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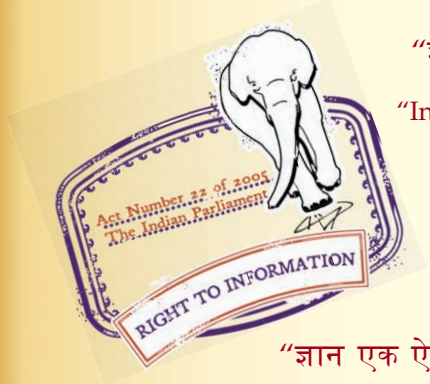

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भारतीय मानक

बेयोनेट लैम्पहोल्डर

(चौथा पुनरीक्षण)

Indian Standard

BAYONET LAMPHOLDERS

(Fourth Revision)

ICS 29.140.10

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

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FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Electric Lamps and Their Auxiliaries Sectional Committee had been approved by the Electrotechnical Division Council.

This standard covers the safety requirements for bayonet lampholders and includes gauges for the control of interchangeability and safety of the cap and holder fit.

NOTE — Safety requirements ensure that lampholders constructed in accordance with these requirements does not endanger the safety of persons, domestic animals or property when property installed and maintained and used in applications for which it was intended.

The thermal characteristics of lampholders are specified by the rated operating temperature (symbol T) which is the highest temperature for which the lampholder is designed.

This standard was originally published in 1958 and subsequently revised in 1967, 1979 and 1987. This revision has been undertaken to bring it in line with International practices. The following changes have been incorporated in this revision:

a) Dimensions essential for purpose of interchangeability and safety have been incorporated for caps; holders and gauges in relevant data sheets.
b) Additional definitions have been included.
c) Sample size for various tests of the standard including general conditions of test in detail have been incorporated.
d) Standard rating of voltage and current have been specified.
e) Classification according to degree of protection, protection against electric shock and resistance to heat added.
f) Screwless terminals have been included including additional types of terminals.
g) Test on general resistance to heat (earlier test for resistance to heat in service) is based on thermal characteristics of lampholders according to rated operating temperature (symbol T), which is the highest temperature for which the lampholder is designed.
h) Additional test for resistance to heat, fire and tracking incorporated.
j) Methods of all the tests given in this standard are more elaborate.

Lampholders covered in this standard are suitable for lamps with bayonet caps of type B15d and B22d. For the sake of convenience data sheets given in this standard have been numbered in line with corresponding IEC 60061-1 'Lamp caps and holders together with gauges for the control of interchangeability and safety — Part 1 : Lamp caps', IEC 60061-2 'Lamp caps and holders together with gauges for the control of interchangeability and safety — Part 2 : Lamp holders' and 60061-3 'Lamp caps and holders together with gauges for the control of interchangeability — Part 3 : Gauges'.

This revision is based on IEC 61184 (1997) 'Bayonet lampholders' issued by the International Electrotechnical Commission (IEC) with the following modifications:

a) Data Sheets for lamp cap, holders and gauges included unlike IEC Publications where reference has been made to relevant IEC Publications. However at a later date as and when Indian Standards are aligned with IEC in respect of lamp cap, holders and gauges on control of interchangeability and safety, similar procedure will be followed.
b) Ambient test conditions changed to 27°C.

(*Continued on third cover*)

Indian Standard

BAYONET LAMPHOLDERS

(Fourth Revision)

1 SCOPE

1.1 This standard applies to bayonet lampholders B15d and B22d for connection of lamps and semi-luminaires to a supply voltage not exceeding 250 V.

As far as it reasonably applies, the standard also covers lampholders, which are wholly or partly integral with a luminaire or intended to be built into appliances.

Independent lampholders, for example, backplate lampholders, not specifically intended for building-in, are submitted to the additional requirements detailed in **4**.

NOTE — Where lampholders are used in luminaires, their maximum operating temperatures are specified in relevant parts of IS 10322.

B15 denotes the cap/holder fit as given in Data Sheets 7004-11 and 7005-16 with the corresponding gauges.

B22 denotes the cap/holder fit as given in Data Sheets 7004-10 and 7005-10 with the corresponding gauges.

2 REFERENCES

The following standards are necessary adjuncts to this standard.

IS No.	*Title*
418 : 2004	Tungsten filament lamps for domestic and similar general lighting puposes (*fourth revision*)
694 : 1990	PVC insulated cables for working voltages up to and including 1 100 V (*third revision*)
2824 : 1975	Method for determining the comparative tracking index of solid insulating materials under moist conditions (*first revision*)
9000 (Part 7/ Sec 1 to 5) : 1979	Basic environmental testing procedures for electronic and electrical items: Part 7 Impact test (Sec 1 to 5 in one volume)
9968 (Part 1) : 1988	Elastomer insulated cables: Part 1 For working voltages up to and including 1 100 V (*first revision*)
10322 (Part 1) : 1982	Luminaries: General requirements
(Part 2) : 1982	Constructional requirements
(Part 3) : 1984	Screw and screwless terminations
(Part 4) : 1984	Methods of tests
11000 (Part 2/ Sec 1) : 1984	Fire hazard testing: Part 2 Test methods, Section 1 Glow-wire test and guidance
11000 (Part 2/ Sec 2) : 1984	Fire hazard testing: Part 2 Test methods, Section 2 Needle flame test
12063 : 1987	Classification of degree of protection provided by enclosures of electrical equipment
15518 (Part 1) : 2004	Safety requirements for incandescent lamps: Part 1 Tungsten filament lamps for domestic and similar general lighting purposes

3 TERMINOLOGY

For the purpose of this standard the following definitions apply.

NOTE — For clarification of some definitions, *see also* Fig. 4.

3.1 Materials

3.1.1 *Plastic Lampholder* — A lampholder, the exterior of which is made wholly of plastic material.

NOTE — The exterior is any part of the lampholder which, when wired and fully assembled and fitted with the testing device shown in Fig. 7, can be touched directly by the standard test finger of IS 12063.

3.1.2 *Ceramic Lampholder* — A lampholder, the exterior of which is made wholly of ceramic material (*see* Note of **3.1.1**).

3.1.3 *Metal Lampholder* — A lampholder, the exterior of which is made wholly or partly of metal (*see* Note of **3.1.1**).

3.2 Means of Fixing

3.2.1 *Cord Grip Lampholder* — A lampholder incorporating a method of retaining a flexible cord by which it may be suspended [*see* Fig. 4(a)].

3.2.2 *Threaded Entry Lampholder* — A lampholder incorporating a threaded component at the point of entry of the supply wires permitting the lampholder

to be mounted on a mating threaded support (formerly called nipple lampholder) [*see* Fig. 4(b)].

3.2.3 *Backplate Lampholder* — A lampholder so designed as to be suitable for mounting, by means of an associated or integral backplate, directly on to a supporting surface or appropriate box [*see* Fig. 4(c)].

3.3 Terminal/Contact Assembly — A part or an assembly of parts which provides a means of connection between the termination of a supply conductor and the contact-making surfaces of the corresponding lamp cap as well as resilient means to maintain contact pressure.

a) Rising type, where the terminal is allowed to rise parallel with the lamp axis on insertion of a lamp cap.

b) Non-rising type, where the terminal is not allowed to rise on insertion of a lamp cap.

NOTE — The terminal and the barrel may be a unique element.

3.4 Union Ring — A cylindrical component which joins together separate external parts of the lampholder.

3.5 Shade Ring — A cylindrical component having an internal thread or other means to engage a corresponding support on the outer shell and intended to carry or retain a shade.

3.6 Skirt (Plastic Lampholders Only) — A component similar to a shade ring but having a longer cylindrical form to extend to the full length of the lampholder body.

3.6.1 *Protective Shield (Plastic Lampholders Only)* — A component similar to a skirt but having a flared open end to protect the user from accidental contact with the lamp cap.

3.7 Dome — Part of a cord grip lampholder or threaded entry lampholder which shields the connecting terminals.

3.8 Barrel — Part of a lampholder which serves for mechanical connection of the lamp cap with the lampholder.

3.9 Lampholder for Building-in — A lampholder designed to be built into a luminaire, an additional enclosure or the like.

3.9.1 *Unenclosed Lampholder* — A lampholder for building-in so designed that it requires additional means, for example, enclosures, to meet the requirements of this standard with regard to protection against electric shock.

3.9.2 *Enclosed Lampholder* — A lampholder for building-in so designed that, on its own, it fulfills the requirements of this standard with regard to protection against electric shock and, if appropriate, IP classification.

3.10 Independent Lampholder — A lampholder so designed that it can be mounted separately from a luminaire and at the same time provide all the necessary protection according to its classification and marking.

3.11 Switched Lampholder — A lampholder provided with an integral switch to control the supply to the lamp.

3.12 Basic Insulation — Insulation applied to live parts to provide basic protection against electric shock.

NOTE — Basic insulation does not necessarily include insulation used exclusively for functional purposes.

3.13 Supplementary Insulation — Independent insulation applied in addition to basic insulation in order to provide protection against electric shock in the event of a failure of basic insulation.

3.14 Double Insulation — Insulation comprising both basic insulation and supplementary insulation.

3.15 Reinforced Insulation — A single insulation system applied to live parts which provide a degree of protection against electric shock equivalent to double insulation under the conditions specified.

NOTE — The term "insulation system" does not imply that the insulation must be one homogeneous piece. It may comprise several layers which cannot be tested singly as supplementary or basic insulation.

3.16 Live Part — A conductive part which may cause an electric shock in normal use. The neutral conductor shall, however, be regarded as a live part.

The test to determine whether or not a conductive part is a live part which may cause an electric shock is given in IS 10322 (Part 2).

3.17 Type Test — A test or series of tests made on a type test specimen for the purpose of checking compliance of the design of a given product with the requirements of the relevant standard.

3.18 Type Test Sample — A sample consisting of one or more similar specimens submitted by the manufacturer or responsible vendor for the purpose of a type test.

3.19 Semi-luminaire — A unit similar to a self-ballasted lamp but designed to utilize a replaceable light source and/or starting device.

3.20 Rated Operating Temperature — The highest temperature for which the lampholder is designed.

3.21 Rated Pulse Voltage — The highest peak of pulse voltages that the holder is able to withstand.

4 GENERAL REQUIREMENTS

4.1 Lampholders shall be so designed and constructed that in normal use they function reliably and cause no danger to persons or surroundings.

In general, compliance is checked by carrying out all the relevant tests specified.

Independent lampholders, not specifically intended for building-in, shall comply with the following requirements as given in IS 10322 (Parts 1 to 4) where these requirements are not covered by the requirements of this standard:

- Classification [*see* **5.1** of IS 10322 (Part 1)]
- Marking [*see* **6** of IS 10322 (Part 1)]
- Construction as appropriate [*see* IS 10322 (Part 2)]
- Protection against electric shock [*see* 21 of IS 10322 (Part 2)]
- Resistance to dust, solid objects and moisture [*see* **2** of IS 10322 (Part 4)]
- Insulation resistance and electric strength (for class II) [*See* **3** of IS 10322 (Part 4)]
- Thermal test [*See* **6** of IS 10322 (Part 4)]

5 GENERAL CONDITIONS FOR TESTS

5.1 Tests according to this standard are type tests.

NOTE — The requirements and tolerances permitted by this standard are related to testing of a type test sample submitted for that purpose. Compliance of the type test sample does not ensure compliance of the whole production of a manufacturer with this safety standard. In addition to type testing, conformity of production is the responsibility of the manufacturer and may include routing tests and quality control.

5.2 Unless otherwise specified, the samples are tested as delivered and installed as in normal use without lamps, at an ambient temperature of 27°C ± 5°C.

5.3 All inspections and tests are carried out on a total of:

- 8 specimens for unswitched lampholders, or
- 11 specimens for switched lampholders,

in the order of the clauses as follows:

- 3 specimens, **4** to **13**;
- 3 specimens, **15** to **19**,
- 3 specimens, **14** (switched lampholder tests only),
- 2 specimens, **20** and **21**.

NOTE — For testing of screwless terminals according to **11.2** separate additional specimens are required. This is also necessary for independent lampholders not specifically intended for building-in (*see* **4**).

5.4 If no lampholder fails in the complete series of tests specified in **5.3**, then lampholders of that type shall be deemed to comply with this standard.

If one lampholder fails in any group in the complete series of tests specified in **5.3**, the lampholders of that type shall be deemed to have failed to comply with this standard, unless that lampholder can be shown to be not representative of normal production or design, in which case a further set of lampholders shall be submitted to the test or tests in that group. Generally, it will be necessary to only repeat the test in which failure occurs. However, if the lampholder fails in the test specified in **15** to **19** inclusive, the tests shall be repeated from the tests of **15** onwards.

An additional type test sample may be submitted, together with the first type test sample, in case one lampholder fails, in which case the additional type test sample shall then be tested and shall only be rejected if a further failure occurs. If there is no failure in this re-test then lampholders of that type shall be deemed to comply with this standard. If the additional type test sample is not submitted at the same time, a failure of one lampholder shall entail a rejection.

If more than one specimen fails in the complete series of tests specified in **5.3** then lampholders of that type shall be deemed to have failed to comply with this standard.

NOTE — In view of the duration of the test procedure, lampholders differing only in detail and having the same constructional principles and materials may be covered by a single series of type tests, subject to agreement between applicant and testing authority.

6 STANDARD RATINGS

6.1 Standard Rated Voltage

For all lampholders rated voltage not exceeding 250 V is allowed.

Lampholders B15d are not intended for use in circuits with ignitors.

Lampholders B22d shall not be used in circuits with ignitors without approval from the lampholder manufacturer.

NOTES

1 From the theoretical point of view the minimum creepage distance required for a holder B22d will result in a clearance sufficient to withstand a pulse voltage of 2.5 kV.

2 The measures required to allow easy contact travel and lamp removal might in some situations, however, be accompanied by unforeseen reduction of the clearance without influence on normal operation (without ignitor) where only the creepage distances are critical.

3 B22d lampholders are specially designed for use in ignitor circuits.

6.2 Standard rated currents are:

— 2 A for lampholders B15,

— 2 A for lampholders B22.

The rated current shall be not less than the standard value, rated currents higher than 2 A are allowed.

Compliance with the requirements of **6.1** and **6.2** is checked by inspection of the marking.

7 CLASSIFICATION

Lampholders are classified:

7.1 According to the material of the exterior:

— lampholders whose exterior is made wholly of plastic material;

— lampholders whose exterior is made wholly of ceramic material;

— lampholders whose exterior is made wholly or partly of metal.

NOTES

1 For definition of "exterior" *see* Note to **3.1.1**.

2 Lampholders with external parts consisting partly of metal and lampholders comprising external parts of insulating material with a conductive outer surface, for example, a metallized outer shell, are considered as metal lampholders.

3 This does not apply to threaded entries and external parts, as for example, a metal shade ring mounted on to the outside of a lampholder of insulating material, which cannot become live even in the case of an insulation fault. Metal lampholders with insulating coverings are considered as metal lampholders.

If in doubt as to whether or not a surface is conductive, two stripe-electrodes 1.5 mm wide, 25 mm long and with a distance of 2 mm from each other are applied to the surface (for example, with silver conductive paint). In accordance with **15.3**, the insulating resistance is measured between the stripes. The surface is considered to be conductive if the resistance is less than 5 MΩ.

7.2 According to degree of protection against solid objects and ingress of water:

— ordinary lampholders,

— drip-proof lampholders.

NOTE — A classification for higher degrees of protection against ingress of water is under consideration.

7.3 According to method of fixing:

— threaded entry lampholders;

— cord grip lampholders;

— backplate lampholders;

— other lampholders.

NOTE — Examples of other lampholders are lampholders provided with a mechanical suspension device, for example, a hook.

7.4 According to type:

— switched lampholders provided with an integral switch to control the supply to the lamp;

— non-switched lampholders.

7.5 According to protection against electric shock:

— enclosed lampholders;

— unenclosed lampholders;

— independent lampholders.

7.6 According to resistance to heat:

— without T marking, suitable for rated operating temperatures up to and including 135°C for B15d lampholders and 165°C for B22d lampholders,

— with Txxx marking, suitable for rated operating temperatures up to and including the temperature marked or declared by the manufacturer. These temperatures shall be not lower than 140°C for B15d lampholders and not lower than 170°C for B22d lampholders,

NOTE — The value of the temperature marking shall be increased by steps of 10°C.

— with T1 marking, suitable for temperatures on the lamp cap up to and including 165°C;

NOTE — The continued use of T1 lampholders is subject to review.

— with T2 marking, suitable for temperatures on the lamp cap up to and including 210°C;

8 MARKING

8.1 Lampholders shall be marked with:

— rated voltage, in volts,

— rated operating temperature Txxx, T1 or T2, if applicable (*see* **7.6**).

In the first version the letter T shall be followed by the value of the rated operating temperature in degree Celsius;

— symbol for nature of supply, if required (for switched lampholders only);

— for lampholders whose exterior is made wholly of ceramic material, information on the rated operating temperature, if applicable, shall either be marked on the lampholder or given in the manufacturer's catalogue;

— mark of origin (this may take the form of a trade-mark, or the manufacturer's or responsible vendor's name or identification mark);

NOTE — The mark of origin is not intended to mean the country of origin.

— either a unique catalogue number or an identifying reference;

NOTE — An identifying reference may include numbers, letters, colour, etc, to identify the lampholder by reference to the manufacturer's or responsible vendor's catalogue or similar literature.

— rated current, in amperes, if greater than 2 A;
— IP number, if other than ordinary, for degree of protection against ingress of water (*see* 7.2);
— for single-pole switched lampholder the switched pole shall be identified;
— Country of manufacture.

8.2 If symbols are used for current and voltage, A shall denote amperes and V volts.

Alternatively, figures alone may be used, the figure for the rated current being marked before or above that for the rated voltage and separated from the latter by a line.

Therefore the marking for current and voltage may be as follows:

$$4\ \text{A}\ 250\ \text{V or } 4/250 \text{ or } \frac{4}{250}$$

The symbol for dc shall be —·

The symbol for protection against ingress of water shall, for drip-proof lampholders, be IPX1.

NOTE — Where X is used in an IP number; it is intended to indicate a missing numeral in the symbol but both the appropriate numerals in accordance with IS 12063 shall be marked on the lampholder.

8.3 The marking of degree of protection against ingress of water shall be on the outside of the lampholder.

8.4 An earthing terminal shall be indicated by the symbol ⏚

This symbol shall not be placed on screws, removable washers or other easily removable parts.

Compliance is checked by inspection.

NOTE — Metal lampholders intended for retail sale shall have the following warning notice attached or incorporated in the associated packaging:

"THIS LAMPHOLDER MUST BE EARTHED"

8.5 Where the terminal size specified in **11.2** is not complied with, the relevant value, or values in case of a range, shall be shown in mm^2 followed by a small square (for example, 0.5 □)

For unenclosed lampholders such marking is not required but relevant information shall be given in the manufacturer's mounting instructions.

8.6 Marking shall be durable and easily legible.

Compliance with the requirements of **8.1** to **8.5** shall be checked by inspection, and by trying to remove the marking by rubbing lightly for 15 seconds with a piece of cloth soaked with water and for a further 15 seconds with a piece of cloth soaked with petroleum spirit. After the tests the marking shall be still legible.

NOTE — The petroleum spirit used should consist of a solvent hexane with a content of aromatics of maximum 0.1 volume percentage, a kauri-butanol value of 29, an initial boiling-point of approximately 65°C, a dry-point of approximately 69°C and a specific density of approximately 0.68 g/cm^3.

8.7 A threaded entry lampholder without means for restraining the flexible cord, intended for retail sale, shall have the following warning notice attached or incorporated in the associated packaging.

"Do not connect this lampholder to a flexible cord which may be subject to tension in normal use, unless means are provided to relieve the conductors from strain and to protect the insulation."

8.8 The lampholders may also be marked with the Standard Mark.

8.8.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act,* 1986 and the regulations made there under. The details of conditions under which a license for the use of the Standard Mark may be granted to the manufacturers or producers may be obtained from the Bureau of Indian Standards.

9 DIMENSIONS

9.1 Lampholder dimensions shall comply with the Data Sheets 7005-10 and 7005-16.

Compliance is checked by measuring in conformity with the Data Sheets 7005-10 and 7005-16 as applicable and by application of the specified gauges as given in the respective Data Sheets.

Lampholders designed for use with shade support devices shall comply with the dimensional requirements of Fig. 8.

Compliance is checked by measurement.

9.2 The threaded entries of lampholders shall be

provided with one of the following screw threads in accordance with Fig. 13.

— lampholders B15 : M10 × 1;
— lampholders B22 : M10 × 1 or M13 × 1.

NOTE — The threaded entry M10 × 1 is mainly intended for the internal wiring of luminaires.

Compliance is checked by means of the gauges in accordance with Fig. 14. In case of doubt, the gauge is introduced into the entry by applying a torque of 0.5 Nm.

NOTE — Other thread sizes are permissible for lampholders not intended for retail sale.

9.3 The dimensions of threaded entries and set screws, if any, shall not be less than the values shown in Table 1.

Table 1 Dimensions of Threaded Entries and Set Screws

(*Clause* 9.3)

Nominal Thread Diameter	M10 × 1 M13 × 1 mm
Length of threaded entry	
— metal entry	3.0
— entry of insulating material	5.0
Diameter of set screw, if any	
— screw with head	2.5
— screw without head	3.0

A negative deviation of 0.15 mm from the nominal value for thread diameter is allowed.

Compliance is checked by measurement.

NOTE — If it is necessary to take the lampholder apart in order to check compliance with the requirements of **9.2** to **9.3**, such checking is done after the tests of **13**.

10 PROTECTION AGAINST ELECTRIC SHOCK

10.1 Lampholders shall be so designed that, when fully assembled, live parts of the lampholder are not accessible when the lampholder is fitted with the testing device shown in Fig. 7.

NOTE — The use of a skirt or protective shield (*see* **3.6** and **3.6.1**) is optional. An example of a protective shield is shown in Fig. 9.

For independent and enclosed lampholders compliance shall be checked by the application of the standard test finger in accordance with IS 12063.

This test finger is applied in every possible position with a force not exceeding 10 N, an electrical indicator being used to show contact with live parts. It is recommended that a voltage of not less than 40 V is used.

Independent lampholders and enclosed lampholders are mounted as in normal use, for example, on a threaded support or on a supporting surface or the like.

Unenclosed lampholders are tested only after appropriate installation in a luminaire or other additional enclosure. For these reasons such lampholders are not for retail sale.

10.2 The construction shall be such that no metal parts of the lampholder other than the terminals and contact mechanism shall become live in normal service either before, during or after insertion of the lamp.

Compliance is checked by inspection.

10.3 Parts providing protection against accidental contact with live parts shall, when correctly assembled, have sufficient mechanical strength to withstand such forces as may arise during removal and replacement as may be necessary to fit supply cords or cables.

They shall also withstand the normal stresses arising from the fitting of corresponding normal lamps and appropriate lamp shades.

It shall be possible to remove and replace, using a reasonable degree of force corresponding to normal use, a corresponding normal lamp and shade, or similar device if fitted, without removing those parts providing protection against accidental contact with live parts.

Compliance is checked by inspection and by the tests of **16.3** which shall be repeated following the test of **19.1**

10.4 External parts of drip-proof lampholders shall be of insulating material, with the exception of threaded entries and shade carrier rings, which cannot become live in the event of a fault.

Lacquer or enamel is not deemed to provide adequate protection for the purpose of this clause.

Compliance is checked by inspection.

NOTE — Parts which are separated from live parts by double or by reinforced insulation are considered as parts which cannot become live in the event of a fault.

11 TERMINALS

11.1 Lampholders shall be provided with at least one of the following means of connection:

— screw-type terminals,
— screwless terminals,
— tabs or pins for push-on connections,

— posts for wire wrapping,

— soldering lugs,

— connecting leads (non-rewirable tails).

Compliance is checked by inspection.

11.2 Terminals shall permit the connection of conductors having the following nominal cross-sectional areas unless otherwise specified in the manufacturer's mounting instructions or marked on the lampholder (*see* **8.5**);

— 0.5 mm² to 1.0 mm², for lampholders B15d and B22d with M10×1 threaded entry and those with cord grip;

— 0.5 mm² to 2.5 mm² for other B22d lampholders.

Compliance is checked by inspection, by fitting conductors of the smallest and largest cross-sectional area specified and by the tests of **17**.

For cord grip lampholders, lampholders B15d and B22d with M10×1 threaded entry, flexible conductors are used, in all other cases the conductors are of the solid type. Threaded entry lampholders are tested on a screwed conduit.

11.3 Terminals shall be of the screw type or the method of connection shall be at least equivalent.

Screw type terminals shall have an ISO (metric) thread or a thread comparable in pitch and mechanical strength and shall otherwise comply with IS 10322 (Part 3).

Terminals of the pillar type shall have dimensions not less than those shown in Table 2.

Table 2 Dimensions of Pillar Type Terminals

(*Clause* 11.3)

Lampholder	Minimum Nominal Thread Diameter mm	Minimum Diameter Conductor Hole mm
B22	2.5	2.5
B15	2.5	2.5 (*see* Note)

NOTE — The diameter of the hole shall be not more than 0.6 mm larger than the diameter of the screw.

The length of the threaded part of the terminal screw shall be not less than the sum of the diameter of the hole for the conductor and the length of thread in the pillar.

NOTE — In order to minimize damage to the conductor, the screw should have a slightly rounded end, and the wall of the hole (against which the screw clamps the conductor) should be unbroken.

Screwless terminals shall be considered equivalent to screw type terminals when complying with IS 10322 (Part 3). Lampholders, unless intended for sale to luminaire or other equipment manufacturers, shall be provided with terminals which will be equally satisfactory with both rigid (solid or stranded) conductors and flexible cables or cords.

Compliance is checked by inspection and measurement.

11.4 Terminals shall be so located that, after correct fitting of the wires, there is no risk of accidental contact between live parts and accessible metal parts, or moving parts of a switch, before, during and after operation.

Compliance is checked by inspection and by the following test:

The insulation is removed over a length of 4 mm from the end of a flexible conductor having the minimum nominal cross-sectional area specified in **11.2**. One wire of the stranded conductor is left free and the remainder are fully inserted into and clamped in the terminal of the lampholder mounted and installed as in normal use (locking screws tightened, etc.)

The free wire is bent, without tearing the insulation back, in every possible direction, but without making sharp bends around barriers.

The free wire of a conductor connected to a live terminal shall not touch any metal part which is accessible, or moving parts of a switch, and that of a conductor connected to an earthing terminal shall not touch any live part.

If necessary, the test is repeated with the free wire in another position.

NOTE — The prohibition against making sharp bends around barriers does not imply that the free wire shall be kept straight during the test. Sharp bends are, moreover, made if it is considered likely that such bends can occur during the normal assembly of the lampholder.

11.5 The requirements of **11.3** do not apply to lampholders intended to be factory-mounted in luminaires and which are provided with connecting leads (non-rewirable tails), tab-terminals or equally effective means.

Connecting leads (non-rewirable tails) shall be connected to the lampholders by soldering, welding, crimping or by any other equivalent method.

Leads shall consist of insulated conductors.

The insulation of the leads shall be at least equal in mechanical and electrical properties to those specified

in IS 694 or IS 9968 (Part 1) or comply with requirements of **19** of IS 10322 (Part 2).

Insulation of the free end of the leads may be stripped.

Fixing of the leads to the lampholders shall withstand the mechanical forces that may occur in normal use.

Compliance is checked by inspection and by the following test, which is made after the test of **19.2** on the same three specimens.

Each connecting lead is subjected to a pull of 20 N, applied without jerks for 1 min in the most unfavourable direction.

During the test, the leads shall not move from their fixing.

After the test, the lampholders shall show no damage within the meaning of this standard.

12 PROVISION FOR EARTHING

12.1 If provision is required for earthing a lampholder, the means adopted shall not interfere with clearance or creepage distance or with the normal functioning of the lampholder. For metal lampholders, the earth terminal or other means of earthing shall be in effective electrical contact with all exposed non-current-carrying metal parts.

Metal parts of the cord anchorage, including clamping screws, shall be insulated from the earthing circuit.

Compliance is checked by inspection.

12.2 Earthing terminals shall comply with the requirements of **11**.

Their clamping means shall be such that it shall not be possible to loosen screw terminals without the use of a tool or screwless terminals unintentionally by hand.

Compliances is checked by inspection and by the tests of **11**.

NOTE — In general, the designs commonly used for current-carrying terminals (complying with the requirements of this standard) provide sufficient resilience to comply with the latter requirement; for other designs special provisions, such as, the use of an adequate resilient part which is not likely to be removed inadvertently, may be necessary.

12.3 Metal lampholders intended to be earthed shall be so designed that all accessible external metal parts can be connected electrically to earth, the method of connection depending upon the intended method of installation of the lampholder.

This requirement may be met by the use of an earthing terminal or other particular provision for the connection of an independent earth continuity conductor. This does, however, not preclude the use of other means by earthing continuity, such as, the nipple, the backplate, the shade ring or other means for attaching the lampholder to earthed parts of the luminaire.

NOTE — Lampholders intended to be earthed but not provided with an earthing terminal or with connecting leads are not for retail sale.

Accessible metal parts of lampholders without earthing terminal which may become live in the event of an insulation fault shall allow reliable earthing. There shall be earth continuity between the outer shell and dome unless the outer shell is screened from live parts by double or reinforced insulation.

NOTE — For the purpose of this requirement, small isolated metal screws and the like for fixing bases or covers are not deemed to be accessible parts which may become live in the event of an insulation fault.

Compliance is checked by the following test:

Lampholders provided with an earthing terminal are fitted with a rigid conductor of the smallest cross-sectional area for which the lampholder is intended. In case the earth continuity between outer shell and dome has also to be checked, the coupling between these parts shall be tightened with a torque equivalent to the values given under **16.3**.

Immediately after the electric strength test of **15.3**, the resistance between the means of earthing and the dome (outer shell) is measured. In the case of lampholders provided with an earthing terminal this is done between the point where the conductor leaves the earthing terminal and the dome (outer shell).

In the case of lampholders without an earthing terminal this is done between that area of the lampholder where it is earthed in the luminaire and the dome (outer shell).

A current of at least 10 A, derived from a source with a no-load voltage not exceeding 12 V, shall be passed for 1 min between the earthing terminal or earthing contact and each of the accessible metal parts in turn.

The voltage drop between the earthing terminal or earthing contact and the accessible metal part shall be measured and the resistance calculated from the current and the voltage drop. In no case shall the resistance exceed 0.1Ω.

12.4 The metal of earthing terminals shall be such that there is no risk of corrosion resulting from contact with the copper of the earthing conductor.

The screw or the body of the earthing terminal shall be of brass or other material no less resistant to corrosion, and the contact surface shall be bare metal.

Compliance is checked by inspection.

NOTE — The risk of corrosion is particularly great when copper is in contact with aluminium.

13 CONSTRUCTION

13.1 The contact-making faces shall be smooth and

so shaped at their edges that they do not prevent the easy insertion and removal of a corresponding lamp.

The contact profile shall be in accordance with relevant Data Sheet 7005-10 (B22) or 7005-16 (B15) as applicable.

Associated resilient means shall provide adequate contact force. The contact force for each contact shall comply with the values shown in Table 3.

Table 3 Contact Force Values of Contacts

(*Clause* 13.1)

Rated Current A	Contact Force (N)	
	Min	*Max*
≤ 4	2.5	15
> 4	5	20

Compliance is checked by inspection and by measurement in accordance with Data Sheet 7005-10 or 7005-16 as applicable.

The contact force is checked by means of the gauges given in Data Sheet 7006-15A (B22d) and 7006-15B (B15d).

This test shall be repeated following the test of **19.2**.

13.2 The various parts of a lampholder shall be reliably connected together. Devices for fixing shades shall be so designed that the lampholder will not be dismantled by rotating the shade ring.

In cord grip or threaded entry lampholders where protection against accidental contact with live parts is provided by a dome screwing directly on to a body, or by a dome or other parts secured by a union ring, such parts shall be attached by at least one and three-quarter turns of thread.

Compliance is checked by inspection and by the tests specified in **16.3**.

13.3 Where provision is made for a screwed type of shade ring, the outer edge of the ring shall be designed to facilitate turning by hand.

Compliance is checked by inspection.

13.4 Where a union ring is used it shall be designed to facilitate turning by hand. It shall retain the parts of the lampholder in concentric positions and the design shall be such as to prevent relative rotation of those parts.

Compliance is checked by inspection.

13.5 If the construction incorporates a separate interior member which supports the current-carrying parts, it shall be keyed in such a way as to prevent rotation with respect to the other parts of the lampholder.

Compliance is checked by inspection.

13.6 There shall be adequate space for the supply wires in the dome of the lampholder. Parts of the lampholder with which insulated conductors may come into contact shall have no sharp edges or a shape likely to damage the insulation.

Threaded entry lampholders with a dome shall be provided with means to prevent the conduit entering too far into the dome.

Such means can either be part of the lampholder or be provided by the design of a luminaire.

NOTE — If such means are provided by the design of a luminaire, their efficiency cannot be checked when testing the lampholder; such a check should be made during testing of the luminaire. Such lampholders are not intended for retail sale.

Compliance is checked by inspection and

- for cord-grip lampholders, B15d lampholders and B22d lampholders with M10 × 1 thread, by fitting cables or cords of the largest cross-sectional area according to **11.2**; and
- for other B22d lampholders, by fitting conductors with a cross-sectional area one size less than the specified maximum cross-sectional area.

For cord-grip lampholders, an ordinary sheathed flexible cord is used. In all other cases two or three PVC insulated single-core cables are used.

For threaded entry lampholders, the dome of the lampholder is screwed on to a conduit having a length of about 100 mm. The cables then are introduced into the conduit and dome, and clamped at the free end of the conduit.

The ends of the cables, after having been prepared in the usual manner, are cut to a length just sufficient to make connection possible, and connected to the terminals of the lampholder. The clamping on the conduit is removed and the cables and the body are moved along a distance of 10 mm in the direction of the conduit.

After this, the cables are again clamped at the free end of the conduit and the lampholder is assembled.

After dismantling, the cables and cords shall not be damaged.

NOTE — The requirement concerning the sharp edges is not meant for the screw ends of threaded entries if they are not in contact with the wires when the lampholder is mounted on a conduit.

In case of doubt with regard to the means to prevent the conduit entering too far into the dome of a threaded

entry lampholder, the lampholder is fixed, as in normal use, to an appropriate nipple or conduit and is then subjected for 1 min in a clockwise direction to the following torque:

— 1.0 Nm for threads M10 × 1; and

— 1.3 Nm for threads M13 × 1.

After this test the nipple or conduit shall not have entered into the space provided for the supply wires in the dome of the lampholder and the lampholder shall not show any change impairing its further use.

13.7 It shall be possible to lock the threaded entry on the conduit. Such device can either be part of the lampholder or be provided by the design of a luminaire.

Except for angle lampholders, it shall be possible to operate the locking device from the inside, if provided as part of the lampholder.

NOTE — If such means are provided by the design of a luminaire, their efficiency cannot be checked when testing the lampholder, such a check should be made during testing of the luminaire. Such lampholders are not intended for retail sale.

Compliance is checked by inspection and, for lampholders having an integral locking device, by the test of **16.2**.

13.8 Cord-grip lampholders shall be provided with a device allowing the lampholder to be so fixed to a flexible cord that the conductors are relieved from strain, including twisting, where they are connected to the terminals, and that the outer covering of the cord is gripped in the lampholder and protected from abrasion.

It shall be clear how the relief from strain and the prevention of twisting is intended to be effected.

It shall not be possible to push the cord into the lampholder to such an extent that the cord is subjected to undue mechanical or thermal stress.

Makeshift precautions, such as, tying the cord into a knot or tying the end with string, are not permissible.

The device shall be of insulating material or be provided with a fixed insulating lining, if otherwise an insulation fault on the cord could make accessible metal parts live.

The design shall be such that the device:

— has at least one part fixed to or integral with the lampholder;

— is suitable for the different types of flexible cord which may be connected to the lampholder;

— does not exert excessive pressure on the cord;

— is unlikely to be damaged when it is tightened or loosened as in normal use.

The device shall be suitable for flexible cords as specified in IS 694 or IS 9968 (Part 1).

Compliance is checked by inspection and by the following test:

The lampholder is fitted with one of the flexible cords mentioned above, the device for strain and twist relief being appropriately used. The conductors are introduced into the terminals and the terminal is slightly tightened so that the conductors cannot easily change their position. After this preparation, it shall not be possible to push the cord further into the lampholder.

The flexible cord is then subjected 100 times to a pull of the appropriate value shown in Table 4 for duration of 1 s each. The pull shall not be applied in jerks.

Immediately afterwards, the flexible cord is subjected for a period of 1 min to a torque as specified in Table 4 applied as close as is practical to the cord entry in the most unfavourable direction.

The lampholders are tested with each of the appropriate types of cord, as specified above, complying with IS 694 or IS 9968 (Part 1).

Table 4 Value of Torque for Flexible Cord

(*Clause* 13.9)

Total Nominal Cross-Sectional Area of All Conductors Together mm²	Pull N	Torque Nm
Up to and including 1.5	60	0.15
Over 1.5 up to and including 3	60	0.25
Over 3 up to and including 5	80	0.35
Over 5 up to and including 8	120	0.35

The test is made first with conductors of the smallest cross-sectional area specified in **11.2**, and then with conductors of either the largest cross-sectional area allowed by the suspending device or the largest cross-sectional area specified in **11.2**, whichever is the smaller.

During the test no damage shall be caused to the flexible cord by the device for strain and twist relief. At the end of the test, the cord shall not have been displaced by more than 2 mm, and the ends of the conductors shall not have been noticeably displaced in the terminals.

In order to enable the displacement to be measured, before starting the test a mark is made on the cord under strain at a distance approximately 20 mm from the strain-relieving device. At the end of the test, the displacement of this mark in relation to the strain-relieving device is measured while the cord is still under strain.

13.9 Suspension devices of enclosed and independent lampholders shall have no accessible metal parts which can become live, even in the event of a fault in the lampholder. Moreover, suspension devices intended to be screwed into threaded entry lampholders shall comply with the requirements of **13.8**.

13.10 Where provision for cable entry/entries is made on the accessible external surface of a backplate lamphloder it shall allow the introduction of cable covering, conduit or trunking etc, as appropriate, so as to afford mechanical protection for at least a distance of 1 mm measured from the accessible external surface of the backplate lampholder.

Compliance is checked by measurement and by the installation test of **11.2**.

NOTE — To meet this requirement, use may be made of knock-outs placed side by side or concentrically.

13.11 The base of backplate lampholders, other than those specifically intended for building-in, shall be suitable for fixing by means of screws to accommodate a fixing screw of M4 size.

Compliance is checked by means of a gauge according to Fig. 3. For this test, the plug is inserted into the hole from the back and the bush is placed on the plug from the front. The bush shall enter the recess of the screw head.

13.12 Insulating barriers forming an integral part of the lampholder shall be provided between the terminals if these are of the rising type to prevent inadvertent contact between conductors at different potentials. This applies whatever the range of movement of the terminals.

Terminals of the rising type are not permitted in backplate lampholders other than those specifically intended for building-in.

Compliance is checked by inspection and by the tests of **18**.

13.13 Lampholders shall not be fitted with a socket-outlet.

Compliance is checked by inspection.

14 SWITCHED LAMPHOLDERS

14.1 Switches are allowed only in ordinary lampholders.

Compliance is checked by inspection.

14.2 The lampholder shall be so constructed that accidental contact between moving parts of the switch and the supply conductors is prevented.

Compliance is checked by the test of **11.4** and by a manual test.

14.3 The switch operating member shall be effectively insulated from live parts and, if broken or damaged, shall not expose live parts.

Compliance is checked by inspection and by the tests of **14.4**.

14.4 Switches in lampholders shall be capable of making and breaking a load comprising a general lighting service (GLS) tungsten filament lamp at rated voltage.

Compliance is checked by the following tests:

For lampholder without temperature marking or marked Txxx, the switch is tested in a heating cabinet with ac ($\cos \varphi = 0.6 \pm 0.05$) at 1.1 times rated voltage and 1.25 times rated current.

The switch shall be operated in a normal manner for 200 switch movements at a rate of 30 movements per minute at regular intervals.

The switch is then tested with ac ($\cos \varphi = 1$) at rated voltage and rated current.

The switch shall be operated in a normal manner for 20,000 switch movements at a rate of 30 movements per minute at regular intervals.

Switches in lampholders B15d without temperature marking shall be tested for an operating temperature of 100°C and switches in lampholders B22d without temperature marking shall be tested for an operating temperature of 125°C.

Switches in lampholders with Txxx marking shall be tested for operating temperatures as follows:

— lampholders B15d: the temperature marking on the lampholder –40°C;

— lampholders B22d: the temperature marking on the lampholder –50°C;

For T1 and T2 rated lampholders, the lampholder shall be mounted in a shade and placed in a draught-free enclosure as described in **19.5**. Suitable access apertures may be made to enable the switch to be operated, but such apertures shall be as small as possible to maintain the required testing conditions.

Voltage adjustments shall be made as described in item (a) of **19.6**, and the temperature of the lamp cap shall be maintained within the specified T1 or T2 testing temperature limits for 2 h immediately before the switching test.

The switch shall then be operated in a normal manner for 20,000 switch movements at a rate not exceeding 12 movements per minute at regular intervals.

At the conclusion of the test, the lampholders shall

withstand the tests specified in **15.3** for insulation resistance and electric strength and they shall be in satisfactory working order.

15 MOISTURE RESISTANCE, INSULATION RESISTANCE AND ELECTRICAL STRENGTH

15.1 The enclosure of drip-proof lampholders shall provide the necessary degree of protection against ingress of water.

Inlet openings of drip-proof lampholders shall allow the connection of the supply wires in such a way that drops of water running along the wires cannot reach the inside of the lampholder.

Compliance is checked by the following test:

Lampholders are fitted with the cables or conduits for which they are designed.

Backplate lampholders are mounted on a vertical surface with one drain-hole, if any, open and directed downwards. Other lampholders are mounted with their lamp entry pointing vertically downwards.

The test is made by means of equipment, the principle of which is shown in Fig. 19; the rate of discharge shall be reasonably uniform over the whole area of the apparatus and shall produce a rainfall of between 3 mm and 5 mm of water per minute, falling vertically from a height of 200 mm measured from the lampholder. The test duration shall be 10 min. The water used for the test shall be at a temperature of 22°C ± 5°C.

Immediately after this treatment, the lampholder shall withstand the same electric strength test as specified in **15.3**, and inspection shall show that water has not entered to an appreciable extent.

NOTE — It is considered that water has entered to an appreciable extent if it has come into contact with live parts.

15.2 Lampholders shall be proof against humid conditions which may occur in normal use.

Compliance is checked by the humidity treatment described in this sub-clause followed immediately by the measurement of the insulation resistance and by the electric strength test specified in **15.3**.

Cable entries, if any, are left open, if knock-outs are provided one of them is opened.

The humidity treatment is carried out in a humidity cabinet containing air with a relative humidity maintained between 91 percent and 95 percent.

The temperature of the air, at all places where samples can be located, is maintained within 1°C of any convenient value t between 25°C and 35°C.

Before being placed in the humidity cabinet the specimens are brought to a temperature between t°C and $(t + 4)$°C.

Lampholders are kept in the cabinet during:

— 2 days (48 h) for ordinary lampholders;

— 7 days (168 h) for IPX 1 drip-proof lampholders.

NOTE — In most cases, the specimens may be brought to the specified temperature by keeping them at this temperature for at least 4 h before the humidity treatment.

Relative humidity between 91 percent and 95 percent can be obtained by placing in the humidity cabinet a saturated solution of sodium sulphate (Na_2SO_4) or potassium nitrate (KNO_3) in water having a sufficiently large contact surface with the air. In order to achieve the specified conditions within the cabinet, it is necessary to ensure constant circulation of the air within and, in general, to use a cabinet which is thermally insulated.

After this treatment, the lampholders shall show no damage within the meaning of this standard.

15.3 The insulation resistance and the electric strength shall be adequate:

a) between live parts of different polarity;

NOTE — For the purposes of this sub-clause, switch contacts in the open position are considered to be live parts of different polarity;

b) between such live parts and external metal parts, including fixing screws of base or enclosure of backplate lampholders and accessible assembling screws; and

c) between the inner and outer surface of the lining of metal enclosures, if such accessible lining is required to give protection in the case that the distance between any live part and the metal of the enclosure is smaller than that required under item 2 of Table 8.

Compliance is checked by an insulation resistance test and an electric strength test, which are applied immediately after the humidity treatment of **15.2** in the humidity cabinet, or in the room in which the specimens were brought to the prescribed temperature.

The insulation resistance is measured with a dc voltage of approximately 500 V, the measurement being made 1 min after application of the voltage.

The insulation resistance is measured consecutively:

— between live parts of different polarity;

— between such live parts connected together and external metal parts, fixing screws of the

base and of the enclosure, accessible assembling screws and metal foil in contact with the surface of external insulating parts;

Both of the measurements prescribed above are made first on the lampholder in which a test cap as shown in Fig. 10 or 11 is inserted and then on an empty lampholder.

— between accessible metal parts and metal foil in contact with the inner surface of insulating lining, if any.

The switch, if any, is placed in the "on" position.

The insulation resistance shall not be less than 4 MΩ.

Care shall be taken to ensure that the insulating material of the test cap will not influence the results.

Immediately after the insulation resistance test, an ac voltage of substantially sine wave form, with a frequency of 50 Hz and with a r.m.s. value of $(2U + 1\,000)$ V (where U is the rated voltage) is applied for 1 min between the points prescribed. Additionally, for switched lampholders, this voltage shall be applied between live parts and other metal parts with the switch both closed and open.

Initially not more than half the prescribed voltage is applied, then it is raised rapidly to the full value.

No flashover or breakdown shall occur.

NOTE — The high-voltage transformer used for the test must be so designed that, when the output terminals are short-circuited after the output voltage has been adjusted to the appropriate test voltage, the output current is at least 200 mA.

The overcurrent relay shall not trip when the output current is less than 100 mA.

Care is taken that the r.m.s. value of the test voltage applied is measured within ± 3 percent.

Glow discharges without drop in voltage are ignored.

16 MECHANICAL STRENGTH

16.1 Lampholders shall have sufficient strength to withstand the stresses of normal operation in service.

NOTE — Brackets or similar devices for the mounting or attachment of lampholders are not covered by the requirements of this clause. The mechanical strength of such devices shall comply with the requirements of the standard for the equipment for which the lampholder is intended.

Compliance is checked by the following tests:

The lampholder shall be supported in any convenient manner with the open end pointed vertically downwards. A mass of 5 kg shall be suspended evenly from the bayonet slots by means of a loading device as shown in Fig. 1, so that the lampholder plungers will not make contact with it.

After 1 h there shall be no deterioration in the lampholder, such as, would affect its normal use.

16.2 Threaded entry lampholders shall be so designed that mounting by means of the attachment thread is effective and will cause no damage to the lampholder rendering it unsafe in normal use.

Compliance is checked by the following test:

The lampholder is fixed, as in normal use, to an appropriate conduit and is subjected to the following torque:

— 1.2 Nm for B15d lampholders;

— 2.0 Nm for B22d lampholders.

The torque is applied for 1 min in a clockwise direction.

If the lampholder is fitted with a locking device with respect to the conduit, its efficiency shall be checked by repeating the above test for 1 min in an anti-clockwise direction, the set screws being tightened with a torque as specified in **17**. If, however, the lampholder loosens, the set screw is further tightened with the smallest torque necessary to prevent the lampholder from loosening during this test. The minimum value of the torque applied should be noted for the purpose of the test of **17**.

NOTE — It is practical to increase the torque by increments of about 20 percent during this test.

At the conclusion of the test there shall be no deformation, damage to parts or loosening of the lampholder such as would render it unsafe in normal use.

16.3 External parts of lampholders when correctly assembled shall have adequate mechanical strength.

Compliance is checked by inspection by any of the following tests:

Where protection against accidental contact with live parts is provided by a dome screwing directly on to a body or a dome secured by a union ring, or by other screwed parts of the exterior, such parts shall be removed and replaced by hand 10 times, tightening each time with a torque of:

— 0.75 Nm for B15d domes and union rings,

— 1.25 Nm for B22d domes and union rings,

— (0.03 × diameter) Nm for other screwed parts of the exterior depending on their nominal outside diameter in millimetres.

NOTE — The constant of 0.03 is derived from the test torques for domes and union rings of commonly known dimensions, and will enable relative torques to be calculated for components of other dimensions.

Where screwed shade rings or equivalent parts are provided, they shall be removed and replaced by hand

10 times, tightening each time with half the torque specified for domes and union rings.

Where protection against accidental contact with live parts is provided by a construction not assembled by the rotation of co-operating threaded components, such a construction shall be checked by dismantling and assembling the external protective parts 10 times and, after each assembly, by applying, between the bayonet slots and such parts, an axial torque of the same value as specified for domes and union rings. The torque shall be applied in a clockwise and in an anti-clockwise direction each time, sustaining the torque for 5 s upon each application.

During the tests, no change impairing the further use of any part shall have occurred and the protection against accidental contact with live parts shall not have been impaired.

16.4 The strength of the connection between dome and threaded entry shall be checked as indicated in Fig. 2.

The specimen is fixed by the threaded entry in a horizontal position.

A device having the maximum dimensions acceptable for caps, and with other dimensions according to Fig. 2, is inserted into the lampholder and fixed as shown in the drawing. It is loaded for 1 min with a mass, as indicated in Fig. 2. The end of the mandrel shall not sag more than 5 mm.

The specimen shall not be damaged. If a permanent deformation occurs, the specimen is forced into the original position and the test is repeated five times, after which the specimen shall show no damage impairing its normal use.

16.5 The mechanical strength of external parts of insulating material with or without a conductive outer surface is checked by means of the pendulum hammer test specified in IS 9000 (Part 7/Sec 1 to 5), subject to the following details:

a) *Method of Mounting*:

The specimen shall be held against plywood sheet of the mounting fixture in such a manner that its axis is horizontal and parallel to the support and its outer edge touches the plywood.

NOTE — For lampholders different from the cylindrical shape, the condition of the axis parallel to the plywood sheet may be obtained by adequate pinewood shimmings.

b) *Height of Fall*:

The striking element shall fall from one of the heights given in Table 5.

Table 5 Height of Fall of Striking Element
(*Clause* 16.5)

Material	Height of Fall
Ceramic parts	100 ± 1
Parts of other material	150 ± 1.5

c) *Number of Impacts*:

Four blows shall be applied to points equally divided over the circumference of the external parts of the lampholder excluding the area of the bayonet slots.

d) *Pre-conditioning*: Not applicable.

e) *Initial Measurements*: Not applicable.

f) *Attitudes and Impact Locations*: *See* (c) above.

g) *Operating mode and functional monitoring*:

The samples shall not operate during impact:

h) *Acceptance and Rejection Criteria*:

After the test, the sample shall show no serious damage within the meaning of this standard, in particular:

1) live parts shall not have become accessible,

Damage to the lampholder which does not reduce creepage distances or clearances below the values specified in **18** and small chips which do not adversely affect the protection against electric shock or ingress of water shall be ignored;

2) cracks not visible to the naked eye and surface cracks in fibre-reinforced moldings and the like shall be ignored.

Cracks or holes in the outer surface of any part of the lampholder shall be ignored if the lampholder complies with this standard even if that part is omitted.

j) *Recovery*: Not applicable.

k) *Final Measurements*: *See* (h) above.

NOTE — The mechanical strength of lampholders used in luminaries or other equipment may be checked by means of the spring hammer specified in IS 9000 (Part 7/Sec 1 to 5) or **5.2** of IS 10322 (Part 4). In IS 10322 (Part 4), the test impact energy used varies from 0.2 Nm to 0.7 Nm depending on component material and luminaries type.

16.6 For metal lampholders the mechanical strength of external metal parts shall be tested by means of a pressure apparatus according to Fig. 18.

The various parts are tested on the complete lampholder. Each part is subjected twice for 1 min to a force

as indicated in Table 6, the pressure being applied on two diameters at right angles to each other.

The test is not made on outer cases of insulating material with a conductive outer surface. Moreover, this test does not apply to the bayonet barrel.

During and after the test, the deformation of the specimen shall not exceed the values indicated in Table 6.

Table 6 Values of Maximum Deformation
(*Clause* 16.6)

Lampholder	Force N	Maximum Deformation mm	
		During the Test	After the Test
B15	75	1	0.3
B22	100	2	0.3

16.7 Entry spouts and glands of drip-proof lampholders shall withstand the mechanical stresses occurring during normal fitting and use.

Compliance is checked by the following test:

Screwed glands are fitted with a cylindrical metal rod having a diameter equal to the nearest whole number of millimetres below the internal diameter of the packing.

The glands are then tightened by means of a suitable spanner, a force of 30 N for metal glands, or 20 N for glands of molded material, being applied for 1 min at a radius of 250 mm.

At the end of the test, the glands, the spouts and the enclosures shall show no damage.

16.8 Backplate lampholders shall be so designed as to withstand fixing to a support without damage.

Compliance is checked by the following test:

The backplate of the lampholder is fixed by means of M4 screws or those of maximum insertable diameter to a rigid flat steel sheet. This sheet has two drilled and tapped holes at a distance equal to the distance between the axis of the fixing holes of the backplate. The screws are gradually tightened, the maximum torque applied being 1.2 Nm.

For backplate lampholders specifically intended for building-in, this test is carried out with the means of attachment specified by the manufacturer.

After this test, the backplate lampholder shall show no damage impairing its further use.

17 SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS

17.1 Screws, current-carrying parts and mechanical connections, the failure of which might cause the lampholder to become unsafe, shall withstand the mechanical stresses occurring in normal use.

Compliance is checked by inspection and the tests of **12** of IS 10322 (Part 2) except that the first row in Table 1 of IS 10322 (Part 2) is replaced by Table 7.

NOTES

1 Screwed connections are already partially checked by the tests of **16**.

2 For the material requirements specified in **11** of IS 10322 (Part 2), the tests of **19** and **21** will show whether current carrying parts are equivalent to copper in respect of current-carrying capacity, mechanical strength and corrosion likely to be met in normal service.

Table 7 Torque to be Applied to Screws and Nuts
(*Clause* 17.1)

Nominal Diameter of Thread mm	Torque Nm	
Up to and including 2.6	0.15	0.3
Over 2.6 up to and including 2.8	0.2	0.4

18 CREEPAGE DISTANCES AND CLEARANCES

18.1 Creepage distances and clearances shall be not less than the values shown in Table 8, the lampholder being fitted as in normal use.

All distances apply in every position of the plunger.

Table 8 Creepage Distances and Clearances
(*Clauses* 15.3 *and* 18.1)

Rated Voltage 250 V		Distances mm
1. Between live parts of different polarity; and		
2. Between live parts and external metal parts, if not lined with insulating material (this includes screws of backplate lampholder)		
— Creepage distances		
Material with	PTI $\geq$ 600	1.7
	PTI < 600	2.5
— Clearances		1.7
3. Clearances in the case of backplate lampholders		
— between live parts and mounting surface; and		
— between live parts and the boundary of the space for the supply wires		3.6

a) PTI (Proof Tracking Index) in accordance with IS 2824.

b) In the case of creepage distances to parts not energized or not intended to be earthed, where no tracking can occur, the values specified for material with PTI ≥ 600 apply for all materials (irrespective of the real PTI).

   For creepage distances subjected to working voltages of less than 60 s duration the values specified for materials with PTI ≥ 600 apply for all materials.

c) For creepage distances not liable to contamination by dust or moisture the values specified for material with PTI ≥ 600 apply (independently of the real PTI).

d) For B15 lamp holders the clearance is reduced to 1.4 mm.

   Compliance is checked by measuring with and without supply wires of the largest cross-sectional area according to **11.2**, connected to the terminals.

19 GENERAL RESISTANCE TO HEAT

19.1 Lampholders shall be sufficiently resistant to heat.

Compliance is checked:

— for lampholders without temperature marking or marked Txxx by the tests of **19.2**, **19.3** and **19.4**;

— for lampholders marked T1 or T2 by the tests of **19.3**, **19.5**, **19.6** and **19.7**.

19.2 Lampholders without temperature marking shall be tested first in a heating cabinet at the temperature indicated in Table 9.

Table 9 Temperature Inside Heating Cabinet
(*Clause* 19.2)

Lampholder	Temperature, °C
B15d	145
B22d	175

Lampholders marked Txxx shall be tested at the marked temperature plus 10 K (°C).

For this test a solid steel test cap shall be inserted into the lampholder in vertical lampholder-up position because the weight of the test cap must not bear on the lampholder. In the area of the contacts the test cap shall comply with maximum dimensions in accordance with Data Sheet 7004-10 (B22d/22) and 7004-11 (B15d/19).

The temperature is maintained with a tolerance of ± 5 K (°C) for 48 h without interruption.

After cooling down for 24 h, without the test cap, the contact force test shall be repeated in accordance with **13.1**.

19.3 Contacts and all other current-carrying parts shall be so constructed as to prevent excessive temperature-rise.

Compliance is checked by the following test which shall be made immediately after the test of **19.2** on the lampholders in whose terminals conductors of the maximum cross-sectional area according to **11.2** are fitted.

The terminal screws shall be tightened with a torque equal to two-thirds of the torque specified in **17**; the lampholder is placed with the open end downwards and loaded for 1 h with 1.25 times its rated current. The temperature rise of terminals shall not exceed 45 K (°C).

This temperature is determined with the aid of melting particles or by thermocouples, not by means of a thermometer.

For this test, a special test cap as shown in Fig. 5 (B15d) or Fig. 6 (B22d) is used. Before the test the contact surface is carefully cleaned and polished.

NOTE — Pellets of beeswax (diameter 3 mm, melting temperature 65°C) may be used as melting particles provided that the ambient temperature equals 20°C.

After the test the conductors shall not be damaged.

19.4 The resistance to heat is then tested in a heating cabinet at the temperature indicated in Table 10.

Table 10 Temperature Inside Heating Cabinet
(*Clause* 19.4)

Lampholder	Temperature, °C
B15d	170
B22d	200

Lampholders marked Txxx shall be tested at the marked temperature plus 35 K (°C).

For this test a solid (preferably stainless steel) test cap is inserted into the lampholder. In the area of the contacts the test cap shall comply with maximum dimensions as given in Data Sheets 7004-10 (B22d/22) and 7004-11 (B15d/19).

The lampholder, with the test cap inserted is placed in the vertical lampholder-up position (because the weight of the test cap must not bear on the lampholder) in a heating cabinet having approximately half the temperature specified in Table 10. This temperature is

raised to the required test temperature within 1 h ± 15 min. Following this, the test is continued for 168 h without interruption. The test temperature is maintained with a tolerance of ± 5 K (°C).

During the test, the lampholder shall not undergo any change impairing its further use especially in the following respects:

— reduction of the protection against electric shock;
— loosening of electrical contacts;
— cracks, swelling or shrinking;
— sealing compound flowing out.

The test cap is removed from the lampholder after cooling down to approximately room temperature.

After the test the lampholder is examined to determine that:

— the shade ring or skirt, if provided, is removable and replaceable without damage,

Compliance is checked by inspection and manual test:

— there is no deformation which could affect the safety or further use of the lampholder;

Compliance is checked by the application of the gauges according as given in Data Sheets 7006-12C and 7006-12D for B15d lampholders and 7006-12A and 7006-12B for B22d lampholders.

The use of the gauge is not intended for checking the reality of the contact, but only for checking the possible deformation of moulded materials.

NOTE — Any deterioration of the lampholder (including discoloration of any part) which does not affect its safety may be ignored.

In addition, the lampholder shall withstand the mechanical strength test made under the conditions specified in **16.2**, **16.3** and **16.5**, the torque, being reduced, however, to 50 percent of the original value and the height of fall being reduced to 50 mm.

19.5 Lampholders marked T1 or T2 shall be tested with an open-ended cylindrical metal shade with an unventilated internal barrier and the dimensions as shown in Fig. 12. The barrier may be removable to facilitate the examination of the lampholder after test.

The lampholder shall be wired with 0.5 mm² conductors having suitable heat-resistant insulation.

Lampholders shall be mounted for test, within the shade, in a manner appropriate to their construction, as follows:

a) All lampholders.

The arrangement shall be such as to ensure that the lamp is positioned below the lampholder with its axis approximately aligned with the vertical axis of the test shade.

b) Lampholders having shade-carrier devices.

The metal test shade shall be suspended from the lampholder by the normal use of the shade-carrier device, external screwed parts being tightened with the appropriate torque values specified in **16.3**, except that a screwed shade-carrier device shall then be loosened by one-eighth of a turn before commencing the test described in **19.6**.

c) Lampholders not having shade-carrier devices.

The lampholder shall be mounted by its intended mounting means on the underside of the internal barrier of the metal test shade.

NOTE — Where necessary, an additional device such as threaded nipple or a special mounting bracket may be used.

The complete assembly shall then be suspended, by means of the 0.5 mm² test wires, approximately in the centre of the draught-free enclosure detailed in Fig. 12.

Each lampholder shall be tested using a new, coiled coil, frosted or white internally coated lamp in accordance with IS 418. Other details of the test lamp shall be as specified in Table 11.

A thermocouple shall be affixed to the lamp cap at a position 3 mm above the lamp glass-to-cap junction and as nearly as possible over the centre of the lamp filament.

The leads to this thermocouple shall be connected to a temperature indicator or a temperature sensitive device, which will enable the lamp cap temperature shown in Table 11 to be measured. The supply to the lamp shall be controlled to achieve and maintain these temperatures. Care shall be taken in fixing the thermocouple to ensure that intimate contact is made with the lamp cap.

19.6 The test procedure shall be as follows:

a) *Preparation*

Determine the relevant lamp rating and test temperature from Table 11, then assemble the lampholder in the test shade and cabinet, as specified in **19.5**, and fit the test lamp with the thermocouple attached. Connect a supply to the lamp and adjust the voltage until a steady temperature is maintained on the lamp cap within the tolerance specified in Table 11, at a voltage not exceeding 110

percent of the rated lamp voltage. At this stage the first 40 h test period shall commence.

NOTE — Owing to possible variations in lamp characteristics it may be necessary to change the test lamp for another, of the same specification, to achieve the specified temperature within permitted voltage limits.

b) *Cycling test*

The complete test shall comprise 12 consecutive cycles or 25 consecutive cycles, as specified in Table 11, each cycle consisting of three consecutive periods:

1) a period of 40 h, with the supply switched on, during which the test temperature shall be maintained within the specified limits,
2) a period of not less than 2 h with the supply switched off, during which the lamp cap temperature shall fall to the ambient level,
3) a period of not less than 1 h with the supply switched on, during which the lamp cap test temperature shall be re-established.

In the event of failure of the test lamp the time required for re-establishing the temperature after replacing the lamp shall not be taken as part of the test.

19.7 After the test specified in **19.6**, and after having cooled to room temperature, the lampholders shall be examined to determine the following:

a) the lampholder is not so deformed as to prevent the proper acceptance of a corresponding lamp cap having maximum or minimum dimensions according to relevant data sheets.

Compliance is checked by the application of the gauges specified in Data Sheets 7006-12A and 7006-12B for B22d lampholders and 7006-12C and 7006-12D for B15d lampholders.

b) the shade ring, or skirt, or protective shield, if provided, is removable and replaceable without damage,

Compliance is checked by inspection and by removing and replacing the shade ring, skirt or protective shield.

c) metal parts attached to insulated parts are still held securely,

Compliance is checked by inspection.

d) the force required to depress each contact mechanism is still satisfactory,

Compliance is checked by repeating the test described in **13.1**.

e) the requirements of the insulation resistance and electric strength tests described in **15.3** are met.

Table 11 Test Temperature and Test Lamp Data of Lampholders Marked T1 and T2

(*Clauses* 19.5 *and* 19.6)

Marking	Lampholder Material	Lamp Cap Temperature +0, –10 °C	Number of Cycles	Holder Type	Test Lamp Data		
					Watt Rating W	Diameter ± 1.0 mm	Overall Length ± 3.5 mm
T1	Plastic, ceramic or metal	175	12	B15d B22d	60 100	35 60	96 105
T2	Incorporating plastic parts[1)]	220	25	B15d B22d	60 150[1)]	35 68	96 125
T2	Not incorporating plastic parts	220	12	B15d B22d	60 150[2)]	35 68	96 125

NOTES

1 The temperature of $220°C^{+0°C}_{-10°C}$ specified above is chosen to prove the performance of T2 lampholders under test conditions and is not to be confused with the limiting temperature for lamp operation in service specified in IS 15518 (Part 1).

2 12 periods equal 480 h at the test temperature.

3 25 periods equal 1000 h at the test temperature.

[1)] Other than cord grip devices of plastic material.

[2)] Alternatively, lamp of 200 W rating may be used with suitable voltage adjustment to achieve 150 W rating.

The requirements for parts providing protection against accidental contact with live parts shall be checked by repeating the appropriate tests described in **10.1** and **16.3**.

NOTE — Any deterioration of the lampholder (including discoloration of any part) which does not affect its safety may be ignored.

20 RESISTANCE TO HEAT, FIRE AND TRACKING

20.1 Parts retaining the contacts and external parts of lampholders of insulating material and of lampholders comprising external parts of insulating material with a conductive outer surface shall be resistant to heat.

For materials other than ceramic compliance is checked with the aid of the ball-pressure test by means of the apparatus shown in Fig. 17.

The surface of the part under test is placed in the horizontal position and a steel ball of 5 mm diameter is pressed against this surface with a force of 20 N.

For lampholders without temperature marking or marked Txxx this test is made in a heating cabinet at a temperature shown in **19.4**.

For lampholders marked T1 or T2 the test is made at a temperature of 125°C ± 5°C.

NOTE — If, in the testing of the luminaire [*see* **6.3** of IS 10322 (Part 4)] temperatures exceeding 100°C are measured on the above mentioned parts, the test is repeated with a temperature 27°C ± 5°C in excess of that temperature.

The test load and the supporting means are placed within the heating cabinet for a sufficient time to ensure that they have attained the stabilized testing temperature before the test commences.

The part to be tested is placed in the heating cabinet for a period of 1 h, before the test load is applied.

If the surface under test bends, the part where the ball presses is supported. For this purpose, if the test cannot be made on the complete specimen, a suitable part may be cut from it.

The specimen shall be at least 2.5 mm thick, but if such a thickness is not available on the specimen then two or more pieces are placed together.

After 1 h, the ball is removed from the specimen which is then immersed within 10 s in cold water for cooling down to approximately room temperature. The diameter of the impression caused by the ball is measured and shall not exceed 2 mm.

NOTE — In the event of curved surfaces, such as, lampholder shells, the shorter axis is measured if the indent is elliptical.

In case of doubt, the depth of the impression is measured and the diameter Ø calculated using the formula: $\emptyset = 2\sqrt{p\,(5-p)}$, in which p = depth of impression.

20.2 External parts of insulating material (outer shell, bayonet barrel, dome or backplate), including those with a conductive exterior providing protection against electric shock, and parts of insulating material (terminal/contact assembly) retaining live parts in position, shall be resistant to flame and ignition.

For materials other than ceramics, compliance is checked by the tests of **20.3** and **20.4**.

20.3 External parts of insulating material providing protection against electric shock including those with a conductive exterior, are subjected to the glow-wire test in accordance with IS 11000 (Part 2/Sec 1), subject to the following details:

- The specimen is a complete lampholder. It may be necessary to take away parts of the lampholder to perform the test, but care shall be taken to ensure that the test conditions are not significantly different from those occurring in normal use.
- The specimen is mounted on the carriage and pressed against the glow-wire tip with a force of 1 N, preferably 15 mm, or more, from the upper edge, into the centre of the surface to be tested. The penetration of the glow-wire into the specimen is mechanically limited to 7 mm.

  If it is not possible to make the test on a specimen as described above because the specimen is too small, the test is made on a separate specimen of the same material, 30 mm × 30 mm square and with a thickness equal to the smallest thickness of the specimen and manufactured by a similar process.
- The temperature of the tip of the glow-wire is 650°C. After 30 s the specimen is withdrawn from contact with the glow-wire tip. The glow-wire temperature and heating current are constant for 1 min prior to commencing the test. Care should be taken to ensure that heat radiation does not influence the specimen during this period. The glow-wire tip temperature is measured by means of a sheathed fine wire thermocouple constructed and calibrated as described in IS 11000 (Part 2/Sec 1).
- Any flame or glowing of the specimen shall extinguish within 30 s of withdrawing the glow-wire and any flaming drops of the material shall not ignite a piece of tissue paper spread out horizontally 200 mm ± 5 mm below the specimen.

20.4 Parts of insulating material retaining live parts in position are subjected to the needle-flame test in accordance with IS 11000 (Part 2/Sec 2), subject to the following details:

— The specimen is a complete lampholder. It may be necessary to take away parts of the lampholder to perform the test, but care shall be taken to ensure that the test conditions are not significantly different from those occurring in normal use.
— The test flame is applied to the centre of the surface to be tested.
— The duration of application is 10 s.
— Any self-sustaining flame shall extinguish within 30 s of removal of the gas flame and any flaming drops of the material shall not ignite a piece of tissue paper spread out horizontally 200 mm ± 5 mm below the specimen.

20.5 For lampholders other than ordinary lampholders, insulating parts retaining live parts shall have adequate resistance to tracking.

For materials other than ceramic, compliance shall be checked by the tracking test in accordance with IS 2824, subject to the following details:

— If the specimen has no flat surface of at least 15 mm × 15 mm, the test may be carried out on a flat surface with reduced dimensions provided drops of liquid do not flow off the specimen during the test.

  No artificial means shall, however, be used to retain the liquid on the surface. In the case of doubt, the test may be made on a separate strip of the same material, having the required dimensions and manufactured by the same process.
— If the thickness of the specimen is less than 3 mm, two, or if necessary, more, specimen shall be stacked to obtain a thickness of at least 3 mm.
— The test shall be made at three places of the specimen or on three specimens.
— The electrodes shall be of copper and having test solution as described in IS 2824, shall be used.
— The specimen shall withstand 50 drops without failure at a test voltage of PTI 175.
— A failure has occurred if a current of 0.5 A or more flows for at least 2 s in a conducting path between the electrodes on the surface of the specimen, thus operating the over current relay, or if the specimen burns without releasing the overcurrent relay.

21 RESISTANCE TO EXCESSIVE RESIDUAL STRESSES (SEASON CRACKING) AND TO RUSTING

21.1 Contacts and other parts of rolled sheets of copper or copper alloy whose failure might cause the lampholder to become unsafe shall not be damaged due to excessive residual stresses.

Compliance is checked by the following test:

The surface of the specimens is carefully cleaned, varnish being removed by acetone, and grease and finger prints by petroleum spirit or the like.

The specimens are placed for 24 h in a test cabinet, the bottom of which is covered by an ammonium chloride solution having a *p*H value of 10 [for details of the test cabinet, the test solution and the procedure (*see* Annex A)].

After this treatment, the specimens are washed in running water, 24 h later they shall show no cracks when inspected at an optical magnification of 8 ×.

Cracks which may occur in very restricted areas of the outer shell of metal lampholders near the fixing areas of the insulating ring shall not be considered.

In order not to influence the results of the test, the specimens shall be handled with care.

21.2 Ferrous parts, the rusting of which may endanger the safety of the lampholder, shall be adequately rust protected.

Compliance is checked by the following test:

All grease is removed from parts to be tested by immersion in a suitable degreasing agent for 10 min. The parts are then immersed for 10 min in a water solution of 10 percent ammonium chloride at a temperature of 27°C ± 5°C.

Without drying, but after shaking off drops of water, the parts are placed for 10 min in a box containing air saturated with moisture at a temperature of 27°C ± 5°C.

After the parts have been dried for 10 min in a heating cabinet at a temperature of 100°C ± 5°C any traces of rust on sharp edges and any yellowish film may be removed by rubbing, after which their surface shall show no signs of rust.

For small helical spring and the like, and for ferrous parts exposed to abrasion, a layer of grease is deemed to provide sufficient rust protection. Such parts are not subjected to the test.

22 TESTS

22.1 Type Test

The following shall be carried out as type tests on selected samples (*see* **5**) of switches being drawn preferably at random from a regular lot of production:

a) Ratings (*see* **6**),
b) Classification (*see* **7**),
c) Marking (*see* **8**),

d) Checking of dimensions (*see* **9**),
e) Protection against electric shock (*see* **10**),
f) Terminals (*see* **11**),
g) Provision for earthing (*see* **12**),
h) Constructional requirements (*see* **13**),
j) Switched lampholders (*see* **14**),
k) Moisture resistance, insulation resistance and electric strength (*see* **15**),
m) Mechanical strength (*see* **16**),
n) Screws, current carrying parts and connections (*see* **17**),
p) Creepage distances and clearances (*see* **18**),
q) General resistance to heat (*see* **19**),
r) Resistance to heat, fire and tracking (*see* **20**), and
s) Resistance to excessive residual stresses (season cracking) and to rusting (*see* **21**).

22.1.1 *Criteria for Acceptance*

The specimen subjected to the type tests shall pass the test for providing conformity with the requirements of this standard. For criteria of acceptance (*see* **5.4**).

22.2 Acceptance Tests

The following shall constitute acceptance test:

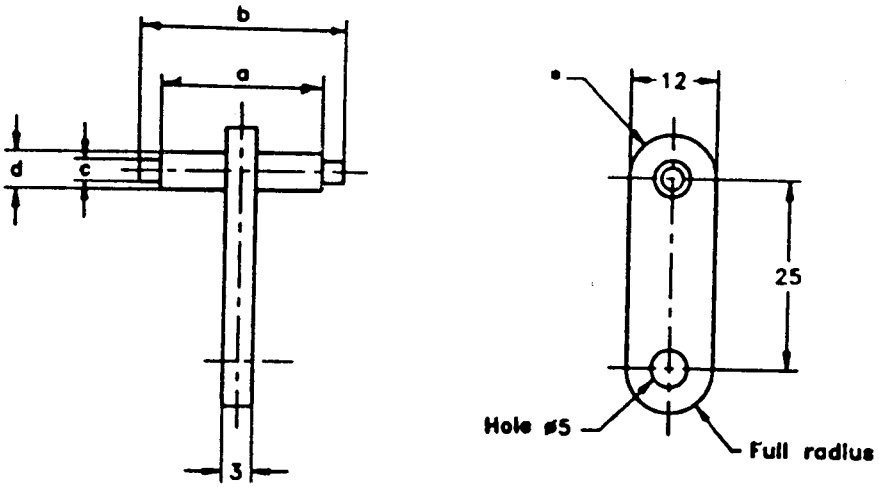
a) Ratings (*see* **6**),
b) Classification (*see* **7**),
c) Marking (*see* **8**),
d) Checking of dimensions (*see* **9**),
e) Protection against electric shock (*see* **10**),
f) Provision for earthing (*see* **12**),
g) Moisture resistance, insulation resistance and electric strength (*see* **15**),
h) Mechanical strength (*see* **16**), and
j) General resistance to heat (*see* **19**).

22.2.1 A recommended sampling procedure for acceptance test is specified in Annex B.

22.3 Routine Tests

The following shall constitute routine tests:

a) Marking (*see* **8**); and
b) Protection against electric shock (*see* **10**).

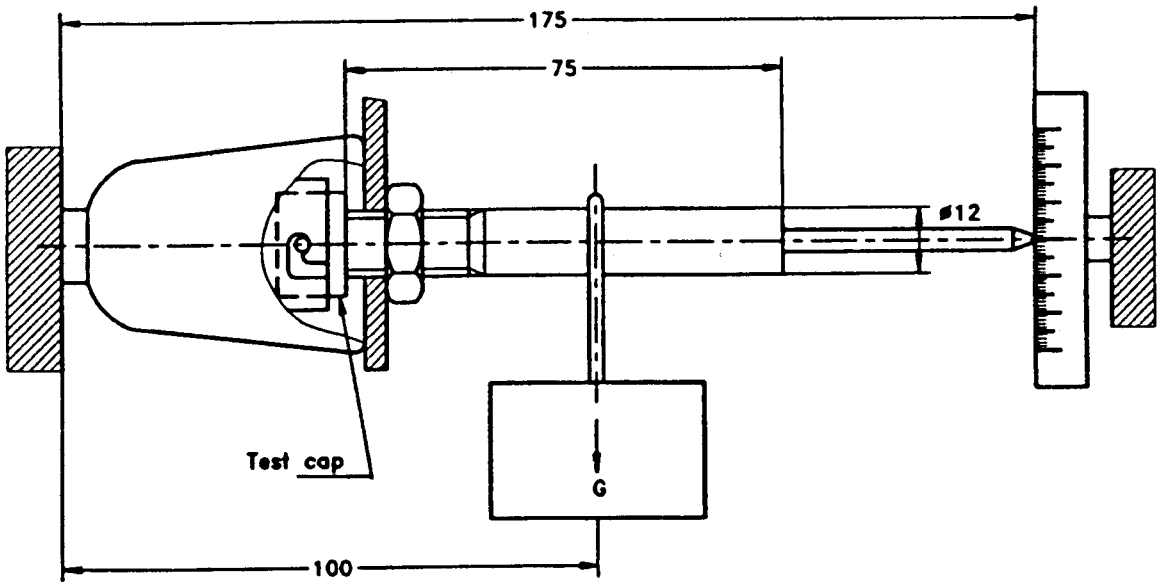


* This radius may need local modification to clear lampholder contacts.

Dimensions in millimetres.

Reference	*Dimension*		*Tolerance*
	B15d	B22d	
a	14	21	+ 0.05 − 0.05
b	17.5	27.5	+ 0.5 − 0.5
c	2.5	2.5	+ 0.05 − 0.05
d	5	5	+ 0.05 − 0.05

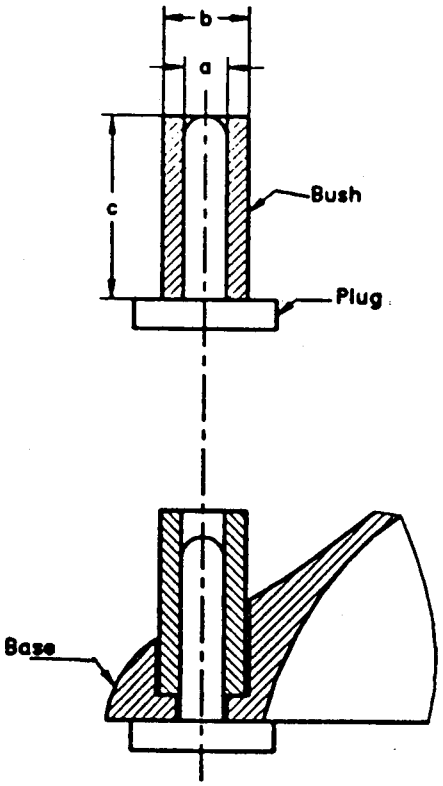
FIG. 1 LOADING DEVICE (*see* **16.1**)



Dimensions in millimetres.

Lampholder	*G*, kg
B15d	1
B22d	2

FIG. 2 BENDING APPARATUS (*see* **16.4**)



Dimensions in millimetres.

Reference	*Dimension*	*Tolerance*	
		Manufacture	Wear
a	4.1	+ 0.03	+ 0.0
		− 0.0	− 0.03
b	8.2	+ 0.03	+ 0.0
		− 0.0	− 0.03
c	18	+ 0.1	—
		− 0.1	—

FIG. 3 GAUGE FOR HOLES FOR BACKPLATE LAMPHOLDERS SCREWS (*see* **13.11**)

The drawings are intended only to show typical parts of a lampholder and should not limit the design.

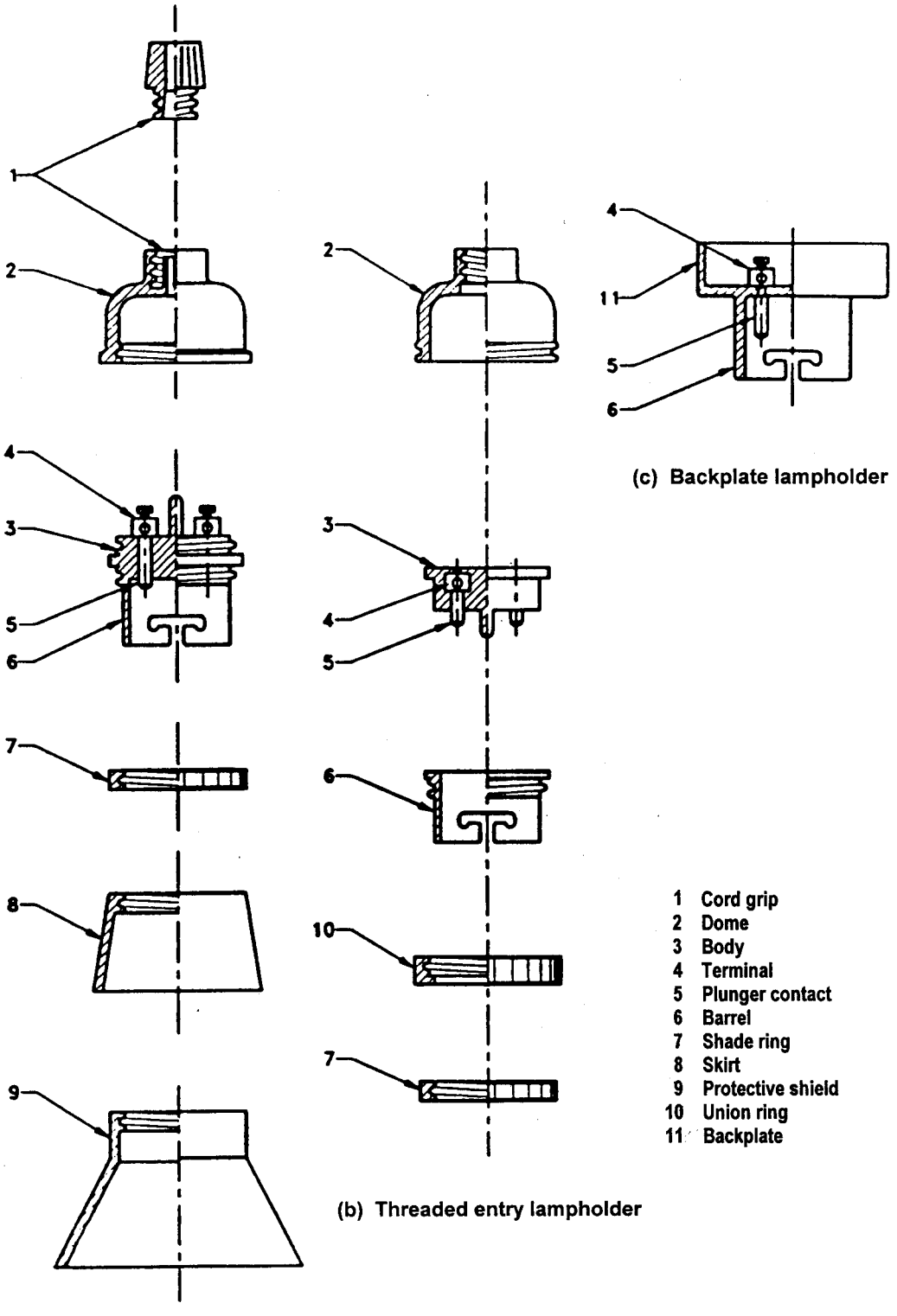
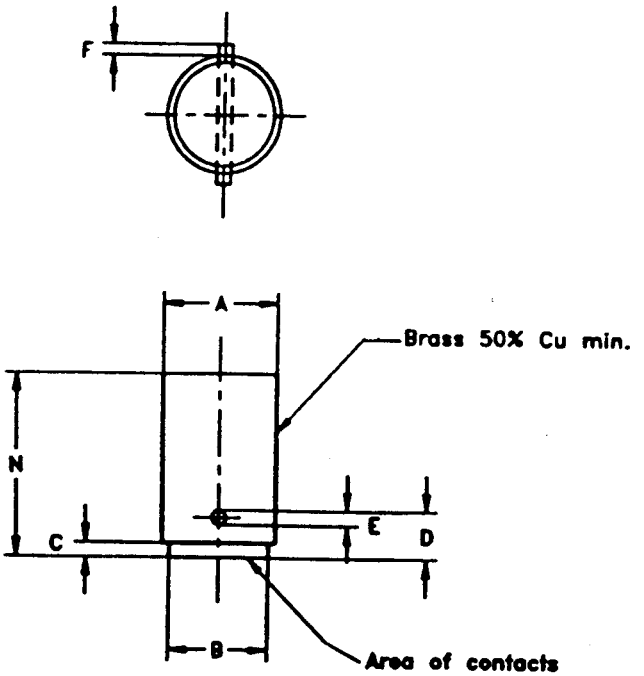


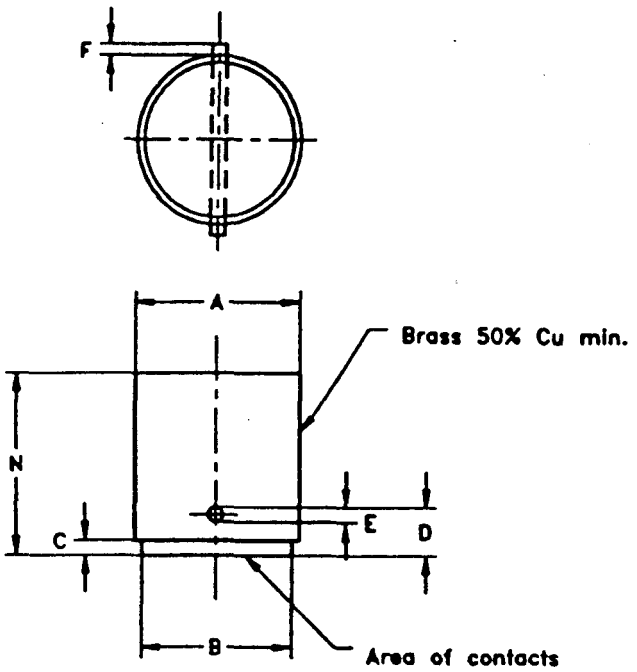
FIG. 4 CLARIFICATION OF SOME OF THE DEFINITIONS (*see* 3)



Dimensions in millimetres.

Reference	*Dimension*	*Tolerance*
A	15.125	+ 0.05 – 0.05
B	13	+ 0.05 – 0.05
C	1.8	+ 0.05 – 0.05
D	6	+ 0.05 – 0.05
E	2	+ 0.05 – 0.05
F	1	+ 0.05 – 0.05
N	22	+ 0.5 – 0.5

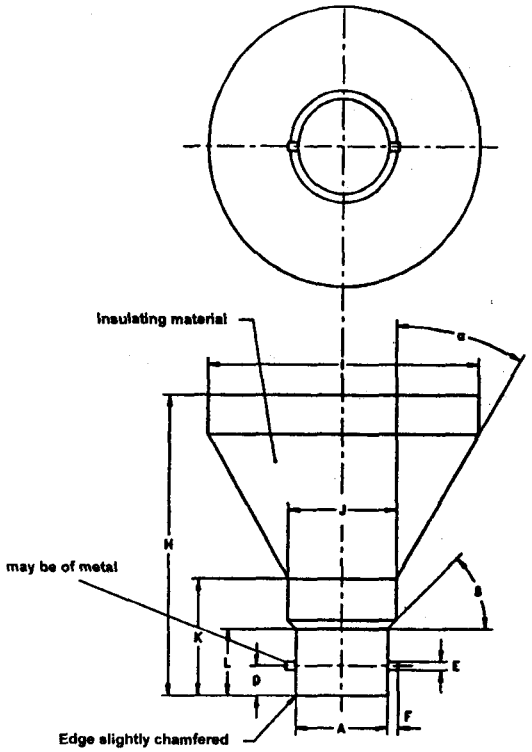
FIG. 5 TEST CAP B15d (*see* **19.3**)



Dimensions in millimetres.

Reference	*Dimension*	*Tolerance*
A	21.95	+0.05 −0.05
B	17	+0.05 −0.05
C	2.2	+0.05 −0.05
D	6	+0.05 −0.05
E	2	+0.05 −0.05
F	2.5	+0.05 −0.05
N	22	+0.5 −0.5

FIG. 6 TEST CAP B22d (*see* **19.3**)

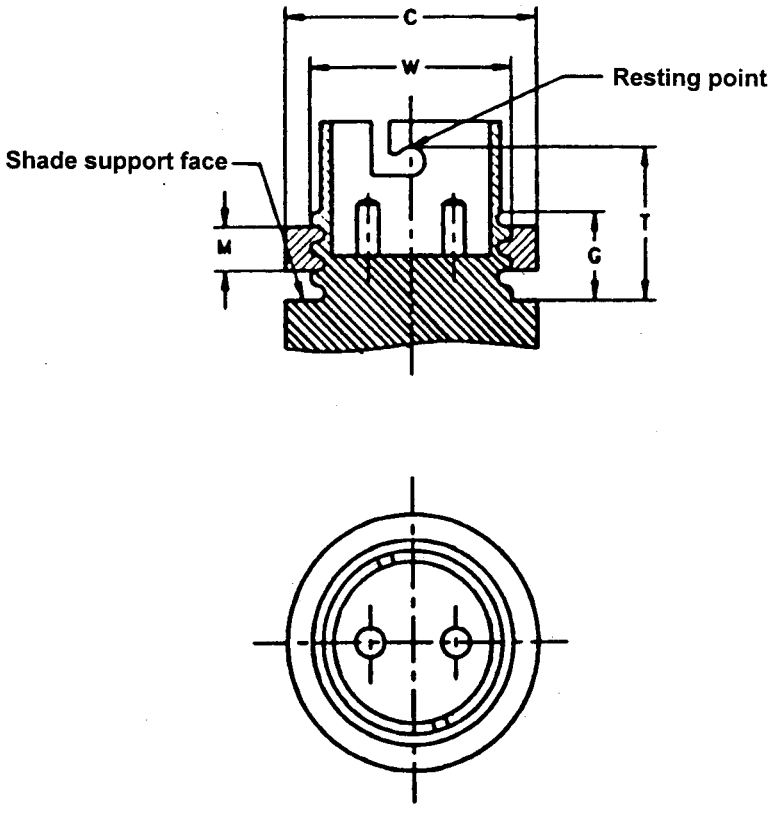


Dimensions in millimetres.

Reference	*Dimension*		*Tolerance*
	B15d	B22d	
A	15.25	22.15	+0.1 −0.0
D	6.4	6.9	+0.0 −0.1
E[1)]	2.2	2.2	+0.0 −0.1
F	1.1	2.7	+0.0 −0.1
H	70	70	+0.1 −0.1
I	55	65	+0.1 −0.0
J	17.1	26.45	+0.1 −0.0
K	26.0	27.0	+0.0 −0.1
L	15.5	15.5	+0.0 −0.1
α	30°	30°	+5′ −5′
β	45°	45°	+5′ −5′

[1)] Pins may be of metal.

FIG. 7 TESTING DEVICE (*see* **10.1**)



Dimensions in millimetres.

Reference	*Dimension*			
	B15d		B22d	
	Min	*Max*	*Min*	*Max*
C	22.5	24.8	31.5	38.1
G	8.0	—	8.0	—
M[1)]	3.0	—	3.5	—
M[2)]	3.5	—	4.0	—
T[3)]	18.0	19.0	18.0	20.0
W[4)]	—	20.0	—	28.5

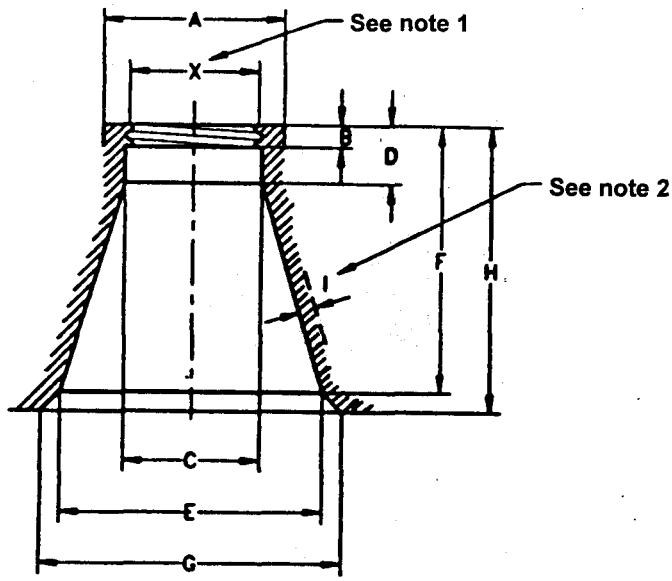
[1)] These dimensions apply to metal shade rings.

[2)] These dimensions apply to plastic shade carrier rings.

[3)] *T* is an optional dimension for lampholders where the position of the lamp is important in relation to the position of the luminaire or of a protective shield, when used.

[4)] Dimension *W* applies only to lampholders designed to accept luminaires having a clearance hole of 29.0 mm minimum for B22d caps and 20.5 mm minimum for B15d caps and intended to be supported by a shade carrier device.

FIG. 8 DIMENSIONS FOR SHADE SUPPORT DEVICES (*see* **9.1**)



Dimensions in millimetres.

Dimension	*Min*	*Max*
A	31.75	—
B	4.75	—
C	29.0	—
D	—	13.5
E	45.0	—
F	38.0	—
G	48.0	49.5
H	39.0	40.0
I	1.5	—

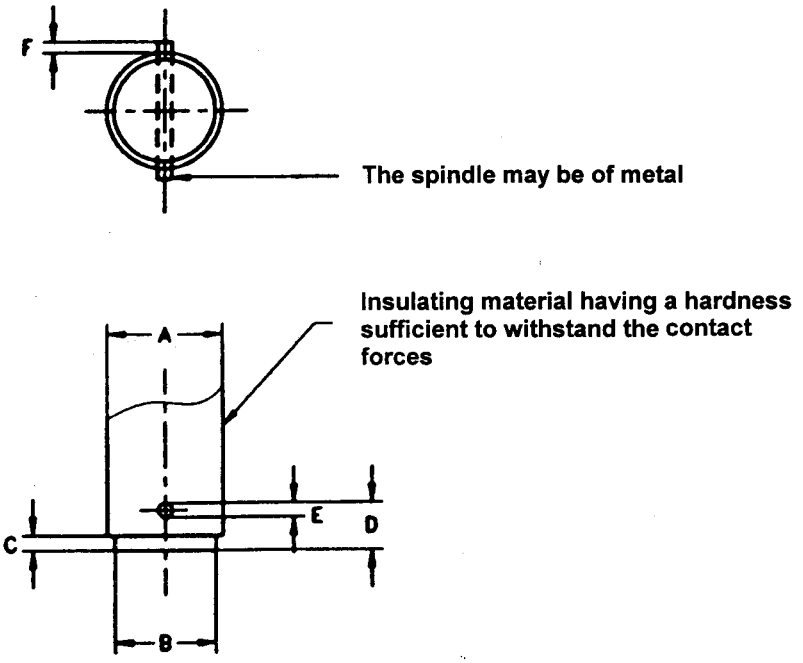
The drawing is intended only to indicate the dimensions that comply with the requirements of IS 418.

NOTES

1 There is to be no encroachment on the shaded profile except that the flared entry defined by dimensions *E*, *F*, *G* and *H* may be of any convenient profile provided that dimension *E* is complied with also within this section. Dimension *X* denotes a female thread or other means of attachment to a corresponding lampholder.

2 There are to be at least three ventilation apertures in the wall of the shield, having an aggregate area not less than 115 mm^2, and the width of each aperture shall not exceed 6.5 mm. The 1.5 mm wall thickness may be reduced adjacent to these apertures.

FIG. 9 DIMENSIONS FOR PROTECTIVE SHIELDS FOR B22d LAMPHOLDERS (*see* **10.1**)

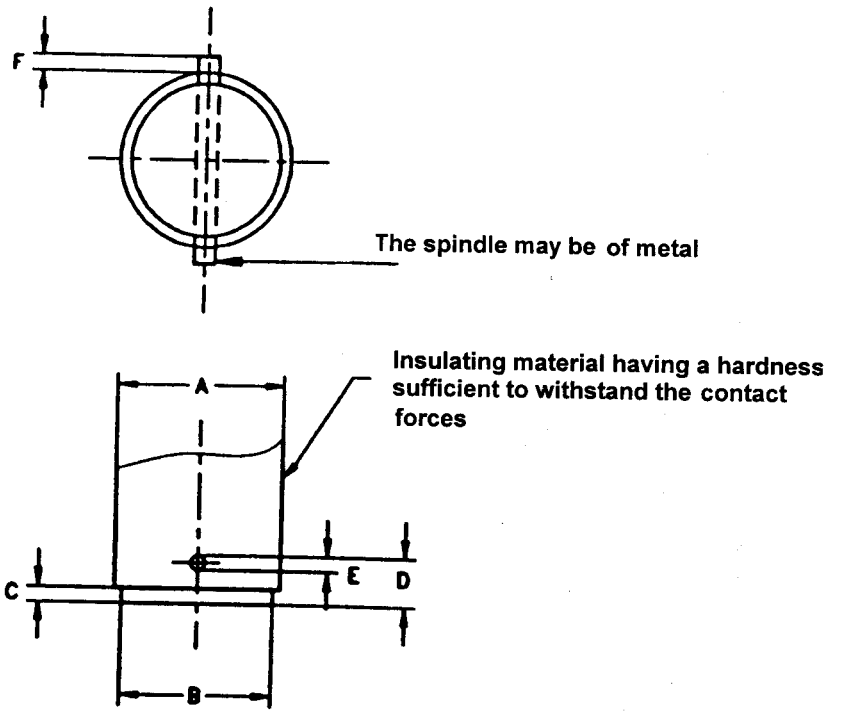


NOTE — This gauge is intended only to operate contact plungers during insulation and high-voltage tests and not to prove lamp fit.

Dimensions in millimetres.

Reference	*Dimension*	*Tolerance*
A	15	+0.1 −0.1
B	13	+0.1 −0.1
C	1.8	+0.1 −0.1
D	7	+0.1 −0.1
E	2	+0.1 −0.1
F	1	+0.1 −0.1

FIG. 10 TEST CAP B15d (*see* **15.3**)

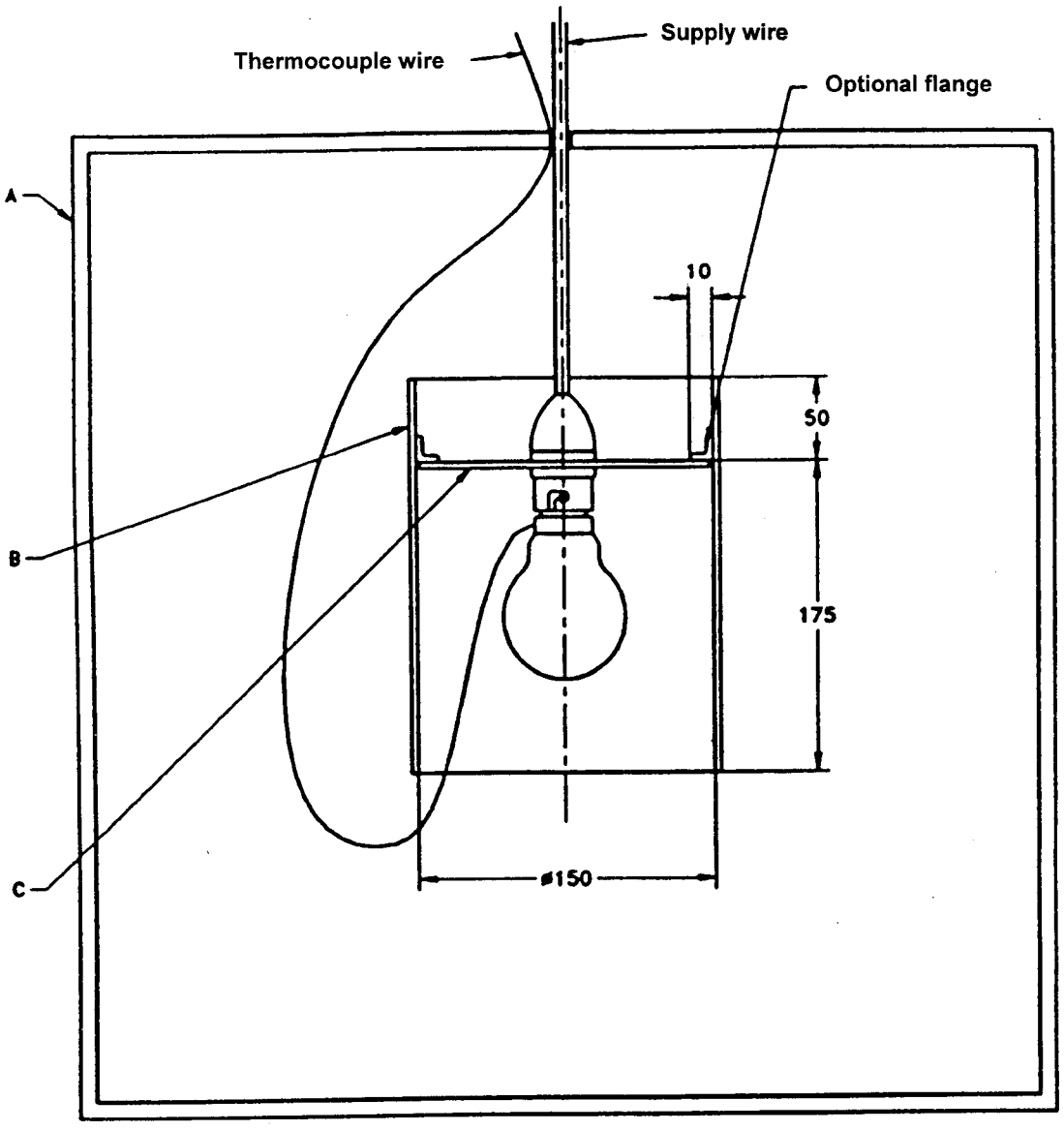


NOTE — This gauge is intended only to operate contact plungers during insulation and high-voltage tests and not to prove lamp fit.

Dimensions in millimetres.

Reference	*Dimension*	*Tolerance*
A	22	+0.1 −0.1
B	17	+0.1 −0.1
C	2.22	+0.1 −0.1
D	7	+0.1 −0.1
E	2	+0.1 −0.1
F	2.5	+0.1 −0.1

FIG. 11 TEST CAP B22d (*see* **15.3**)



Dimensions in millimetres.

A-Test cabinet

Material	:	10 mm (nominal) plywood
Internal finish	:	Two coats of matt paint
Internal dimensions	:	500 mm × 500 mm × 500 mm with a tolerance of ±10 mm for each dimension.
		One wall to be removable to provide access.
Location	:	Minimum clearance from adjacent surfaces:
		— horizontally: 150 mm on all sides.
		— vertically: 300 mm above; 500 mm below.

NOTE — Test cabinets shall not be subjected to heating or cooling from adjacent surfaces and extreme air movement shall be avoided.

FIG. 12 TYPICAL APPARATUS FOR THE HEATING TEST (*see* **19.5**) — (*Continued*)

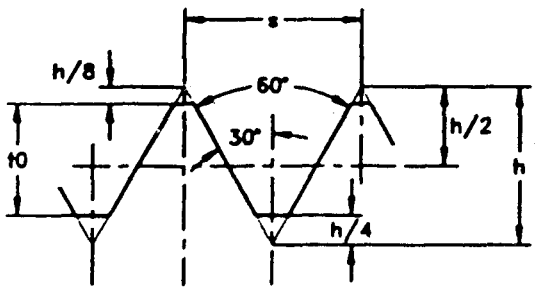
B and *C*-Test shade details

Material	:	0.5 mm (nominal) thick sheet steel
Finish	:	For B15d/T1, B22d/T1 and B22d/T2 lampholders: — two coats minimum of matt black paint outside and inside the shade. For B15d/T2 lampholders: — two coats minimum of black paint outside and above the internal shade barrier. Below the internal shade barrier *C*, including the underside, bright plated or polish finish.
B-Shade dimensions	:	Open-ended tube, 150 mm internal diameter, 225 mm long with flange 50 mm in top which rests on shade barrier.
C-Shade barrier dimensions	:	150 mm diameter disc with central hole (29.0 mm diameter for B22d lampholder; 20.5 mm diameter for B15d lampholders).

NOTE — For 200 W lamp, the height of the shade dimensions may be 200 mm in place of 175 mm.

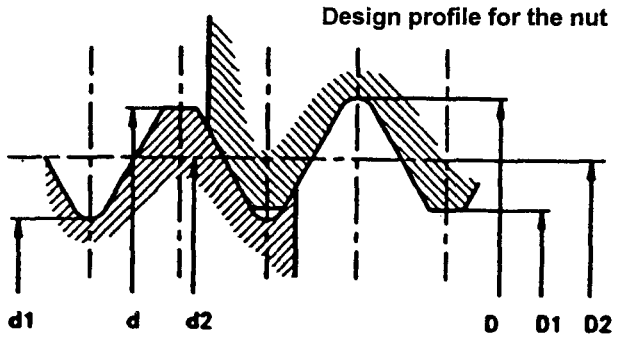
FIG. 12 TYPICAL APPARATUS FOR THE HEATING TEST

Metric ISO thread



h = 0,866 03 s
h/4 = 0,216 51 s
h/8 = 0,108 25 s
t0 = 5/8h = 0,541 27 s

Basic profile*



Design profile for the screw

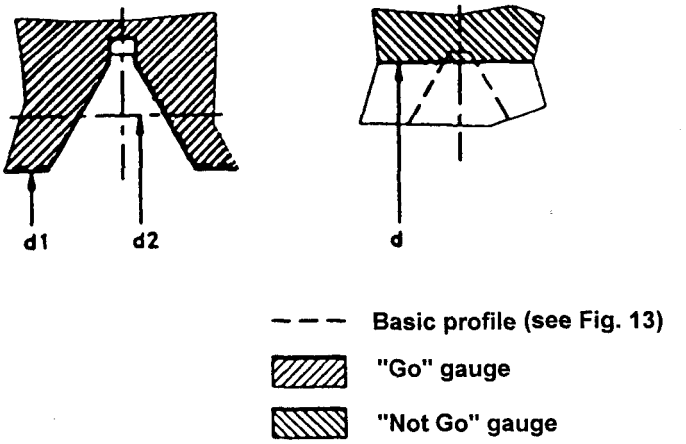
* The basic profile is the profile to which the deviations defining the limits of the external threads are applied.

Dimensions in millimetres.

Designation	*s*	*Screw*					*Nut*				
		d		*d2*		*d1*	*D*	*D2*		*D1*	
		Max	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*
M10 × 1	1	10.000	9.800	9.350	9.238	8.917	10.000	9.462	9,350	9.117	8.917
M 13 × 1	1	13000	12.800	12.350	12.190	11.917	13.000	12.510	12.350	12.117	11.917

FIG. 13 NIPPLE THREAD FOR LAMPHODERS. BASIC PROFILE AND DESIGN PROFILE FOR THE NUT AND FOR THE SCREW (*see* **9.2**)

Gauges for the screw

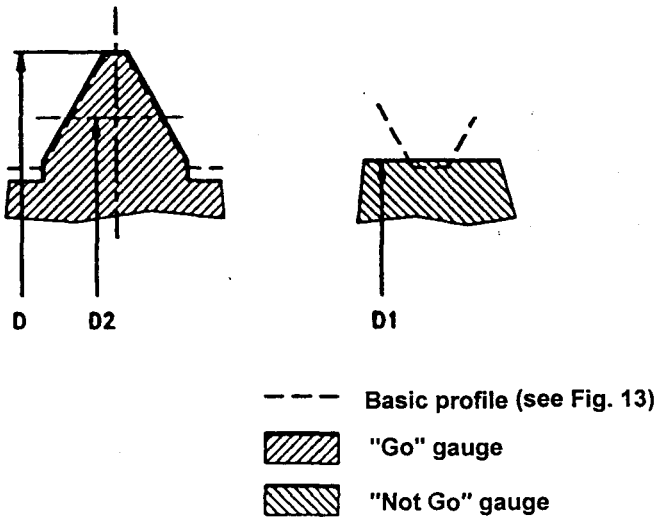


Dimensions in millimetres.

Designation	*s*	*d*		*d*2		*d*1		
		Tolerance		Tolerance		Tolerance		Wear
M10 × 1	1	9.800	+ 0.004 − 0.004	9.350	+ 0.012 − 0.020	8.917	+ 0.004 − 0.004	0.012
M13 × 1	1	12.800	+ 0.004 − 0.004	12.350	+ 0.012 − 0.020	11.917	+ 0.004 − 0.004	0.012

FIG. 14 GAUGES FOR METRIC ISO THREAD FOR NIPPLES (*see* **9.2**) — (*Continued*)

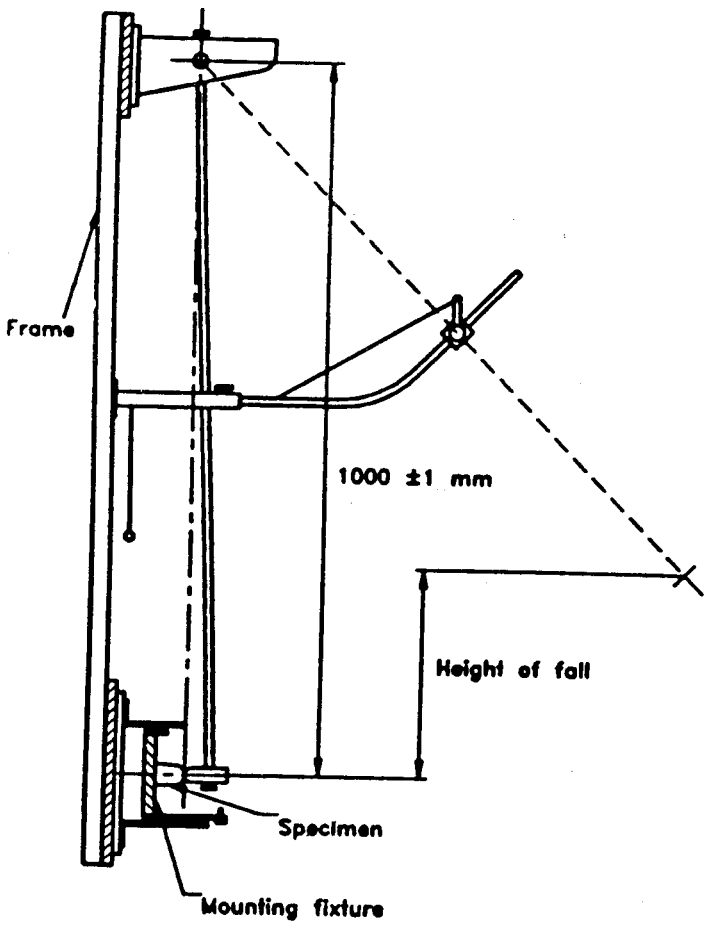
Gauges for the nut



Dimensions in millimetres.

Designation	*s*	*D*		*D*2		*D*1		
		Tolerance		Tolerance		Tolerance		Wear
M10 × 1	1	10.000	+ 0.004 − 0.004	9.350	+ 0.012 − 0.020	9.117	+ 0.004 − 0.004	0.012
M13 × 1	1	13.000	+ 0.004 − 0.004	12.350	+ 0.012 − 0.020	12.117	+ 0.004 − 0.004	0.012

FIG. 14 GAUGES FOR METRIC ISO THREAD FOR NIPPLES



NOTE — For information these drawings have been retained in this standard, although there is basic standard. In case of doubt regarding the drawing refer to IS 9000 (Part 7/Sec 1 to 5).

FIG. 15 IMPACT TEST APPARATUS

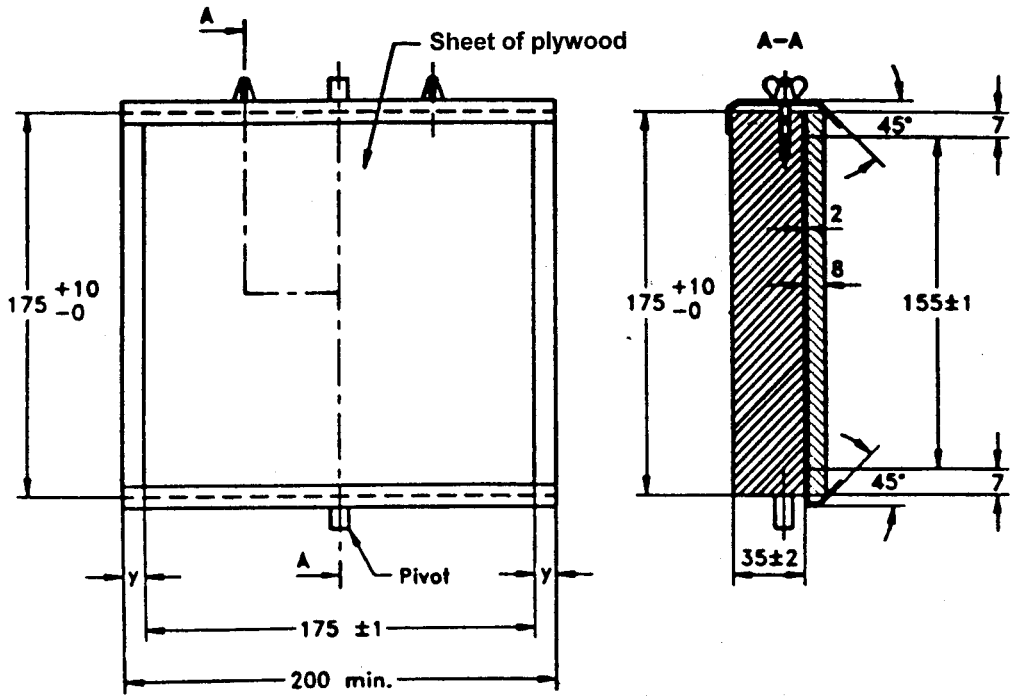


FIG. 16 MOUNTING SUPPORT

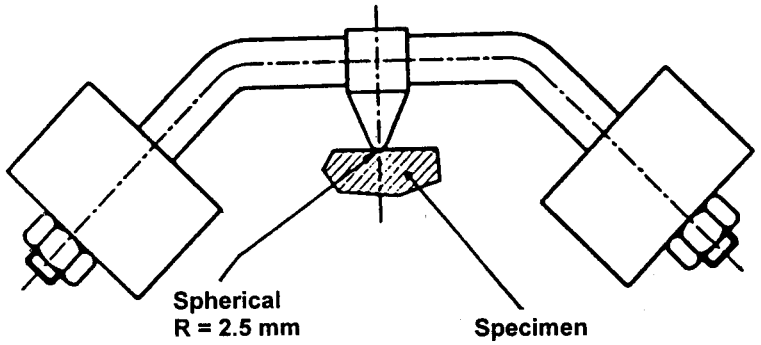


FIG. 17 BALL-PRESSURE TEST APPARATUS

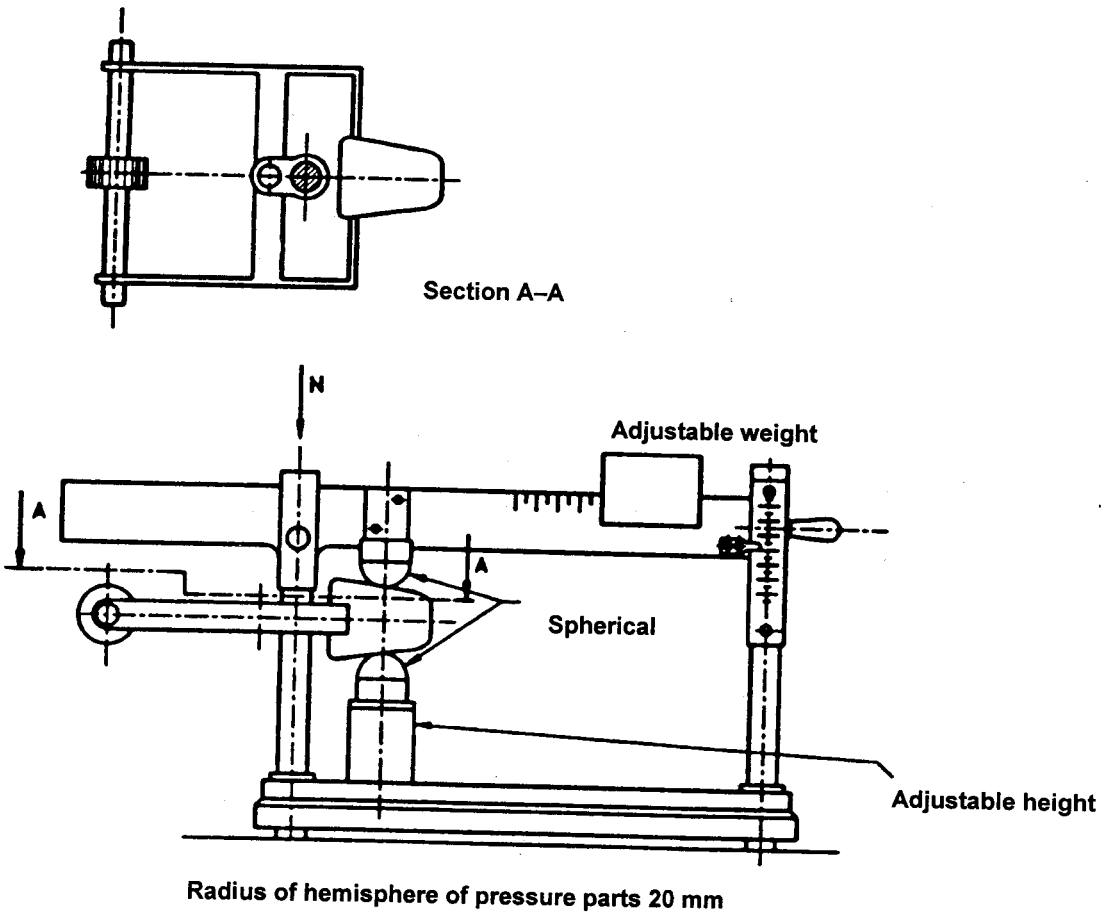
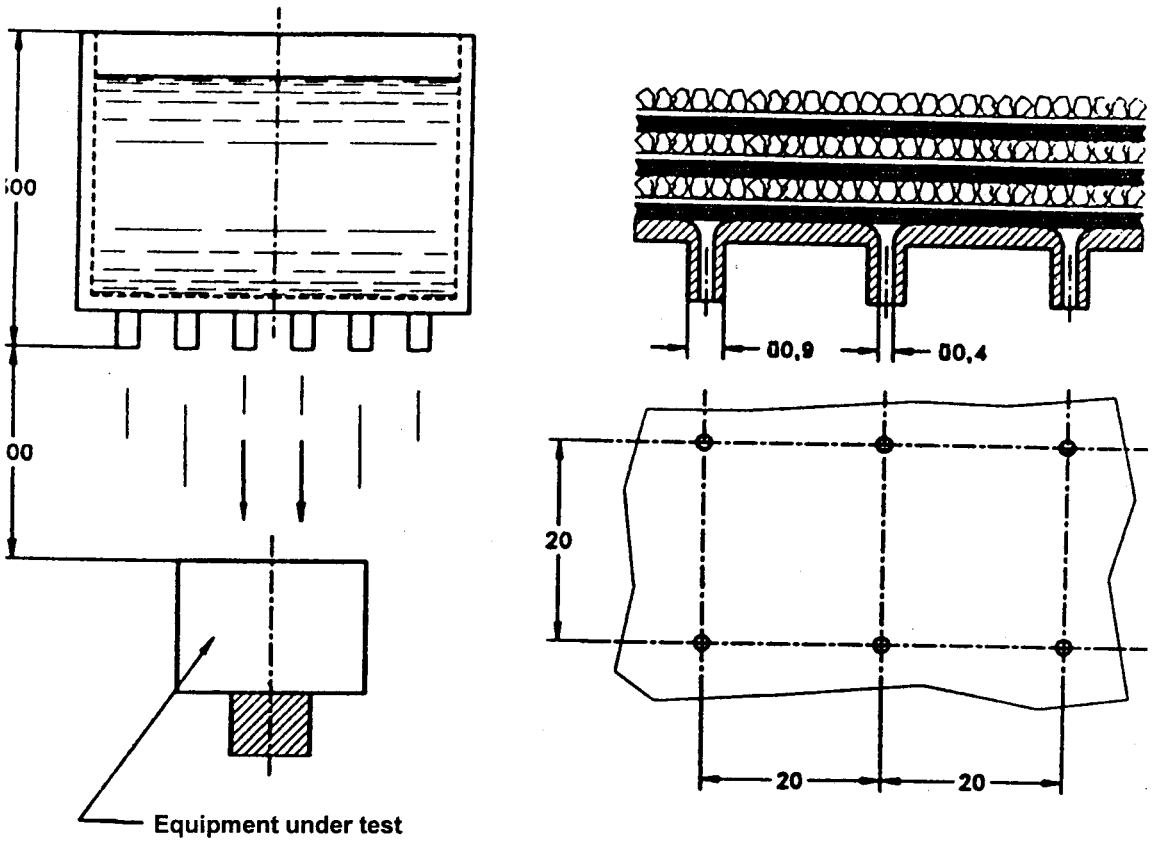


FIG. 18 PRESSURE APPARATUS



Dimensions in millimetres.

Layers of sand and gravel to regulate flow of water, these layers being separated by metallic gauze and blotting paper.

NOTE — The support shall be smaller than the equipment under test.

FIG. 19 EQUIPMENT TO PROVE PROTECTION AGAINST DROPS OF LIQUID

ANNEX A

(*Clause* 21.1)

SEASON CRACKING/CORROSION TEST

NOTE — In the interest of environmental protection, the following requirements relating to test solution, volume and volume of vessel may be modified at the discretion of the test laboratory.

In this event, the test vessel shall retain a volume in the range 500 to 1 000 times larger than the volume of the sample and the volume of test solution shall be such that the ratio of vessel volume to solution volume is in the range of 20:1 to 10:1. In case of doubt, however, the conditions of **A-1** apply.

A-1 TEST CABINET

Closeable glass vessels shall be used for the test. These may, for example, be desiccator vessels or simple glass troughs with ground rim and lid. The vessels' volume shall be at least 10 litres. A certain ratio of test space to volume of test solution shall be maintained (20:1 to 10:1).

A-2 TEST SOLUTION

Preparation of 1 litre of solution.

Dissolve 107 g ammonium chloride (reagent grade NH_4Cl) in about 0.75 litre of distilled or fully demineralized water and add as much of 30 percent sodium hydroxide solution (prepared from reagent grade NaOH and distilled or fully demineralized water) as is necessary to reach a *p*H value of 10 at 22°C. For other temperatures, adjust this solution to the corresponding *p*H values specified in Table 12.

Table 12 *p*H Value at Different Temperatures

Temperature °C	Test Solution *p*H
22 ± 1	10.0 ± 0.1
25 ± 1	9.9 ± 0.1
27 ± 1	9.8 ± 0.1
30 ± 1	9.7 ± 0.1

After the *p*H adjustment, make up to 1 litre with distilled or fully demineralized water. This does not change the *p*H value any further.

Keep the temperature constant in any event to within ± 1°C during the *p*H adjustment, and carry out the *p*H measurement using an instrument which permits an adjustment of the *p*H value to within ± 0.02.

The test solutions may be used over a prolonged period, but the *p*H value, which represents a measure of the ammonia concentration in the vapour atmosphere, shall be checked at least every three weeks and adjusted if necessary.

A-3 TEST PROCEDURE

Introduce, preferably suspended, the specimens in the test cabinet in such a way that the ammonia vapour can take effect unhindered. The specimens shall not dip into the test solution nor touch each other. Supports or suspension devices shall be made of materials which are not susceptible to attack by ammonia vapour, for example, glass or porcelain.

Testing shall be carried out at a constant temperature of 30°C ± 1°C to exclude visible condensed water formation caused by temperature fluctuations, which could severely falsify the test result.

Prior to testing, the test cabinet containing the test solution shall be brought to a temperature of 30°C ± 1°C. The test cabinet shall subsequently be filled as quickly as possible with the specimens pre-heated to 30°C and closed.

This moment is to be considered the beginning of the test.

ANNEX B

(*Clause* 22.2.1)

SAMPLING PROCEDURE

B-1 LOT

In any consignment, all samples of the same type, designation, rating and manufactured by the same factory under essentially similar conditions of production shall be grouped together to constitute a lot.

B-1.1 From each lot, a certain number of switches as specified in Table 13 shall be selected at random and subjected to tests specified in **22.2.**

B-2 CRITERION FOR CONFORMITY

B-2.1 In Table 13, N is the size of the first samples. If the number of failures found in this sample is less than or equal to $C1$ the lot shall be considered to be conformity to this standard and accepted. If the number of failures is greater than or equal to $C2$, the lot shall be rejected. If the number of failures is between $C1$ and $C2$ further sample or $N2$ pieces shall be taken and subjected to all tests.

B-2.1.1 If the number of failures in the two samples combined is less than $C2$, the lot shall be accepted, otherwise rejected.

Table 13 Sampling Plan

(*Clauses* B-2.1 *and* B-2.1.1)

Lot Size	$N1$	$N2$	$(N1 + N2)$	$C1$	$C2$
51 to 100	10	20	30	1	2
101 to 200	13	26	39	1	3
201 to 300	20	40	60	1	5
301 to 500	25	50	75	1	6
501 to 800	35	75	105	2	7
800 to 1 300	50	100	150	3	10
1 300 and above	75	150	225	5	12

NOTE — The plan recommended in this table assures that lots with defectives 4 percent or less would be accepted most of the time, and lots with defectives 25 percent and above would be rejected most of the time. The exact consumers risk depends on the lot size and it would be minimum when the lot size is maximum.

BAYONET CAPS
B22d

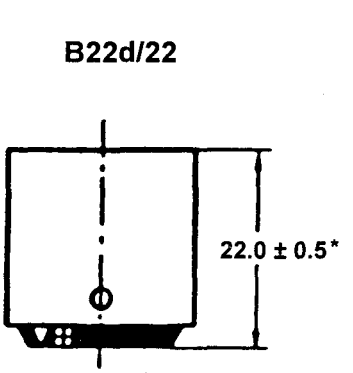
Dimensions in millimetres.

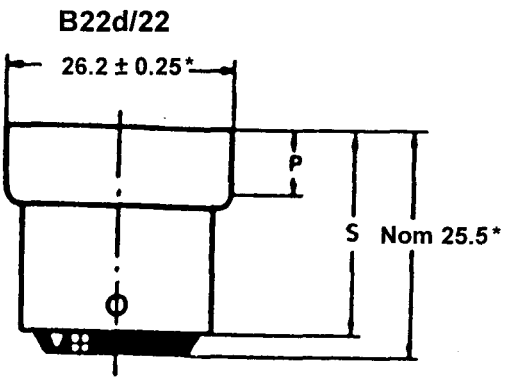
The drawings are intended only to indicate the dimensions essential for interchangeability.

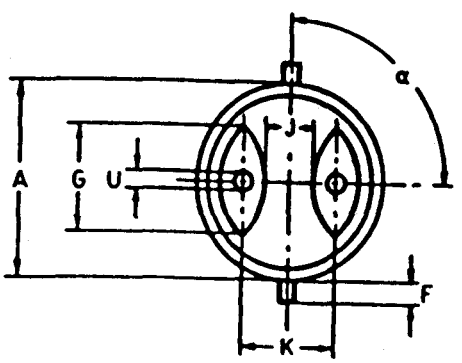
For details of lampholder B22d, *see* Data Sheet 7005-10.

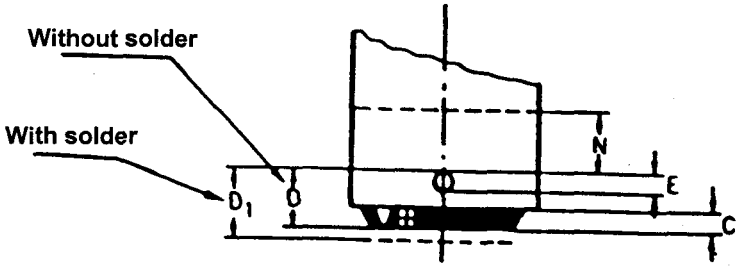
Caps may be made with a flare* the diameter of which shall be not more than 1 mm greater than the maximum permissible diameter of the corresponding cap without a flare.

For finished lamps the creepage distance over insulation shall be not less than 3 mm between live parts and not less than 2.5 mm between the parts and the metal shell.









Data Sheet No. 7004-10

(*Continued*)

Dimension	Unmounted Caps**		Caps on Finished Lamps	
	Min	*Max*	*Min*	*Max*
A[2]	21.75	22.05	21.75	22.15
C	1.9	2.5	—	—
D[4]	6.0	6.8	—	—
D_1	—	—	6.0	8.0
E	1.8	2.2	1.8	2.2
F	2.3	2.7	2.3	2.7
G	10.0	—	10.0[1]	—
J	4.0	—	3.0[1]	—
K	10.3[3]	10.5[3]	—	—
N[2]	6.7	—	6.7	—
P[5]	7.5	8.5	—	—
S	23.0	23.5	—	—
U	—	1.75[3]	—	—
α	Nom 90°[3]		—	

* These dimensions are solely for cap design and are not to be gauged on the finished lamp.

** The values shown below are solely for cap design and are not to be gauged unless otherwise specified.

In those instances where checking of unmounted caps is controlled by neutral authorities, the gauges shown on Data Sheets 7006-10 and 7006-11 shall be used.

[1] This dimension is checked with a millimetre scale.

[2] Dimension N denotes the minimum length over which both the minimum and maximum limits of dimension A shall be observed. Below dimension N, only the limits for dimension A maximum apply.

[3] These values apply to caps B22d/22 and B22d/25 × 26, which shall be accepted by the gauge shown on Data Sheet 7006-3.

Dimension U maximum is to be checked by a suitable plug gauge.

For other caps, dimension K may have values of 10.0 mm minimum, and 11.3 mm maximum and angle limiting value of 82°30′ and 97°30′. The value of dimension U is not specified.

[4] A displacement in height between the two pins is permitted but this shall not exceed 0.4 mm.

[5] Dimension P denotes the length over which the skirt shall be cylindrical.

Data Sheet No. 7004-10

BAYONET CAPS
B15

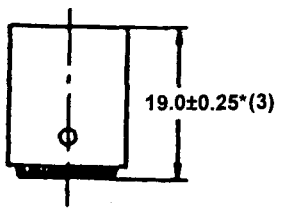
Dimensions in millimetres.

The drawings are intended only to indicate the dimensions essential for interchangeability.

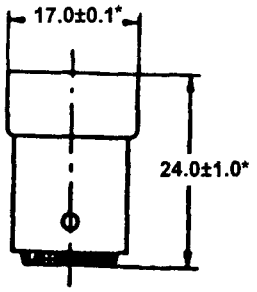
Caps may be made with a flare* the diameter of which shall be not more than 1 mm greater than the maximum permissible diameter of the corresponding cap without a flare.

For finished lamps the creeping distance over insulation shall be not less than 3 mm between live parts and not less than 2 mm between the parts and the metal shell.

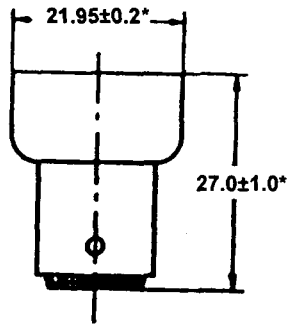
B15d/19



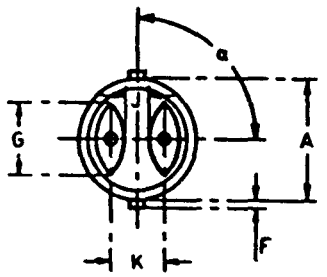
B15d/24 × 17

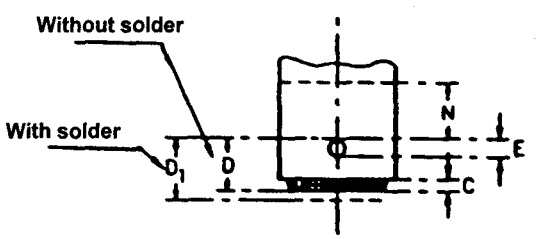


B15d/27 × 22



B15d





Data Sheet No. 7004-11

(Continued)

Dimension	*Min*	*Max*
A	15.00	15.25
*C**	1.5	—
D	6.0	6.66*
D_1	—	7.5
E	1.80	2.20
F	0.90	1.10
G[1)]	Approx. 9	
H[1)]	Approx. 5	
J[1)]	3.0	—
*K**	7.0	8.0
N[2)]	7.0	—
α	82°30′	97°30′

* These dimensions are solely for cap design and are not to be gauged on the finished lamp.

[1)] This dimension is checked with a millimetre scale.

[2)] "*N*" denotes the minimum length to which dimension "*A*" must conform.

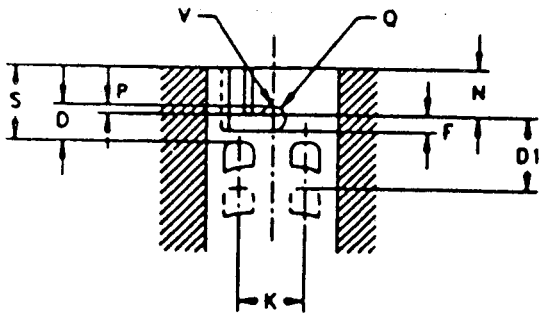
Data Sheet No. 7004-11

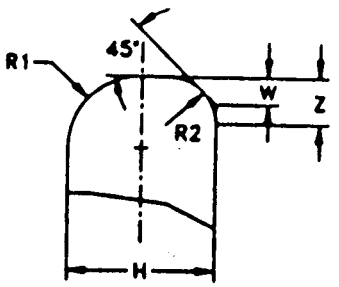
BAYONET LAMPHOLDERS
B22d

Dimensions in millimetres.

The drawing is intended only to illustrate the dimensions essential for interchangeability.

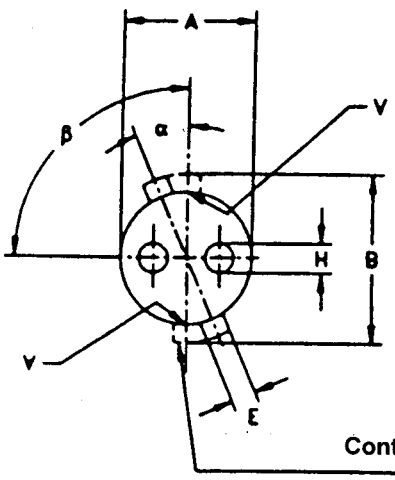
For details of cap B22d, *see* Data Sheet 7004-10.





Min. Profile Max. Profile

EXTREME PLUNGER PROFILE
(Piston type only)



Contour of free space for cap pins

V = resting point of cap pin.

Data Sheet No. 7005-10

(*Continued*)

Dimension	*Min*	*Max*
A[1) 3)]	22.3[2)]	22.7[4)]
B	27.27[3)]	–
D	–	4.9[5)]
*D*1	8.5	–
E[6)]	2.7	3.8
F	2.7[6)]	–
H[7)]	3.5	–
K	10.5	13.2
N	–	6.5
P	0.9	1.3
Q	*E*/2[3)]	
R[1)]	*H*/2	
R[2)]	*Z*	
S[8)]	8.0	–
W	Approx 1.0	
Z	1.3	–
α	Approx 23°	
β	82°30′	97°30′

[1)] Departures from the full cylindrical form depicted are allowed provided that dimension *A* is maintained immediately above the resting Points "*V*" and also at a sufficient number of other points around the perimeter of the holder to provide adequate support for the lamp cap.

[2)] This value may be reduced to 22.1 mm for lampholders the shells of which are slotted to provide spring tension for gripping the lamp cap.

[3)] To be checked by means of the appropriate gauge shown on Data Sheet 7006-12.

[4)] This value may be increased to 23.19 mm for holders of "all ceramic" construction which case it shall be checked by means of the gauge shown on Data Sheet 7006-12B.

[5)] To be checked by means of the gauge shown on Data Sheet 7006-15A.

[6)] To be checked by means of the appropriate gauge shown on Data Sheet 7006-13.

[7)] Dimension *H* refers to the diameter of plunger contacts only.

[8)] For the significance of dimension *S*, *see* the relevant requirement given below:

The dimensions shown are for design purposes only shall not be checked individually. Checks to verify interchangeability with respect to the corresponding caps on finished lamps shall be made only by means of the gauges specified.

Holders shall be so designed that there is no risk of electrical contact with, or short-circuit between, the holder contacts by the shells of the lamp cap when an attempt is made to insert this at an angle to the axis of the holder.

This may be achieved in either of the following ways:

a) By observing the limit for dimension *S* at a sufficient number of points around the perimeter of the holder bore.

b) By the provision of a skirt or similar device to limit the degree of possible skewness during insertion of a lamp.

Data Sheet No. 7005-10

(*Continued*)

The contact-making surface shall be smooth and so shaped at their edges that they do not prevent easy insertion and removal of a corresponding lamp.

Where piston-type cylindrical plungers are used, the following particular requirements shall apply:

a) The contact face of the plunger shall be flat or convex; it shall not be concave. The contact-making surface shall be free from burrs or other sharp projections.
b) The transition of the contact-making surface to the cylindrical diameter of the plunger shall be rounded or chamfered in accordance with values given in the table.
c) The extreme profile of the plunger face may be hemispherical.

The forces required to depress each contact individually to positions of 6.0 mm[1)] and 8.0 mm[1)] beyond the plane through the resting points "*V*" shall comply with the values shown in Table 3.

To be checked by means of the gauge shown on Data Sheet 7006-15A.

[1)] These contact positions correspond with those resulting from the fitting of caps of which the values of dimension *D*1 are minimum and maximum respectively.

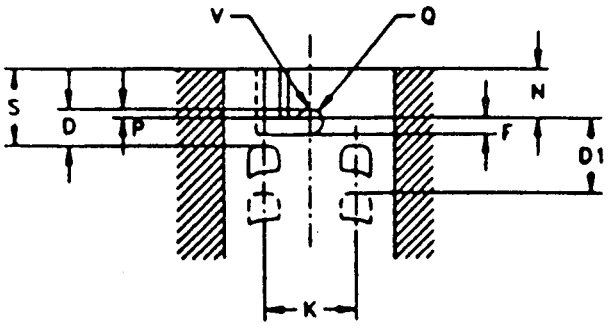
Data Sheet No. 7005-10

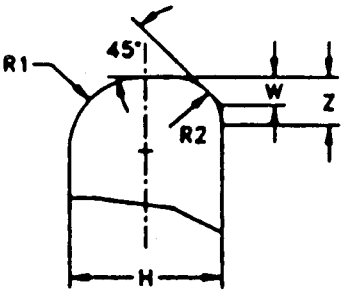
BAYONET LAMPHOLDERS
B15d

Dimensions in millimetres.

The drawing is intended only to illustrate the dimensions essential for interchangeability.

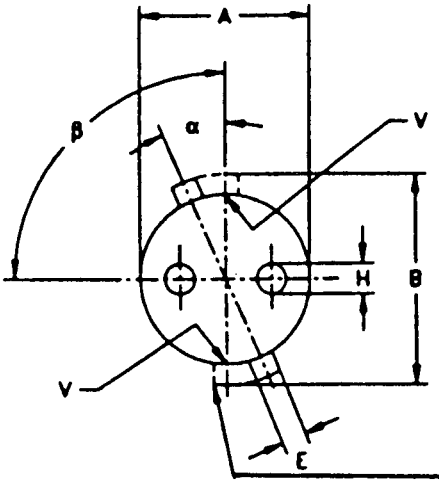
For details of cap B15d, *see* Data Sheet 7004-11.





Min Profile Max Profile

EXTREME PLUNGER PROFILE
(Piston type only)



Contour of free space for cap pins

V = resting points of cap pin.

Data Sheet No. 7005-16

(*Continued*)

Dimension	*Min*	*Max*
$A^{1)\,2)}$	15.3	15.5
B	17.65 [3)]	—
D	—	4.9[3)]
*D*1	8.0	—
$E^{4)}$	2.7	3.2
F	2.7[4)]	—
$H^{5)}$	2.6	—
K	7.9	9.7
N	—	6.8
P	0.7	1.0
Q	*E*/2	
*R*1	*H*/2	
*R*2	*Z*	
$S^{6)}$	6.0	—
W	Approx 0.75	
Z	1.3	—
a	Approx 29°	
β	82°30′	97°30′

[1)] Departures from the full cylindrical form depicted are allowed provided that dimension *A* is immediately above the resting points "*V*" and also at a sufficient number of other points around the perimeter of the holder to provide adequate support for the lamp cap.

[2)] To be checked by means of the appropriate gauge shown on Data Sheet 7006-12.

[3)] To be checked by means of the gauge shown on Data Sheet 7006-15B.

[4)] To be checked by means of the gauge shown on Data Sheet 7006-13.

[5)] Dimension *H* refers to the diameter of plunger contacts only.

[6)] For the significance of dimension *S*, *see* the relevant requirement given below:

The dimensions shown are for design purposes only and shall not be checked individually checks to verify interchangeability with respect to the corresponding caps on finished lamps shall be made only be means of the gauges specified.

Holders shall be so designed that there is no risk of electrical contact with, or short-circuit between, the holder contacts by the shell of the lamp cap when an attempt is made to insert this at an angle to the axis of the holder.

This may be achieved in either of the following ways:

a) By observing the limit for dimension *S* at a sufficient number of points around the perimeter of the holder bore.

b) By the provision of a skirt or similar device to limit the degree of possible skewness during insertion of a lamp.

Data Sheet No. 7005-16

(*Continued*)

The contact-making surfaces shall be smooth and so shaped at their edges that they do not prevent easy insertion and removal of a corresponding lamp.

Where piston-type cylindrical plungers are used, the following particular requirements shall apply.

a) The contact face of the plunger shall be flat or concave. The contact-making surface shall be free from burrs or other sharp projections.

b) The transition of the contact-making surface to the cylindrical diameter of the plunger shall be rounded or chamfered in accordance with the values given in the table.

c) The extreme profile of the plunger face may be hemispherical.

The forces required to depress each contact individually to positions of 6.0 mm[1)] and 7.5 mm[2)] beyond the plane through the resting points "*V*" shall comply with the values shown in Table 3.

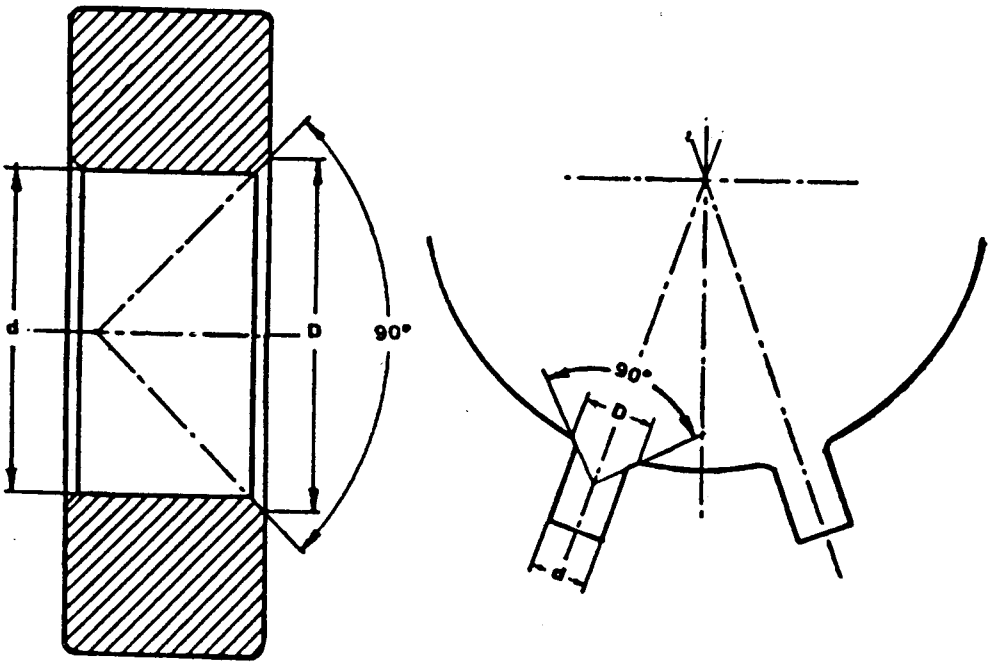
To be checked by means of the gauge shown on Data Sheet 7006-15B.

[1)] These contact positions correspond with those resulting from the fitting of caps of which the values of dimension *D*1 are minimum and maximum respectively.

Data Sheet No. 7005-16

FACETS ON GAUGES EDGES

Wherever a simple rounding off of an edge is to be specified, this shall be done in accordance with the principle shown below. On the specific drawings such edges shall be marked simply as "Edges slightly chamfered (*see* Data Sheet 7006-1)".



The value of dimension "*D*" is determined by applying the following rules:

"NOT GO" gauges "*D*" = approx. 1.1 *d* (rounded out to full millimetres).

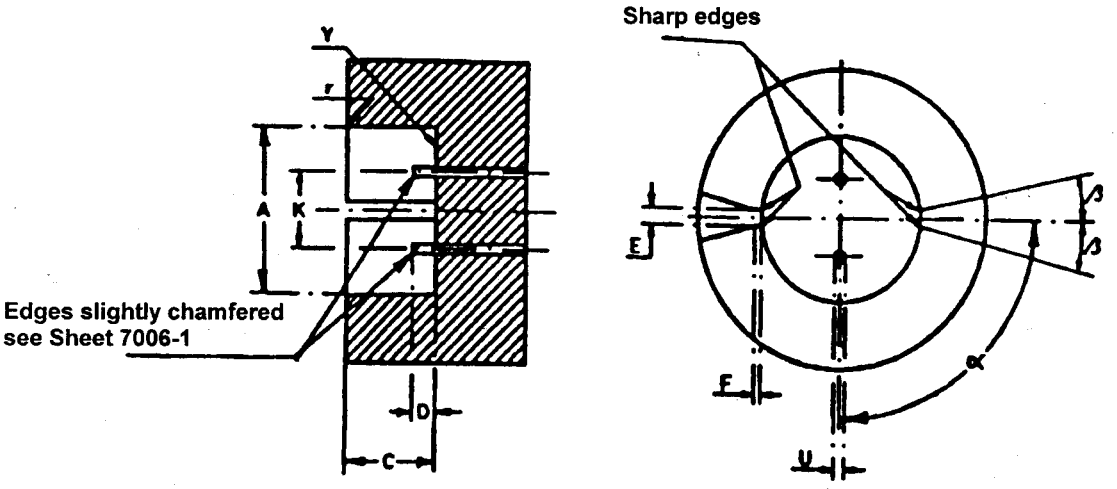
"GO"
- When "*D*" has an influence on the result, its value is fixed accordingly.
- When "*D*" has no influence on the result, "*D*" = approx. 1.1 *d*.

Data Sheet No 7006-1

ACCEPTANCE GAUGE FOR B22d CAPS INTENDED FOR AUTOMATIC WIRE THREADING

Dimensions in millimetres.

The drawing is intended only to illustrate the essential dimensions of the gauge.



PURPOSE — To check the suitability for automatic wire threading of B22d caps as shown in Data Sheet 7004-10.

TESTING — The cap shall be assumed to be correct if it can be inserted smoothly into the gauge until the contact plates of the cap touch surface *Y* of the gauge.

Reference	Dimension	Tolerance
A	22.2	+ 0.01 – 0.01
C	12.7	+ 0.1 – 0.1
D	3.1	+ 0.1 – 0.1
E	2.4	+ 0.01 – 0.01
F	1	+ 0.1 – 0.1
K	10.4	+ 0.01 – 0.01
U	1.3	+ 0.0 – 0.01
r	1.6	+ 0.2 – 0.2
α	90°	+ 2′ – 2′
β	Approx 15°	

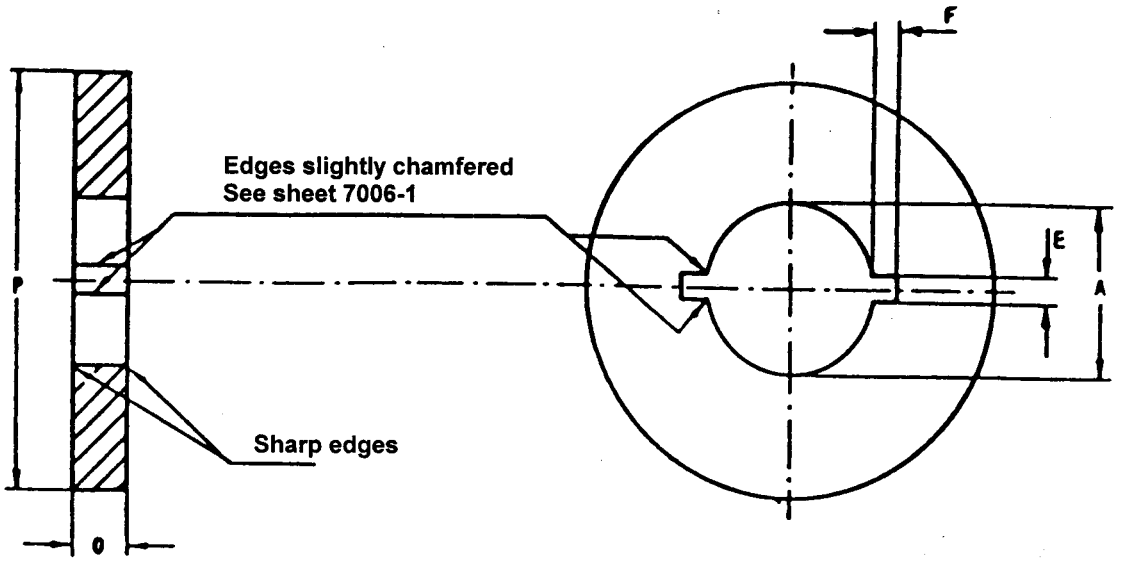
Data Sheet No. 7006-3

"NOT GO" GAUGES FOR CAPS B15 AND B22 OF FINISHED LAMPS

Dimensions in millimetres.

The drawing is intended only to illustrate the essential dimensions of the gauges.

For details of caps B15 and B22, *see* Data Sheets 7004-11 and 7004-10 respectively.



PURPOSE — To check dimensions *A* minimum, of caps B15 and B22 on finished lamps.

TESTING — Caps on finished lamps shall assumed to be correct if the gauge does not pass over the cap by its own weight.

The gauge for B15 may also be used for checking unmounted caps.

Reference	Dimension		Tolerance
	B15	B22	
A	15.0	21.75	+ 0.0 – 0.01
E	3.5	3.5	+ 0.5 – 0.5
F	3.5	3.5	+ 0.5 – 0.5
O	7	7	+ 0.1 – 0.1
Mass (kg)	0.050	0.100	+ 10% – 10%

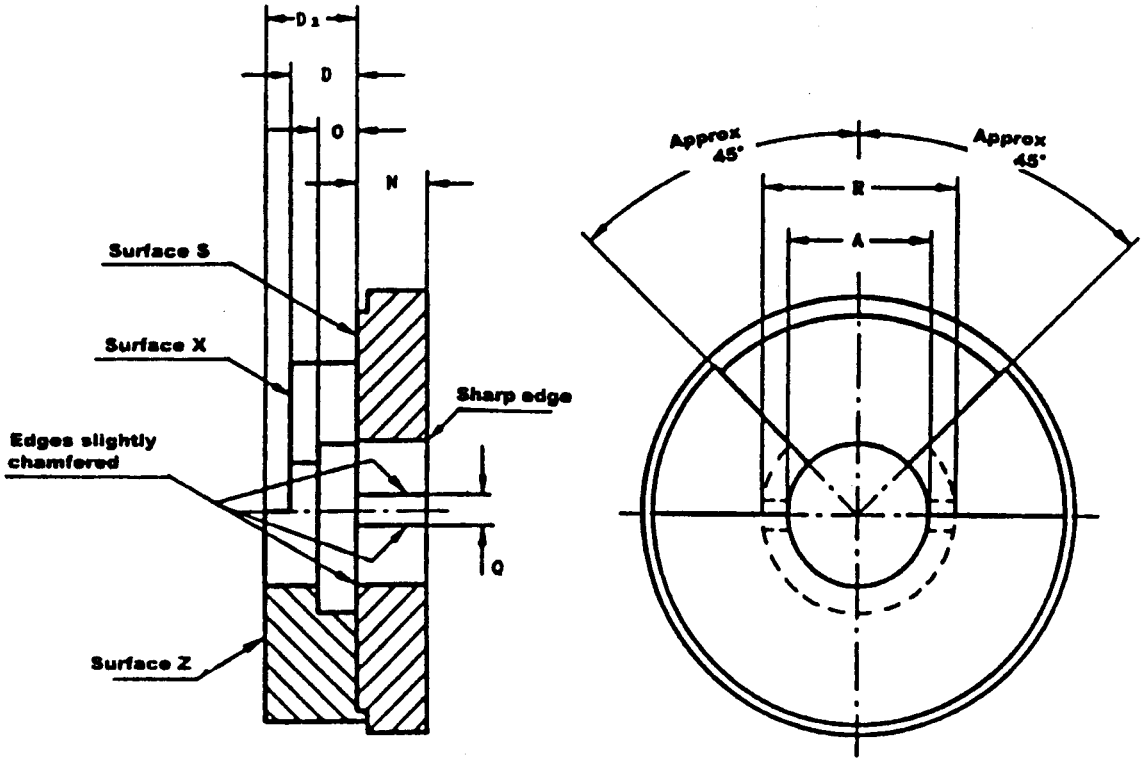
Data Sheet No. 7006-10

"GO" GAUGES FOR CAPS ON FINISHED LAMPS
B15 and B22

Dimensions in millimetres.

The drawing is intended only to illustrate the essential dimensions of the gauges.

For details of caps B15 and B22, *see* Data Sheets 7004-10 and 7004-11 respectively.



Data Sheet No. 7006-11

(Continued)

Dimension	B15	B22	Tolerance
A	15.25	22.15	+ 0.01 – 0.0
D	6.0	6.0	+ 0.0 – 0.01
D_1	7.5	8.0	+ 0.02 – 0.0
N[1)]	7.0	6.7	+ 0.0 – 0.01
O	3.05	3.05	+ 0.0 – 0.05
Q	2.5	2.5	+ 0.0 – 0.04
R	20.5	29.5	+ 0.0 – 1.0

PURPOSE — To check dimensions *A* maximum, *N* minimum, *D* minimum, D_1 maximum, and the diametrical position of the pins of caps B15 and B22 on finished lamps.

TESTING — The cap shall enter the gauge until the pins have passed through the slots *Q*. The cap is then turned through a small angle and is pressed so that the pins are in close contact with surface *S*. In this position, the contact-make in surface shall not be below surface *X* nor shall it project beyond surface *Z*.

NOTE — A similar gauge may be used for checking unmounted caps B15 provided that provision is made for checking dimension *D* maximum, as shown on Data Sheet 7004-11.

[1)] Dimensions *N* of the gauge checks the diameter of the cap for a sufficient length to ensure interchangeability of the caps in the holders.

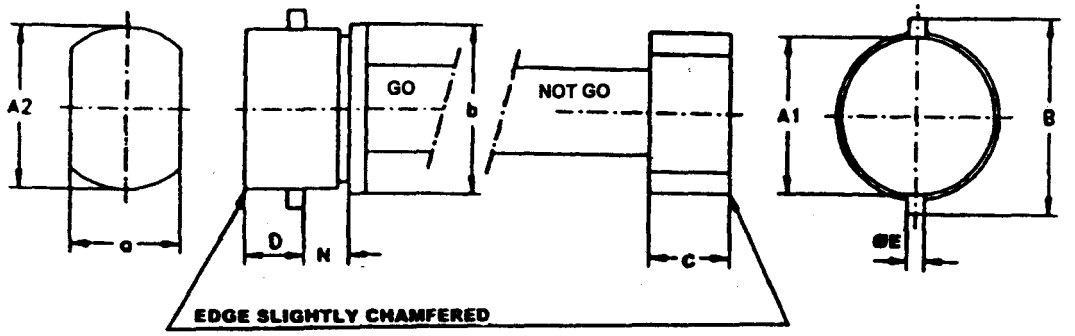
Data Sheet No. 7006-11

PLUG GAUGES FOR LAMPHOLDERS
B15 and B22

Dimensions in millimetres.

The drawing is intended only to illustrate the essential dimensions of the gauge.

For details of lampholders B15 and B22, *see* Data Sheets 7005-16 and 7005-10 respectively.



PURPOSE — To check dimensions *A* minimum, *A* maximum, *B* minimum, *D*1 minimum, *N* maximum and the diametrical position of the slots of lampholdes B15, B22 respectively.

TESTING — It shall be possible to insert the GO side of the gauge into the lampholder and turn it so that the pins pass the lowest points of the retaining slots and reach the seating point without using undue force.

It shall not be possible to insert the NOT GO side of the gauge by its own weight.

This test shall be made at least twice, the gauge being turned through approximately 90° the second time.

In case of "all ceramic" construction, the NOT GO side can be inserted by its weight, but not in all positions. The lampholder shall further fulfil the test of the gauge shown on Data Sheet 7006-12D (B15) or 7006-12B (B22).

Dimension	B15	B22	Tolerance
*A*1	15.3	22.3	+ 0.0 – 0.01
*A*2	15.5	22.7	+ 0.01 – 0.0
B	17.47	27.65	+ 0.0 – 0.01
D	8	8.53	+ 0.0 – 0.01
E	2.5	2.5	+ 0.0 – 0.01
N	6.8	6.5	+ 0.02 – 0.0
A	10.5	15.5	+ 1.0 – 0.0
B	16.5	23.7	+ 0.5 – 0.0
C	9.5	11.5	+ 1.0 – 0.0
Mass (kg)	0.2	0.3	+ 10% – 10%

Data Sheet No. 7006-12

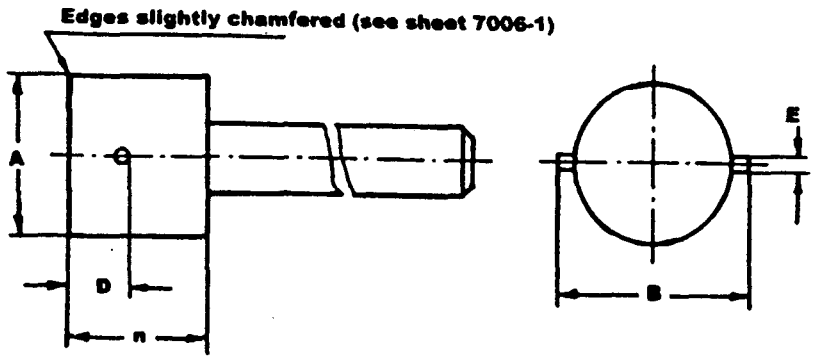
SUPPLEMENTARY "GO" GAUGES FOR LAMPHOLDERS B22d

Dimensions in millimetres.

The drawing is intended only to illustrate the essential dimensions of the gauges.

For details of lampholders B22d, *see* Data Sheet 7005-10.

NOTE — Special attention is drawn to the restricted use of these gauges. *See* "PURPOSE" below.



PURPOSE — The gauge shall be used solely to check interchangeability with respect to the corresponding caps B22d on finished lamps, after the test for resistance to heat in normal service.

TESTING — It shall be possible to insert the gauge into the holder and to locate the pins at the resting points without using undue force.

Reference	Dimensions B22d	Tolerance
A	22.2	+ 0.01 – 0.0
B	27.55	+ 0.01 – 0.0
D	8.02	+ 0.01 – 0.0
E	2.2	+ 0.01 – 0.0
n	20	+ 1 – 1

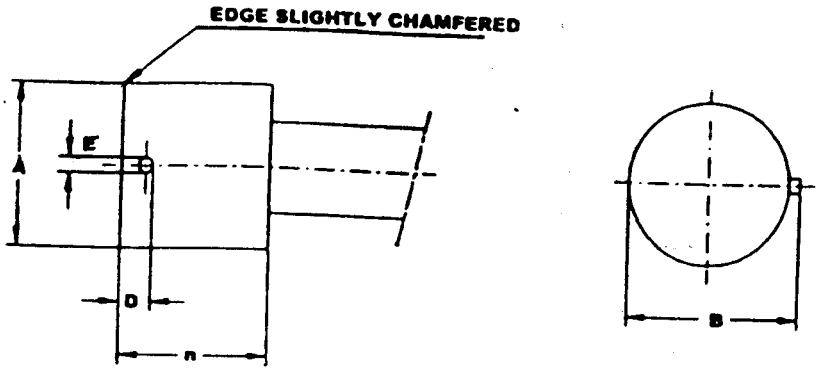
Data Sheet No. 7006-12A

"NOT GO"/RETENTION GAUGE FOR LAMPHOLDERS B22

Dimensions in millimetres.

The drawing is intended only to illustrate the essential dimensions of the gauge.

For details of holder B22, *see* Data Sheet 7005-10.



PURPOSE — The use of this gauge is restricted to the following purposes:

a) To check the maximum internal diameter, dimension *A*, of lampholders of "all ceramic" construction to Data Sheet 7005-10, with respect to maintaining retention of caps by both pins and to restricting angular displacement of lamp.

b) To check the maximum internal diameter, dimension *A*, of lampholders according to Data Sheet 7005-10 with respect to maintaining retention of caps by both pins and to restricting angular displacement of lamps, after the test of general resistance to heat (*see* **19**).

TESTING

a) With its axis parallel to the axis of the lampholder, it shall not be possible to insert the gauge (including the pin) into the bore of the lampholder other than at the "J" slots or at other points where it is not intended that the lamp cap should be supported.

b) The gauge shall be inserted into the bore of the lampholder with pin in one of the "J" slots and turned until the pin is seated at the appropriate resting point. The gauge then is displaced laternally away from the direction of the pin as far as it will go in order to reduce retention to a minimum.

In this position it shall not be possible to remove the gauge when an axial pull is applied to it.

The test is repeated at the other "J" slot.

Reference	Dimension	Tolerance
A	21.75	+ 0.0 − 0.01
B	23.2	+ 0.01 − 0.0
D	4.25	+ 0.0 − 0.05
E	2.0	+ 0.01 − 0.01
n	20	+ 1 − 1

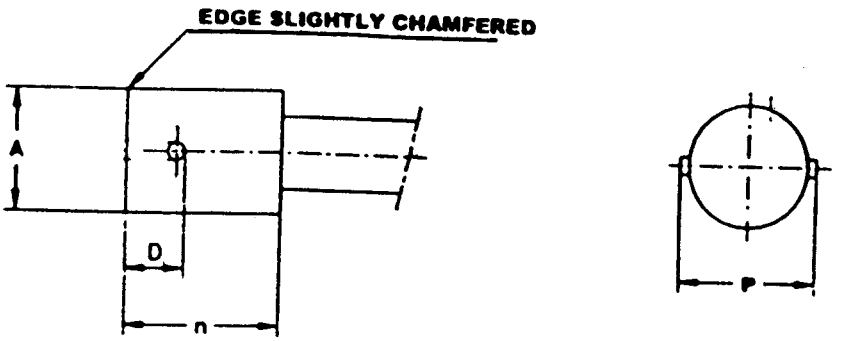
Data Sheet No. 7006-12B

SUPPLEMENTARY "GO" GAUGE FOR LAMPHOLDERS
B15d

Dimensions in millimetres.

The drawing is intended only to illustrate the essential dimensions of the gauge.

For details of holder B15, *see* Data Sheet 7005-16.



PURPOSE — The gauge shall be used solely to check interchangeability with respect to the corresponding caps on finished lamps, after the test of general resistance to heat (*see* **19**).

TESTING — It shall be possible to insert the gauge into the holder and to locate the pins at the points without using undue force.

Reference	Dimension	Tolerance
A	15.26	+ 0.01 − 0.0
B	7.52	+ 0.01 − 0.0
E	2.2	+ 0.01 − 0.0
P	17.45	+ 0.01 − 0.0
n	20	+ 1 − 1

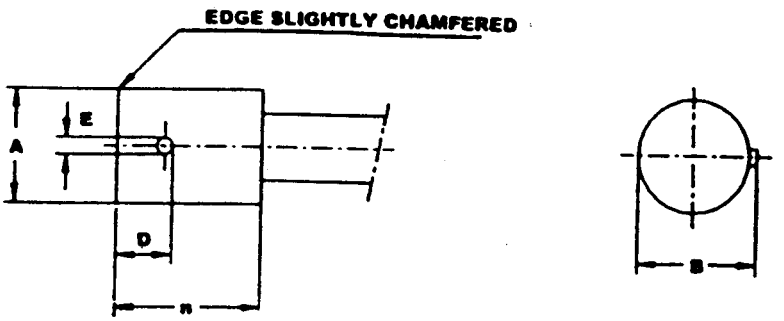
Data Sheet No. 7006-12C

"NOT GO" RETENTION GAUGE FOR LAMPHOLDERS B15

Dimensions in millimetres.

The drawing is intended only to illustrate the essential dimensions of the gauge.

For details of holder B15, *see* Data Sheet 7005-16.



PURPOSE — The use of this gauge is restricted to the following purposes:

a) To check the maximum internal diameter, dimension *A*, of lampholders of "all-ceramic" construction according to Data Sheet 7005-16 with respect to maintaining retention of caps pins and to restricting angular displacement of lamps.

b) To check the maximum internal diameter, dimension *A*, of lampholders according to Data Sheet 7005-16 with respect to maintaining retention of caps by both pins and to restricting angular displacement of lamps, after the test of general resistance to heat (*see* **19**).

TESTING

a) With its axis parallel to the axis of the lampholder, it shall not be possible to insert the gauge (including the pin) into the bore of the lampholder other than at the "J" slots or at other points where it is not intended that the lamp cap should be supported.

b) The gauge shall be inserted into the bore of the lampholder with the pin in one of the "J" slots and turned until the pin is seated at the appropriate resting point. The gauge then is displaced laterally away from the direction of the pin as far as it will go in order to reduce retention to a minimum.

In this position it shall not be possible to remove the gauge when an axial pull is applied to it.

The test is repeated at the other "J" slot.

Reference	Dimension	Tolerance
A	15.0	+ 0.0 – 0.01
B	15.9	+ 0.01 – 0.0
D	4.25	+ 0.0 – 0.05
E	2.0	+ 0.01 – 0.01
n	20	+ 1 – 1

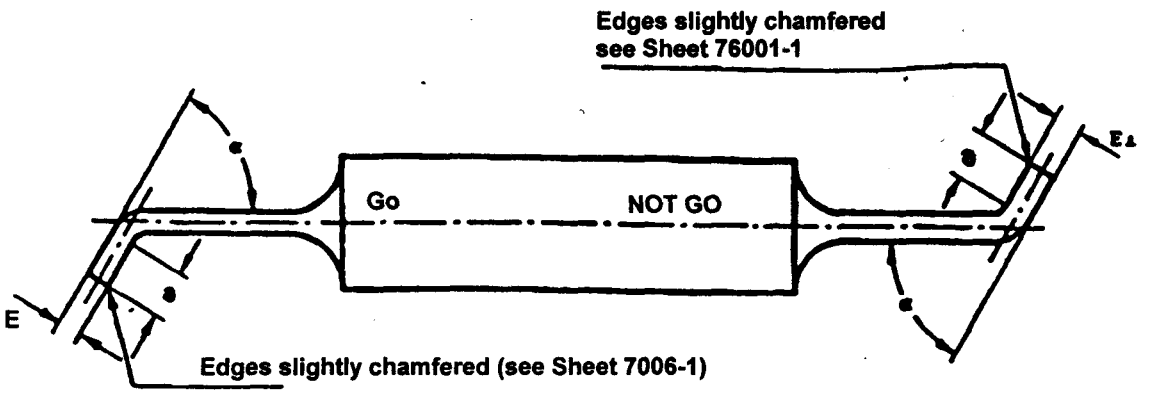
Data Sheet No. 7006-12D

GAUGES FOR THE SLOTS IN LAMPHOLDERS
B15d and B22d

Dimensions in millimetres.

The drawing is intended only to illustrate the essential dimensions of the gauges.

For details of lampholders B15d and B22d, *see* Data Sheets 7005-16 and 7005-10 respectively.



PURPOSE — To check the minimum and maximum width of the slots of lampholders B15d and B22d respectively.

TESTING — The slot is assumed to be correct, if the "GO" side of the gauge enters the slot and passed under the projection until it stops in the resting place of the bayonet pins and if the "NOT GO" side of the gauge does not enter the straight part of the slot.

Reference	Dimension		Tolerance
	B15d	B22d	
E	2.7		+ 0.0 − 0.01
*E*1	3.2	3.8	+ 0.01 − 0.0
a	6		+ 0.5 − 0.5
α	Approx 60°		—

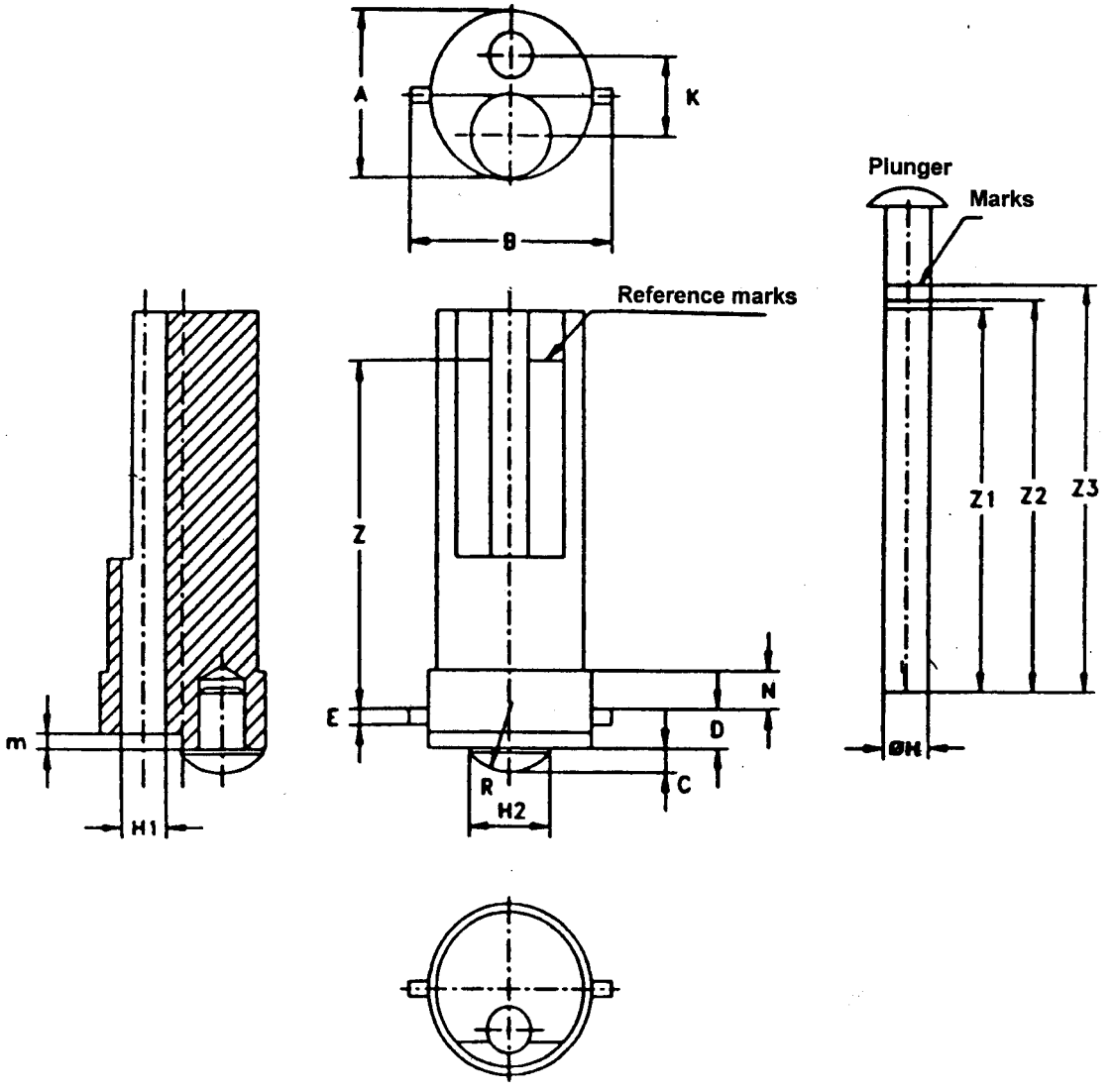
Data Sheet No. 7006-13

GAUGES FOR CHECKING CONTACT POSITION AND CONTACT FORCE IN BAYONET LAMPHOLDERS
B22d

Dimensions in millimetres.

The drawing is intended only to illustrate the dimensions essential for interchangeability.

For details of lampholders B22d, *see* Data Sheet 7005-10.



The drawing does not show a means of clamping the gauge in the lampholder.

The manner in which such means are provided depends on the design of the lampholder under test. However, it must be ensured that in every case both pins of the gauge are held firmly against the corresponding resting points of the lampholder.

Data Sheet No. 7006-15A

(*Continued*)

Reference	Dimension	Tolerance
A	22.15	+ 0.0 – 0.1
B	27.55	+ 0.0 – 0.2
C	3.0	+ 0.05 – 0.05
D	5.0	+ 0.0 – 0.05
E	2	+ 0.2 – 0.0
H	6.0	+ 0.0 – 0.03
*H*1	6.01	+ 0.03 – 0.0
*H*2	11	+ 0.1 – 0.0
K	10.5	+ 0.1 – 0.1
N	Approx 5[1)]	—
R	7.5	+ 0.2 – 0.2
Z	Approx 45	—
*Z*1	*Z* + 4.9	+ 0.05 – 0.05
*Z*2	*Z* + 6.0	+ 0.05 – 0.05
*Z*3	*Z* + 8.0	+ 0.05 – 0.05
m	2	+ 0.1 – 0.1

[1)] This value is optional and is recommended where the gauge is used for checking conventional pendant type holders. It is intended to simulate as nearly as possible the barrel of the lamp cap.

PURPOSE — To check lampholders B22d with respect to:

a) Dimension $D_{Max.}$

b) The minimum and maximum forces of the individual contacts corresponding with those resulting from the fitting of caps B22d of which the values of dimension *D*1 are minimum and maximum respectively.

Data Sheet No. 7006-15A

(Continued)

TESTING

a) To check dimension D_{Max}.

With the relevant gauge held firmly in the lampholder and with both retention pins held against the corresponding testing points, the plunger is inserted into the bore provided until it touches one of the holder contacts. With the lampholder held with its axis vertical and with the gauge uppermost, the mark *Z*1 on the plunger shall coincide with or be above the reference marks on the gauge body. During this test no force shall be applied to the plunger.

The test is repeated for the other holder contact.

b) To check the minimum and maximum contact force.

With the relevant gauge assembled in the lampholder as in (a) above, an axial force is applied to the plunger until mark *Z*2 coincide with the reference marks on the gauge body. At this position the force shall be measured and shall be not less than the minimum force specified in Table 3.

The force is then increased until mark *Z*3 coincides with the relevant marks. At this position the force shall be measured and shall be not more than the maximum force specified in Table 3.

The test is repeated for the other holder contact.

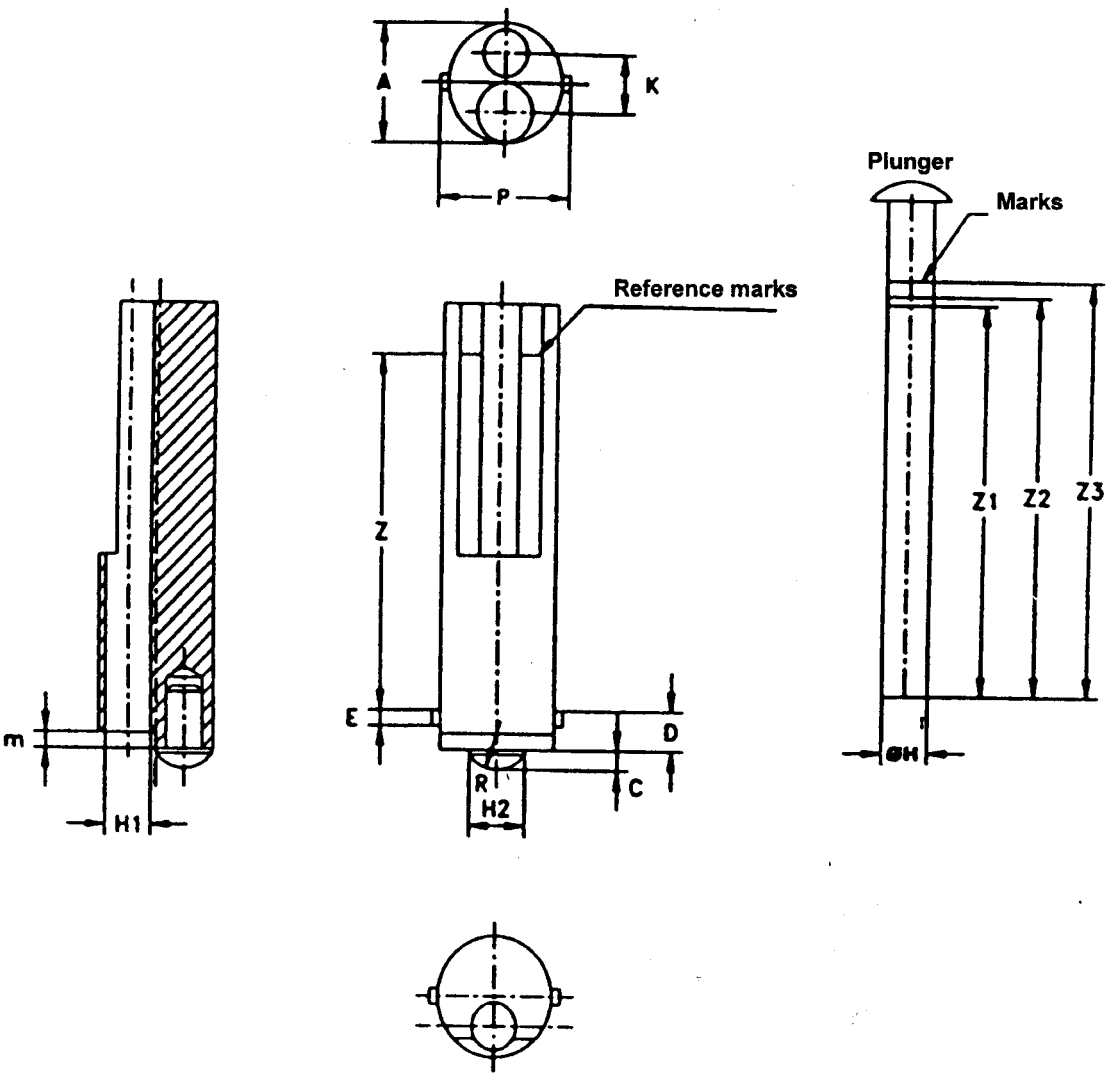
Data Sheet No. 7006-15A

GAUGES FOR CHECKING CONTACT POSITION AND CONTACT FORCE IN BAYONET LAMPHOLDERS
B15d

Dimensions in millimetres.

The drawing is intended only to illustrate the dimensions essential for interchangeability.

For details of lampholders B15d, *see* Data Sheet 7005-16.



The drawing does not show a means of clamping the gauge in the lampholder.

The manner in which such means are provided depends on the design of the lampholder under test. However, it must be ensured that in every case both pins of the gauge are held firmly against the corresponding resting point of the lampholder.

Data Sheet No. 7006-15B

(Continued)

Reference	Dimension	Tolerance
A	15.25	+ 0.0 – 0.1
C	2.5	+ 0.05 – 0.05
D	5.0	+ 0.0 – 0.05
E	2	+ 0.2 – 0.0
H	6.0	+ 0.0 – 0.03
*H*1	6.01	+ 0.03 – 0.0
*H*2	7.5	+ 0.1 – 0.0
K	7.5	+ 0.1 – 0.1
P	17.45	+ 0.0 – 0.2
R	4.7	+ 0.2 – 0.2
Z	Approx 45	—
*Z*1	*Z* + 4.9	+ 0.05 – 0.05
*Z*2	*Z* + 6.0	+ 0.05 – 0.05
*Z*3	*Z* + 7.5	+ 0.05 – 0.05
m	2	+ 0.1 – 0.1

PURPOSE — To check lampholders B15d with respect to:

a) Dimension D_{Max}.

b) The minimum and maximum forces of the individual contacts corresponding with those resulting from the fitting of caps B15d of which the values of dimensions *D*1 are minimum and maximum respectively.

Data Sheet No. 7006-15B

(*Continued*)

TESTING

a) To check dimension D_{Max}.

With the relevant gauge held firmly in the lampholder and with both retention pins held against the corresponding resting points, the plunger is inserted into the bore provided until it touches one of the holder contacts. With the lampholder held with its axis vertical and with the gauge uppermost, the mark *Z*1 on the plunger shall coincide with or be above the reference marks on the gauge body. During this test no force shall be applied to the plunger.

The test is repeated for the other holder contact.

b) To check the minimum and maximum contact force.

With the relevant gauge assembled in the lampholder as in (a) above, an axial force is applied to the plunger until mark *Z*2 coincides with the reference marks on the gauge body. At this position the force shall be measured and shall be not less than the minimum force specified in Table 3.

The force is then increased until mark *Z*3 coincides with the relevant marks. At this position the force shall be measured and shall be not more than the maximum force specified in Table 3.

The test is repeated for the other holder contact.

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(*Continued from second cover*)

c) Supply frequency specified as 50 HZ in line with Indian Electricity Rules in place of both 50 HZ and 60 HZ

d) In Table 11, for testing of lampholders of T2 marking, lamp of 200 W has been allowed.

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 '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.

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AMENDMENT NO. 1 NOVEMBER 2007
TO
IS 1258 : 2005 BAYONET LAMPHOLDERS

(Fourth Revision)

[*Page* 21, *clause* **22.2**(j)] — Insert the following note at the end:

'NOTE — The test for 'Resistance to Heat (*see* **19**)' shall be in abeyance till 31 December 2007.'

(ETD 14)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 DECEMBER 2009
TO
IS 1258 : 2005 BAYONET LAMPHOLDERS

(Third Revision)

(*Page* 12, *clause* **15.2**) **—** Insert the following Note 2 and renumber the existing Note as Note 1:

'**2** For the purpose of acceptance test, the humidity treatment is subjected for 24 hours.'

[*Page* 21, *clause* **22.2**(j)] **—** Insert the following Note at the end:

'NOTE **—** General resistance to heat test will be applicable as acceptance test after December 2009.'

(ET 14)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 3 AUGUST 2011
TO
IS 1258 : 2005 BAYONET LAMPHOLDERS

(Fourth Revision)

[*Page* 19, *clause* **20.1**, *para* 4] — Insert the following Note at the end of this para:

'NOTE — Resistance to heat test shall be carried out at 175°C and 200°C inside the heating cabinet on inner parts of the lampholders which hold the current carrying parts while on outer body of dome and skirt, the same shall be carried out at 125°C with tolerance of ±1°C only.'

(ET 14)

Reprography Unit, BIS, New Delhi, India