SRI LANKA STANDARD 320 : 1993

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SPECIFICATION FOR

CEILING ROSES

(FIRST REVISION)

SRI LANKA STANDARDS INSTITUTION

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SLS 320 : 1993

Gr. 17

SRI LANKA STANDARDS INSTITUTION
53, Dharmapala Mawatha,
Colombo 3,
Sri Lanka.

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FOREWORD

This standard was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 93-01-21 , after the draft, finalized by the Sectoral Committee on Electrical accessories and appliances.

This is the first revision of **SLS 320 : 1974**. It has been revised to fall in line with current international standards.

Guidelines for the determination for a compliance of a lot with the requirements of this standard based on statistical sampling and inspection is given in Appendix **A**. Guidelines for type testing is given in Appendix **B**.

All values given in this specification are in SI Units.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the results of a test or an analysis shall be rounded off in accordance with **SLS** 102. The number of figures to be retained in the rounded off values shall be the same as that of the specified value in this standard.

In the preparation of this standard, the assistance derived from the **BS 67 : 1987** Specification for ceiling roses is gratefully acknowledged.

1 SCOPE

This Standard specifies requirements for ceiling roses having maximum ratings of 6 A and 250 V intended for

a) for ceiling roses with screw-type supply terminals for use in final circuits rated at 16 A maxium; or

b) ceiling roses with screwless supply terminal for use in final circuits rated at 10 A maximum.

The ceiling roses are intended for use with cords and cables complying with **SLS 879** .

Ceiling roses incorporating means other than rewirable terminals, to facilitate the connection and disconnection of lampholders or luminaires are not covered by this standard.

NOTE
Accessories complying with this standard may be regarded as lighting outlets.

2 REFERENCES

IEC 51	Direct action indicating analogue electrical measuring instruments and their accessories.
IEC 423	Outside diameters of conduits for electrical installations and threads for conduits and fittings.
IEC 584	Thermocouples Part 1 : Reference tables
IEC 670	Enclosures accessories, household and similar wired installations
ISO 4046	Paper, board, pulp and related terms, vocabulary
SLS 102	Presentation of numerical values
SLS 428	Random sampling methods
SLS 733	PVC-Insulated cables with copper conductors for electric power and lighting
SLS 841	Specification for Standard test fingers and probes
SLS 879	PVC insulated flexible cables and cords
SLS 963	Degree of protection provided by enclosures (IP Code)

3 DEFINITIONS

For the purposes of this specification the following definitions shall apply.

3.1 ceiling rose: An accessory for connection to the fixed wiring of an installation to pass current to a lampholder or a luminaire by means of the conductors of a flexible cord.

3.2 surface-type ceiling rose: A ceiling rose provided with a seating surface such that when mounted as intended it projects wholly outside the surface on which it is mounted.

3.3 semi-recessed or flush-type ceiling rose: A ceiling rose intended for mounting with its base partially or completely sunk into a box.

3.4 terminal housing: That part of the ceiling rose which locates and separates the terminals.

NOTE

The terminal housing may, or may not, be integral with the base.

3.5 terminal: A means by which the user can make an electrical connection between the appropriate cable or flexible cord and the conducting parts of the accessory without the use of special tools.

3.6 screw-type terminal: A terminal in which the connection is made directly or indirectly by means of screws or nuts of any kind.

NOTE

The following are examples of screw-type terminals.

a) A pillar terminal is a terminal in which the conductor is inserted into a hole or cavity, where it is clamped under the shank of the screw or screws. The clamping pressure may be applied directly by the shank of the screw or through an intermediate member to which pressure is applied by the shank of the screw.

b) A screw terminal is a terminal in which the conductor is clamped under the head of the screw. The clamping pressure may be applied directly by the head of the screw or through an intermediate part, such as a washer, clamping plate or anti-spread device.

c) A stud terminal is a terminal in which the conductor is clamped under a nut. The clamping pressure may be applied directly by a suitably shaped nut or through an intermediate part, such as a washer, clamping plate or anti-spread device.

3.7 screwless terminal : A connecting terminal for the connection and subsequent disconnection of one conductor or the dismountable interconnection of two or more conductors capable of being dismantled, the connection being made, directly or indirectly, by means of springs or wedges, eccentrics or cones, etc.

3.8 load terminals: Terminals intended to accommodate flexible conductors for the connection of a lamp load, via a lampholder or luminaire.

3.9 supply terminals: Terminals intended to accommodate conductors of the fixed wiring

3.10 loop terminal: A supply terminal intended for the interconnection of live conductors without the provision for the connection of flexible cords.

3.11 cover: That part of the external enclosure which is intended to be removed to gain access for installation purposes.

3.12 live parts: Current carrying parts, and those metal parts in contact with them during normal use.

NOTE

Earthing terminals are not considered to be current carrying parts.

3.13 rated current: The maximum load, in amperes, which may be connected to the load terminals.

4 RATINGS

4.1 Ceiling roses shall have a rated voltage of 250 V.

4.2 Ceiling roses shall have a rated current not exceeding 6 A.

5 CLASSIFICATION

Ceiling roses shall be classified as follows.

a) According to the method of mounting as:
   i) surface-type (see 3.2); or
   ii) semi-recessed or flush-type (see 3.3)

b) According to load-supporting capability (see 10.4) as:
   i) intened to support mechanical loads by means of a flexible cord complying with SLS 879
   ii) intended to support mechanical loads as indicated by the manufacturer in addition to those specified in 5(b) (i) , by means other than a flexible cord.

c) According to the current-carrying terminal arrangement as:
   i) having provision for the connection of switch wiring; or
   ii) having no provision for the connection of switch wiring.

d) According to terminal type as:
   i) having screw-type terminals; or
   ii) having screwless terminals; or
   iii) having a combination of both types of terminals

6 GENERAL REQUIREMENTS

Ceiling roses shall be so designed and constructed that when installed in the proper manner and in normal use they function reliably and cause no danger to persons or surroundings.

NOTE
Where tolerances are not specified in this specification the values are to be regarded as nominal.

7 ACCESSIBILITY

7.1 Ceiling roses shall be so designed and constructed that when properly assembled, correctly wired and fitted with flexible cord and cover as in normal use, live parts are not accessible.

7.1.1 Compliance shall be checked by applying, with a force of 5 N, Test Pin 1 of SLS 841 : 1988 to all accessible parts of the ceiling rose, when fitted with a circular twin 0.5 mm^2 flexible cord complying with Table 3 of SLS 879 : 1990 connected to the load terminals.

7.2 Ceiling roses shall be so designed and constructd that when properly assembled, correctly wired and fitted with cover, but not fitted with flexible cord, live parts are not accessible.

7.2.1 Compliance shall be checked by applying, with a force of 5 N, Test Finger 1 of SLS 841 : 1988 to all accessible parts of the ceiling rose.

7.3 When an associated controlling switch is in the 'OFF' position and the ceiling rose is dismantled to the extent necessary to remove or replace a corresponding flexible cord, any conducting part which may remain electrified shall not be accessible to accidental contact.

7.3.1 Compliance shall be checked by applying with a force of 5 N, Test Finger 1 of SLS 841 : 1988 in a manner most likely to make contact with such parts, with the ceiling rose fitted with 1.0 mm^2 insulated conductors from a cable complying with Table 5 of SLS 733 : 1986 .

7.4 Ceiling roses shall be provided with an enclosure to prevent inadvertent contact with live parts. If this enclosure includes a removable cover, the cover shall either:

a) require the use of a tool for its removal; or
b) comply with 7.4.1; or
c) comply with 7.4.2

7.4.1 Screw type covers of ceiling roses shall not be removable without the cover being unscrewed through an angle of more than 270°.

7.4.1.1 Compliance shall be checked by mounting the ceiling rose on a flat plain surface, wired as in normal use and with the cover tightened to a torque, in newton metres, equal to 0.02 times the effective thread diameter, in millimetres, of the securing thread. The cover shall not be removable without first being turned through an angle greater than 270°.

7.4.2 Live parts shall not be accessible with the cover removed.

7.4.2.1 Compliance shall be checked by mounting the ceiling rose as in normal use and correctly wired but with the cover removed. It shall not be possible to touch live parts with Test Finger 1 of SLS 841 : 1988 applied with a force of 5 N.

7.5 In applying the tests described in 7.1.1, 7.2.1, 7.3.1 and 7.4.2.1 a supply of 45 $\pm$ 5 V, in series with a suitable indicating lamp, shall be connected between the Test Pin or Test Finger and the relevant conducting parts of the ceiling rose.

8 PROVISION FOR EARTHING

8.1 All ceiling roses shall be provided with an earthing terminal as specified in 10.

8.2 Provision shall be made for the effective earthing of all metal parts that may become live in the event of failure of the insulation of the ceiling rose or conductors and which are capable of being touched by Test Finger 1 of **SLS 841 : 1988** when the ceiling rose is correctly wired and mounted as in normal use. This requirement does not apply to screws in or through non-conducting material and separated by such material from live parts in such a way that, in normal use , they cannot become live. Any connection between the earthing terminal or earthing contact and parts required to be connected thereto shall be of low resistance.

8.2.1 Compliance shall be checked by measuring the resistance between the earthing terminal and any other metal required to be earthed. The resistance shall not exceed 0.05 ohms at 25 A.

9 TERMINALS

9.1 Terminals shall be provided for the connection of line, neutral and preferably for protective earthing conductors. Terminals intended for the connection of fixed wiring shall permit the connection, without special preparation, of one, two or three 1.0 mm^2 1.5 mm^2 solid conductors, except in the case of the terminal for the connection of switch wiring, which shall permit the connection of one or two such conductors. There shall be separate means to permit the connection of line and neutral conductors of a flexible cord from 0.5 mm^2 to 1.0 mm^2.

Terminals shall be of a type in which each conductor is gripped firmly and they shall be so designed as to prevent the strands of the conductor from slipping out. Compliance shall be checked by inspection.

NOTE

A screw type terminal may clamp rigid conductors individually or collectively.

9.2 Screw type terminals shall be so located that they are prevented from rotating when the terminal screws are turned.
When pillar type terminals are used they shall meet the following requirements:

a) minimum nominal diameter of terminal screw: 2.5 mm;

b) minimum thickness of wall through which the terminal screw passes: half core diameter of the thread of the terminal screw;

c) The diameter of the conductor hole shall not permit a clearance greater than 0.4 mm on either side of the terminal screw. The screw shall be long enough under the head to extend to the far side of the conductor hole. The screw shall have a slightly rounded end, and the wall of the hole (against which the screw clamps the conductor) shall be unbroken.

9.2.1 Compliance shall be checked by inspection, measurement and the following test. A rigid conductor of 1.0 mm² cross-sectional area shall be placed in the terminal. Screws and nuts shall be tightened and loosened five times by means of a suitable screwdriver or spanner applying a torque as shown in Table 1.

TABLE 1 - Terminal screw torque values

Nominal diameter of screw mm	Mechanical strength test (see 9.2)		Normal use (see clause 15.2)	
	For screws without head	For other screws and nuts	For screws without head *	For other screws and nuts
	Nm	Nm	Nm	Nm
(1)	(2)	(3)	(4)	(5)
Up to and including 2.6	0.15	0.30	0.10	0.20
Over 2.6, up to and including 2.8	0.20	0.40	0.13	0.26
Over 2.8, up to and including 3.0	0.25	0.50	0.16	0.32
Over 3.0, up to and including 3.2	0.30	0.60	0.20	0.40
Over 3.2, up to and including 3.6	0.40	0.80	0.30	0.60
Over 3.6, up to and including 4.1	0.70	1.20	0.40	0.80
Over 4.1, up to and including 4.7	0.80	1.80	0.60	1.20
Over 4.7, up to and including 5.3	0.80	2.00	0.60	1.40
Over 5.3, up to and including 6.0	0.80	2.50	0.60	1.60

NOTE

It is essential that the shape of the blade of the test screwdriver suits the head of the screw being tested and that the screw is not tightened in jerks.

The conductor shall be moved each time the screw or nut is loosened.

During the test, no change shall occur that impairs the further use of the terminal.

9.3 It is permissible for screwless terminals to be suitable for rigid and/or flexible conductors.

If the screwless terminal is suitable for both rigid and flexible conductors, tests shall be carried out with rigid conductors first and then repeated with flexible conductors.

Screwless terminals shall be provided with clamping units which allow the proper connection of copper conductors having nominal cross-sectional areas complying with 9.1

NOTE

The screwless terminals are intended for the connection of copper conductors only, without special preparation.

When two conductors have to be connected, each conductor shall be introduced into a separate independent clamping unit. (This does not necessarily mean in separate holes).

Parts of screwless terminals mainly intended for carrying current shall be of materials as specified in 11.3.

NOTE

Springs, resilient units, clamping plates and the like are not considered as parts mainly intended for carrying current.

9.3.1 *Compliance shall be checked by inspection.*

9.4 Screwless terminals shall be so designed that they clamp the specified conductors with sufficient contact pressure and without undue damage to the conductors. Conductors shall be deemed to be unduly damaged if they show deep or sharp indentation.

The conductor shall be clamped between metal surfaces. It shall be clear how the insertion and disconnection of the conductors is intended to be effected; this may be with or without the aid of a tool.

The intended disconnection of a conductor shall require an operation other than a pull not exceeding 30 N on the conductor.

If openings are provided for the use of a tool intended to assist the insertion or disconnection, they shall be clearly distinguishable from the opening intended for the conductor.

9.4.1 Compliance shall be checked by inspection and by the tests described in 9.8.

9.5 Screwless terminals which are intended to be used for the interconnection of more than one conductor shall be so designed that:

a) during the insertion, the operation of the clamping means of one of the conductors is independent of the operation of that of the other conductor;

b) during the disconnection, the conductors can be disconnected either at the same time or separately.

It shall be possible to clamp securely any number of conductors up to the maximum as designed.

9.5.1 Compliance shall be checked by inspection and manual tests using the appropriate conductors (number and size)

9.6 Screwless terminals shall be so designed that undue insertion of the conductor is prevented and adequate insertion is obvious.

NOTE

For the purpose of this requirement, an appropriate marking indicating the length of insulation to be removed before the insertion of the conductor into the screwless terminal may be put on the ceiling rose or given in an instruction sheet which accompanies the ceiling rose.

9.6.1 Compliance shall be checked by inspection and by the tests of 9.8.

9.7 Screwless terminals shall be properly fixed to the ceiling rose. They shall not work loose when the conductors are inserted or disconnected (during installation and in normal use).

NOTE

Covering with sealing compound without other means of locking is not sufficient. Self hardening resins may, however, be used to fix terminals which are not subject to mechanical stress in normal use.

9.7.1 Compliance shall be checked by inspection and by the tests of **9.8.**

9.8 Screwless terminals shall withstand the mechanical stresses occurring in normal use.

9.8.1 For screwless terminals designed for use with rigid conductors, compliance shall be checked with insulated conductor on one screwless terminal of each ceiling rose. The test is carried out with solid copper conductors, first with conductors having the largest cross sectional area, and then with conductors having the smallest cross sectional area as specified in **9.1.**

Conductors are inserted and disconnected five times, new conductors being used each time, except for the fifth time when conductors used for the fourth insertion are clamped at the same place.

For each insertion, the conductors are either pushed as far as possible into the terminal or are inserted so that adequate connection is obvious.

After each insertion, the conductor is subjected to a pull of 30 N, the pull is applied without jerks for 1 min, in the direction of the longitudinal axis of the conductor space. During the application of the pull, the conductor shall not come out of the screwless terminal. The test is then repeated with rigid stranded copper conductors having the largest and smallest cross sectional areas specified in 9.1 . These conductors, are, however, inserted and disconnected only once.

After the tests, neither the terminals nor the clamping means shall have worked loose and the conductors shall show no deterioration impairing their further use.

9.8.2 For screwless terminals designed for use with flexible conductors, compliance shall be checked with insulated conductors on one screwless terminal on each ceiling rose.

The test is carried out with flexible copper conductors, first with conductors having the largest cross sectional area, and then with conductors having the smallest cross-sectional area as specified in 9.1

Conductors are inserted and disconnected five times, new conductors being used each time, except for the fifth time when conductors used for the fourth insertion are clamped at the same place.

For each insertion, the conductors are either pushed as far as possible into the terminal or are inserted so that adequate connection is obvious.

After each insertion, the conductor is subjected to a pull of 10 N, the pull is applied without jerks, for 1 min, in the direction of the longitudinal axis of the conductor space.

During the application of the pull, the conductor shall not come out of the screwless terminal.

After the tests, neither the terminals nor the clamping means shall have worked loose and the conductors shall show no deterioration impairing their further use.

9.8.3 For screwless terminals designed for use with both rigid and flexible conductors, compliance shall be checked with insulated conductors on one screwless terminal of each ceiling rose.

The test is carried out with solid copper conductors, first with Conductors having the largest cross-sectional area, and then with conductors having the smallest cross-sectional area as specified in 9.1

Conductors are inserted and disconnected five times, new conductors being used each time, except for the fifth time when conductors used for the fourth insertion are clamped at the same place.

For each insertion, the conductors are either pushed as far as possible into the terminal or are inserted so that adequate connection is obvious.

After each insertion, the conductor is subjected to a pull of 30 N, the pull is applied without jerks, for 1 min, in the direction of the longitudinal axis of the conductor space. During the application of the pull, the conductor shall not come out of the screwless terminal.

The test is then repeated with rigid stranded copper conductors having the largest and smallest cross-sectional areas specified in 9.1 These conductors are, however, inserted and disconnected only once.

The test is then repeated with flexible copper conductors having the largest and smallest cross-sectional areas specified in 9.1. These conductors are however, inserted and disconnected only once and the pull is reduced to 10 N. After the tests, neither the terminals nor the clamping means shall have worked loose and the conductors shall show no deterioration impairing their further use.

9.9 screwless terminals shall withstand the electrical and thermal stresses occurring in normal use.

9.9.1 Compliance shall be checked by the tests described in 9.9.2 and 9.9.3, which are carried out on five screwless terminals of ceiling roses which have not been used for any other test.

Both tests shall be carried out with unused copper conductors.

9.9.2 The test is carried out loading the screwless terminals for 1 h with an alternating current, as specified in Table 2, when connected to 1 m long conductors having the cross-sectional areas as specified in the same table and using the type of conductor, i.e. rigid or flexible, applicable to the terminal. The test is carried out on each clamping unit.

Table 2 Test currents for test on screwless terminal

Cross-sectional area of the conductor	Test current
mm^2	A
1.0	10
1.5	15

During the test the current is not passed through the ceiling rose but only through the terminals.

Immediately after this period the voltage drop across each clamping unit is measured with rated current flowing. In no case shall the voltage drop exceed 15 mV. The measurements shall be made across each clamping unit and as near as possible to the place of contact.

NOTE

If the back connection of the terminal is not accessible the ceiling roses may be suitably prepared by the manufacturer. Care should be taken not to affect the behaviour of the terminals.

It is essential that care is taken to ensure that during the period of the test, including the measurements, the conductors and the measurements taps cannot move noticeably in the terminals.

9.9.3 The connections already subjected to the determination of the voltage drop specified in 9.9.2 are tested as follows.

During the test, a current equal to the test current value given in Table 2 is passed. The whole test arrangement, including the conductors, shall not be moved until the measurements of the voltage drop have been completed. The connections are subjected to 192 cycles, each cycle having a duration of approximately 1 h and being carried out as follows:

(a) with the current flowing, for approximately 30 min;

(b) for a further 30 min approximately, with no current flowing.

The voltage drop in each clamping unit is determined as described in 9.9.2 after each 24 cycles and after the 192 cycles have been completd. In no case shall the voltage drop exceed 22.5 mV.

After this test an inspection by normal or corrected vision without additional magnification shall show no changes evidently impairing further use such as cracks, deformations or the like. Furthermore the appropriate mechanical strength test described in 9.8 is repeated and all five terminals shall withstand this test.

10 CONSTRUCTION

10.1 Where protection against electric shock is provided by a cover screwing on to a base, or by similar attachment, such parts shall withstand the forces likely to be applied in normal use.

10.1.1 Compliance shall be checked by removing and replacing such parts by hand 10 times, tightening each time with a torque, in newton metres, equal to 0.03 times the outside diameter, in millimetres, of the part under test.

10.2 Provision shall be made on the cover for the entry and connection of a circular flexible cord having three conductors of 1.0 mm^2 and complying with Table 3 of SLS 879 : 1988. The means of entry shall be smooth and shall not cause abrasion or other damage to the sheath of the cord.

10.2.1 Compliances shall be checked by connection of the 3-core, 1.00 mm^2, flexible cord followed by inspection.

10.3 A device or means of insulating material, referred to herein as a strain relief, shall be provided, to prevent strain upon flexible conductors, connected to the ceiling rose, being transmitted to the terminals.

10.3.1 Compliance shall be checked by the following test. The ceiling rose shall be fitted with 2-core, 0.5 mm^2, circular sheathed flexible cord complying with Table 2 of SLS 879 : 1990. The terminal screws shall be tightened only sufficiently to stop the conductors slipping out of the terminals but not sufficiently to influence the effectiveness of the strain relief. The device shall then be tightened in a manner appropriate to its design, as in normal use. If the strain relief incorporates one or more screws, then these shall be tightened with a torque equal to two thirds of the appropriate value given in Table 1. If the strain relief relies upon the screwing together of related threaded parts, then such parts shall be tightened with a torque equal to 2/3 of the value specified in 10.1. The cord shall be subjected to a pull of 25 N for 1 min steadily applied in the direction of the axis of the cord in normal use. The test shall be applied three times, the force being removed after each test.

At the conclusion of the three tests, the conductors hall not have moved noticeably in the terminals and there shall be no damage to the conductor insulation such as to expose the conductor.

10.4 The ceiling rose shall be capable of carrying a load as follows:

a) ceiling roses classified in accordance with 5(b) (1) : 2.5 kg;

b) ceiling roses classified in accordance with 5(b) (2) : 2.5 kg or higher as nominated by the manufacturer.

10.4.1 Compliance shall be checked by inspection and by the following tests.

The ceiling rose shall be secured as in normal use to the underside of a horizontal surface and fitted with a 1.0 mm^2 circular twin flexible cord complying with Table 3 of SLS 879 : Part 2 : 1988. The terminal screws shall be tightened with the torque values for normal use specified in Table 1 and the strain relief device or means shall be tightened as specified in 10.3. A test load of 5 kg shall be suspended from the ceiling rose via the flexible cord and the equipment placed in an oven at a temperature of 40° C for a period of 24 h.

At the conclusion of the test the load shall still be supported, the ceiling rose shall remain in a usable condition and shall comply with 7 and, where appropriate, 10.1 and /or 10.2.

For ceiling roses classified in accordance with 5 (b) (2) the above test is carried out and then repeated with twice the load nominated by the manufacturer with no load being transmitted through the flexible cord.

At the conclusion of the test the load shall still be supported, the ceiling rose shall remain in a usable condition and shall comply with 7 and where appropriate, 10.1 and/ or 10.2.

11 SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS

11.1 Screwed connections, electrical and otherwise, shall withstand the mechanical stresses occurring in normal use. Screws transmitting electrical contact pressure shall screw into metal. Screws shall not be of metal which is soft and liable to creep.

Screws shall not be of insulating material if their replacement by a metal screw would affect compliance with 12.

Electrical connections shall be so designed that contact pressure is not transmitted through insulating material other than ceramic, unless there is sufficient resiliency in the metal parts to compensate for any possible shrinkage of the insulating material.

11.1.1 Compliance shall be checked by inspection and, for screws and nuts which are intended to be tightened during installation, or use, by the following test:

The screw shall be tightened and loosened :

a) 10 times for screws in engagement with a thread of insulating material, the screw being completely removed and replaced each time;

b) five times for nuts and other screws.

The requirements for the verification of terminals are given in Clause 9.

The test shall be made by means of a suitable test screwdriver, applying a torque as given in Table 1.

During the test no damage impairing the further use of the screwed connection shall occur.

It is essential that the shape of the blade of the test screwdriver suits the head of the screw being tested, and that the screw is nottightened in jerks.

11.2 Thread-forming screws shall not be used for the connection of current-carrying parts.

NOTE

Thread forming screws may be used to provide earthing continuity, provided that it is not necessary to disturb the connection in normal use and at least two screws are used for each connection.

Screws which make a mechanical connection between different parts of the accessory shall be locked against loosening, if the connection carries current.

Rivets used for current-carrying connections shall be locked against loosening, if these connections are subject to torsion in normal use.

11.2.1 Compliance shall be checked by inspection and by manual test to check tightness

NOTES

1. Spring washers and the like may provide satisfactory locking .

2. For rivets a non-circular shank or an appropriate notch may be sufficient.

11.3 Current-carrying parts shall be of brass, copper, phosphar-bronze or other metal at least equivalent with regard to its onductivity and resistance to corrosion.

NOTE

This requirement does not apply to screws, nuts, washers, clamping lates and similar parts of terminals, nor to parts used for earth continuity purposes.

11.3.1 Compliance shall be checked by inspection and by the relevant tests of clauses **15.2** and **15.6**

12 CREEPAGE DISTANCES AND CLEARANCES

Creepage distances and clearances shall be not less than the values shown in Table 3.

TABLE 3 - Creepage distances and clearances
(See Appendix A)

Dimensions in millimetres

Path under consideration	Clearance	Creepage
(1)	(2)	(3)
Between live parts of different polarity	2.0	2.5
Between live parts and other metal parts	2.5	2.5
Between live metal parts and the enclosure or the surface on which the accessory is mounted, unless the holes containing such live parts are filled in with a non-hygroscopic insulant of at least 1 mm thickness	3.0	--

12.1 Compliance shall be checked by inspection and measurement.

13 DIMENSIONS

13.1 Semi-recessed or flush ceiling roses shall be so designed that they can be fitted to the following relevant mounting boxes.

a) For circular ceiling roses the box shall be as specified in IEC 423.

b) For square ceiling roses the box shall be as specified in IEC 670 and SLS 963.

13.2 Surface mounting ceiling roses shall be provided with a minimum of two holes of at least diameter of 5.0 mm to accommodate mounting screws.

NOTE

The two holes should preferably be on centres of 50.8 mm or 60.3 mm nominal.

14 MARKING

14.1 Ceiling roses shall be marked with the following information on their main part, or one of the parts fixed to it in normal use:

a) rated voltage, i.e. 250 V;

b) rated current, specified by the manufacturer;

c) ceiling roses provided with screwless terminals for installation wiring shall be marked 'Not to be used in circuits with ratings exceeding 10 A';

d) name or trade mark of the manufacturer or responsible vendor;

14.2 When symbols are used, they shall be as follows:

amperes A
volts V

earth or

NOTE

It is recommended that, where practicable, first symbol should be used.

Line L
Neutral N

For the marking of the rated current and rated voltage, figures may be used alone. The figure for rated current shall be placed before or above that for the rated voltage and separated from the latter by a line, e.g. 6 A 250 V, or 6/250, or $\frac{6}{250}$.

14.3 Where any terminal is provided for particular connection purposes there shall be marking to indicate its intended use, (e.g. LOOP). Such marking shall not be placed on screws, washers or other easily removable parts.

14.4 Marking shall be easily legible and durable.

14.4.1 Compliance shall be checked by inspection and by the tset specified in 15.8.

Markings produced by an engraving or moulding process are deemed to comply without test.

14.5 Ceiling roses classified in accordance with clause 5(b) (ii) shall be provided with installation information regarding their safe working mechanical loads and the method of fixing to mounting surfaces.

14.5.1 Compliance shall be checked by inspection

NOTE

Attention is drawn to certification facilities offered by the SLSI. See the inside back cover of this standard.

15 TESTS

Uless otherwise specified in this specification ceiling roses shall be tested as delivered and installed, as in normal use, at an ambient temperature of 27 ± 3 °C.

15.1 Resistance to moisture and humidity, insulation resistance and electric strength

15.1.1 Ceramic parts of ceiling roses shall be sufficiently non-hygroscopic. The resistance to moisture shall not depend on glaze or varnish or similar surface treatment.

15.1.1.1 Compliance shall be checked by the following test. Initial mass of the ceiling rose shall be measured immediately. Ceramic parts shall be conditioned for 24 h at a temperature in the range of 15 °C to 35 °C and 45 per cent relative humidity to 75 per cent relative humidity and then immersed in distilled water for 24 h at a temperature of 27 ± 3 °C. At the end of this period the parts shall be removed and, after all visible water has been wiped from the surface, the mass of the parts shall not have increased by more than 0.5 per cent.

15.1.2 Plastic parts of ceiling roses shall be sufficiently non-hygroscopic. The resistance to moisture shall not depend on glaze or varnish or similar surface treatment.

15.1.2.1 Compliance shall be checked by the following test. Plastics parts shall be conditioned for 24 h at a temperature in he range of 15 °C to 35 °C and 45 per cent relative humidity to 75 per cent relative humidity and then immersed in distilled water for 48 h at a temperature of 27 ± 3 °C. At the end of this period the parts shall be removed and, after all visible water has been wiped from the surface,there shall be no distortion, swelling, delamination or other deformation which would impair the function of the ceiling rose.

15.1.3 Complete ceiling roses shall be proof against humid conditions that may occur in normal use.

15.1.3.1 Compliance shall be checked by the humidity treatment described in this sub-clause follwed immediately by the measurement of the insulation resistance and by the electric strength tests described in 15.1.5.and 15.1.6.

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

The humidity treatment shall be carried out in a humidity cabinet containing air with a relative humidity maintained between 91 per cent and 95 per cent. The temperature of the air, at all places where samples can be located, shall be maintained within 1 °C any convenient value t between 20 °C and 30 °C.

Before being placed in the humidity cabinet, the ceiling roses shall be brought to a temperature between t °C and t+4 °C. Ceiling roses shall be kept in the cabinet for 48 h.

After this treatment, the ceiling roses shall show no damage that affects compliance with this standard.

NOTES

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

2. Relative humidity between 91 per cent and 95 per cent 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 that is thermally insulated.,

15.1.4 Insulation shall be effective between:

a) live parts of opposite polarity;
b) live parts of opposite polarity connected together, and other metal parts insulated therefrom, including earthed metal parts.

15.1.4.1 Compliance shall be checked by the tests described in 15.1.5 and 15.1.6

15.1.5 The insulation resistance shall be measured with a d.c. voltage of approximately 500 V, the measurement being made 1 min after the application of the voltage consecutively between the points defined in 15.1.4. The insulation resistance shall be not less than 5 megaohms.

15.1.6 Immediately after the test specified in 15.1.5 and a.c. voltage of substantially sine-wave form, with a frequency of 50 Hz and with an r.m.s. value of 2000 ± 60 V. shall be applied for 1 min between the points defined in.

15.1.4. Initially not more than half the prescribed voltage shall be applied, then it shall be raised rapidly to the full value. No breakdown or flashover shall occur. Glow discharges without drop in voltage are ignored.

15.2 **Temperature rise**

15.2.1 Ceiling roses shall be so designed and constructed that, when installed and used as in normal use, the temperature rise of current-carrying parts is not excessive.

15.2.1.1 Compliance shall be checked by the tests described in 15.2.2 and 15.2.3.

15.2.2 Ceiling roses shall be mounted, in the manner indicated by the classification of 5.1 on the underside of a horizontal surface comprising a piece of plywood approximately 10 mm thick and 500 mm x 500 mm square, painted matt white. Any necessary mounting box or device shall be used in a manner typical of normal installation practie and the ceiling rose shall be located in the centre of the mounting surface.

All terminals, other than those intended for the exclusive connection of flexible cords, shall be wired with 1.5 mm^2 flat twin with circuit protective conductor cable complying with Table 5 of SLS 733 : 1986

Terminals intended for the connection of flexible cords shall be wired with 0.75 mm^2 circular twin flexible cord complying with Table 16 SLS 879 Part 1 : 1988.

The length of the specified cables or cords, outside the ceiling rose, shall be at least 1.0 m for cable and 0.5 m for cords.

The following circuit connections shall be made:

a) incoming supply : 1.5 mm² cable;
b) outgoing supply : 1.5 mm² cable;
c) switch connections : 1.5 mm² cable;
d) load connections : 0.75 mm² flexible cord.

Terminal screws shall be tightened with the torque values for normal use given in Table 1.

15.2.3 Loads shall then be connected to the cables referred to at the end of 15.2.2 to provide two test conditions as follows.

Method 1 :

a) connect to supply source;

b) connect to a resistive load as follows:
i) for screw-type terminals connect to a 16 A resistive load;
ii) for screwless terminals connect to a 10 A resistive load;

c) open circuit* ;

d) open circuit.

Method 2 :
a) connect to supply source;

b) connect to a resistive load as follows:
i) for screw-type terminals connect to a 10 A resistive load;
ii) for screwless terminals connect to a 4 A resistive load;

c) close-circuit* ;

d) connect to a 6 A resistive load.

The temperature rise of any current-carrying terminal, on load, shall not exceed 45 °C in either test. The test shall continue until stability is reached, stability being taken as not more than 1 °C rise within 1 h.

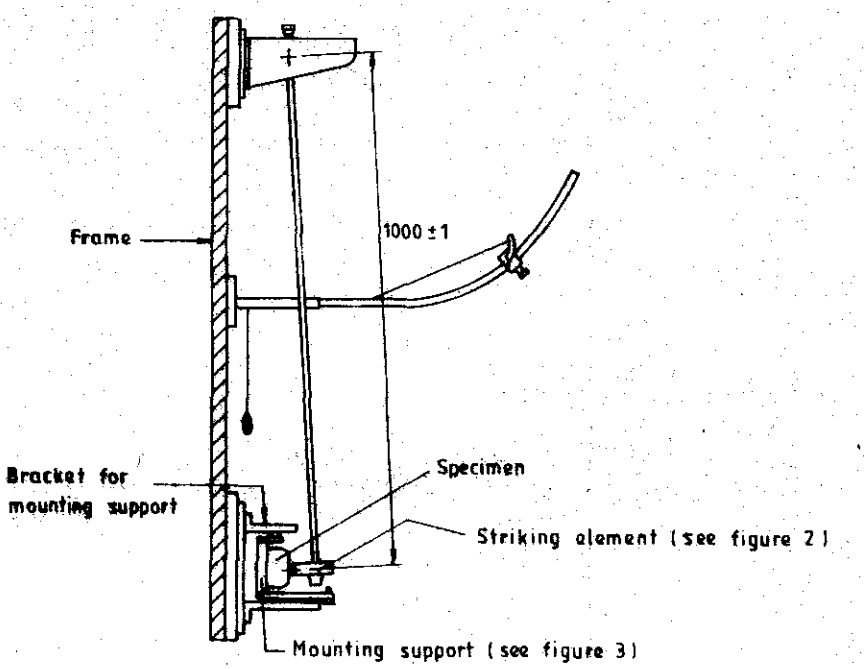
15.3 Mechanical strength

15.3.1 Ceiling roses shall have adequate mechanical strength to withstand the stresses imposed during installation and use.

15.3.1.1 Compliance shall be checked by the tests described in 15.3.3 using the apparatus described in 15.3.2 .

15.3.2 Ceiling roses are tested with the impact test apparatus shown in Figure 1.

* Except that, in a ceiling rose not intended for the connection for a switching circuit, item (c) is omitted.



NOTE. This drawing is not intended to govern design except as regards the dimensions and specific requirements shown.

Dimensions in millimetres

FIGURE 1 - Pendulum impact test apparatus

The pendulum consists of a steel tube suspended in such a way that it swings only in a vertical plane. A striking element of 0.15 kg is rigidly fixed to the lower end with its axis 1 m from the axis of suspension.

The striking element has a hemispherical face made of polyamide having a Rockwell hardness of R 100*, or hornbeam, and a radius of 10 mm (See Figure 2).

* Except that, in a ceiling rose not intended for the connection for a switching circuit, item (c) is omitted.

The design of the apparatus is such that a force of between 1.9 N and 2 N has to be applied to the face of the striking element to maintain the pendulum in a horizontal position.

Ceiling roses are mounted in the centre of a sheet of plywood, 8 mm thick and 175 mm square, secured at its top and bottom edges to a mounting support shown in Figure 3.

The mounting support (see Figure 3), having a mass of 10 ± 1 kg, is mounted on a rigid bracket by means of pivots. The bracket is mounted on a frame which is fixed to a solid wall. The design of the rigid mounting is such that:

a) the ceiling rose can be so placed that the point of impact lies in the vertical plane through the axis of the pivot;

b) the ceiling rose can be moved horizontally and turned about n axis perpendicular to the surface of the plywood;

c) the plywood can be turned about a vertical axis.

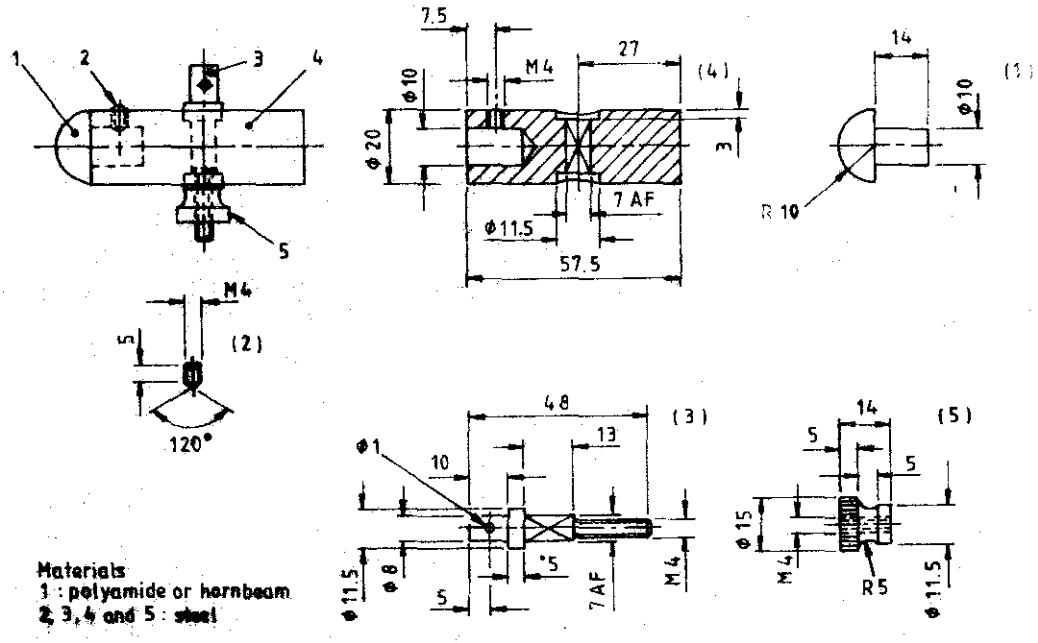
15.3.3 Surface type ceiling roses shall be mounted on the plywood.

Flush or semi-recessed type ceiling roses and their boxes, if any, shall be placed in a block of hardwood which is itself fixed to the sheet of plywood. In the wood used for the block, the direction of the wood fibres shall be perpendicular to the direction of impact. To simulate the condition of normal use the rear of the plate is flush with the surface of the block. The front edge of the box shall be between 2.5 mm and 5 mm behind the face of the block.

For all tests the striking element shall fall from a height of 150 mm measured vertically between the point of impact on the ceiling rose and the face of the striking element at the point of release.

A total of 10 blows shall be applied to points evenly distributed over the accessible external surface of the ceiling rose, excluding knock-outs.

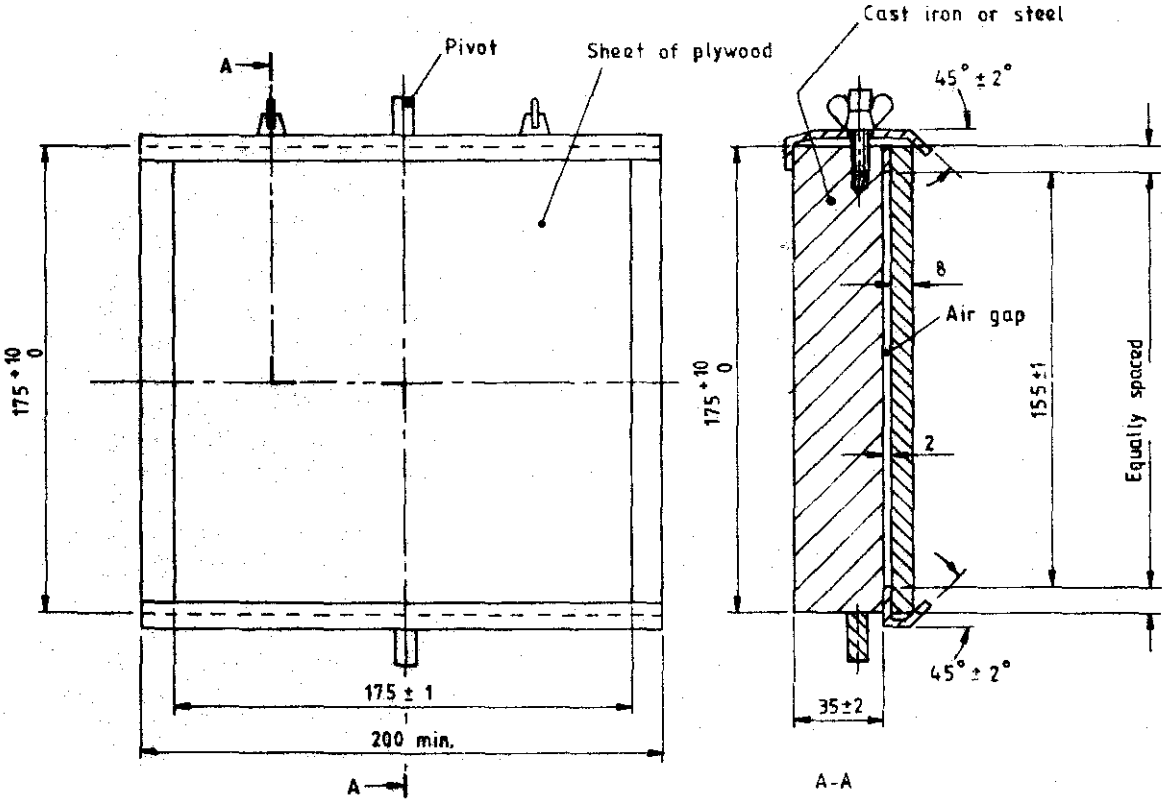
During the test, cracks may appear and small pieces may become detached, but provided the ceiling rose cover can be removed and replaced and still complies with clauses 7 and 15.1 the ceiling rose is deemed to comply with 15.3.1.



NOTE. This drawing is not intended to govern design except as regards the dimensions and specific requirements shown.

Dimensions in millimetres

FIGURE 2 - Constructional details of striking element



NOTE. This drawing is not intended to govern design except as regards the dimensions and specific requirements shown.

Dimensions in millimetres

FIGURE 3 - Constructional details of mounting support for test specimens

15.4 Resistance to heat

15.4.1 Ceiling roses shall be resistant to heat.

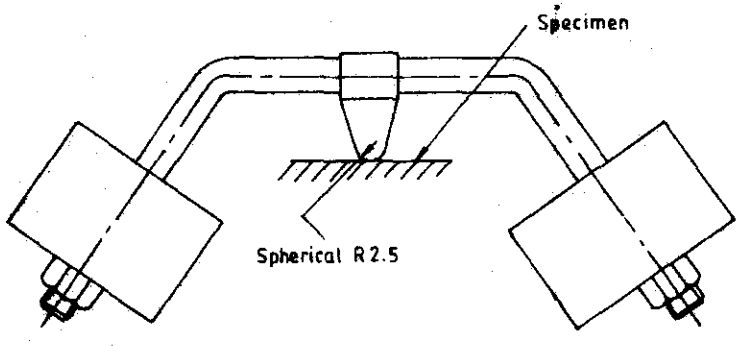
15.4.1.1 Compliance shall be checked by the tests described in 15.4.2, 15.4.3 and 15.4.4.

15.4.2 The ceiling roses shall be kept for 1 h in a heating cabinet at a temperature of 100 ± 2 °C.

During the test, the ceiling roses shall not undergo any change impairing their further use and sealing compund shall not flow to such an extent that live parts are exposed. A slight displacement of the sealing compound shall be disregarded.

After the test the ceiling rose shall still comply with clause 7.

15.4.3 Parts of insulating material necessary to retain current-carrying parts shall be subjected to a ball pressure test by means of the apparatus shown in Figure 4. The surface of the part to be tested shall be placed in a horizontal position and a steel ball of 5 mm diameter shall be pressed against this surface with a force of 20 N.



NOTE. This drawing is not intended to govern design except as regards the dimension and specific requirements shown.

Dimensions in millimetres

FIGURE 4 - Ball pressure test apparatus

When it is not possible to carry out the test on the ceiling rose itself the test shall be carried out on a specimen of the same material not less than 2 mm thick.

The tests shall be made in a heating cabinet at a temperature of 125 ± 2 °C.

The underside of the part being tested shall be supported to withstand the test force and to minimize the risk of distortion.

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

The part to be tested shall be placed in the heating cabinet for a period of 10 min before the test load is applied.

After 1 h, the ball shall be removed from the specimen which shall then be cooled down by immersion for at least 10 seconds in water at approximately room temperature. The diameter of the impression caused by the ball shall be measured and shall not exceed 2 mm.

15.4.4 Parts of insulating material not necessary to retain current-carrying parts in position, even though they are in contact with them, shall be subjected to a ball pressure test as described in 15.4.3 but the test shall be made at a temperature of
75 ± 2 °C.

15.5 Resistance to abnormal heat fire and tracking

Accessories shall be proof against abnormal heat, fire and tracking.

Compliance shall be checked by the tests described in 15.5.2 and 15.5.3.

The tests shall not be made on parts of ceramic material or metal.

15.5.1 *Glow-wire test*

15.5.1.1 General - The glow-wire test is applied to ensure that an electrically heated test wire under defined test conditions does not cause ignition of insulating parts or to ensure that a part of any insulating material which might be ignited by the heated test wire under defined conditions has a limited time to burn without spreading fire by flame or burning parts or droplets falling down from the tested part.

If the test specified is required to be made at more than one place on the same specimen, it is essential that care is taken to ensure that any deterioration caused by previous tests does not affect the result of the test to be made.

NOTE :

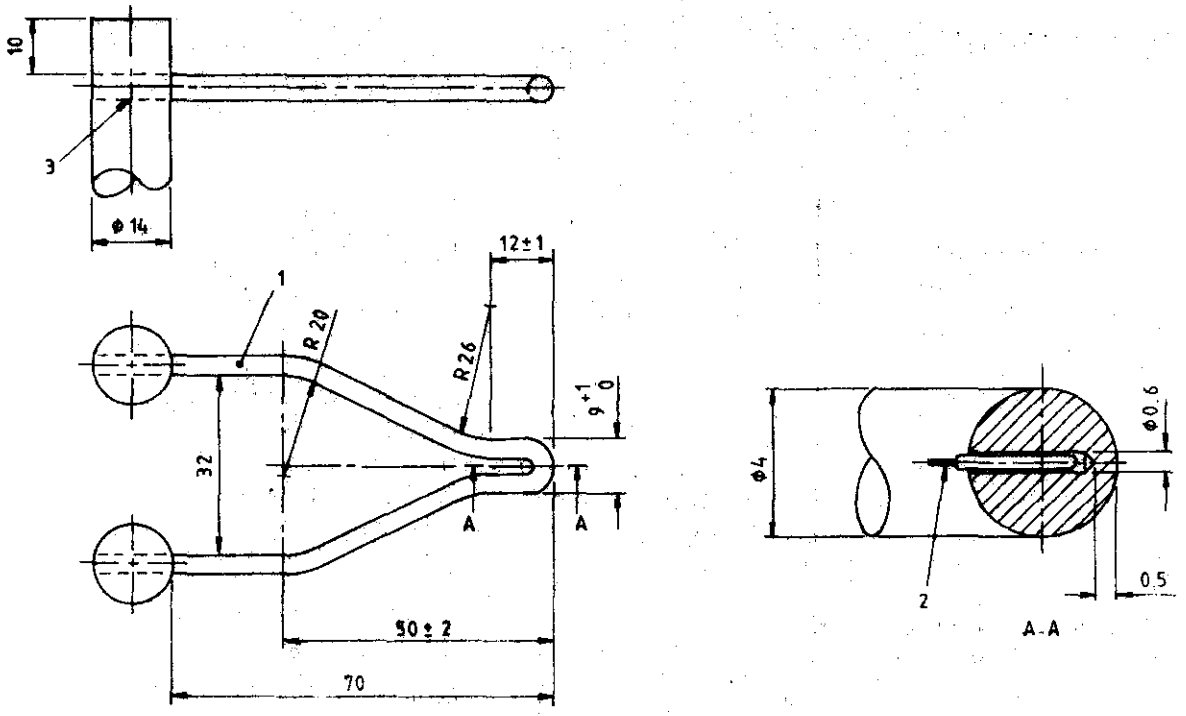
These tests should not be carried out on small parts unlikely to be subjected to abnormal heat and whose failure to pass these tests would not materlly affect the safety of the accessory.

15.5.1.2 Test specimen - The test specimen shall be either a complete accessory, or, if the test cannot be made on the complete accessory, a suitable part of one cut out for the purpose of the test. The test specimen is conditioned for 24 h at a temperature in the range 15 °C to 35 °C, and 45 per cent r.h. to 75 per cent r.h. The test is made on one specimen and, in case of doubt, is repeated on two further specimens.

15.5.1.3 Test apparatus

a) Glow wire, consisting of a specified loop of 80/20 Ni/Cr wire, (See Figure 5). When forming the loop it is essential that care is taken to avoid fire cracking of the tip.

The glow wire is electrically heated, the current necessary for heating the tip to a temperature of 960 °C shall be between 120 A and 150 A.



Dimensions in millimetres

Key
1. Glow wire, brazed to 3
2. Thermocouple
3. Brass studs (37% Cu)

FIGURE 5 - Glow wire with thermocouple

b) Sheathed finewire thermocouple for temperature measurement, having an outside diameter of 0.5 mm. The wires consist of nickel-chromium and nickel-aluminium, the welding being located inside the sheath.

The sheath consists of a refractory metal, resistant to a temperature of at least 960 °C. The thermocouple is arranged in a 0.6 mm diameter pocket hole drilled in the tip of the glow wire as shown in section A-A of Figure 5.

The thermo-voltages shall comply with the international thermocouple tables given in IEC 584 Part 1 : 1977, the characteristics being practically linear. The cold connection is kept in melting ice or in a compensation box.

c) Voltmeter, for measuring the thermo-voltage, having an accuracy of class 0.5, as specified in IEC 51 Part 2 : 1984.

d) The test apparatus shall be so designed that the glow wire is kept horizontal and that a force of 1 N is maintained on the specimen when either the glow wire or the specimen is moved horizontally towards the other over a distance of at least 7 mm.

NOTE

An example of the test apparatus is shown in Figure 6.

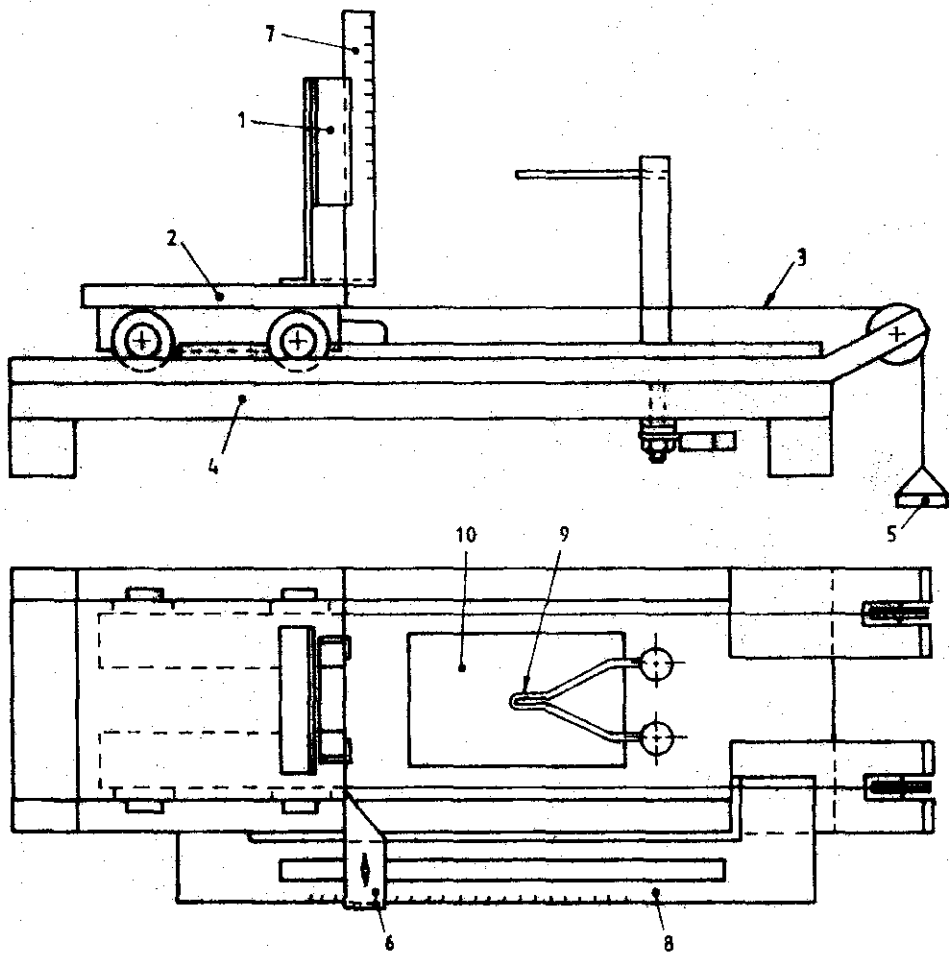
15.5.1.4 Procedure : The test apparatus is placed in a draught-free room in subdued light so that any flame is visible.

Before starting the test, the thermocouple is calibrated at a temperature of 960 °C determined by the melting of a 2 mm x 2 mm chip of pure silver foil (99.8 per cent) having a thickness of 0.06 mm which is placed on the upper surface of the tip of the heated glow wire. The temperature of 960 °C is reached when the foil lying flat on the surface just melts.

Allowance is made for the fact that the thermocouple is able to compensate by an axial movement for thermal elongation of the glow wire.

The specimen is positioned during the test in the most unfavourable position of its normal use (normally with the surface tested in a vertical position). The tip of the glow wire is applied to the specified surface of the test sample according to the intended use under which a heated or glowing element may come into contact with the test sample.

A piece of white pine-board approximately 10 mm thick covered with a single layer of wrapping tissue is positioned 200 mm directly beneath the glow wire where it is applied to the specimen.



Key
1. Support for sample
2. Carriage
3. Pulling string
4. Base plate
5. Weight
6. Adjustable stop
7. Scale for flame height
8. Scale for depth of penetration
9. Glow wire with thermocouple
10. Opening in base plate to pass molten or glowing particles

FIGURE 6 - Glow-wire test apparatus

NOTE

Wrapping tissue paper as defined in 6.86 of ISO 4046 : 1978 may be used i.e. a soft and strong light-weight wrapping paper of grammage (basic weight) generally between 12 g/m² and 30 g/m² It is primarily intended for protective packaging of delicate articles and for gift wrapping.

The glow wire is electrically heated to the appropriate test temperature (as given in Table 4) which is measured with the calibrated thermocouple. It is essential that care is taken to ensure that this temperature and the heating current are constant for 60 seconds before starting the test and that no heat radiation influences the specimen during this period.

The tip of the glow wire is brought in contact with the specimen and applied for 30 $\pm$ 1 seconds, the heating current being maintained during this period.

The movement of the tip of the glow wire through the test specimen to which it is pressed shall be limited to 7 mm. If possible, the tip of the glow wire is applied to flat surfaces and not to grooves, knock-outs, narrow recesses or sharp edges. The tip of the glow wire is applied where the section is the thinnest but not less than 15 mm from the upper edge of the specimen.
After 30 $\pm$ 1 seconds the glow wire is removed from the specimen any movement of air which may affect the results of the test and any further heating of the specimen being avoided.

NOTE

It is necessary to clean the tip of residue of insulating material after each test, e.g. by means of a brush.

15.5.1.5 Measurement and observations : During the application time of the glow wire and during a period of 30 seconds from the end of the application time the specimen and the surrounding parts, including the layer under the specimen, are observed.

The time when ignition of the specimen and/or the time when flames extinguish during or after the application time are measured and recorded.

15.5.1.6 Evaluation of the test results : The specimen is regarded as having passed the glow-wire test if there is no visible flame and no sustained glowing, or if flames and glowing at the specimen extinguish within 30 seconds after the removal of the glow wire. There shall be no burning of the tissue paper or scorching of the board.

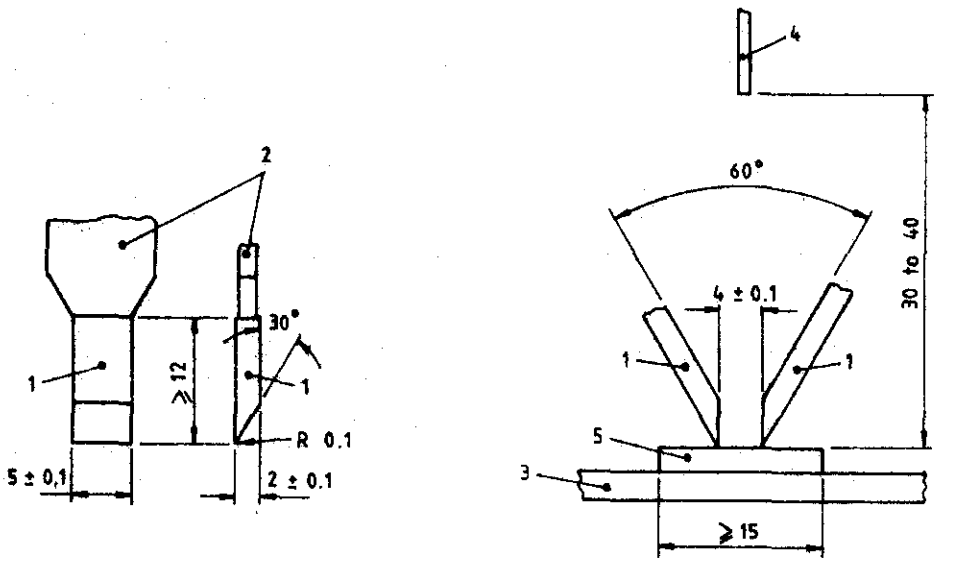
15.5.1.7 Application of glow-wire test : The glow-wire test shall be applied to parts made of insulating material at the test temperatures given in Table 4.

TABLE 4 - Application of glow-wire test

Part	Temperature of glow wire
-	°C
(1)	(2)
Parts necessary to retain live parts in position	850 ± 15
Parts not necessary to retain live parts in position (although they may be in contact with live parts)	650 ± 10

15.5.2 *Tracking test*

A flat surface of the part to be tested, if possible at least 15 mm x 15 mm and 3 mm thick, is placed in a horizontal position. Two electrodes of platinum with dimensions shown in Figure 7 are placed on the surface of the specimen as shown in the Figure 7 so that the rounded edges are in contact with the specimen over the whole length . The force exerted on the surface by each electrode is 1 ± 0.05 N.



(a) Electrode

(b) Electrode arrangement

Key
1. Platinum electrode
2. Brass extension
3. Support
4. Tip of dropping device
5. Specimen

Dimensions in millimetres

FIGURE 7 - Arrangement and dimensions of the electrodes for the tracking test

The electrodes are connected to a 50 Hz supply of substantially sinusoidal waveform with a no-load voltage of 175 V. The short circuit current is adjusted by means of a variable resistor to 1 ± 0.1 A with Cos = 0.95 ± 0.05. An overcurrent relay which will trip when 0.5 A or more has persisted for 2 seconds is included in the circuit.

The surface of the specimen is wetted by allowing drops of a solution of ammonium chloride in distilled water to fall centrally between the electrodes. The solution shall have a resistivity of 395 ± 5 ohm. cm at 23 ± 1 °C corresponding to a concentration of 0.1 per cent . The drops shall have a volume of 20 + 3 mm^3 or 20 - 0 mm^3 and shall fall a distance of 35 ± 5 mm.

The time interval between one drop and the next shall be 30 ± 5 seconds.

No flashover or breakdown between the electrodes shall occur before 50 drops have fallen.

The test shall be made at three places on the specimen.

NOTE

It is essential that care is taken to ensure that the electrodes are clean, correctly shaped and correctly positioned before each test is started.

15.6 Resistance to excessive residual stresses and to rusting

15.6.1 Contacts and other functional parts of copper or copper alloy shall be resistant to failure in use due to brittleness.

Parts made from copper or copper alloy containing not less than 80 per cent copper shall be assumed to comply. For copper alloys containing less than 80 per cent copper compliance shall be checked by the following test.

The part is degreased in a suitable alkaline degreasing solution or organic solvent, then immersed in an aqueous solution of mercurous nitrate containing 10 g of $Hg_2(NO_3)_2$ and 10 ml of HNO_3 (relative density 1.42) per litre of solution for 30 min at a temperature of 27 ± 3 °C.

NOTE

Attention is drawn to the fact that due precautions should be taken when using these liquids as they are toxic.

After the treatment the sample is washed in running water, any excess mercury wiped off and the sample is immediately visually examined. There shall be no cracks visible with normal or corrected vision without additional magnification.

15.6.2 *Ferrous parts shall be adequately protected against rusting.*

15.6.2.1. Compliance shall be checked by the following test:
All grease is removed from the parts to be tested, by immersion in trichloroethane or an equivalent degreasing agent for 10 min. The parts are then immersed for 10 min. in a 10 per cent solution of ammonium chloride in water at a temperature of 27 ± 3 °C.

Without drying, but after shaking off any drops, the parts are placed for 10 min in a box containing air saturated with moisture at a temperature of 27 ± 3 °C. After the parts have been dried for 10 min in a heating cabinet at a temperature of 100 ± 5 °C, their surfaces shall show no signs of rust.

NOTES

1. Traces of rust on sharp edges and any yellowish film removable by rubbing should be ignored.

2. For small helical springs and the like, and for parts exposed to abrasion, a layer of grease may provide sufficient protection against rusting. Such parts are only subjected to the test if there is doubt about the effectiveness of the grease film and the test should then be made without previous removal of the grease.

15.7 Measurement of creepage distance and clearance

The methods of measuring creepage distances and clearances to be used in interpreting the requirements of clause 12 are indicated in Fig.8.

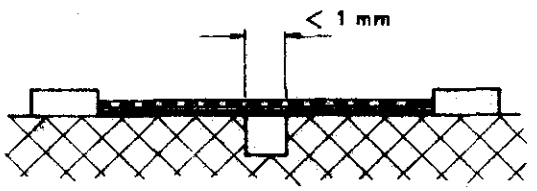
The figures do not show the differentiation between gaps and grooves or between types of insulation.

The following assumptions are made.

a) A groove may have parallel, converging or diverging sides.

b) Any groove having diverging sides, a minimum width exceeding 0.25 mm, a depth exceeding 1.5 mm and a width at the bottom equal to, or greater than, 1 mm, is regarded as an air gap (see Fig.8 (h)).

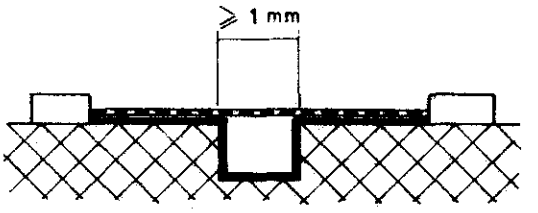
c) Any corner including an angle less than 80° is assumed to be bridged with an insulating link of 1 mm width (0.25 mm for dirt-free situations) moved into the most unfavourable position (see Fig.8 (c)).



Path under consideration includes a parallel or converging-sided groove of any depth with a width less than 1 mm.

Creepage distance and clearance are measured directly across the groove as shown.

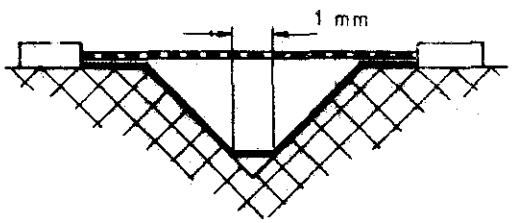
(a)



Path under consideration includes a parallel sided groove of any depth and equal to, or more than, 1 mm wide.

Clearance is the 'line of sight' distance. Creepage path follows the contour of the groove.

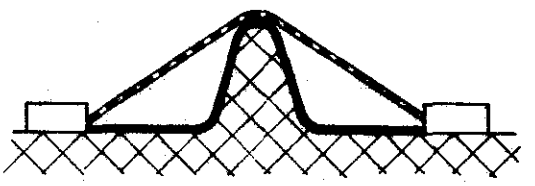
(b)



Path under consideration includes a V-shaped groove with internal angle of less than 80° and with a width greater than 1 mm.

Clearance is the 'line of sight' distance. Creepage path follows the contour of the groove but 'short-circuits' the bottom of the groove by 1 mm (0.25 mm for dirt-free situations) link.

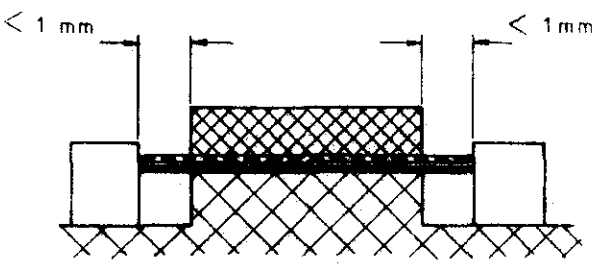
(c)



Path under consideration includes a rib.

Clearance is the shortest direct air path over the top of the rib. Creepage path follows the contour of the rib.

(d)



Path under consideration includes an uncemented joint with grooves less than 1 mm (0.25 mm for dirt-free situations) wide on each side.

Creepage and clearance path is the 'line of sight' distance shown.

(e)

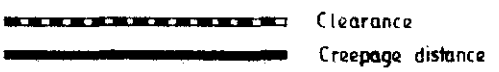
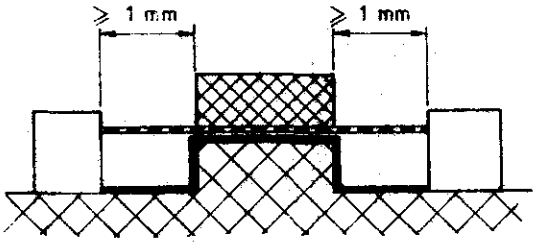


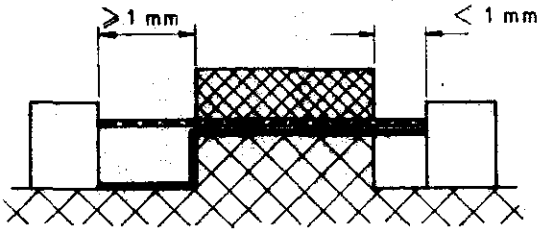
FIGURE 8



Path under consideration includes an uncemented joint with grooves equal to, or more than 1 mm wide on each side.

Clearance is the 'line of sight' distance. Creepage path follows the contour of the grooves.

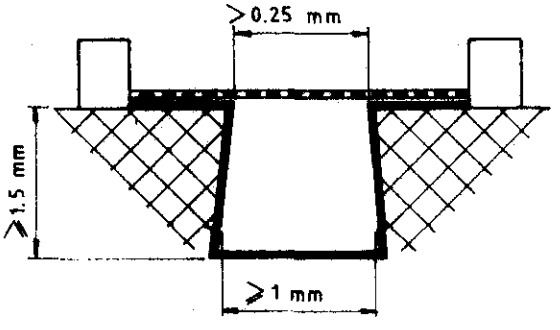
(f)



Path under consideration includes an uncemented joint with a groove on one side less than 1 mm wide and the groove on the other side equal to, or more than, 1 mm wide.

Clearance and creepage parths are as shown.

(g)

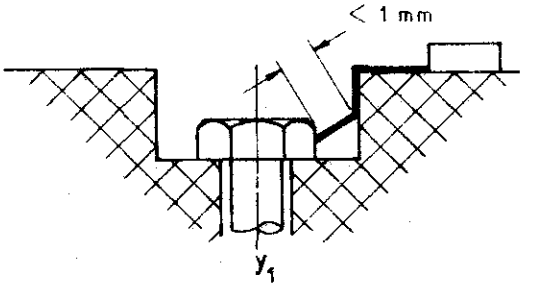


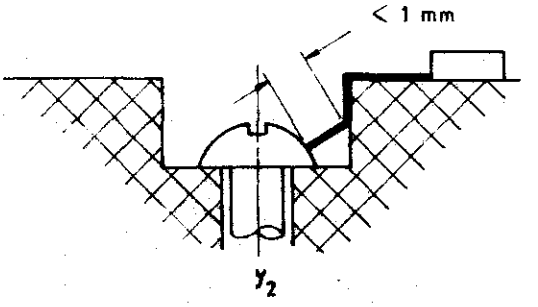
Path under consideration includes a diverging sided groove equal to, or more than, 1.5 mm deep and more than 0.25 mm wide at the narrowest part and equal to, or more than, 1mm at the bottom.

Clearance is the 'line of sight' distance. Creepage path follows the contour of the groove.

Fig. 8c applies as well to an internal corner if the angle is less than 80°.

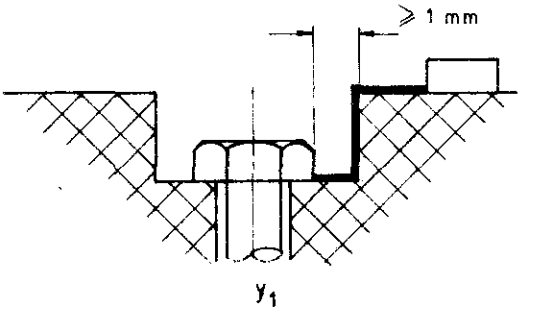
(h)

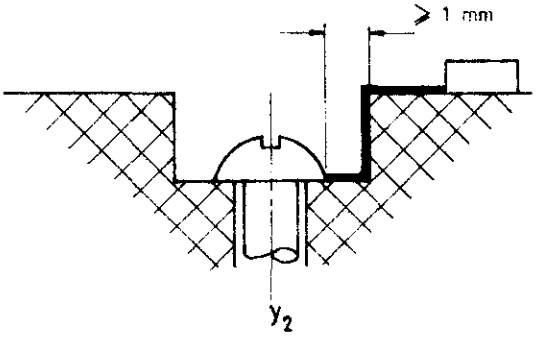




Gap between head of screw and wall of recess too narrow to be taken into account.

(j)





Gap between head of screw and wall of recess wide enough to be taken into account.

Clearance

Creepage distance

FIGURE 8

d) Where the distance across the top of a groove is 1 mm (0.25 mm for dirt-free situations) or more, no creepage distance exists across the air space (see Fig.8 (b)).

e) A creepage path is assumed not to exist if there is an air gap, as defined in item b) above, exceeding 0.25 mm.

f) Creepage distances and clearances measured between parts moving relative to each other are measured when these parts are in their most unfavourable stationary positions.

g) A computed creepage distance is never less than a measured clearance.

h) Any air gap less than 1 mm wide (0.25 mm for dirt-free situations) is ignored in computing the total clearance.

15.8 Durability of Marking

Durability of marking shall be tested by rubbing the markings for 15 s with a cloth soaked in water and again for 15 s with the cloth soaked in petroleum spirit. The marking shall remain legible.

APPENDIX A
COMPLIANE OF A LOT

A.1 Lot
In any consignment, all ceiling rosees of the same type belonging to one batch of manufacturer or supply shall constitute a lot.

A.1.1 Samples shall be tested from each lot for ascertaining conformity to the requirements of this specification.

A.1.2 The number of ceiling roses to be selected from a lot shall be in accordance with the following Table.

TABLE 5 - Scale of sampling

No. of ceiling roses in the lot (1)	No. of roses to be selected (2)	Sub-sample size (3)
Up to 250	10	2
251 to 500	12	3
501 to 1200	14	4
1200 to 3000	20	5
3000 and above	32	6

A.1.3 The ceiling roses shall be selected at random. In order to ensure randomness of selection random numbers as given in SLS 426 shall be used.

A.2 Number of tests

A.2.1 Each ceiling rose selected as in **A.1.2** shall be inspected for marking requirements.

A.2.2 Each ceiling rose inspected as in **A.2.1** shall be tested for requirements given in **4, 7, 8, 11.1, 12,** and **13.**

A.2.3 A sub sample of size given as in column 3 of the table shall be tested for **15.1, 15.3** and any other important requirements as given in this specification.

A.3 Criteria for conformity

A lot shall be declared as conforming to the requirements of this specification.

A.3.1 Each ceiling rose inspected as in **A.2.1** satisfies marking requirements.

A.3.2 Each ceiling rose tested as in **A.2.2** and **A.2.3** satisfies the relevant requirements.

APPENDIX B
TYPE TESTING

B.1 Type test
A test,or a series of tests, conducted on a sample, consisting of one or more similar items, to determine whether or not ceiling roses, manufactured to the same design as the sample,are capable of meeting the requirements.

B.2 All tests in this specification are type tests.

B.3 A total sample of nine ceiling roses shall be submitted to inspection and tests in the following order of clauses:

a) three ceiling roses : 6 to 10, 11 and 12 (mainly inspection);
b) three ceiling roses : 7 to 11, 15.1.3 to 15.1.6 and 15.3 (general tests);
c) three ceiling roses : 15.1.1, 15.1.2, 15.4, 15.5 and 15.6 (material tests).

B.4 If no ceiling rose fails in the tests specified in B.3, then ceiling roses of that type shall be deemed to comply with this spcification.

If one ceiling rose fails in any individual test, or series of tests, specified in B.3 and that ceiling rose can be shown to be not representative of normal design or production, then a seperate set of three ceiling roses shall be submitted to the relevant test or series of tests specified in B.3. If no ceiling rose fails in this re-test then ceiling roses of that type shall be deemed to comply with this standard.

If more than one ceiling rose fails in the tests specified in B.3 then ceiling roses of that type shall be deemed not to comply with this standard.

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