3 Samples

Test for creepage distances and clearances (see **10.11**)

Non-flammability test (on moulded insulating materials)(*see* **10.12**)

Test for corrosion (on ferrous parts only) (*see* **10.13**)

Test for brittleness (on non-ferrous parts only) (*see* **10.14**)

3 Samples

Test for heat resistance (*see* **10.15**)

APPENDIX B

(*Clause* 10.1.2.1)

SAMPLING OF BI-PIN LAMPHOLDERS

B-1. LOT

B-1.1 In any consignment, all the bi-pin holders of the same type and size manufactured by the same factory and during the same period shall be grouped together to constitute a lot. Each lot shall, however, consist of maximum of 1 000 of bi-pin holders.

B-1.2 From each lot a certain number of bi-pin holders as specified in Table 3 shall be selected at random and subjected to acceptance tests. For this purpose IS : 4905-1968* shall be used.

TABLE 3 SAMPLING SCHEME

LOT SIZE	FIRST STAGE N_1	SECOND STAGE N_2	(N_1 + N_2)	C_1	C_2
(1)	(2)	(3)	(4)	(5)	(6)
Up to 101	3	3	G	0	2
101 „ 300	0	8	16	0	2
301 „ 300	13	13	26	0	4
501 „ 1 000	20	20	40	1	5

B-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

B-2.1 In Table 3, N_1 is the size of the first stage sample. These samples shall be selected at random. A sample shall be declared defective if it fails in one or more of the acceptance tests. If the number of defectives found in this sample is less than or equal to C_1, the lot shall be considered as conforming to this standard and accepted. If the number of defectives is greater than or equal to C_2, the lot shall be rejected. If the number of defectives is between C_1 and C_2, further sample of N_2 size shall be selected at random and subjected to acceptance tests.

B-2.1.1 If the number of defectives in the two samples combined is less than C_2, the lot shall be accepted, otherwise rejected.

*Methods for random sampling.

APPENDIX C

(*Clause* 10.6)

IMPACT TEST

C-l. DESCRIPTION OF APPARATUS

C-l.l A typical impact apparatus is shown in Fig. 1.

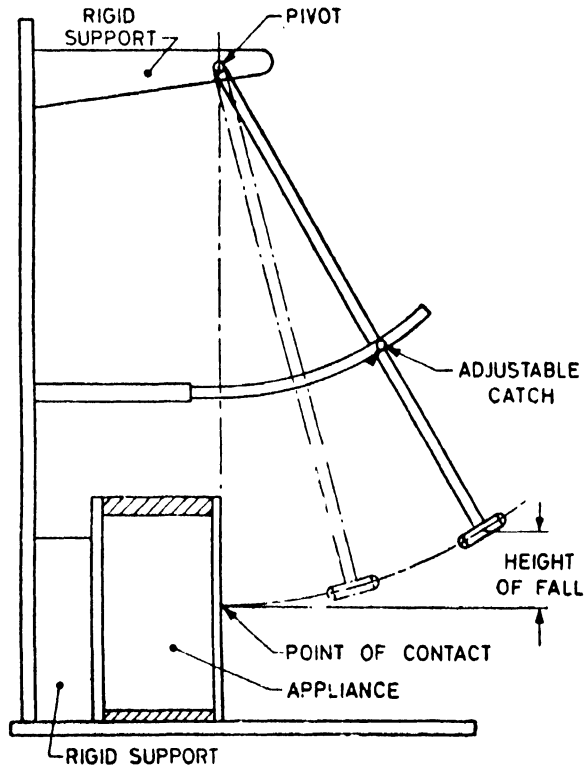


FIG. 1 APPARATUS FOR IMPACT TEST

C-1.2 The striking element has a hemispherical face of radius 10 mm made of hardwood, polyamide or similar material weighing 0·15 kg. It is rigidly fixed to the lower end of a steel tube with an external diameter of 9 mm and thickness 05 mm which is pivoted at its upper end in such a way that it swings only in the vertical plane of the axis of the striking element. The axis of the pivot is 1 mm above the axis of the striking element. The

design of the apparatus is such that a force between 1·0 N and 20 N has to be applied to the face of the hammer to maintain the pendulum in a horizontal position.

C-2. PROCEDURE

C-2.1 The fitting under test is held against a solid as brick, concrete or the like, and the test apparatus is so arranged that the pivot of the pendulum is vertically above the point of impact of the hammer. The hammer is then allowed to fall from a height of 300 mm.

C-2.2 The height of the fall is measured vertically between the point of impact on the sample and the face of the hammer at the point of release.

C-2.3 Three blows shall be applied to points evenly distributed over the sample.

C-3. REQUIREMENT

C-3.1 After the test, the samples shall show no damage within the meaning of this standard.

APPENDIX D

(*Clause* 10.12)

TEST FOR NON-FLAMMABILITY

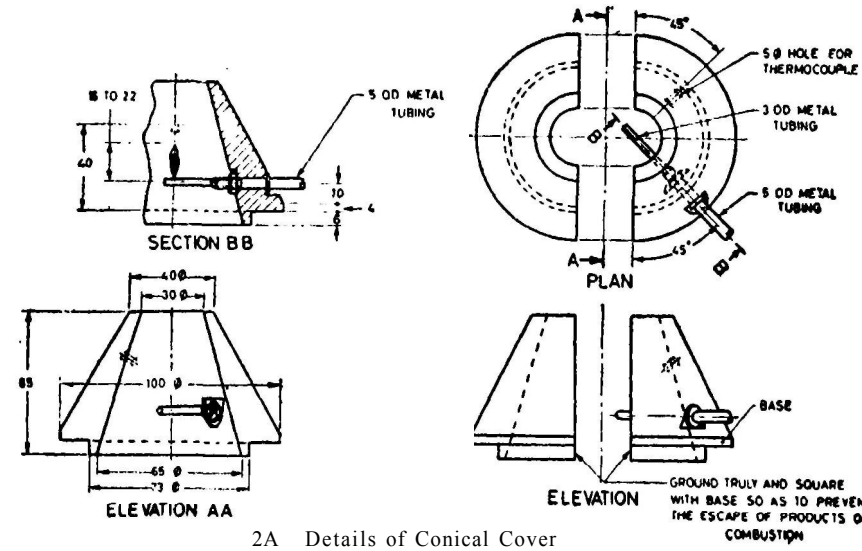
D-l. PREPARATION OF SAMPLE

D-1.1 The specimen shall consist of a portion of moulded insulating material and shall weigh not less than 6 g nor more than 10 g, and shall be not more than 10 mm in thickness measured from an externally cured face.

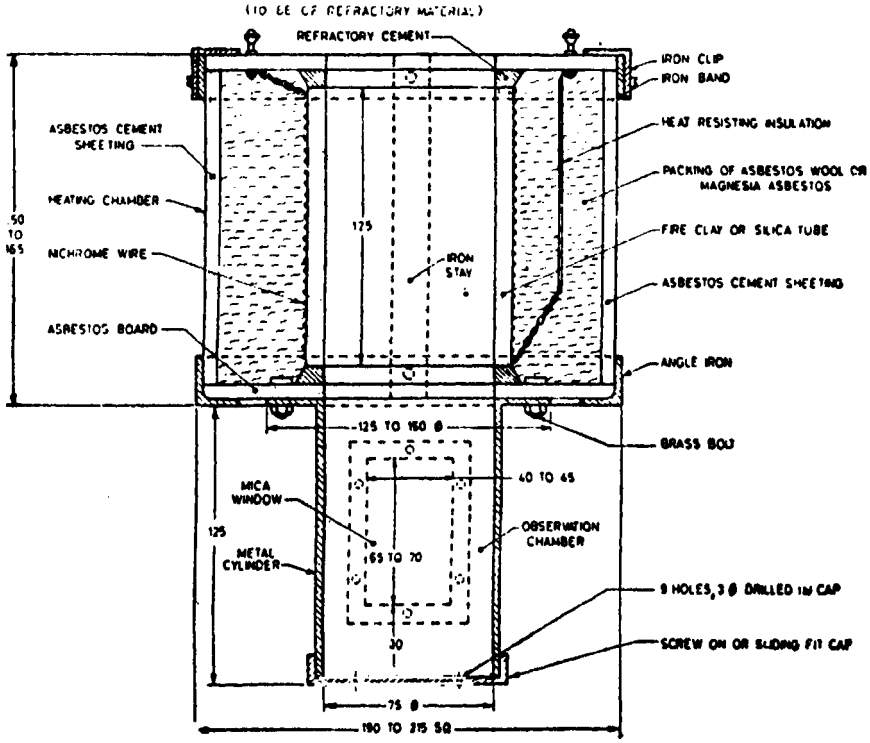
D-2. APPARATUS

D-2.1 The specimen shall be tested in the heating tube of an apparatus of the general type shown in Fig. 2 the pilot flame being located 20 mm above the upper end of the specimen.

D-2.2 A support for the specimen shall be provided in the heating tube, and this may suitably consist of a light stirrup of nichrome wire, supported by a length of nichrome wire passing over the pilot flame tube. The support shall be such that the specimen is fixed centrally in the heating tube with its largest dimension vertical.



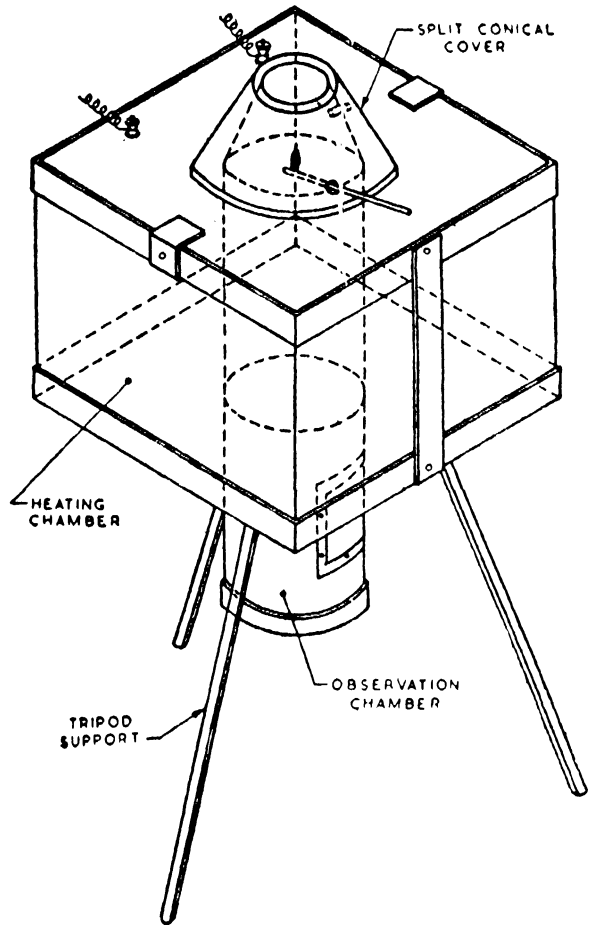
2A Details of Conical Cover



2B Details of Test Oven

All dimensions in millimetres.

FIG. 2 APPARATUS FOR NON-FLAMMABILITY TEST — *Contd*



2C Sketch of Assembled Apparatus

FIG. 2 APPARATUS FOR NON-FLAMMABILITY TEST

D-2.3 The apparatus shall be heated by passing a suitably regulated electric current through a nichrome resistance wire surrounding the heating tube.

D-2.4 Measurement of Temperature of Tube — The temperature of the tube shall be taken as shown by a thermocouple situated at the level of the centre of the specimen and equidistant from the inner surface of the heating tube and the specimen. The wires of which the thermocouple is made shall be not larger than 1·25 mm and not smaller than 0·45 mm and shall be bare for a length of 25 mm from the junction.

D-3. TEST FOR NON-FLAMMABILITY

D-3.1 The temperature of the tube shall be raised to 00°C and the specimen shall then be readjusted to 300°C within a period of 3 minutes, and this temperature shall be maintained until a period of 5 minutes has elapsed from the time of insertion of the specimen. During this period of 5 minutes, a conical cover at the top shall limit the opening to approximately 6·5 cm^2 while the air intake orifice at the bottom shall be open approximately 065 cm^2. At the end of the period of 5 minutes, the specimen shall be removed from the tube. The material shall not be deemed non-flammable if at any time during the test the specimen flames or gives off flammable vapours in sufficient quantities to ignite at the pilot flame.

APPENDIX E
(*Clause* 10.15)

HEAT RESISTANCE TEST

E-l. The samples shall be kept for 1 hour in an oven, in which a constant temperature of 100 ± 5°C is maintained. At the end of this period, the samples shall satisfactorily pass the following tests:

a) Visual examination,
b) Test on screw terminal, and
c) Test for accidental contact of live parts.

E-2. After the heat treatment, the external housing or other enclosures made of insulating material other than ceramic material shall be subjected to the ball pressure test by means of the apparatus shown in Fig 3. The test shall be carried out as given in **E-2.1** and **E-2.2**.

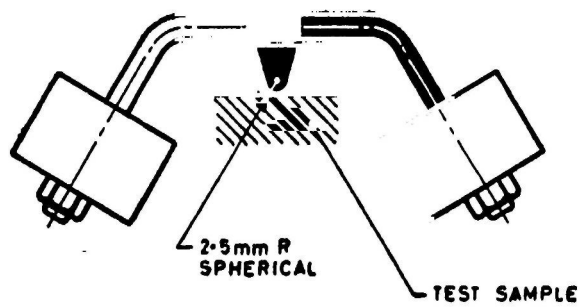


FIG. 3 BALL-PRESSURE APPARATUS

E-2.1 The part to be tested shall be placed in an oven at a temperatuce of 125 ± 5°C. A steel ball of 5 mm diameter shall be kept pressed under the weight of 2 kg on the surface to be tested for 1 hour.

E-2.2 After 1 hour the diameter of the impression made by the ball shall not be more than 2 mm.

AMENDMENT NO. 1 NOVEMBER 1983

TO

IS:3323-1980 SPECIFICATION FOR BI-PIN LAMPHOLDERS FOR TUBULAR FLUORESCENT LAMPS

(First Revision)

Alterations

[*Page 11, clause 10.1.2(d)*] - Substitute the following for the existing item (d) and renumber item (e) and (f) as (f) and (g):

'(d) Insulation resistance dry test(*See* 10.8.2.1),

(e) High voltage test *(see* 10.8.3),'

(*Page 11, clause 10.1.3.1*) - Delete.

(*Page 18, clause C-1.2, line 6*) - Substitute '1000 ± 1 mm' *for* 'l mm'.

(*Page 19, clause C-2.1, line 4*) - Substitute '200 mm' *for* '300 mm'.

Addenda

(*Page 13, clause 10.8.2.2*) - Add the following Note after 10.8.2.2:

'Note - For the purpose of acceptance test, humidity treatment mentioned in 10.8.1 shall not be carried out.'

(*Page 14, clause 10.12*) - Add the following Note after 10.12:

'Note - This test need not be carried out on the finished lampholders If this has been done at the material stage.'

(ETDC 23)

Printed at Dee Kay Printers, New Delhi-110015, India.

BUREAU OF INDIAN STANDARDS

Headquarters.
Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones: 323 0131, 323 3375, 323 9402
Fax: 91 11 3234062, 91 11 3239399, 91 11 3239382

Telegrams : Manaksanstha
(Common to all Offices)

Centra/ Laboratory:	Telephone
Plot No. 20/9, Site IV, Sahibabad Industrial Area, Sahibabad 201010	8-77 00 32
Regional Offices:	
Central: Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	323 76 17
*Eastern : 1/14 CIT Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	337 86 62
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022	60 38 43
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113	235 23 15
tWestern : Manakalaya, E9, Behind Marol Telephone Exchange, Andheri (East), MUMBAI 400093	832 92 95
Branch Offices::	
'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMEDABAD 380001	550 13 48
‡Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road, BANGALORE 560058	839 49 55
Gangotri Complex, 5th Floor, Bhadbhada Road, T.T. Nagar, BHOPAL 462003	55 40 21
Plot No. 62-63, Unit VI, Ganga Nagar, BHUBANESHWAR 751001	40 36 27
Kalaikathir Buildings, 670 Avinashi Road, COIMBATORE 641037	21 01 41
Plot No. 43, Sector 16 A, Mathura Road, FARIDABAD 121001	8-28 38 01
Savitri Complex, 116 G.T. Road, GHAZIABAD 201001	8-71 19 96
53/5 Ward No.29, R.G. Barua Road, 5th By-lane, GUWAHATI 781003	54 11 37
5-8-56C, L.N. Gupta Marg, Nampally Station Road, HYDERABAD 500001	20 10 83
E-52, Chitaranjan Marg, C-Scheme, JAIPUR 302001	37 29 25
117/418 B, Sarvodaya Nagar. KANPUR 208005	21 68 76
Seth Bhawan. 2nd ROOT. Behind Leela Cinema. Naval Kishore Road. LUCKNOW 226001	23 89 23
NIT BUilding, Second FlOOr, Gokulpat Market, NAGPUR 440010	52 51 71
Patliputra Industrial Estate, PATNA 800013	26 23 05
Institution of Engineers (India) Building 1332 Shivaji Nagar, PUNE 411005	32 36 35
T.C. No. 14/1421, University P. O. Palayam, THIRUVANANTHAPURAM 695034	6 21 17

*Sales Office is at 5 Chowringhee Approach, P.O. Princep Street. CALCUTTA 700072	27 10 85
†Sales Office is at Novelty Chambers, Grant Road, MUMBAI 400007	309 65 28
‡Sales Office is at 'F' Block, Unity Building, Narashimaraja Square, BANGALORE 560002	222 39 71

Printed at Dee Kay Printers, New Delhi. India